

# Publiceerbare aanvraag/melding omgevingsvergunning

Formuliertersie  
2020.01

## Aanvraaggegevens

### Algemeen

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aanvraagnummer                  | 7943379                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Aanvraagnaam                    | Aanvraag bouw uitkijktoren Windpark Streepland                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Uw referentiecode               | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Ingediend op                    | 17-07-2023                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Soort procedure                 | Onbekend                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Projectomschrijving             | Per ongeluk Aanvraag 7853019 ingetrokken. Dus bij deze nogmaals: N.a.v. een vooroverleg heeft het college van gemeente Moerdijk op 5 juni 2022 besloten dat er een omgevingsvergunning mag worden ingediend voor de aanleg van een uitkijktoren nabij Windpark Streepland. Initiatiefnemer is voornemens om naast een waterpoel in de vorm van een zwaluw een uitkijktoren, genaamd Flying High in de vorm van een zwaluw, te realiseren. Naar de uitkijktoren toe wordt er een educatief wandelpad gerealiseerd. |
| Opmerking                       | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Gefaseerd                       | Nee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Blokkerende onderdelen weglaten | Nee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Kosten openbaar maken           | Nee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Bijlagen die later komen        | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bijlagen n.v.t. of al bekend    | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Bevoegd gezag</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Naam:                           | Gemeente Moerdijk                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bezoekadres:                    | Pastoor van Kessellaan 15<br>4761BJ Zevenbergen                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Postadres:                      | Postbus 4<br>4760AA Zevenbergen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Telefoonnummer:                 | 140168                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| E-mailadres:                    | VH@moerdijk.nl                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Website:                        | www.moerdijk.nl                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Contactpersoon:                 | team VVTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## Overzicht bijgevoegde modulebladen

Aanvraaggegevens

Locatie van de werkzaamheden

Werkzaamheden en onderdelen

Overig bouwwerk bouwen

- Bouwen

Handelen in strijd met regels ruimtelijke ordening

- Handelen in strijd met regels ruimtelijke ordening

Bijlagen





# Locatie

## 1 Kadastraal perceelnummer

|                                                                                            |                                                                        |
|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Burgerlijke gemeente                                                                       | Moerdijk                                                               |
| Kadastrale gemeente                                                                        | Zevenbergen                                                            |
| Kadastrale sectie                                                                          | O                                                                      |
| Kadastraal perceelnummer                                                                   | 2559                                                                   |
| Bouwplannaam                                                                               | -                                                                      |
| Bouwnummer                                                                                 | -                                                                      |
| Gelden de werkzaamheden in deze<br>aanvraag/melding voor meerdere<br>adressen of percelen? | <input type="checkbox"/> Ja<br><input checked="" type="checkbox"/> Nee |



# Bouwen

## Overig bouwwerk bouwen

### 1 De bouwwerkzaamheden

Wat is er op het bouwwerk van toepassing?

- ☐ Het wordt geheel vervangen  
☐ Het wordt gedeeltelijk vervangen  
☒ Het wordt nieuw geplaatst

Eventuele toelichting

-

Hebt u voor deze bouwwerkzaamheden al eerder een vergunning aangevraagd?

- ☐ Ja  
☒ Nee

### 2 Plaats van het bouwwerk

Waar gaat u bouwen?

Terrein

### 3 Bruto vloeroppervlakte bouwwerk

Verandert de bruto vloeroppervlakte van het bouwwerk door de bouwwerkzaamheden?

- ☒ Ja  
☐ Nee

Wat is de bruto vloeroppervlakte van het bouwwerk in m2 voor uitvoering van de bouwwerkzaamheden?

0

Wat is de bruto vloeroppervlakte van het bouwwerk in m2 na uitvoering van de bouwwerkzaamheden?

250

### 4 Bruto inhoud bouwwerk

Verandert de bruto inhoud van het bouwwerk door de bouwwerkzaamheden?

- ☒ Ja  
☐ Nee

Wat is de bruto inhoud van het bouwwerk in m3 voor uitvoering van de bouwwerkzaamheden?

0

Wat is de bruto inhoud van het bouwwerk in m3 na uitvoering van de bouwwerkzaamheden?

2500

### 5 Oppervlakte bebouwd terrein

Verandert de bebouwde oppervlakte van het terrein na uitvoering van de bouwwerkzaamheden?

- ☒ Ja  
☐ Nee

Wat is de bebouwde oppervlakte van het terrein in m2 voor uitvoering van de bouwwerkzaamheden?

0

Wat is de bebouwde oppervlakte van het terrein in m2 na uitvoering van de bouwwerkzaamheden?

185

## 6 Seizoensgebonden en tijdelijke bouwwerken

Gaat het om een seizoengebonden bouwwerk?

☐ Ja

☒ Nee

Gaat het om een tijdelijk bouwwerk?

☐ Ja

☒ Nee

## 7 Gebruik

Waar gebruikt u het bouwwerk en/of terrein momenteel voor?

☐ Wonen

☒ Overige gebruiksfuncties

Geef aan waar u het bouwwerk en/of terrein momenteel voor gebruikt.

De grond is in eigendom van de Staat (I&W) en is op het moment grasland.

Waar gaat u het bouwwerk voor gebruiken?

☐ Wonen

☒ Overige gebruiksfuncties

Geef aan waar u het bouwwerk voor gaat gebruiken.

Het wordt een openbare uitkijktoren waar geïnteresseerden naartoe kunnen.

## 8 Gebruiksfuncties

In onderstaande tabel staan in de eerste kolom mogelijke gebruiksfuncties die in een bouwwerk kunnen voorkomen. Vul voor alle gebruiksfuncties die voor u van toepassing zijn het aantal personen, de totale gebruiksoppervlakte en de totale vloeroppervlakte van het verblijfsgebied in m2 in hele getallen in.

| Gebruiksfunctie          | Aantal personen | Gebruiksoppervlakte (m2) | Verblijfsoppervlakte (m2) |
|--------------------------|-----------------|--------------------------|---------------------------|
| Bijeenkomst              | -               | -                        | -                         |
| Cel                      | -               | -                        | -                         |
| Gezondheidszorg          | -               | -                        | -                         |
| Industrie                | -               | -                        | -                         |
| Kantoor                  | -               | -                        | -                         |
| Logies                   | -               | -                        | -                         |
| Onderwijs                | -               | -                        | -                         |
| Sport                    | -               | -                        | -                         |
| Winkel                   | -               | -                        | -                         |
| Overige gebruiksfuncties | -               | -                        | -                         |

## 9 Uiterlijk bouwwerk/welstand

Beschrijf van de onderstaande onderdelen de materialen en kleuren die u voor het bouwwerk gebruikt. U mag het veld leeg laten als u materialen en kleuren in de bijlagen vermeldt

| Onderdelen            | Materiaal | Kleur |
|-----------------------|-----------|-------|
| Gevels                | -         | -     |
| - Plint gebouw        | -         | -     |
| - Gevelbekleding      | -         | -     |
| - Borstweringen       | -         | -     |
| - Voegwerk            | -         | -     |
| Kozijnen              | -         | -     |
| - Ramen               | -         | -     |
| - Deuren              | -         | -     |
| - Luiken              | -         | -     |
| Dakgoten en boeidelen | -         | -     |
| Dakbedekking          | -         | -     |

Vul hier overige onderdelen en -  
bijbehorende materialen en kleuren  
in.

#### 10 Mondeling toelichten

Ik wil mijn bouwplan  
mondeling toelichten voor  
de welstandscommissie/  
stadsbouwmeester.

- ☐ Ja  
☒ Nee

# Handelen in strijd met regels ruimtelijke ordening

## 1 Handelen in strijd met regels ruimtelijke ordening

Met welke regels voor ruimtelijke ordening zijn de voorgenomen werkzaamheden in strijd?

- ☒ Bestemmingsplan
- ☐ Beheersverordening
- ☐ Exploitatieplan
- ☐ Regels op grond van de provinciale verordening
- ☐ Regels op grond van een AMvB
- ☐ Regels van het voorbereidingsbesluit

Beschrijf hoe en in welke mate de voorgenomen werkzaamheden in strijd zijn met de regels voor ruimtelijke ordening.

Op deze gronden mogen uitsluitend bouwwerken, geen gebouwen zijnde, ten dienste van de bestemming worden gebouwd.

3. Voor het bouwen geldt het volgende:

Op de gronden mogen uitsluitend terrein- en erfafscheidingen, en voorzieningen ten behoeve van de waterbeheersing worden gebouwd;

b) Overigens geldt het volgende:

- Terrein- en erfafscheidingen: maximaal 2 meter hoog;
- Overige bouwwerken, geen gebouw zijnde: maximaal 4 meter hoog

Beschrijf het huidige gebruik van de gronden of het bouwwerk.

De gronden die zijn aangewezen voor 'Agrarische doeleinden' zijn bestemd voor:

1. volwaardige of reële agrarische bedrijven, als bedoeld in artikel 1 lid 5 sub a, b, c, f, g en i

Beschrijf het beoogde gebruik van de gronden of het bouwwerk.

Het bouwen van uitkijktoren die toegankelijk is (een bouwwerk) (artikel 2.1, lid 1, onder a Wabo)

Beschrijf de gevolgen van het beoogde gebruik voor de ruimtelijke ordening.

Wat betreft ecologie, waterhuishouding, Bodem, Landschap, Externe veiligheid is geconcludeerd dat door het beoogde gebruik sprake is van een goede ruimtelijke ordening.

Is het beoogde gebruik tijdelijk van aard?

- ☒ Ja
- ☐ Nee

Hoeveel hele jaren duurt het gebruik?

25

Hoeveel maanden duurt het gebruik?

300

Hebt u een rapport nodig waarin de archeologische waarde van het terrein dat zal worden verstoord in voldoende mate is vastgelegd?

- ☐ Ja
- ☒ Nee

Wordt er afgeweken van het exploitatieplan?

- ☐ Ja
- ☒ Nee

# Bijlagen

## Formele bijlagen

| Naam bijlage                             | Bestandsnaam                                                            | Type                                                                                                                                                                                                                                                                                                                                                                                   | Datum ingediend | Status document |
|------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|
| oelichting_op_de_aanvraag_definitief_pdf | 20230606 Bijlage 1 Toelichting op de aanvraag definitief.pdf            | Plattegronden, doorsneden en detailtekeningen bouwen complexere bouwwerken<br>Bruikbaarheid bouwwerk<br>Bestemmingsplan, beheersverordening en bouwverordening complexere bouwwerken<br>Overige gegevens veiligheid<br>Welstand<br>Gegevens Handelen in strijd met regels ruimtelijke ordening                                                                                         | 17-07-2023      | In behandeling  |
| onderbouwing_uitkijktoren_definitief_pdf | 20230606 Bijlage 2 Ruimtelijke onderbouwing uitkijktoren definitief.pdf | Plattegronden, doorsneden en detailtekeningen bouwen complexere bouwwerken<br>Installaties complexere bouwwerken<br>Bruikbaarheid bouwwerk<br>Bestemmingsplan, beheersverordening en bouwverordening complexere bouwwerken<br>Constructieve veiligheid complexere bouwwerken<br>Overige gegevens veiligheid<br>Welstand<br>Gegevens Handelen in strijd met regels ruimtelijke ordening | 17-07-2023      | In behandeling  |
| Uitgangspunten_constructief_ontwerp__pdf | Bijlage 1 bij rob Uitgangspunten constructief ontwerp .pdf              | Plattegronden, doorsneden en detailtekeningen bouwen complexere bouwwerken<br>Installaties complexere bouwwerken<br>Brandveiligheid<br>Gelijkwaardigheid<br>Constructieve veiligheid complexere bouwwerken<br>Energiezuinigheid en milieu<br>Kwaliteitsverklaringen                                                                                                                    | 17-07-2023      | In behandeling  |
| Bijlage_2_bij_rob_Quickscan_ecologie_pdf | Bijlage 2 bij rob Quickscan ecologie.pdf                                | Anders                                                                                                                                                                                                                                                                                                                                                                                 | 17-07-2023      | In behandeling  |
| Verkennd_bodem_en_asbestonderzoek_pdf    | Bijlage 3 bij rob Verkennd bodem-                                       | Anders                                                                                                                                                                                                                                                                                                                                                                                 | 17-07-2023      | In behandeling  |

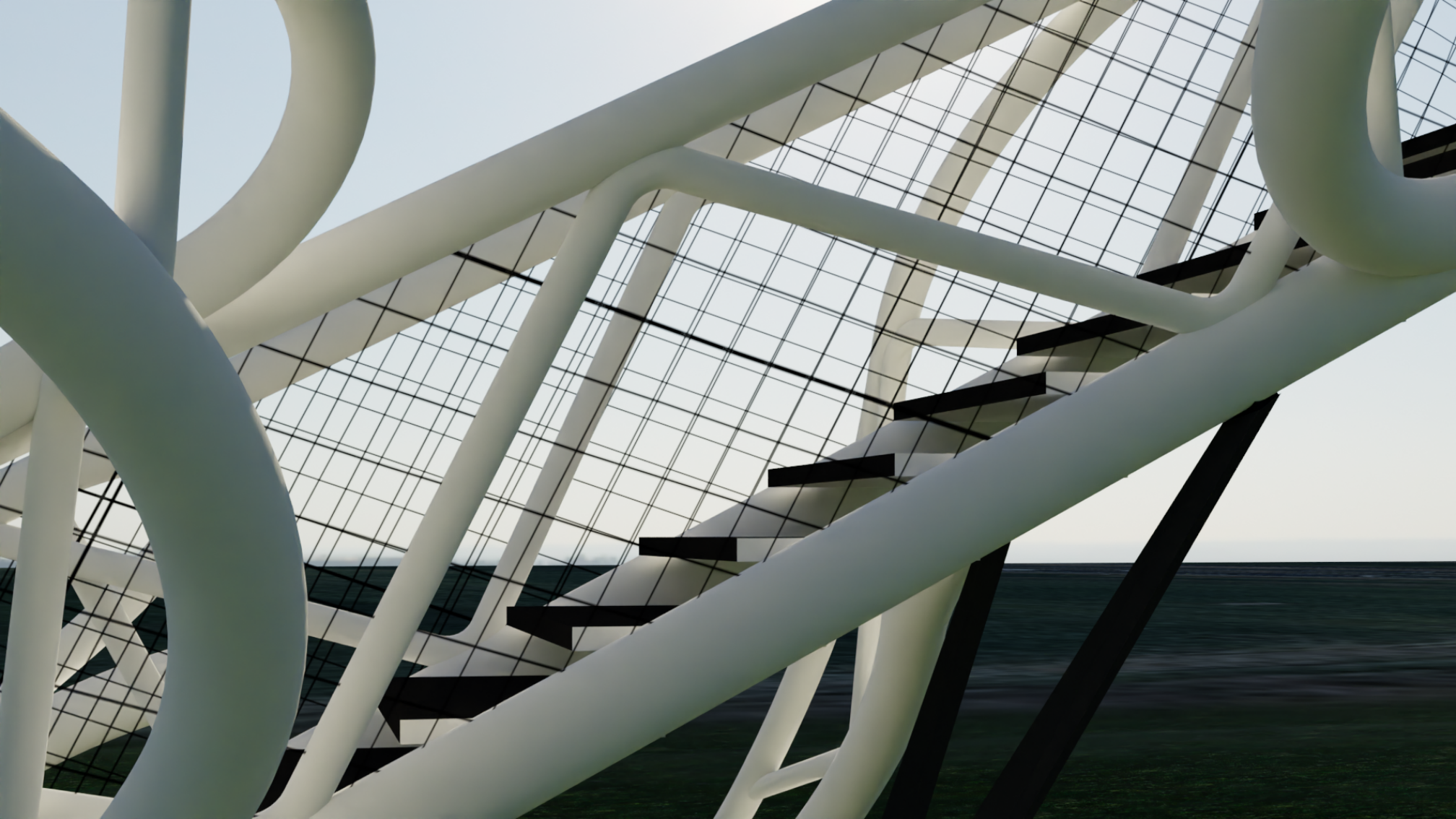
| Naam bijlage | Bestandsnaam           | Type | Datum ingediend | Status document |
|--------------|------------------------|------|-----------------|-----------------|
|              | en asbestonderzoek.pdf |      |                 |                 |



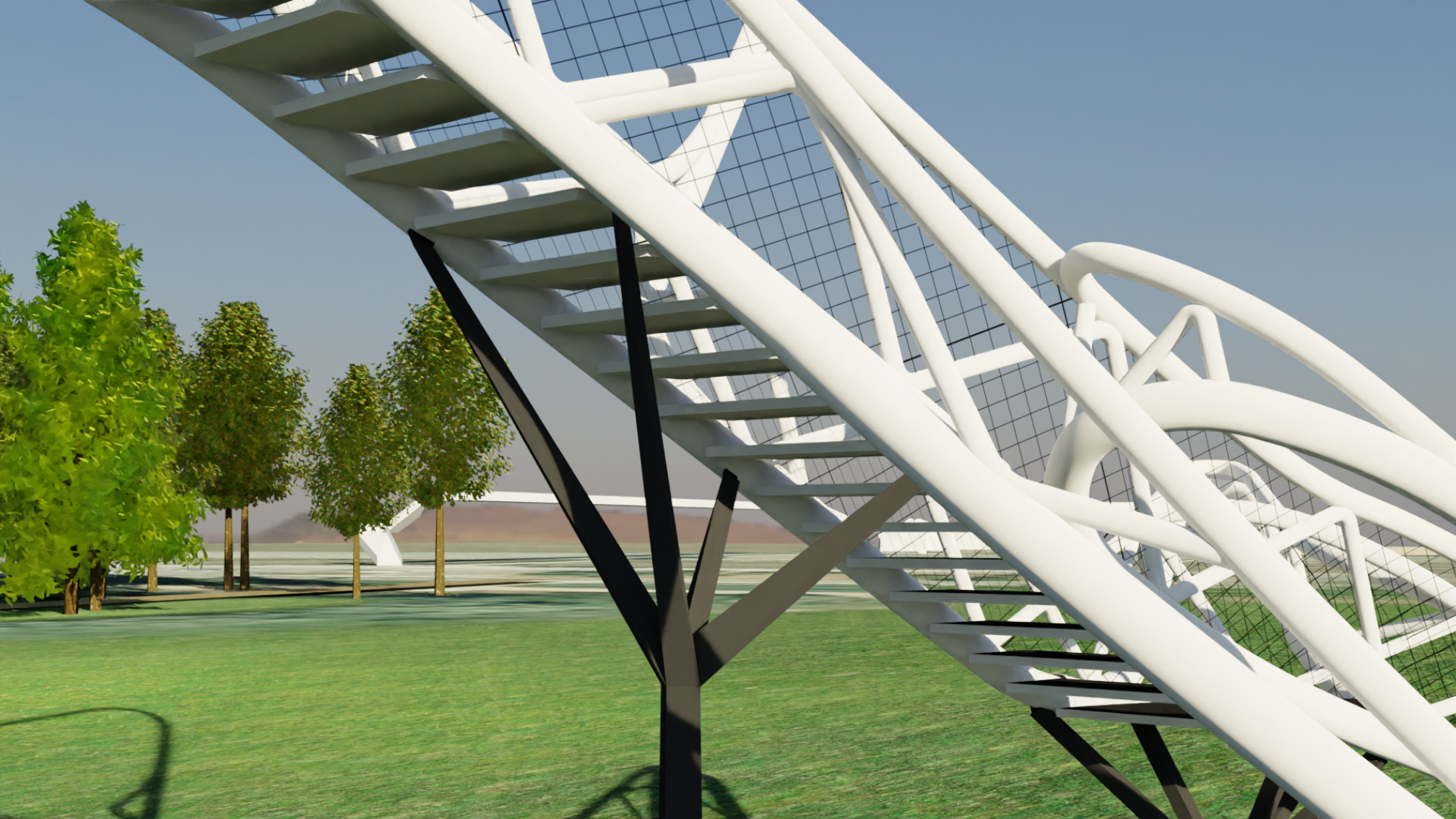




























## UITGANGSPUNTEN CONSTRUCTIEF ONTWERP



520147

Zwaluw uitkijkpunt

520147-A



**Titel**                      Uitgangspunten constructief ontwerp

**Project**                    Zwaluw uitkijkpunt

**Projectnummer**        520147

**Documentnummer**    520147-A

**Datum**                    31 mei 2022

**Opdrachtgever**        Wilwy Sittard  
Nusterweg 70 Industriepark Noord  
6136 KV Sittard

**Auteur**                  D. Krijntjes

**Controleur**             D. Loo

| Wijziging | Omschrijving                                                            | Datum      | Auteur | Controleur   |
|-----------|-------------------------------------------------------------------------|------------|--------|--------------|
| A         | Uitwisselen 3D pag.1 en maatschets pag.6 zonder beoordeling             | 18-04-2023 | D. Loo |              |
| B         | Toevoegen bijlage en completeren document                               | 24-11-2023 | D. Loo | B. Velderman |
| C         | Toevoegen gewijzigde profilering architect<br>Vergelijk paragraaf 5.3.3 | 16-01-204  | D. Loo | B. Velderman |
|           |                                                                         |            |        |              |
|           |                                                                         |            |        |              |

# Inhoudsopgave

|           |                                                            |           |
|-----------|------------------------------------------------------------|-----------|
| <b>1.</b> | <b>Inleiding .....</b>                                     | <b>4</b>  |
| 1.1.      | Algemeen .....                                             | 4         |
| 1.2.      | Projectomschrijving .....                                  | 4         |
| 1.3.      | Schetsontwerp van de constructie .....                     | 7         |
| <b>2.</b> | <b>Eisen constructief ontwerp .....</b>                    | <b>14</b> |
| 2.1.      | Van toepassing zijnde normen en voorschriften.....         | 14        |
| 2.2.      | Gevolklasse, levensduur en referentieperiode .....         | 15        |
| 2.3.      | Vervormingen en trillingen .....                           | 15        |
| 2.4.      | Fundering .....                                            | 15        |
| <b>3.</b> | <b>Belastingen en belastingcombinaties .....</b>           | <b>16</b> |
| 3.1.      | Belastingen .....                                          | 16        |
| 3.2.      | Belastingcombinaties.....                                  | 21        |
| <b>4.</b> | <b>Uitgangspunten constructief ontwerp .....</b>           | <b>24</b> |
| 4.1.      | Materialen .....                                           | 24        |
| 4.2.      | Betonkwaliteit, milieuklasse, dekking en scheurwijdte..... | 26        |
| 4.3.      | Toegepaste software en programmatuur .....                 | 26        |
| <b>5.</b> | <b>Staalconstructie .....</b>                              | <b>27</b> |
| 5.1.      | Berekeningswijze .....                                     | 27        |
| 5.2.      | Traptreden, leuningen en balusters.....                    | 28        |
| 5.3.      | Sterkte en stabiliteit .....                               | 30        |
| 5.4.      | Eigenfrequentie en trillingen .....                        | 35        |
| <b>6.</b> | <b>Beschouwing fundering.....</b>                          | <b>40</b> |
| <b>7.</b> | <b>Bijlagen.....</b>                                       | <b>42</b> |
| 7.1.      | Computerberekening .....                                   | 42        |



# 1. Inleiding

## 1.1. Algemeen

Ingenieursbureau A. Palte B.V. heeft opdracht gekregen voor het maken van UPD met een omschrijving van de constructie, belastingen en stabiliteit ten behoeve van de vergunningsaanvraag van het Zwaluw uitkijkpunt.

Het doel van dit document is het maken van een uitgangspuntendocument met betrekking tot het constructief ontwerp van het uitkijkpunt. Dit houdt in het omschrijven van de constructie, de stabiliteit en belastingen. Overzichten van de constructie zijn hierbij schetsmatig opgenomen in het document.

## 1.2. Projectomschrijving

### Algemeen

Het project betreft de aanleg van een stalen uitzichtpunt in de vorm van een zwaluw gelegen in Windpark Streepland in de Klaverpolder. De afmetingen van het uitkijkpunt bedragen circa De afmetingen van het uitzichtpunt zijn ca.  $L \times B \times H = 15.84 \times 11.2 \times 6.48 - 9.36$  m.

Het uitzichtpunt bestaat uit een staalconstructie met constructieve leuningen en daaraan uitkragend verbonden (staart)vleugels. De lage vleugel wordt op het diepste punt ondersteund door een kolom op de fundering. De trap wordt ondersteund door een tweetal hoofdkolommen onder de buik, welke op de fundering afgesteund worden. Ook de trap zelf is aan de voet gefundeerd.

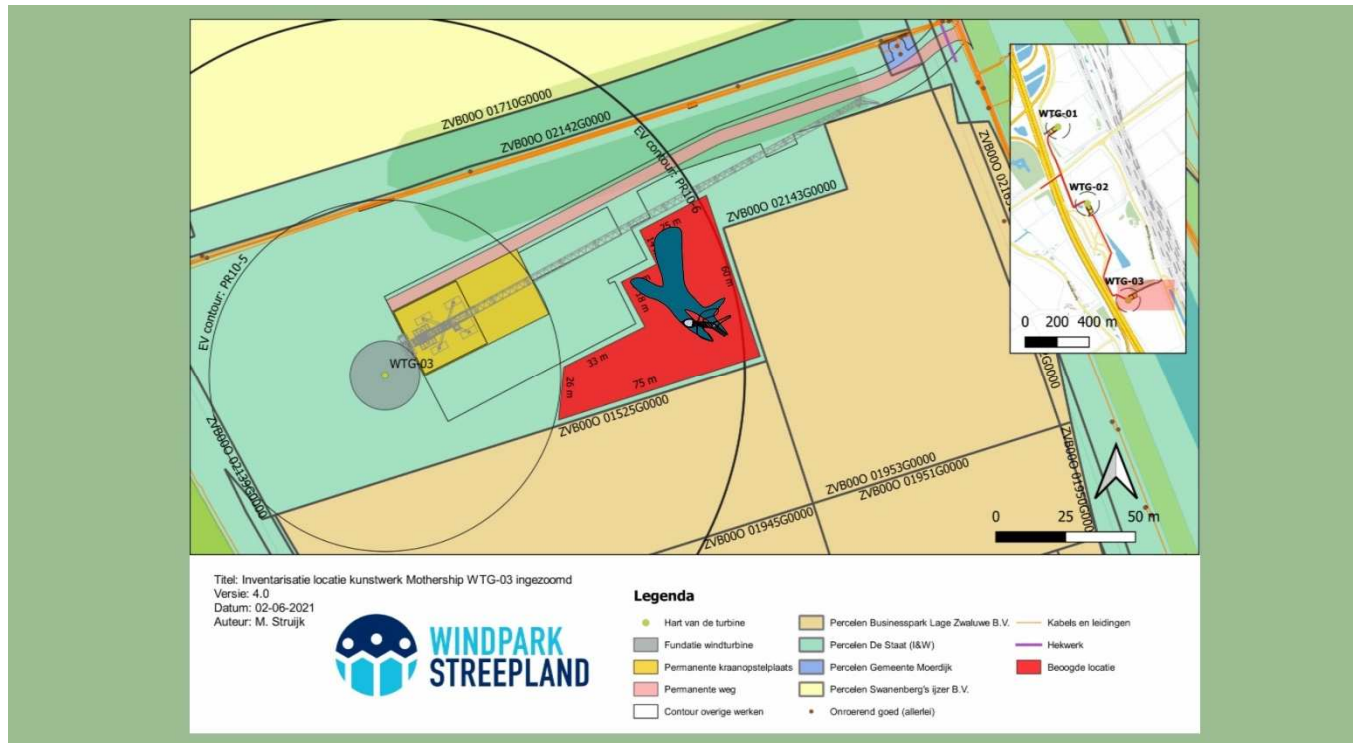
Met betrekking tot het ontwerp gelden de volgende randvoorwaarden:

- Geén invloed van omgeving en of windmolens op de belastingen.
- Geén beschouwing van effecten van wind op bruikbaarheid, bv. fluiten door de railing.
- Geén bevestiging van externe materialen die openingen in de constructie sluiten, bv. doek of zeil.
- Constructie anders dan de traptreden niet begaanbaar.

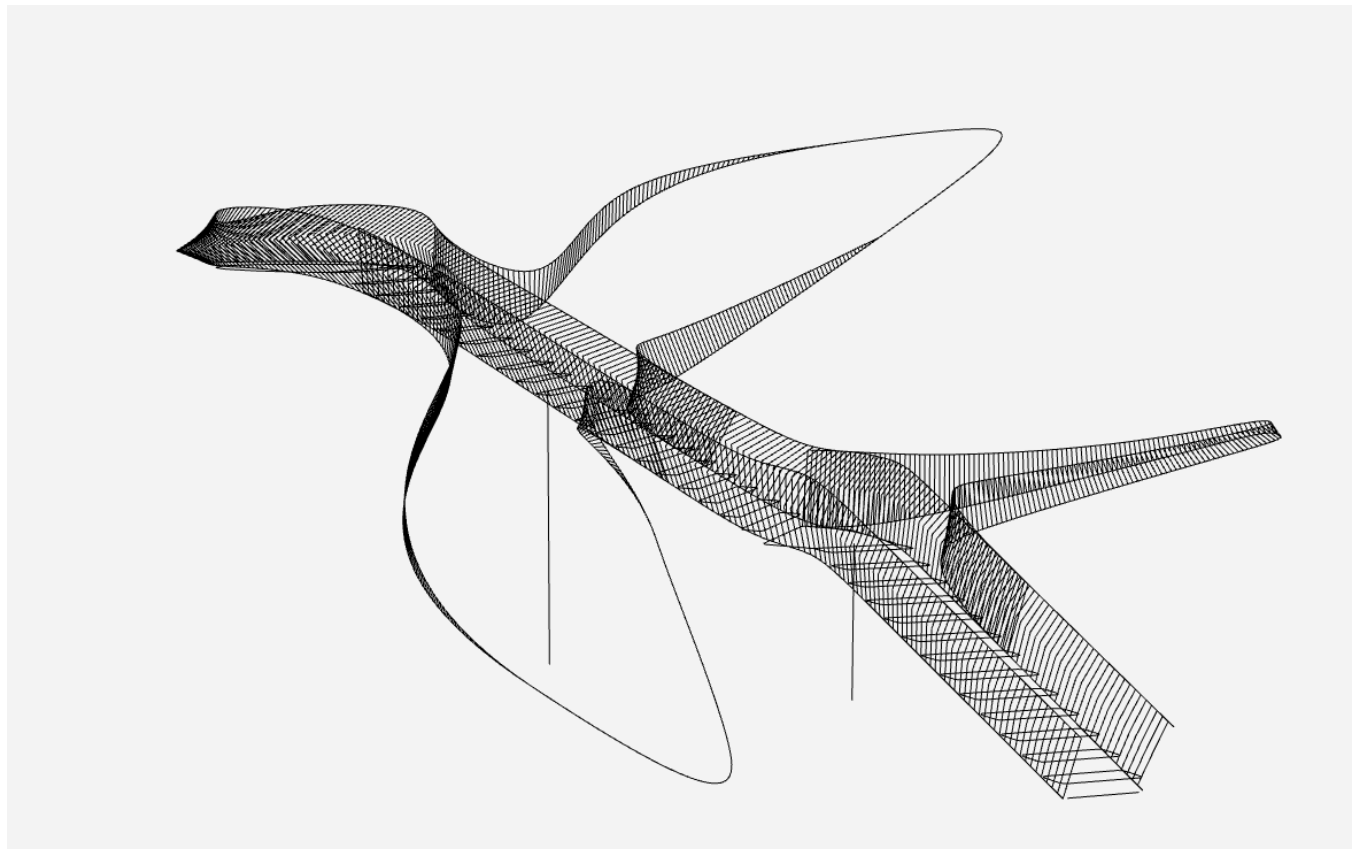
### Overzicht van het uitkijkpunt

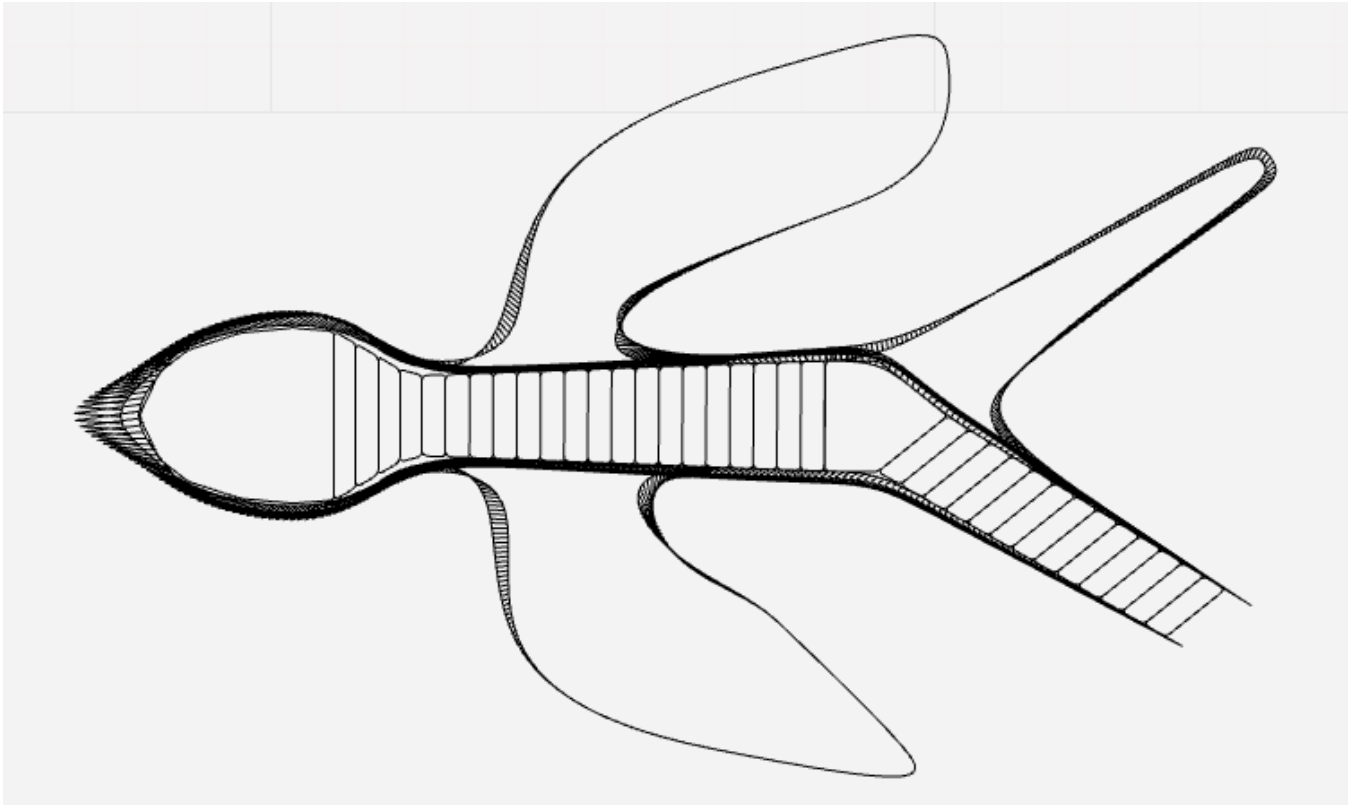
In het volgende wordt een overzicht van het uitkijkpunt gegevens middels de tekeningen van de kunstenaar. Deze en overige illustraties in dit document dienen slechts en alleen ter verduidelijking van het ontwerp van de constructie. De laatste versie van de daadwerkelijke tekeningen is te allen tijde leading.

## Situatie

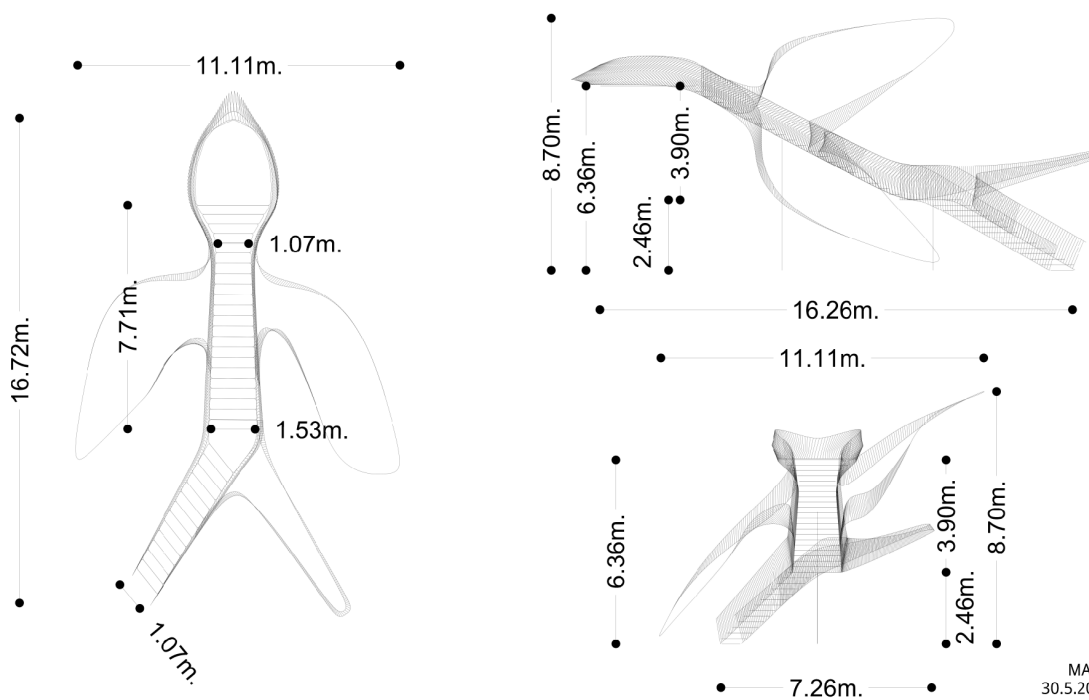


## 3-D aanzicht



**Bovenaanzicht****Overzicht afmetingen (illustratief, vervallen)**

Onderstaande maten slechts en alleen ter referentie.

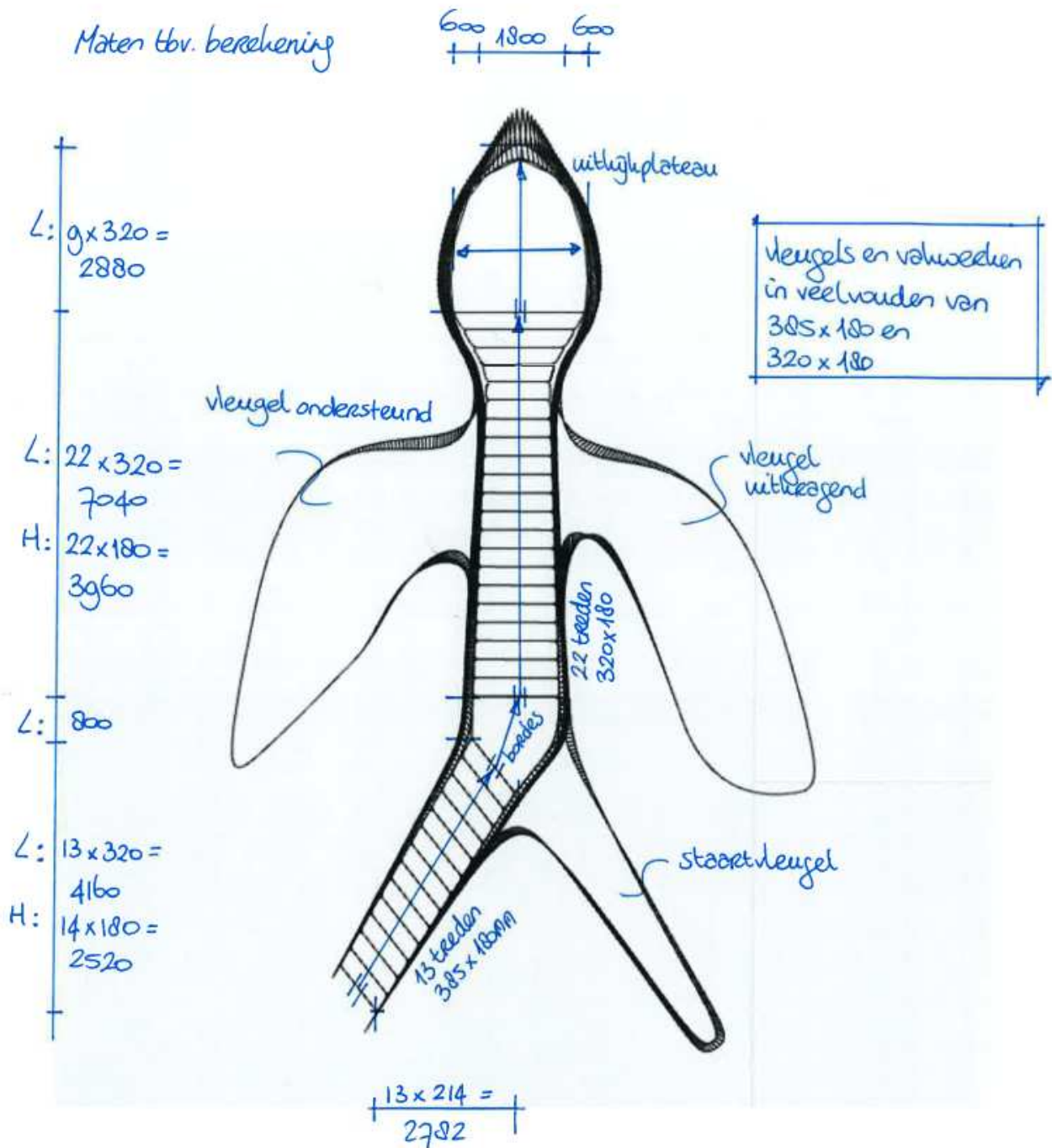


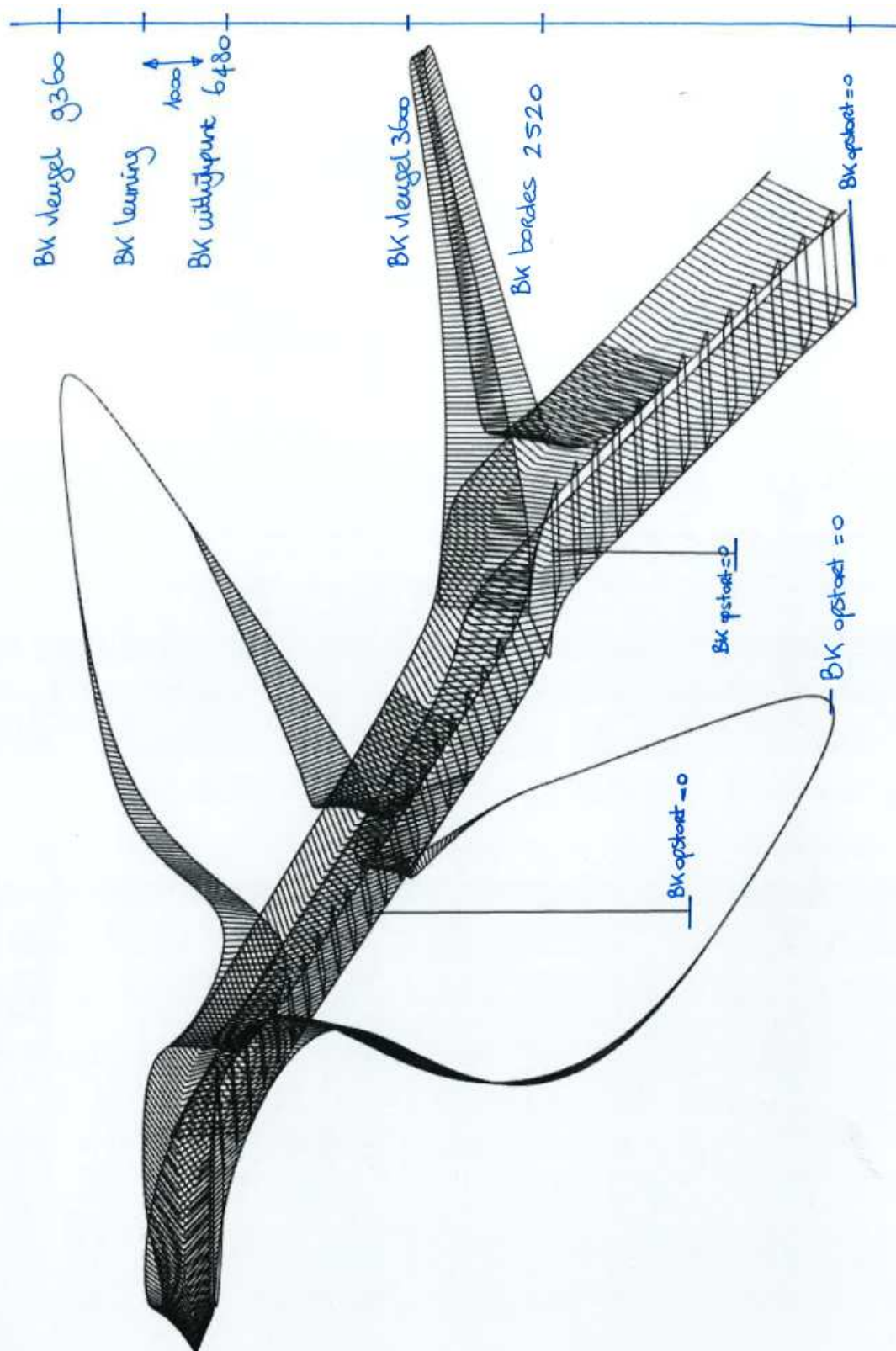


### 1.3. Schetsontwerp van de constructie

Alle maten ca. maten t.b.v. berekening. Deze dienen definitief te worden vastgesteld in de UO-berekening.  
Alle profielen indicatief. Deze kunnen nog wijzigen in de definitieve UO-berekening.

Maten t.b.v. berekening - lengte, breedte en veelvouden



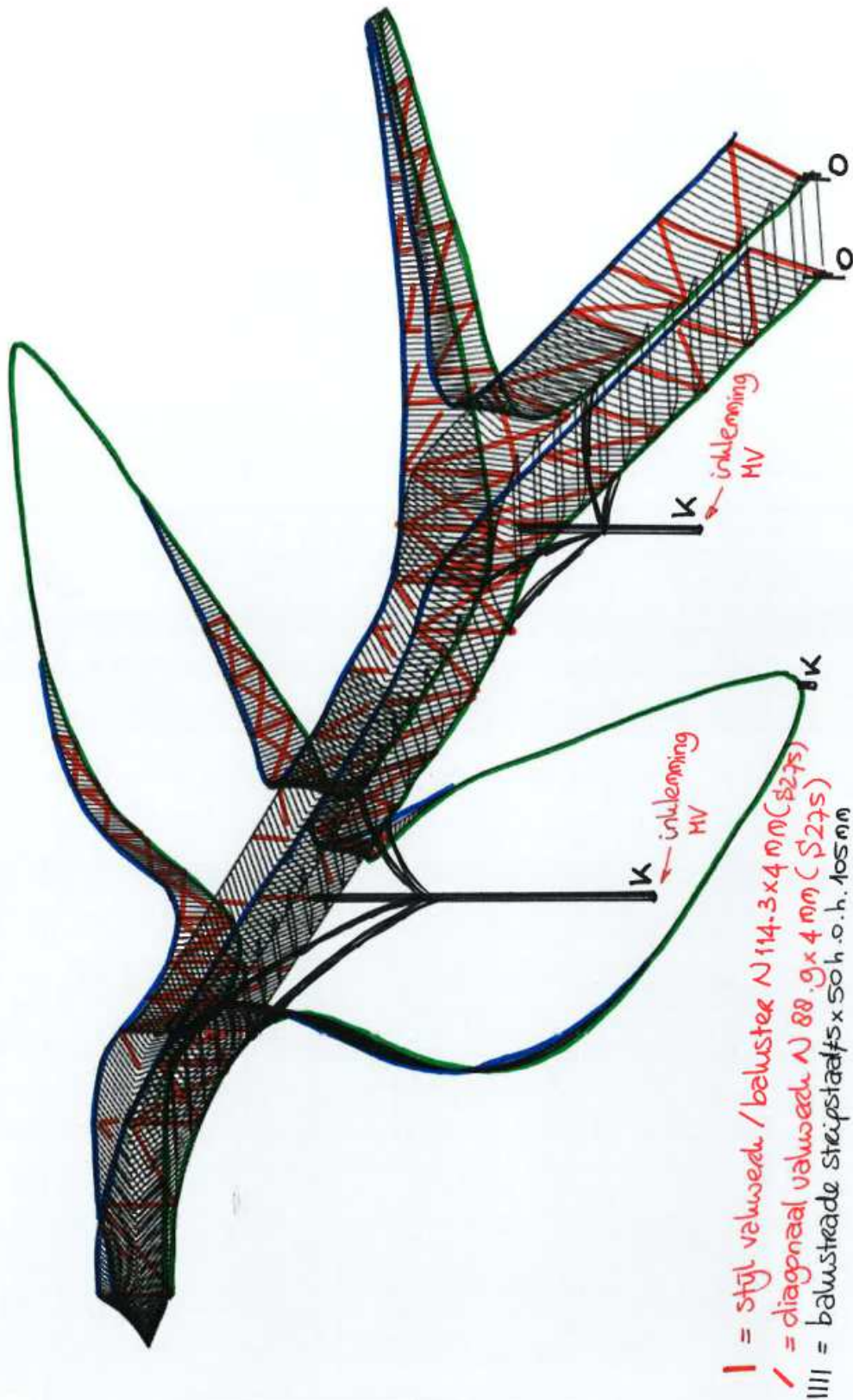
Maten t.b.v. berekening - hoogtes*Maten t.b.v. berekening*

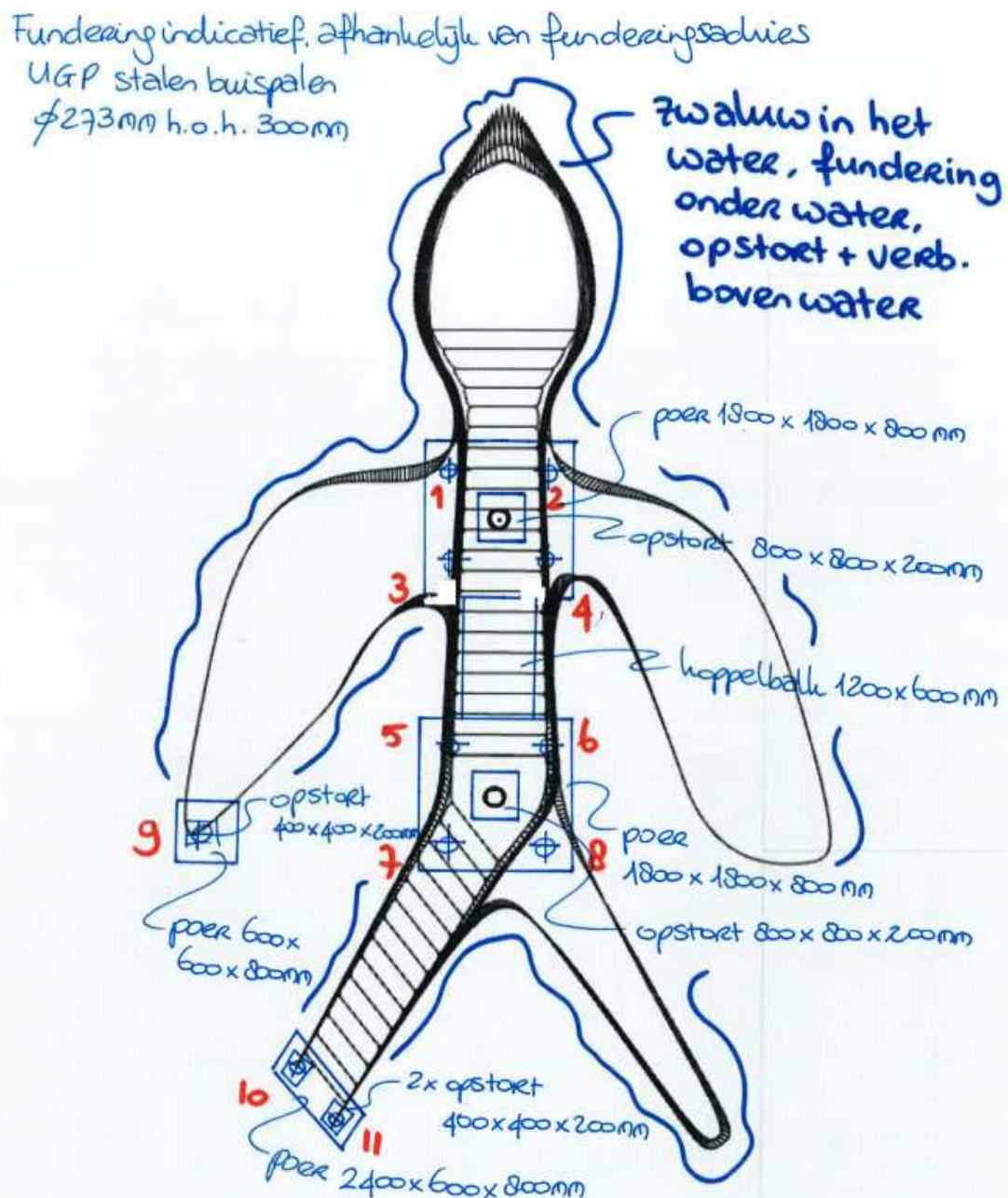
- $\Phi K$  = kolom
- $\bigcirc$  = oplegging
  - = onderregel N21g.1 x 6.3 (S'275)
  - = bovenregel N13g.7 x 4 (S'275)
- $\overline{VL}$ — = ligger in trap, onderdeel van valwerk / loobmstructuur
- $\overline{L}$ — = ligger tbr. oplegging trap treden
- $\longleftrightarrow$  = trap treden **T** 320 x 160 x 8 mm
- $\longleftrightarrow$  = trap treden **T** 305 x 160 x 8 mm

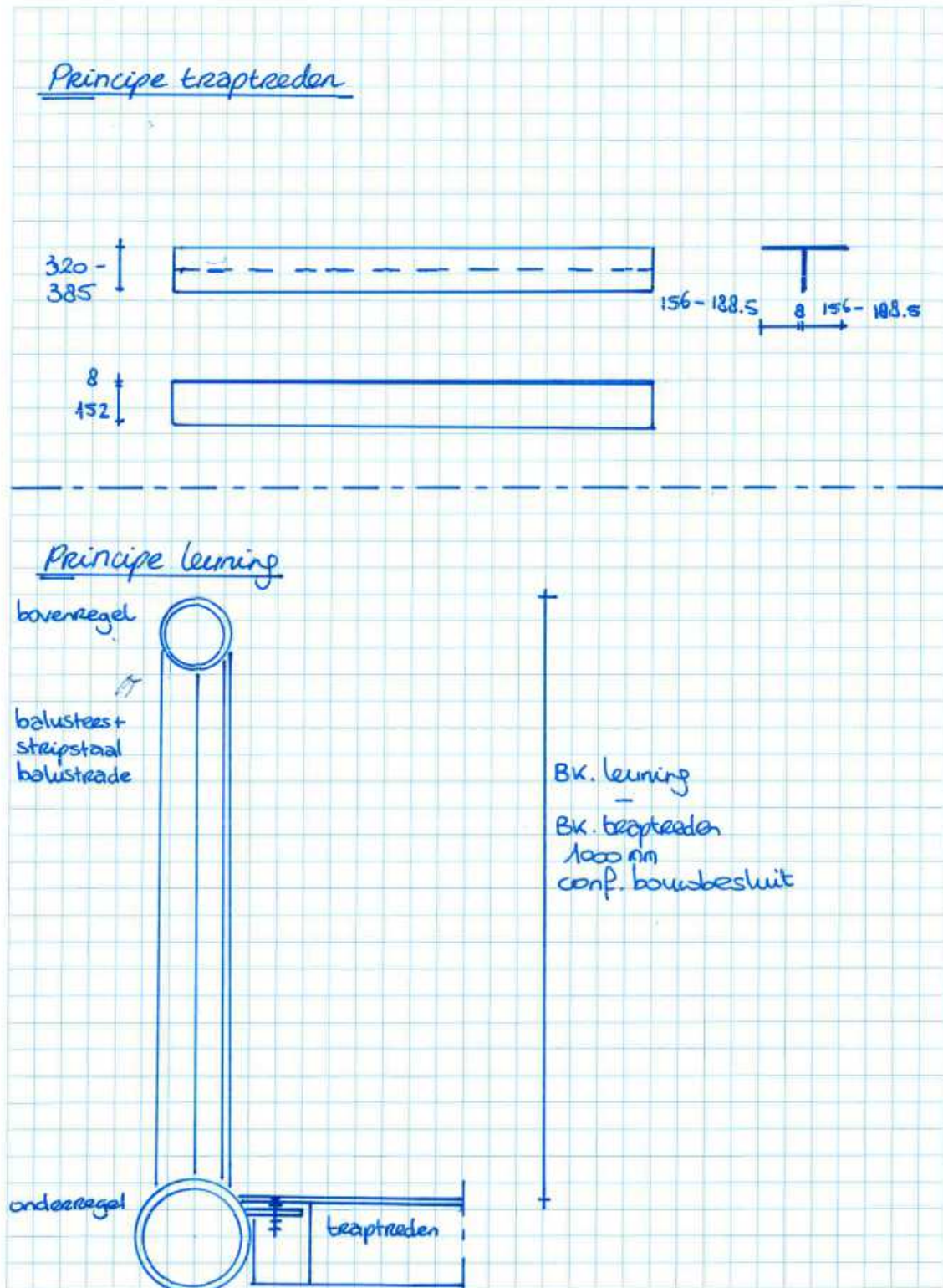


# Principe van de constructie - 3-D

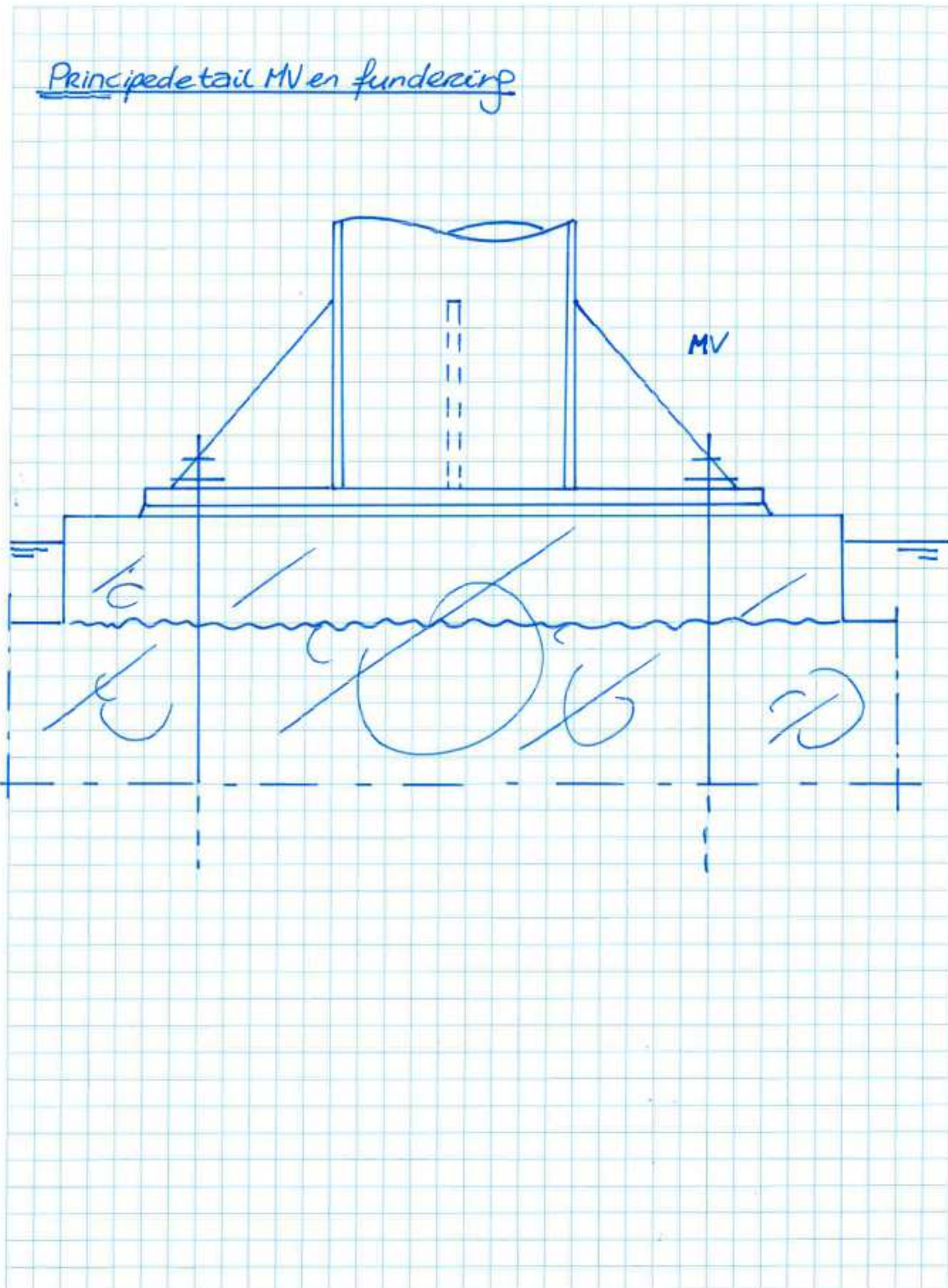
Alle profielen indicatief, definitieve profilering conf. def. berekening



Principe van de constructie - fundering

Principedetails - traptreden en balustrade



Principedetails - fundering

## 2. Eisen constructief ontwerp

### 2.1. Van toepassing zijnde normen en voorschriften

|                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Eurocode 0</b><br>NEN-EN 1990                                                                                                                      | <b>Grondslagen</b><br>Grondslagen van het constructief ontwerp                                                                                                                                                                                                                                                                                               |
| <b>Eurocode 1</b><br>NEN-EN 1991-1-1                                                                                                                  | <b>Belastingen op constructies</b><br>Algemene belastingen - Volumieke gewichten, eigengewicht en opgelegde belastingen voor gebouwen                                                                                                                                                                                                                        |
| NEN-EN 1991-1-4                                                                                                                                       | Algemene belastingen - Windbelasting                                                                                                                                                                                                                                                                                                                         |
| NEN-EN 1991-1-5                                                                                                                                       | Algemene belastingen - Thermische belasting                                                                                                                                                                                                                                                                                                                  |
| NEN-EN 1991-1-7                                                                                                                                       | Buitengewone belastingen: stootbelastingen en ontploffingen                                                                                                                                                                                                                                                                                                  |
| NEN-EN 1991-2                                                                                                                                         | Verkeersbelasting op bruggen                                                                                                                                                                                                                                                                                                                                 |
| <b>Eurocode 2</b><br>NEN-EN 1992-1-1<br>NEN-EN 1992-2<br>NEN-EN 206-1                                                                                 | <b>Ontwerp en berekening van betonconstructies</b><br>Algemene regels en regels voor gebouwen<br>Betonnen bruggen - Regels voor ontwerp, berekening en detaillering<br>Deel 1: Specificatie, eigenschappen, vervaardiging en conformiteit                                                                                                                    |
| <b>Eurocode 3</b><br>NEN-EN 1993-1-1<br>NEN-EN 1993-1-5<br>NEN-EN 1993-1-6<br>NEN-EN 1993-1-7<br>NEN-EN 1993-1-8<br>NEN-EN 1993-1-10<br>NEN-EN 1993-2 | <b>Ontwerp en berekening van staalconstructies</b><br>Algemene regels en regels voor gebouwen<br>Constructieve plaatvelden<br>Sterkte en stabiliteit van schaalconstructies<br>Sterkte en stabiliteit haaks op het vlak belaste platen<br>Ontwerp en berekening van verbindingen<br>Materiaaltaaiheid en eigenschappen in de dikterichting<br>Stalen bruggen |
| <b>Eurocode 7</b><br>NEN-EN 1997-1-1                                                                                                                  | <b>Geotechnisch ontwerp</b><br>Algemene regels                                                                                                                                                                                                                                                                                                               |
| <b>Eurocode 1090</b><br>NEN-EN 1090-1<br>NEN-EN 1090-2                                                                                                | <b>Het vervaardigen van staal- en aluminiumconstructies</b><br>Eisen voor het vaststellen van de conformiteit van constructieve onderdelen<br>Technische eisen voor staalconstructies                                                                                                                                                                        |
| <b>Hivoss</b><br>RFS2-CT-2007-00033                                                                                                                   | <b>Human Induced Vibrations of Steel Structures</b><br>Ontwerp van voetgangersbruggen - Richtlijn                                                                                                                                                                                                                                                            |
| <b>CUR</b><br>CUR 228                                                                                                                                 | <b>Bouw &amp; infra</b><br>Ontwerprichtlijn door horizontaal belaste palen                                                                                                                                                                                                                                                                                   |
| <b>Rijkswaterstaat Richtlijnen</b><br>NBD 000750                                                                                                      | <b>Overgangsconstructies</b>                                                                                                                                                                                                                                                                                                                                 |

Met betrekking tot de belastingen geldt dat naast de in dit document genoemde belastingen, het gestelde in de NEN-EN 1990 en de NEN-EN 1991 als minimum van kracht blijft.

## 2.2. Gevolgklasse, levensduur en referentieperiode

### Uitzichtpunt

|                         |                 |    |
|-------------------------|-----------------|----|
| Type bouwwerk           | Voetgangersbrug |    |
| Gevolgklasse            | CC2             | a) |
| Ontwerplevensduurklasse | 3               | b) |
| Referentieperiode       | 50 jaar         | c) |

- a) Gevolgklasse conform NEN-EN 1990 - Tabel NB.11 - 2.1
- b) Ontwerplevensduurklasse conform NEN-EN 1990 - Tabel NB.11 - 2.1
- c) Er is gekozen voor een levensduur van 100 jaar conform NEN-EN 1990 - Tabel NB.11 - 2.1

## 2.3. Vervormingen en trillingen

### Vervormingen

Voor de maximaal toelaatbare vervormingen van het dek is NEN-EN 1990 - A2.4.4 aangehouden.  
De maximale toelaatbare verticale doorbuiging is gelijk genomen aan  $L / 800$ .

Voor de maximaal toelaatbare vervormingen van de balustrades is CEN-TR 16949 - 4.5.3 aangehouden.  
De maximaal toelaatbare vervorming t.o.v. van de bovenzijde van het dek bedraagt  $\delta_h \leq 0.01$ .  
Voor de maximaal toelaatbare doorbuiging van de leuning is NEN-EN 1990 - A.1.4.3 aangehouden.  
De maximaal toelaatbare doorbuiging van de leuning bedraagt  $l_{rep} / 150$ .

### Trillingen

De kritische gebieden voor de natuurlijke frequenties  $f_i$  van voetgangersbruggen onder loopbelastingen zijn:

- 1) Voor verticale en longitudinale trillingen  $1.25 \text{ Hz} \leq f_i \leq 4.60 \text{ Hz}$
- 2) Voor zijdelingse trillingen  $0.50 \text{ Hz} \leq f_i \leq 1.20 \text{ Hz}$

Conform 'Cement - rekenen in de praktijk 2 - 3-2018: *versnelling voetgangersbrug*' dient de comfortklasse slechts en alleen getoetst te worden indien er aan bovengenoemde richtlijnen niet voldaan wordt bij een eigenfrequentie bepaald met de permanent aanwezige belasting. De uitzichtpunten worden dusdanig gedimensioneerd dat deze buiten het kritische gebied vallen.

## 2.4. Fundering

Er is in deze fase van het project nog geen funderingsadvies beschikbaar.

Afhankelijk van het benodigde geotechnisch draagvermogen ten behoeve van de sterkte en stabiliteit en de benodigde stijfheid van de fundering teneinde het beperken van de vervormingen en trillingen wordt er in een latere fase gekozen voor een fundering op staal, dan wel op palen. Uitgangspunt is een fundering op geheide stalen buispalen met voet.

De aangenomen, te realiseren veren en het benodigde geotechnisch draagvermogen worden in een latere fase vastgesteld.



## 3. Belastingen en belastingcombinaties

### 3.1. Belastingen

#### 3.1.1. Eigen gewicht en permanente belastingen

Zie NEN-EN 1991-1-1 - Bijlage A.

Uitzichtpunt trap / dek -  $l_{ef} = 1.81$  m

Traptreden T-stuk  $t = 8$  mm  $p_G = 1.00$  kN/m<sup>2</sup>

Valbeveiliging -  $h_{ef} = 1.00$  m

Strippen  $50 \times 5$  h.o.h. 105 mm  $p_G = 0.20$  kN/m<sup>2</sup>

#### 3.1.2. Verticale verkeersbelastingen

Het dienstvoertuig kan een voertuig zijn voor onderhoud, hulpdiensten (ambulance, brandweer) of voor andere diensten. Voor de geometrie en grootte van het laststelsel is uitgegaan van NEN-EN 1991-2 - 5.3. Conform 5.3.2.1 (3)  $2.5 \leq q_{fk} \leq 5.0$  en  $q_{fk} = 2.0 + 120 / (17.52 + 30)$  kN/m<sup>2</sup> met  $L = 17.52$  m.

| Belasting                       |            | Karakteristieke waarde                                                                                                                                                                           |
|---------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gelijkmatig verdeelde belasting | $q_{fk}$   | $2.0 + 120 / (17.52 + 30) = 4.5$ kN/m <sup>2</sup>                                                                                                                                               |
| Geconcentreerde belasting       | $Q_{fvd}$  | 7 kN aangrijpend op een oppervlak van $0.10 \times 0.10$ m                                                                                                                                       |
| Dienstvoertuig                  | $Q_{serv}$ | Twee assen met een wielbasis van 3 m<br>Totaalgewicht 50 kN, maximale aslast 25 kN<br>Voor elke as twee wielen met een spoorbreedte van 1.75 m<br>Contactvlak voor elk wiel $0.25 \times 0.25$ m |

Gezien de uitzichtpunten te smal zijn voor het oprijden van een dienstvoertuig is deze belasting dus niet van toepassing en wordt een dienstvoertuig in het volgende niet meer beschouwd. De geconcentreerde belasting is niet maatgevend ten opzichte van de gelijkmatig verdeelde belasting.

#### 3.1.3. Horizontale verkeersbelastingen

Zie NEN-EN 1991-2 - 5.4.

| Belasting                       |           | Karakteristieke waarde                                                                |
|---------------------------------|-----------|---------------------------------------------------------------------------------------|
| Gelijkmatig verdeelde belasting | $Q_{f1k}$ | 10% van de totale belasting in overeenstemming met de gelijkmatig verdeelde belasting |
| Dienstvoertuig                  | $Q_{f1k}$ | 30% van het totale gewicht van het dienstvoertuig                                     |

De horizontale belasting  $Q_{f1k}$  grijpt aan langs de as van het brugdek ter hoogte van de slijtlaag, gelijktijdig met de overeenkomstige verticale belasting.

### 3.1.4. Windbelastingen

#### Windsnelheid en stuwdruk

##### Basiswaarden conform NEN-EN 1991-1-4 - 4.2

Terreincategorie II onbebouwd is aangehouden.

|                     |                                                                           |                                                                                    |            |
|---------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------|
| K                   | = windgebied II                                                           | = 0.234                                                                            | -          |
| N                   | = windgebied II                                                           | = 0.5                                                                              | -          |
| R                   | = referentieperiode                                                       | = 50                                                                               | jaar       |
| p                   | = 1 / R                                                                   | = 0.02                                                                             | -          |
| C <sub>dir</sub>    | = windrichtingsfactor                                                     | = 1.0                                                                              | -          |
| C <sub>season</sub> | = seizoensfactor                                                          | = 1.0                                                                              | -          |
| V <sub>b,0</sub>    | = fundamentele basiswindsnelheid                                          | = 27.0                                                                             | m/s        |
| C <sub>prob</sub>   | $= \left( \frac{1-K \ln(-\ln(1-p))}{1-K \ln(-\ln(0.98))} \right)^n$       | $= \left( \frac{1-0.234 \ln(-\ln(1-0.02))}{1-0.234 \ln(-\ln(0.98))} \right)^{0.5}$ | = 1.0      |
| V <sub>b</sub>      | = C <sub>dir</sub> C <sub>season</sub> V <sub>b,0</sub> C <sub>prob</sub> | = 1.0*1.0*24.5*1.0                                                                 | = 27.0 m/s |

##### Orografie conform NEN-EN 1991-1-4 - Bijlage A

|                |                                                     |       |   |
|----------------|-----------------------------------------------------|-------|---|
| c <sub>o</sub> | = géén invloeden van terrein conform uitgangspunten | = 1.0 | - |
|----------------|-----------------------------------------------------|-------|---|

##### Gemiddelde wind conform NEN-EN 1991-1-4 - 4.3

|                    |                                                        |                                       |            |
|--------------------|--------------------------------------------------------|---------------------------------------|------------|
| z                  | = hoogte boven maaiveld                                | = 9.58                                | m          |
| z <sub>0</sub>     | = ruwheidslengte                                       | = 0.005                               | m          |
| k <sub>r</sub>     | = 0.19 (z <sub>0</sub> / 0.05) <sup>0.07</sup>         | = 0.19*(0.005 / 0.05) <sup>0.07</sup> | = 0.162    |
| z <sub>min</sub>   | = minimale hoogte                                      | = 1                                   | m          |
| z <sub>max</sub>   | = maximale hoogte                                      | = 200                                 | m          |
| c <sub>r</sub> (z) | = k <sub>r</sub> ln(z / z <sub>0</sub> )               | = 0.162*ln(9.61 / 0.005)              | = 1.225    |
| V <sub>m</sub> (z) | = c <sub>r</sub> (z) c <sub>o</sub> (z) V <sub>b</sub> | = 1.225*1.0*27.0                      | = 33.1 m/s |

##### Windturbulentie conform NEN-EN 1991-1-4 - 4.4

|                    |                                                                 |                                |         |
|--------------------|-----------------------------------------------------------------|--------------------------------|---------|
| k <sub>l</sub>     | = turbulentiefactor                                             | = 1.0                          | -       |
| I <sub>v</sub> (z) | = k <sub>l</sub> / [c <sub>o</sub> (z) ln(z / z <sub>0</sub> )] | = 1.0 / (1.0*ln(9.58 / 0.005)) | = 0.132 |

##### Extreme stuwdruk conform NEN-EN 1991-1-4 - 4.5

|                    |                                                                               |                                                                          |                          |
|--------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------|
| ρ                  | = dichtheid van lucht                                                         | = 1.25                                                                   | kg/m <sup>3</sup>        |
| q <sub>p</sub> (z) | = [1 + 7 I <sub>v</sub> (z)] <sup>1/2</sup> ρ V <sub>m</sub> <sup>2</sup> (z) | = [1 + 7*0.132] <sup>1/2</sup> *1.25*33.1 <sup>2</sup> *10 <sup>-3</sup> | = 1.32 kN/m <sup>2</sup> |
| q <sub>b</sub>     | = <sup>1/2</sup> ρ V <sub>b</sub> <sup>2</sup>                                | = <sup>1/2</sup> *1.25*27.0 <sup>2</sup> *10 <sup>-3</sup>               | = 0.46 kN/m <sup>2</sup> |

### Windbelasting op uitzichtpunt

De zijkant van het uitkijkpunt bestaat uit een spijlenhekwerk met een buisprofiel als boven- en onderregel. Gezien de boven- en onderregel van de brug bestaan uit dichte liggers met daartussen een open indeling van slanke stijlen wordt de veiligheidskering als openbrugleuning en open veiligheidskering aan beide zijden beschouwd. De windbelasting wordt verdeeld over de beide zijden middels een beschuttingsfactor (asymmetrisch).

Voor de afmetingen zijn de omhullende afmetingen van het eerste schetsen en het ontwerp t.b.v. de constructie gebruikt. In de UO-fase zullen de definitieve afmetingen gebruikt worden.

#### Algemeen

|                 |                              |         |   |
|-----------------|------------------------------|---------|---|
| L               | = lengte in y-richting       | = 17.52 | m |
| b               | = breedte in x-richting      | = 11.11 | m |
| b <sub>ef</sub> | = eff. breedte in x-richting | = 1.81  | m |
| d               | = diepte in z-richting       | = 0.3   | m |

#### Keuze van de procedure voor responsieberekening conform NEN-EN 1991-1-4 - 8.2

|                               |                   |                            |        |   |
|-------------------------------|-------------------|----------------------------|--------|---|
| c <sub>s</sub> c <sub>d</sub> | = NEN-EN 1991-1-4 | = Figuur D.4; conservatief | = 1.10 | - |
|-------------------------------|-------------------|----------------------------|--------|---|

#### Beschuttingsfactor voor brugleuning conform NEN-EN 1991-1-4 - 7.4.2

|                |                        |                             |        |   |
|----------------|------------------------|-----------------------------|--------|---|
| x              | = hart-op-hart afstand | = zijkanten                 | = 1.81 | m |
| h              | = hart-op-hart afstand | = hoogte                    | = 1.00 | m |
| ρ              | = dichtheid            | = beschutting gevende zijde | = 0.8  | - |
| ψ <sub>s</sub> | = NEN-EN 1991-1-4      | = Figuur 7.20               | = 0.4  | - |

#### Krachtcoëfficiënten in de x-richting conform NEN-EN 1991-1-4 - 8.3.1

|                      |                                                                                                   |                                                                              |        |                   |
|----------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|--------|-------------------|
| d <sub>tot</sub>     | = d + 1.2                                                                                         | = 0.4 + 1.2                                                                  | = 1.6  | m                 |
| c <sub>fx,0</sub>    | = max. {2.2 - 0.275 (b / d <sub>tot</sub> ); 1.3}                                                 |                                                                              |        |                   |
|                      | = max. {2.2 - 0.275*(1.81 / 1.6); 1.3}                                                            | = 1.89                                                                       | -      |                   |
| c <sub>fx</sub>      | = c <sub>fx,0</sub>                                                                               | = 1.89                                                                       | -      |                   |
| c <sub>e</sub>       | = q <sub>p</sub> (z) / q <sub>b</sub>                                                             | = 1.32 / 0.46                                                                | = 2.87 | -                 |
| C                    | = c <sub>e</sub> c <sub>fx</sub>                                                                  | = 2.87*1.89                                                                  | = 5.42 | -                 |
| A <sub>ref,x</sub>   | = d <sub>tot</sub> L                                                                              | = 1.6*17.52                                                                  | = 28.0 | m <sup>2</sup>    |
| F <sub>w,x</sub>     | = c <sub>s</sub> c <sub>d</sub> <sup>1/2</sup> ρ v <sub>b</sub> <sup>2</sup> C A <sub>ref,x</sub> | = 1.10*[ <sup>1/2</sup> *1.25*27.0 <sup>2</sup> *5.42*28.0]*10 <sup>-3</sup> | = 76.1 | kN                |
| p <sub>w,x</sub>     | = F <sub>w,x</sub> / A <sub>ref,x</sub>                                                           | = 76.1 / 28.0                                                                | = 2.72 | kN/m <sup>2</sup> |
| p <sub>w,x,min</sub> | = ψ <sub>s</sub> p <sub>w,x</sub> / (1 + ψ <sub>s</sub> )                                         | = 0.3*2.72 / (1 + 0.3)                                                       | = 0.63 | kN/m <sup>2</sup> |
| p <sub>w,x,max</sub> | = p <sub>w,x</sub> / (1 + ψ <sub>s</sub> )                                                        | = 1.0*2.72 / (1 + 0.3)                                                       | = 2.09 | kN/m <sup>2</sup> |

#### Windkrachten op brugdekken in y-richting (vlak) conform NEN-EN 1991-1-4 - 8.3.4

|                    |                                         |               |        |                   |
|--------------------|-----------------------------------------|---------------|--------|-------------------|
| A <sub>ref,y</sub> | = b <sub>ef</sub> L                     | = 1.81*17.52  | = 31.7 | m <sup>2</sup>    |
| F <sub>w,y</sub>   | = 40% van F <sub>w,x</sub>              | = 0.40*76.1   | = 30.4 | kN                |
| p <sub>w,y</sub>   | = F <sub>w,y</sub> / A <sub>ref,y</sub> | = 31.7 / 30.4 | = 1.04 | kN/m <sup>2</sup> |

#### Windkrachten op brugdekken in de z-richting (vlak) conform NEN-EN 1991-1-4 - 8.3.3

|                                   |                                                                                                                                     |                       |        |                   |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------|-------------------|
| α                                 | = hoek wind met horizontaal                                                                                                         | = horizontaal terrein | ≈ 5    | °                 |
| β                                 | = dwarshelling brugdek                                                                                                              |                       | = 0    | °                 |
| θ                                 | = α + β                                                                                                                             | = 5 + 0               | = 5    | °                 |
| b <sub>ef</sub> /d <sub>tot</sub> | = 1.81 / 1.6                                                                                                                        |                       | = 1.13 | -                 |
| c <sub>f,z</sub>                  | = NEN-EN 1991-1-4                                                                                                                   | = Figuur NB.8 - 8.6   | = 0.90 | -                 |
| A <sub>ref,z</sub>                | = b <sub>ef</sub> L                                                                                                                 | = 1.81*17.52          | = 31.7 | m <sup>2</sup>    |
| F <sub>w,z</sub>                  | = c <sub>s</sub> c <sub>d</sub> [ <sup>1/2</sup> ρ v <sub>b</sub> <sup>2</sup> c <sub>e</sub> c <sub>f,z</sub> A <sub>ref,z</sub> ] |                       |        |                   |
|                                   | = 1.10*[ <sup>1/2</sup> *1.25*27.0 <sup>2</sup> *2.87*0.90*31.7]*10 <sup>-3</sup>                                                   | = 41.0                | kN     |                   |
| p <sub>w,z</sub>                  | = F <sub>w,z</sub> / A <sub>ref,z</sub>                                                                                             | = 41.0 / 31.7         | = 1.29 | kN/m <sup>2</sup> |

#### Windbelastingen op pijlers en vleugels

De windbelastingen op de pijlers (kolommen) en vleugels (liggers) worden conform NEN-EN 1991-1-4 - 8.4.2 berekend als windbelasting op een dodecagonaal met glad oppervlak conform NEN-EN 1991-1-4 - 7.8.

|                    |                                       |             |        |                   |
|--------------------|---------------------------------------|-------------|--------|-------------------|
| p <sub>w,f,0</sub> | = c <sub>f,0</sub> q <sub>p</sub> (z) | = 0.90*1.32 | = 1.19 | kN/m <sup>2</sup> |
|--------------------|---------------------------------------|-------------|--------|-------------------|



### 3.1.5. Sneeuwbelastingen

Conform NEN-EN 1991-1-3 - 6.2 bedraagt de sneeuwophoping bij uitstekende delen en obstakels niet meer dan  $\mu_2 s_k = 2.0 \cdot 0.7 = 1.40 \text{ kN/m}^2$ .

De sneeuwbelasting is niet maatgevend ten opzichte van de verticale verkeersbelastingen en wordt derhalve in het volgende niet meer beschouwd.

### 3.1.6. Thermische belastingen

#### Uitgangspunten

De thermische belastingen zijn vastgesteld conform NEN-EN 1991-1-5 - 6.1.

Het 'dek' is hierbij geclassificeerd als dektype 1 Stalen dek conform NEN-EN 1991-1-1 - 6.1.1.

Voor de temperatuurverschillen van de constructieve elementen boven het dek worden conservatief de belastingen dektype 1 aangehouden voor alle constructieve onderdelen gelegen onder het dek en temperaturen voor constructies boven het grondniveau (helder licht).

#### Gelijkmatige temperatuurcomponent van de brug

$T_0$  = NEN-EN 1991-1-5 - Bijlage A = aanvangstemperatuur = +10 °C

$T_{\max}$  = NEN-EN 1991-1-5 - Tabel 5.2 = +30 °C

$T_{\min}$  = NEN-EN 1991-1-5 - Tabel 5.2 = -25 °C

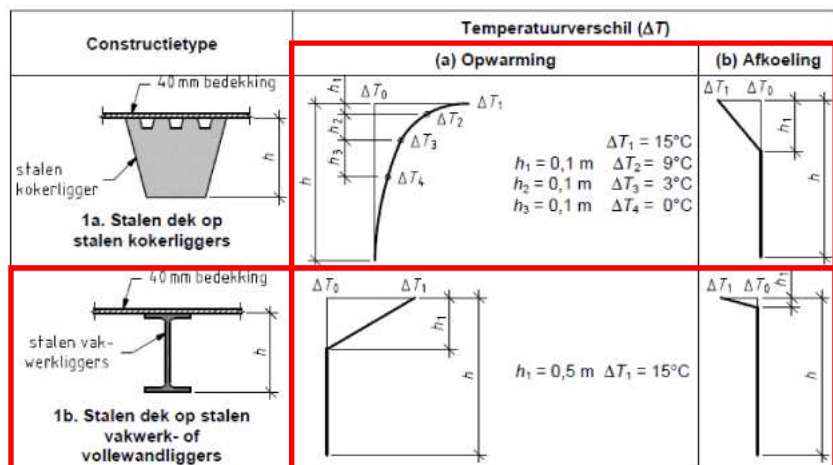
$T_{\text{red}}$  = reductie voor stalen vakwerk- en vollwandliggers =  $\pm 3$  °C

$T_{e,\max}$  = NEN-EN 1991-1-5 - Figuur NB.1 - 6.1 =  $(+30) + (+16) - 3$  = +43 °C

$T_{e,\min}$  = NEN-EN 1991-1-5 - Figuur NB.1 - 6.1 =  $(-25) + (-3) + 3$  = -25 °C

$\Delta T_{N,\text{exp}}$  = NEN-EN 1991-1-5 - 6.1.3.3 (3) =  $(+43) - (+10)$  = +33 °C

$\Delta T_{N,\text{con}}$  = NEN-EN 1991-1-5 - 6.1.3.3 (3) =  $(+10) - (-25)$  = -35 °C



Bij een lengte van ca.  $\sqrt{(17.52^2 + 6.61^2)} = 18.725 \text{ m}$  en een lineaire uitzettingscoëfficiënt van  $\alpha = 10 \times 10^{-6} / ^\circ\text{C}$  conform NEN-EN 1991-1-5 - Tabel C.1 zou de maximale verlening en verkorting ca.  $35 \cdot 18.725 \cdot 10 \cdot 10^{-6} = 6.5 \text{ mm}$  bedragen. Er dient in het detailleren van de verbindingen rekening te worden gehouden met deze vervorming. Indien er van (gedeeltelijke) verhinderde vervorming optreedt worden de hieruit voortkomende spanningen beschouwd.

Alle holle profielen dienen voorzien te worden van een of meerdere gaatjes (en of ontwateringsgaten) ten behoeve van het voorkomen van een atmosferisch drukverschil zoals vermeld in NEN-EN 1991-1-5 - 6.1.3.1. Hiermee is géén rekening gehouden.

### 3.1.7. Buitengewone ontwerpsituaties

Conform NEN-EN 1991-2 - 5.6 dient er gerekend te worden met een buitengewone aanwezigheid van voertuigen op de brug tenzij er een permanent obstakel belet dat een voertuig de brug op wordt gereden. Het is voor een voertuig niet mogelijk om de trap op te rijden.

Deze belasting is dus niet van toepassing en wordt derhalve in het volgende niet meer beschouwd.

### 3.1.8. Belastingen op leuningen

Conform NEN-EN 1991-2 - 5.8 (en 4.8) wordt er een belasting  $3.0 \text{ kN/m}^1$  op de bovenzijde van de leuningen beschouwd, zowel een keer horizontaal als verticaal.

### 3.1.9. Belastingmodel voor landhoofd en muren grenzend aan bruggen

Conform NEN-EN 1991-2 - 5.9 worden de ruimtes naast de toegangsweg en gepositioneerd achter de landhoofden, vleugelwanden, zijwanden en andere delen van het uitkijkpunt die in contact staan met de grond belast met een gelijkmatig verdeelde verticale belasting van  $5 \text{ kN/m}^2$ .

Voor de horizontale gronddruk wordt er uitgegaan van neutrale gronddruk met  $k_n = 1/2$ .

### 3.1.10. Buitengewone belastingen veroorzaakt door wegvoertuigen

#### Stootbelasting op de ondersteunende onderbouw

Conform NEN-EN 1991-1-7 - 4.3.1 dient er te worden gerekend met stootbelastingen op de ondersteunende onderbouw. Het uitkijkpunt is gelegen in een park met geen aanwezige wegen binnen 40 m. Voor wegen in stedelijke gebieden met  $d_b = 10 \text{ m}$  geldt dan een vermenigvuldigingsfactor van  $J(1 - d / d_b) = J(1 - 40 / 10) = 0$ . Er wordt derhalve geen stootbelasting op de bovenbouw van de brug gerekend. In aanvulling op bovenstaande is het uitkijkpunt omgeven door water, een additionele natuurlijke barrière tegen aanrijding.

Gezien er geen wegen nabij de onderbouw zijn en deze niet met voertuigen bereikbaar is wordt er conservatief rekening gehouden met een stootbelasting door een onderhoudsvoertuig met een gewicht  $\leq 3.5 \text{ ton}$ , waarbij het terrein als binnenplaats wordt beschouwd conform Tabel NB.1 - 4.1.

De afstand naar het aanrijdpunt wordt beschouwd als breedte hart 'rijbaan' van  $2.50 / 2 = 1.25 \text{ m}$  plus de minimale randafstand fundering - voetaansluiting van  $0.75 \text{ m}$ , dus  $2 \text{ m}$ . Voor (onderhoud)auto's op binnenplaatsen met  $d_b = 4$  en min.  $2 \text{ m}$  naar geldt er dan een vermenigvuldigingsfactor van  $J(1 - 2 / 4) = 0.5$ . Er wordt derhalve gerekend met een stootbelasting van  $0.5 \times 100 = 50 \text{ kN}$  op een hoogte van  $0.5 \text{ m}$  boven het wegoppervlak (maaiveld).

#### Stootbelasting op de bovenbouw

Conform NEN-EN 1991-1-7 - 4.3.2 dient er te worden gerekend met stootbelastingen op de bovenbouw. Aanrijding van de bovenbouw is gezien de aanwezigheid van het watervolume en omgeving niet mogelijk.

Stootbelasting op de bovenbouw is dus niet van toepassing en wordt derhalve in het volgende niet meer beschouwd.

### 3.1.11. Groepen verkeersbelastingen

Definitie van belastinggroepen conform NEN-EN 1991-2 - Tabel NB.10 - 5.1

| Groep | Verticale krachten                         |                        | Horizontale belastingen |
|-------|--------------------------------------------|------------------------|-------------------------|
|       | Gelijkmatig verdeelde belasting            | Dienstvoertuig         |                         |
| gr1   | Karakteristieke waarde                     | 0                      | Karakteristieke waarde  |
| gr2   | 0.8 x karakteristieke waarde <sup>a)</sup> | Karakteristieke waarde | Karakteristieke waarde  |

a) Niet op de plaats van het dienstvoertuig, inclusief een ruimte van 5 m voor en achter

## 3.2. Belastingcombinaties

### 3.2.1. Momentaanfactoren belastingen

Momentaanfactoren voor voetgangers- en fietsbruggen conform NEN-EN 1990 - Tabel NB.13 - A2.2.

| Belasting                   | Symbool                           |                                                        | $\Psi_0$ | $\Psi_1$          | $\Psi_2$          |
|-----------------------------|-----------------------------------|--------------------------------------------------------|----------|-------------------|-------------------|
| Verkeersbelasting           | gr1                               | Gelijkmatig verdeelde belasting $q_{fk}$               | 0.4      | 0.8 <sup>c)</sup> | 0.4               |
|                             |                                   | Horizontale belasting $Q_{flk}$                        |          |                   |                   |
|                             | gr2                               | Gelijkmatig verdeelde belasting $q_{fk}$ <sup>b)</sup> | 0.4      | 0.8 <sup>b)</sup> | 0                 |
|                             |                                   | Dienstvoertuig $Q_{serv}$                              |          |                   |                   |
|                             |                                   | Horizontale belasting $Q_{flk}$                        |          |                   |                   |
|                             | Onbedoelde voertuig <sup>c)</sup> | 0                                                      | 0.8      | 0                 |                   |
| Windkrachten                | $F_{wk}$                          | Blijvende ontwerpsituatie                              | 0.3      | 0.6               | 0                 |
|                             |                                   | Uitvoering                                             | 0.8      | 0                 | -                 |
| Thermische belastingen      | $T_k$                             | 0.8                                                    | 0.3      | 0.8               | 0.3 <sup>a)</sup> |
| Sneeuwbelastingen           | $Q_{sn,k}$                        | Blijvende ontwerpsituatie                              | 0        | 0                 | 0                 |
|                             |                                   | Uitvoering                                             | 0.8      | 0                 | 0                 |
| Belastingen tijdens de bouw | $Q_c$                             |                                                        | 1.0      | 0                 | 1.0               |

a) In de uiterste grenstoestand kan voor  $\Psi_2$  voor thermische belasting 0 worden aangehouden

b) Voor aanrijding op of onder de brug en aanvaring  $\Psi_1 = 0$

c) Voor aanrijding op of onder de brug en aanvaring  $\Psi_1 = 0.4$

Groepen verkeersbelastingen hoeven niet met elkaar te zijn gecombineerd.



### 3.2.2. Belastingcombinaties uiterste grenstoestanden

Belastingcombinaties conform NEN-EN 1990 - Bijlage A2.

| Blijvende en tijdelijke<br>ontwerpsituaties | Blijvende belastingen |             | Overheersende<br>veranderlijke<br>belasting | Begeleidende veranderlijke<br>belasting |                        |
|---------------------------------------------|-----------------------|-------------|---------------------------------------------|-----------------------------------------|------------------------|
|                                             | Ongunstig             | Gunstig     |                                             | Belangrijkste<br>(indien aanwezig)      | Andere                 |
| (Vlg. 6.10)                                 | $\gamma_{Gsup}$       | $G_{kjsup}$ | $\gamma_{Gjinf}$                            | $G_{kjinf}$                             | $\gamma_{Q1}$ $Q_{k1}$ |

|                 |        |                                             |                             |  |  |
|-----------------|--------|---------------------------------------------|-----------------------------|--|--|
| $\gamma_{Gsup}$ | = 1.05 | algemeen                                    |                             |  |  |
|                 | = 1.35 | bij respons met verschillende waarden       |                             |  |  |
| $\gamma_{Ginf}$ | = 0.95 | algemeen                                    |                             |  |  |
|                 | = 1.25 | bij respons met verschillende waarden       |                             |  |  |
| $\gamma_Q$      | = 1.35 | voor weg- en voetgangersverkeersbelastingen | (0 ingeval ze gunstig zijn) |  |  |
| $\gamma_Q$      | = 1.5  | voor alle andere veranderlijke belastingen  | (0 ingeval ze gunstig zijn) |  |  |

Tabel 3.a Tabel NB.12 - A2.4(B) - Rekenwaarden voor de belastingen in CC2 (STR/GEO) (groep B)

| Blijvende en tijdelijke<br>ontwerpsituaties | Blijvende belastingen |                   | Overheersende<br>veranderlijke<br>belasting | Begeleidende veranderlijke<br>belasting |                                    |
|---------------------------------------------|-----------------------|-------------------|---------------------------------------------|-----------------------------------------|------------------------------------|
|                                             | Ongunstig             | Gunstig           |                                             | Belangrijkste<br>(indien aanwezig)      | Andere                             |
| (Vlg. 6.10a)                                | $\gamma_{Gsup}$       | $G_{kjsup}$       | $\gamma_{Gjinf}$                            | $G_{kjinf}$                             | $\gamma_{Q1}$ $\psi_{01}$ $Q_{k1}$ |
| (Vlg. 6.10b)                                | $\gamma_{Gsup}$       | $\xi$ $G_{kjsup}$ | $\gamma_{Gjinf}$                            | $G_{kjinf}$                             | $\gamma_{Q1}$ $\psi_{0i}$ $Q_{ki}$ |

|                     |        |                     |                   |                             |  |
|---------------------|--------|---------------------|-------------------|-----------------------------|--|
| $\gamma_{Gsup}$     | = 1.30 | vergelijking 6.10a  |                   |                             |  |
| $\xi \gamma_{Gsup}$ | = 1.20 | vergelijking 6.10b  |                   |                             |  |
| $\gamma_{Ginf}$     | = 0.9  |                     |                   |                             |  |
| $\gamma_Q$          | = 1.35 | verkeersbelastingen | (met $\psi = 1$ ) | (0 ingeval ze gunstig zijn) |  |
| $\gamma_Q$          | = 1.5  | overig veranderlijk | (met $\psi = 1$ ) | (0 ingeval ze gunstig zijn) |  |

Tabel 3.b Tabel NB.15 - A2.4(C) - Rekenwaarden voor de belastingen (STR/GEO) (groep C)

| Blijvende en tijdelijke<br>ontwerpsituaties | Blijvende belastingen |             | Overheersende<br>veranderlijke<br>belasting | Begeleidende veranderlijke<br>belasting |                                    |
|---------------------------------------------|-----------------------|-------------|---------------------------------------------|-----------------------------------------|------------------------------------|
|                                             | Ongunstig             | Gunstig     |                                             | Belangrijkste<br>(indien aanwezig)      | Andere                             |
| (Vlg. 6.10a)                                | $\gamma_{Gsup}$       | $G_{kjsup}$ | $\gamma_{Gjinf}$                            | $G_{kjinf}$                             | $\gamma_{Q1}$ $\psi_{0i}$ $Q_{ki}$ |

|                 |        |                                            |                             |  |  |
|-----------------|--------|--------------------------------------------|-----------------------------|--|--|
| $\gamma_{Gsup}$ | = 1    |                                            |                             |  |  |
| $\gamma_{Ginf}$ | = 1.00 |                                            |                             |  |  |
| $\gamma_Q$      | = 1.15 | voor verkeersbelastingen                   | (0 ingeval ze gunstig zijn) |  |  |
| $\gamma_Q$      | = 1.30 | voor alle andere veranderlijke belastingen | (0 ingeval ze gunstig zijn) |  |  |

### 3.2.3. Belastingcombinaties bruikbaarheids- en andere specifieke grenstoestanden

Belastingcombinaties conform NEN-EN 1990 - Bijlage A2.

| Combinatie     | Blijvende belastingen |             | Overheersende veranderlijke belasting | Begeleidende veranderlijke belasting |                    |
|----------------|-----------------------|-------------|---------------------------------------|--------------------------------------|--------------------|
|                | Ongunstig             | Gunstig     |                                       | Belangrijkste (indien aanwezig)      | Andere             |
| Karakteristiek | $G_{kjsup}$           | $G_{kjinf}$ | $Q_{k1}$                              | -                                    | $\psi_{0i} Q_{ki}$ |
| Frequent       | $G_{kjsup}$           | $G_{kjinf}$ | $\psi_{11} Q_{k1}$                    | -                                    | $\psi_{2i} Q_{ki}$ |
| Quasi-blijvend | $G_{kjsup}$           | $G_{kjinf}$ | $\psi_{21} Q_{k1}$                    | -                                    | $\psi_{2i} Q_{ki}$ |

## 4. Uitgangspunten constructief ontwerp

### 4.1. Materialen

#### Beton

##### Constructieve onderdelen

Betonkwaliteit, milieuklasse, dekking en scheurwijdte conform hoofdstuk 4.2.

| Beton          | C30/37 | [Eenheid]         |
|----------------|--------|-------------------|
| $f_{ck}$       | 30     | N/mm <sup>2</sup> |
| $f_{cm}$       | 38     | N/mm <sup>2</sup> |
| $f_{cd}$       | 20.0   | N/mm <sup>2</sup> |
| $f_{ctm}$      | 2.90   | N/mm <sup>2</sup> |
| $f_{ctk,0.05}$ | 2.03   | N/mm <sup>2</sup> |
| $f_{ctd}$      | 1.35   | N/mm <sup>2</sup> |
| $E_{cm}$       | 33000  | N/mm <sup>2</sup> |
| $E_{cm}^*$     | 11400  | N/mm <sup>2</sup> |

##### Mortelvoegen

|        |     |                          |
|--------|-----|--------------------------|
| Prefab | K70 | aangieten                |
| Staal  | K70 | aangieten / ondersabelen |

| Mortel (28 dagen) | K70 | [Eenheid]         |
|-------------------|-----|-------------------|
| Buigtreksterkte   | 10  | N/mm <sup>2</sup> |
| Druksterkte       | 91  | N/mm <sup>2</sup> |

##### Wapeningsstaal

|      |       |
|------|-------|
| Alle | B500B |
|------|-------|

| Wapeningsstaal | B500B  | [Eenheid]         |
|----------------|--------|-------------------|
| $f_{yk}$       | 500    | N/mm <sup>2</sup> |
| $f_{yd}$       | 435    | N/mm <sup>2</sup> |
| $E_s$          | 200000 | N/mm <sup>2</sup> |



## Staal

### Constructieve onderdelen (tenzij anders vermeld)

Alle aan te sluiten delen uitvoeren in dezelfde staalkwaliteit als het constructieve onderdeel.

Toelaatbare staalspanning gereduceerd conform NEN-EN 1993-1-10 indien de staaldikte groter is dan 40 mm.

De staalconstructie wordt uitgevoerd in executieklasse EXC2.

Algemeen S235 / S355

Buizen en kokers S275 / S355 warmgewalst

| Constructiestaal | S235   | S275   | S355   | [Eenheid]         |
|------------------|--------|--------|--------|-------------------|
| $f_y$            | 235    | 275    | 355    | N/mm <sup>2</sup> |
| $f_u$            | 360    | 430    | 490    | N/mm <sup>2</sup> |
| E                | 210000 | 210000 | 210000 | N/mm <sup>2</sup> |

### Bevestigingen (tenzij anders vermeld)

Bouten 8.8 gerolde draad

Ankerbouten 8.8 gerolde draad ankerplaat

Tabel 4.a Materiaaleigenschappen bevestigingen

| Bevestigingen | 8.8 | [Eenheid]         |
|---------------|-----|-------------------|
| $f_{yb}$      | 640 | N/mm <sup>2</sup> |
| $f_{ub}$      | 800 | N/mm <sup>2</sup> |

### Executieklasse

Aangezien het een brug betreft voor langzaam verkeer is deze volgens NEN-EN 1090-2 - Tabel B.1 indeelbaar in gebruikscategorie SC1. Dan valt de constructie conform Tabel.3 SC1 + CC2 = EXC2.

| Categorieën | Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SC1</b>  | <ul style="list-style-type: none"> <li>Constructies en onderdelen ontworpen en berekend voor quasistatische belasting (voorbeeld: gebouwen)</li> <li>Constructies en onderdelen waarvan de verbindingen zijn ontworpen en berekend voor aardbevingsbelastingen in gebieden met lage aardbevingsactiviteit en in DCL*</li> <li>Constructies en onderdelen ontworpen en berekend voor vermoeingsbelastingen door kranen (klasse S<sub>0</sub>)**</li> </ul>                                                                                          |
| <b>SC2</b>  | <ul style="list-style-type: none"> <li>Constructies en onderdelen ontworpen en berekend voor vermoeingsbelastingen volgens EN 1993 (voorbeelden: wegverkeers- en spoorwegbruggen, kranen (klasse S<sub>1</sub> tot en met S<sub>0</sub>)**, constructies gevoelig voor door wind, publiek of draaiende machines veroorzaakte trillingen)</li> <li>Constructies en onderdelen waarvan de verbindingen zijn ontworpen en berekend voor aardbevingsbelastingen in gebieden met gemiddelde of hoge aardbevingsactiviteit en in DCM* en DCH*</li> </ul> |

\* DCL, DCM, DCH: ductiliteitsklasse volgens EN 1998-1.  
\*\* Voor indeling van vermoeingsbelasting door kranen, zie EN 1991-3 en EN 13001-1.

Tabel 4.b. Tabel B.3 - Aanbevolen matrix voor de bepaling van de uitvoeringsklassen.

| Gevolgklasse          | CC1 |      | CC2  | CC3  |                   |                   |
|-----------------------|-----|------|------|------|-------------------|-------------------|
| Gebruikscategorieën   | SC1 | SC2  | SC1  | SC2  | SC1               | SC2               |
| Productie-categorieën | PC1 | EXC1 | EXC2 | EXC3 | EXC3 <sup>a</sup> | EXC3 <sup>a</sup> |
|                       | PC2 | EXC2 | EXC2 | EXC3 | EXC3 <sup>a</sup> | EXC4              |

<sup>a</sup> EXC4 behoort van toepassing te zijn bij speciale constructies of constructies met extreme gevolgen bij constructief bezwijken zoals vereist in nationale regelgeving.

### Voegovergangen

Voegrubbers conform opgave leverancier.

### Grond

Gewapende grond (geogrids) en of grondverbetering conform opgave leverancier.

## 4.2. Betonkwaliteit, milieuklasse, dekking en scheurwijdte

### Algemeen

De gegeven betonkwaliteiten zijn de minimale kwaliteiten. Deze kunnen tijdens als gevolg van een uitvoeringsberekening nog wijzigen (hoger worden). De gegeven dekking is de minimale dekking.

### Uitgangspunten

- 1) Constructieklasse S4 (ontwerplevensduur 50 jaar en betonkwaliteit min. C30/37).
- 2) Poeren, funderingsbalken en liftvloeren gestort op werkvloer.
- 3) Poeren, funderingsbalken en liftwanden gestort tegen bekisting.
- 4) Bij plaatgeometrie constructieklasse gereduceerd met 1.
- 5) Reductie constructieklasse in verband met eventuele hogere betonkwaliteit of kwaliteitsbeheersing betonproductie niet gerekend.

| Onderdeel | Opmerkingen          | Beton-kwaliteit | Zijde  | Milieuklasse               | C <sub>toeg</sub><br>[mm] | W <sub>max</sub><br>[mm] |
|-----------|----------------------|-----------------|--------|----------------------------|---------------------------|--------------------------|
| Fundering | CEM III<br>werkvloer | C30/37          | rondom | XA3, XC4, XD3,<br>XF4, XS4 | 55                        | 0.2                      |

|                    |                                        |                                                     |
|--------------------|----------------------------------------|-----------------------------------------------------|
| C <sub>min</sub>   | = max.                                 | (C <sub>min,b</sub> ; C <sub>min,dur</sub> ; 10 mm) |
| C <sub>nom</sub>   | = C <sub>min</sub> + ΔC <sub>dev</sub> |                                                     |
| ΔC <sub>dev</sub>  | = 5 mm                                 | (uitvoeringstolerantie)                             |
|                    | = 10 mm                                | (bij storten tegen een werkvloer)                   |
|                    | = 50 mm                                | (bij storten op of tegen grond)                     |
| C <sub>min,b</sub> | = Ø                                    | (afzonderlijke staaf)                               |
|                    | = √(n Ø <sub>n</sub> )                 | (bundel van n staven)                               |
| C <sub>toeg</sub>  | ≥ C <sub>nom</sub>                     |                                                     |

## 4.3. Toegepaste software en programmatuur

### Rekensoftware

|                         |             |
|-------------------------|-------------|
| MatrixFrame             | versie 5.5  |
| MatrixFrame Toolbox     | versie 5.5  |
| SCIA Engineer           | versie 19.1 |
| Technosoft verbindingen | versie 6.0  |

### Overige software

|                  |             |
|------------------|-------------|
| Microsoft Office | versie 2019 |
|------------------|-------------|

## 5. Staalconstructie

### 5.1. Berekeningswijze

De constructie wordt opgedeeld in de twee maatgevende delen, namelijk de uitkragende vleugel en de trapboom. Deze worden met behulp van de ontwikkelde lengtes en maten ingevoerd in het 2-D rekenprogramma MatrixFrame. Met behulp van het rekenprogramma wordt de sterkte en stabiliteit van het staal getoetst en de doorbuiging en verplaatsing van het model beoordeeld.

Met behulp van eenheidslasten wordt er middels eenvoudige handberekeningen indicatief een afschatting gemaakt van de al dan niet te verwachten eigenfrequenties en trillingen.

Voor de fundering wordt er getoetst of de optredende belastingen naar verwachting op te nemen zijn middels de beschouwde (paal)fundering.

In de UO-fase zal er een 3-D model van het gehele uitkijkpunt gemaakt dienen te worden, waarin alle belastingen gelijktijdig op het model gezet kunnen worden.

N.B.1: in deze fase zijn er nog geen veren onder de fundering gemodelleerd. Deze veerwaarden (zowel verticaal als horizontaal) zullen de in UO-fase opgegeven worden door de geotechnisch adviseur en gemodelleerd worden.

## 5.2. Traptreden, leuning en balusters

### Uitgangspunten en gegevens

De traptreden bestaan uit T-stukken samengesteld uit staalplaten, welke gebout op strippen bevestigd aan de onderregel. De leuning bestaat uit een constructieve onder- en bovenregel die deel uitmaken van een vakwerk in de trapboom. Daartussen worden strippen toegepast met een maximale netto tussenopening van 100 mm. De strippen worden beschouwd als steun langs een trap. Het geheel wordt gesteund door balusters.

### Belastingen

#### Belastingen op traptreden

|       |                             |        |                   |
|-------|-----------------------------|--------|-------------------|
| $p_Q$ | = conform verkeersbelasting | = 4.50 | kN/m <sup>2</sup> |
| $F_k$ | = conservatief              | = 7.00 | kN                |

#### Belastingen op strippen

|       |                                            |        |    |
|-------|--------------------------------------------|--------|----|
| $F_k$ | = conform NEN-EN 1991-1-1 - Bijlage NB.A.1 | = 1.00 | kN |
|-------|--------------------------------------------|--------|----|

#### Belastingen op regels

|       |                                 |        |                   |
|-------|---------------------------------|--------|-------------------|
| $q_G$ | = 0.10 + 0.20                   | = 0.30 | kN/m <sup>1</sup> |
| $q_k$ | = conform NEN-EN 1992-1-2 - 4.8 | = 3.00 | kN/m <sup>1</sup> |

#### Belastingen op balusters

|       |             |        |    |
|-------|-------------|--------|----|
| $F_k$ | = 1.60*3.00 | = 4.80 | kN |
|-------|-------------|--------|----|

### Controle sterkte en stabiliteit

#### Controle traptreden - T-stuk 320 - 385 x 160 x 8 mm (S235)

|          |                                                                  |            |                   |
|----------|------------------------------------------------------------------|------------|-------------------|
| $q_d$    | = 1.2*0.32*1.00                                                  | = 0.38     | kN/m <sup>1</sup> |
|          | = 1.5*4.50                                                       | = 6.75     | kN/m <sup>1</sup> |
| $F_d$    | = 1.5*7.00                                                       | = 10.5     | kN                |
| $M_{Ed}$ | = $\frac{1}{8} * 7.36 * 1.80^2$                                  | = 2.98     | kNm               |
|          | = $\frac{1}{8} * 0.38 * 1.80^2 + \frac{1}{4} * 10.5 * 1.80$      | = 4.88     | kNm               |
| $A$      | = 8*152 + 320*8                                                  | = 3776     | mm <sup>2</sup>   |
| $z_{zp}$ | = $(8*152*76 + 320*8*156) / 3776$                                | ≈ 130      | mm                |
| $I_y$    | = $\frac{1}{12} * (8*152^3 + 320*8^3) + 8*152*54^2 + 320*8*26^2$ | = 7631275  | mm <sup>4</sup>   |
| $W_y$    | = 7631275 / 130                                                  | = 58702    | mm <sup>3</sup>   |
| $M_{Rd}$ | = $(58702*235) * 10^{-6}$                                        | = 13.8     | kNm               |
| u.c.     | = 4.88 / 13.8                                                    | = 0.35 < 1 | → voldoet         |

#### Controle strippen - 5 x 50 h.o.h. 105 mm (S235)

|          |                                              |            |                   |
|----------|----------------------------------------------|------------|-------------------|
| $q_d$    | = 1.5*1.00                                   | = 1.50     | kN/m <sup>1</sup> |
| $M_{Ed}$ | = $\frac{1}{4} * 1.50 * 1.00$                | = 0.38     | kNm               |
| $M_{Rd}$ | = $(\frac{1}{6} * 5 * 50^2 * 235) * 10^{-6}$ | = 0.49     | kNm               |
| u.c.     | = 0.38 / 0.49                                | = 0.78 < 1 | → voldoet         |

#### Controle bovenregel - Ø114.3 x 4 mm (S275)

|          |                                 |            |                   |
|----------|---------------------------------|------------|-------------------|
| $q_d$    | = 1.2*0.30 + 1.5*3.00           | = 4.86     | kN/m <sup>1</sup> |
| $M_{Ed}$ | = $\frac{1}{8} * 4.86 * 1.60^2$ | = 1.56     | kNm               |
| $M_{Rd}$ | = $(36930 * 235) * 10^{-6}$     | = 8.68     | kNm               |
| u.c.     | = 1.44 / 8.68                   | = 0.17 < 1 | → voldoet         |

#### Controle balusters - Ø139.7 x 4 mm (S275)

|           |                             |            |           |
|-----------|-----------------------------|------------|-----------|
| $F_{H,d}$ | = 1.5*1.60*3.00             | = 7.20     | kN        |
| $M_{Ed}$  | = 7.20*1.00                 | = 7.20     | kNm       |
| $M_{Rd}$  | = $(56240 * 235) * 10^{-6}$ | = 13.2     | kNm       |
| u.c.      | = 7.20 / 13.2               | = 0.55 < 1 | → voldoet |



## Beoordeling doorbuiging en verplaatsing

### Beoordeling doorbuiging - traptreden

$$\begin{aligned}
 w_{\max} &= 5 \cdot 1.76 \cdot 1800^4 / (384 \cdot 210000 \cdot 7631275) &= 0.15 &\text{mm} \\
 &= (5 \cdot 0.32 \cdot 1800^4 / 384 + 7000 \cdot 1800^3 / 48) / (210000 \cdot 7631275) &= 0.56 &\text{mm} \\
 w_{\text{toel}} &= 1/800 \cdot 1800 &= 2.25 &\text{mm} \\
 \text{u.c.} &= 0.56 / 2.25 &= 0.25 < 1 &\rightarrow \text{akkoord}
 \end{aligned}$$

### Beoordeling horizontale verplaatsing - strippen

$$\begin{aligned}
 v_{\max} &= 1000 \cdot 1000^3 / (48 \cdot 210000 \cdot 1/12 \cdot 5 \cdot 50^3) &= 1.90 &\text{mm} \\
 v_{\text{toel}} &= 0.01 \cdot 500 &= 5.00 &\text{mm} \\
 \text{u.c.} &= 1.90 / 5.00 &= 0.38 < 1 &\rightarrow \text{akkoord}
 \end{aligned}$$

### Beoordeling verticale doorbuiging - bovenregel

$$\begin{aligned}
 w_{\max} &= 5 \cdot (0.30 + 3.00) \cdot 1600^4 / (384 \cdot 210000 \cdot 2110000) &= 0.64 &\text{mm} \\
 w_{\text{toel}} &= 1/150 \cdot 1600 &= 10.7 &\text{mm} \\
 \text{u.c.} &= 0.64 / 10.7 &= 0.06 < 1 &\rightarrow \text{akkoord}
 \end{aligned}$$

### Beoordeling horizontale verplaatsing - bovenregel en leuning

$$\begin{aligned}
 v_{\max} &= [4800 \cdot 1000^3 / (3 \cdot 3929000) + 5 \cdot 3.00 \cdot 1600^4 / (384 \cdot 2110000)] / 210000 &= 2.52 &\text{mm} \\
 v_{\text{toel}} &= 0.01 \cdot 1000 &= 10.0 &\text{mm} \\
 \text{u.c.} &= 2.52 / 10.0 &= 0.25 < 1 &\rightarrow \text{akkoord}
 \end{aligned}$$

## Conclusie leuningen en balusters

Met behulp van de berekeningen in dit hoofdstuk is aannemelijk gemaakt dat de traptreden en de leuningconstructie inclusief balusters voldoet op sterkte en bruikbaarheid. In de volgende fase zal er met behulp van een 3-D model getoetst dienen te worden of de constructie als geheel excl. de traptreden ook aan deze eisen en richtlijnen voldoet, onder andere onder invloed van bijvoorbeeld temperatuurspanningen.

## 5.3. Sterkte en stabiliteit

### 5.3.1. Vleugels

#### **Uitgangspunten**

Maatgevende vleugel betreft de uitkragende vleugel (niet ondersteund). De vleugels worden uitgevoerd als vakwerk waar deze voorzien zijn van een wand er daarna als doorgaande stalen buis waarbij de onderregel doorloopt. De vleugel wordt ter plekke van de verbindingen met het trapgedeelte afgesteund naar de stalen kolommen, welke in dwarsrichting ingeklemd zijn in de fundering. In dwarsrichting worden de vleugels momentvast bevestigd tegen het trapgedeelte. In verticale richting worden de belastingen door het eigen gewicht en de stijlen en de windbelasting gerekend. In horizontale richting wordt de windbelasting op de onderregel gerekend en ter plekke van de leuning wordt ook de horizontale belasting uit de wind gerekend. Voor de kniklengte van de bovenregel wordt  $2 l_{sys}$  aangehouden en voor de onderregel  $l_{sys}$ . Voor de kniklengte van de kolom wordt zijdelings  $2 l_{sys}$  aangehouden en in langsrichting  $l_{sys}$ .

#### **Belastingen**

|       |                      |          |                 |
|-------|----------------------|----------|-----------------|
| $q_G$ | $= 1.00 \cdot 0.20$  | $= 0.20$ | $\text{kN/m}^1$ |
| $q_w$ | $= 0.267 \cdot 1.19$ | $= 0.35$ | $\text{kN/m}^1$ |

#### **Controle sterkte en stabiliteit**

##### Controle bovenregel

|            |                                         |          |                 |
|------------|-----------------------------------------|----------|-----------------|
| $q_d$      | $= 1.5 \cdot 0.35$                      | $= 0.53$ | $\text{kN/m}^1$ |
| $V_{y,Ed}$ | $= \frac{1}{2} \cdot 0.53 \cdot 7.76$   | $= 2$    | $\text{kN}$     |
| $M_{z,Ed}$ | $= \frac{1}{8} \cdot 0.53 \cdot 7.76^2$ | $= 4$    | $\text{kNm}$    |

##### Controle onderregel

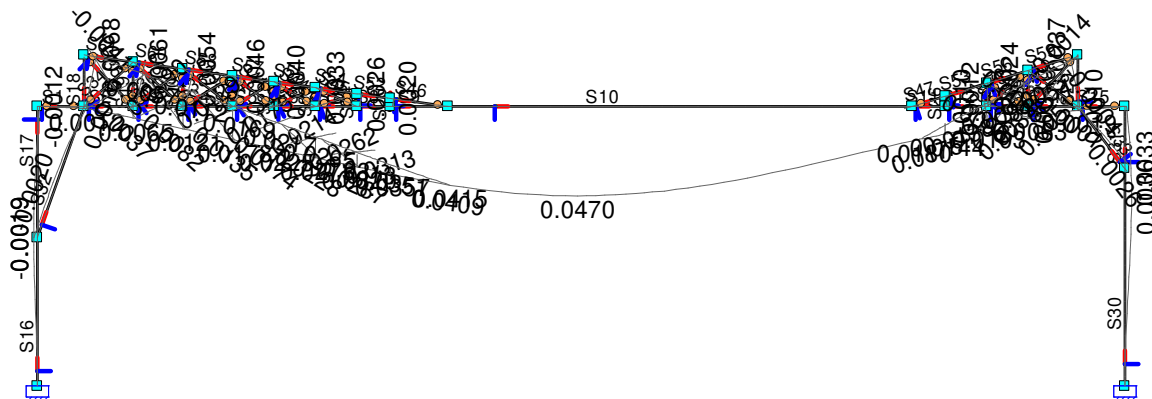
|            |                                         |          |                 |
|------------|-----------------------------------------|----------|-----------------|
| $q_d$      | $= 1.5 \cdot 0.35$                      | $= 0.53$ | $\text{kN/m}^1$ |
| $V_{y,Ed}$ | $= \frac{1}{2} \cdot 0.53 \cdot 19.2$   | $= 5$    | $\text{kN}$     |
| $M_{z,Ed}$ | $= \frac{1}{8} \cdot 0.53 \cdot 19.2^2$ | $= 24$   | $\text{kNm}$    |

##### Controle sterkte en stabiliteit

|      |                                    |       |                       |
|------|------------------------------------|-------|-----------------------|
| u.c. | $=$ zie bijlage computerberekening | $< 1$ | $\rightarrow$ voldoet |
|------|------------------------------------|-------|-----------------------|

### Beoordeling verticale doorbuiging

|                   |                       |            |           |
|-------------------|-----------------------|------------|-----------|
| $W_{\max}$        | = conform MatrixFrame | = 47.0     | mm        |
| $W_{\text{toel}}$ | = $1/250 \cdot 19200$ | = 76.8     | mm        |
| u.c.              | = 47.0 / 76.8         | = 0.61 < 1 | → akkoord |



### Beoordeling horizontale verplaatsing

|                   |                                                         |            |           |
|-------------------|---------------------------------------------------------|------------|-----------|
| $V_{\max}$        | = $0.35 \cdot 9600^4 / (8 \cdot 210000 \cdot 29600000)$ | = 59.8     | mm        |
| $V_{\text{toel}}$ | = $2/250 \cdot 9600$                                    | = 76.8     | mm        |
| u.c.              | = 59.8 / 76.8                                           | = 0.78 < 1 | → akkoord |

### Beoordeling uitwijking

|                        |                                          |            |           |
|------------------------|------------------------------------------|------------|-----------|
| $\delta_{\max}$        | = $\sqrt{47.0^2 + 59.8^2}$               | = 76.1     | mm        |
| $\delta_{\text{toel}}$ | = $1/250 \cdot 19200 = 2/250 \cdot 9600$ | = 76.8     | mm        |
| u.c.                   | = 76.1 / 76.8                            | = 0.99 < 1 | → akkoord |

### 5.3.2. Trapboom

#### Uitgangspunten

Maatgevende trapboom betreft die aan de lange zijde, waaraan de uitkragende vleugel verbonden is. Trapboom kopgebouw als vakwerk met stripstaal hekwerk daar tussensin. De trapboom is opgebouwd uit een stalen boven- en onderregel met daartussen staanders en diagonalen. Op deze wijze is ook het uitkragend gedeelte opgehangen. Delingen kunnen gemaakt worden ter plekke van de kolommen. De kolommen worden schuin geschoord en steunen ook de vleugels af. Ter plekke van de schoren en de kolommen worden er stalen liggers in de trap voorzien. Voor het overige worden er plaatstalen traptreden tussen de onderregel geplaatst als loopvlak. De kolommen worden aan de onderzijde scharnierend op de fundering aangesloten en in zijdelings richting ingeklemd. Voor de kniklengte van de bovenregel wordt  $2 l_{sys}$  aangehouden en voor de onderregel  $l_{sys}$ . Voor de kniklengte van de kolom wordt zijdelings  $2 l_{sys}$  aangehouden en in langsrichting  $l_{sys}$ . Voor de verdeling windbelasting bovenregel - onderregel wordt  $1/3 - 2/3$  aangehouden.

#### Belastingen

Belastingen door uitkragende vleugel conform MatrixFrame, zie ook hoofdstuk 5.3.1.

Voor de staartvleugel wordt de halve belasting van de uitkragende vleugel aangenomen.

|           |                                     |              |                 |
|-----------|-------------------------------------|--------------|-----------------|
| $q_{V,G}$ | $= 0.90 \cdot 1.00$                 | $= 0.90$     | $\text{kN/m}^1$ |
|           | $= 1.50 \cdot 1.00$                 | $= 1.50$     | $\text{kN/m}^1$ |
| $q_{H,G}$ | $= 1.00 \cdot 0.20$                 | $= 0.20$     | $\text{kN/m}^1$ |
| $q_{V,Q}$ | $= 0.90 \cdot 4.50$                 | $= 4.05$     | $\text{kN/m}^1$ |
|           | $= 1.50 \cdot 4.50$                 | $= 6.75$     | $\text{kN/m}^1$ |
| $q_{H,Q}$ | $= 0.10 \cdot 4.05$                 | $= 0.405$    | $\text{kN/m}^1$ |
|           | $= 0.10 \cdot 6.75$                 | $= 0.675$    | $\text{kN/m}^1$ |
| $q_{w,x}$ | $= 0.90 \cdot 2.09$                 | $= 1.88$     | $\text{kN/m}^1$ |
|           | $= 1.50 \cdot 2.09$                 | $= 3.14$     | $\text{kN/m}^1$ |
| $q_{w,y}$ | $= 1/3 \cdot 2.09$                  | $= 0.70$     | $\text{kN/m}^1$ |
|           | $= 2/3 \cdot 2.09$                  | $= 1.39$     | $\text{kN/m}^1$ |
| $q_{w,z}$ | $= 0.90 \cdot 1.29$                 | $= 1.16$     | $\text{kN/m}^1$ |
|           | $= 1.50 \cdot 1.29$                 | $= 1.94$     | $\text{kN/m}^1$ |
| $F_{EG}$  | = eigen gewicht vleugel hoog        | $= 10.7$     | $\text{kN}$     |
|           | = eigen gewicht vleugel laag        | $= 9.28$     | $\text{kN}$     |
| $F_G$     | = permanente belasting vleugel hoog | $= 0.81$     | $\text{kN}$     |
|           | = permanente belasting vleugel laag | $= 0.51$     | $\text{kN}$     |
| $F_w$     | = windbelasting vleugel hoog        | $= \pm 3.40$ | $\text{kN}$     |
|           | = windbelasting vleugel laag        | $= \pm 3.32$ | $\text{kN}$     |

#### Controle sterkte en stabiliteit

##### Controle bovenregel

|            |                                 |          |                 |
|------------|---------------------------------|----------|-----------------|
| $q_d$      | $= 1.5 \cdot 0.70$              | $= 1.05$ | $\text{kN/m}^1$ |
| $V_{y,Ed}$ | $= 1/2 \cdot 1.05 \cdot 7.12$   | $= 4$    | $\text{kN}$     |
| $M_{z,Ed}$ | $= 1/8 \cdot 1.05 \cdot 7.12^2$ | $= 7$    | $\text{kNm}$    |

##### Controle onderregel

|            |                                             |          |                 |
|------------|---------------------------------------------|----------|-----------------|
| $q_d$      | $= 1.5 \cdot 1.39$                          | $= 2.09$ | $\text{kN/m}^1$ |
| $V_{y,Ed}$ | $= 1/2 \cdot 2.09 \cdot (0.7 \cdot 7.12)$   | $= 5$    | $\text{kN}$     |
| $M_{z,Ed}$ | $= 1/8 \cdot 2.09 \cdot (0.7 \cdot 7.12^2)$ | $= 9$    | $\text{kNm}$    |

##### Controle sterkte en stabiliteit

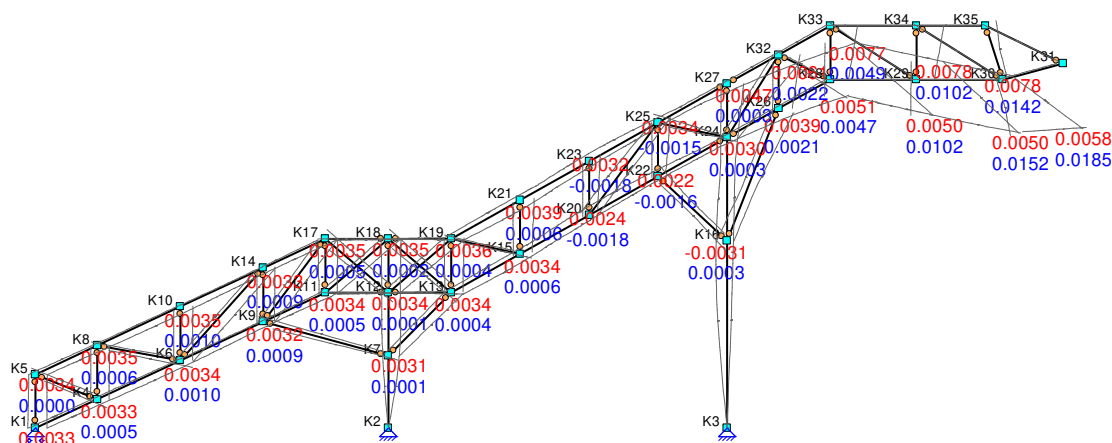
u.c. = zie bijlage computerberekening

< 1 → voldoet



### Beoordeling verticale doorbuiging

|            |                                          |              |           |
|------------|------------------------------------------|--------------|-----------|
| $W_{init}$ | = conform MatrixFrame                    | = 3.3        | mm        |
| $W_{max}$  | = conform MatrixFrame                    | = 15.2       | mm        |
| $W_{zeeg}$ | = $3.3 + \frac{1}{3} \cdot (15.2 - 3.3)$ | $\approx 10$ | mm        |
| $W_{toel}$ | = $\frac{2}{800} \cdot 5120$             | = 12.8       | mm        |
| u.c.       | = $(15.2 - 10) / 12.8$                   | = 0.41 < 1   | → akkoord |



### Beoordeling horizontale verplaatsing en uitwijking

De horizontale verplaatsing en uitwijking is niet maatgevend ten opzichte van de verticale en horizontale belasting die op de leuningen en balusters gerekend dient te worden, zie ook hoofdstuk 5.2.

### 5.3.3. Trapboom aangepast ontwerp architect

De architect heeft de voorkeur gegeven voor een ontwerp bestaande uit een vakwerk met alleen diagonalen in plaats van het vakwerk zoals in 5.3.2).

In deze paragraaf is deze wijziging beoordeeld aan de hand van een vergelijk van doorbuiging en spanning in de trapboom. Hierbij is 2D het raamwerk opgezet aan de hand van het huidige ontwerp en vergeleken met het in dit rapport berekende ontwerp.

#### Belastingen

De belastingen veranderen niet en zijn dus hetzelfde als berekend in 5.3.2.

#### Controle sterkte en stabiliteit

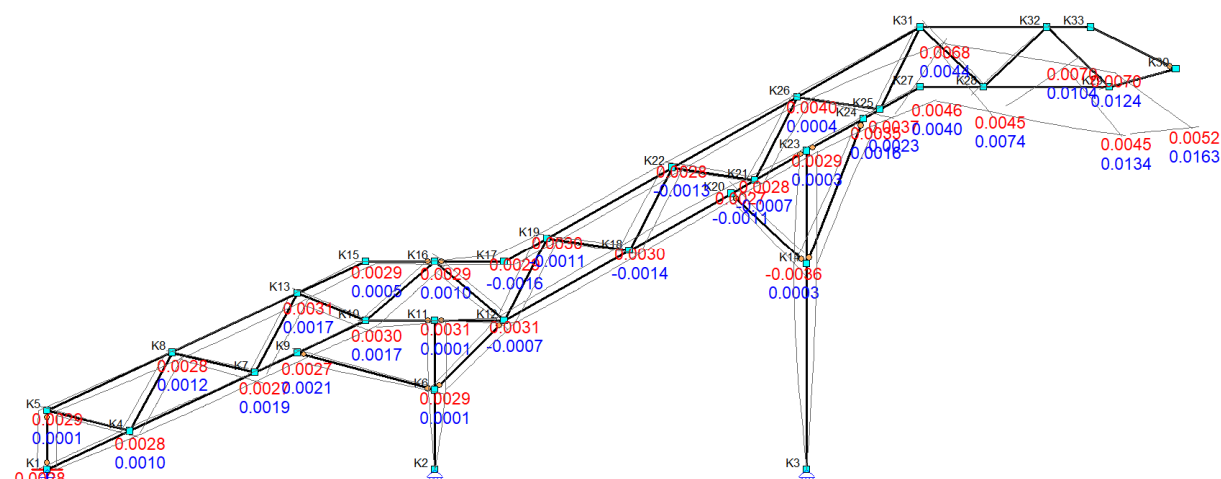
u.c. = zie bijlage computerberekening

< 1 → voldoet

#### Doorbuiging

De doorbuiging is, zoals in onderstaande afbeelding te zien, geringer dan in het vakwerk met verticalen spijlen. Hiermee is voor deze fase aangetoond dat de beoordeelde dimensies in dit document voor deze fase voldoende beoordeeld zijn.

Definitieve 3D berekeningen worden in de volgende fase verder uitgewerkt zoals al beschreven in dit document.



## 5.4. Eigenfrequentie en trillingen

De berekeningen in deze paragraaf zijn gebaseerd op het oude ontwerp echter de doorbuigingen zijn geringer bij het nieuwe ontwerp, zoals aangetoond in 5.3.3, waardoor trillingen ook minder maatgevend zullen zijn.

### 5.4.1. Vleugels

#### Uitgangspunten

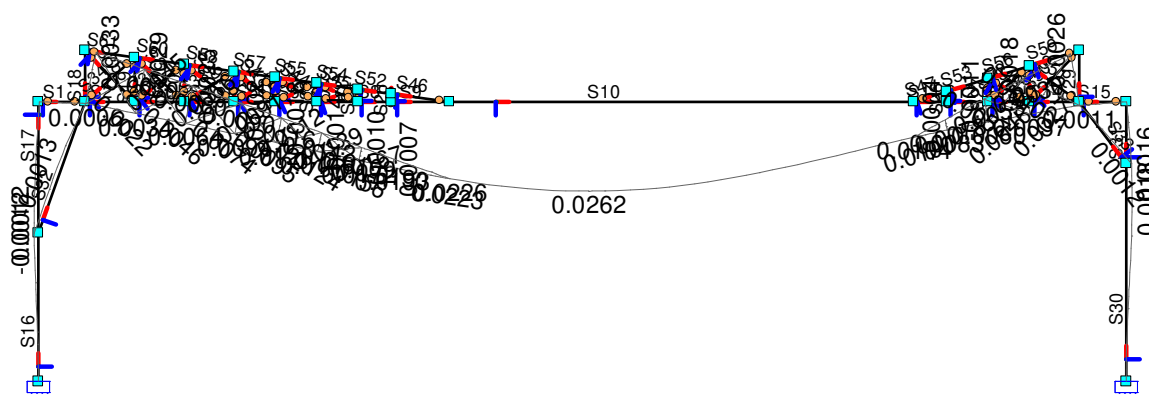
In deze fase is er nog geen 3-D model beschikbaar waardoor er een benadering voor de te verwachten trillingen van het loopgedeelte uiteengezet wordt. Het overstek zal hierbij maatgevend zijn.

De uitgangspunten met betrekking tot sterkte bij verticale trillingen en bijbehorende comfortcriteria zijn genoemd in hoofdstuk 2.3 van dit document.

Een handvat voor bruikbaarheid is gegeven in de NEN-EN 1990 - Bijlage A1.4.4 waarbij de het al dan niet optreden van een visueel ongemakkelijk gevoel door trillingen gerelateerd wordt aan de frequentie van 3 Hz bij windbelasting en de daarbij behorende doorbuiging in de quasi-blijvende combinatie.

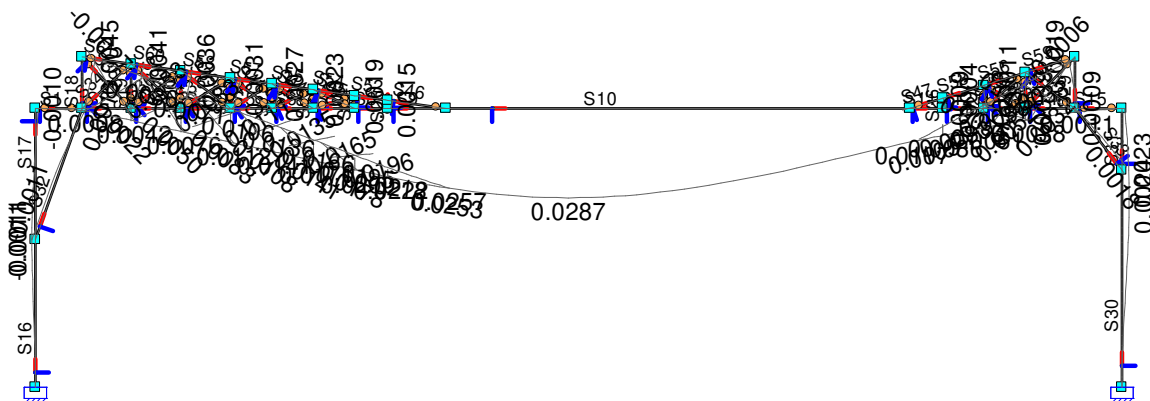
#### Beoordeling eigenfrequentie bij eigen gewicht en permanente belasting

|            |                                                                                                            |                       |                              |
|------------|------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------|
| $q$        | $= 0.40 + 0.10$                                                                                            | $= 0.50$              | $\text{kN/m}^1$              |
| $w_{\max}$ | $= \text{conform MatrixFrame}$                                                                             | $= 23.2$              | $\text{mm}$                  |
| $E$        | $= 210000 \cdot 10^6$                                                                                      | $= 2.1 \cdot 10^{11}$ | $\text{Nmm}$                 |
| $I$        | $= 5 \cdot 0.50 \cdot 19200^4 / (384 \cdot 210000 \cdot 26.2) \cdot 10^{-12}$                              | $= 1.6 \cdot 10^{-4}$ | $\text{m}^4$                 |
| $\mu$      | $= 40 + 10$                                                                                                | $\approx 50$          | $\text{kg/m}^1$              |
| $f$        | $= 2 / \pi \cdot \sqrt{(3 \cdot 2.1 \cdot 10^{11} \cdot 1.6 \cdot 10^{-4} / (0.2 \cdot 50 \cdot 19.2^4))}$ | $= 5.5$               | $\text{Hz}$                  |
| u.c.       | $= 1.25 \geq 5.5 \geq 4.6$                                                                                 | $5.5 > 4.6$           | $\rightarrow \text{voldoet}$ |



### Beoordeling aan de hand van doorbuiging

|            |                                                 |            |           |
|------------|-------------------------------------------------|------------|-----------|
| $W_{qp}$   | = conform MatrixFrame                           | = 28.7     | mm        |
| $W_{toel}$ | = conform NEN-EN 1990 - Bijlage A1.4.4 bij 3 Hz | = 34       | mm        |
| u.c.       | = 28.7 / 34                                     | = 0.84 < 1 | → akkoord |



### Conclusie eigenfrequentie en trillingen vleugels

Met behulp van de beschouwingen in dit hoofdstuk is het aannemelijk dat de vleugels zal voldoen aan de eisen en richtlijnen met betrekking tot eigenfrequentie en trillingen.

In de volgende fase zal er met behulp van een 3-D model getoetst dienen te worden of de constructie als geheel ook aan deze eisen en richtlijnen voldoet.



## 5.4.2. Trapboom

### Uitgangspunten

In deze fase is er nog geen 3-D model beschikbaar waardoor er een benadering voor de te verwachten trillingen van het loopgedeelte uiteengezet wordt. Het overstek zal hierbij maatgevend zijn.

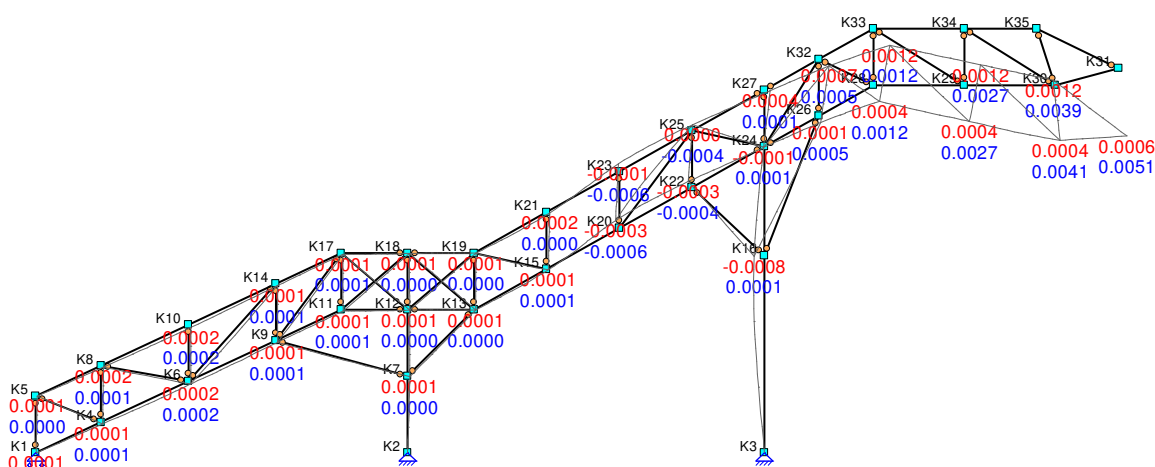
De uitgangspunten met betrekking tot sterkte bij verticale trillingen en bijbehorende comfortcriteria zijn genoemd in hoofdstuk 2.3 van dit document.

Een handvat voor bruikbaarheid is gegeven in de NEN-EN 1990 - Bijlage A1.4.4 waarbij de het al dan niet optreden van een ongemakkelijk gevoel door trillingen gerelateerd wordt aan de hoogste frequentie van 5 Hz die opgewekt kan worden door personen en een daarbij behorende doorbuiging in de quasi-blijvende combinatie.

Een handvat voor comfort is te vinden in het document Hivoss - Human induced Vibrations of Steel Structures een methode met handberekeningen gegeven om de aanbevolen ES-RMS<sub>90</sub> te bepalen en beschouwen.

### Beoordeling eigenfrequentie bij eigen gewicht en permanente belasting

|                  |                                                                                             |                        |                   |
|------------------|---------------------------------------------------------------------------------------------|------------------------|-------------------|
| q                | = 0.20 + 0.20 + 0.20 + 0.905*1.00                                                           | = 1.50                 | kN/m <sup>1</sup> |
| W <sub>max</sub> | = conform MatrixFrame                                                                       | = 5.1                  | mm                |
| E                | = 210000*10 <sup>6</sup>                                                                    | = 2.1*10 <sup>11</sup> | Nmm               |
| I                | = 1.50*6240 <sup>4</sup> / (8*210000*384*5.1)*10 <sup>-12</sup>                             | = 2.5*10 <sup>-4</sup> | m <sup>4</sup>    |
| μ                | = 2*(20 + 20 + 20) + 1.81*100                                                               | ≈ 300                  | kg/m <sup>1</sup> |
| f                | = 1 / (2*π)*√(3*2.1*10 <sup>11</sup> *2.5*10 <sup>-4</sup> / (0.24*300*6.24 <sup>4</sup> )) | = 5.9                  | Hz                |
| u.c.             | = 1.25 ≥ 5.9 ≥ 4.6                                                                          | 5.9 > 4.6              | → voldoet         |



**Beoordeling aan de hand van doorbuiging** $W_{qp}$  = conform MatrixFrame

= 7.1 mm

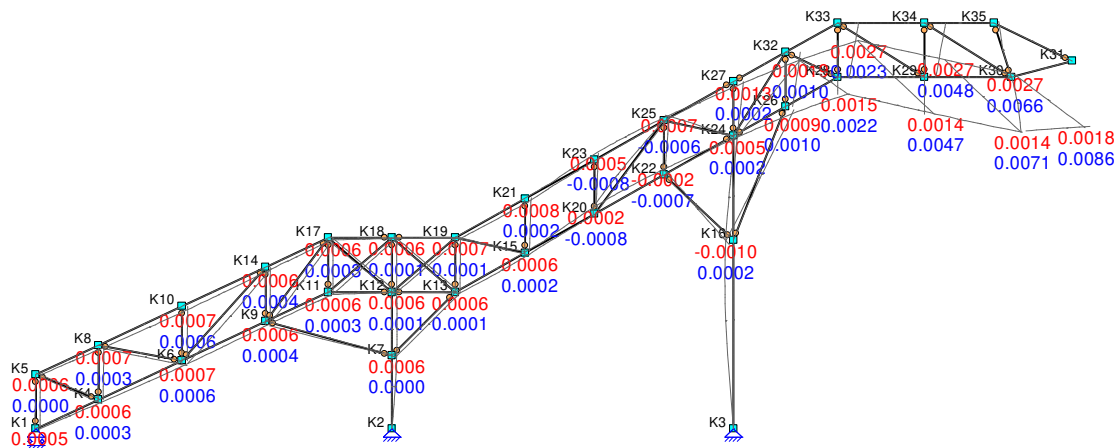
 $W_{toel}$  = conform NEN-EN 1990 - Bijlage A1.4.4 bij 5 Hz

= 12 mm

u.c. = 7.1 / 12

= 0.59 &lt; 1

→ akkoord



## Beoordeling aan de hand van ES-RMS<sub>90</sub>

### Gegevens

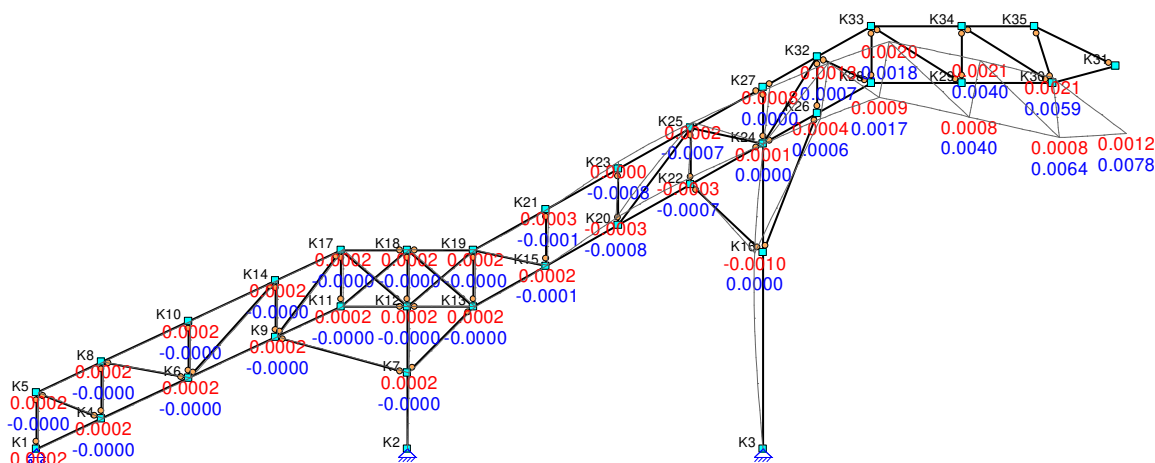
|                      |                                                                |                        |                   |
|----------------------|----------------------------------------------------------------|------------------------|-------------------|
| $F_{\text{eenheid}}$ | = eenheid t.b.v. bepalen EI                                    | = 10000                | N                 |
| $w_{\text{max}}$     | = bij eenheidslast                                             | = 6.4                  | mm                |
| $E$                  | = 210000*10 <sup>6</sup>                                       | = 2.1*10 <sup>11</sup> | Nmm               |
| $I$                  | = [10000*5120 <sup>3</sup> / (3*210000*6.4)]*10 <sup>-12</sup> | = 3.3*10 <sup>-4</sup> | m <sup>4</sup>    |
| $\mu_{\text{min}}$   | = 2*(20 + 20 + 20) + 1.81*100 + 0.10*1.81*450                  | ≈ 380                  | kg/m <sup>1</sup> |
| $\mu_{\text{max}}$   | = 2*(20 + 20 + 20) + 1.81*100 + 0.20*1.81*450                  | ≈ 450                  | kg/m <sup>1</sup> |
| $D$                  | = demping enkel staal                                          | = 1                    | %                 |

### Trillingen bij minimale ES-RMS<sub>90</sub>

|                      |                                                                             |        |    |
|----------------------|-----------------------------------------------------------------------------|--------|----|
| $f_{\text{min}}$     | = 1 / (2* $\pi$ )* $\sqrt{(3*2.1*10^{11}*3.3*10^{-4} / (0.24*380*5.12^4))}$ | = 9.2  | Hz |
| $M_{\text{mod}}$     | = 0.64*380*5.12                                                             | = 1250 | kg |
| ES-RMS <sub>90</sub> | = Figuur 3                                                                  | ≈ 9    | -  |
| Klasse               | = Tabel 1                                                                   | = E    | -  |

### Trillingen bij minimale ES-RMS<sub>90</sub>

|                      |                                                                             |        |    |
|----------------------|-----------------------------------------------------------------------------|--------|----|
| $f_{\text{min}}$     | = 1 / (2* $\pi$ )* $\sqrt{(3*2.1*10^{11}*3.3*10^{-4} / (0.24*450*5.12^4))}$ | = 8.4  | Hz |
| $M_{\text{mod}}$     | = 0.64*450*5.12                                                             | = 1500 | kg |
| ES-RMS <sub>90</sub> | = Figuur 3                                                                  | ≈ 7    | -  |
| Klasse               | = Tabel 1                                                                   | = E    | -  |



## Conclusie eigenfrequentie en trillingen loopgedeelte

Met behulp van de beschouwingen in dit hoofdstuk is het aannemelijk dat het loopgedeelte van de trap en het uitkijkpunt zal voldoen aan de eisen en richtlijnen met betrekking tot eigenfrequentie en trillingen. In de volgende fase zal er met behulp van een 3-D model getoetst dienen te worden of de constructie als geheel ook aan deze eisen en richtlijnen voldoet.

## 6. Beschouwing fundering

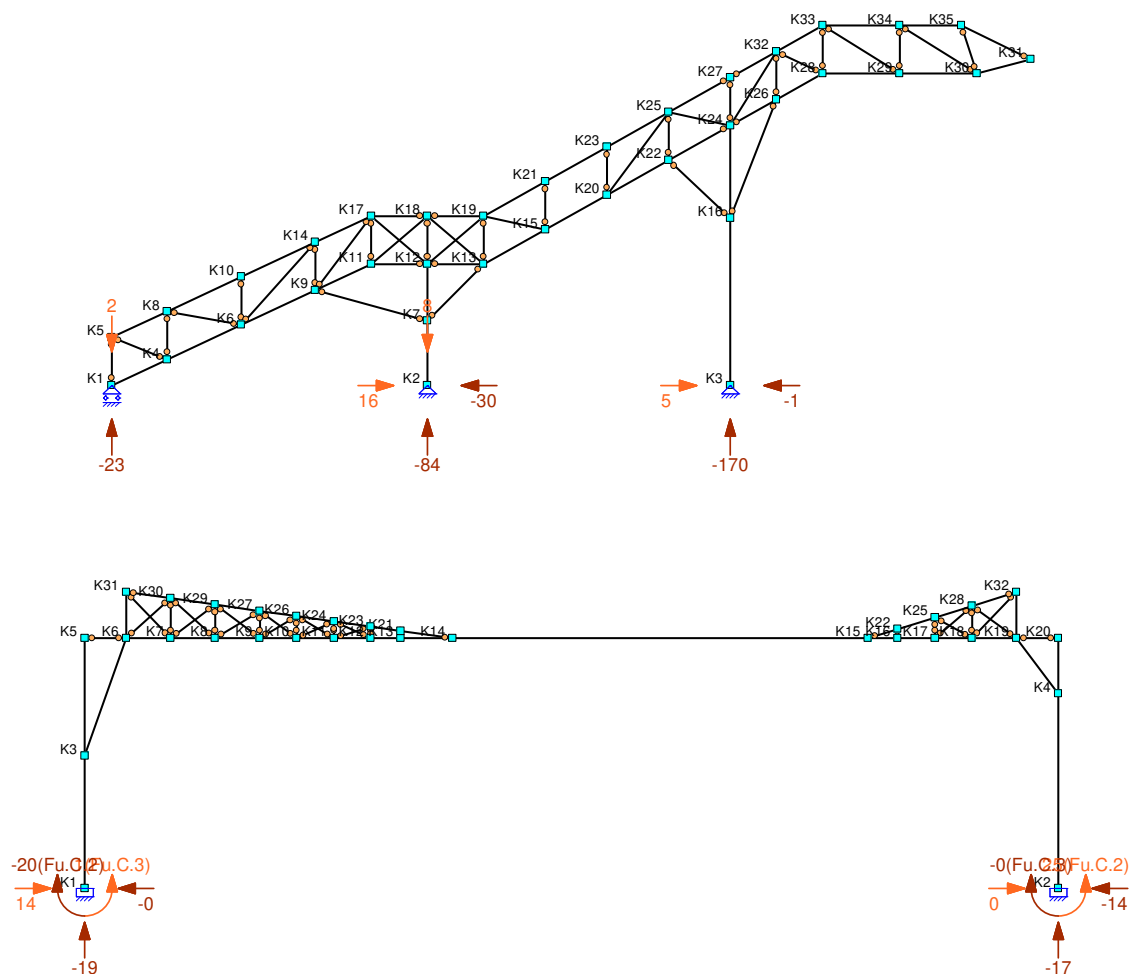
### Uitgangspunten en gegevens

De zwaluw wordt gefundeerd op een gewapende betonfundering met opstort. De kolommen en de trapbomen worden afgesteund op de opstorten. Er is in deze fase nog geen funderingsadvies beschikbaar, echter wordt er gezien de omgeving en de plaatsing in het water een fundering op palen verwacht. Als gevolg van de benodigde horizontale veerwaarde van de steunpunten kunnen er al dan niet schoorpalen worden toegepast.

De fundering wordt onderling gekoppeld met een koppelbalk. Naar verwachting is de normatieve minimumwapening van de poeren maatgevend en afdoende om te voldoen op zowel sterkte en stabiliteit als op scheurwijdte. De opstorten steken boven het water uit zodat de staal-op-beton verbindingen vrij zijn voor inspectie. Fundering onder hoofdkolommen aanname 1800 x 1800 x 800 mm met palen h.o.h. 1200 mm.

### Belastingen op de fundering

|           |                                                    |         |     |
|-----------|----------------------------------------------------|---------|-----|
| $F_{v,d}$ | $= 2 \cdot 23$                                     | $= 46$  | kN  |
|           | $= 2 \cdot 84$                                     | $= 168$ | kN  |
|           | $= 2 \cdot 170$                                    | $= 340$ | kN  |
| $F_{H,d}$ | $= 2 \cdot (30 + 1) + \frac{3}{2} \cdot (14 + 14)$ | $= 104$ | kN  |
| $M_d$     | $= \frac{1}{2} \cdot (1 + 26)$                     | $= 14$  | kNm |
|           | $= \frac{3}{2} \cdot (1 + 26)$                     | $= 41$  | kNm |





## Controle funderingspalen

### Controle trek op de fundering

$$\begin{aligned}
 F_{x,d} &= \frac{2}{3} \cdot 1.5 \cdot 76.1 &= 76 & \text{kN} \\
 F_{y,d} &= \frac{2}{3} \cdot 1.5 \cdot 30.4 &= 30 & \text{kN} \\
 F_{z,d,min} &= 0.9 \cdot (31 + 15) - 1.5 \cdot 25 &= 4 & \text{kN} \\
 R_{c,min,Ed} &= +4 / 4 - (76 \cdot 1.00 / 6.40 + 30 \cdot 1.00 / 1.20) / 2 &= 16 & \text{kN} \\
 R_{c,min,Rd} &= 0.9 \cdot (0.90 \cdot 0.90 \cdot 0.80 + 0.20 \cdot 0.20 \cdot 0.20) \cdot 25 &= 15 & \text{kN} \\
 u.c. &= 16 / 15 &= 1.07 \approx 1 & \rightarrow \text{acceptabel}
 \end{aligned}$$

### Controle druk op fundering

$$\begin{aligned}
 F_{x,d} &= \frac{2}{3} \cdot 1.5 \cdot 76.1 &= 76 & \text{kN} \\
 F_{y,d} &= \frac{2}{3} \cdot 1.5 \cdot 30.4 &= 30 & \text{kN} \\
 F_{z,d,max} &= 2 \cdot 170 + 1.30 \cdot (1.80 \cdot 1.80 \cdot 0.80 + 0.80 \cdot 0.80 \cdot 0.20) \cdot 25 &= 428 & \text{kN} \\
 R_{c,max,Ed} &= 428 / 4 + (76 \cdot 1.00 / 6.40 + 30 \cdot 1.00 / 1.20) / 2 &= 125 & \text{kN} \\
 R_{c,min,Rd} &= \text{aannname, conform opgave geotechnisch adviseur} &= 200 & \text{kN} \\
 u.c. &= 125 / 200 &= 0.63 < 1 & \rightarrow \text{acceptabel}
 \end{aligned}$$

## Conclusie fundering

Uitgangspunt is een fundering op palen. Palen aanname stalen buispalen 2x 2 Ø273 h.o.h. 1200 x 1200 mm per hoofkolom, 2x 1 Ø273 h.o.h. 1200 mm ter plekke van de opstap en 1x Ø273 mm onder de vleugel. Door de poeren afdoende groot te kiezen, bijvoorbeeld 1800 x 1800 x 800 mm worden momenten afschuifkrachten als trek-druk in de palen weggezet en is er voldoende bovenbelasting aanwezig om trek op de palen te voorkomen. Het geotechnisch draagvermogen van de palen zal afdoende zijn.

## 7. Bijlagen

### 7.1. Computerberekening

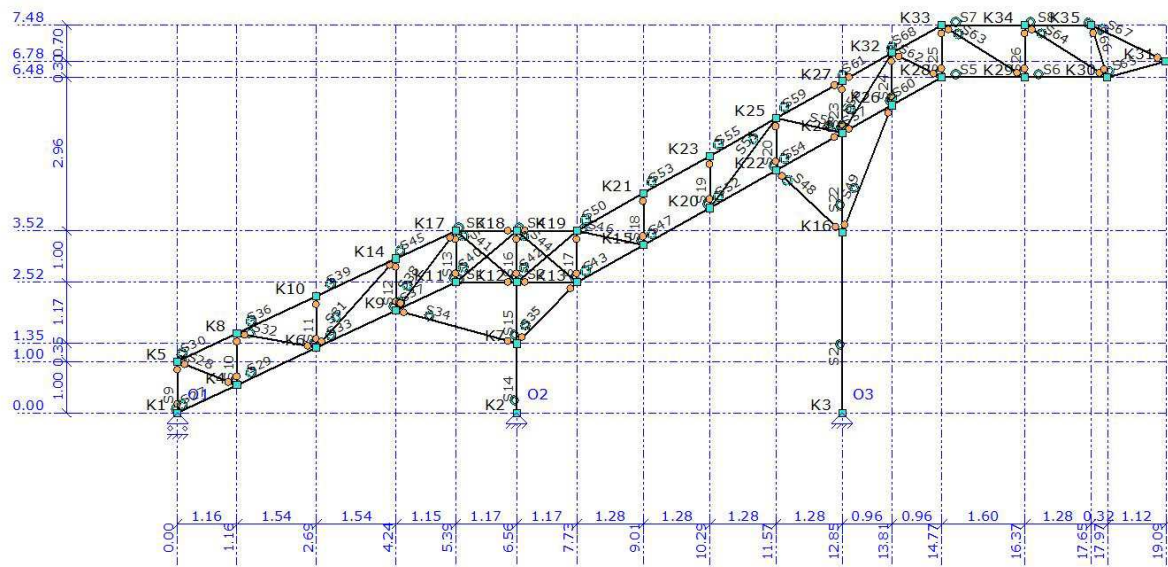
|                               |      |
|-------------------------------|------|
| Trapboom.....                 | pag. |
| Trapboom (nieuw ontwerp)..... | pag. |
| Vleugel uitkragend.....       | pag. |

|               |                                                                  |               |            |
|---------------|------------------------------------------------------------------|---------------|------------|
| Projectnaam   | Zwaluw uitkijkpunt                                               | Projectnummer | 520147     |
| Omschrijving  | Trapboom                                                         | Constructeur  | DaKr       |
| Opdrachtgever | Wilwy                                                            | Eenheden      | m, kN, kNm |
| Bestand       | P:\520147\1 - Constructeur\003-A - UPD\520147-A-0 - Trapboom.mxf |               |            |

## CONSTRUCTIEGEGEVENS

| Projecttype | Knopen | Staven | Opleggingen | Profielen | Bel.gev. | Bel.comb. |
|-------------|--------|--------|-------------|-----------|----------|-----------|
| 2D-Raamwerk | 35     | 68     | 3           | 6         | 8        | 125       |

### AFB. GEOMETRIE RAAMWERK



## STAVEN

| Staat | Knoop B | Knoop E | X-B    | Z-B    | X-E    | Z-E    | Lengte Profiel | Positie          |
|-------|---------|---------|--------|--------|--------|--------|----------------|------------------|
| S1    | K11     | K12     | 5.390  | -2.520 | 6.560  | -2.520 | 1.170 P1       | 0.000 - L(1.170) |
| S2    | K12     | K13     | 6.560  | -2.520 | 7.730  | -2.520 | 1.170 P1       | 0.000 - L(1.170) |
| S3    | K17     | K18     | 5.390  | -3.520 | 6.560  | -3.520 | 1.170 P2       | 0.000 - L(1.170) |
| S4    | K18     | K19     | 6.560  | -3.520 | 7.730  | -3.520 | 1.170 P2       | 0.000 - L(1.170) |
| S5    | K28     | K29     | 14.770 | -6.480 | 16.370 | -6.480 | 1.600 P1       | 0.000 - L(1.600) |
| S6    | K29     | K30     | 16.370 | -6.480 | 17.970 | -6.480 | 1.600 P1       | 0.000 - L(1.600) |
| S7    | K33     | K34     | 14.770 | -7.480 | 16.370 | -7.480 | 1.600 P2       | 0.000 - L(1.600) |
| S8    | K34     | K35     | 16.370 | -7.480 | 17.650 | -7.480 | 1.280 P2       | 0.000 - L(1.280) |
| S9    | K1      | K5      | 0.000  | 0.000  | 0.000  | -1.000 | 1.000 P3       | 0.000 - L(1.000) |
| S10   | K4      | K8      | 1.155  | -0.540 | 1.155  | -1.540 | 1.000 P3       | 0.000 - L(1.000) |
| S11   | K6      | K10     | 2.695  | -1.260 | 2.695  | -2.260 | 1.000 P3       | 0.000 - L(1.000) |
| S12   | K9      | K14     | 4.235  | -1.980 | 4.235  | -2.980 | 1.000 P3       | 0.000 - L(1.000) |
| S13   | K11     | K17     | 5.390  | -2.520 | 5.390  | -3.520 | 1.000 P3       | 0.000 - L(1.000) |
| S14   | K2      | K7      | 6.560  | 0.000  | 6.560  | -1.350 | 1.350 P6       | 0.000 - L(1.350) |
| S15   | K7      | K12     | 6.560  | -1.350 | 6.560  | -2.520 | 1.170 P6       | 0.000 - L(1.170) |
| S16   | K12     | K18     | 6.560  | -2.520 | 6.560  | -3.520 | 1.000 P3       | 0.000 - L(1.000) |
| S17   | K13     | K19     | 7.730  | -2.520 | 7.730  | -3.520 | 1.000 P3       | 0.000 - L(1.000) |
| S18   | K15     | K21     | 9.010  | -3.240 | 9.010  | -4.240 | 1.000 P3       | 0.000 - L(1.000) |
| S19   | K20     | K23     | 10.290 | -3.960 | 10.290 | -4.960 | 1.000 P3       | 0.000 - L(1.000) |
| S20   | K22     | K25     | 11.570 | -4.680 | 11.570 | -5.680 | 1.000 P3       | 0.000 - L(1.000) |
| S21   | K3      | K16     | 12.850 | 0.000  | 12.850 | -3.480 | 3.480 P6       | 0.000 - L(3.480) |
| S22   | K16     | K24     | 12.850 | -3.480 | 12.850 | -5.400 | 1.920 P6       | 0.000 - L(1.920) |
| S23   | K24     | K27     | 12.850 | -5.400 | 12.850 | -6.400 | 1.000 P3       | 0.000 - L(1.000) |
| S24   | K26     | K32     | 13.810 | -5.940 | 13.810 | -6.940 | 1.000 P3       | 0.000 - L(1.000) |
| S25   | K28     | K33     | 14.770 | -6.480 | 14.770 | -7.480 | 1.000 P3       | 0.000 - L(1.000) |
| S26   | K29     | K34     | 16.370 | -6.480 | 16.370 | -7.480 | 1.000 P3       | 0.000 - L(1.000) |
| S27   | K1      | K4      | 0.000  | 0.000  | 1.155  | -0.540 | 1.275 P1       | 0.000 - L(1.275) |
| S28   | K5      | K4      | 0.000  | -1.000 | 1.155  | -0.540 | 1.243 P4       | 0.000 - L(1.243) |
| S29   | K4      | K6      | 1.155  | -0.540 | 2.695  | -1.260 | 1.700 P1       | 0.000 - L(1.700) |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Staaf | Knoop B | Knoop E | X-B    | Z-B    | X-E    | Z-E    | Lengte Profiel | Positie          |
|-------|---------|---------|--------|--------|--------|--------|----------------|------------------|
| S30   | K5      | K8      | 0.000  | -1.000 | 1.155  | -1.540 | 1.275 P2       | 0.000 - L(1.275) |
| S31   | K6      | K14     | 2.695  | -1.260 | 4.235  | -2.980 | 2.309 P4       | 0.000 - L(2.309) |
| S32   | K8      | K6      | 1.155  | -1.540 | 2.695  | -1.260 | 1.565 P4       | 0.000 - L(1.565) |
| S33   | K6      | K9      | 2.695  | -1.260 | 4.235  | -1.980 | 1.700 P1       | 0.000 - L(1.700) |
| S34   | K9      | K7      | 4.235  | -1.980 | 6.560  | -1.350 | 2.409 P5       | 0.000 - L(2.409) |
| S35   | K7      | K13     | 6.560  | -1.350 | 7.730  | -2.520 | 1.655 P5       | 0.000 - L(1.655) |
| S36   | K8      | K10     | 1.155  | -1.540 | 2.695  | -2.260 | 1.700 P2       | 0.000 - L(1.700) |
| S37   | K9      | K11     | 4.235  | -1.980 | 5.390  | -2.520 | 1.275 P1       | 0.000 - L(1.275) |
| S38   | K9      | K17     | 4.235  | -1.980 | 5.390  | -3.520 | 1.925 P4       | 0.000 - L(1.925) |
| S39   | K10     | K14     | 2.695  | -2.260 | 4.235  | -2.980 | 1.700 P2       | 0.000 - L(1.700) |
| S40   | K11     | K18     | 5.390  | -2.520 | 6.560  | -3.520 | 1.539 P4       | 0.000 - L(1.539) |
| S41   | K17     | K12     | 5.390  | -3.520 | 6.560  | -2.520 | 1.539 P4       | 0.000 - L(1.539) |
| S42   | K12     | K19     | 6.560  | -2.520 | 7.730  | -3.520 | 1.539 P4       | 0.000 - L(1.539) |
| S43   | K13     | K15     | 7.730  | -2.520 | 9.010  | -3.240 | 1.469 P1       | 0.000 - L(1.469) |
| S44   | K18     | K13     | 6.560  | -3.520 | 7.730  | -2.520 | 1.539 P4       | 0.000 - L(1.539) |
| S45   | K14     | K17     | 4.235  | -2.980 | 5.390  | -3.520 | 1.275 P2       | 0.000 - L(1.275) |
| S46   | K19     | K15     | 7.730  | -3.520 | 9.010  | -3.240 | 1.310 P4       | 0.000 - L(1.310) |
| S47   | K15     | K20     | 9.010  | -3.240 | 10.290 | -3.960 | 1.469 P1       | 0.000 - L(1.469) |
| S48   | K22     | K16     | 11.570 | -4.680 | 12.850 | -3.480 | 1.755 P5       | 0.000 - L(1.755) |
| S49   | K16     | K26     | 12.850 | -3.480 | 13.810 | -5.940 | 2.641 P5       | 0.000 - L(2.641) |
| S50   | K19     | K21     | 7.730  | -3.520 | 9.010  | -4.240 | 1.469 P2       | 0.000 - L(1.469) |
| S51   | K25     | K20     | 11.570 | -5.680 | 10.290 | -3.960 | 2.144 P4       | 0.000 - L(2.144) |
| S52   | K20     | K22     | 10.290 | -3.960 | 11.570 | -4.680 | 1.469 P1       | 0.000 - L(1.469) |
| S53   | K21     | K23     | 9.010  | -4.240 | 10.290 | -4.960 | 1.469 P2       | 0.000 - L(1.469) |
| S54   | K22     | K24     | 11.570 | -4.680 | 12.850 | -5.400 | 1.469 P1       | 0.000 - L(1.469) |
| S55   | K23     | K25     | 10.290 | -4.960 | 11.570 | -5.680 | 1.469 P2       | 0.000 - L(1.469) |
| S56   | K24     | K32     | 12.850 | -5.400 | 13.810 | -6.940 | 1.815 P4       | 0.000 - L(1.815) |
| S57   | K24     | K26     | 12.850 | -5.400 | 13.810 | -5.940 | 1.101 P1       | 0.000 - L(1.101) |
| S58   | K24     | K25     | 12.850 | -5.400 | 11.570 | -5.680 | 1.310 P4       | 0.000 - L(1.310) |
| S59   | K25     | K27     | 11.570 | -5.680 | 12.850 | -6.400 | 1.469 P2       | 0.000 - L(1.469) |
| S60   | K26     | K28     | 13.810 | -5.940 | 14.770 | -6.480 | 1.101 P1       | 0.000 - L(1.101) |
| S61   | K27     | K32     | 12.850 | -6.400 | 13.810 | -6.940 | 1.101 P2       | 0.000 - L(1.101) |
| S62   | K32     | K28     | 13.810 | -6.940 | 14.770 | -6.480 | 1.065 P4       | 0.000 - L(1.065) |
| S63   | K33     | K29     | 14.770 | -7.480 | 16.370 | -6.480 | 1.887 P4       | 0.000 - L(1.887) |
| S64   | K34     | K30     | 16.370 | -7.480 | 17.970 | -6.480 | 1.887 P4       | 0.000 - L(1.887) |
| S65   | K30     | K31     | 17.970 | -6.480 | 19.090 | -6.780 | 1.159 P2       | 0.000 - L(1.159) |
| S66   | K35     | K30     | 17.650 | -7.480 | 17.970 | -6.480 | 1.050 P3       | 0.000 - L(1.050) |
| S67   | K35     | K31     | 17.650 | -7.480 | 19.090 | -6.780 | 1.601 P2       | 0.000 - L(1.601) |
| S68   | K32     | K33     | 13.810 | -6.940 | 14.770 | -7.480 | 1.101 P2       | 0.000 - L(1.101) |
| -     | -       | -       | m      | m      | m      | m      | m -            | -                |

## PROFIELEN

| Profiel | Profielnaam | Oppervlakte | ly Materiaal                | Hoek |
|---------|-------------|-------------|-----------------------------|------|
| P1      | N219.1/6.3  | 4.2117e-03  | 2.3861e-05 S235H(EN10210-1) | 0.0  |
| P2      | N139.7/4    | 1.7053e-03  | 3.9286e-06 S235H(EN10210-1) | 0.0  |
| P3      | N114.3/4    | 1.3861e-03  | 2.1107e-06 S235H(EN10210-1) | 0.0  |
| P4      | N88.9/4     | 1.0669e-03  | 9.6340e-07 S235H(EN10210-1) | 0.0  |
| P5      | N244.5/6.3  | 4.7145e-03  | 3.3460e-05 S235H(EN10210-1) | 0.0  |
| P6      | N267/8      | 6.5094e-03  | 5.4634e-05 S235H(EN10210-1) | 0.0  |
| -       | -           | m2          | m4 -                        | °    |

## MATERIALEN

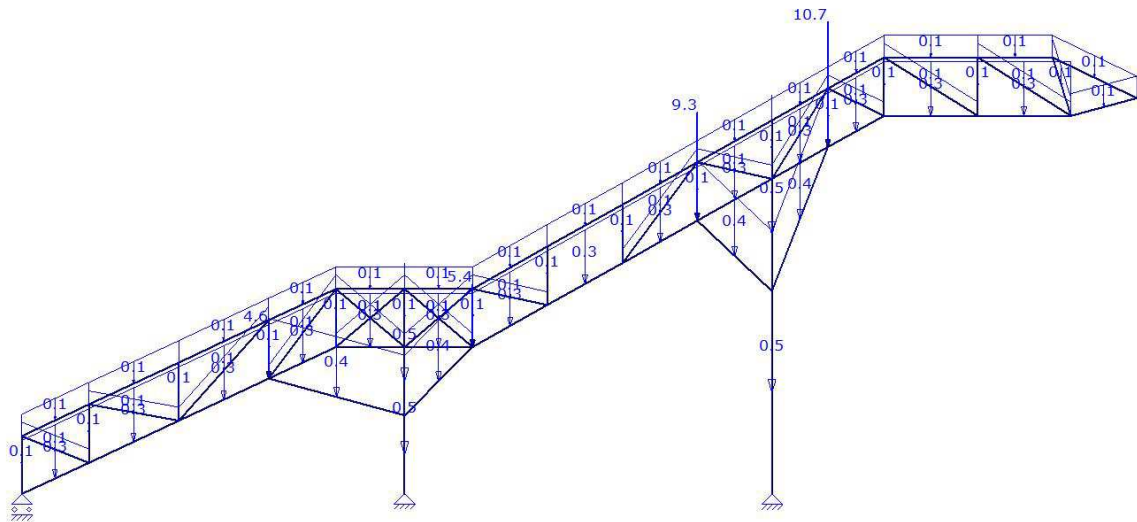
| Materiaal        | Dichtheid | E-Modulus  | Uitzettingcoeff |
|------------------|-----------|------------|-----------------|
| S235H(EN10210-1) | 78.50     | 2.1000e+08 | 12.0000e-06     |
| -                | kN/m3     | kN/m2      | C°m             |

## OPLEGGINGEN

| Oplegging | Object | Positie | X    | Z    | Yr      | HoekYr |
|-----------|--------|---------|------|------|---------|--------|
| O1        | K1     | 0.000   | Vrij | Vast | Vrij    | 0      |
| O2        | K2     | 0.000   | Vast | Vast | Vrij    | 0      |
| O3        | K3     | 0.000   | Vast | Vast | Vrij    | 0      |
| -         | -      | m       | kN/m | kN/m | kNm/rad | °      |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

## B.G.1: EIGEN GEWICHT EN PERMANENT



## B.G.1: EIGEN GEWICHT EN PERMANENT

| Type                                     | Beginwaarde  | Eindwaarde   | Beginafstand | Eindafstand | Richting Staaf of knoop   |
|------------------------------------------|--------------|--------------|--------------|-------------|---------------------------|
| <b>B.G.1: Eigen gewicht en permanent</b> |              |              |              |             |                           |
| qG                                       | 0.33 (1.00x) | 0.33 (1.00x) | 0.000        | 1.170(L)    | Z" S1-S2                  |
| qG                                       | 0.13 (1.00x) | 0.13 (1.00x) | 0.000        | 1.170(L)    | Z" S3-S4                  |
| qG                                       | 0.33 (1.00x) | 0.33 (1.00x) | 0.000        | 1.600(L)    | Z" S5-S6                  |
| qG                                       | 0.13 (1.00x) | 0.13 (1.00x) | 0.000        | 1.600(L)    | Z" S7                     |
| qG                                       | 0.13 (1.00x) | 0.13 (1.00x) | 0.000        | 1.280(L)    | Z" S8                     |
| qG                                       | 0.11 (1.00x) | 0.11 (1.00x) | 0.000        | 1.000(L)    | Z" S9-S13,S16-S20,S23-S26 |
| qG                                       | 0.51 (1.00x) | 0.51 (1.00x) | 0.000        | 1.350(L)    | Z" S14                    |
| qG                                       | 0.51 (1.00x) | 0.51 (1.00x) | 0.000        | 1.170(L)    | Z" S15                    |
| qG                                       | 0.51 (1.00x) | 0.51 (1.00x) | 0.000        | 3.480(L)    | Z" S21                    |
| qG                                       | 0.51 (1.00x) | 0.51 (1.00x) | 0.000        | 1.920(L)    | Z" S22                    |
| qG                                       | 0.33 (1.00x) | 0.33 (1.00x) | 0.000        | 1.275(L)    | Z" S27,S37                |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 1.243(L)    | Z" S28                    |
| qG                                       | 0.33 (1.00x) | 0.33 (1.00x) | 0.000        | 1.700(L)    | Z" S29,S33                |
| qG                                       | 0.13 (1.00x) | 0.13 (1.00x) | 0.000        | 1.275(L)    | Z" S30,S45                |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 2.309(L)    | Z" S31                    |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 1.565(L)    | Z" S32                    |
| qG                                       | 0.37 (1.00x) | 0.37 (1.00x) | 0.000        | 2.409(L)    | Z" S34                    |
| qG                                       | 0.37 (1.00x) | 0.37 (1.00x) | 0.000        | 1.655(L)    | Z" S35                    |
| qG                                       | 0.13 (1.00x) | 0.13 (1.00x) | 0.000        | 1.700(L)    | Z" S36,S39                |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 1.925(L)    | Z" S38                    |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 1.539(L)    | Z" S40-S42,S44            |
| qG                                       | 0.33 (1.00x) | 0.33 (1.00x) | 0.000        | 1.469(L)    | Z" S43,S47,S52,S54        |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 1.310(L)    | Z" S46,S58                |
| qG                                       | 0.37 (1.00x) | 0.37 (1.00x) | 0.000        | 1.755(L)    | Z" S48                    |
| qG                                       | 0.37 (1.00x) | 0.37 (1.00x) | 0.000        | 2.641(L)    | Z" S49                    |
| qG                                       | 0.13 (1.00x) | 0.13 (1.00x) | 0.000        | 1.469(L)    | Z" S50,S53,S55,S59        |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 2.144(L)    | Z" S51                    |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 1.815(L)    | Z" S56                    |
| qG                                       | 0.33 (1.00x) | 0.33 (1.00x) | 0.000        | 1.101(L)    | Z" S57,S60                |
| qG                                       | 0.13 (1.00x) | 0.13 (1.00x) | 0.000        | 1.101(L)    | Z" S61,S68                |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 1.065(L)    | Z" S62                    |
| qG                                       | 0.08 (1.00x) | 0.08 (1.00x) | 0.000        | 1.887(L)    | Z" S63-S64                |



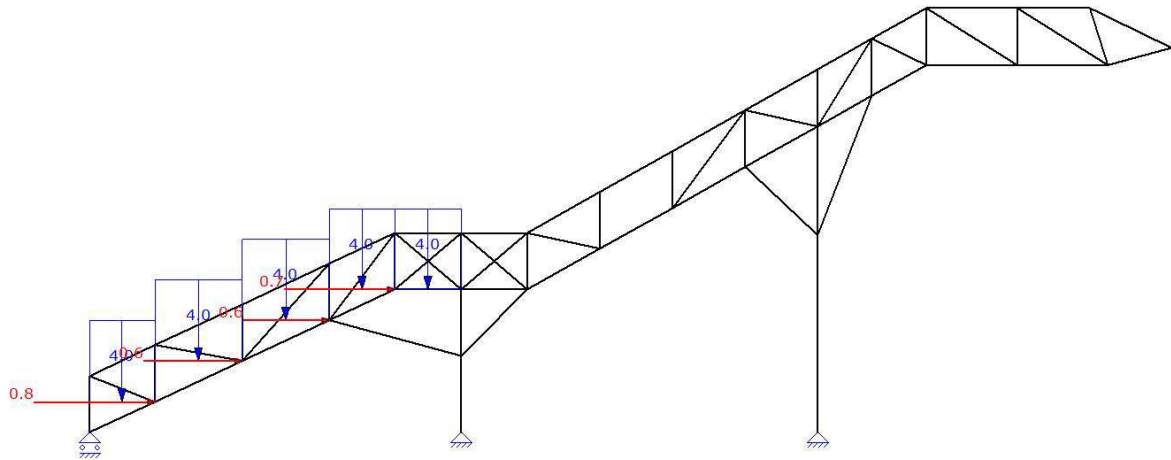
| Type                                     | Beginwaarde    | Eindwaarde         | Beginafstand | Eindafstand | Richting Staaf of knoop |
|------------------------------------------|----------------|--------------------|--------------|-------------|-------------------------|
| <b>B.G.1: Eigen gewicht en permanent</b> |                |                    |              |             |                         |
| qG                                       | 0.13 (1.00x)   | 0.13 (1.00x)       | 0.000        | 1.159(L)    | Z" S65                  |
| qG                                       | 0.11 (1.00x)   | 0.11 (1.00x)       | 0.000        | 1.050(L)    | Z" S66                  |
| qG                                       | 0.13 (1.00x)   | 0.13 (1.00x)       | 0.000        | 1.601(L)    | Z" S67                  |
| N                                        | 10.70          |                    |              |             | Z K26                   |
| N                                        | 9.28           |                    |              |             | Z K22                   |
| N                                        | 5.35           |                    |              |             | Z K13                   |
| N                                        | 4.64           |                    |              |             | Z K9                    |
| <b>Som lasten</b>                        | <b>X: 0.00</b> | <b>kN Z: 50.26</b> | <b>kN</b>    |             |                         |
| -                                        | -              | -                  | m            | m           | - -                     |

The diagram illustrates a stepped retaining wall with a trapezoidal cross-section. The wall has a top width of 0.8m and a bottom width of 0.2m. The height is 1.0m. The wall is subjected to a horizontal force of 0.2m at the top and a vertical force of 1.0m at the base. The wall is supported by three vertical piles. The diagram shows the internal forces and moments on the wall and the piles.

| Type                    | Beginwaarde    | Eindwaarde         | Beginafstand | Eindafstand | Richting Staaf of knoop                                           |
|-------------------------|----------------|--------------------|--------------|-------------|-------------------------------------------------------------------|
| <b>B.G.2: Permanent</b> |                |                    |              |             |                                                                   |
| q                       | 1.00           | 1.00               | 0.000        | 1.155(L)    | Z S1-S2,S27,S29,<br>S33,S37,S43,S47,S52,S54,S57,S60               |
| q                       | 1.50           | 1.50               | 0.000        | 1.600(L)    | Z S5-S6                                                           |
| q                       | 0.20           | 0.20               | 0.000        | 1.155(L)    | Z S1-S2,S5-S6,S27,<br>S29,S33,S37,S43,<br>S47,S52,S54,S57,S60,S65 |
| N                       | 0.81           |                    |              |             | Z K26                                                             |
| N                       | 0.51           |                    |              |             | Z K22                                                             |
| N                       | 0.41           |                    |              |             | Z K13                                                             |
| N                       | 0.26           |                    |              |             | Z K9                                                              |
| <b>Som lasten</b>       | <b>X: 0.00</b> | <b>kN Z: 25.38</b> | <b>kN</b>    |             |                                                                   |
| -                       | -              | -                  | m            | m           | - -                                                               |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

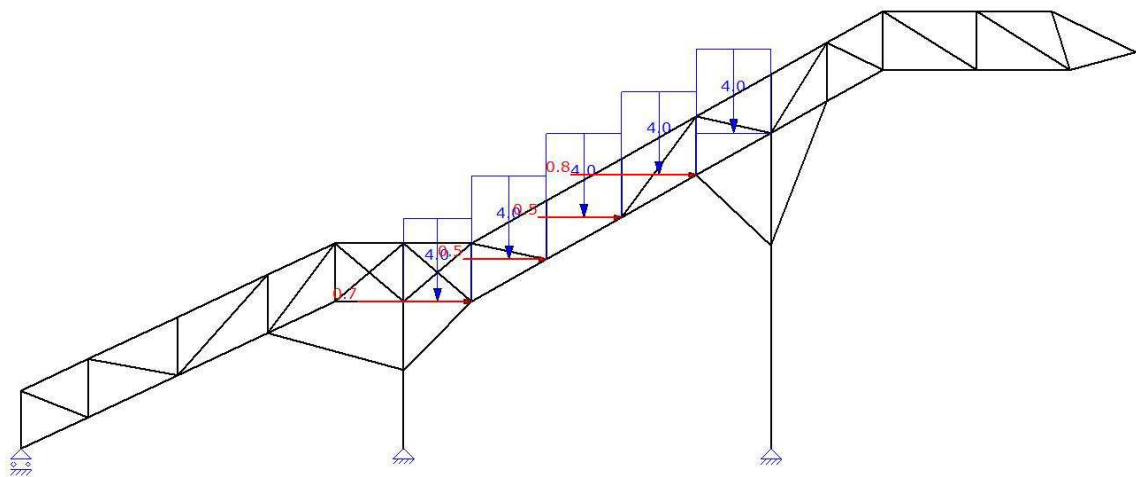
### B.G.3: VERANDERLIJK 1



### B.G.3: VERANDERLIJK 1

| Type                         | Beginwaarde | Eindwaarde  | Beginafstand | Eindafstand | Richting Staaf of knoop |
|------------------------------|-------------|-------------|--------------|-------------|-------------------------|
| <b>B.G.3: Veranderlijk 1</b> |             |             |              |             |                         |
| q                            | 4.05        | 4.05        | 0.000        | 1.155(L)    | Z S1,S27,S29,S33,S37    |
| N                            | 0.78        |             |              |             | X K4                    |
| N                            | 0.63        |             |              |             | X K6                    |
| N                            | 0.55        |             |              |             | X K9                    |
| N                            | 0.71        |             |              |             | X K11                   |
| Som lasten                   | X: 2.67     | kN Z: 26.57 | kN           |             |                         |
| -                            | -           | -           | m            | m           | - -                     |

### B.G.4: VERANDERLIJK 2

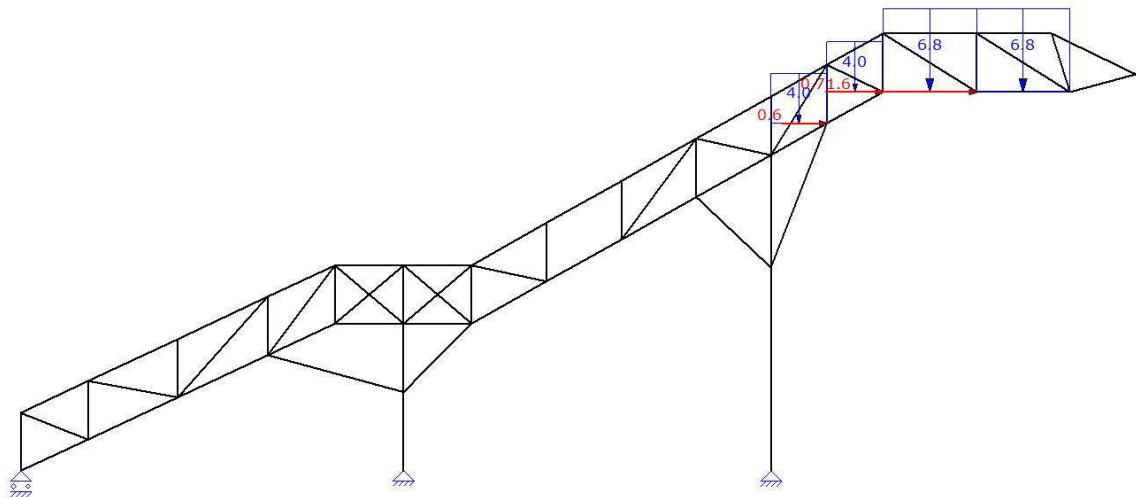


|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### B.G.4: VERANDERLIJK 2

| Type                         | Beginwaarde    | Eindwaarde         | Beginafstand | Eindafstand | Richting Staaf of knoop |
|------------------------------|----------------|--------------------|--------------|-------------|-------------------------|
| <b>B.G.4: Veranderlijk 2</b> |                |                    |              |             |                         |
| q                            | 4.05           | 4.05               | 0.000        | 1.170(L)    | Z S2,S43,S47,S52,S54    |
| N                            | 0.71           |                    |              |             | X K13                   |
| N                            | 0.52           |                    |              |             | X K15,K20               |
| N                            | 0.78           |                    |              |             | X K22                   |
| <b>Som lasten</b>            | <b>X: 2.53</b> | <b>kN Z: 25.47</b> | <b>kN</b>    | <b>m</b>    | <b>- -</b>              |
| -                            | -              | -                  | m            | m           | - -                     |

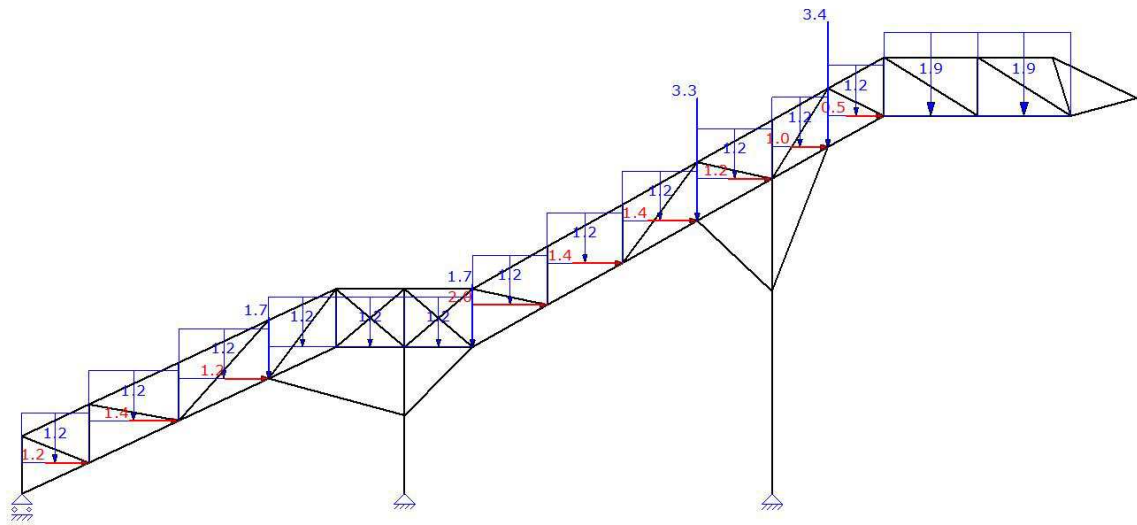
#### B.G.5: VERANDERLIJK 3



#### B.G.5: VERANDERLIJK 3

| Type                         | Beginwaarde    | Eindwaarde         | Beginafstand | Eindafstand | Richting Staaf of knoop |
|------------------------------|----------------|--------------------|--------------|-------------|-------------------------|
| <b>B.G.5: Veranderlijk 3</b> |                |                    |              |             |                         |
| q                            | 4.05           | 4.05               | 0.000        | 0.960(L)    | Z S57,S60               |
| q                            | 6.75           | 6.75               | 0.000        | 1.600(L)    | Z S5-S6                 |
| N                            | 0.58           |                    |              |             | X K26                   |
| N                            | 0.74           |                    |              |             | X K28                   |
| N                            | 1.62           |                    |              |             | X K29                   |
| <b>Som lasten</b>            | <b>X: 2.94</b> | <b>kN Z: 29.38</b> | <b>kN</b>    | <b>m</b>    | <b>- -</b>              |
| -                            | -              | -                  | m            | m           | - -                     |

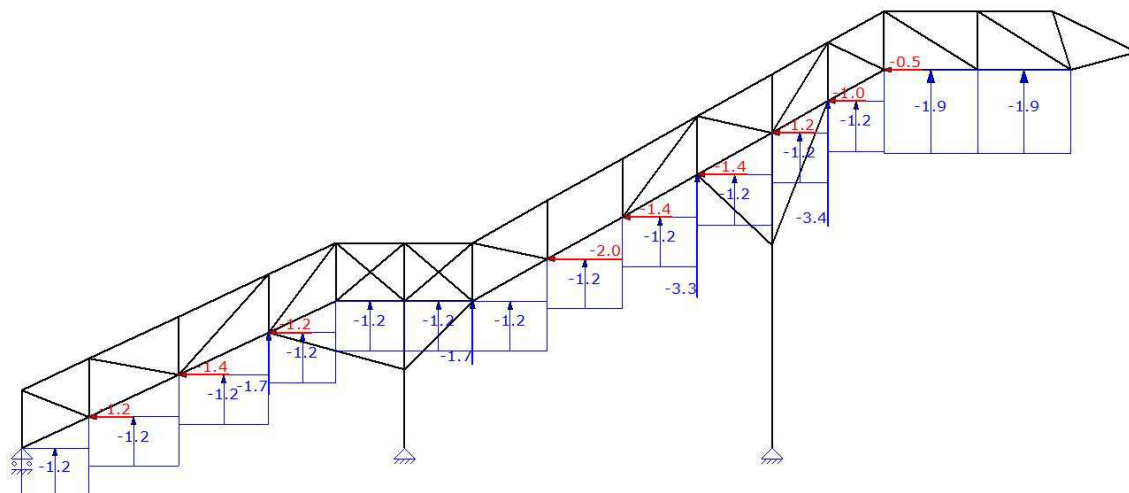
## B.G.6: WIND NEERWAARTS



### B.G.6: WIND NEERWAARTS

| Type                          | Beginwaarde     | Eindwaarde         | Beginafstand | Eindafstand | Richting Staaf of knoop                             |
|-------------------------------|-----------------|--------------------|--------------|-------------|-----------------------------------------------------|
| <b>B.G.6: Wind neerwaarts</b> |                 |                    |              |             |                                                     |
| q                             | 1.16            | 1.16               | 0.000        | 1.155(L)    | Z S1-S2,S27,S29,<br>S33,S37,S43,S47,S52,S54,S57,S60 |
| q                             | 1.94            | 1.94               | 0.000        | 1.600(L)    | Z S5-S6                                             |
| N                             | 1.18            |                    |              |             | X K4,K9,K24                                         |
| N                             | 1.35            |                    |              |             | X K6,K20,K22                                        |
| N                             | 2.03            |                    |              |             | X K15                                               |
| N                             | 1.02            |                    |              |             | X K26                                               |
| N                             | 0.51            |                    |              |             | X K28                                               |
| N                             | 3.40            |                    |              |             | Z K26                                               |
| N                             | 3.32            |                    |              |             | Z K22                                               |
| N                             | 1.70            |                    |              |             | Z K13                                               |
| N                             | 1.66            |                    |              |             | Z K9                                                |
| <b>Som lasten</b>             | <b>X: 11.15</b> | <b>kN Z: 33.42</b> | <b>kN</b>    |             |                                                     |
| -                             | -               | -                  | m            | m           | - -                                                 |

## B.G.7: WIND OPWAARTS



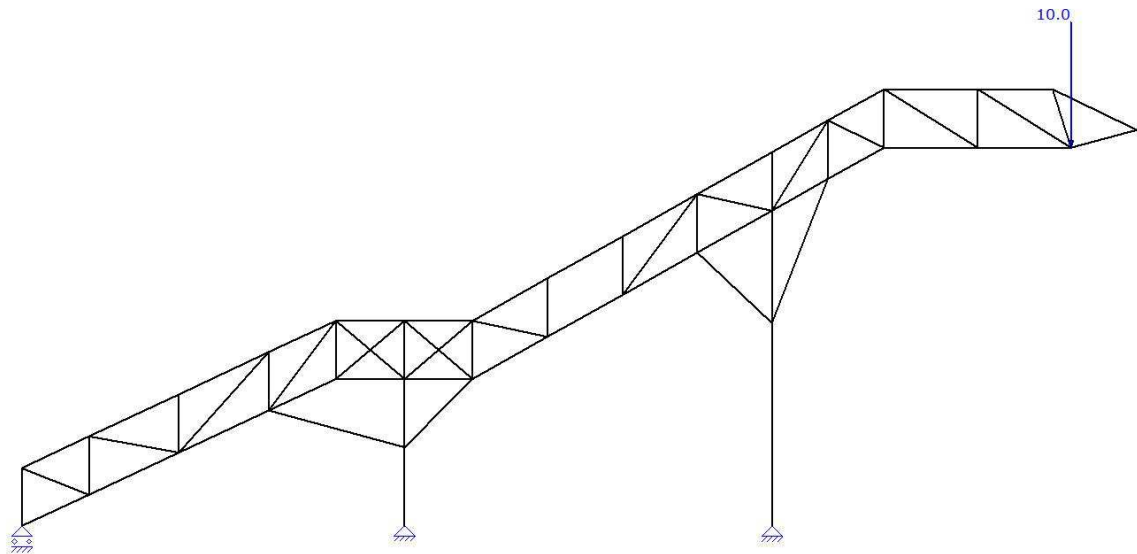
## B.G.7: WIND OPWAARTS

| Type                        | Beginwaarde      | Eindwaarde          | Beginafstand | Eindafstand | Richting | Staaaf of knoop                                   |
|-----------------------------|------------------|---------------------|--------------|-------------|----------|---------------------------------------------------|
| <b>B.G.7: Wind opwaarts</b> |                  |                     |              |             |          |                                                   |
| q                           | -1.16            | -1.16               | 0.000        | 1.155(L)    | Z        | S1-S2,S27,S29,<br>S33,S37,S43,S47,S52,S54,S57,S60 |
| q                           | -1.94            | -1.94               | 0.000        | 1.600(L)    | Z        | S5-S6                                             |
| N                           | -1.18            |                     |              |             | X        | K4,K9,K24                                         |
| N                           | -1.35            |                     |              |             | X        | K6,K20,K22                                        |
| N                           | -2.03            |                     |              |             | X        | K15                                               |
| N                           | -1.02            |                     |              |             | X        | K26                                               |
| N                           | -0.51            |                     |              |             | X        | K28                                               |
| N                           | -3.40            |                     |              |             | Z        | K26                                               |
| N                           | -3.32            |                     |              |             | Z        | K22                                               |
| N                           | -1.70            |                     |              |             | Z        | K13                                               |
| N                           | -1.66            |                     |              |             | Z        | K9                                                |
| <b>Som lasten</b>           | <b>X: -11.15</b> | <b>kN Z: -33.42</b> | <b>kN</b>    |             |          |                                                   |
| -                           | -                | -                   | m            | m           | -        | -                                                 |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

## B.G.8: EENHEID T.B.V. STIJFHEID



## B.G.8: EENHEID T.B.V. STIJFHEID

| Type                                   | Beginwaarde | Eindwaarde  | Beginafstand | Eindafstand | Richting | Staaft of knoop |
|----------------------------------------|-------------|-------------|--------------|-------------|----------|-----------------|
| <b>B.G.8: Eenheid t.b.v. stijfheid</b> |             |             |              |             |          |                 |
| N                                      | 10.00       |             |              |             |          | Z K30           |
| Som lasten                             | X: 0.00     | kN Z: 10.00 | kN           |             |          |                 |
| -                                      | -           | -           | m            | m           | -        | -               |

## UITGANGSPUNTEN VAN DE ANALYSE

Lineaire Elastische Analyse uitgevoerd

## FUNDAMENTEEL BELASTINGSCOMBINATIES (TABEL)

| B.G.  | Omschrijving               | Fu.C.1  | Fu.C.2  | Fu.C.3  | Fu.C.4  | Fu.C.5  | Fu.C.6  | Fu.C.7  | Fu.C.8  |
|-------|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| B.G.1 | Eigen gewicht en permanent | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    |
| B.G.2 | Permanent                  | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    |
| B.G.3 | Veranderlijk 1             | 0.54    | -       | -       | -       | -       | 0.54    | 0.54    | 0.54    |
| B.G.4 | Veranderlijk 2             | -       | 0.54    | -       | -       | -       | 0.54    | -       | -       |
| B.G.5 | Veranderlijk 3             | -       | -       | 0.54    | -       | -       | -       | 0.54    | -       |
| B.G.6 | Wind neerwaarts            | -       | -       | -       | 0.45    | -       | -       | -       | 0.45    |
| B.G.7 | Wind opwaarts              | -       | -       | -       | -       | 0.45    | -       | -       | -       |
| B.G.8 | Eenheid t.b.v. stijfheid   | -       | -       | -       | -       | -       | -       | -       | -       |
| B.G.  | Omschrijving               | Fu.C.9  | Fu.C.10 | Fu.C.11 | Fu.C.12 | Fu.C.13 | Fu.C.14 | Fu.C.15 | Fu.C.16 |
| B.G.1 | Eigen gewicht en permanent | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    |
| B.G.2 | Permanent                  | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    |
| B.G.3 | Veranderlijk 1             | 0.54    | -       | -       | -       | -       | -       | 0.54    | 0.54    |
| B.G.4 | Veranderlijk 2             | -       | 0.54    | 0.54    | 0.54    | -       | -       | 0.54    | 0.54    |
| B.G.5 | Veranderlijk 3             | -       | 0.54    | -       | -       | 0.54    | 0.54    | 0.54    | -       |
| B.G.6 | Wind neerwaarts            | -       | -       | 0.45    | -       | 0.45    | -       | -       | 0.45    |
| B.G.7 | Wind opwaarts              | 0.45    | -       | -       | 0.45    | -       | 0.45    | -       | -       |
| B.G.8 | Eenheid t.b.v. stijfheid   | -       | -       | -       | -       | -       | -       | -       | -       |
| B.G.  | Omschrijving               | Fu.C.17 | Fu.C.18 | Fu.C.19 | Fu.C.20 | Fu.C.21 | Fu.C.22 | Fu.C.23 | Fu.C.24 |
| B.G.1 | Eigen gewicht en permanent | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.20    |
| B.G.2 | Permanent                  | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.20    |
| B.G.3 | Veranderlijk 1             | 0.54    | 0.54    | 0.54    | -       | -       | 0.54    | 0.54    | 1.35    |
| B.G.4 | Veranderlijk 2             | 0.54    | -       | -       | 0.54    | 0.54    | 0.54    | 0.54    | -       |
| B.G.5 | Veranderlijk 3             | -       | 0.54    | 0.54    | 0.54    | 0.54    | 0.54    | 0.54    | -       |
| B.G.6 | Wind neerwaarts            | -       | 0.45    | -       | 0.45    | -       | 0.45    | -       | -       |
| B.G.7 | Wind opwaarts              | 0.45    | -       | 0.45    | -       | 0.45    | -       | 0.45    | -       |



- - - kN kN kNm - kN kN kNm kN kN kNm

AFB. FU.C. OPLEGREACTIES OMHULLENDE Fundamenteel Belastingscombinaties

11

|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|

| Staaf | B.C.    | Mb            | Mmax         | xMmax | Me            | x-M0  | x-M0 T/D | Nmax           | Vb            | Vmax          | Ve            |
|-------|---------|---------------|--------------|-------|---------------|-------|----------|----------------|---------------|---------------|---------------|
| S7    | Fu.C.41 | <b>-0.34</b>  | 0.00         | 0.000 | 0.22          | 0.837 | 0.000 T  | <b>19.57</b>   | <b>0.48</b>   | <b>0.48</b>   | 0.22          |
|       | Fu.C.45 | -0.34         | 0.00         | 0.000 | <b>0.22</b>   | 0.832 | 0.000 T  | 19.56          | 0.48          | 0.48          | 0.22          |
|       | Fu.C.62 | -0.02         | 0.02         | 0.648 | <b>-0.05</b>  | 0.169 | 1.127 T  | 0.66           | 0.10          | <b>-0.15</b>  | <b>-0.15</b>  |
|       | Fu.C.63 | -0.32         | 0.00         | 0.000 | 0.21          | 0.844 | 0.000 T  | 18.33          | 0.43          | 0.43          | <b>0.24</b>   |
| S8    | Fu.C.28 | -0.05         | 0.00         | 0.785 | -0.02         | 0.609 | 0.960 T  | 0.28           | <b>0.13</b>   | <b>0.13</b>   | -0.08         |
|       | Fu.C.35 | -0.05         | 0.00         | 0.783 | -0.02         | 0.609 | 0.957 T  | <b>0.28</b>    | 0.13          | 0.13          | -0.08         |
|       | Fu.C.41 | 0.22          | 0.23         | 0.351 | <b>0.16</b>   | 0.000 | 0.000 T  | 0.08           | 0.06          | -0.15         | -0.15         |
|       | Fu.C.45 | <b>0.22</b>   | <b>0.23</b>  | 0.349 | 0.16          | 0.000 | 0.000 T  | 0.08           | 0.06          | <b>-0.15</b>  | <b>-0.15</b>  |
|       | Fu.C.57 | -0.05         | <b>-0.01</b> | 0.812 | -0.02         | 0.000 | 0.000 T  | 0.22           | 0.10          | 0.10          | -0.06         |
| S9    | Fu.C.62 | <b>-0.05</b>  | 0.00         | 0.784 | <b>-0.02</b>  | 0.000 | 0.000 T  | 0.25           | 0.13          | 0.13          | -0.08         |
|       | Fu.C.31 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-18.28</b>  | 0.00          | 0.00          | 0.00          |
| S10   | Fu.C.66 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>1.50</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.32 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-8.21</b>   | 0.00          | 0.00          | 0.00          |
| S11   | Fu.C.65 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>6.77</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.28 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-0.70</b>   | 0.00          | 0.00          | 0.00          |
| S12   | Fu.C.67 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>0.79</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.45 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-13.96</b>  | 0.00          | 0.00          | 0.00          |
| S13   | Fu.C.50 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>3.45</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.31 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>10.97</b>   | 0.00          | 0.00          | 0.00          |
| S14   | Fu.C.66 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-1.40</b>   | 0.00          | 0.00          | 0.00          |
|       | Fu.C.39 | 0.00          | 0.00         | 0.000 | 31.09         | 0.000 | 0.000 D  | <b>-84.33</b>  | 23.03         | 23.03         | 23.03         |
| S15   | Fu.C.45 | 0.00          | 0.00         | 0.000 | <b>40.88</b>  | 0.000 | 0.000 D  | -65.12         | <b>30.28</b>  | <b>30.28</b>  | <b>30.28</b>  |
|       | Fu.C.50 | 0.00          | 0.00         | 0.000 | <b>-21.11</b> | 0.000 | 0.000 D  | -11.26         | <b>-15.64</b> | <b>-15.64</b> | <b>-15.64</b> |
|       | Fu.C.59 | 0.00          | 0.00         | 0.000 | <b>-11.31</b> | 0.000 | 0.000 T  | <b>8.57</b>    | -8.38         | -8.38         | -8.38         |
|       | Fu.C.35 | -17.79        | 0.00         | 0.000 | <b>0.22</b>   | 1.156 | 0.000 D  | -12.12         | 15.39         | 15.39         | 15.39         |
|       | Fu.C.39 | 31.09         | 0.00         | 0.000 | -0.25         | 1.161 | 0.000 D  | <b>-54.43</b>  | -26.78        | -26.78        | -26.78        |
| S16   | Fu.C.45 | <b>40.88</b>  | 0.00         | 0.000 | -0.30         | 1.161 | 0.000 D  | -44.75         | <b>-35.20</b> | <b>-35.20</b> | <b>-35.20</b> |
|       | Fu.C.50 | <b>-21.11</b> | 0.00         | 0.000 | 0.21          | 1.158 | 0.000 T  | 4.50           | <b>18.22</b>  | <b>18.22</b>  | <b>18.22</b>  |
|       | Fu.C.59 | -11.31        | 0.00         | 0.000 | 0.16          | 1.154 | 0.000 T  | <b>14.18</b>   | 9.81          | 9.81          | 9.81          |
|       | Fu.C.63 | 37.56         | 0.00         | 0.000 | <b>-0.31</b>  | 1.161 | 0.000 D  | -28.67         | -32.36        | -32.36        | -32.36        |
|       | Fu.C.39 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-24.89</b>  | 0.00          | 0.00          | 0.00          |
| S17   | Fu.C.59 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>3.45</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.41 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>39.82</b>   | 0.00          | 0.00          | 0.00          |
| S18   | Fu.C.57 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-10.25</b>  | 0.00          | 0.00          | 0.00          |
|       | Fu.C.36 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>5.73</b>    | 0.00          | 0.00          | 0.00          |
| S19   | Fu.C.62 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-1.88</b>   | 0.00          | 0.00          | 0.00          |
|       | Fu.C.36 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-4.90</b>   | 0.00          | 0.00          | 0.00          |
| S20   | Fu.C.62 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>1.29</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.36 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-36.74</b>  | 0.00          | 0.00          | 0.00          |
| S21   | Fu.C.62 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>10.51</b>   | 0.00          | 0.00          | 0.00          |
|       | Fu.C.37 | 0.00          | 0.00         | 0.000 | <b>-16.01</b> | 0.000 | 0.000 D  | -77.80         | <b>-4.60</b>  | <b>-4.60</b>  | <b>-4.60</b>  |
|       | Fu.C.43 | 0.00          | 0.00         | 0.000 | -9.01         | 0.000 | 0.000 D  | <b>-169.66</b> | -2.59         | -2.59         | -2.59         |
| S22   | Fu.C.61 | 0.00          | 0.00         | 0.000 | <b>3.27</b>   | 0.000 | 0.000 D  | -93.57         | <b>0.94</b>   | <b>0.94</b>   | <b>0.94</b>   |
|       | Fu.C.35 | -0.47         | 0.00         | 0.000 | -0.03         | 0.000 | 0.000 D  | <b>-11.13</b>  | 0.23          | 0.23          | 0.23          |
|       | Fu.C.37 | <b>-16.01</b> | 0.00         | 0.000 | 0.27          | 1.888 | 0.000 T  | 19.25          | <b>8.48</b>   | <b>8.48</b>   | <b>8.48</b>   |
|       | Fu.C.42 | -15.94        | 0.00         | 0.000 | <b>0.28</b>   | 1.887 | 0.000 T  | 20.67          | 8.45          | 8.45          | 8.45          |
|       | Fu.C.56 | 3.21          | 0.00         | 0.000 | <b>-0.21</b>  | 1.800 | 0.000 D  | -10.51         | -1.78         | -1.78         | -1.78         |
| S23   | Fu.C.61 | <b>3.27</b>   | 0.00         | 0.000 | -0.21         | 1.804 | 0.000 D  | -9.09          | <b>-1.81</b>  | <b>-1.81</b>  | <b>-1.81</b>  |
|       | Fu.C.63 | -12.27        | 0.00         | 0.000 | 0.10          | 1.905 | 0.000 T  | <b>21.00</b>   | 6.44          | 6.44          | 6.44          |
|       | Fu.C.43 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>1.61</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.54 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-0.35</b>   | 0.00          | 0.00          | 0.00          |
|       | Fu.C.43 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-63.99</b>  | 0.00          | 0.00          | 0.00          |
| S24   | Fu.C.54 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>2.73</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.43 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-73.30</b>  | 0.00          | 0.00          | 0.00          |
| S25   | Fu.C.54 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>2.15</b>    | 0.00          | 0.00          | 0.00          |
|       | Fu.C.41 | 0.00          | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-12.25</b>  | 0.00          | 0.00          | 0.00          |
| S26   | Fu.C.31 | 0.00          | <b>1.01</b>  | 0.522 | -1.10         | 1.043 | 0.000 T  | 2.63           | <b>3.89</b>   | -5.62         | -5.62         |
|       | Fu.C.45 | 0.00          | 0.97         | 0.510 | <b>-1.21</b>  | 1.020 | 0.000 T  | <b>2.67</b>    | 3.80          | <b>-5.70</b>  | <b>-5.70</b>  |
|       | Fu.C.50 | 0.00          | -0.01        | 0.224 | <b>0.14</b>   | 0.449 | 0.000 D  | <b>-0.13</b>   | -0.06         | <b>0.29</b>   | <b>0.29</b>   |
| S27   | Fu.C.66 | 0.00          | <b>-0.04</b> | 0.543 | 0.03          | 1.087 | 0.000 D  | -0.09          | <b>-0.15</b>  | 0.20          | 0.20          |
|       | Fu.C.1  | 0.00          | <b>0.02</b>  | 0.622 | 0.00          | 0.000 | 0.000 T  | 12.61          | <b>0.06</b>   | <b>0.06</b>   | <b>-0.06</b>  |
|       | Fu.C.31 | 0.00          | 0.02         | 0.622 | 0.00          | 0.000 | 0.000 T  | <b>22.33</b>   | 0.06          | 0.06          | -0.06         |
|       | Fu.C.66 | 0.00          | 0.01         | 0.622 | 0.00          | 0.000 | 0.000 D  | <b>-2.00</b>   | 0.04          | 0.04          | -0.04         |
| S28   | Fu.C.31 | -1.10         | 2.97         | 1.045 | 1.37          | 0.153 | 0.000 T  | 22.05          | 7.79          | 7.79          | <b>-4.89</b>  |
|       | Fu.C.32 | -0.52         | 1.62         | 0.964 | 0.37          | 0.125 | 0.000 T  | <b>23.43</b>   | 4.44          | 4.44          | -3.38         |
|       | Fu.C.45 | <b>-1.21</b>  | <b>3.01</b>  | 1.064 | <b>1.50</b>   | 0.166 | 0.000 T  | 16.33          | <b>7.93</b>   | <b>7.93</b>   | -4.74         |

|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|

| Staaf | B.C.    | Mb           | Mmax         | xMmax | Me           | x-M0  | x-M0 T/D | Nmax          | Vb           | Vmax          | Ve            |
|-------|---------|--------------|--------------|-------|--------------|-------|----------|---------------|--------------|---------------|---------------|
| S29   | Fu.C.50 | <b>0.14</b>  | 0.00         | 0.000 | <b>-0.28</b> | 0.330 | 0.000 T  | 5.79          | <b>-0.48</b> | <b>-0.48</b>  | -0.02         |
|       | Fu.C.59 | 0.11         | <b>-0.24</b> | 1.598 | -0.24        | 0.278 | 0.000 T  | 4.11          | -0.43        | -0.43         | 0.03          |
|       | Fu.C.65 | -0.55        | 1.21         | 1.169 | 0.85         | 0.200 | 0.000 D  | <b>-3.58</b>  | 3.02         | 3.02          | -1.37         |
|       | Fu.C.66 | 0.03         | -0.17        | 1.226 | -0.14        | 0.102 | 0.000 D  | -0.14         | -0.33        | -0.33         | <b>0.13</b>   |
| S30   | Fu.C.31 | 0.00         | 0.06         | 0.888 | 0.05         | 0.000 | 0.000 D  | <b>-22.94</b> | 0.13         | 0.13          | -0.06         |
|       | Fu.C.32 | 0.00         | <b>0.08</b>  | 1.035 | 0.07         | 0.000 | 0.000 D  | -21.13        | <b>0.15</b>  | <b>0.15</b>   | -0.03         |
|       | Fu.C.43 | 0.00         | 0.01         | 0.328 | <b>-0.06</b> | 0.656 | 0.000 D  | -1.31         | 0.05         | <b>-0.14</b>  | <b>-0.14</b>  |
|       | Fu.C.54 | 0.00         | 0.08         | 1.178 | <b>0.08</b>  | 0.000 | 0.000 D  | -19.61        | 0.13         | 0.13          | -0.01         |
| S31   | Fu.C.66 | 0.00         | 0.01         | 0.432 | -0.03        | 0.864 | 0.000 T  | <b>2.08</b>   | 0.05         | -0.09         | -0.09         |
|       | Fu.C.1  | 0.00         | <b>0.05</b>  | 1.154 | 0.00         | 0.000 | 0.000 T  | 6.88          | <b>0.08</b>  | <b>0.08</b>   | <b>-0.08</b>  |
|       | Fu.C.45 | 0.00         | 0.04         | 1.154 | 0.00         | 0.000 | 0.000 T  | <b>27.53</b>  | 0.08         | 0.08          | -0.08         |
|       | Fu.C.50 | 0.00         | 0.03         | 1.154 | 0.00         | 0.000 | 0.000 D  | <b>-6.97</b>  | 0.06         | 0.06          | -0.06         |
| S32   | Fu.C.1  | 0.00         | <b>0.03</b>  | 0.783 | 0.00         | 0.000 | 0.000 T  | 4.01          | <b>0.08</b>  | <b>0.08</b>   | <b>-0.08</b>  |
|       | Fu.C.32 | 0.00         | 0.03         | 0.783 | 0.00         | 0.000 | 0.000 T  | <b>12.14</b>  | 0.08         | 0.08          | -0.08         |
|       | Fu.C.65 | 0.00         | 0.02         | 0.783 | 0.00         | 0.000 | 0.000 D  | <b>-11.32</b> | 0.06         | 0.06          | -0.06         |
| S33   | Fu.C.32 | 0.37         | <b>2.32</b>  | 0.920 | 0.92         | 0.000 | 0.000 T  | <b>36.78</b>  | <b>4.23</b>  | <b>4.23</b>   | -3.59         |
|       | Fu.C.45 | <b>1.50</b>  | 1.74         | 0.251 | <b>-6.09</b> | 0.934 | 0.000 D  | -16.38        | 1.87         | <b>-10.80</b> | <b>-10.80</b> |
|       | Fu.C.50 | <b>-0.28</b> | 0.00         | 0.000 | <b>2.21</b>  | 0.220 | 0.000 T  | 19.43         | 1.23         | 1.69          | <b>1.69</b>   |
|       | Fu.C.65 | 0.85         | 0.00         | 0.000 | -4.80        | 0.485 | 0.000 D  | <b>-30.07</b> | <b>-1.13</b> | -5.52         | -5.52         |
| S34   | Fu.C.66 | -0.14        | <b>-0.14</b> | 0.047 | 0.23         | 1.067 | 0.000 T  | 1.23          | -0.01        | 0.45          | 0.45          |
|       | Fu.C.1  | 0.00         | <b>0.34</b>  | 1.204 | 0.00         | 0.000 | 0.000 D  | -19.65        | <b>0.56</b>  | <b>-0.56</b>  | <b>-0.56</b>  |
|       | Fu.C.45 | 0.00         | 0.31         | 1.204 | 0.00         | 0.000 | 0.000 D  | <b>-68.72</b> | 0.52         | -0.52         | -0.52         |
|       | Fu.C.50 | 0.00         | 0.23         | 1.204 | 0.00         | 0.000 | 0.000 T  | <b>16.36</b>  | 0.39         | -0.39         | -0.39         |
| S35   | Fu.C.1  | 0.00         | <b>0.12</b>  | 0.827 | 0.00         | 0.000 | 0.000 D  | -19.56        | <b>0.28</b>  | <b>-0.28</b>  | <b>-0.28</b>  |
|       | Fu.C.40 | 0.00         | 0.11         | 0.827 | 0.00         | 0.000 | 0.000 D  | <b>-44.89</b> | 0.26         | -0.26         | -0.26         |
|       | Fu.C.58 | 0.00         | 0.08         | 0.827 | 0.00         | 0.000 | 0.000 T  | <b>18.12</b>  | 0.19         | -0.19         | -0.19         |
| S36   | Fu.C.22 | 0.00         | <b>0.22</b>  | 1.652 | 0.22         | 0.000 | 0.000 D  | -10.45        | 0.26         | 0.26          | -0.01         |
|       | Fu.C.28 | 0.01         | 0.03         | 0.553 | -0.07        | 1.196 | 0.000 D  | -12.77        | 0.08         | <b>-0.17</b>  | <b>-0.17</b>  |
|       | Fu.C.32 | 0.07         | 0.20         | 1.328 | 0.19         | 0.000 | 0.000 D  | <b>-34.32</b> | 0.19         | 0.19          | -0.05         |
|       | Fu.C.43 | <b>-0.06</b> | 0.00         | 0.000 | 0.21         | 0.217 | 0.000 T  | 10.49         | 0.28         | 0.28          | 0.03          |
| S37   | Fu.C.45 | 0.01         | 0.00         | 0.000 | <b>0.47</b>  | 0.000 | 0.000 D  | -11.18        | <b>0.39</b>  | <b>0.39</b>   | 0.15          |
|       | Fu.C.50 | 0.01         | 0.02         | 0.364 | <b>-0.08</b> | 0.914 | 0.000 D  | -10.75        | 0.04         | -0.15         | -0.15         |
|       | Fu.C.54 | <b>0.08</b>  | 0.18         | 1.398 | 0.18         | 0.000 | 0.000 D  | -32.31        | 0.15         | 0.15          | -0.03         |
|       | Fu.C.65 | -0.06        | 0.00         | 0.000 | 0.19         | 0.248 | 0.000 T  | <b>12.47</b>  | 0.24         | 0.24          | 0.05          |
| S38   | Fu.C.66 | -0.03        | <b>0.00</b>  | 0.682 | -0.06        | 0.000 | 0.000 T  | 3.06          | 0.07         | -0.11         | -0.11         |
|       | Fu.C.67 | 0.01         | 0.00         | 0.000 | 0.45         | 0.000 | 0.000 D  | -9.17         | 0.35         | 0.35          | <b>0.17</b>   |
|       | Fu.C.31 | -4.11        | <b>1.38</b>  | 1.213 | 1.36         | 0.605 | 0.000 T  | 51.67         | 9.04         | 9.04          | -0.46         |
|       | Fu.C.32 | 0.92         | 1.11         | 0.288 | -1.13        | 0.982 | 0.000 T  | 25.92         | 1.32         | <b>-4.54</b>  | <b>-4.54</b>  |
| S39   | Fu.C.43 | -4.90        | 0.00         | 0.000 | <b>2.47</b>  | 0.746 | 0.000 T  | 32.00         | 7.67         | 7.67          | 3.89          |
|       | Fu.C.45 | <b>-6.09</b> | 0.00         | 0.000 | 2.41         | 0.688 | 0.000 T  | <b>54.20</b>  | <b>11.41</b> | <b>11.41</b>  | 1.91          |
|       | Fu.C.50 | <b>2.21</b>  | 0.00         | 0.000 | -1.11        | 0.828 | 0.000 D  | <b>-0.43</b>  | <b>-2.78</b> | -2.78         | -2.43         |
|       | Fu.C.54 | 1.02         | 1.13         | 0.228 | <b>-1.18</b> | 0.961 | 0.000 T  | 21.77         | 0.96         | -4.41         | -4.41         |
| S40   | Fu.C.65 | -4.80        | 0.00         | 0.000 | 2.43         | 0.757 | 0.000 T  | 27.85         | 7.31         | 7.31          | <b>4.02</b>   |
|       | Fu.C.1  | 0.00         | <b>0.03</b>  | 0.963 | 0.00         | 0.000 | 0.000 T  | 8.61          | <b>0.06</b>  | <b>0.06</b>   | <b>-0.06</b>  |
|       | Fu.C.32 | 0.00         | 0.03         | 0.963 | 0.00         | 0.000 | 0.000 T  | <b>18.69</b>  | 0.06         | 0.06          | -0.06         |
|       | Fu.C.65 | 0.00         | 0.02         | 0.963 | 0.00         | 0.000 | 0.000 D  | <b>-9.74</b>  | 0.04         | 0.04          | -0.04         |
| S41   | Fu.C.28 | -0.07        | 0.00         | 0.000 | 0.32         | 0.197 | 0.000 D  | -12.89        | <b>0.35</b>  | <b>0.35</b>   | 0.10          |
|       | Fu.C.32 | 0.19         | <b>0.33</b>  | 1.379 | 0.32         | 0.000 | 0.000 D  | <b>-34.32</b> | 0.20         | 0.20          | -0.05         |
|       | Fu.C.43 | 0.21         | 0.00         | 0.000 | <b>-0.65</b> | 0.497 | 0.000 T  | 10.80         | -0.38        | -0.63         | -0.63         |
|       | Fu.C.45 | <b>0.47</b>  | 0.00         | 0.000 | -0.65        | 0.792 | 0.000 D  | -10.75        | -0.53        | <b>-0.78</b>  | <b>-0.78</b>  |
| S42   | Fu.C.50 | <b>-0.08</b> | 0.00         | 0.000 | 0.32         | 0.258 | 0.000 D  | -10.88        | 0.33         | 0.33          | <b>0.14</b>   |
|       | Fu.C.54 | 0.18         | 0.33         | 1.653 | <b>0.33</b>  | 0.000 | 0.000 D  | -32.32        | 0.18         | 0.18          | -0.01         |
|       | Fu.C.65 | 0.19         | 0.00         | 0.000 | -0.65        | 0.451 | 0.000 T  | <b>12.77</b>  | -0.40        | -0.59         | -0.59         |
|       | Fu.C.67 | 0.45         | 0.00         | 0.000 | -0.64        | 0.761 | 0.000 D  | -8.75         | <b>-0.55</b> | -0.74         | -0.74         |
| S43   | Fu.C.28 | <b>-0.06</b> | 0.00         | 1.265 | 0.00         | 1.067 | 1.463 T  | 5.00          | <b>0.10</b>  | <b>0.10</b>   | -0.02         |
|       | Fu.C.32 | -0.05        | <b>-0.01</b> | 1.108 | -0.01        | 0.000 | 0.000 T  | 16.45         | 0.08         | 0.08          | -0.03         |
|       | Fu.C.39 | 0.05         | 0.00         | 0.000 | <b>-0.05</b> | 1.040 | 0.000 T  | 24.35         | -0.01        | -0.12         | -0.12         |
|       | Fu.C.43 | 0.05         | <b>0.05</b>  | 0.062 | -0.04        | 1.187 | 0.000 T  | 13.40         | 0.00         | -0.11         | -0.11         |
| S44   | Fu.C.45 | 0.06         | 0.00         | 0.000 | -0.05        | 1.116 | 0.000 T  | <b>24.85</b>  | -0.01        | <b>-0.12</b>  | <b>-0.12</b>  |
|       | Fu.C.59 | -0.05        | 0.01         | 1.418 | <b>0.01</b>  | 0.826 | 0.000 T  | 3.28          | 0.08         | 0.08          | -0.01         |
|       | Fu.C.67 | <b>0.06</b>  | 0.00         | 0.000 | -0.04        | 1.116 | 0.000 T  | 22.64         | <b>-0.02</b> | -0.11         | -0.11         |
|       | Fu.C.31 | -0.02        | 0.06         | 1.425 | 0.06         | 0.198 | 0.000 D  | <b>-19.35</b> | 0.11         | 0.11          | -0.01         |
| S45   | Fu.C.32 | -0.03        | <b>-0.03</b> | 0.218 | -0.09        | 0.000 | 0.000 D  | -16.61        | 0.02         | -0.10         | -0.10         |
|       | Fu.C.35 | 0.03         | 0.00         | 0.000 | <b>-0.14</b> | 0.436 | 0.000 D  | -5.29         | -0.05        | <b>-0.17</b>  | <b>-0.17</b>  |
|       | Fu.C.41 | -0.04        | 0.00         | 0.000 | 0.11         | 0.243 | 0.000 D  | -18.45        | <b>0.16</b>  | <b>0.16</b>   | 0.04          |
|       | Fu.C.42 | <b>-0.04</b> | -0.02        | 0.836 | -0.04        | 0.000 | 0.000 D  | -15.71        | 0.06         | 0.06          | -0.05         |



|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|

| Staaf | B.C.    | Mb           | Mmax         | xMmax | Me            | x-M0  | x-M0 T/D | Nmax           | Vb            | Vmax          | Ve            |
|-------|---------|--------------|--------------|-------|---------------|-------|----------|----------------|---------------|---------------|---------------|
| S41   | Fu.C.45 | 0.00         | <b>0.08</b>  | 1.443 | 0.08          | 0.000 | 0.000 D  | -17.53         | 0.11          | 0.11          | -0.01         |
|       | Fu.C.56 | <b>0.04</b>  | 0.05         | 0.533 | 0.02          | 0.000 | 0.000 D  | -6.14          | 0.03          | -0.06         | -0.06         |
|       | Fu.C.57 | 0.03         | 0.00         | 0.000 | -0.13         | 0.425 | 0.000 D  | -3.40          | <b>-0.06</b>  | -0.15         | -0.15         |
|       | Fu.C.63 | -0.03        | 0.00         | 0.000 | <b>0.12</b>   | 0.244 | 0.000 D  | -16.55         | 0.15          | 0.15          | <b>0.06</b>   |
| S42   | Fu.C.36 | -0.14        | <b>-0.07</b> | 1.332 | -0.08         | 0.000 | 0.000 T  | 7.07           | 0.10          | 0.10          | -0.02         |
|       | Fu.C.37 | 0.11         | 0.00         | 0.000 | <b>-0.14</b>  | 0.799 | 0.000 T  | 17.11          | -0.11         | <b>-0.22</b>  | <b>-0.22</b>  |
|       | Fu.C.39 | <b>-0.22</b> | 0.00         | 0.000 | 0.04          | 1.197 | 0.000 D  | -9.21          | <b>0.23</b>   | <b>0.23</b>   | 0.11          |
|       | Fu.C.42 | 0.06         | 0.00         | 0.000 | -0.12         | 0.721 | 0.000 T  | <b>19.50</b>   | -0.06         | -0.18         | -0.18         |
|       | Fu.C.56 | -0.17        | 0.00         | 0.000 | 0.03          | 1.247 | 0.000 D  | <b>-12.05</b>  | 0.17          | 0.17          | 0.08          |
|       | Fu.C.59 | <b>0.11</b>  | 0.00         | 0.000 | -0.14         | 0.804 | 0.000 T  | 16.64          | <b>-0.12</b>  | -0.21         | -0.21         |
|       | Fu.C.61 | -0.21        | 0.00         | 0.000 | <b>0.05</b>   | 1.174 | 0.000 D  | -9.66          | 0.22          | 0.22          | <b>0.13</b>   |
|       | Fu.C.62 | 0.03         | <b>0.04</b>  | 0.308 | -0.02         | 1.280 | 0.000 T  | 0.43           | 0.02          | -0.09         | -0.09         |
|       | Fu.C.34 | -2.06        | <b>3.61</b>  | 1.281 | 3.49          | 0.259 | 0.000 T  | 4.28           | 8.86          | 8.86          | -1.30         |
| S43   | Fu.C.36 | -2.64        | 0.00         | 0.000 | <b>12.85</b>  | 0.215 | 0.000 D  | -14.84         | 12.58         | 12.58         | <b>8.52</b>   |
|       | Fu.C.40 | -0.98        | <b>-0.86</b> | 0.235 | -4.11         | 0.000 | 0.000 D  | -28.24         | 1.01          | -5.27         | -5.27         |
|       | Fu.C.42 | -1.56        | 0.00         | 0.000 | 5.26          | 0.331 | 0.000 D  | <b>-41.65</b>  | 4.73          | 4.73          | 4.56          |
|       | Fu.C.43 | <b>-3.49</b> | 0.00         | 0.000 | 12.05         | 0.235 | 0.000 D  | -11.33         | <b>15.65</b>  | <b>15.65</b>  | 5.50          |
|       | Fu.C.54 | <b>0.04</b>  | 0.00         | 0.000 | -3.60         | 0.015 | 0.000 D  | -28.76         | <b>-2.66</b>  | -2.66         | -2.30         |
|       | Fu.C.56 | -1.89        | 3.33         | 1.261 | 3.19          | 0.254 | 0.000 T  | <b>7.17</b>    | 8.27          | 8.27          | -1.36         |
|       | Fu.C.62 | -0.83        | -0.80        | 0.128 | <b>-4.39</b>  | 0.000 | 0.000 D  | -26.44         | 0.51          | <b>-5.36</b>  | <b>-5.36</b>  |
|       | Fu.C.34 | -0.04        | -0.03        | 0.616 | -0.06         | 0.000 | 0.000 T  | <b>15.05</b>   | 0.05          | -0.07         | -0.07         |
|       | Fu.C.39 | <b>-0.05</b> | -0.03        | 0.725 | -0.06         | 0.000 | 0.000 T  | 13.36          | 0.06          | -0.06         | -0.06         |
| S44   | Fu.C.43 | -0.04        | -0.03        | 0.213 | <b>-0.10</b>  | 0.000 | 0.000 T  | 12.85          | 0.02          | <b>-0.10</b>  | <b>-0.10</b>  |
|       | Fu.C.45 | -0.05        | <b>-0.04</b> | 0.322 | -0.10         | 0.000 | 0.000 T  | 11.16          | 0.02          | -0.09         | -0.09         |
|       | Fu.C.50 | 0.00         | <b>0.01</b>  | 0.634 | -0.01         | 1.346 | 0.000 D  | -5.91          | 0.04          | -0.05         | -0.05         |
|       | Fu.C.54 | -0.01        | 0.01         | 0.780 | -0.01         | 0.206 | 1.353 D  | -7.61          | 0.04          | <b>0.04</b>   | -0.04         |
|       | Fu.C.59 | <b>0.01</b>  | 0.01         | 0.097 | -0.05         | 0.684 | 0.000 D  | -8.11          | 0.01          | -0.08         | -0.08         |
|       | Fu.C.62 | -0.02        | 0.00         | 0.757 | -0.02         | 0.545 | 0.968 D  | -0.30          | <b>0.06</b>   | -0.06         | -0.06         |
|       | Fu.C.64 | 0.00         | 0.00         | 0.242 | -0.05         | 0.140 | 0.344 D  | <b>-9.80</b>   | 0.01          | -0.07         | -0.07         |
|       | Fu.C.19 | 0.05         | <b>0.05</b>  | 0.033 | -0.07         | 0.837 | 0.000 D  | -13.57         | 0.01          | -0.20         | -0.20         |
|       | Fu.C.32 | 0.32         | 0.00         | 0.000 | <b>-0.24</b>  | 0.790 | 0.000 D  | <b>-32.85</b>  | -0.35         | <b>-0.54</b>  | <b>-0.54</b>  |
| S45   | Fu.C.43 | <b>-0.65</b> | 0.00         | 0.000 | 0.37          | 0.779 | 0.000 T  | 24.70          | <b>0.90</b>   | <b>0.90</b>   | 0.71          |
|       | Fu.C.54 | <b>0.33</b>  | 0.00         | 0.000 | -0.24         | 0.785 | 0.000 D  | -31.47         | <b>-0.37</b>  | -0.51         | -0.51         |
|       | Fu.C.65 | -0.65        | 0.00         | 0.000 | <b>0.38</b>   | 0.782 | 0.000 T  | <b>26.06</b>   | 0.88          | 0.88          | <b>0.74</b>   |
|       | Fu.C.25 | -0.03        | <b>0.05</b>  | 1.267 | 0.05          | 0.308 | 0.000 T  | 10.09          | 0.12          | 0.12          | 0.00          |
|       | Fu.C.28 | -0.02        | <b>-0.02</b> | 0.067 | -0.10         | 0.000 | 0.000 T  | 4.14           | 0.01          | -0.12         | -0.12         |
|       | Fu.C.36 | -0.20        | 0.00         | 0.000 | <b>0.71</b>   | 0.274 | 0.000 D  | <b>-43.12</b>  | <b>0.76</b>   | <b>0.76</b>   | <b>0.63</b>   |
|       | Fu.C.41 | <b>-0.21</b> | 0.00         | 0.000 | 0.65          | 0.293 | 0.000 D  | -38.78         | 0.72          | 0.72          | 0.59          |
|       | Fu.C.57 | <b>0.01</b>  | 0.00         | 0.000 | -0.14         | 0.100 | 0.000 T  | 17.13          | -0.07         | -0.16         | -0.16         |
|       | Fu.C.62 | 0.00         | 0.00         | 0.000 | <b>-0.20</b>  | 0.011 | 0.000 T  | <b>21.63</b>   | <b>-0.09</b>  | <b>-0.22</b>  | <b>-0.22</b>  |
| S47   | Fu.C.24 | -0.21        | <b>-0.11</b> | 0.363 | -0.99         | 0.000 | 0.000 D  | -21.23         | 0.52          | -1.59         | -1.59         |
|       | Fu.C.34 | 3.70         | <b>3.72</b>  | 0.073 | -3.01         | 1.110 | 0.000 T  | 8.68           | 0.50          | -9.65         | -9.65         |
|       | Fu.C.36 | <b>13.56</b> | 0.00         | 0.000 | <b>-13.35</b> | 0.780 | 0.000 D  | -50.58         | <b>-16.30</b> | -20.36        | -20.36        |
|       | Fu.C.42 | 5.57         | 0.00         | 0.000 | -7.33         | 0.638 | 0.000 D  | <b>-59.66</b>  | -8.69         | -8.87         | -8.87         |
|       | Fu.C.43 | 12.73        | 0.00         | 0.000 | -12.01        | 0.863 | 0.000 D  | -34.77         | -11.77        | <b>-21.92</b> | <b>-21.92</b> |
|       | Fu.C.54 | -3.78        | 0.00         | 0.000 | 2.09          | 0.960 | 0.000 D  | -18.74         | 3.82          | 4.18          | <b>4.18</b>   |
|       | Fu.C.56 | 3.38         | 3.42         | 0.114 | -2.59         | 1.136 | 0.000 T  | <b>11.77</b>   | 0.75          | -8.88         | -8.88         |
|       | Fu.C.62 | <b>-4.60</b> | 0.00         | 0.000 | <b>3.37</b>   | 0.652 | 0.000 D  | -3.90          | <b>8.36</b>   | <b>8.36</b>   | 2.49          |
|       | Fu.C.1  | 0.00         | <b>0.14</b>  | 0.877 | 0.00          | 0.000 | 0.000 D  | -19.10         | <b>0.31</b>   | <b>-0.31</b>  | <b>-0.31</b>  |
| S48   | Fu.C.43 | 0.00         | 0.12         | 0.877 | 0.00          | 0.000 | 0.000 D  | <b>-61.66</b>  | 0.28          | -0.28         | -0.28         |
|       | Fu.C.54 | 0.00         | 0.09         | 0.877 | 0.00          | 0.000 | 0.000 T  | <b>3.46</b>    | 0.21          | -0.21         | -0.21         |
|       | Fu.C.1  | 0.00         | <b>0.15</b>  | 1.320 | 0.00          | 0.000 | 0.000 D  | -45.84         | <b>0.23</b>   | <b>0.23</b>   | <b>-0.23</b>  |
| S49   | Fu.C.43 | 0.00         | 0.14         | 1.320 | 0.00          | 0.000 | 0.000 D  | <b>-143.73</b> | 0.21          | 0.21          | -0.21         |
|       | Fu.C.36 | -0.70        | 0.00         | 0.000 | <b>2.36</b>   | 0.325 | 0.000 T  | 76.82          | <b>2.19</b>   | <b>2.19</b>   | <b>1.98</b>   |
|       | Fu.C.41 | <b>-0.73</b> | 0.00         | 0.000 | 2.14          | 0.360 | 0.000 T  | <b>83.74</b>   | 2.06          | 2.06          | 1.85          |
| S50   | Fu.C.51 | -0.10        | <b>-0.06</b> | 0.967 | -0.07         | 0.000 | 0.000 T  | 0.51           | 0.10          | 0.10          | -0.05         |
|       | Fu.C.57 | <b>0.02</b>  | 0.00         | 0.000 | -0.43         | 0.081 | 0.000 D  | <b>-16.11</b>  | -0.23         | -0.38         | -0.38         |
|       | Fu.C.62 | -0.03        | 0.00         | 0.000 | <b>-0.65</b>  | 0.000 | 0.000 D  | -7.97          | <b>-0.32</b>  | <b>-0.53</b>  | <b>-0.53</b>  |
|       | Fu.C.8  | 0.01         | <b>0.01</b>  | 0.130 | 0.14          | 0.000 | 0.000 T  | 17.84          | -0.01         | 0.13          | 0.13          |
|       | Fu.C.32 | <b>0.05</b>  | -0.07        | 2.009 | -0.07         | 0.482 | 0.000 D  | -12.98         | -0.12         | -0.12         | 0.01          |
|       | Fu.C.35 | 0.03         | <b>-0.08</b> | 1.889 | -0.07         | 0.295 | 0.000 D  | -1.31          | -0.11         | -0.11         | 0.02          |
|       | Fu.C.36 | -0.06        | 0.00         | 0.000 | <b>0.67</b>   | 0.208 | 0.000 T  | 78.51          | 0.28          | <b>0.41</b>   | <b>0.41</b>   |
|       | Fu.C.43 | -0.06        | 0.00         | 0.000 | 0.63          | 0.241 | 0.000 T  | <b>84.90</b>   | 0.26          | 0.39          | 0.39          |
|       | Fu.C.54 | 0.05         | 0.00         | 0.000 | -0.10         | 0.454 | 0.000 D  | <b>-16.14</b>  | -0.12         | -0.12         | <b>-0.02</b>  |
| S51   | Fu.C.58 | -0.06        | 0.00         | 0.000 | 0.65          | 0.217 | 0.000 T  | 75.31          | <b>0.28</b>   | 0.38          | 0.38          |
|       | Fu.C.62 | 0.05         | 0.00         | 0.000 | <b>-0.13</b>  | 0.348 | 0.000 D  | -9.02          | <b>-0.15</b>  | <b>-0.15</b>  | -0.02         |

|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|

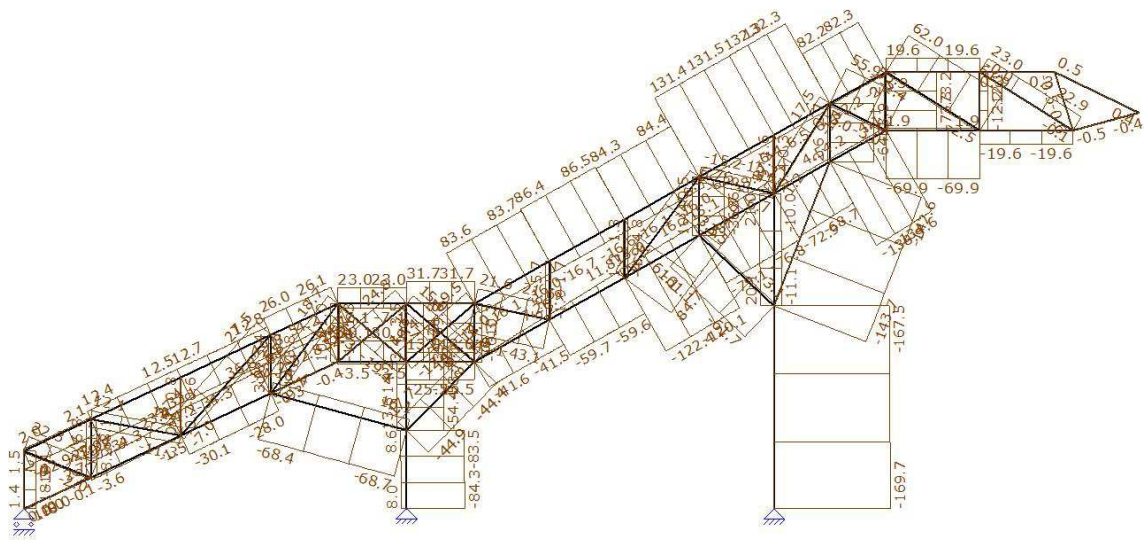
| Staaf | B.C.    | Mb            | Mmax         | xMmax | Me           | x-M0  | x-M0 T/D | Nmax           | Vb           | Vmax          | Ve            |
|-------|---------|---------------|--------------|-------|--------------|-------|----------|----------------|--------------|---------------|---------------|
| S51   | Fu.C.65 | <b>-0.07</b>  | 0.00         | 0.000 | 0.61         | 0.251 | 0.000 T  | 81.70          | 0.27         | 0.36          | 0.36          |
| S52   | Fu.C.36 | <b>-12.68</b> | 0.00         | 0.000 | -7.05        | 0.000 | 0.000 D  | -119.40        | 5.86         | 5.86          | 1.80          |
|       | Fu.C.39 | -2.13         | -1.21        | 0.517 | -4.34        | 0.000 | 0.000 D  | -32.20         | 3.57         | <b>-6.58</b>  | <b>-6.58</b>  |
|       | Fu.C.41 | -12.00        | 0.00         | 0.000 | -6.91        | 0.000 | 0.000 D  | <b>-122.42</b> | 5.50         | 5.50          | 1.44          |
|       | Fu.C.43 | <b>-11.38</b> | <b>-7.66</b> | 1.036 | <b>-8.31</b> | 0.000 | 0.000 D  | -106.94        | <b>7.17</b>  | <b>7.17</b>   | -2.99         |
|       | Fu.C.54 | 2.00          | 0.00         | 0.000 | <b>0.97</b>  | 0.000 | 0.000 D  | -2.70          | <b>-0.88</b> | -0.88         | -0.52         |
|       | Fu.C.57 | 2.63          | 2.71         | 0.203 | -0.43        | 1.379 | 0.000 T  | <b>16.21</b>   | 0.79         | -4.95         | -4.95         |
|       | Fu.C.59 | -7.25         | 0.00         | 0.000 | -3.00        | 0.000 | 0.000 D  | -77.44         | 2.71         | 3.07          | <b>3.07</b>   |
|       | Fu.C.62 | <b>3.24</b>   | <b>3.27</b>  | 0.123 | -0.35        | 1.402 | 0.000 T  | 11.54          | 0.49         | -5.38         | -5.38         |
| S53   | Fu.C.25 | 0.22          | <b>0.22</b>  | 0.116 | 0.09         | 0.000 | 0.000 D  | -2.61          | 0.02         | -0.19         | -0.19         |
|       | Fu.C.36 | <b>2.36</b>   | 0.00         | 0.000 | <b>-2.21</b> | 0.770 | 0.000 T  | 79.74          | <b>-3.01</b> | <b>-3.22</b>  | <b>-3.22</b>  |
|       | Fu.C.41 | 2.14          | 0.00         | 0.000 | -2.11        | 0.752 | 0.000 T  | <b>86.47</b>   | -2.79        | -3.00         | -3.00         |
|       | Fu.C.57 | -0.43         | 0.00         | 0.000 | 0.57         | 0.592 | 0.000 D  | <b>-16.67</b>  | 0.76         | 0.76          | 0.60          |
|       | Fu.C.62 | <b>-0.65</b>  | 0.00         | 0.000 | <b>0.66</b>  | 0.687 | 0.000 D  | -8.71          | <b>0.99</b>  | <b>0.99</b>   | <b>0.79</b>   |
| S54   | Fu.C.40 | -0.63         | 0.86         | 0.835 | 0.00         | 0.201 | 0.000 T  | 12.97          | 3.57         | 3.57          | <b>-2.71</b>  |
|       | Fu.C.41 | -6.91         | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 D  | <b>-79.11</b>  | 6.73         | 6.73          | 2.68          |
|       | Fu.C.43 | <b>-8.31</b>  | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 D  | -61.09         | <b>10.74</b> | <b>10.74</b>  | 0.58          |
|       | Fu.C.54 | <b>0.97</b>   | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 D  | -3.13          | <b>-0.84</b> | <b>-0.84</b>  | -0.48         |
|       | Fu.C.57 | -0.43         | 0.85         | 0.809 | 0.00         | 0.149 | 0.000 T  | <b>18.33</b>   | 3.16         | 3.16          | -2.58         |
|       | Fu.C.58 | -6.71         | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 D  | -73.46         | 6.33         | 6.33          | <b>2.81</b>   |
|       | Fu.C.62 | -0.35         | <b>0.91</b>  | 0.794 | 0.00         | 0.120 | 0.000 T  | 15.65          | 3.18         | 3.18          | -2.70         |
| S55   | Fu.C.4  | -0.42         | <b>-0.28</b> | 1.329 | -0.29        | 0.000 | 0.000 T  | 19.33          | 0.20         | 0.20          | -0.02         |
|       | Fu.C.32 | 0.24          | <b>0.24</b>  | 0.089 | 0.11         | 0.000 | 0.000 T  | 12.19          | 0.01         | -0.19         | -0.19         |
|       | Fu.C.36 | <b>-2.21</b>  | 0.00         | 0.000 | -0.99        | 0.000 | 0.000 T  | 77.52          | <b>0.94</b>  | <b>0.94</b>   | 0.73          |
|       | Fu.C.41 | -2.11         | 0.00         | 0.000 | -0.95        | 0.000 | 0.000 T  | <b>84.39</b>   | 0.90         | 0.90          | 0.69          |
|       | Fu.C.43 | -1.85         | 0.00         | 0.000 | <b>-1.12</b> | 0.000 | 0.000 T  | 60.01          | 0.60         | 0.60          | 0.40          |
|       | Fu.C.54 | 0.31          | 0.00         | 0.000 | <b>0.16</b>  | 0.000 | 0.000 T  | 8.41           | -0.03        | -0.18         | -0.18         |
|       | Fu.C.57 | 0.57          | 0.00         | 0.000 | -0.01        | 1.439 | 0.000 D  | <b>-16.06</b>  | -0.32        | -0.47         | -0.47         |
|       | Fu.C.58 | -2.15         | 0.00         | 0.000 | -0.94        | 0.000 | 0.000 T  | 73.74          | 0.90         | 0.90          | <b>0.74</b>   |
|       | Fu.C.62 | <b>0.66</b>   | 0.00         | 0.000 | 0.01         | 0.000 | 0.000 D  | -7.96          | <b>-0.33</b> | <b>-0.54</b>  | <b>-0.54</b>  |
| S56   | Fu.C.34 | -0.17         | 0.00         | 0.000 | -0.01        | 0.000 | 0.000 T  | 7.45           | <b>0.13</b>  | <b>0.13</b>   | 0.04          |
|       | Fu.C.41 | -0.11         | -0.10        | 0.596 | <b>-0.14</b> | 0.000 | 0.000 T  | 14.36          | 0.03         | -0.06         | -0.06         |
|       | Fu.C.42 | 0.02          | 0.00         | 0.000 | -0.14        | 0.340 | 0.000 T  | 9.62           | -0.04        | <b>-0.13</b>  | <b>-0.13</b>  |
|       | Fu.C.43 | <b>-0.17</b>  | -0.11        | 1.434 | -0.12        | 0.000 | 0.000 T  | <b>17.52</b>   | 0.08         | 0.08          | -0.02         |
|       | Fu.C.45 | -0.17         | <b>-0.11</b> | 1.419 | -0.12        | 0.000 | 0.000 T  | 17.01          | 0.08         | 0.08          | -0.02         |
|       | Fu.C.54 | <b>0.03</b>   | <b>0.03</b>  | 0.179 | -0.02        | 1.421 | 0.000 D  | <b>-1.17</b>   | 0.01         | -0.07         | -0.07         |
|       | Fu.C.56 | -0.15         | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 T  | 6.84           | 0.12         | 0.12          | <b>0.05</b>   |
|       | Fu.C.57 | -0.02         | 0.01         | 1.296 | <b>0.00</b>  | 0.626 | 0.000 T  | 2.10           | 0.05         | 0.05          | -0.02         |
|       | Fu.C.64 | 0.03          | 0.00         | 0.000 | -0.13        | 0.459 | 0.000 T  | 9.01           | <b>-0.05</b> | -0.12         | -0.12         |
| S57   | Fu.C.32 | 0.00          | <b>0.02</b>  | 0.587 | 0.00         | 0.000 | 0.000 D  | -0.14          | 0.07         | 0.07          | -0.06         |
|       | Fu.C.41 | 0.00          | 0.00         | 0.000 | -7.79        | 0.000 | 0.000 D  | <b>-72.94</b>  | -3.26        | -10.88        | -10.88        |
|       | Fu.C.43 | 0.00          | 0.00         | 0.000 | <b>-8.15</b> | 0.000 | 0.000 D  | -71.06         | <b>-3.60</b> | <b>-11.21</b> | <b>-11.21</b> |
|       | Fu.C.54 | 0.00          | 0.00         | 0.000 | <b>0.37</b>  | 0.000 | 0.000 T  | 2.77           | <b>0.20</b>  | <b>0.47</b>   | <b>0.47</b>   |
|       | Fu.C.57 | 0.00          | <b>-0.03</b> | 0.529 | 0.01         | 1.058 | 0.000 T  | <b>4.66</b>    | -0.13        | 0.14          | 0.14          |
| S58   | Fu.C.34 | -0.04         | 0.00         | 0.000 | <b>0.12</b>  | 0.497 | 0.000 D  | <b>-15.21</b>  | 0.06         | <b>0.19</b>   | <b>0.19</b>   |
|       | Fu.C.42 | <b>0.26</b>   | 0.00         | 0.000 | -0.05        | 1.044 | 0.000 T  | 5.79           | <b>-0.30</b> | <b>-0.30</b>  | -0.17         |
|       | Fu.C.43 | 0.13          | <b>0.10</b>  | 0.745 | 0.12         | 0.000 | 0.000 D  | -9.61          | -0.07        | -0.07         | 0.06          |
|       | Fu.C.56 | <b>-0.06</b>  | 0.00         | 0.000 | 0.12         | 0.544 | 0.000 D  | -14.27         | <b>0.09</b>  | 0.19          | 0.19          |
|       | Fu.C.57 | -0.01         | <b>-0.01</b> | 0.238 | 0.03         | 0.868 | 0.000 D  | -11.47         | -0.02        | 0.08          | 0.08          |
|       | Fu.C.64 | 0.25          | 0.00         | 0.000 | <b>-0.05</b> | 1.032 | 0.000 T  | <b>6.72</b>    | -0.28        | -0.28         | <b>-0.18</b>  |
| S59   | Fu.C.41 | -0.86         | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 T  | <b>131.54</b>  | 0.69         | 0.69          | 0.48          |
|       | Fu.C.43 | <b>-0.94</b>  | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 T  | 129.08         | <b>0.74</b>  | <b>0.74</b>   | <b>0.54</b>   |
|       | Fu.C.54 | <b>0.07</b>   | <b>0.07</b>  | 0.301 | 0.00         | 0.000 | 0.000 D  | -4.04          | 0.03         | <b>-0.12</b>  | <b>-0.12</b>  |
|       | Fu.C.57 | -0.01         | 0.02         | 0.823 | 0.00         | 0.177 | 0.000 D  | <b>-6.50</b>   | 0.09         | 0.09          | -0.07         |
| S60   | Fu.C.41 | -7.79         | -5.82        | 0.754 | <b>-6.24</b> | 0.000 | 0.000 D  | <b>-138.86</b> | 5.22         | 5.22          | <b>-2.40</b>  |
|       | Fu.C.43 | <b>-8.15</b>  | <b>-5.87</b> | 0.813 | -6.16        | 0.000 | 0.000 D  | -138.62        | <b>5.62</b>  | <b>5.62</b>   | -2.00         |
|       | Fu.C.50 | 0.31          | <b>0.24</b>  | 0.786 | 0.25         | 0.000 | 0.000 T  | 4.04           | -0.19        | -0.19         | 0.08          |
|       | Fu.C.54 | <b>0.37</b>   | 0.24         | 1.056 | 0.24         | 0.000 | 0.000 T  | 4.00           | <b>-0.26</b> | <b>-0.26</b>  | 0.01          |
|       | Fu.C.57 | 0.01          | 0.00         | 0.000 | <b>0.32</b>  | 0.000 | 0.000 T  | <b>4.24</b>    | 0.15         | 0.42          | <b>0.42</b>   |
| S61   | Fu.C.41 | 0.00          | 0.00         | 0.000 | -0.97        | 0.000 | 0.000 T  | <b>132.35</b>  | -0.81        | -0.96         | -0.96         |
|       | Fu.C.43 | 0.00          | 0.00         | 0.000 | <b>-1.04</b> | 0.000 | 0.000 T  | 129.95         | <b>-0.87</b> | <b>-1.02</b>  | <b>-1.02</b>  |
|       | Fu.C.54 | 0.00          | <b>0.05</b>  | 0.940 | <b>0.05</b>  | 0.000 | 0.000 D  | -4.08          | <b>0.10</b>  | <b>0.10</b>   | -0.02         |
|       | Fu.C.57 | 0.00          | 0.01         | 0.370 | -0.02        | 0.740 | 0.000 D  | <b>-6.48</b>   | 0.04         | -0.08         | -0.08         |
| S62   | Fu.C.1  | 0.00          | <b>0.01</b>  | 0.532 | 0.00         | 0.000 | 0.000 T  | 12.15          | <b>0.05</b>  | <b>-0.05</b>  | <b>-0.05</b>  |
|       | Fu.C.41 | 0.00          | 0.01         | 0.532 | 0.00         | 0.000 | 0.000 T  | <b>55.95</b>   | 0.05         | -0.05         | -0.05         |
|       | Fu.C.57 | 0.00          | 0.01         | 0.532 | 0.00         | 0.000 | 0.000 D  | <b>-3.02</b>   | 0.04         | -0.04         | -0.04         |

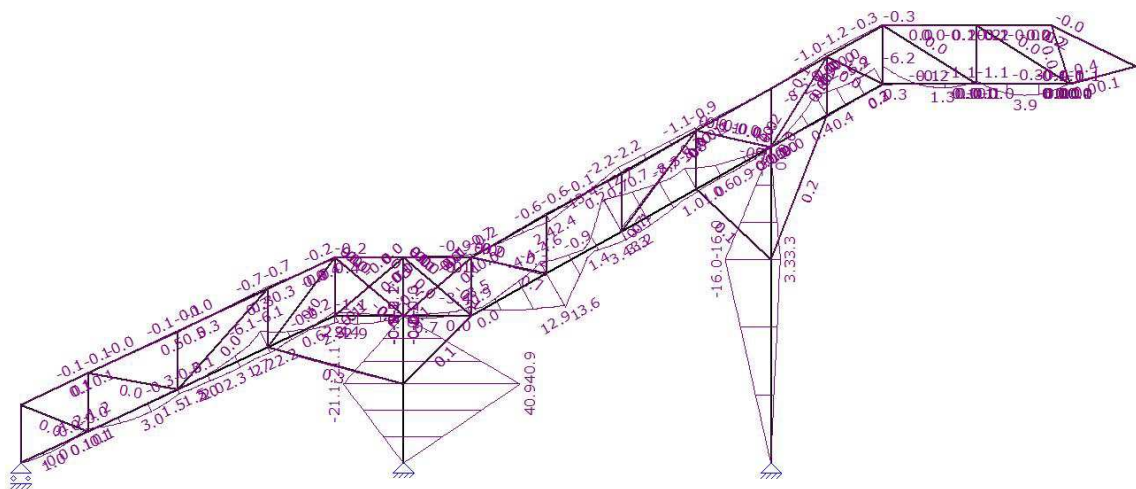
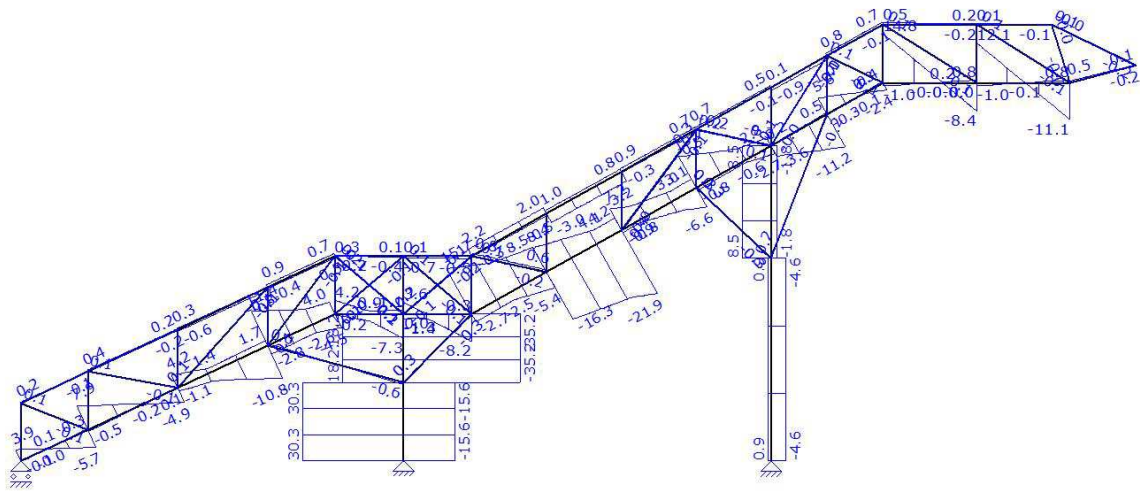
|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Staaf | B.C.    | Mb           | Mmax         | xMmax | Me           | x-M0  | x-M0 T/D | Nmax         | Vb           | Vmax         | Ve           |
|-------|---------|--------------|--------------|-------|--------------|-------|----------|--------------|--------------|--------------|--------------|
| S63   | Fu.C.1  | 0.00         | <b>0.04</b>  | 0.943 | 0.00         | 0.000 | 0.000 T  | 13.65        | <b>0.09</b>  | <b>-0.09</b> | <b>-0.09</b> |
|       | Fu.C.43 | 0.00         | 0.04         | 0.943 | 0.00         | 0.000 | 0.000 T  | <b>61.97</b> | 0.08         | -0.08        | -0.08        |
|       | Fu.C.54 | 0.00         | 0.03         | 0.943 | 0.00         | 0.000 | 0.000 D  | <b>-2.51</b> | 0.06         | -0.06        | -0.06        |
| S64   | Fu.C.1  | 0.00         | <b>0.04</b>  | 0.943 | 0.00         | 0.000 | 0.000 T  | 6.11         | <b>0.09</b>  | <b>-0.09</b> | <b>-0.09</b> |
|       | Fu.C.41 | 0.00         | 0.04         | 0.943 | 0.00         | 0.000 | 0.000 T  | <b>23.04</b> | 0.08         | -0.08        | -0.08        |
|       | Fu.C.57 | 0.00         | 0.03         | 0.943 | 0.00         | 0.000 | 0.000 D  | <b>-0.08</b> | 0.06         | -0.06        | -0.06        |
| S65   | Fu.C.12 | -0.07        | 0.04         | 0.731 | 0.00         | 0.302 | 0.000 D  | <b>-0.53</b> | 0.30         | 0.30         | -0.18        |
|       | Fu.C.35 | -0.02        | <b>0.06</b>  | 0.617 | 0.00         | 0.075 | 0.000 D  | -0.51        | 0.23         | 0.23         | <b>-0.21</b> |
|       | Fu.C.41 | <b>-0.37</b> | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 D  | -0.33        | <b>0.54</b>  | <b>0.54</b>  | 0.10         |
|       | Fu.C.57 | <b>0.00</b>  | 0.05         | 0.565 | 0.00         | 0.000 | 0.000 D  | -0.40        | 0.16         | -0.17        | -0.17        |
|       | Fu.C.62 | 0.00         | 0.06         | 0.576 | 0.00         | 0.000 | 0.000 D  | -0.47        | 0.19         | <b>-0.19</b> | -0.19        |
| S66   | Fu.C.63 | -0.35        | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 D  | -0.21        | 0.46         | 0.46         | <b>0.13</b>  |
|       | Fu.C.1  | 0.00         | <b>0.01</b>  | 0.525 | 0.00         | 0.000 | 0.000 D  | -0.60        | <b>0.02</b>  | <b>0.02</b>  | <b>-0.02</b> |
|       | Fu.C.12 | 0.00         | 0.01         | 0.525 | 0.00         | 0.000 | 0.000 D  | <b>-0.61</b> | 0.02         | 0.02         | -0.02        |
| S67   | Fu.C.35 | -0.02        | 0.04         | 0.876 | 0.00         | 0.150 | 0.000 T  | <b>0.55</b>  | 0.13         | 0.13         | -0.10        |
|       | Fu.C.41 | <b>0.16</b>  | <b>0.16</b>  | 0.124 | 0.00         | 0.000 | 0.000 T  | 0.21         | 0.02         | <b>-0.21</b> | <b>-0.21</b> |
|       | Fu.C.62 | <b>-0.02</b> | 0.03         | 0.907 | 0.00         | 0.214 | 0.000 T  | 0.52         | <b>0.13</b>  | <b>0.13</b>  | -0.10        |
| S68   | Fu.C.63 | 0.15         | 0.00         | 0.000 | 0.00         | 0.000 | 0.000 T  | 0.09         | <b>-0.01</b> | -0.18        | -0.18        |
|       | Fu.C.35 | -0.08        | <b>-0.02</b> | 0.876 | -0.03        | 0.000 | 0.000 T  | 2.40         | 0.12         | 0.12         | -0.03        |
|       | Fu.C.41 | -1.12        | 0.00         | 0.000 | <b>-0.34</b> | 0.000 | 0.000 T  | 82.24        | 0.78         | 0.78         | 0.62         |
|       | Fu.C.43 | <b>-1.16</b> | 0.00         | 0.000 | -0.34        | 0.000 | 0.000 T  | <b>82.31</b> | <b>0.82</b>  | <b>0.82</b>  | <b>0.66</b>  |
|       | Fu.C.54 | <b>0.02</b>  | <b>0.03</b>  | 0.307 | -0.01        | 1.030 | 0.000 D  | <b>-2.21</b> | 0.03         | <b>-0.08</b> | <b>-0.08</b> |
| -     | -       | kNm          | kNm          | m     | kNm          | m     | m -      | kN           | kN           | kN           | kN           |

AFB. FU.C. NORMAALKRACHT (NX) OMHULLENDE

Fundamenteel Belastingscombinaties





| B.G.  | Omschrijving               | Ka.C.(w1) | Ka.C.1 | Ka.C.2  | Ka.C.3  | Ka.C.4  | Ka.C.5  | Ka.C.6  | Ka.C.7  |
|-------|----------------------------|-----------|--------|---------|---------|---------|---------|---------|---------|
| B.G.1 | Eigen gewicht en permanent | 1.00      | 1.00   | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| B.G.2 | Permanent                  | -         | 1.00   | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| B.G.3 | Veranderlijk 1             | -         | 1.00   | -       | -       | -       | -       | 1.00    | 1.00    |
| B.G.4 | Veranderlijk 2             | -         | -      | 1.00    | -       | -       | -       | 1.00    | -       |
| B.G.5 | Veranderlijk 3             | -         | -      | -       | 1.00    | -       | -       | -       | 1.00    |
| B.G.6 | Wind neerwaarts            | -         | -      | -       | -       | 1.00    | -       | -       | -       |
| B.G.7 | Wind opwaarts              | -         | -      | -       | -       | -       | 1.00    | -       | -       |
| B.G.8 | Eenheid t.b.v. stijfheid   | -         | -      | -       | -       | -       | -       | -       | -       |
| B.G.  | Omschrijving               | Ka.C.8    | Ka.C.9 | Ka.C.10 | Ka.C.11 | Ka.C.12 | Ka.C.13 | Ka.C.14 | Ka.C.15 |
| B.G.1 | Eigen gewicht en permanent | 1.00      | 1.00   | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| B.G.2 | Permanent                  | 1.00      | 1.00   | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| B.G.3 | Veranderlijk 1             | 1.00      | 1.00   | -       | -       | -       | -       | -       | 1.00    |

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

|             |                            |                |                |                |                |                |                |                |                |
|-------------|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| B.G.4       | Veranderlijk 2             | -              | -              | 1.00           | 1.00           | 1.00           | -              | -              | 1.00           |
| B.G.5       | Veranderlijk 3             | -              | -              | 1.00           | -              | -              | 1.00           | 1.00           | 1.00           |
| B.G.6       | Wind neerwaarts            | 1.00           | -              | -              | 1.00           | -              | 1.00           | -              | -              |
| B.G.7       | Wind opwaarts              | -              | 1.00           | -              | -              | 1.00           | -              | 1.00           | -              |
| B.G.8       | Eenheid t.b.v. stijfheid   | -              | -              | -              | -              | -              | -              | -              | -              |
| <b>B.G.</b> | <b>Omschrijving</b>        | <b>Ka.C.16</b> | <b>Ka.C.17</b> | <b>Ka.C.18</b> | <b>Ka.C.19</b> | <b>Ka.C.20</b> | <b>Ka.C.21</b> | <b>Ka.C.22</b> | <b>Ka.C.23</b> |
| B.G.1       | Eigen gewicht en permanent | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.2       | Permanent                  | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.3       | Veranderlijk 1             | 1.00           | 1.00           | 1.00           | 1.00           | -              | -              | 1.00           | 1.00           |
| B.G.4       | Veranderlijk 2             | 1.00           | 1.00           | -              | -              | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.5       | Veranderlijk 3             | -              | -              | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.6       | Wind neerwaarts            | 1.00           | -              | 1.00           | -              | 1.00           | -              | 1.00           | -              |
| B.G.7       | Wind opwaarts              | -              | 1.00           | -              | 1.00           | -              | 1.00           | -              | 1.00           |
| B.G.8       | Eenheid t.b.v. stijfheid   | -              | -              | -              | -              | -              | -              | -              | -              |

## KA.C. EXTREME KNOOPVERPLAATSINGEN

| Knoop | B.C.    | X              | Z              | Ry                |
|-------|---------|----------------|----------------|-------------------|
| K1    | Ka.C.1  | -0.0003        | 0.0000         | <b>-0.515e-03</b> |
|       | Ka.C.9  | <b>-0.0022</b> | 0.0000         | -0.511e-03        |
|       | Ka.C.20 | <b>0.0033</b>  | 0.0000         | -0.040e-03        |
| K2    | Ka.C.5  | 0.0000         | 0.0000         | <b>1.465e-03</b>  |
|       | Ka.C.22 | 0.0000         | 0.0000         | <b>-2.880e-03</b> |
| K3    | Ka.C.14 | 0.0000         | 0.0000         | <b>1.492e-03</b>  |
|       | Ka.C.16 | 0.0000         | 0.0000         | <b>-0.596e-03</b> |
| K4    | Ka.C.1  | 0.0000         | <b>0.0005</b>  | <b>-0.435e-03</b> |
|       | Ka.C.5  | <b>-0.0019</b> | 0.0002         | -0.145e-03        |
|       | Ka.C.20 | <b>0.0033</b>  | 0.0000         | -0.019e-03        |
| K5    | Ka.C.1  | 0.0000         | <b>0.0000</b>  | -0.435e-03        |
|       | Ka.C.5  | <b>-0.0019</b> | 0.0000         | -0.161e-03        |
|       | Ka.C.9  | -0.0018        | 0.0000         | <b>-0.450e-03</b> |
| K6    | Ka.C.22 | <b>0.0034</b>  | 0.0000         | -0.292e-03        |
|       | Ka.C.5  | <b>-0.0018</b> | 0.0004         | -0.128e-03        |
|       | Ka.C.9  | -0.0017        | <b>0.0010</b>  | <b>-0.154e-03</b> |
| K7    | Ka.C.20 | 0.0033         | <b>-0.0001</b> | <b>0.203e-03</b>  |
|       | Ka.C.22 | <b>0.0034</b>  | 0.0006         | 0.177e-03         |
|       | Ka.C.5  | <b>-0.0016</b> | 0.0000         | <b>0.661e-03</b>  |
| K8    | Ka.C.6  | 0.0007         | <b>0.0001</b>  | -0.219e-03        |
|       | Ka.C.20 | 0.0029         | 0.0000         | <b>-1.192e-03</b> |
|       | Ka.C.22 | <b>0.0031</b>  | 0.0000         | -1.187e-03        |
| K9    | Ka.C.1  | 0.0002         | 0.0005         | <b>-0.376e-03</b> |
|       | Ka.C.5  | <b>-0.0018</b> | 0.0002         | -0.132e-03        |
|       | Ka.C.9  | -0.0016        | <b>0.0006</b>  | -0.383e-03        |
| K10   | Ka.C.22 | <b>0.0035</b>  | 0.0004         | -0.262e-03        |
|       | Ka.C.5  | <b>-0.0017</b> | 0.0004         | 0.111e-03         |
|       | Ka.C.9  | -0.0017        | <b>0.0009</b>  | <b>0.280e-03</b>  |
| K11   | Ka.C.20 | 0.0031         | <b>-0.0003</b> | <b>-0.090e-03</b> |
|       | Ka.C.22 | <b>0.0032</b>  | 0.0001         | 0.079e-03         |
|       | Ka.C.5  | <b>-0.0018</b> | 0.0004         | <b>-0.102e-03</b> |
| K12   | Ka.C.9  | -0.0016        | <b>0.0010</b>  | -0.107e-03        |
|       | Ka.C.20 | 0.0033         | <b>-0.0001</b> | <b>0.162e-03</b>  |
|       | Ka.C.22 | <b>0.0035</b>  | 0.0006         | 0.158e-03         |
| K13   | Ka.C.5  | <b>-0.0018</b> | 0.0002         | 0.205e-03         |
|       | Ka.C.9  | -0.0018        | <b>0.0005</b>  | <b>0.371e-03</b>  |
|       | Ka.C.20 | 0.0033         | <b>0.0000</b>  | <b>-0.233e-03</b> |
| K14   | Ka.C.22 | <b>0.0033</b>  | 0.0003         | -0.067e-03        |
|       | Ka.C.5  | <b>-0.0018</b> | 0.0000         | -0.029e-03        |
|       | Ka.C.12 | -0.0012        | 0.0000         | <b>-0.140e-03</b> |
| K15   | Ka.C.16 | 0.0025         | <b>0.0001</b>  | 0.210e-03         |
|       | Ka.C.18 | 0.0028         | 0.0001         | <b>0.381e-03</b>  |
|       | Ka.C.22 | <b>0.0034</b>  | 0.0001         | 0.269e-03         |
| K16   | Ka.C.5  | <b>-0.0018</b> | -0.0002        | 0.138e-03         |
|       | Ka.C.9  | -0.0018        | <b>-0.0003</b> | <b>0.268e-03</b>  |
|       | Ka.C.20 | 0.0033         | <b>0.0004</b>  | <b>-0.415e-03</b> |
| K17   | Ka.C.22 | <b>0.0034</b>  | 0.0003         | -0.285e-03        |
|       | Ka.C.5  | <b>-0.0018</b> | 0.0004         | 0.138e-03         |
|       | Ka.C.9  | -0.0017        | <b>0.0009</b>  | <b>0.336e-03</b>  |
| K18   | Ka.C.20 | 0.0033         | <b>-0.0003</b> | <b>-0.097e-03</b> |
|       | Ka.C.22 | <b>0.0033</b>  | 0.0002         | 0.101e-03         |
|       | Ka.C.9  | <b>-0.0020</b> | -0.0005        | -0.053e-03        |
| K19   | Ka.C.11 | 0.0026         | <b>0.0006</b>  | 0.105e-03         |
|       | Ka.C.13 | 0.0027         | 0.0001         | <b>0.938e-03</b>  |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

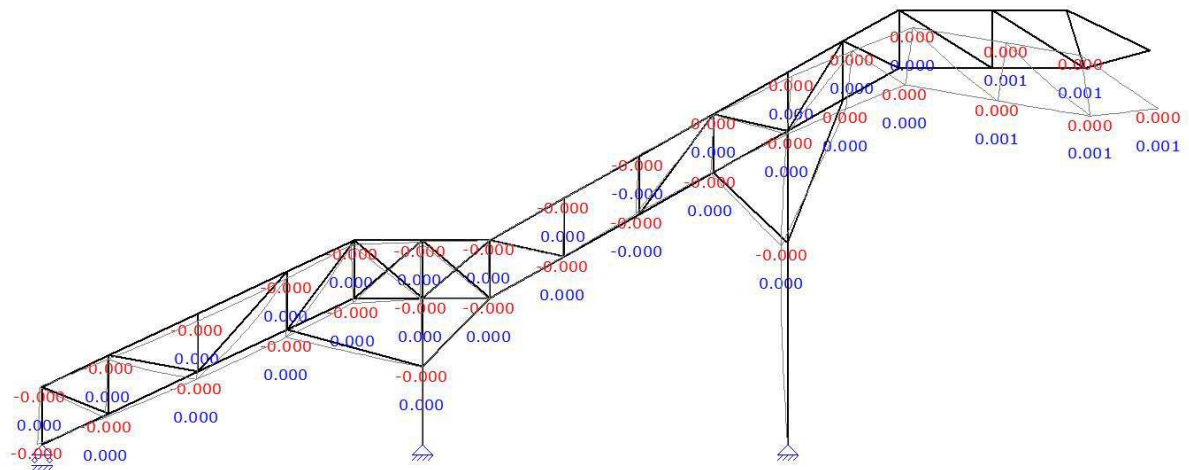
| Knoop | B.C.    | X              | Z              | Ry                |
|-------|---------|----------------|----------------|-------------------|
| K15   | Ka.C.17 | -0.0012        | 0.0000         | <b>-0.225e-03</b> |
|       | Ka.C.19 | -0.0012        | <b>-0.0006</b> | 0.608e-03         |
|       | Ka.C.20 | <b>0.0034</b>  | 0.0006         | 0.765e-03         |
| K16   | Ka.C.12 | -0.0009        | 0.0001         | <b>0.201e-03</b>  |
|       | Ka.C.13 | -0.0004        | 0.0003         | <b>-0.902e-03</b> |
|       | Ka.C.14 | <b>-0.0031</b> | 0.0002         | -0.334e-03        |
|       | Ka.C.16 | <b>0.0018</b>  | 0.0002         | -0.377e-03        |
| K17   | Ka.C.20 | 0.0005         | <b>0.0003</b>  | -0.872e-03        |
|       | Ka.C.9  | <b>-0.0021</b> | <b>0.0005</b>  | <b>0.398e-03</b>  |
|       | Ka.C.20 | <b>0.0035</b>  | <b>0.0000</b>  | <b>-0.229e-03</b> |
| K18   | Ka.C.9  | <b>-0.0021</b> | 0.0001         | <b>0.279e-03</b>  |
|       | Ka.C.16 | 0.0025         | <b>0.0002</b>  | 0.053e-03         |
|       | Ka.C.20 | <b>0.0035</b>  | 0.0001         | <b>-0.120e-03</b> |
| K19   | Ka.C.9  | <b>-0.0020</b> | -0.0003        | <b>0.262e-03</b>  |
|       | Ka.C.11 | 0.0026         | <b>0.0004</b>  | -0.310e-03        |
|       | Ka.C.19 | -0.0011        | <b>-0.0003</b> | 0.107e-03         |
|       | Ka.C.20 | <b>0.0036</b>  | 0.0003         | <b>-0.465e-03</b> |
| K20   | Ka.C.5  | <b>-0.0019</b> | -0.0001        | -0.124e-03        |
|       | Ka.C.9  | -0.0018        | -0.0002        | <b>-0.229e-03</b> |
|       | Ka.C.12 | -0.0010        | <b>0.0005</b>  | -0.079e-03        |
|       | Ka.C.18 | 0.0016         | <b>-0.0018</b> | 0.952e-03         |
|       | Ka.C.20 | 0.0024         | -0.0012        | <b>1.103e-03</b>  |
| K21   | Ka.C.22 | <b>0.0024</b>  | -0.0013        | 0.997e-03         |
|       | Ka.C.9  | <b>-0.0021</b> | -0.0005        | -0.094e-03        |
|       | Ka.C.11 | 0.0028         | <b>0.0006</b>  | 0.088e-03         |
|       | Ka.C.13 | 0.0031         | 0.0001         | <b>0.784e-03</b>  |
|       | Ka.C.17 | -0.0013        | 0.0000         | <b>-0.230e-03</b> |
| K22   | Ka.C.19 | -0.0010        | <b>-0.0006</b> | 0.466e-03         |
|       | Ka.C.20 | <b>0.0039</b>  | 0.0005         | 0.648e-03         |
|       | Ka.C.5  | <b>-0.0018</b> | 0.0000         | -0.041e-03        |
|       | Ka.C.12 | -0.0011        | <b>0.0003</b>  | <b>0.171e-03</b>  |
|       | Ka.C.18 | 0.0015         | <b>-0.0016</b> | <b>-0.984e-03</b> |
| K23   | Ka.C.22 | <b>0.0022</b>  | -0.0013        | -0.772e-03        |
|       | Ka.C.5  | <b>-0.0019</b> | -0.0001        | -0.134e-03        |
|       | Ka.C.9  | -0.0019        | -0.0002        | <b>-0.251e-03</b> |
|       | Ka.C.12 | -0.0011        | <b>0.0005</b>  | -0.056e-03        |
|       | Ka.C.18 | 0.0024         | <b>-0.0018</b> | 0.787e-03         |
| K24   | Ka.C.20 | <b>0.0032</b>  | -0.0012        | <b>0.982e-03</b>  |
|       | Ka.C.5  | <b>-0.0018</b> | 0.0001         | -0.122e-03        |
|       | Ka.C.12 | -0.0012        | 0.0001         | <b>0.154e-03</b>  |
|       | Ka.C.13 | 0.0024         | 0.0003         | <b>-1.741e-03</b> |
|       | Ka.C.20 | 0.0030         | <b>0.0003</b>  | -1.465e-03        |
| K25   | Ka.C.22 | <b>0.0030</b>  | 0.0003         | -1.470e-03        |
|       | Ka.C.5  | <b>-0.0018</b> | 0.0000         | -0.042e-03        |
|       | Ka.C.12 | -0.0012        | <b>0.0003</b>  | <b>0.189e-03</b>  |
|       | Ka.C.18 | 0.0028         | <b>-0.0015</b> | <b>-1.185e-03</b> |
|       | Ka.C.22 | <b>0.0034</b>  | -0.0012        | -0.954e-03        |
| K26   | Ka.C.5  | <b>-0.0018</b> | 0.0001         | -0.099e-03        |
|       | Ka.C.12 | -0.0013        | <b>0.0000</b>  | <b>0.086e-03</b>  |
|       | Ka.C.13 | 0.0033         | <b>0.0021</b>  | <b>-2.193e-03</b> |
|       | Ka.C.22 | <b>0.0039</b>  | 0.0019         | -2.012e-03        |
| K27   | Ka.C.5  | <b>-0.0017</b> | 0.0001         | 0.000e-03         |
|       | Ka.C.20 | 0.0047         | <b>0.0003</b>  | 0.000e-03         |
|       | Ka.C.22 | <b>0.0047</b>  | 0.0003         | 0.000e-03         |
| K28   | Ka.C.5  | <b>-0.0017</b> | 0.0003         | -0.153e-03        |
|       | Ka.C.12 | -0.0013        | <b>-0.0001</b> | <b>0.013e-03</b>  |
|       | Ka.C.13 | 0.0047         | <b>0.0047</b>  | <b>-3.231e-03</b> |
|       | Ka.C.22 | <b>0.0051</b>  | 0.0044         | -3.065e-03        |
| K29   | Ka.C.5  | <b>-0.0017</b> | 0.0005         | -0.181e-03        |
|       | Ka.C.12 | -0.0013        | <b>-0.0001</b> | -0.009e-03        |
|       | Ka.C.13 | 0.0046         | <b>0.0102</b>  | <b>-3.374e-03</b> |
|       | Ka.C.22 | <b>0.0050</b>  | 0.0096         | -3.203e-03        |
| K30   | Ka.C.5  | <b>-0.0017</b> | 0.0008         | -0.171e-03        |
|       | Ka.C.12 | -0.0013        | <b>0.0000</b>  | 0.000e-03         |
|       | Ka.C.13 | 0.0046         | <b>0.0152</b>  | <b>-2.820e-03</b> |
|       | Ka.C.22 | <b>0.0050</b>  | 0.0143         | -2.650e-03        |
| K31   | Ka.C.5  | <b>-0.0017</b> | 0.0010         | -0.139e-03        |
|       | Ka.C.12 | -0.0013        | <b>-0.0001</b> | <b>0.032e-03</b>  |
|       | Ka.C.13 | 0.0054         | <b>0.0184</b>  | <b>-2.963e-03</b> |
|       | Ka.C.22 | <b>0.0058</b>  | 0.0174         | -2.793e-03        |
| K32   | Ka.C.5  | <b>-0.0016</b> | 0.0001         | -0.113e-03        |

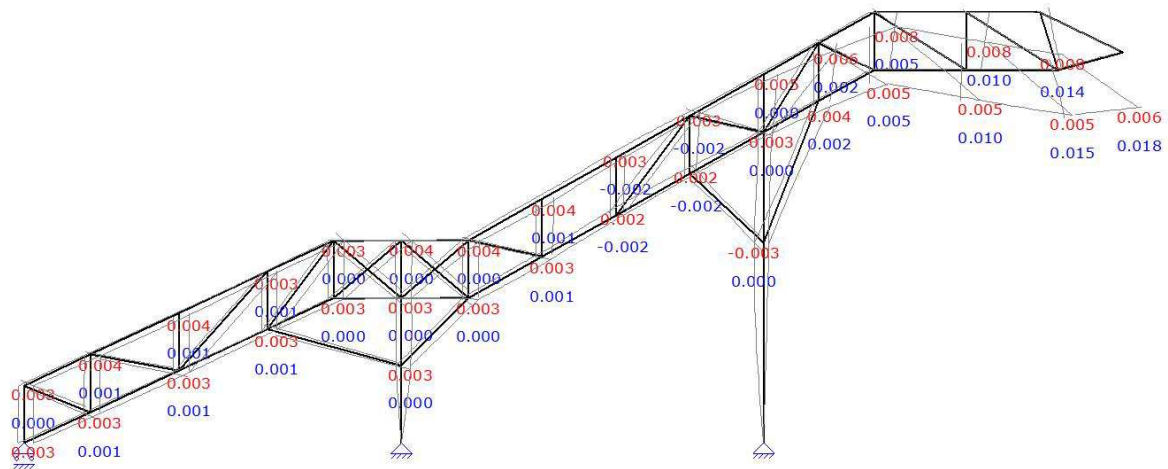
|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Knoop | B.C.    | X              | Z             | Ry                |
|-------|---------|----------------|---------------|-------------------|
| K32   | Ka.C.12 | -0.0013        | <b>0.0000</b> | <b>0.070e-03</b>  |
|       | Ka.C.13 | 0.0057         | <b>0.0022</b> | <b>-2.500e-03</b> |
|       | Ka.C.22 | <b>0.0061</b>  | 0.0021        | -2.321e-03        |
| K33   | Ka.C.5  | <b>-0.0016</b> | 0.0003        | -0.165e-03        |
|       | Ka.C.12 | -0.0013        | <b>0.0000</b> | 0.004e-03         |
|       | Ka.C.13 | 0.0074         | <b>0.0049</b> | <b>-3.218e-03</b> |
|       | Ka.C.22 | <b>0.0077</b>  | 0.0046        | -3.049e-03        |
| K34   | Ka.C.5  | <b>-0.0015</b> | 0.0005        | -0.173e-03        |
|       | Ka.C.12 | -0.0013        | <b>0.0000</b> | -0.002e-03        |
|       | Ka.C.13 | 0.0075         | <b>0.0102</b> | <b>-3.261e-03</b> |
|       | Ka.C.22 | <b>0.0078</b>  | 0.0096        | -3.091e-03        |
| K35   | Ka.C.5  | <b>-0.0015</b> | 0.0008        | -0.175e-03        |
|       | Ka.C.12 | -0.0013        | <b>0.0000</b> | -0.004e-03        |
|       | Ka.C.13 | 0.0075         | <b>0.0142</b> | <b>-3.022e-03</b> |
|       | Ka.C.22 | <b>0.0078</b>  | 0.0134        | -2.852e-03        |
| -     | -       | m              | m             | rad               |

AFB. KA.C.(W1) VERPLAATSINGEN

Ka.C.(w1) Belastingscombinaties





## KA.C. EXTREME DOORBUIGINGEN

| Staaf | B.C.    | Knoop Begin |       | Staaf | Z'      | Knoop Eind |       |
|-------|---------|-------------|-------|-------|---------|------------|-------|
|       |         | X           | Z     |       |         | X          | Z     |
| S1    | Ka.C.5  | -0.002      | 0.000 | 0.476 | 0.0000  | -0.002     | 0.000 |
| S1    | Ka.C.22 | 0.003       | 0.000 | 0.545 | 0.0001  | 0.003      | 0.000 |
| S2    | Ka.C.13 | 0.003       | 0.000 | 0.734 | 0.0000  | 0.003      | 0.000 |
| S2    | Ka.C.16 | 0.002       | 0.000 | 0.436 | 0.0000  | 0.002      | 0.000 |
| S3    | Ka.C.12 | -0.001      | 0.000 | 0.390 | 0.0000  | -0.001     | 0.000 |
| S3    | Ka.C.20 | 0.003       | 0.000 | 0.507 | 0.0000  | 0.004      | 0.000 |
| S4    | Ka.C.12 | -0.001      | 0.000 | 0.543 | 0.0000  | -0.001     | 0.000 |
| S4    | Ka.C.18 | 0.003       | 0.000 | 0.681 | -0.0001 | 0.003      | 0.000 |
| S5    | Ka.C.18 | 0.005       | 0.005 | 0.261 | 0.0000  | 0.005      | 0.010 |
| S6    | Ka.C.18 | 0.005       | 0.010 | 0.813 | 0.0001  | 0.005      | 0.015 |
| S7    | Ka.C.12 | -0.001      | 0.000 | 0.811 | 0.0000  | -0.001     | 0.000 |
| S7    | Ka.C.18 | 0.007       | 0.005 | 0.383 | 0.0000  | 0.008      | 0.010 |
| S8    | Ka.C.18 | 0.008       | 0.010 | 0.626 | 0.0000  | 0.008      | 0.014 |
| S14   | Ka.C.5  | 0.000       | 0.000 | 0.779 | -0.0001 | -0.002     | 0.000 |
| S14   | Ka.C.22 | 0.000       | 0.000 | 0.779 | 0.0003  | 0.003      | 0.000 |
| S15   | Ka.C.5  | -0.002      | 0.000 | 0.493 | -0.0001 | -0.002     | 0.000 |
| S15   | Ka.C.22 | 0.003       | 0.000 | 0.493 | 0.0002  | 0.003      | 0.000 |
| S21   | Ka.C.14 | 0.000       | 0.000 | 2.009 | -0.0008 | -0.003     | 0.000 |
| S21   | Ka.C.16 | 0.000       | 0.000 | 2.009 | 0.0001  | 0.002      | 0.000 |
| S22   | Ka.C.14 | -0.003      | 0.000 | 0.807 | -0.0002 | -0.001     | 0.000 |
| S22   | Ka.C.16 | 0.002       | 0.000 | 0.784 | 0.0000  | 0.002      | 0.000 |
| S27   | Ka.C.8  | 0.002       | 0.000 | 0.579 | 0.0000  | 0.002      | 0.001 |
| S28   | Ka.C.4  | 0.002       | 0.000 | 0.622 | 0.0000  | 0.002      | 0.000 |
| S28   | Ka.C.13 | 0.003       | 0.000 | 0.622 | 0.0000  | 0.003      | 0.000 |
| S29   | Ka.C.22 | 0.003       | 0.000 | 0.916 | 0.0001  | 0.003      | 0.001 |
| S30   | Ka.C.9  | -0.002      | 0.000 | 0.691 | 0.0000  | -0.002     | 0.001 |
| S31   | Ka.C.18 | 0.003       | 0.001 | 1.154 | 0.0001  | 0.003      | 0.000 |
| S32   | Ka.C.5  | -0.002      | 0.000 | 0.783 | 0.0000  | -0.002     | 0.000 |
| S33   | Ka.C.9  | -0.002      | 0.001 | 0.855 | 0.0001  | -0.002     | 0.001 |
| S33   | Ka.C.20 | 0.003       | 0.000 | 1.147 | -0.0001 | 0.003      | 0.000 |
| S34   | Ka.C.22 | 0.003       | 0.000 | 1.204 | 0.0000  | 0.003      | 0.000 |
| S35   | Ka.C.17 | -0.001      | 0.000 | 0.827 | 0.0000  | -0.001     | 0.000 |
| S36   | Ka.C.8  | 0.002       | 0.001 | 0.939 | 0.0001  | 0.002      | 0.001 |
| S37   | Ka.C.9  | -0.002      | 0.001 | 0.540 | 0.0000  | -0.002     | 0.000 |
| S37   | Ka.C.20 | 0.003       | 0.000 | 0.361 | 0.0000  | 0.003      | 0.000 |
| S38   | Ka.C.22 | 0.003       | 0.000 | 0.963 | 0.0000  | 0.003      | 0.000 |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Staat | B.C.    | Knoop Begin |        | Staat  |         | Knoop Eind |        |
|-------|---------|-------------|--------|--------|---------|------------|--------|
|       |         | X           | Z      | Z'afst | Z'      | X          | Z      |
| S39   | Ka.C.9  | -0.002      | 0.001  | 0.867  | 0.0001  | -0.002     | 0.001  |
| S39   | Ka.C.20 | 0.003       | 0.000  | 1.119  | -0.0001 | 0.003      | 0.000  |
| S40   | Ka.C.9  | -0.002      | 0.000  | 0.565  | 0.0000  | -0.002     | 0.000  |
| S40   | Ka.C.20 | 0.003       | 0.000  | 0.615  | 0.0000  | 0.004      | 0.000  |
| S41   | Ka.C.5  | -0.002      | 0.000  | 0.927  | 0.0000  | -0.002     | 0.000  |
| S41   | Ka.C.20 | 0.003       | 0.000  | 0.804  | 0.0001  | 0.003      | 0.000  |
| S42   | Ka.C.5  | -0.002      | 0.000  | 0.558  | 0.0000  | -0.002     | 0.000  |
| S42   | Ka.C.22 | 0.003       | 0.000  | 0.670  | -0.0001 | 0.003      | 0.000  |
| S43   | Ka.C.9  | -0.002      | 0.000  | 0.837  | -0.0001 | -0.002     | 0.000  |
| S43   | Ka.C.20 | 0.003       | 0.000  | 0.874  | 0.0002  | 0.003      | 0.001  |
| S44   | Ka.C.5  | -0.002      | 0.000  | 0.669  | 0.0000  | -0.002     | 0.000  |
| S44   | Ka.C.22 | 0.003       | 0.000  | 0.840  | -0.0001 | 0.003      | 0.000  |
| S45   | Ka.C.5  | -0.002      | 0.000  | 0.412  | 0.0000  | -0.002     | 0.000  |
| S45   | Ka.C.22 | 0.003       | 0.000  | 0.393  | 0.0000  | 0.003      | 0.000  |
| S46   | Ka.C.13 | 0.003       | 0.000  | 0.809  | 0.0002  | 0.003      | 0.000  |
| S46   | Ka.C.17 | -0.001      | 0.000  | 0.768  | -0.0001 | -0.001     | 0.000  |
| S47   | Ka.C.19 | -0.001      | -0.001 | 1.085  | -0.0001 | -0.002     | -0.002 |
| S47   | Ka.C.20 | 0.003       | 0.001  | 0.416  | 0.0001  | 0.002      | -0.001 |
| S48   | Ka.C.13 | 0.001       | -0.002 | 0.877  | 0.0000  | 0.000      | 0.000  |
| S49   | Ka.C.14 | -0.003      | 0.000  | 1.320  | 0.0000  | -0.001     | 0.001  |
| S50   | Ka.C.9  | -0.002      | 0.000  | 0.811  | -0.0001 | -0.002     | 0.000  |
| S50   | Ka.C.20 | 0.004       | 0.000  | 0.909  | 0.0002  | 0.004      | 0.001  |
| S51   | Ka.C.13 | 0.003       | -0.001 | 1.284  | 0.0006  | 0.002      | -0.002 |
| S51   | Ka.C.17 | -0.001      | 0.000  | 1.254  | -0.0001 | -0.001     | 0.000  |
| S52   | Ka.C.13 | 0.002       | -0.002 | 0.697  | -0.0004 | 0.001      | -0.002 |
| S52   | Ka.C.17 | -0.001      | 0.000  | 0.633  | 0.0001  | -0.001     | 0.000  |
| S53   | Ka.C.7  | 0.001       | 0.000  | 1.143  | -0.0001 | 0.001      | -0.002 |
| S53   | Ka.C.20 | 0.004       | 0.001  | 0.394  | 0.0001  | 0.003      | -0.001 |
| S54   | Ka.C.13 | 0.001       | -0.002 | 0.596  | -0.0001 | 0.002      | 0.000  |
| S54   | Ka.C.17 | -0.001      | 0.000  | 0.813  | 0.0000  | -0.001     | 0.000  |
| S55   | Ka.C.13 | 0.002       | -0.002 | 0.687  | -0.0004 | 0.003      | -0.001 |
| S55   | Ka.C.17 | -0.001      | 0.000  | 0.611  | 0.0001  | -0.001     | 0.000  |
| S56   | Ka.C.9  | -0.002      | 0.000  | 0.648  | 0.0000  | -0.002     | 0.000  |
| S56   | Ka.C.20 | 0.003       | 0.000  | 0.878  | -0.0002 | 0.006      | 0.002  |
| S57   | Ka.C.20 | 0.003       | 0.000  | 0.659  | -0.0001 | 0.004      | 0.002  |
| S58   | Ka.C.13 | 0.002       | 0.000  | 0.575  | 0.0001  | 0.003      | -0.001 |
| S59   | Ka.C.9  | -0.002      | 0.000  | 0.783  | 0.0000  | -0.002     | 0.000  |
| S59   | Ka.C.20 | 0.003       | -0.001 | 0.611  | -0.0001 | 0.005      | 0.000  |
| S60   | Ka.C.20 | 0.004       | 0.002  | 0.536  | -0.0001 | 0.005      | 0.004  |
| S61   | Ka.C.20 | 0.005       | 0.000  | 0.639  | -0.0001 | 0.006      | 0.002  |
| S62   | Ka.C.19 | 0.001       | 0.001  | 0.532  | 0.0000  | 0.000      | 0.003  |
| S63   | Ka.C.19 | 0.002       | 0.003  | 0.943  | 0.0001  | 0.000      | 0.007  |
| S64   | Ka.C.20 | 0.008       | 0.010  | 0.943  | 0.0001  | 0.005      | 0.014  |
| S65   | Ka.C.12 | -0.001      | 0.000  | 0.610  | 0.0000  | -0.001     | 0.000  |
| S66   | Ka.C.17 | -0.001      | 0.000  | 0.525  | 0.0000  | -0.001     | 0.000  |
| S67   | Ka.C.18 | 0.008       | 0.014  | 0.723  | 0.0000  | 0.006      | 0.018  |
| S68   | Ka.C.20 | 0.006       | 0.002  | 0.501  | -0.0001 | 0.008      | 0.005  |
| -     | -       | m           | m      | m      | m       | m          | m      |

#### FREQUENT BELASTINGSCOMBINATIES (TABEL)

| B.G.  | Omschrijving               | Fr.C.(w1) | Fr.C.1 | Fr.C.2  | Fr.C.3  | Fr.C.4  | Fr.C.5  | Fr.C.6  | Fr.C.7  |
|-------|----------------------------|-----------|--------|---------|---------|---------|---------|---------|---------|
| B.G.1 | Eigen gewicht en permanent | 1.00      | 1.00   | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| B.G.2 | Permanent                  | -         | 1.00   | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| B.G.3 | Veranderlijk 1             | -         | 0.80   | -       | -       | -       | -       | 0.80    | 0.80    |
| B.G.4 | Veranderlijk 2             | -         | -      | 0.80    | -       | -       | -       | 0.80    | -       |
| B.G.5 | Veranderlijk 3             | -         | -      | -       | 0.80    | -       | -       | -       | 0.80    |
| B.G.6 | Wind neerwaarts            | -         | -      | -       | -       | 0.60    | -       | -       | -       |
| B.G.7 | Wind opwaarts              | -         | -      | -       | -       | -       | 0.60    | -       | -       |
| B.G.8 | Eenheid t.b.v. stijfheid   | -         | -      | -       | -       | -       | -       | -       | -       |
| B.G.  | Omschrijving               | Fr.C.8    | Fr.C.9 | Fr.C.10 | Fr.C.11 | Fr.C.12 | Fr.C.13 | Fr.C.14 | Fr.C.15 |
| B.G.1 | Eigen gewicht en permanent | 1.00      | 1.00   | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| B.G.2 | Permanent                  | 1.00      | 1.00   | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| B.G.3 | Veranderlijk 1             | 0.80      | 0.80   | -       | -       | -       | -       | -       | 0.80    |
| B.G.4 | Veranderlijk 2             | -         | -      | 0.80    | 0.80    | 0.80    | -       | -       | 0.80    |

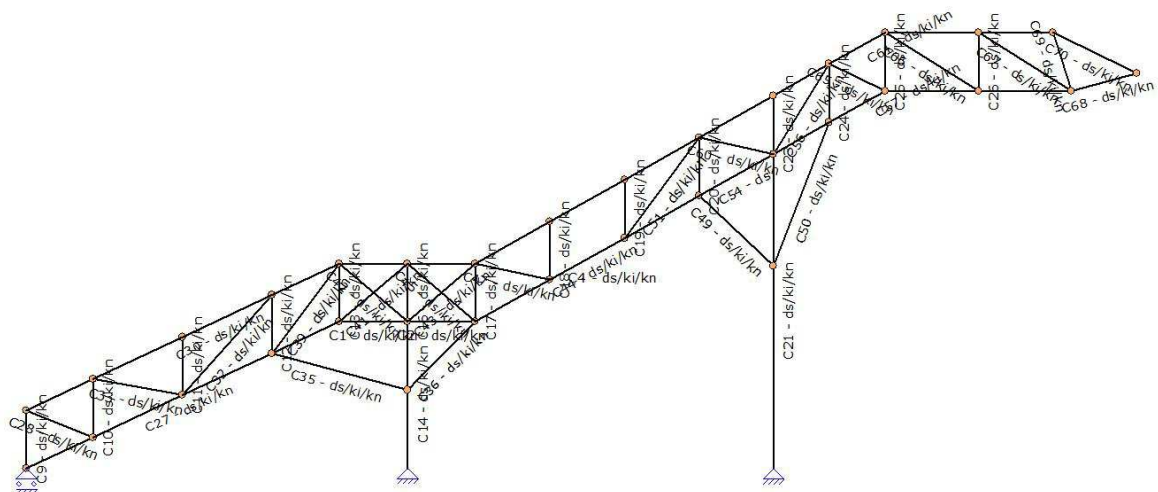
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

|             |                            |                |                |                |                |                |                |                |                |
|-------------|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| B.G.5       | Veranderlijk 3             | -              | -              | 0.80           | -              | -              | 0.80           | 0.80           | 0.80           |
| B.G.6       | Wind neerwaarts            | 0.60           | -              | -              | 0.60           | -              | 0.60           | -              | -              |
| B.G.7       | Wind opwaarts              | -              | 0.60           | -              | -              | 0.60           | -              | 0.60           | -              |
| B.G.8       | Eenheid t.b.v. stijfheid   | -              | -              | -              | -              | -              | -              | -              | -              |
| <b>B.G.</b> | <b>Omschrijving</b>        | <b>Fr.C.16</b> | <b>Fr.C.17</b> | <b>Fr.C.18</b> | <b>Fr.C.19</b> | <b>Fr.C.20</b> | <b>Fr.C.21</b> | <b>Fr.C.22</b> | <b>Fr.C.23</b> |
| B.G.1       | Eigen gewicht en permanent | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.2       | Permanent                  | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.3       | Veranderlijk 1             | 0.80           | 0.80           | 0.80           | 0.80           | -              | -              | 0.80           | 0.80           |
| B.G.4       | Veranderlijk 2             | 0.80           | 0.80           | -              | -              | 0.80           | 0.80           | 0.80           | 0.80           |
| B.G.5       | Veranderlijk 3             | -              | -              | 0.80           | 0.80           | 0.80           | 0.80           | 0.80           | 0.80           |
| B.G.6       | Wind neerwaarts            | 0.60           | -              | 0.60           | -              | 0.60           | -              | 0.60           | -              |
| B.G.7       | Wind opwaarts              | -              | 0.60           | -              | 0.60           | -              | 0.60           | -              | 0.60           |
| B.G.8       | Eenheid t.b.v. stijfheid   | -              | -              | -              | -              | -              | -              | -              | -              |

### QUASI-PERMANENT BELASTINGSCOMBINATIES (TABEL)

| B.G.  | Omschrijving               | Qu.C.1 | Qu.C.2 | Qu.C.3 | Qu.C.4 | Qu.C.5 | Qu.C.6 | Qu.C.7 | Qu.C.8 |
|-------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| B.G.1 | Eigen gewicht en permanent | 1.00   | 1.00   | 1.00   | 1.00   | 1.00   | 1.00   | 1.00   | 1.00   |
| B.G.2 | Permanent                  | -      | 1.00   | 1.00   | 1.00   | 1.00   | 1.00   | 1.00   | 1.00   |
| B.G.3 | Veranderlijk 1             | -      | 0.40   | -      | -      | 0.40   | 0.40   | -      | 0.40   |
| B.G.4 | Veranderlijk 2             | -      | -      | 0.40   | -      | 0.40   | -      | 0.40   | 0.40   |
| B.G.5 | Veranderlijk 3             | -      | -      | -      | 0.40   | -      | 0.40   | 0.40   | 0.40   |
| B.G.6 | Wind neerwaarts            | -      | -      | -      | -      | -      | -      | -      | -      |
| B.G.7 | Wind opwaarts              | -      | -      | -      | -      | -      | -      | -      | -      |
| B.G.8 | Eenheid t.b.v. stijfheid   | -      | -      | -      | -      | -      | -      | -      | -      |

AFB. STAALCONTROLE



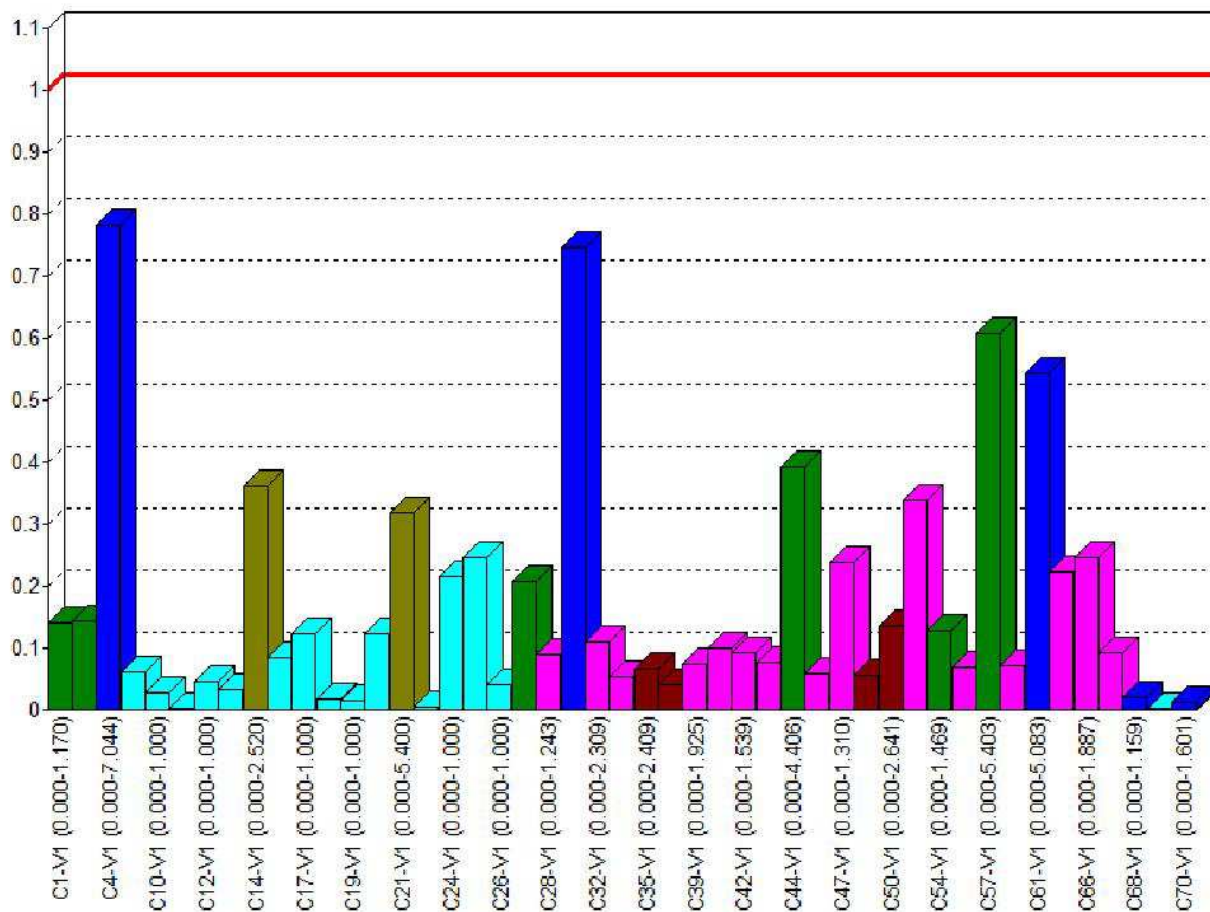
### EXTREME UNITY CHECK NEN-EN1993-1-1:2016/NB:2016

| Veld                 | Toetsing    | Combinatie | Artikel                   | UC max |
|----------------------|-------------|------------|---------------------------|--------|
| C1-V1 (0.000-1.170)  | Doorsnede   | Fu.C.45    | NEN-EN1993-1-1(NB.33)     | 0.14   |
| C2-V1 (0.000-1.170)  | Doorsnede   | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.14   |
| C4-V1 (0.000-7.044)  | Stabiliteit | Fu.C.57    | NEN-EN1993-1-1(6.61&6.62) | 0.78   |
| C9-V1 (0.000-1.000)  | Stabiliteit | Fu.C.31    | NEN-EN1993-1-1(6.46)      | 0.06   |
| C10-V1 (0.000-1.000) | Stabiliteit | Fu.C.32    | NEN-EN1993-1-1(6.46)      | 0.03   |
| C11-V1 (0.000-1.000) | Doorsnede   | Fu.C.67    | NEN-EN1993-1-1(6.5)       | 0.00   |
| C12-V1 (0.000-1.000) | Stabiliteit | Fu.C.45    | NEN-EN1993-1-1(6.46)      | 0.05   |
| C13-V1 (0.000-1.000) | Doorsnede   | Fu.C.31    | NEN-EN1993-1-1(6.5)       | 0.03   |
| C14-V1 (0.000-2.520) | Stabiliteit | Fu.C.45    | NEN-EN1993-1-1(6.61&6.62) | 0.36   |
| C16-V1 (0.000-1.000) | Stabiliteit | Fu.C.39    | NEN-EN1993-1-1(6.46)      | 0.08   |
| C17-V1 (0.000-1.000) | Doorsnede   | Fu.C.41    | NEN-EN1993-1-1(6.5)       | 0.12   |
| C18-V1 (0.000-1.000) | Doorsnede   | Fu.C.36    | NEN-EN1993-1-1(6.5)       | 0.02   |



| Veld                 | Toetsing    | Combinatie | Artikel                   | UC max |
|----------------------|-------------|------------|---------------------------|--------|
| C19-V1 (0.000-1.000) | Stabiliteit | Fu.C.36    | NEN-EN1993-1-1(6.46)      | 0.02   |
| C20-V1 (0.000-1.000) | Stabiliteit | Fu.C.36    | NEN-EN1993-1-1(6.46)      | 0.12   |
| C21-V1 (0.000-5.400) | Stabiliteit | Fu.C.36    | NEN-EN1993-1-1(6.61&6.62) | 0.32   |
| C23-V1 (0.000-1.000) | Doorsnede   | Fu.C.43    | NEN-EN1993-1-1(6.5)       | 0.00   |
| C24-V1 (0.000-1.000) | Stabiliteit | Fu.C.43    | NEN-EN1993-1-1(6.46)      | 0.22   |
| C25-V1 (0.000-1.000) | Stabiliteit | Fu.C.43    | NEN-EN1993-1-1(6.46)      | 0.25   |
| C26-V1 (0.000-1.000) | Stabiliteit | Fu.C.41    | NEN-EN1993-1-1(6.46)      | 0.04   |
| C27-V1 (0.000-5.950) | Stabiliteit | Fu.C.65    | NEN-EN1993-1-1(6.61&6.62) | 0.21   |
| C28-V1 (0.000-1.243) | Doorsnede   | Fu.C.31    | NEN-EN1993-1-1(6.5)       | 0.09   |
| C30-V1 (0.000-7.120) | Stabiliteit | Fu.C.32    | NEN-EN1993-1-1(6.61&6.62) | 0.75   |
| C32-V1 (0.000-2.309) | Doorsnede   | Fu.C.45    | NEN-EN1993-1-1(6.5)       | 0.11   |
| C33-V1 (0.000-1.565) | Stabiliteit | Fu.C.65    | NEN-EN1993-1-1(6.61&6.62) | 0.05   |
| C35-V1 (0.000-2.409) | Stabiliteit | Fu.C.45    | NEN-EN1993-1-1(6.61&6.62) | 0.07   |
| C36-V1 (0.000-1.655) | Stabiliteit | Fu.C.40    | NEN-EN1993-1-1(6.61&6.62) | 0.04   |
| C39-V1 (0.000-1.925) | Doorsnede   | Fu.C.32    | NEN-EN1993-1-1(6.5)       | 0.07   |
| C41-V1 (0.000-1.539) | Doorsnede   | Fu.C.45    | NEN-EN1993-1-1(6.5)       | 0.10   |
| C42-V1 (0.000-1.539) | Stabiliteit | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.09   |
| C43-V1 (0.000-1.539) | Doorsnede   | Fu.C.42    | NEN-EN1993-1-1(6.5)       | 0.08   |
| C44-V1 (0.000-4.406) | Stabiliteit | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.39   |
| C45-V1 (0.000-1.539) | Doorsnede   | Fu.C.34    | NEN-EN1993-1-1(6.5)       | 0.06   |
| C47-V1 (0.000-1.310) | Stabiliteit | Fu.C.36    | NEN-EN1993-1-1(6.61&6.62) | 0.24   |
| C49-V1 (0.000-1.755) | Stabiliteit | Fu.C.43    | NEN-EN1993-1-1(6.61&6.62) | 0.06   |
| C50-V1 (0.000-2.641) | Stabiliteit | Fu.C.43    | NEN-EN1993-1-1(6.61&6.62) | 0.14   |
| C51-V1 (0.000-2.144) | Doorsnede   | Fu.C.43    | NEN-EN1993-1-1(6.5)       | 0.34   |
| C54-V1 (0.000-1.469) | Doorsnede   | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.13   |
| C56-V1 (0.000-1.815) | Doorsnede   | Fu.C.43    | NEN-EN1993-1-1(6.5)       | 0.07   |
| C57-V1 (0.000-5.403) | Stabiliteit | Fu.C.43    | NEN-EN1993-1-1(6.61&6.62) | 0.61   |
| C60-V1 (0.000-1.310) | Stabiliteit | Fu.C.34    | NEN-EN1993-1-1(6.61&6.62) | 0.07   |
| C61-V1 (0.000-5.083) | Doorsnede   | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.54   |
| C65-V1 (0.000-1.065) | Doorsnede   | Fu.C.41    | NEN-EN1993-1-1(6.5)       | 0.22   |
| C66-V1 (0.000-1.887) | Doorsnede   | Fu.C.43    | NEN-EN1993-1-1(6.5)       | 0.25   |
| C67-V1 (0.000-1.887) | Doorsnede   | Fu.C.41    | NEN-EN1993-1-1(6.5)       | 0.09   |
| C68-V1 (0.000-1.159) | Doorsnede   | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.02   |
| C69-V1 (0.000-1.050) | Stabiliteit | Fu.C.12    | NEN-EN1993-1-1(6.61&6.62) | 0.00   |
| C70-V1 (0.000-1.601) | Doorsnede   | Bi.C.1     | NEN-EN1993-1-1(NB.33)     | 0.01   |

## AFB. STAAL UC DIAGRAM



## STAALTOETS RESULTATEN MET PROFIELGEGEVENS NEN-EN1993-1-1:2016/NB:2016

Uitgangspunten berekening voor staalcontrole

Alpha; cr = 0.00 < 10; GNL analyse vereist

Profielgegevens staaf C1-V1 (0.000-1.170)

|                         |                                           |                                               |                                                     |
|-------------------------|-------------------------------------------|-----------------------------------------------|-----------------------------------------------------|
| N219.1/6.3              | Analyse                                   | Staal S235H(EN10210-1)                        | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 219.1 mm            | A = 4.21e-03 m <sup>2</sup>               | W <sub>y;el</sub> = 217.8e-06 m <sup>3</sup>  | W <sub>y;pl</sub> = 285.4e-06 m <sup>3</sup>        |
| b = 219.1 mm            | I <sub>y</sub> = 238.6e-07 m <sup>4</sup> | W <sub>z;el</sub> = 217.8e-06 m <sup>3</sup>  | W <sub>z;pl</sub> = 285.4e-06 m <sup>3</sup>        |
| t <sub>f</sub> = 6.3 mm | I <sub>z</sub> = 238.6e-07 m <sup>4</sup> | A <sub>w;y;el</sub> = 2.68e-03 m <sup>2</sup> | A <sub>w;y;pl</sub> = 2.68e-03 m <sup>2</sup>       |
| t <sub>w</sub> = 6.3 mm | Massa/m = 33.1 kg/m                       | A <sub>w;z;el</sub> = 2.68e-03 m <sup>2</sup> | A <sub>w;z;pl</sub> = 2.68e-03 m <sup>2</sup>       |
| r = 103.2 mm            |                                           | I <sub>t</sub> = 477.2e-07 m <sup>4</sup>     | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

### Doorsnedetoetsing C1-V1 (0.000-1.170)

Maatgevende combinatie: Fu.C.45 op 0.363 m

|                            |                              |                              |
|----------------------------|------------------------------|------------------------------|
| N <sub>Ed</sub> = 30.1 kN  | V <sub>y;Ed</sub> = 5.0 kN   | M <sub>y;Ed</sub> = 2.9 kNm  |
|                            | V <sub>z;Ed</sub> = 0.0 kN   | M <sub>z;Ed</sub> = 9.0 kNm  |
| N <sub>Rd</sub> = 989.8 kN | V <sub>y;Rd</sub> = 363.8 kN | M <sub>y;Rd</sub> = 67.1 kNm |
|                            | V <sub>z;Rd</sub> = 363.8 kN | M <sub>z;Rd</sub> = 67.1 kNm |

NEN-EN1993-1-1(NB.33): UC = 0.14 < 1

### Kiptoetsing C1-V1 (0.000-1.170)

Equi. profiel: N219.1/6.3

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (1)

M = 0.0kN/m

MBeta = 0.0

Bovenflens maatgevend

X<sub>b</sub>;l<sub>st</sub> = 0.000 m

X<sub>e</sub>;l<sub>st</sub> = 1.170 m

l<sub>st</sub> = 1.170 m

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                       |                   |                      |                     |
|-----------------------|-------------------|----------------------|---------------------|
| Lsys = 1.170 m        | Lg = 1.170 m      | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.75             | C2 = 0.00 (tabel) | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm         | kred = 1.0        | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00 | M;Ed = 0.0 kNm    |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00       | lkip = 1.170 m    |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm    | My;eind = 0.0 kNm |                      |                     |

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C1-V1 (0.000-1.170)

Maatgevende combinatie: Fu.C.50

|                               |                    |                    |                   |
|-------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -3.5 kN                | Nb;Rd;y = 960.2 kN | Nb;Rd;z = 989.8 kN |                   |
| Methode Y = Handmatige Invoer | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 2.340 m |
| Methode Z = Cons. gesch.      | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.170 m  |
| Chi;y = 0.97                  |                    | Knikcurve: A       |                   |
| Chi;z = 1.00                  |                    | Knikcurve: A       |                   |

NEN-EN1993-1-1(6.46): UC = 0.00 < 1

#### Buiging & Druk C1-V1 (0.000-1.170)

Maatgevende combinatie: Fu.C.50

|                |                       |                       |                   |
|----------------|-----------------------|-----------------------|-------------------|
| N;Ed = -3.5 kN | My;Ed = 1.1 kNm       | Mz;Ed = 9.0 kNm       | Profielklasse = 1 |
|                | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |                   |
| My = -1.1 kNm  | My;Psi = 0.0 kNm      | My;s = -0.6 kNm       |                   |
| Mz = 9.0 kNm   | Mz;Psi = 0.0 kNm      | Mz;s = 4.5 kNm        |                   |
| Cmy = 0.65     | Cmz = 0.60            | CmLT = 0.65           |                   |
| Kyy = 0.647    | Kyz = 0.360           | Kzy = 0.388           | Kzz = 0.600       |
| Chi;y = 0.97   | Chi;z = 1.00          | Chi;LT = 1.00         |                   |

NEN-EN1993-1-1(6.61&6.62): UC = 0.09 < 1

#### Profielgegevens staaf C2-V1 (0.000-1.170)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N219.1/6.3   | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 219.1 mm | A = 4.21e-03 m2     | Wy;el = 217.8e-06 m3   | Wy;pl = 285.4e-06 m3       |
| b = 219.1 mm | Iy = 238.6e-07 m4   | Wz;el = 217.8e-06 m3   | Wz;pl = 285.4e-06 m3       |
| tf = 6.3 mm  | Iz = 238.6e-07 m4   | Aw;y;el = 2.68e-03 m2  | Aw;y;pl = 2.68e-03 m2      |
| tw = 6.3 mm  | Massa/m = 33.1 kg/m | Aw;z;el = 2.68e-03 m2  | Aw;z;pl = 2.68e-03 m2      |
| r = 103.2 mm |                     | It = 477.2e-07 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C2-V1 (0.000-1.170)

Maatgevende combinatie: Fu.C.43 op 1.170 m

|                 |                  |                  |                   |
|-----------------|------------------|------------------|-------------------|
| N;Ed = -14.9 kN | Vy;Ed = 5.0 kN   | My;Ed = -3.4 kNm | Profielklasse = 1 |
|                 | Vz;Ed = -8.2 kN  | Mz;Ed = 9.0 kNm  |                   |
| N;Rd = 989.8 kN | Vy;Rd = 363.8 kN | MyRd = 67.1 kNm  |                   |
|                 | Vz;Rd = 363.8 kN | MzRd = 67.1 kNm  |                   |

NEN-EN1993-1-1(NB.33): UC = 0.14 < 1

#### Kiptoetsing C2-V1 (0.000-1.170)

Equi. profiel: N219.1/6.3

Maatgevende combinatie: Bi.C.1

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                            |                        |                      |                     |
|----------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund    | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (1) | M = -0.6kN/m           | MBeta = 0.0          |                     |
| Bovenflens maatgevend      | Xb;lst = 0.000 m       | Xe;lst = 1.170 m     | lst = 1.170 m       |
| Lsys = 1.170 m             | Lg = 1.170 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.75                  | C2 = 0.00 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm              | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00      | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00            | lkip = 1.170 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm         | My;eind = -0.6 kNm     |                      |                     |

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: flens onder trek

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Stabiliteitstoetsing C2-V1 (0.000-1.170)

Maatgevende combinatie: Fu.C.41

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -25.5 kN                     | Nb;Rd;y = 960.2 kN | Nb;Rd;z = 989.8 kN |                   |
| Methode Y = Handmatige Invoer       | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 2.340 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.170 m  |
| Chi;y = 0.97                        |                    | Knikkcurve: A      |                   |
| Chi;z = 1.00                        |                    | Knikkcurve: A      |                   |
| NEN-EN1993-1-1(6.46): UC = 0.03 < 1 |                    |                    |                   |

#### Buiging & Druk C2-V1 (0.000-1.170)

Maatgevende combinatie: Fu.C.41

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -25.5 kN                          | My;Ed = 2.5 kNm       | Profielklasse = 1     |             |
|                                          | Delta;My;Ed = 0.0 kNm | Mz;Ed = 9.0 kNm       |             |
|                                          |                       | Delta;Mz;Ed = 0.0 kNm |             |
| My = -2.5 kNm                            | My;Psi = 0.0 kNm      | My;s = -0.6 kNm       |             |
| Mz = 9.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 4.5 kNm        |             |
| Cmy = 0.41                               | Cmz = 0.60            | CmLT = 0.41           |             |
| Kyy = 0.407                              | Kyz = 0.360           | Kzy = 0.244           | Kzz = 0.599 |
| Chi;y = 0.97                             | Chi;z = 1.00          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.12 < 1 |                       |                       |             |

#### Profielgegevens staaf C4-V1 (0.000-7.044)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N139.7/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 139.7 mm | A = 1.71e-03 m2     | Wy;el = 562.4e-07 m3   | Wy;pl = 736.8e-07 m3       |
| b = 139.7 mm | Iy = 392.9e-08 m4   | Wz;el = 562.4e-07 m3   | Wz;pl = 736.8e-07 m3       |
| tf = 4.0 mm  | Iz = 392.9e-08 m4   | Aw;y;el = 1.09e-03 m2  | Aw;y;pl = 1.09e-03 m2      |
| tw = 4.0 mm  | Massa/m = 13.4 kg/m | Aw;z;el = 1.09e-03 m2  | Aw;z;pl = 1.09e-03 m2      |
| r = 65.8 mm  |                     | It = 785.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C4-V1 (0.000-7.044)

Maatgevende combinatie: Fu.C.41 op 5.576 m

|                 |                  |                   |  |
|-----------------|------------------|-------------------|--|
| N;Ed = 131.4 kN | Vy;Ed = 4.0 kN   | Profielklasse = 1 |  |
|                 | Vz;Ed = 0.7 kN   | My;Ed = -0.9 kNm  |  |
|                 |                  | Mz;Ed = 7.0 kNm   |  |
| N;Rd = 400.7 kN | Vy;Rd = 147.3 kN | MyRd = 17.3 kNm   |  |
|                 | Vz;Rd = 147.3 kN | MzRd = 17.3 kNm   |  |

NEN-EN1993-1-1(NB.33): UC = 0.54 < 1

#### Kiptoetsing C4-V1 (0.000-7.044)

Equi. profiel: N139.7/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (3)                                                             | F = 0.1kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 7.044 m     | lst = 7.044 m       |
| Lsys = 7.044 m                                                                         | Lg = 7.044 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.35                                                                              | C2 = 0.55 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.6 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | lkip = 7.044 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                                                     | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

#### Stabiliteitstoetsing C4-V1 (0.000-7.044)

Maatgevende combinatie: Fu.C.57

|                                     |                    |                   |                   |
|-------------------------------------|--------------------|-------------------|-------------------|
| N;Ed = -16.7 kN                     | Nb;Rd;y = 139.1 kN | Nb;Rd;z = 38.4 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000     | Lknik Y = 7.044 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B       | Lbuc Z = 14.088 m |
| Chi;y = 0.35                        |                    | Knikkcurve: A     |                   |
| Chi;z = 0.10                        |                    | Knikkcurve: A     |                   |
| NEN-EN1993-1-1(6.46): UC = 0.43 < 1 |                    |                   |                   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Buiging & Druk C4-V1 (0.000-7.044)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.57          |                       | Profielklasse = 1     |             |
| N;Ed = -16.7 kN                          | My;Ed = 0.6 kNm       | Mz;Ed = 7.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.2 kNm        |             |
| Mz = 7.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 3.5 kNm        |             |
| Cmy = 0.95                               | Cmz = 0.60            | CmLT = 0.95           |             |
| Kyy = 1.041                              | Kyz = 0.485           | Kzy = 0.625           | Kzz = 0.809 |
| Chi;y = 0.35                             | Chi;z = 0.10          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.78 < 1 |                       |                       |             |

#### Profielgegevens staaf C9-V1 (0.000-1.000)

|                         |                                           |                                           |                                                     |
|-------------------------|-------------------------------------------|-------------------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                                   | Staal S235H(EN10210-1)                    | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>               | Wy;el = 369.3e-07 m <sup>3</sup>          | Wy;pl = 486.9e-07 m <sup>3</sup>                    |
| b = 114.3 mm            | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | Wz;el = 369.3e-07 m <sup>3</sup>          | Wz;pl = 486.9e-07 m <sup>3</sup>                    |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | Aw;y;el = 8.82e-04 m <sup>2</sup>         | Aw;y;pl = 8.82e-04 m <sup>2</sup>                   |
| tw = 4.0 mm             | Massa/m = 10.9 kg/m                       | Aw;z;el = 8.82e-04 m <sup>2</sup>         | Aw;z;pl = 8.82e-04 m <sup>2</sup>                   |
| r = 53.1 mm             |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup> | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C9-V1 (0.000-1.000)

|                                            |                  |                   |  |
|--------------------------------------------|------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.31 op 0.000 m |                  | Profielklasse = 1 |  |
| N;Ed = -18.3 kN                            | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |  |
|                                            | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 325.7 kN                            | Vy;Rd = 119.7 kN | MyRd = 11.4 kNm   |  |
|                                            | Vz;Rd = 119.7 kN | MzRd = 11.4 kNm   |  |
| NEN-EN1993-1-1(6.9): UC = 0.06 < 1         |                  |                   |  |

#### Kiptoetsing C9-V1 (0.000-1.000)

|                                                              |                              |                              |                                             |
|--------------------------------------------------------------|------------------------------|------------------------------|---------------------------------------------|
| Equi. profiel: N114.3/4                                      |                              | Instab. curve Kip:d          |                                             |
| Maatgevende combinatie: Bi.C.1                               |                              |                              |                                             |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                              |                              |                                             |
| Kipsteun bovenflens: N.v.t.                                  |                              |                              |                                             |
| Kipsteun onderflens: N.v.t.                                  |                              |                              |                                             |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund       | b-eff(Begin) = 0.000         | b-eff(Eind) = 0.000                         |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m                  | = 0.0                        |                                             |
| Bovenflens maatgevend                                        | Xb;l <sub>st</sub> = 0.000 m | Xe;l <sub>st</sub> = 1.000 m | l <sub>st</sub> = 1.000 m                   |
| L <sub>sys</sub> = 1.000 m                                   | L <sub>g</sub> = 1.000 m     | S = 0.000 m                  | I <sub>wa</sub> = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)            | C2(toegepast) = 0.00         | C = 0.00                                    |
| M <sub>cr</sub> = 0.0 kNm                                    | k <sub>red</sub> = 1.0       | Lam-rel = 0.00               | Profielklasse 1                             |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm               |                              | UC(y) = 0.00                                |
| Chi;LT,Z = 1.00                                              | I <sub>kip</sub> = 1.000 m   |                              | UC(z) = 0.00                                |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm            |                              |                                             |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                              |                              |                                             |

#### Stabiliteitstoetsing C9-V1 (0.000-1.000)

|                                     |                    |                    |                               |
|-------------------------------------|--------------------|--------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.31     |                    |                    |                               |
| N;Ed = -18.3 kN                     | Nb;Rd;y = 320.4 kN | Nb;Rd;z = 296.2 kN |                               |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | L <sub>knik</sub> Y = 1.000 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | L <sub>buc</sub> Z = 2.000 m  |
| Chi;y = 0.98                        |                    | Knikcurve: A       |                               |
| Chi;z = 0.91                        |                    | Knikcurve: A       |                               |
| NEN-EN1993-1-1(6.46): UC = 0.06 < 1 |                    |                    |                               |

#### Buiging & Druk C9-V1 (0.000-1.000)

|                                 |                       |                       |  |
|---------------------------------|-----------------------|-----------------------|--|
| Maatgevende combinatie: Fu.C.31 |                       | Profielklasse = 1     |  |
| N;Ed = -18.3 kN                 | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |  |
|                                 | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |  |
| My = 0.0 kNm                    | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |  |
| Mz = 0.0 kNm                    | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |  |
| Cmy = 1.00                      | Cmz = 1.00            | CmLT = 1.00           |  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Kyy = 1.004                      Kyz = 0.613                      Kzy = 0.602                      Kzz = 1.021  
 Chi;y = 0.98                      Chi;z = 0.91                      Chi;LT = 1.00  
 NEN-EN1993-1-1(6.61&6.62): UC = 0.06 < 1

#### Profielgegevens staaf C10-V1 (0.000-1.000)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | Iy = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | Iz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C10-V1 (0.000-1.000)

|                                            |                   |
|--------------------------------------------|-------------------|
| Maatgevende combinatie: Fu.C.32 op 0.000 m | Profielklasse = 1 |
| N;Ed = -8.2 kN                             | Vy;Ed = 0.0 kN    |
|                                            | Vz;Ed = 0.0 kN    |
| N;Rd = 325.7 kN                            | Vy;Rd = 119.7 kN  |
|                                            | Vz;Rd = 119.7 kN  |
|                                            | MyRd = 11.4 kNm   |
|                                            | MzRd = 11.4 kNm   |
| NEN-EN1993-1-1(6.9): UC = 0.03 < 1         |                   |

#### Kiptoetsing C10-V1 (0.000-1.000)

|                                                              |                        |
|--------------------------------------------------------------|------------------------|
| Equi. profiel: N114.3/4                                      |                        |
| Maatgevende combinatie: Bi.C.1                               | Instab. curve Kip:d    |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |
| Kipsteun bovenflens: N.v.t.                                  |                        |
| Kipsteun onderflens: N.v.t.                                  |                        |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m           |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      |
| Mcr = 0.0 kNm                                                | kred = 1.0             |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |
| Chi;LT,Z = 1.00                                              | Ikip = 1.000 m         |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |

#### Stabiliteitstoetsing C10-V1 (0.000-1.000)

|                                     |                    |
|-------------------------------------|--------------------|
| Maatgevende combinatie: Fu.C.32     |                    |
| N;Ed = -8.2 kN                      | Nb;Rd;y = 320.4 kN |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        |
| Chi;y = 0.98                        |                    |
| Chi;z = 0.91                        |                    |
| NEN-EN1993-1-1(6.46): UC = 0.03 < 1 |                    |

#### Buiging & Druk C10-V1 (0.000-1.000)

|                                          |                       |
|------------------------------------------|-----------------------|
| Maatgevende combinatie: Fu.C.32          | Profielklasse = 1     |
| N;Ed = -8.2 kN                           | Mz;Ed = 0.0 kNm       |
|                                          | Delta;Mz;Ed = 0.0 kNm |
| My = 0.0 kNm                             | My;s = 0.0 kNm        |
| Mz = 0.0 kNm                             | Mz;s = 0.0 kNm        |
| Cmy = 1.00                               | CmLT = 1.00           |
| Kyy = 1.002                              | Kyz = 0.601           |
| Chi;y = 0.98                             | Chi;LT = 1.00         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.03 < 1 | Kzz = 1.010           |

#### Profielgegevens staaf C11-V1 (0.000-1.000)

|              |                 |                        |                            |
|--------------|-----------------|------------------------|----------------------------|
| N114.3/4     | Analyse         | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2 | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|              |                     |                       |                       |
|--------------|---------------------|-----------------------|-----------------------|
| b = 114.3 mm | ly = 211.1e-08 m4   | Wz;el = 369.3e-07 m3  | Wz;pl = 486.9e-07 m3  |
| tf = 4.0 mm  | lz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2 | Aw;y;pl = 8.82e-04 m2 |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2 | Aw;z;pl = 8.82e-04 m2 |
| r = 53.1 mm  |                     | It = 422.1e-08 m4     | Iwa = 0.0e-02 m6      |

#### Doorsnedetoetsing C11-V1 (0.000-1.000)

|                                            |                  |                   |
|--------------------------------------------|------------------|-------------------|
| Maatgevende combinatie: Fu.C.67 op 1.000 m |                  | Profielklasse = 1 |
| N;Ed = 0.8 kN                              | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |
|                                            | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |
| N;Rd = 325.7 kN                            | Vy;Rd = 119.7 kN | MyRd = 11.4 kNm   |
|                                            | Vz;Rd = 119.7 kN | MzRd = 11.4 kNm   |

NEN-EN1993-1-1(6.5): UC = 0.00 < 1

#### Kiptoetsing C11-V1 (0.000-1.000)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                      |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.000 m     | lst = 1.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 1.000 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C11-V1 (0.000-1.000)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.28     |                    |                    |                   |
| N;Ed = -0.7 kN                      | Nb;Rd;y = 320.4 kN | Nb;Rd;z = 296.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.000 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 2.000 m  |
| Chi;y = 0.98                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                    |                    |                   |

#### Buiging & Druk C11-V1 (0.000-1.000)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.28          |                       | Profielklasse = 1     |             |
| N;Ed = -0.7 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |             |
| Kyy = 1.000                              | Kyz = 0.600           | Kzy = 0.600           | Kzz = 1.001 |
| Chi;y = 0.98                             | Chi;z = 0.91          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |             |

#### Profielgegevens staaf C12-V1 (0.000-1.000)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | ly = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | lz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C12-V1 (0.000-1.000)

|                                            |                |                   |
|--------------------------------------------|----------------|-------------------|
| Maatgevende combinatie: Fu.C.45 op 0.000 m |                | Profielklasse = 1 |
| N;Ed = -14.0 kN                            | Vy;Ed = 0.0 kN | My;Ed = 0.0 kNm   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Vz;Ed = 0.0 kN  
 N;Rd = 325.7 kN  
 Vy;Rd = 119.7 kN  
 Vz;Rd = 119.7 kN  
 Mz;Ed = 0.0 kNm  
 MyRd = 11.4 kNm  
 MzRd = 11.4 kNm  
 NEN-EN1993-1-1(6.9): UC = 0.04 < 1

#### Kiptoetsing C12-V1 (0.000-1.000)

Equi. profiel: N114.3/4  
 Maatgevende combinatie: Bi.C.1  
 Aangrijphoogte van de last: 0.000 m vanaf hart profiel  
 Kipsteun bovenflens: N.v.t.  
 Kipsteun onderflens: N.v.t.  
 Inklem. begin: Gesteund  
 Tabel gebruikt NB.NB.1 (4)  
 Bovenflens maatgevend  
 Lsys = 1.000 m  
 C1 = 1.04  
 Mcr = 0.0 kNm  
 Chi;LT(Bi.C.1) = 1.00  
 Chi;LT,Z = 1.00  
 My;begin = 0.0 kNm  
 NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging  
 Beperk. eind: Gesteund  
 F = 0.0kN/m  
 Xb;lst = 0.000 m  
 Lg = 1.000 m  
 C2 = 0.42 (tabel)  
 kred = 1.0  
 M;Ed = 0.0 kNm  
 Ikip = 1.000 m  
 My;eind = 0.0 kNm  
 Instab. curve Kip:d  
 b-eff(Begin) = 0.000  
 = 0.0  
 Xe;lst = 1.000 m  
 S = 0.000 m  
 C2(toegepast) = 0.00  
 Lam-rel = 0.00  
 b-eff(Eind) = 0.000  
 Ist = 1.000 m  
 Iwa = 0.0000e+00 m6  
 C = 0.00  
 Profielklasse 1  
 UC(y) = 0.00  
 UC(z) = 0.00

#### Stabiliteitstoetsing C12-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.45  
 N;Ed = -14.0 kN  
 Methode Y = Cons. gesch.  
 Methode Z = Handmatige Invoer  
 Chi;y = 0.98  
 Chi;z = 0.91  
 NEN-EN1993-1-1(6.46): UC = 0.05 < 1  
 Nb;Rd;y = 320.4 kN  
 Ca(y) = 0.000  
 Ca(z) = N/B  
 Nb;Rd;z = 296.2 kN  
 Cb(y) = 0.000  
 Cb(z) = N/B  
 Knikcurve: A  
 Knikcurve: A  
 Lknik Y = 1.000 m  
 Lbuc Z = 2.000 m

#### Buiging & Druk C12-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.45  
 N;Ed = -14.0 kN  
 My = 0.0 kNm  
 Mz = 0.0 kNm  
 Cmy = 1.00  
 Kyy = 1.003  
 Chi;y = 0.98  
 NEN-EN1993-1-1(6.61&6.62): UC = 0.05 < 1  
 My;Ed = 0.0 kNm  
 Delta;My;Ed = 0.0 kNm  
 My;Psi = 0.0 kNm  
 Mz;Psi = 0.0 kNm  
 Cmz = 1.00  
 Kyz = 0.610  
 Chi;z = 0.91  
 Profielklasse = 1  
 Mz;Ed = 0.0 kNm  
 Delta;Mz;Ed = 0.0 kNm  
 My;s = 0.0 kNm  
 Mz;s = 0.0 kNm  
 CmLT = 1.00  
 Kzy = 0.602  
 Chi;LT = 1.00  
 Kzz = 1.016

#### Profielgegevens staaf C13-V1 (0.000-1.000)

N114.3/4  
 h = 114.3 mm  
 b = 114.3 mm  
 tf = 4.0 mm  
 tw = 4.0 mm  
 r = 53.1 mm  
 Analyse  
 A = 1.39e-03 m2  
 Iy = 211.1e-08 m4  
 Iz = 211.1e-08 m4  
 Massa/m = 10.9 kg/m  
 Staal S235H(EN10210-1)  
 Wy;el = 369.3e-07 m3  
 Wz;el = 369.3e-07 m3  
 Aw;y;el = 8.82e-04 m2  
 Aw;z;el = 8.82e-04 m2  
 It = 422.1e-08 m4  
 fyd(toegepast) = 235 N/mm2  
 Wy;pl = 486.9e-07 m3  
 Wz;pl = 486.9e-07 m3  
 Aw;y;pl = 8.82e-04 m2  
 Aw;z;pl = 8.82e-04 m2  
 Iwa = 0.0e-02 m6

#### Doorsnedetoetsing C13-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.31 op 1.000 m  
 Nx;Ed = 11.0 kN  
 Nc;Rd = 325.7 kN  
 NVy;Rd = 0.0 kN  
 NEN-EN1993-1-1(6.5): UC = 0.03 < 1  
 Vy;Ed = 0.0 kN  
 Vz;Ed = 0.0 kN  
 Vy;Rd = 119.7 kN  
 Vz;Rd = 119.7 kN  
 NVz;Rd = 0.0 kN  
 Profielklasse = 1  
 My;Ed = 0.0 kNm  
 Mz;Ed = 0.0 kNm  
 My;Rd = 11.4 kNm  
 Mz;Rd = 11.4 kNm  
 MVy;Rd = 0.0 kNm  
 MVz;Rd = 0.0 kNm

#### Kiptoetsing C13-V1 (0.000-1.000)

Equi. profiel: N114.3/4

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (4)

F = 0.0kN/m

= 0.0

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 1.000 m

lst = 1.000 m

Lsys = 1.000 m

Lg = 1.000 m

S = 0.000 m

lwa = 0.0000e+00 m6

C1 = 1.04

C2 = 0.42 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.0 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 1.000 m

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging

#### Stabiliteitstoetsing C13-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.66

N;Ed = -1.4 kN

Nb;Rd;y = 320.4 kN

Nb;Rd;z = 296.2 kN

Methode Y = Cons. gesch.

Ca(y) = 0.000

Cb(y) = 0.000

Lknik Y = 1.000 m

Methode Z = Handmatige Invoer

Ca(z) = N/B

Cb(z) = N/B

Lbuc Z = 2.000 m

Chi;y = 0.98

Knikcurve: A

Chi;z = 0.91

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.00 < 1

#### Buiging & Druk C13-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.66

N;Ed = -1.4 kN

My;Ed = 0.0 kNm

Profielklasse = 1

Delta;My;Ed = 0.0 kNm

Mz;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = 0.0 kNm

My;Psi = 0.0 kNm

My;s = 0.0 kNm

Mz = 0.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 0.0 kNm

Cmy = 1.00

Cmz = 1.00

CmLT = 1.00

Kyy = 1.000

Kyz = 0.601

Kzy = 0.600

Kzz = 1.002

Chi;y = 0.98

Chi;z = 0.91

Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1

#### Profielgegevens staaf C14-V1 (0.000-2.520)

N267/8

Analyse

Staal S235H(EN10210-1)

fyd(toegepast) = 235 N/mm2

h = 267.0 mm

A = 6.51e-03 m2

Wy;el = 409.2e-06 m3

Wy;pl = 536.8e-06 m3

b = 267.0 mm

Iy = 546.3e-07 m4

Wz;el = 409.2e-06 m3

Wz;pl = 536.8e-06 m3

tf = 8.0 mm

Iz = 546.3e-07 m4

Aw;y;el = 4.14e-03 m2

Aw;y;pl = 4.14e-03 m2

tw = 8.0 mm

Massa/m = 51.1 kg/m

Aw;z;el = 4.14e-03 m2

Aw;z;pl = 4.14e-03 m2

r = 125.5 mm

It = 109.3e-06 m4

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C14-V1 (0.000-2.520)

Maatgevende combinatie: Fu.C.45 op 1.350 m

Profielklasse = 1

Nx;Ed = -64.3 kN

Vy;Ed = 0.0 kN

My;Ed = 40.9 kNm

Vz;Ed = 30.3 kN

Mz;Ed = 0.0 kNm

Nc;Rd = 1,529.7 kN

Vy;Rd = 562.2 kN

My;Rd = 126.2 kNm

Vz;Rd = 562.2 kN

Mz;Rd = 126.2 kNm

NVy;Rd = 1,529.7 kN

NVz;Rd = 1,529.7 kN

MV;y;Rd = 126.2 kNm

MV;z;Rd = 126.2 kNm

NEN-EN1993-1-1(NB.33): UC = 0.32 < 1

#### Kiptoetsing C14-V1 (0.000-2.520)

Equi. profiel: N267/8

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.001

b-eff(Eind) = 0.001

Tabel gebruikt NB.NB.7

M = 0.0kN/m

MBeta = 0.0

F = 3.1

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 2.520 m

lst = 2.520 m

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                                                                        |                   |                      |                     |
|----------------------------------------------------------------------------------------|-------------------|----------------------|---------------------|
| Lsys = 2.520 m                                                                         | Lg = 2.520 m      | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.36                                                                              | C2 = 0.55 (tabel) | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0        | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 2.1 kNm    |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | Ikip = 2.520 m    |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                                                     | My;eind = 0.0 kNm |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                   |                      |                     |

#### Stabiliteitstoetsing C14-V1 (0.000-2.520)

Maatgevende combinatie: Fu.C.45

|                                     |                      |                      |                   |
|-------------------------------------|----------------------|----------------------|-------------------|
| N;Ed = -65.1 kN                     | Nb;Rd;y = 1,369.5 kN | Nb;Rd;z = 1,369.5 kN |                   |
| Methode Y = Handmatige Invoer       | Ca(y) = 0.000        | Cb(y) = 0.000        | Lknik Y = 5.040 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B          | Cb(z) = N/B          | Lbuc Z = 5.040 m  |
| Chi;y = 0.90                        |                      | Knikcurve: A         |                   |
| Chi;z = 0.90                        |                      | Knikcurve: A         |                   |
| NEN-EN1993-1-1(6.46): UC = 0.05 < 1 |                      |                      |                   |

#### Buiging & Druk C14-V1 (0.000-2.520)

Maatgevende combinatie: Fu.C.45

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -65.1 kN                          | My;Ed = 40.9 kNm      | Profielklasse = 1     |             |
|                                          | Delta;My;Ed = 0.0 kNm | Mz;Ed = 0.0 kNm       |             |
|                                          |                       | Delta;Mz;Ed = 0.0 kNm |             |
| My = -0.3 kNm                            | My;Psi = 0.0 kNm      | My;s = 38.2 kNm       |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.967                              | Kyz = 0.611           | Kzy = 0.580           | Kzz = 1.018 |
| Chi;y = 0.90                             | Chi;z = 0.90          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.36 < 1 |                       |                       |             |

#### Profielgegevens staaf C16-V1 (0.000-1.000)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | Iy = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | Iz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C16-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.39 op 0.000 m

|                                    |                  |                   |                   |
|------------------------------------|------------------|-------------------|-------------------|
| Nx;Ed = -24.9 kN                   | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |                   |
|                                    | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |                   |
| Nc;Rd = 325.7 kN                   | Vy;Rd = 119.7 kN | My;Rd = 11.4 kNm  |                   |
|                                    | Vz;Rd = 119.7 kN | Mz;Rd = 11.4 kNm  |                   |
| NVy;Rd = 0.0 kN                    | NVz;Rd = 0.0 kN  | MV;y;Rd = 0.0 kNm | MV;z;Rd = 0.0 kNm |
| NEN-EN1993-1-1(6.9): UC = 0.08 < 1 |                  |                   |                   |

#### Kiptoetsing C16-V1 (0.000-1.000)

Equi. profiel: N114.3/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.000 m     | lst = 1.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 1.000 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Stabiliteitstoetsing C16-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.39

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -24.9 kN                     | Nb;Rd;y = 320.4 kN | Nb;Rd;z = 296.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.000 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 2.000 m  |
| Chi;y = 0.98                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.08 < 1 |                    |                    |                   |

#### Buiging & Druk C16-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.39

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -24.9 kN                          | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |             |
| Kyy = 1.006                              | Kyz = 0.617           | Kzy = 0.603           | Kzz = 1.029 |
| Chi;y = 0.98                             | Chi;z = 0.91          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.08 < 1 |                       |                       |             |

#### Profielgegevens staaf C17-V1 (0.000-1.000)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | Iy = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | Iz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C17-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.41 op 1.000 m

|                 |                  |                 |
|-----------------|------------------|-----------------|
| N;Ed = 39.8 kN  | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm |
|                 | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm |
| N;Rd = 325.7 kN | Vy;Rd = 119.7 kN | MyRd = 11.4 kNm |
|                 | Vz;Rd = 119.7 kN | MzRd = 11.4 kNm |

NEN-EN1993-1-1(6.5): UC = 0.12 < 1

#### Kipstoetsing C17-V1 (0.000-1.000)

Equi. profiel: N114.3/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.000 m     | lst = 1.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 1.000 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C17-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.57

|                               |                    |                    |                   |
|-------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -10.3 kN               | Nb;Rd;y = 320.4 kN | Nb;Rd;z = 296.2 kN |                   |
| Methode Y = Cons. gesch.      | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.000 m |
| Methode Z = Handmatige Invoer | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 2.000 m  |
| Chi;y = 0.98                  |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                  |                    | Knikcurve: A       |                   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.46): UC = 0.03 < 1

#### Buiging & Druk C17-V1 (0.000-1.000)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.57          |                       | Profielklasse = 1     |             |
| N;Ed = -10.3 kN                          | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |             |
| Kyy = 1.002                              | Kyz = 0.607           | Kzy = 0.601           | Kzz = 1.012 |
| Chi;y = 0.98                             | Chi;z = 0.91          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.03 < 1 |                       |                       |             |

#### Profielgegevens staaf C18-V1 (0.000-1.000)

|              |                               |                                   |                                                     |
|--------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N114.3/4     | Analyse                       | Staal S235H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 114.3 mm | A = 1.39e-03 m <sup>2</sup>   | Wy;el = 369.3e-07 m <sup>3</sup>  | Wy;pl = 486.9e-07 m <sup>3</sup>                    |
| b = 114.3 mm | Iy = 211.1e-08 m <sup>4</sup> | Wz;el = 369.3e-07 m <sup>3</sup>  | Wz;pl = 486.9e-07 m <sup>3</sup>                    |
| tf = 4.0 mm  | Iz = 211.1e-08 m <sup>4</sup> | Aw;y;el = 8.82e-04 m <sup>2</sup> | Aw;y;pl = 8.82e-04 m <sup>2</sup>                   |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m           | Aw;z;el = 8.82e-04 m <sup>2</sup> | Aw;z;pl = 8.82e-04 m <sup>2</sup>                   |
| r = 53.1 mm  |                               | It = 422.1e-08 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C18-V1 (0.000-1.000)

|                                            |                  |                   |  |
|--------------------------------------------|------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.36 op 1.000 m |                  | Profielklasse = 1 |  |
| N;Ed = 5.7 kN                              | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |  |
|                                            | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 325.7 kN                            | Vy;Rd = 119.7 kN | MyRd = 11.4 kNm   |  |
|                                            | Vz;Rd = 119.7 kN | MzRd = 11.4 kNm   |  |
| NEN-EN1993-1-1(6.5): UC = 0.02 < 1         |                  |                   |  |

#### Kiptoetsing C18-V1 (0.000-1.000)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                      |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.000 m     | lst = 1.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 1.000 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C18-V1 (0.000-1.000)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.62     |                    |                    |                   |
| N;Ed = -1.9 kN                      | Nb;Rd;y = 320.4 kN | Nb;Rd;z = 296.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.000 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 2.000 m  |
| Chi;y = 0.98                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.01 < 1 |                    |                    |                   |

#### Buiging & Druk C18-V1 (0.000-1.000)

|                                 |                       |                       |  |
|---------------------------------|-----------------------|-----------------------|--|
| Maatgevende combinatie: Fu.C.62 |                       | Profielklasse = 1     |  |
| N;Ed = -1.9 kN                  | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |  |
|                                 | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |  |
| My = 0.0 kNm                    | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |  |
| Mz = 0.0 kNm                    | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |  |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

C<sub>my</sub> = 1.00                      C<sub>mz</sub> = 1.00                      C<sub>mLT</sub> = 1.00  
 K<sub>yy</sub> = 1.000                      K<sub>yz</sub> = 0.601                      K<sub>zy</sub> = 0.600                      K<sub>zz</sub> = 1.002  
 Chi;<sub>y</sub> = 0.98                      Chi;<sub>z</sub> = 0.91                      Chi;<sub>LT</sub> = 1.00  
 NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1

#### Profielgegevens staaf C19-V1 (0.000-1.000)

|                         |                                           |                                               |                                                     |
|-------------------------|-------------------------------------------|-----------------------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                                   | Staal S235H(EN10210-1)                        | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>               | W <sub>y;el</sub> = 369.3e-07 m <sup>3</sup>  | W <sub>y;pl</sub> = 486.9e-07 m <sup>3</sup>        |
| b = 114.3 mm            | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | W <sub>z;el</sub> = 369.3e-07 m <sup>3</sup>  | W <sub>z;pl</sub> = 486.9e-07 m <sup>3</sup>        |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | A <sub>w;y;el</sub> = 8.82e-04 m <sup>2</sup> | A <sub>w;y;pl</sub> = 8.82e-04 m <sup>2</sup>       |
| t <sub>w</sub> = 4.0 mm | Massa/m = 10.9 kg/m                       | A <sub>w;z;el</sub> = 8.82e-04 m <sup>2</sup> | A <sub>w;z;pl</sub> = 8.82e-04 m <sup>2</sup>       |
| r = 53.1 mm             |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup>     | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C19-V1 (0.000-1.000)

|                                            |                                           |                                           |                                           |
|--------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| Maatgevende combinatie: Fu.C.36 op 0.000 m |                                           | Profielklasse = 1                         |                                           |
| N <sub>x</sub> ;E <sub>d</sub> = -4.9 kN   | V <sub>y</sub> ;E <sub>d</sub> = 0.0 kN   | M <sub>y</sub> ;E <sub>d</sub> = 0.0 kNm  |                                           |
|                                            | V <sub>z</sub> ;E <sub>d</sub> = 0.0 kN   | M <sub>z</sub> ;E <sub>d</sub> = 0.0 kNm  |                                           |
| N <sub>c</sub> ;R <sub>d</sub> = 325.7 kN  | V <sub>y</sub> ;R <sub>d</sub> = 119.7 kN | M <sub>y</sub> ;R <sub>d</sub> = 11.4 kNm |                                           |
|                                            | V <sub>z</sub> ;R <sub>d</sub> = 119.7 kN | M <sub>z</sub> ;R <sub>d</sub> = 11.4 kNm |                                           |
| NV <sub>y</sub> ;R <sub>d</sub> = 0.0 kN   | NV <sub>z</sub> ;R <sub>d</sub> = 0.0 kN  | MV <sub>y</sub> ;R <sub>d</sub> = 0.0 kNm | MV <sub>z</sub> ;R <sub>d</sub> = 0.0 kNm |
| NEN-EN1993-1-1(6.9): UC = 0.02 < 1         |                                           |                                           |                                           |

#### Kipstoetsing C19-V1 (0.000-1.000)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                      |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.000 m     | Ist = 1.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 1.000 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C19-V1 (0.000-1.000)

|                                          |                                              |                                              |                               |
|------------------------------------------|----------------------------------------------|----------------------------------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.36          |                                              |                                              |                               |
| N <sub>i</sub> ;E <sub>d</sub> = -4.9 kN | N <sub>b</sub> ;R <sub>d</sub> ;y = 320.4 kN | N <sub>b</sub> ;R <sub>d</sub> ;z = 296.2 kN |                               |
| Methode Y = Cons. gesch.                 | Ca(y) = 0.000                                | Cb(y) = 0.000                                | L <sub>knik</sub> Y = 1.000 m |
| Methode Z = Handmatige Invoer            | Ca(z) = N/B                                  | Cb(z) = N/B                                  | L <sub>buc</sub> Z = 2.000 m  |
| Chi; <sub>y</sub> = 0.98                 |                                              | Knikcurve: A                                 |                               |
| Chi; <sub>z</sub> = 0.91                 |                                              | Knikcurve: A                                 |                               |
| NEN-EN1993-1-1(6.46): UC = 0.02 < 1      |                                              |                                              |                               |

#### Buiging & Druk C19-V1 (0.000-1.000)

|                                          |                                                |                                                |                         |
|------------------------------------------|------------------------------------------------|------------------------------------------------|-------------------------|
| Maatgevende combinatie: Fu.C.36          |                                                | Profielklasse = 1                              |                         |
| N <sub>i</sub> ;E <sub>d</sub> = -4.9 kN | M <sub>y</sub> ;E <sub>d</sub> = 0.0 kNm       | M <sub>z</sub> ;E <sub>d</sub> = 0.0 kNm       |                         |
|                                          | Delta;M <sub>y</sub> ;E <sub>d</sub> = 0.0 kNm | Delta;M <sub>z</sub> ;E <sub>d</sub> = 0.0 kNm |                         |
| M <sub>y</sub> = 0.0 kNm                 | M <sub>y</sub> ;P <sub>si</sub> = 0.0 kNm      | M <sub>y</sub> ;s = 0.0 kNm                    |                         |
| M <sub>z</sub> = 0.0 kNm                 | M <sub>z</sub> ;P <sub>si</sub> = 0.0 kNm      | M <sub>z</sub> ;s = 0.0 kNm                    |                         |
| C <sub>my</sub> = 1.00                   | C <sub>mz</sub> = 1.00                         | C <sub>mLT</sub> = 1.00                        |                         |
| K <sub>yy</sub> = 1.001                  | K <sub>yz</sub> = 0.603                        | K <sub>zy</sub> = 0.601                        | K <sub>zz</sub> = 1.006 |
| Chi; <sub>y</sub> = 0.98                 | Chi; <sub>z</sub> = 0.91                       | Chi; <sub>LT</sub> = 1.00                      |                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.02 < 1 |                                                |                                                |                         |

#### Profielgegevens staaf C20-V1 (0.000-1.000)

|                                                              |                        |                       |                  |                            |  |
|--------------------------------------------------------------|------------------------|-----------------------|------------------|----------------------------|--|
|                                                              |                        |                       |                  |                            |  |
|                                                              |                        |                       |                  |                            |  |
| N114.3/4                                                     | Analyse                | Staal                 | S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |  |
| h = 114.3 mm                                                 | A = 1.39e-03 m2        | Wy;el = 369.3e-07 m3  |                  | Wy;pl = 486.9e-07 m3       |  |
| b = 114.3 mm                                                 | Iy = 211.1e-08 m4      | Wz;el = 369.3e-07 m3  |                  | Wz;pl = 486.9e-07 m3       |  |
| tf = 4.0 mm                                                  | Iz = 211.1e-08 m4      | Aw;y;el = 8.82e-04 m2 |                  | Aw;y;pl = 8.82e-04 m2      |  |
| tw = 4.0 mm                                                  | Massa/m = 10.9 kg/m    | Aw;z;el = 8.82e-04 m2 |                  | Aw;z;pl = 8.82e-04 m2      |  |
| r = 53.1 mm                                                  |                        | It = 422.1e-08 m4     |                  | Iwa = 0.0e-02 m6           |  |
| <b>Doorsnedetoetsing C20-V1 (0.000-1.000)</b>                |                        |                       |                  |                            |  |
| Maatgevende combinatie: Fu.C.36 op 0.000 m                   |                        | Profielklasse = 1     |                  |                            |  |
| N;Ed = -36.7 kN                                              | Vy;Ed = 0.0 kN         | My;Ed = 0.0 kNm       |                  |                            |  |
|                                                              | Vz;Ed = 0.0 kN         | Mz;Ed = 0.0 kNm       |                  |                            |  |
| N;Rd = 325.7 kN                                              | Vy;Rd = 119.7 kN       | MyRd = 11.4 kNm       |                  |                            |  |
|                                                              | Vz;Rd = 119.7 kN       | MzRd = 11.4 kNm       |                  |                            |  |
| NEN-EN1993-1-1(6.9): UC = 0.11 < 1                           |                        |                       |                  |                            |  |
| <b>Kiptoetsing C20-V1 (0.000-1.000)</b>                      |                        |                       |                  |                            |  |
| Equi. profiel: N114.3/4                                      |                        |                       |                  |                            |  |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d   |                  |                            |  |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                       |                  |                            |  |
| Kipsteun bovenflens: N.v.t.                                  |                        |                       |                  |                            |  |
| Kipsteun onderflens: N.v.t.                                  |                        |                       |                  |                            |  |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000  |                  | b-eff(Eind) = 0.000        |  |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                 |                  |                            |  |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.000 m      |                  | lst = 1.000 m              |  |
| Lsys = 1.000 m                                               | Lg = 1.000 m           | S = 0.000 m           |                  | Iwa = 0.0000e+00 m6        |  |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00  |                  | C = 0.00                   |  |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00        |                  | Profielklasse 1            |  |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                       |                  | UC(y) = 0.00               |  |
| Chi;LT,Z = 1.00                                              | Ikip = 1.000 m         |                       |                  | UC(z) = 0.00               |  |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                       |                  |                            |  |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                       |                  |                            |  |
| <b>Stabiliteitstoetsing C20-V1 (0.000-1.000)</b>             |                        |                       |                  |                            |  |
| Maatgevende combinatie: Fu.C.36                              |                        |                       |                  |                            |  |
| N;Ed = -36.7 kN                                              | Nb;Rd;y = 320.4 kN     | Nb;Rd;z = 296.2 kN    |                  |                            |  |
| Methode Y = Cons. gesch.                                     | Ca(y) = 0.000          | Cb(y) = 0.000         |                  | Lknik Y = 1.000 m          |  |
| Methode Z = Handmatige Invoer                                | Ca(z) = N/B            | Cb(z) = N/B           |                  | Lbuc Z = 2.000 m           |  |
| Chi;y = 0.98                                                 |                        | Knikcurve: A          |                  |                            |  |
| Chi;z = 0.91                                                 |                        | Knikcurve: A          |                  |                            |  |
| NEN-EN1993-1-1(6.46): UC = 0.12 < 1                          |                        |                       |                  |                            |  |
| <b>Buiging &amp; Druk C20-V1 (0.000-1.000)</b>               |                        |                       |                  |                            |  |
| Maatgevende combinatie: Fu.C.36                              |                        | Profielklasse = 1     |                  |                            |  |
| N;Ed = -36.7 kN                                              | My;Ed = 0.0 kNm        | Mz;Ed = 0.0 kNm       |                  |                            |  |
|                                                              | Delta;My;Ed = 0.0 kNm  | Delta;Mz;Ed = 0.0 kNm |                  |                            |  |
| My = 0.0 kNm                                                 | My;Psi = 0.0 kNm       | My;s = 0.0 kNm        |                  |                            |  |
| Mz = 0.0 kNm                                                 | Mz;Psi = 0.0 kNm       | Mz;s = 0.0 kNm        |                  |                            |  |
| Cmy = 1.00                                                   | Cmz = 1.00             | CmLT = 1.00           |                  |                            |  |
| Kyy = 1.008                                                  | Kyz = 0.626            | Kzy = 0.605           |                  | Kzz = 1.043                |  |
| Chi;y = 0.98                                                 | Chi;z = 0.91           | Chi;LT = 1.00         |                  |                            |  |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.12 < 1                     |                        |                       |                  |                            |  |
| <b>Profielgegevens staaf C21-V1 (0.000-5.400)</b>            |                        |                       |                  |                            |  |
| N267/8                                                       | Analyse                | Staal                 | S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |  |
| h = 267.0 mm                                                 | A = 6.51e-03 m2        | Wy;el = 409.2e-06 m3  |                  | Wy;pl = 536.8e-06 m3       |  |
| b = 267.0 mm                                                 | Iy = 546.3e-07 m4      | Wz;el = 409.2e-06 m3  |                  | Wz;pl = 536.8e-06 m3       |  |
| tf = 8.0 mm                                                  | Iz = 546.3e-07 m4      | Aw;y;el = 4.14e-03 m2 |                  | Aw;y;pl = 4.14e-03 m2      |  |
| tw = 8.0 mm                                                  | Massa/m = 51.1 kg/m    | Aw;z;el = 4.14e-03 m2 |                  | Aw;z;pl = 4.14e-03 m2      |  |
| r = 125.5 mm                                                 |                        | It = 109.3e-06 m4     |                  | Iwa = 0.0e-02 m6           |  |
| <b>Doorsnedetoetsing C21-V1 (0.000-5.400)</b>                |                        |                       |                  |                            |  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Maatgevende combinatie: Fu.C.37 op 3.480 m

|                   |                  |                   |
|-------------------|------------------|-------------------|
| N;Ed = -75.7 kN   | Vy;Ed = 0.0 kN   | My;Ed = -16.0 kNm |
|                   | Vz;Ed = -4.6 kN  | Mz;Ed = 0.0 kNm   |
| N;Rd = 1,529.7 kN | Vy;Rd = 562.2 kN | MyRd = 126.2 kNm  |
|                   | Vz;Rd = 562.2 kN | MzRd = 126.2 kNm  |

NEN-EN1993-1-1(NB.33): UC = 0.13 < 1

#### Kiptoetsing C21-V1 (0.000-5.400)

Equi. profiel: N267/8

Maatgevende combinatie: Bi.C.1

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                         |                        |                      |                     |
|-------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund | Beperk. eind: Gesteund | b-eff(Begin) = 0.001 | b-eff(Eind) = 0.001 |
| Tabel gebruikt NB.NB.4  | M = 0.1kN/m            | MBeta = 0.0          | q = 1.3             |
| Bovenflens maatgevend   | Xb;lst = 0.000 m       | Xe;lst = 5.400 m     | lst = 5.400 m       |
| Lsys = 5.400 m          | Lg = 5.400 m           | S = 0.000 m          | lwa = 0.0000e+00 m6 |
| C1 = 1.13               | C2 = 0.47 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm           | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00   | M;Ed = 0.1 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00         | lkip = 5.400 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm      | My;eind = 0.1 kNm      |                      |                     |

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C21-V1 (0.000-5.400)

Maatgevende combinatie: Fu.C.36

|                               |                    |                    |                    |
|-------------------------------|--------------------|--------------------|--------------------|
| N;Ed = -153.9 kN              | Nb;Rd;y = 759.0 kN | Nb;Rd;z = 759.0 kN |                    |
| Methode Y = Handmatige Invoer | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 10.800 m |
| Methode Z = Handmatige Invoer | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 10.800 m  |
| Chi;y = 0.50                  |                    | Knikcurve: A       |                    |
| Chi;z = 0.50                  |                    | Knikcurve: A       |                    |

NEN-EN1993-1-1(6.46): UC = 0.20 < 1

#### Buiging & Druk C21-V1 (0.000-5.400)

Maatgevende combinatie: Fu.C.36

|                  |                       |                       |
|------------------|-----------------------|-----------------------|
| N;Ed = -153.9 kN | My;Ed = 13.1 kNm      | Profielklasse = 1     |
|                  | Delta;My;Ed = 0.0 kNm | Mz;Ed = 0.0 kNm       |
|                  |                       | Delta;Mz;Ed = 0.0 kNm |
| My = 0.1 kNm     | My;Psi = 0.0 kNm      | My;s = -10.2 kNm      |
| Mz = 0.0 kNm     | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |
| Cmy = 0.95       | Cmz = 1.00            | CmLT = 0.95           |
| Kyy = 1.104      | Kyz = 0.697           | Kzy = 0.662           |
| Chi;y = 0.50     | Chi;z = 0.50          | Kzz = 1.162           |
|                  |                       | Chi;LT = 1.00         |

NEN-EN1993-1-1(6.61&6.62): UC = 0.32 < 1

#### Profielgegevens staaf C23-V1 (0.000-1.000)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | Iy = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | Iz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | lwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C23-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.43 op 1.000 m

|                  |                  |                   |
|------------------|------------------|-------------------|
| Nx;Ed = 1.6 kN   | Vy;Ed = 0.0 kN   | Profielklasse = 1 |
|                  | Vz;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |
|                  |                  | Mz;Ed = 0.0 kNm   |
| Nc;Rd = 325.7 kN | Vy;Rd = 119.7 kN | My;Rd = 11.4 kNm  |
|                  | Vz;Rd = 119.7 kN | Mz;Rd = 11.4 kNm  |
| NVy;Rd = 0.0 kN  | NVz;Rd = 0.0 kN  | MV;y;Rd = 0.0 kNm |
|                  |                  | MV;z;Rd = 0.0 kNm |

NEN-EN1993-1-1(6.5): UC = 0.00 < 1

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Kiptoetsing C23-V1 (0.000-1.000)

Equi. profiel: N114.3/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (4)

F = 0.0kN/m

= 0.0

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 1.000 m

lst = 1.000 m

Lsys = 1.000 m

Lg = 1.000 m

S = 0.000 m

lwa = 0.0000e+00 m6

C1 = 1.04

C2 = 0.42 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.0 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 1.000 m

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging

#### Stabiliteitstoetsing C23-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.54

N;Ed = -0.4 kN

Nb;Rd;y = 320.4 kN

Nb;Rd;z = 296.2 kN

Methode Y = Cons. gesch.

Ca(y) = 0.000

Cb(y) = 0.000

Lknik Y = 1.000 m

Methode Z = Handmatige Invoer

Ca(z) = N/B

Cb(z) = N/B

Lbuc Z = 2.000 m

Chi;y = 0.98

Knikcurve: A

Chi;z = 0.91

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.00 < 1

#### Buiging & Druk C23-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.54

N;Ed = -0.4 kN

My;Ed = 0.0 kNm

Profielklasse = 1

Delta;My;Ed = 0.0 kNm

Mz;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = 0.0 kNm

My;Psi = 0.0 kNm

My;s = 0.0 kNm

Mz = 0.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 0.0 kNm

Cmy = 1.00

Cmz = 1.00

CmLT = 1.00

Kyy = 1.000

Kyz = 0.600

Kzy = 0.600

Kzz = 1.000

Chi;y = 0.98

Chi;z = 0.91

Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1

#### Profielgegevens staaf C24-V1 (0.000-1.000)

N114.3/4

Analyse

Staal S235H(EN10210-1)

fyd(toegepast) = 235 N/mm2

h = 114.3 mm

A = 1.39e-03 m2

Wy;el = 369.3e-07 m3

Wy;pl = 486.9e-07 m3

b = 114.3 mm

Iy = 211.1e-08 m4

Wz;el = 369.3e-07 m3

Wz;pl = 486.9e-07 m3

tf = 4.0 mm

Iz = 211.1e-08 m4

Aw;y;el = 8.82e-04 m2

Aw;y;pl = 8.82e-04 m2

tw = 4.0 mm

Massa/m = 10.9 kg/m

Aw;z;el = 8.82e-04 m2

Aw;z;pl = 8.82e-04 m2

r = 53.1 mm

It = 422.1e-08 m4

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C24-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.43 op 0.000 m

N;Ed = -64.0 kN

Vy;Ed = 0.0 kN

Profielklasse = 1

Vz;Ed = 0.0 kN

My;Ed = 0.0 kNm

N;Rd = 325.7 kN

Vy;Rd = 119.7 kN

Mz;Ed = 0.0 kNm

Vz;Rd = 119.7 kN

MyRd = 11.4 kNm

MzRd = 11.4 kNm

NEN-EN1993-1-1(6.9): UC = 0.20 < 1

#### Kiptoetsing C24-V1 (0.000-1.000)

Equi. profiel: N114.3/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (4)

F = 0.0kN/m

= 0.0

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                                              |                   |                      |                     |
|--------------------------------------------------------------|-------------------|----------------------|---------------------|
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m  | Xe;lst = 1.000 m     | lst = 1.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m      | S = 0.000 m          | lwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel) | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0        | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm    |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 1.000 m    |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                   |                      |                     |

#### Stabiliteitstoetsing C24-V1 (0.000-1.000)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.43     |                    |                    |                   |
| N;Ed = -64.0 kN                     | Nb;Rd;y = 320.4 kN | Nb;Rd;z = 296.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.000 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 2.000 m  |
| Chi;y = 0.98                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.22 < 1 |                    |                    |                   |

#### Buiging & Druk C24-V1 (0.000-1.000)

|                                          |                       |                       |                   |
|------------------------------------------|-----------------------|-----------------------|-------------------|
| Maatgevende combinatie: Fu.C.43          |                       |                       | Profielklasse = 1 |
| N;Ed = -64.0 kN                          | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |                   |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |                   |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |                   |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |                   |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |                   |
| Kyy = 1.015                              | Kyz = 0.645           | Kzy = 0.609           | Kzz = 1.075       |
| Chi;y = 0.98                             | Chi;z = 0.91          | Chi;LT = 1.00         |                   |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.22 < 1 |                       |                       |                   |

#### Profielgegevens staaf C25-V1 (0.000-1.000)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | Iy = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | Iz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | lwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C25-V1 (0.000-1.000)

|                                            |                  |                 |                   |
|--------------------------------------------|------------------|-----------------|-------------------|
| Maatgevende combinatie: Fu.C.43 op 0.000 m |                  |                 | Profielklasse = 1 |
| N;Ed = -73.3 kN                            | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm |                   |
|                                            | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm |                   |
| N;Rd = 325.7 kN                            | Vy;Rd = 119.7 kN | MyRd = 11.4 kNm |                   |
|                                            | Vz;Rd = 119.7 kN | MzRd = 11.4 kNm |                   |
| NEN-EN1993-1-1(6.9): UC = 0.23 < 1         |                  |                 |                   |

#### Kiptoetsing C25-V1 (0.000-1.000)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                      |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.000 m     | lst = 1.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m           | S = 0.000 m          | lwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 1.000 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Stabiliteitstoetsing C25-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.43

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -73.3 kN                     | Nb;Rd;y = 320.4 kN | Nb;Rd;z = 296.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.000 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 2.000 m  |
| Chi;y = 0.98                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.25 < 1 |                    |                    |                   |

#### Buiging & Druk C25-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.43

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -73.3 kN                          | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |             |
| Kyy = 1.017                              | Kyz = 0.651           | Kzy = 0.610           | Kzz = 1.086 |
| Chi;y = 0.98                             | Chi;z = 0.91          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.25 < 1 |                       |                       |             |

#### Profielgegevens staaf C26-V1 (0.000-1.000)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | Iy = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | Iz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C26-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.41 op 0.000 m

|                 |                  |                 |
|-----------------|------------------|-----------------|
| N;Ed = -12.2 kN | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm |
|                 | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm |
| N;Rd = 325.7 kN | Vy;Rd = 119.7 kN | MyRd = 11.4 kNm |
|                 | Vz;Rd = 119.7 kN | MzRd = 11.4 kNm |

NEN-EN1993-1-1(6.9): UC = 0.04 < 1

#### Kiptoetsing C26-V1 (0.000-1.000)

Equi. profiel: N114.3/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.000 m     | lst = 1.000 m       |
| Lsys = 1.000 m                                               | Lg = 1.000 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 1.000 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C26-V1 (0.000-1.000)

Maatgevende combinatie: Fu.C.41

|                               |                    |                    |                   |
|-------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -12.2 kN               | Nb;Rd;y = 320.4 kN | Nb;Rd;z = 296.2 kN |                   |
| Methode Y = Cons. gesch.      | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.000 m |
| Methode Z = Handmatige Invoer | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 2.000 m  |
| Chi;y = 0.98                  |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                  |                    | Knikcurve: A       |                   |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.46): UC = 0.04 < 1

#### Buiging & Druk C26-V1 (0.000-1.000)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.41          |                       | Profielklasse = 1     |             |
| N;Ed = -12.2 kN                          | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |             |
| Kyy = 1.003                              | Kyz = 0.609           | Kzy = 0.602           | Kzz = 1.014 |
| Chi;y = 0.98                             | Chi;z = 0.91          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.04 < 1 |                       |                       |             |

#### Profielgegevens staaf C27-V1 (0.000-5.950)

|              |                               |                                   |                                                     |
|--------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N219.1/6.3   | Analyse                       | Staal S235H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 219.1 mm | A = 4.21e-03 m <sup>2</sup>   | Wy;el = 217.8e-06 m <sup>3</sup>  | Wy;pl = 285.4e-06 m <sup>3</sup>                    |
| b = 219.1 mm | Iy = 238.6e-07 m <sup>4</sup> | Wz;el = 217.8e-06 m <sup>3</sup>  | Wz;pl = 285.4e-06 m <sup>3</sup>                    |
| tf = 6.3 mm  | Iz = 238.6e-07 m <sup>4</sup> | Aw;y;el = 2.68e-03 m <sup>2</sup> | Aw;y;pl = 2.68e-03 m <sup>2</sup>                   |
| tw = 6.3 mm  | Massa/m = 33.1 kg/m           | Aw;z;el = 2.68e-03 m <sup>2</sup> | Aw;z;pl = 2.68e-03 m <sup>2</sup>                   |
| r = 103.2 mm |                               | It = 477.2e-07 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C27-V1 (0.000-5.950)

|                                            |                   |                     |                    |
|--------------------------------------------|-------------------|---------------------|--------------------|
| Maatgevende combinatie: Fu.C.45 op 4.675 m |                   | Profielklasse = 1   |                    |
| Nx;Ed = -10.4 kN                           | Vy;Ed = 5.0 kN    | My;Ed = -6.1 kNm    |                    |
|                                            | Vz;Ed = -10.8 kN  | Mz;Ed = 9.0 kNm     |                    |
| Nc;Rd = 989.8 kN                           | Vy;Rd = 363.8 kN  | My;Rd = 67.1 kNm    |                    |
|                                            | Vz;Rd = 363.8 kN  | Mz;Rd = 67.1 kNm    |                    |
| NVy;Rd = 989.8 kN                          | NVz;Rd = 989.8 kN | MV;y;Rd = 67.1 kNm  | MV;z;Rd = 67.1 kNm |
| α 1 = 2.000                                | β 1 = 1.000       | MNV;y;Rd = 67.1 kNm | q(y) = 1.030       |
| α 2 = 2.000                                | β 2 = 1.000       | MNV;z;Rd = 67.1 kNm | q(z) = 1.030       |
| NEN-EN1993-1-1(NB.33): UC = 0.16 < 1       |                   |                     |                    |

#### Kipptoetsing C27-V1 (0.000-5.950)

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N219.1/6.3                                                              |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                                                         |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                                            |                        |                      |                     |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.7                                                                 | M = 0.0kN/m            | MBeta = 0.0          | F = 0.0             |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 5.950 m     | Ist = 5.950 m       |
| Lsys = 5.950 m                                                                         | Lg = 5.950 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 2.30                                                                              | C2 = 0.60 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | Ikip = 5.950 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                                                     | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

#### Stabiliteitstoetsing C27-V1 (0.000-5.950)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.65     |                    |                    |                   |
| N;Ed = -30.1 kN                     | Nb;Rd;y = 763.1 kN | Nb;Rd;z = 301.6 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 5.950 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 11.900 m |
| Chi;y = 0.77                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.30                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.10 < 1 |                    |                    |                   |

#### Buiging & Druk C27-V1 (0.000-5.950)

|                                 |                 |                   |  |
|---------------------------------|-----------------|-------------------|--|
| Maatgevende combinatie: Fu.C.65 |                 | Profielklasse = 1 |  |
| N;Ed = -30.1 kN                 | My;Ed = 4.8 kNm | Mz;Ed = 9.0 kNm   |  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 2.4 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.8 kNm        |             |
| Mz = 9.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 4.5 kNm        |             |
| Cmy = 0.48                               | Cmz = 0.60            | CmLT = 0.48           |             |
| Kyy = 0.492                              | Kyz = 0.389           | Kzy = 0.295           | Kzz = 0.648 |
| Chi;y = 0.77                             | Chi;z = 0.30          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.21 < 1 |                       |                       |             |

#### Profielgegevens staaf C28-V1 (0.000-1.243)

|                         |                                           |                                           |                                                     |
|-------------------------|-------------------------------------------|-------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S235H(EN10210-1)                    | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | Wy;el = 216.7e-07 m <sup>3</sup>          | Wy;pl = 288.5e-07 m <sup>3</sup>                    |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | Wz;el = 216.7e-07 m <sup>3</sup>          | Wz;pl = 288.5e-07 m <sup>3</sup>                    |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | Aw;y;el = 6.79e-04 m <sup>2</sup>         | Aw;y;pl = 6.79e-04 m <sup>2</sup>                   |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | Aw;z;el = 6.79e-04 m <sup>2</sup>         | Aw;z;pl = 6.79e-04 m <sup>2</sup>                   |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup> | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C28-V1 (0.000-1.243)

|                                            |                 |                   |  |
|--------------------------------------------|-----------------|-------------------|--|
| Maatgevende combinatie: Fu.C.31 op 0.000 m |                 | Profielklasse = 1 |  |
| N;Ed = 22.3 kN                             | Vy;Ed = 0.0 kN  | My;Ed = 0.0 kNm   |  |
|                                            | Vz;Ed = 0.1 kN  | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 250.7 kN                            | Vy;Rd = 92.2 kN | MyRd = 6.8 kNm    |  |
|                                            | Vz;Rd = 92.2 kN | MzRd = 6.8 kNm    |  |

NEN-EN1993-1-1(6.5): UC = 0.09 < 1

#### Kiptoetsing C28-V1 (0.000-1.243)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.243 m     | lst = 1.243 m       |
| Lsys = 1.243 m                                               | Lg = 1.243 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 1.243 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C28-V1 (0.000-1.243)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.66     |                    |                    |                   |
| N;Ed = -2.0 kN                      | Nb;Rd;y = 236.1 kN | Nb;Rd;z = 236.1 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.243 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.243 m  |
| Chi;y = 0.94                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.94                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.01 < 1 |                    |                    |                   |

#### Buiging & Druk C28-V1 (0.000-1.243)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.66          |                       | Profielklasse = 1     |             |
| N;Ed = -2.0 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.952                              | Kyz = 0.601           | Kzy = 0.571           | Kzz = 1.002 |
| Chi;y = 0.94                             | Chi;z = 0.94          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1 |                       |                       |             |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C30-V1 (0.000-7.120)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N139.7/4                | Analyse                                   | Staal S235H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 139.7 mm            | A = 1.71e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 562.4e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 736.8e-07 m <sup>3</sup>       |
| b = 139.7 mm            | I <sub>y</sub> = 392.9e-08 m <sup>4</sup> | W <sub>z</sub> ;el = 562.4e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 736.8e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 392.9e-08 m <sup>4</sup> | A <sub>w</sub> ;y;el = 1.09e-03 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 1.09e-03 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 13.4 kg/m                       | A <sub>w</sub> ;z;el = 1.09e-03 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 1.09e-03 m <sup>2</sup>      |
| r = 65.8 mm             |                                           | I <sub>t</sub> = 785.7e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C30-V1 (0.000-7.120)

|                                            |                               |                               |  |
|--------------------------------------------|-------------------------------|-------------------------------|--|
| Maatgevende combinatie: Fu.C.43 op 4.675 m |                               | Profielklasse = 1             |  |
| N;Ed = 10.8 kN                             | V <sub>y</sub> ;Ed = 4.0 kN   | M <sub>y</sub> ;Ed = -0.7 kNm |  |
|                                            | V <sub>z</sub> ;Ed = -0.6 kN  | M <sub>z</sub> ;Ed = 7.0 kNm  |  |
| N;Rd = 400.7 kN                            | V <sub>y</sub> ;Rd = 147.3 kN | M <sub>y</sub> Rd = 17.3 kNm  |  |
|                                            | V <sub>z</sub> ;Rd = 147.3 kN | M <sub>z</sub> Rd = 17.3 kNm  |  |
| NEN-EN1993-1-1(NB.33): UC = 0.41 < 1       |                               |                               |  |

#### Kiptoetsing C30-V1 (0.000-7.120)

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N139.7/4                                                                |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                                                         |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                                            |                        |                      |                     |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (3)                                                             | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 7.120 m     | lst = 7.120 m       |
| Lsys = 7.120 m                                                                         | Lg = 7.120 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.35                                                                              | C2 = 0.55 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | Ikip = 7.120 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                                                     | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

#### Stabiliteitstoetsing C30-V1 (0.000-7.120)

|                                     |                                 |                                |                               |
|-------------------------------------|---------------------------------|--------------------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.32     |                                 |                                |                               |
| N;Ed = -34.3 kN                     | N <sub>b</sub> ;Rd;y = 136.6 kN | N <sub>b</sub> ;Rd;z = 83.5 kN |                               |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000                   | C <sub>b</sub> (y) = 0.000     | L <sub>knik</sub> Y = 7.120 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B                     | C <sub>b</sub> (z) = N/B       | L <sub>buc</sub> Z = 9.350 m  |
| Chi;y = 0.34                        |                                 | K <sub>nik</sub> curve: A      |                               |
| Chi;z = 0.21                        |                                 | K <sub>nik</sub> curve: A      |                               |
| NEN-EN1993-1-1(6.46): UC = 0.41 < 1 |                                 |                                |                               |

#### Buiging & Druk C30-V1 (0.000-7.120)

|                                          |                                    |                                    |                         |
|------------------------------------------|------------------------------------|------------------------------------|-------------------------|
| Maatgevende combinatie: Fu.C.32          |                                    | Profielklasse = 1                  |                         |
| N;Ed = -34.3 kN                          | M <sub>y</sub> ;Ed = 0.3 kNm       | M <sub>z</sub> ;Ed = 7.0 kNm       |                         |
|                                          | Delta;M <sub>y</sub> ;Ed = 0.0 kNm | Delta;M <sub>z</sub> ;Ed = 0.0 kNm |                         |
| M <sub>y</sub> = 0.0 kNm                 | M <sub>y</sub> ;Psi = 0.0 kNm      | M <sub>y</sub> ;s = 0.3 kNm        |                         |
| M <sub>z</sub> = 7.0 kNm                 | M <sub>z</sub> ;Psi = 0.0 kNm      | M <sub>z</sub> ;s = 3.5 kNm        |                         |
| C <sub>my</sub> = 0.95                   | C <sub>mz</sub> = 0.60             | C <sub>mLT</sub> = 0.95            |                         |
| K <sub>yy</sub> = 1.141                  | K <sub>yz</sub> = 0.478            | K <sub>zy</sub> = 0.685            | K <sub>zz</sub> = 0.797 |
| Chi;y = 0.34                             | Chi;z = 0.21                       | Chi;LT = 1.00                      |                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.75 < 1 |                                    |                                    |                         |

#### Profielgegevens staaf C32-V1 (0.000-2.309)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S235H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | W <sub>z</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | A <sub>w</sub> ;y;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 6.79e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | A <sub>w</sub> ;z;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 6.79e-04 m <sup>2</sup>      |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Doorsnedetoetsing C32-V1 (0.000-2.309)

Maatgevende combinatie: Fu.C.45 op 2.309 m

N;Ed = 27.5 kN

Vy;Ed = 0.0 kN

Vz;Ed = -0.1 kN

N;Rd = 250.7 kN

Vy;Rd = 92.2 kN

Vz;Rd = 92.2 kN

Profielklasse = 1

My;Ed = 0.0 kNm

Mz;Ed = 0.0 kNm

MyRd = 6.8 kNm

MzRd = 6.8 kNm

NEN-EN1993-1-1(6.5): UC = 0.11 < 1

#### Kiptoetsing C32-V1 (0.000-2.309)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (4)

F = 0.0kN/m

= 0.0

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 2.309 m

lst = 2.309 m

Lsys = 2.309 m

Lg = 2.309 m

S = 0.000 m

lwa = 0.0000e+00 m6

C1 = 1.04

C2 = 0.42 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.0 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 2.309 m

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging

#### Stabiliteitstoetsing C32-V1 (0.000-2.309)

Maatgevende combinatie: Fu.C.50

N;Ed = -7.0 kN

Nb;Rd;y = 196.9 kN

Nb;Rd;z = 196.9 kN

Methode Y = Cons. gesch.

Ca(y) = 0.000

Cb(y) = 0.000

Lknik Y = 2.309 m

Methode Z = Cons. gesch.

Ca(z) = N/B

Cb(z) = N/B

Lbuc Z = 2.309 m

Chi;y = 0.79

Knikcurve: A

Chi;z = 0.79

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.04 < 1

#### Buiging & Druk C32-V1 (0.000-2.309)

Maatgevende combinatie: Fu.C.50

N;Ed = -7.0 kN

My;Ed = 0.0 kNm

Profielklasse = 1

Delta;My;Ed = 0.0 kNm

Mz;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = 0.0 kNm

My;Psi = 0.0 kNm

My;s = 0.0 kNm

Mz = 0.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 0.0 kNm

Cmy = 0.95

Cmz = 1.00

CmLT = 0.95

Kyy = 0.971

Kyz = 0.613

Kzy = 0.582

Kzz = 1.022

Chi;y = 0.79

Chi;z = 0.79

Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.04 < 1

#### Profielgegevens staaf C33-V1 (0.000-1.565)

N88.9/4

Analyse

Staal S235H(EN10210-1) fyd(toegepast) = 235 N/mm2

h = 88.9 mm

A = 1.07e-03 m2

Wy;el = 216.7e-07 m3

Wy;pl = 288.5e-07 m3

b = 88.9 mm

Iy = 963.4e-09 m4

Wz;el = 216.7e-07 m3

Wz;pl = 288.5e-07 m3

tf = 4.0 mm

Iz = 963.4e-09 m4

Aw;y;el = 6.79e-04 m2

Aw;y;pl = 6.79e-04 m2

tw = 4.0 mm

Massa/m = 8.4 kg/m

Aw;z;el = 6.79e-04 m2

Aw;z;pl = 6.79e-04 m2

r = 40.4 mm

It = 192.7e-08 m4

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C33-V1 (0.000-1.565)

Maatgevende combinatie: Fu.C.32 op 0.000 m

Profielklasse = 1

Nx;Ed = 12.1 kN

Vy;Ed = 0.0 kN

My;Ed = 0.0 kNm

Vz;Ed = 0.1 kN

Mz;Ed = 0.0 kNm

Nc;Rd = 250.7 kN

Vy;Rd = 92.2 kN

My;Rd = 6.8 kNm

Vz;Rd = 92.2 kN

Mz;Rd = 6.8 kNm

NVy;Rd = 250.7 kN

NVz;Rd = 250.7 kN

MV;y;Rd = 6.8 kNm

MV;z;Rd = 6.8 kNm

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.5): UC = 0.05 < 1

#### Kiptoetsing C33-V1 (0.000-1.565)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.565 m     | lst = 1.565 m       |
| Lsys = 1.565 m                                               | Lg = 1.565 m           | S = 0.000 m          | lwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 1.565 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C33-V1 (0.000-1.565)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.65     |                    |                    |                   |
| N;Ed = -11.3 kN                     | Nb;Rd;y = 227.2 kN | Nb;Rd;z = 227.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.565 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.565 m  |
| Chi;y = 0.91                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.05 < 1 |                    |                    |                   |

#### Buiging & Druk C33-V1 (0.000-1.565)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.65          |                       | Profielklasse = 1     |             |
| N;Ed = -11.3 kN                          | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.967                              | Kyz = 0.611           | Kzy = 0.580           | Kzz = 1.018 |
| Chi;y = 0.91                             | Chi;z = 0.91          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.05 < 1 |                       |                       |             |

#### Profielgegevens staaf C35-V1 (0.000-2.409)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N244.5/6.3   | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 244.5 mm | A = 4.71e-03 m2     | Wy;el = 273.7e-06 m3   | Wy;pl = 357.5e-06 m3       |
| b = 244.5 mm | Iy = 334.6e-07 m4   | Wz;el = 273.7e-06 m3   | Wz;pl = 357.5e-06 m3       |
| tf = 6.3 mm  | Iz = 334.6e-07 m4   | Aw;y;el = 3.00e-03 m2  | Aw;y;pl = 3.00e-03 m2      |
| tw = 6.3 mm  | Massa/m = 37.0 kg/m | Aw;z;el = 3.00e-03 m2  | Aw;z;pl = 3.00e-03 m2      |
| r = 116.0 mm |                     | It = 669.2e-07 m4      | lwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C35-V1 (0.000-2.409)

|                                            |                     |                    |                    |
|--------------------------------------------|---------------------|--------------------|--------------------|
| Maatgevende combinatie: Fu.C.45 op 2.007 m |                     | Profielklasse = 1  |                    |
| Nx;Ed = -68.7 kN                           | Vy;Ed = 0.0 kN      | My;Ed = 0.2 kNm    |                    |
|                                            | Vz;Ed = -0.3 kN     | Mz;Ed = 0.0 kNm    |                    |
| Nc;Rd = 1,107.9 kN                         | Vy;Rd = 407.2 kN    | My;Rd = 84.0 kNm   |                    |
|                                            | Vz;Rd = 407.2 kN    | Mz;Rd = 84.0 kNm   |                    |
| NVy;Rd = 1,107.9 kN                        | NVz;Rd = 1,107.9 kN | MV;y;Rd = 84.0 kNm | MV;z;Rd = 84.0 kNm |
| NEN-EN1993-1-1(6.9): UC = 0.06 < 1         |                     |                    |                    |

#### Kiptoetsing C35-V1 (0.000-2.409)

|                                                        |  |                     |
|--------------------------------------------------------|--|---------------------|
| Equi. profiel: N244.5/6.3                              |  |                     |
| Maatgevende combinatie: Bi.C.1                         |  | Instab. curve Kip:d |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel |  |                     |
| Kipsteun bovenflens: N.v.t.                            |  |                     |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Tabel gebruikt NB.NB.1 (4)

Bovenflens maatgevend

Lsys = 2.409 m

C1 = 1.04

Mcr = 0.0 kNm

Chi;LT(Bi.C.1) = 1.00

Chi;LT,Z = 1.00

My;begin = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging

Beperk. eind: Gesteund

F = 0.0kN/m

Xb;lst = 0.000 m

Lg = 2.409 m

C2 = 0.42 (tabel)

kred = 1.0

M;Ed = 0.0 kNm

lkip = 2.409 m

My;eind = 0.0 kNm

b-eff(Begin) = 0.000

= 0.0

Xe;lst = 2.409 m

S = 0.000 m

C2(toegepast) = 0.00

Lam-rel = 0.00

b-eff(Eind) = 0.000

lst = 2.409 m

Iwa = 0.0000e+00 m6

C = 0.00

Profielklasse 1

UC(y) = 0.00

UC(z) = 0.00

#### Stabiliteitstoetsing C35-V1 (0.000-2.409)

Maatgevende combinatie: Fu.C.45

N;Ed = -68.7 kN

Methode Y = Cons. gesch.

Methode Z = Cons. gesch.

Chi;y = 0.98

Chi;z = 0.98

NEN-EN1993-1-1(6.46): UC = 0.06 < 1

Nb;Rd;y = 1,081.8 kN

Ca(y) = 0.000

Ca(z) = N/B

Nb;Rd;z = 1,081.8 kN

Cb(y) = 0.000

Cb(z) = N/B

Knikcurve: A

Knikcurve: A

Lknik Y = 2.409 m

Lbuc Z = 2.409 m

#### Buiging & Druk C35-V1 (0.000-2.409)

Maatgevende combinatie: Fu.C.45

N;Ed = -68.7 kN

My = 0.0 kNm

Mz = 0.0 kNm

Cmy = 0.95

Kyy = 0.956

Chi;y = 0.98

NEN-EN1993-1-1(6.61&6.62): UC = 0.07 < 1

My;Ed = 0.3 kNm

Delta;My;Ed = 0.0 kNm

My;Psi = 0.0 kNm

Mz;Psi = 0.0 kNm

Cmz = 1.00

Kyz = 0.604

Chi;z = 0.98

Profielklasse = 1

Mz;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My;s = 0.3 kNm

Mz;s = 0.0 kNm

CmLT = 0.95

Kzy = 0.574

Chi;LT = 1.00

Kzz = 1.007

#### Profielgegevens staaf C36-V1 (0.000-1.655)

N244.5/6.3

h = 244.5 mm

b = 244.5 mm

tf = 6.3 mm

tw = 6.3 mm

r = 116.0 mm

Analyse

A = 4.71e-03 m2

Iy = 334.6e-07 m4

Iz = 334.6e-07 m4

Massa/m = 37.0 kg/m

Staal S235H(EN10210-1)

Wy;el = 273.7e-06 m3

Wz;el = 273.7e-06 m3

Aw;y;el = 3.00e-03 m2

Aw;z;el = 3.00e-03 m2

It = 669.2e-07 m4

fyd(toegepast) = 235 N/mm2

Wy;pl = 357.5e-06 m3

Wz;pl = 357.5e-06 m3

Aw;y;pl = 3.00e-03 m2

Aw;z;pl = 3.00e-03 m2

Iwa = 0.0e-02 m6

#### Doorsnedetoetsing C36-V1 (0.000-1.655)

Maatgevende combinatie: Fu.C.40 op 0.000 m

N;Ed = -44.9 kN

N;Rd = 1,107.9 kN

NEN-EN1993-1-1(6.9): UC = 0.04 < 1

Vy;Ed = 0.0 kN

Vz;Ed = 0.3 kN

Vy;Rd = 407.2 kN

Vz;Rd = 407.2 kN

Profielklasse = 1

My;Ed = 0.0 kNm

Mz;Ed = 0.0 kNm

MyRd = 84.0 kNm

MzRd = 84.0 kNm

#### Kiptoetsing C36-V1 (0.000-1.655)

Equi. profiel: N244.5/6.3

Maatgevende combinatie: Bi.C.1

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Tabel gebruikt NB.NB.1 (4)

Bovenflens maatgevend

Lsys = 1.655 m

C1 = 1.04

Mcr = 0.0 kNm

Chi;LT(Bi.C.1) = 1.00

Beperk. eind: Gesteund

F = 0.0kN/m

Xb;lst = 0.000 m

Lg = 1.655 m

C2 = 0.42 (tabel)

kred = 1.0

M;Ed = 0.0 kNm

b-eff(Begin) = 0.000

= 0.0

Xe;lst = 1.655 m

S = 0.000 m

C2(toegepast) = 0.00

Lam-rel = 0.00

b-eff(Eind) = 0.000

lst = 1.655 m

Iwa = 0.0000e+00 m6

C = 0.00

Profielklasse 1

UC(y) = 0.00



|                                                              |                        |                        |                            |
|--------------------------------------------------------------|------------------------|------------------------|----------------------------|
|                                                              |                        |                        |                            |
|                                                              |                        |                        |                            |
|                                                              |                        |                        |                            |
| Chi;LT,Z = 1.00                                              | Ikip = 1.655 m         | UC(z) = 0.00           |                            |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                        |                            |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                        |                            |
| Stabiliteitstoetsing C36-V1 (0.000-1.655)                    |                        |                        |                            |
| Maatgevende combinatie: Fu.C.40                              |                        |                        |                            |
| N;Ed = -44.9 kN                                              | Nb;Rd;y = 1,105.7 kN   | Nb;Rd;z = 1,105.7 kN   |                            |
| Methode Y = Cons. gesch.                                     | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 1.655 m          |
| Methode Z = Cons. gesch.                                     | Ca(z) = N/B            | Cb(z) = N/B            | Lbuc Z = 1.655 m           |
| Chi;y = 1.00                                                 |                        | Knikcurve: A           |                            |
| Chi;z = 1.00                                                 |                        | Knikcurve: A           |                            |
| NEN-EN1993-1-1(6.46): UC = 0.04 < 1                          |                        |                        |                            |
| Buiging & Druk C36-V1 (0.000-1.655)                          |                        |                        |                            |
| Maatgevende combinatie: Fu.C.40                              |                        | Profielklasse = 1      |                            |
| N;Ed = -44.9 kN                                              | My;Ed = 0.1 kNm        | Mz;Ed = 0.0 kNm        |                            |
|                                                              | Delta;My;Ed = 0.0 kNm  | Delta;Mz;Ed = 0.0 kNm  |                            |
| My = 0.0 kNm                                                 | My;Psi = 0.0 kNm       | My;s = 0.1 kNm         |                            |
| Mz = 0.0 kNm                                                 | Mz;Psi = 0.0 kNm       | Mz;s = 0.0 kNm         |                            |
| Cmy = 0.95                                                   | Cmz = 1.00             | CmLT = 0.95            |                            |
| Kyy = 0.950                                                  | Kyz = 0.600            | Kzy = 0.570            | Kzz = 1.000                |
| Chi;y = 1.00                                                 | Chi;z = 1.00           | Chi;LT = 1.00          |                            |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.04 < 1                     |                        |                        |                            |
| Profielgegevens staaf C39-V1 (0.000-1.925)                   |                        |                        |                            |
| N88.9/4                                                      | Analyse                | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 88.9 mm                                                  | A = 1.07e-03 m2        | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm                                                  | Iy = 963.4e-09 m4      | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm                                                  | Iz = 963.4e-09 m4      | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm                                                  | Massa/m = 8.4 kg/m     | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm                                                  |                        | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |
| Doorsnedetoetsing C39-V1 (0.000-1.925)                       |                        |                        |                            |
| Maatgevende combinatie: Fu.C.32 op 1.925 m                   |                        | Profielklasse = 1      |                            |
| N;Ed = 18.7 kN                                               | Vy;Ed = 0.0 kN         | My;Ed = 0.0 kNm        |                            |
|                                                              | Vz;Ed = -0.1 kN        | Mz;Ed = 0.0 kNm        |                            |
| N;Rd = 250.7 kN                                              | Vy;Rd = 92.2 kN        | MyRd = 6.8 kNm         |                            |
|                                                              | Vz;Rd = 92.2 kN        | MzRd = 6.8 kNm         |                            |
| NEN-EN1993-1-1(6.5): UC = 0.07 < 1                           |                        |                        |                            |
| Kiptoetsing C39-V1 (0.000-1.925)                             |                        |                        |                            |
| Equi. profiel: N88.9/4                                       |                        | Instab. curve Kip:d    |                            |
| Maatgevende combinatie: Bi.C.1                               |                        |                        |                            |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                        |                            |
| Kipsteun bovenflens: N.v.t.                                  |                        |                        |                            |
| Kipsteun onderflens: N.v.t.                                  |                        |                        |                            |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000   | b-eff(Eind) = 0.000        |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                  |                            |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.925 m       | lst = 1.925 m              |
| Lsys = 1.925 m                                               | Lg = 1.925 m           | S = 0.000 m            | Iwa = 0.0000e+00 m6        |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00   | C = 0.00                   |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00         | Profielklasse 1            |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                        | UC(y) = 0.00               |
| Chi;LT,Z = 1.00                                              | Ikip = 1.925 m         |                        | UC(z) = 0.00               |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                        |                            |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                        |                            |
| Stabiliteitstoetsing C39-V1 (0.000-1.925)                    |                        |                        |                            |
| Maatgevende combinatie: Fu.C.65                              |                        |                        |                            |
| N;Ed = -9.7 kN                                               | Nb;Rd;y = 214.6 kN     | Nb;Rd;z = 214.6 kN     |                            |
| Methode Y = Cons. gesch.                                     | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 1.925 m          |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Methode Z = Cons. gesch. Ca(z) = N/B Cb(z) = N/B Lbuc Z = 1.925 m  
Chi;y = 0.86 Knikcurve: A  
Chi;z = 0.86 Knikcurve: A  
NEN-EN1993-1-1(6.46): UC = 0.05 < 1

#### Buiging & Druk C39-V1 (0.000-1.925)

|                                          |                       |                       |
|------------------------------------------|-----------------------|-----------------------|
| Maatgevende combinatie: Fu.C.65          |                       | Profielklasse = 1     |
| N;Ed = -9.7 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |
| Kyy = 0.971                              | Kyz = 0.613           | Kzy = 0.582           |
| Chi;y = 0.86                             | Chi;z = 0.86          | Chi;LT = 1.00         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.05 < 1 |                       | Kzz = 1.022           |

#### Profielgegevens staaf C41-V1 (0.000-1.539)

|             |                    |                        |                            |
|-------------|--------------------|------------------------|----------------------------|
| N88.9/4     | Analyse            | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 88.9 mm | A = 1.07e-03 m2    | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm | Iy = 963.4e-09 m4  | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm | Iz = 963.4e-09 m4  | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm | Massa/m = 8.4 kg/m | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm |                    | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C41-V1 (0.000-1.539)

|                                            |                 |                   |
|--------------------------------------------|-----------------|-------------------|
| Maatgevende combinatie: Fu.C.45 op 1.539 m |                 | Profielklasse = 1 |
| N;Ed = 24.8 kN                             | Vy;Ed = 0.0 kN  | My;Ed = 0.0 kNm   |
|                                            | Vz;Ed = -0.1 kN | Mz;Ed = 0.0 kNm   |
| N;Rd = 250.7 kN                            | Vy;Rd = 92.2 kN | MyRd = 6.8 kNm    |
|                                            | Vz;Rd = 92.2 kN | MzRd = 6.8 kNm    |
| NEN-EN1993-1-1(6.5): UC = 0.10 < 1         |                 |                   |

#### Kiptoetsing C41-V1 (0.000-1.539)

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                                                 |                        | Instab. curve Kip:d  |                     |
| Maatgevende combinatie: Bi.C.1                                                         |                        |                      |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                                            |                        |                      |                     |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (1)                                                             | M = 0.0kN/m            | MBeta = 0.0          |                     |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 1.539 m     | Ist = 1.539 m       |
| Lsys = 1.539 m                                                                         | Lg = 1.539 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 2.04                                                                              | C2 = 0.00 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | Ikip = 1.539 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                                                     | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

#### Profielgegevens staaf C42-V1 (0.000-1.539)

|             |                    |                        |                            |
|-------------|--------------------|------------------------|----------------------------|
| N88.9/4     | Analyse            | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 88.9 mm | A = 1.07e-03 m2    | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm | Iy = 963.4e-09 m4  | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm | Iz = 963.4e-09 m4  | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm | Massa/m = 8.4 kg/m | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm |                    | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C42-V1 (0.000-1.539)

|                                            |                |                   |
|--------------------------------------------|----------------|-------------------|
| Maatgevende combinatie: Fu.C.31 op 1.539 m |                | Profielklasse = 1 |
| Nx;Ed = -19.4 kN                           | Vy;Ed = 0.0 kN | My;Ed = 0.1 kNm   |
|                                            | Vz;Ed = 0.0 kN | Mz;Ed = 0.0 kNm   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Nc;Rd = 250.7 kN  
 Vy;Rd = 92.2 kN  
 My;Rd = 6.8 kNm  
 NVy;Rd = 250.7 kN  
 Vz;Rd = 92.2 kN  
 Mz;Rd = 6.8 kNm  
 NEN-EN1993-1-1(6.9): UC = 0.08 < 1  
 NVz;Rd = 250.7 kN  
 MVy;Rd = 6.8 kNm  
 MVz;Rd = 6.8 kNm

#### Kiptoetsing C42-V1 (0.000-1.539)

Equi. profiel: N88.9/4  
 Maatgevende combinatie: Bi.C.1  
 Aangrijphoogte van de last: 0.000 m vanaf hart profiel  
 Kipsteun bovenflens: N.v.t.  
 Kipsteun onderflens: N.v.t.  
 Inklem. begin: Gesteund  
 Beperk. eind: Gesteund  
 b-eff(Begin) = 0.000  
 b-eff(Eind) = 0.000  
 Tabel gebruikt NB.NB.1 (1)  
 M = 0.0kN/m  
 MBeta = 0.0  
 Bovenflens maatgevend  
 Xb;lst = 0.000 m  
 Xe;lst = 1.539 m  
 Ist = 1.539 m  
 Lsys = 1.539 m  
 Lg = 1.539 m  
 S = 0.000 m  
 Iwa = 0.0000e+00 m6  
 C1 = 2.26  
 C2 = 0.00 (tabel)  
 C2(toegepast) = 0.00  
 C = 0.00  
 Mcr = 0.0 kNm  
 kred = 1.0  
 Lam-rel = 0.00  
 Profielklasse 1  
 Chi;LT(Bi.C.1) = 1.00  
 M;Ed = 0.0 kNm  
 UC(y) = 0.00  
 Chi;LT,Z = 1.00  
 Ikip = 1.539 m  
 UC(z) = 0.00  
 My;begin = 0.0 kNm  
 My;eind = 0.0 kNm  
 NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C42-V1 (0.000-1.539)

Maatgevende combinatie: Fu.C.41  
 N;Ed = -18.4 kN  
 Nb;Rd;y = 228.0 kN  
 Nb;Rd;z = 228.0 kN  
 Methode Y = Cons. gesch.  
 Ca(y) = 0.000  
 Cb(y) = 0.000  
 Lknik Y = 1.539 m  
 Methode Z = Cons. gesch.  
 Ca(z) = N/B  
 Cb(z) = N/B  
 Lbuc Z = 1.539 m  
 Chi;y = 0.91  
 Knikcurve: A  
 Chi;z = 0.91  
 Knikcurve: A  
 NEN-EN1993-1-1(6.46): UC = 0.08 < 1

#### Buiging & Druk C42-V1 (0.000-1.539)

Maatgevende combinatie: Fu.C.41  
 N;Ed = -18.4 kN  
 My;Ed = 0.1 kNm  
 Mz;Ed = 0.0 kNm  
 Delta;My;Ed = 0.0 kNm  
 My = 0.1 kNm  
 My;Psi = 0.0 kNm  
 My;s = 0.1 kNm  
 Mz = 0.0 kNm  
 Mz;Psi = 0.0 kNm  
 Mz;s = 0.0 kNm  
 Crny = 0.63  
 Cmz = 1.00  
 CmLT = 0.63  
 Kyy = 0.652  
 Kyz = 0.617  
 Kzy = 0.391  
 Kzz = 1.028  
 Chi;y = 0.91  
 Chi;z = 0.91  
 Chi;LT = 1.00  
 NEN-EN1993-1-1(6.61&6.62): UC = 0.09 < 1

#### Profielgegevens staaf C43-V1 (0.000-1.539)

N88.9/4  
 Analyse  
 Staal S235H(EN10210-1)  
 fyd(toegepast) = 235 N/mm2  
 h = 88.9 mm  
 A = 1.07e-03 m2  
 Wy;el = 216.7e-07 m3  
 Wy;pl = 288.5e-07 m3  
 b = 88.9 mm  
 Iy = 963.4e-09 m4  
 Wz;el = 216.7e-07 m3  
 Wz;pl = 288.5e-07 m3  
 tf = 4.0 mm  
 Iz = 963.4e-09 m4  
 Aw;y;el = 6.79e-04 m2  
 Aw;y;pl = 6.79e-04 m2  
 tw = 4.0 mm  
 Massa/m = 8.4 kg/m  
 Aw;z;el = 6.79e-04 m2  
 Aw;z;pl = 6.79e-04 m2  
 r = 40.4 mm  
 It = 192.7e-08 m4  
 Iwa = 0.0e-02 m6

#### Doorsnedetoetsing C43-V1 (0.000-1.539)

Maatgevende combinatie: Fu.C.42 op 1.539 m  
 Profielklasse = 1  
 N;Ed = 19.5 kN  
 Vy;Ed = 0.0 kN  
 My;Ed = -0.1 kNm  
 Vz;Ed = -0.2 kN  
 Mz;Ed = 0.0 kNm  
 N;Rd = 250.7 kN  
 Vy;Rd = 92.2 kN  
 MyRd = 6.8 kNm  
 Vz;Rd = 92.2 kN  
 MzRd = 6.8 kNm  
 NEN-EN1993-1-1(6.5): UC = 0.08 < 1

#### Kiptoetsing C43-V1 (0.000-1.539)

Equi. profiel: N88.9/4  
 Maatgevende combinatie: Bi.C.1  
 Instab. curve Kip:d

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (1)

M = 0.0kN/m

MBeta = 0.0

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 1.539 m

lst = 1.539 m

Lsys = 1.539 m

Lg = 1.539 m

S = 0.000 m

lwa = 0.0000e+00 m6

C1 = 2.17

C2 = 0.00 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.0 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 1.539 m

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C43-V1 (0.000-1.539)

Maatgevende combinatie: Fu.C.56

N;Ed = -12.0 kN

Nb;Rd;y = 228.0 kN

Nb;Rd;z = 228.0 kN

Methode Y = Cons. gesch.

Ca(y) = 0.000

Cb(y) = 0.000

Lknik Y = 1.539 m

Methode Z = Cons. gesch.

Ca(z) = N/B

Cb(z) = N/B

Lbuc Z = 1.539 m

Chi;y = 0.91

Knikcurve: A

Chi;z = 0.91

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.05 < 1

#### Buiging & Druk C43-V1 (0.000-1.539)

Maatgevende combinatie: Fu.C.56

N;Ed = -12.0 kN

My;Ed = 0.2 kNm

Profielklasse = 1

Mz;Ed = 0.0 kNm

Delta;My;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = -0.2 kNm

My;Psi = 0.0 kNm

My;s = -0.1 kNm

Mz = 0.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 0.0 kNm

Cmy = 0.46

Cmz = 1.00

CmLT = 0.46

Kyy = 0.465

Kyz = 0.611

Kzy = 0.279

Kzz = 1.018

Chi;y = 0.91

Chi;z = 0.91

Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.06 < 1

#### Profielgegevens staaf C44-V1 (0.000-4.406)

N219.1/6.3

Analyse

Staal S235H(EN10210-1)

fyd(toegepast) = 235 N/mm2

h = 219.1 mm

A = 4.21e-03 m2

Wy;el = 217.8e-06 m3

Wy;pl = 285.4e-06 m3

b = 219.1 mm

Iy = 238.6e-07 m4

Wz;el = 217.8e-06 m3

Wz;pl = 285.4e-06 m3

tf = 6.3 mm

Iz = 238.6e-07 m4

Aw;y;el = 2.68e-03 m2

Aw;y;pl = 2.68e-03 m2

tw = 6.3 mm

Massa/m = 33.1 kg/m

Aw;z;el = 2.68e-03 m2

Aw;z;pl = 2.68e-03 m2

r = 103.2 mm

It = 477.2e-07 m4

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C44-V1 (0.000-4.406)

Maatgevende combinatie: Fu.C.36 op 2.937 m

Nx;Ed = -119.4 kN

Vy;Ed = 5.0 kN

Profielklasse = 1

My;Ed = -12.7 kNm

Vz;Ed = 5.9 kN

Mz;Ed = 9.0 kNm

Nc;Rd = 989.8 kN

Vy;Rd = 363.8 kN

My;Rd = 67.1 kNm

Vz;Rd = 363.8 kN

Mz;Rd = 67.1 kNm

NVy;Rd = 989.8 kN

NVz;Rd = 989.8 kN

MV;y;Rd = 67.1 kNm

MV;z;Rd = 67.1 kNm

$\alpha$  1 = 2.000

$\beta$  1 = 1.000

MNV;y;Rd = 67.1 kNm

q(y) = 1.030

$\alpha$  2 = 2.000

$\beta$  2 = 1.000

MNV;z;Rd = 67.1kNm

q(z) = 1.030

NEN-EN1993-1-1(NB.33): UC = 0.25 < 1

#### Kiptoetsing C44-V1 (0.000-4.406)

Equi. profiel: N219.1/6.3

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.002

b-eff(Eind) = 0.001

Tabel gebruikt NB.NB.7

M = -1.5kN/m

MBeta = -0.7

F = 2.0

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                                                                        |                    |                      |                     |
|----------------------------------------------------------------------------------------|--------------------|----------------------|---------------------|
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m   | Xe;lst = 4.406 m     | lst = 4.406 m       |
| Lsys = 4.406 m                                                                         | Lg = 4.406 m       | S = 0.000 m          | lwa = 0.0000e+00 m6 |
| C1 = 2.21                                                                              | C2 = 1.29 (tabel)  | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0         | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 3.8 kNm     |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | lkip = 4.406 m     |                      | UC(z) = 0.00        |
| My;begin = -0.7 kNm                                                                    | My;eind = -1.5 kNm |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                    |                      |                     |

#### Stabiliteitstoetsing C44-V1 (0.000-4.406)

Maatgevende combinatie: Fu.C.41

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -122.4 kN                    | Nb;Rd;y = 871.9 kN | Nb;Rd;z = 496.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 4.406 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 8.812 m  |
| Chi;y = 0.88                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.50                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.25 < 1 |                    |                    |                   |

#### Buiging & Druk C44-V1 (0.000-4.406)

Maatgevende combinatie: Fu.C.41

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -122.4 kN                         | My;Ed = 12.6 kNm      | Profielklasse = 1     |             |
|                                          | Delta;My;Ed = 0.0 kNm | Mz;Ed = 9.0 kNm       |             |
|                                          |                       | Delta;Mz;Ed = 0.0 kNm |             |
| My = -6.9 kNm                            | My;Psi = -2.6 kNm     | My;s = 0.5 kNm        |             |
| Mz = 9.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 4.5 kNm        |             |
| Cmy = 0.40                               | Cmz = 0.60            | CmLT = 0.40           |             |
| Kyy = 0.424                              | Kyz = 0.431           | Kzy = 0.254           | Kzz = 0.718 |
| Chi;y = 0.88                             | Chi;z = 0.50          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.39 < 1 |                       |                       |             |

#### Profielgegevens staaf C45-V1 (0.000-1.539)

|             |                    |                        |                            |
|-------------|--------------------|------------------------|----------------------------|
| N88.9/4     | Analyse            | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 88.9 mm | A = 1.07e-03 m2    | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm | Iy = 963.4e-09 m4  | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm | Iz = 963.4e-09 m4  | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm | Massa/m = 8.4 kg/m | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm |                    | It = 192.7e-08 m4      | lwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C45-V1 (0.000-1.539)

Maatgevende combinatie: Fu.C.34 op 0.000 m

|                                    |                   |                   |                   |
|------------------------------------|-------------------|-------------------|-------------------|
| Nx;Ed = 15.0 kN                    | Vy;Ed = 0.0 kN    | My;Ed = 0.0 kNm   |                   |
|                                    | Vz;Ed = 0.0 kN    | Mz;Ed = 0.0 kNm   |                   |
| Nc;Rd = 250.7 kN                   | Vy;Rd = 92.2 kN   | My;Rd = 6.8 kNm   |                   |
|                                    | Vz;Rd = 92.2 kN   | Mz;Rd = 6.8 kNm   |                   |
| NVy;Rd = 250.7 kN                  | NVz;Rd = 250.7 kN | MV;y;Rd = 6.8 kNm | MV;z;Rd = 6.8 kNm |
| NEN-EN1993-1-1(6.5): UC = 0.06 < 1 |                   |                   |                   |

#### Kiptoetsing C45-V1 (0.000-1.539)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (1)

MBeta = 0.0

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 1.539 m

lst = 1.539 m

Lsys = 1.539 m

Lg = 1.539 m

S = 0.000 m

lwa = 0.0000e+00 m6

C1 = 2.04

C2 = 0.00 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.0 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 1.539 m

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = 0.0 kNm

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C45-V1 (0.000-1.539)

Maatgevende combinatie: Fu.C.64

|                          |                    |                    |                   |
|--------------------------|--------------------|--------------------|-------------------|
| N;Ed = -9.8 kN           | Nb;Rd;y = 228.0 kN | Nb;Rd;z = 228.0 kN |                   |
| Methode Y = Cons. gesch. | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.539 m |
| Methode Z = Cons. gesch. | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.539 m  |
| Chi;y = 0.91             |                    | Knikcurve: A       |                   |
| Chi;z = 0.91             |                    | Knikcurve: A       |                   |

NEN-EN1993-1-1(6.46): UC = 0.04 < 1

#### Buiging & Druk C45-V1 (0.000-1.539)

Maatgevende combinatie: Fu.C.64

|                |                       |                       |             |
|----------------|-----------------------|-----------------------|-------------|
| N;Ed = -9.8 kN | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm   | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm   | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.40     | Cmz = 1.00            | CmLT = 0.40           |             |
| Kyy = 0.406    | Kyz = 0.609           | Kzy = 0.244           | Kzz = 1.015 |
| Chi;y = 0.91   | Chi;z = 0.91          | Chi;LT = 1.00         |             |

NEN-EN1993-1-1(6.61&6.62): UC = 0.05 < 1

#### Profielgegevens staaf C47-V1 (0.000-1.310)

|                         |                               |                                   |                                                     |
|-------------------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                       | Staal S235H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>   | Wy;el = 216.7e-07 m <sup>3</sup>  | Wy;pl = 288.5e-07 m <sup>3</sup>                    |
| b = 88.9 mm             | Iy = 963.4e-09 m <sup>4</sup> | Wz;el = 216.7e-07 m <sup>3</sup>  | Wz;pl = 288.5e-07 m <sup>3</sup>                    |
| t <sub>f</sub> = 4.0 mm | Iz = 963.4e-09 m <sup>4</sup> | Aw;y;el = 6.79e-04 m <sup>2</sup> | Aw;y;pl = 6.79e-04 m <sup>2</sup>                   |
| tw = 4.0 mm             | Massa/m = 8.4 kg/m            | Aw;z;el = 6.79e-04 m <sup>2</sup> | Aw;z;pl = 6.79e-04 m <sup>2</sup>                   |
| r = 40.4 mm             |                               | It = 192.7e-08 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C47-V1 (0.000-1.310)

Maatgevende combinatie: Fu.C.36 op 1.201 m

|                 |                 |                 |
|-----------------|-----------------|-----------------|
| N;Ed = -43.1 kN | Vy;Ed = 0.0 kN  | My;Ed = 0.6 kNm |
|                 | Vz;Ed = 0.6 kN  | Mz;Ed = 0.0 kNm |
| N;Rd = 250.7 kN | Vy;Rd = 92.2 kN | MyRd = 6.8 kNm  |
|                 | Vz;Rd = 92.2 kN | MzRd = 6.8 kNm  |

NEN-EN1993-1-1(6.9): UC = 0.17 < 1

#### Kiptoetsing C47-V1 (0.000-1.310)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (1)

M = 0.2kN/m

MBeta = -0.1

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 1.310 m

lst = 1.310 m

Lsys = 1.310 m

Lg = 1.310 m

S = 0.000 m

Iwa = 0.0000e+00 m<sup>6</sup>

C1 = 2.08

C2 = 0.00 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.2 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 1.310 m

UC(z) = 0.00

My;begin = -0.1 kNm

My;eind = 0.2 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C47-V1 (0.000-1.310)

Maatgevende combinatie: Fu.C.36

|                          |                    |                    |                   |
|--------------------------|--------------------|--------------------|-------------------|
| N;Ed = -43.1 kN          | Nb;Rd;y = 234.4 kN | Nb;Rd;z = 234.4 kN |                   |
| Methode Y = Cons. gesch. | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.310 m |
| Methode Z = Cons. gesch. | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.310 m  |
| Chi;y = 0.94             |                    | Knikcurve: A       |                   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Chi;z = 0.94

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.18 < 1

#### Buiging & Druk C47-V1 (0.000-1.310)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.36          |                       | Profielklasse = 1     |             |
| N;Ed = -43.1 kN                          | My;Ed = 0.7 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.7 kNm                             | My;Psi = -0.2 kNm     | My;s = 0.3 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.51                               | Cmz = 1.00            | CmLT = 0.51           |             |
| Kyy = 0.533                              | Kyz = 0.629           | Kzy = 0.320           | Kzz = 1.049 |
| Chi;y = 0.94                             | Chi;z = 0.94          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.24 < 1 |                       |                       |             |

#### Profielgegevens staaf C49-V1 (0.000-1.755)

|              |                               |                                   |                                                     |
|--------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N244.5/6.3   | Analyse                       | Staal S235H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 244.5 mm | A = 4.71e-03 m <sup>2</sup>   | Wy;el = 273.7e-06 m <sup>3</sup>  | Wy;pl = 357.5e-06 m <sup>3</sup>                    |
| b = 244.5 mm | Iy = 334.6e-07 m <sup>4</sup> | Wz;el = 273.7e-06 m <sup>3</sup>  | Wz;pl = 357.5e-06 m <sup>3</sup>                    |
| tf = 6.3 mm  | Iz = 334.6e-07 m <sup>4</sup> | Aw;y;el = 3.00e-03 m <sup>2</sup> | Aw;y;pl = 3.00e-03 m <sup>2</sup>                   |
| tw = 6.3 mm  | Massa/m = 37.0 kg/m           | Aw;z;el = 3.00e-03 m <sup>2</sup> | Aw;z;pl = 3.00e-03 m <sup>2</sup>                   |
| r = 116.0 mm |                               | It = 669.2e-07 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C49-V1 (0.000-1.755)

|                                            |                     |                    |                    |
|--------------------------------------------|---------------------|--------------------|--------------------|
| Maatgevende combinatie: Fu.C.43 op 1.755 m |                     | Profielklasse = 1  |                    |
| Nx;Ed = -61.7 kN                           | Vy;Ed = 0.0 kN      | My;Ed = 0.0 kNm    |                    |
|                                            | Vz;Ed = -0.3 kN     | Mz;Ed = 0.0 kNm    |                    |
| Nc;Rd = 1,107.9 kN                         | Vy;Rd = 407.2 kN    | My;Rd = 84.0 kNm   |                    |
|                                            | Vz;Rd = 407.2 kN    | Mz;Rd = 84.0 kNm   |                    |
| NVy;Rd = 1,107.9 kN                        | NVz;Rd = 1,107.9 kN | MV;y;Rd = 84.0 kNm | MV;z;Rd = 84.0 kNm |
| NEN-EN1993-1-1(6.9): UC = 0.06 < 1         |                     |                    |                    |

#### Kiptoetsing C49-V1 (0.000-1.755)

|                                                              |                        |                      |                                 |
|--------------------------------------------------------------|------------------------|----------------------|---------------------------------|
| Equi. profiel: N244.5/6.3                                    |                        |                      |                                 |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                                 |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                                 |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                                 |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                                 |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000             |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                                 |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.755 m     | lst = 1.755 m                   |
| Lsys = 1.755 m                                               | Lg = 1.755 m           | S = 0.000 m          | Iwa = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00                        |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1                 |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00                    |
| Chi;LT,Z = 1.00                                              | Ikip = 1.755 m         |                      | UC(z) = 0.00                    |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                                 |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                                 |

#### Stabiliteitstoetsing C49-V1 (0.000-1.755)

|                                     |                      |                      |                   |
|-------------------------------------|----------------------|----------------------|-------------------|
| Maatgevende combinatie: Fu.C.43     |                      |                      |                   |
| N;Ed = -61.7 kN                     | Nb;Rd;y = 1,102.6 kN | Nb;Rd;z = 1,102.6 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000        | Cb(y) = 0.000        | Lknik Y = 1.755 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B          | Cb(z) = N/B          | Lbuc Z = 1.755 m  |
| Chi;y = 1.00                        |                      | Knikcurve: A         |                   |
| Chi;z = 1.00                        |                      | Knikcurve: A         |                   |
| NEN-EN1993-1-1(6.46): UC = 0.06 < 1 |                      |                      |                   |

#### Buiging & Druk C49-V1 (0.000-1.755)

|                                 |                       |                       |  |
|---------------------------------|-----------------------|-----------------------|--|
| Maatgevende combinatie: Fu.C.43 |                       | Profielklasse = 1     |  |
| N;Ed = -61.7 kN                 | My;Ed = 0.1 kNm       | Mz;Ed = 0.0 kNm       |  |
|                                 | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |  |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                          |                  |                |             |
|------------------------------------------|------------------|----------------|-------------|
| My = 0.0 kNm                             | My;Psi = 0.0 kNm | My;s = 0.1 kNm |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm | Mz;s = 0.0 kNm |             |
| Cmy = 0.95                               | Cmz = 1.00       | CmLT = 0.95    |             |
| Kyy = 0.951                              | Kyz = 0.601      | Kzy = 0.571    | Kzz = 1.001 |
| Chi;y = 1.00                             | Chi;z = 1.00     | Chi;LT = 1.00  |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.06 < 1 |                  |                |             |

#### Profielgegevens staaf C50-V1 (0.000-2.641)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N244.5/6.3   | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 244.5 mm | A = 4.71e-03 m2     | Wy;el = 273.7e-06 m3   | Wy;pl = 357.5e-06 m3       |
| b = 244.5 mm | Iy = 334.6e-07 m4   | Wz;el = 273.7e-06 m3   | Wz;pl = 357.5e-06 m3       |
| tf = 6.3 mm  | Iz = 334.6e-07 m4   | Aw;y;el = 3.00e-03 m2  | Aw;y;pl = 3.00e-03 m2      |
| tw = 6.3 mm  | Massa/m = 37.0 kg/m | Aw;z;el = 3.00e-03 m2  | Aw;z;pl = 3.00e-03 m2      |
| r = 116.0 mm |                     | It = 669.2e-07 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C50-V1 (0.000-2.641)

|                                            |                  |                   |  |
|--------------------------------------------|------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.43 op 0.000 m |                  | Profielklasse = 1 |  |
| N;Ed = -143.7 kN                           | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |  |
|                                            | Vz;Ed = 0.2 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 1,107.9 kN                          | Vy;Rd = 407.2 kN | MyRd = 84.0 kNm   |  |
|                                            | Vz;Rd = 407.2 kN | MzRd = 84.0 kNm   |  |
| NEN-EN1993-1-1(6.9): UC = 0.13 < 1         |                  |                   |  |

#### Kiptoetsing C50-V1 (0.000-2.641)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N244.5/6.3                                    |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 2.641 m     | lst = 2.641 m       |
| Lsys = 2.641 m                                               | Lg = 2.641 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 2.641 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C50-V1 (0.000-2.641)

|                                     |                      |                      |                   |
|-------------------------------------|----------------------|----------------------|-------------------|
| Maatgevende combinatie: Fu.C.43     |                      |                      |                   |
| N;Ed = -143.7 kN                    | Nb;Rd;y = 1,074.1 kN | Nb;Rd;z = 1,074.1 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000        | Cb(y) = 0.000        | Lknik Y = 2.641 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B          | Cb(z) = N/B          | Lbuc Z = 2.641 m  |
| Chi;y = 0.97                        |                      | Knikcurve: A         |                   |
| Chi;z = 0.97                        |                      | Knikcurve: A         |                   |
| NEN-EN1993-1-1(6.46): UC = 0.13 < 1 |                      |                      |                   |

#### Buiging & Druk C50-V1 (0.000-2.641)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.43          |                       | Profielklasse = 1     |             |
| N;Ed = -143.7 kN                         | My;Ed = 0.1 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.1 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.967                              | Kyz = 0.611           | Kzy = 0.580           | Kzz = 1.018 |
| Chi;y = 0.97                             | Chi;z = 0.97          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.14 < 1 |                       |                       |             |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C51-V1 (0.000-2.144)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S235H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | W <sub>z</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | A <sub>w</sub> ;y;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 6.79e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | A <sub>w</sub> ;z;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 6.79e-04 m <sup>2</sup>      |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C51-V1 (0.000-2.144)

|                                            |                              |                               |  |
|--------------------------------------------|------------------------------|-------------------------------|--|
| Maatgevende combinatie: Fu.C.43 op 0.000 m |                              | Profielklasse = 1             |  |
| N <sub>i</sub> ;Ed = 84.9 kN               | V <sub>y</sub> ;Ed = 0.0 kN  | M <sub>y</sub> ;Ed = -0.1 kNm |  |
|                                            | V <sub>z</sub> ;Ed = 0.3 kN  | M <sub>z</sub> ;Ed = 0.0 kNm  |  |
| N <sub>i</sub> ;Rd = 250.7 kN              | V <sub>y</sub> ;Rd = 92.2 kN | M <sub>y</sub> Rd = 6.8 kNm   |  |
|                                            | V <sub>z</sub> ;Rd = 92.2 kN | M <sub>z</sub> Rd = 6.8 kNm   |  |
| NEN-EN1993-1-1(6.5): UC = 0.34 < 1         |                              |                               |  |

#### Kipptoetsing C51-V1 (0.000-2.144)

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                                                 |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                                                         |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                                            |                        |                      |                     |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (1)                                                             | M = 0.2kN/m            | MBeta = 0.0          |                     |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 2.144 m     | lst = 2.144 m       |
| Lsys = 2.144 m                                                                         | Lg = 2.144 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.87                                                                              | C2 = 0.00 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.2 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | Ikip = 2.144 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                                                     | My;eind = 0.2 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

#### Stabiliteitstoetsing C51-V1 (0.000-2.144)

|                                     |                                 |                                 |                               |
|-------------------------------------|---------------------------------|---------------------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.54     |                                 |                                 |                               |
| N <sub>i</sub> ;Ed = -16.1 kN       | N <sub>b</sub> ;Rd;y = 205.1 kN | N <sub>b</sub> ;Rd;z = 205.1 kN |                               |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000                   | Cb(y) = 0.000                   | L <sub>knik</sub> Y = 2.144 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B                     | Cb(z) = N/B                     | L <sub>buc</sub> Z = 2.144 m  |
| Chi;y = 0.82                        |                                 | K <sub>nik</sub> curve: A       |                               |
| Chi;z = 0.82                        |                                 | K <sub>nik</sub> curve: A       |                               |
| NEN-EN1993-1-1(6.46): UC = 0.08 < 1 |                                 |                                 |                               |

#### Buiging & Druk C51-V1 (0.000-2.144)

|                                          |                                    |                                    |                         |
|------------------------------------------|------------------------------------|------------------------------------|-------------------------|
| Maatgevende combinatie: Fu.C.54          |                                    | Profielklasse = 1                  |                         |
| N <sub>i</sub> ;Ed = -16.1 kN            | M <sub>y</sub> ;Ed = 0.1 kNm       | M <sub>z</sub> ;Ed = 0.0 kNm       |                         |
|                                          | Delta;M <sub>y</sub> ;Ed = 0.0 kNm | Delta;M <sub>z</sub> ;Ed = 0.0 kNm |                         |
| M <sub>y</sub> = -0.1 kNm                | M <sub>y</sub> ;Psi = 0.0 kNm      | M <sub>y</sub> ;s = -0.1 kNm       |                         |
| M <sub>z</sub> = 0.0 kNm                 | M <sub>z</sub> ;Psi = 0.0 kNm      | M <sub>z</sub> ;s = 0.0 kNm        |                         |
| C <sub>m</sub> y = 0.62                  | C <sub>m</sub> z = 1.00            | C <sub>m</sub> LT = 0.62           |                         |
| K <sub>yy</sub> = 0.644                  | K <sub>yz</sub> = 0.626            | K <sub>zy</sub> = 0.386            | K <sub>zz</sub> = 1.044 |
| Chi;y = 0.82                             | Chi;z = 0.82                       | Chi;LT = 1.00                      |                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.09 < 1 |                                    |                                    |                         |

#### Profielgegevens staaf C54-V1 (0.000-1.469)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N219.1/6.3              | Analyse                                   | Staal S235H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 219.1 mm            | A = 4.21e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 217.8e-06 m <sup>3</sup>  | W <sub>y</sub> ;pl = 285.4e-06 m <sup>3</sup>       |
| b = 219.1 mm            | I <sub>y</sub> = 238.6e-07 m <sup>4</sup> | W <sub>z</sub> ;el = 217.8e-06 m <sup>3</sup>  | W <sub>z</sub> ;pl = 285.4e-06 m <sup>3</sup>       |
| t <sub>f</sub> = 6.3 mm | I <sub>z</sub> = 238.6e-07 m <sup>4</sup> | A <sub>w</sub> ;y;el = 2.68e-03 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 2.68e-03 m <sup>2</sup>      |
| t <sub>w</sub> = 6.3 mm | Massa/m = 33.1 kg/m                       | A <sub>w</sub> ;z;el = 2.68e-03 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 2.68e-03 m <sup>2</sup>      |
| r = 103.2 mm            |                                           | I <sub>t</sub> = 477.2e-07 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Doorsnedetoetsing C54-V1 (0.000-1.469)

Maatgevende combinatie: Fu.C.43 op 0.000 m

Profielklasse = 1

N;Ed = -61.1 kN

Vy;Ed = 0.0 kN

My;Ed = -8.3 kNm

Vz;Ed = 10.7 kN

Mz;Ed = 0.0 kNm

N;Rd = 989.8 kN

Vy;Rd = 363.8 kN

MyRd = 67.1 kNm

Vz;Rd = 363.8 kN

MzRd = 67.1 kNm

NEN-EN1993-1-1(NB.33): UC = 0.13 < 1

#### Profielgegevens staaf C56-V1 (0.000-1.815)

N88.9/4

Analyse

Staal S235H(EN10210-1)

f<sub>yd</sub>(toegepast) = 235 N/mm<sup>2</sup>

h = 88.9 mm

A = 1.07e-03 m<sup>2</sup>

Wy;el = 216.7e-07 m<sup>3</sup>

Wy;pl = 288.5e-07 m<sup>3</sup>

b = 88.9 mm

I<sub>y</sub> = 963.4e-09 m<sup>4</sup>

Wz;el = 216.7e-07 m<sup>3</sup>

Wz;pl = 288.5e-07 m<sup>3</sup>

t<sub>f</sub> = 4.0 mm

I<sub>z</sub> = 963.4e-09 m<sup>4</sup>

Aw;y;el = 6.79e-04 m<sup>2</sup>

Aw;y;pl = 6.79e-04 m<sup>2</sup>

t<sub>w</sub> = 4.0 mm

Massa/m = 8.4 kg/m

Aw;z;el = 6.79e-04 m<sup>2</sup>

Aw;z;pl = 6.79e-04 m<sup>2</sup>

r = 40.4 mm

I<sub>t</sub> = 192.7e-08 m<sup>4</sup>

I<sub>wa</sub> = 0.0e-02 m<sup>6</sup>

#### Doorsnedetoetsing C56-V1 (0.000-1.815)

Maatgevende combinatie: Fu.C.43 op 1.815 m

Profielklasse = 1

Nx;Ed = 17.5 kN

Vy;Ed = 0.0 kN

My;Ed = -0.1 kNm

Vz;Ed = 0.0 kN

Mz;Ed = 0.0 kNm

Nc;Rd = 250.7 kN

Vy;Rd = 92.2 kN

My;Rd = 6.8 kNm

Vz;Rd = 92.2 kN

Mz;Rd = 6.8 kNm

NV;Rd = 250.7 kN

NVz;Rd = 250.7 kN

MV;y;Rd = 6.8 kNm

MV;z;Rd = 6.8 kNm

NEN-EN1993-1-1(6.5): UC = 0.07 < 1

#### Kipstoetsing C56-V1 (0.000-1.815)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (1)

M = -0.1kN/m

MBeta = 0.0

Bovenflens maatgevend

X<sub>b</sub>;l<sub>st</sub> = 0.000 m

X<sub>e</sub>;l<sub>st</sub> = 1.815 m

l<sub>st</sub> = 1.815 m

L<sub>sys</sub> = 1.815 m

L<sub>g</sub> = 1.815 m

S = 0.000 m

I<sub>wa</sub> = 0.0000e+00 m<sup>6</sup>

C1 = 1.78

C2 = 0.00 (tabel)

C2(toegepast) = 0.00

C = 0.00

M<sub>cr</sub> = 0.0 kNm

k<sub>red</sub> = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.0 kNm

Lam-rel = 0.00

UC(y) = 0.00

Chi;LT,Z = 1.00

l<sub>kip</sub> = 1.815 m

Lam-rel = 0.00

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = -0.1 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C56-V1 (0.000-1.815)

Maatgevende combinatie: Fu.C.54

N;Ed = -1.2 kN

Nb;Rd;y = 218.9 kN

Nb;Rd;z = 218.9 kN

Methode Y = Cons. gesch.

Ca(y) = 0.000

Cb(y) = 0.000

L<sub>knik</sub> Y = 1.815 m

Methode Z = Cons. gesch.

Ca(z) = N/B

Cb(z) = N/B

L<sub>buc</sub> Z = 1.815 m

Chi;y = 0.87

K<sub>nik</sub>curve: A

Chi;z = 0.87

K<sub>nik</sub>curve: A

NEN-EN1993-1-1(6.46): UC = 0.01 < 1

#### Buiging & Druk C56-V1 (0.000-1.815)

Maatgevende combinatie: Fu.C.54

Profielklasse = 1

N;Ed = -1.2 kN

My;Ed = 0.0 kNm

Mz;Ed = 0.0 kNm

Delta;My;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = 0.0 kNm

My;Psi = 0.0 kNm

My;s = 0.0 kNm

Mz = 0.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 0.0 kNm

C<sub>my</sub> = 0.74

C<sub>mz</sub> = 1.00

C<sub>mLT</sub> = 0.74

K<sub>yy</sub> = 0.738

K<sub>yz</sub> = 0.601

K<sub>zy</sub> = 0.443

K<sub>zz</sub> = 1.002

Chi;y = 0.87

Chi;z = 0.87

Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C57-V1 (0.000-5.403)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N219.1/6.3              | Analyse                                   | Staal S235H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 219.1 mm            | A = 4.21e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 217.8e-06 m <sup>3</sup>  | W <sub>y</sub> ;pl = 285.4e-06 m <sup>3</sup>       |
| b = 219.1 mm            | I <sub>y</sub> = 238.6e-07 m <sup>4</sup> | W <sub>z</sub> ;el = 217.8e-06 m <sup>3</sup>  | W <sub>z</sub> ;pl = 285.4e-06 m <sup>3</sup>       |
| t <sub>f</sub> = 6.3 mm | I <sub>z</sub> = 238.6e-07 m <sup>4</sup> | A <sub>w</sub> ;y;el = 2.68e-03 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 2.68e-03 m <sup>2</sup>      |
| t <sub>w</sub> = 6.3 mm | Massa/m = 33.1 kg/m                       | A <sub>w</sub> ;z;el = 2.68e-03 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 2.68e-03 m <sup>2</sup>      |
| r = 103.2 mm            |                                           | I <sub>t</sub> = 477.2e-07 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C57-V1 (0.000-5.403)

|                                            |                               |                               |  |
|--------------------------------------------|-------------------------------|-------------------------------|--|
| Maatgevende combinatie: Fu.C.43 op 1.101 m |                               | Profielklasse = 1             |  |
| N;Ed = -138.6 kN                           | V <sub>y</sub> ;Ed = 5.0 kN   | M <sub>y</sub> ;Ed = -8.2 kNm |  |
|                                            | V <sub>z</sub> ;Ed = 5.6 kN   | M <sub>z</sub> ;Ed = 9.0 kNm  |  |
| N;Rd = 989.8 kN                            | V <sub>y</sub> ;Rd = 363.8 kN | M <sub>y</sub> Rd = 67.1 kNm  |  |
|                                            | V <sub>z</sub> ;Rd = 363.8 kN | M <sub>z</sub> Rd = 67.1 kNm  |  |
| NEN-EN1993-1-1(NB.33): UC = 0.21 < 1       |                               |                               |  |

#### Kiptoetsing C57-V1 (0.000-5.403)

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N219.1/6.3                                                              |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                                                         |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                                            |                        |                      |                     |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.002 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.4                                                                 | M = 0.3kN/m            | MBeta = 0.0          | q = 0.4             |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 5.403 m     | lst = 5.403 m       |
| Lsys = 5.403 m                                                                         | Lg = 5.403 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.15                                                                              | C2 = 0.53 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.3 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | Ikip = 5.403 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                                                     | My;eind = 0.3 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

#### Stabiliteitstoetsing C57-V1 (0.000-5.403)

|                                     |                                              |                                              |                                |
|-------------------------------------|----------------------------------------------|----------------------------------------------|--------------------------------|
| Maatgevende combinatie: Fu.C.43     |                                              |                                              |                                |
| N;Ed = -138.6 kN                    | N <sub>b</sub> ;R <sub>d</sub> ;y = 356.9 kN | N <sub>b</sub> ;R <sub>d</sub> ;z = 356.9 kN |                                |
| Methode Y = Handmatige Invoer       | Ca(y) = 0.000                                | C <sub>b</sub> (y) = 0.000                   | L <sub>knik</sub> Y = 10.806 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B                                  | C <sub>b</sub> (z) = N/B                     | L <sub>buc</sub> Z = 10.806 m  |
| Chi;y = 0.36                        |                                              | K <sub>nik</sub> curve: A                    |                                |
| Chi;z = 0.36                        |                                              | K <sub>nik</sub> curve: A                    |                                |
| NEN-EN1993-1-1(6.46): UC = 0.39 < 1 |                                              |                                              |                                |

#### Buiging & Druk C57-V1 (0.000-5.403)

|                                          |                                    |                                    |                         |
|------------------------------------------|------------------------------------|------------------------------------|-------------------------|
| Maatgevende combinatie: Fu.C.43          |                                    | Profielklasse = 1                  |                         |
| N;Ed = -138.6 kN                         | M <sub>y</sub> ;Ed = 8.2 kNm       | M <sub>z</sub> ;Ed = 9.0 kNm       |                         |
|                                          | Delta;M <sub>y</sub> ;Ed = 0.0 kNm | Delta;M <sub>z</sub> ;Ed = 0.0 kNm |                         |
| M <sub>y</sub> = -0.4 kNm                | M <sub>y</sub> ;Psi = 0.0 kNm      | M <sub>y</sub> ;s = -0.6 kNm       |                         |
| M <sub>z</sub> = 9.0 kNm                 | M <sub>z</sub> ;Psi = 0.0 kNm      | M <sub>z</sub> ;s = 4.5 kNm        |                         |
| C <sub>my</sub> = 0.98                   | C <sub>mz</sub> = 0.60             | C <sub>mLT</sub> = 0.98            |                         |
| K <sub>yy</sub> = 1.284                  | K <sub>yz</sub> = 0.472            | K <sub>zy</sub> = 0.770            | K <sub>zz</sub> = 0.786 |
| Chi;y = 0.36                             | Chi;z = 0.36                       | Chi;LT = 1.00                      |                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.61 < 1 |                                    |                                    |                         |

#### Profielgegevens staaf C60-V1 (0.000-1.310)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S235H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | W <sub>z</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | A <sub>w</sub> ;y;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 6.79e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | A <sub>w</sub> ;z;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 6.79e-04 m <sup>2</sup>      |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Doorsnedetoetsing C60-V1 (0.000-1.310)

Maatgevende combinatie: Fu.C.34 op 0.000 m

|                                    |                   |                   |                   |
|------------------------------------|-------------------|-------------------|-------------------|
| Nx;Ed = -15.2 kN                   | Vy;Ed = 0.0 kN    | My;Ed = 0.0 kNm   |                   |
|                                    | Vz;Ed = 0.1 kN    | Mz;Ed = 0.0 kNm   |                   |
| Nc;Rd = 250.7 kN                   | Vy;Rd = 92.2 kN   | My;Rd = 6.8 kNm   |                   |
|                                    | Vz;Rd = 92.2 kN   | Mz;Rd = 6.8 kNm   |                   |
| NVy;Rd = 250.7 kN                  | NVz;Rd = 250.7 kN | MV;y;Rd = 6.8 kNm | MV;z;Rd = 6.8 kNm |
| NEN-EN1993-1-1(6.9): UC = 0.06 < 1 |                   |                   |                   |

#### Kiptoetsing C60-V1 (0.000-1.310)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (1)                                                             | M = 0.1kN/m            | MBeta = 0.0          |                     |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 1.310 m     | lst = 1.310 m       |
| Lsys = 1.310 m                                                                         | Lg = 1.310 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.79                                                                              | C2 = 0.00 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.1 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | lkip = 1.310 m         |                      | UC(z) = 0.00        |
| My;begin = 0.1 kNm                                                                     | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

#### Stabiliteitstoetsing C60-V1 (0.000-1.310)

Maatgevende combinatie: Fu.C.34

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -15.2 kN                     | Nb;Rd;y = 234.4 kN | Nb;Rd;z = 234.4 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.310 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.310 m  |
| Chi;y = 0.94                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.94                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.06 < 1 |                    |                    |                   |

#### Buiging & Druk C60-V1 (0.000-1.310)

Maatgevende combinatie: Fu.C.34

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -15.2 kN                          | My;Ed = 0.1 kNm       | Profielklasse = 1     |             |
|                                          | Delta;My;Ed = 0.0 kNm | Mz;Ed = 0.0 kNm       |             |
|                                          |                       | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.1 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.40                               | Cmz = 1.00            | CmLT = 0.40           |             |
| Kyy = 0.407                              | Kyz = 0.610           | Kzy = 0.244           | Kzz = 1.017 |
| Chi;y = 0.94                             | Chi;z = 0.94          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.07 < 1 |                       |                       |             |

#### Profielgegevens staaf C61-V1 (0.000-5.083)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N139.7/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 139.7 mm | A = 1.71e-03 m2     | Wy;el = 562.4e-07 m3   | Wy;pl = 736.8e-07 m3       |
| b = 139.7 mm | Iy = 392.9e-08 m4   | Wz;el = 562.4e-07 m3   | Wz;pl = 736.8e-07 m3       |
| tf = 4.0 mm  | Iz = 392.9e-08 m4   | Aw;y;el = 1.09e-03 m2  | Aw;y;pl = 1.09e-03 m2      |
| tw = 4.0 mm  | Massa/m = 13.4 kg/m | Aw;z;el = 1.09e-03 m2  | Aw;z;pl = 1.09e-03 m2      |
| r = 65.8 mm  |                     | It = 785.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C61-V1 (0.000-5.083)

Maatgevende combinatie: Fu.C.41 op 1.101 m

|                 |                  |                  |  |
|-----------------|------------------|------------------|--|
| N;Ed = 132.3 kN | Vy;Ed = 4.0 kN   | My;Ed = -1.0 kNm |  |
|                 | Vz;Ed = -1.0 kN  | Mz;Ed = 7.0 kNm  |  |
| N;Rd = 400.7 kN | Vy;Rd = 147.3 kN | MyRd = 17.3 kNm  |  |
|                 | Vz;Rd = 147.3 kN | MzRd = 17.3 kNm  |  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(NB.33): UC = 0.54 < 1

#### Kiptoetsing C61-V1 (0.000-5.083)

Equi. profiel: N139.7/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.4

M = 0.2kN/m

MBeta = 0.0

q = 0.1

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 5.083 m

lst = 5.083 m

Lsys = 5.083 m

Lg = 5.083 m

S = 0.000 m

lwa = 0.0000e+00 m6

C1 = 2.15

C2 = 0.89 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.2 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 5.083 m

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = 0.2 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C61-V1 (0.000-5.083)

Maatgevende combinatie: Fu.C.57

N;Ed = -6.5 kN

Nb;Rd;y = 231.3 kN

Nb;Rd;z = 71.4 kN

Methode Y = Cons. gesch.

Ca(y) = 0.000

Cb(y) = 0.000

Lknik Y = 5.083 m

Methode Z = Handmatige Invoer

Ca(z) = N/B

Cb(z) = N/B

Lbuc Z = 10.166 m

Chi;y = 0.58

Knikcurve: A

Chi;z = 0.18

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.09 < 1

#### Buiging & Druk C61-V1 (0.000-5.083)

Maatgevende combinatie: Fu.C.57

N;Ed = -6.5 kN

My;Ed = 0.0 kNm

Profielklasse = 1

Delta;My;Ed = 0.0 kNm

Mz;Ed = 7.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = 0.0 kNm

My;Psi = 0.0 kNm

My;s = 0.0 kNm

Mz = 7.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 3.5 kNm

Cmy = 0.64

Cmz = 0.60

CmLT = 0.64

Kyy = 0.650

Kyz = 0.386

Kzy = 0.390

Kzz = 0.644

Chi;y = 0.58

Chi;z = 0.18

Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.35 < 1

#### Profielgegevens staaf C65-V1 (0.000-1.065)

N88.9/4

Analyse

Staal S235H(EN10210-1)

fyd(toegepast) = 235 N/mm2

h = 88.9 mm

A = 1.07e-03 m2

Wy;el = 216.7e-07 m3

Wy;pl = 288.5e-07 m3

b = 88.9 mm

Iy = 963.4e-09 m4

Wz;el = 216.7e-07 m3

Wz;pl = 288.5e-07 m3

tf = 4.0 mm

Iz = 963.4e-09 m4

Aw;y;el = 6.79e-04 m2

Aw;y;pl = 6.79e-04 m2

tw = 4.0 mm

Massa/m = 8.4 kg/m

Aw;z;el = 6.79e-04 m2

Aw;z;pl = 6.79e-04 m2

r = 40.4 mm

It = 192.7e-08 m4

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C65-V1 (0.000-1.065)

Maatgevende combinatie: Fu.C.41 op 0.000 m

Profielklasse = 1

N;Ed = 55.9 kN

Vy;Ed = 0.0 kN

My;Ed = 0.0 kNm

Vz;Ed = 0.0 kN

Mz;Ed = 0.0 kNm

N;Rd = 250.7 kN

Vy;Rd = 92.2 kN

MyRd = 6.8 kNm

Vz;Rd = 92.2 kN

MzRd = 6.8 kNm

NEN-EN1993-1-1(6.5): UC = 0.22 < 1

#### Kiptoetsing C65-V1 (0.000-1.065)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.065 m     | lst = 1.065 m       |
| Lsys = 1.065 m                                               | Lg = 1.065 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 1.065 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C65-V1 (0.000-1.065)

Maatgevende combinatie: Fu.C.57

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -3.0 kN                      | Nb;Rd;y = 240.4 kN | Nb;Rd;z = 240.4 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.065 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.065 m  |
| Chi;y = 0.96                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.96                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.01 < 1 |                    |                    |                   |

#### Buiging & Druk C65-V1 (0.000-1.065)

Maatgevende combinatie: Fu.C.57

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -3.0 kN                           | My;Ed = 0.0 kNm       | Profielklasse = 1     |             |
|                                          | Delta;My;Ed = 0.0 kNm | Mz;Ed = 0.0 kNm       |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | Delta;Mz;Ed = 0.0 kNm |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | Mz;s = 0.0 kNm        |             |
| Kyy = 0.952                              | Kyz = 0.601           | CmLT = 0.95           |             |
| Chi;y = 0.96                             | Chi;z = 0.96          | Kzy = 0.571           | Kzz = 1.002 |
|                                          |                       | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1 |                       |                       |             |

#### Profielgegevens staaf C66-V1 (0.000-1.887)

|             |                    |                        |                            |
|-------------|--------------------|------------------------|----------------------------|
| N88.9/4     | Analyse            | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 88.9 mm | A = 1.07e-03 m2    | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm | Iy = 963.4e-09 m4  | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm | Iz = 963.4e-09 m4  | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm | Massa/m = 8.4 kg/m | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm |                    | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C66-V1 (0.000-1.887)

Maatgevende combinatie: Fu.C.43 op 0.000 m

|                 |                 |                   |  |
|-----------------|-----------------|-------------------|--|
| N;Ed = 62.0 kN  | Vy;Ed = 0.0 kN  | Profielklasse = 1 |  |
|                 | Vz;Ed = 0.1 kN  | My;Ed = 0.0 kNm   |  |
| N;Rd = 250.7 kN | Vy;Rd = 92.2 kN | Mz;Ed = 0.0 kNm   |  |
|                 | Vz;Rd = 92.2 kN | MyRd = 6.8 kNm    |  |
|                 |                 | MzRd = 6.8 kNm    |  |

NEN-EN1993-1-1(6.5): UC = 0.25 < 1

#### Kiptoetsing C66-V1 (0.000-1.887)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                            |                        |                      |                     |
|----------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund    | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4) | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend      | Xb;lst = 0.000 m       | Xe;lst = 1.887 m     | lst = 1.887 m       |
| Lsys = 1.887 m             | Lg = 1.887 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                  | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm              | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00      | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00            | Ikip = 1.887 m         |                      | UC(z) = 0.00        |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

My;begin = 0.0 kNm                      My;eind = 0.0 kNm  
NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging

#### Stabiliteitstoetsing C66-V1 (0.000-1.887)

Maatgevende combinatie: Fu.C.54

|                          |                    |                    |                   |
|--------------------------|--------------------|--------------------|-------------------|
| N;Ed = -2.5 kN           | Nb;Rd;y = 216.1 kN | Nb;Rd;z = 216.1 kN |                   |
| Methode Y = Cons. gesch. | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.887 m |
| Methode Z = Cons. gesch. | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.887 m  |
| Chi;y = 0.86             |                    | Knikcurve: A       |                   |
| Chi;z = 0.86             |                    | Knikcurve: A       |                   |

NEN-EN1993-1-1(6.46): UC = 0.01 < 1

#### Buiging & Druk C66-V1 (0.000-1.887)

|                                 |                       |                       |
|---------------------------------|-----------------------|-----------------------|
| Maatgevende combinatie: Fu.C.54 |                       | Profielklasse = 1     |
| N;Ed = -2.5 kN                  | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |
|                                 | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |
| My = 0.0 kNm                    | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |
| Mz = 0.0 kNm                    | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |
| Cmy = 0.95                      | Cmz = 1.00            | CmLT = 0.95           |
| Kyy = 0.955                     | Kyz = 0.603           | Kzy = 0.573           |
| Chi;y = 0.86                    | Chi;z = 0.86          | Kzz = 1.005           |
|                                 |                       | Chi;LT = 1.00         |

NEN-EN1993-1-1(6.61&6.62): UC = 0.02 < 1

#### Profielgegevens staaf C67-V1 (0.000-1.887)

|             |                               |                                   |                                                     |
|-------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N88.9/4     | Analyse                       | Staal S235H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 88.9 mm | A = 1.07e-03 m <sup>2</sup>   | Wy;el = 216.7e-07 m <sup>3</sup>  | Wy;pl = 288.5e-07 m <sup>3</sup>                    |
| b = 88.9 mm | Iy = 963.4e-09 m <sup>4</sup> | Wz;el = 216.7e-07 m <sup>3</sup>  | Wz;pl = 288.5e-07 m <sup>3</sup>                    |
| tf = 4.0 mm | Iz = 963.4e-09 m <sup>4</sup> | Aw;y;el = 6.79e-04 m <sup>2</sup> | Aw;y;pl = 6.79e-04 m <sup>2</sup>                   |
| tw = 4.0 mm | Massa/m = 8.4 kg/m            | Aw;z;el = 6.79e-04 m <sup>2</sup> | Aw;z;pl = 6.79e-04 m <sup>2</sup>                   |
| r = 40.4 mm |                               | It = 192.7e-08 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C67-V1 (0.000-1.887)

|                                            |                 |                   |
|--------------------------------------------|-----------------|-------------------|
| Maatgevende combinatie: Fu.C.41 op 0.000 m |                 | Profielklasse = 1 |
| N;Ed = 23.0 kN                             | Vy;Ed = 0.0 kN  | My;Ed = 0.0 kNm   |
|                                            | Vz;Ed = 0.1 kN  | Mz;Ed = 0.0 kNm   |
| N;Rd = 250.7 kN                            | Vy;Rd = 92.2 kN | MyRd = 6.8 kNm    |
|                                            | Vz;Rd = 92.2 kN | MzRd = 6.8 kNm    |

NEN-EN1993-1-1(6.5): UC = 0.09 < 1

#### Kiptoetsing C67-V1 (0.000-1.887)

|                                                              |                        |                      |
|--------------------------------------------------------------|------------------------|----------------------|
| Equi. profiel: N88.9/4                                       |                        | Instab. curve Kip:d  |
| Maatgevende combinatie: Bi.C.1                               |                        |                      |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.887 m     |
| Lsys = 1.887 m                                               | Lg = 1.887 m           | S = 0.000 m          |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      |
| Chi;LT,Z = 1.00                                              | lkip = 1.887 m         |                      |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |

b-eff(Eind) = 0.000  
lst = 1.887 m  
Iwa = 0.0000e+00 m<sup>6</sup>  
C = 0.00  
Profielklasse 1  
UC(y) = 0.00  
UC(z) = 0.00

#### Stabiliteitstoetsing C67-V1 (0.000-1.887)

Maatgevende combinatie: Fu.C.57

|                          |                    |                    |                   |
|--------------------------|--------------------|--------------------|-------------------|
| N;Ed = -0.1 kN           | Nb;Rd;y = 216.1 kN | Nb;Rd;z = 216.1 kN |                   |
| Methode Y = Cons. gesch. | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.887 m |
| Methode Z = Cons. gesch. | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.887 m  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Chi;y = 0.86  
Chi;z = 0.86  
NEN-EN1993-1-1(6.46): UC = 0.00 < 1

Knikcurve: A  
Knikcurve: A

#### Buiging & Druk C67-V1 (0.000-1.887)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.57          |                       | Profielklasse = 1     |             |
| N;Ed = -0.1 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.950                              | Kyz = 0.600           | Kzy = 0.570           | Kzz = 1.000 |
| Chi;y = 0.86                             | Chi;z = 0.86          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |             |

#### Profielgegevens staaf C68-V1 (0.000-1.159)

|              |                               |                                   |                                                     |
|--------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N139.7/4     | Analyse                       | Staal S235H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 139.7 mm | A = 1.71e-03 m <sup>2</sup>   | Wy;el = 562.4e-07 m <sup>3</sup>  | Wy;pl = 736.8e-07 m <sup>3</sup>                    |
| b = 139.7 mm | Iy = 392.9e-08 m <sup>4</sup> | Wz;el = 562.4e-07 m <sup>3</sup>  | Wz;pl = 736.8e-07 m <sup>3</sup>                    |
| tf = 4.0 mm  | Iz = 392.9e-08 m <sup>4</sup> | Aw;y;el = 1.09e-03 m <sup>2</sup> | Aw;y;pl = 1.09e-03 m <sup>2</sup>                   |
| tw = 4.0 mm  | Massa/m = 13.4 kg/m           | Aw;z;el = 1.09e-03 m <sup>2</sup> | Aw;z;pl = 1.09e-03 m <sup>2</sup>                   |
| r = 65.8 mm  |                               | It = 785.7e-08 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C68-V1 (0.000-1.159)

|                                            |                  |                   |  |
|--------------------------------------------|------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.41 op 0.000 m |                  | Profielklasse = 1 |  |
| N;Ed = -0.3 kN                             | Vy;Ed = 0.0 kN   | My;Ed = -0.4 kNm  |  |
|                                            | Vz;Ed = 0.5 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 400.7 kN                            | Vy;Rd = 147.3 kN | MyRd = 17.3 kNm   |  |
|                                            | Vz;Rd = 147.3 kN | MzRd = 17.3 kNm   |  |
| NEN-EN1993-1-1(NB.33): UC = 0.02 < 1       |                  |                   |  |

#### Kiptoetsing C68-V1 (0.000-1.159)

|                                                                                        |                        |                      |                                 |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------------------|
| Equi. profiel: N139.7/4                                                                |                        | Instab. curve Kip:d  |                                 |
| Maatgevende combinatie: Bi.C.1                                                         |                        |                      |                                 |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                      |                                 |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                      |                                 |
| Kipsteun onderflens: N.v.t.                                                            |                        |                      |                                 |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000             |
| Tabel gebruikt NB.NB.1 (1)                                                             | M = 0.3kN/m            | MBeta = 0.0          |                                 |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 1.159 m     | Ist = 1.159 m                   |
| Lsys = 1.159 m                                                                         | Lg = 1.159 m           | S = 0.000 m          | Iwa = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.75                                                                              | C2 = 0.00 (tabel)      | C2(toegepast) = 0.00 | C = 0.00                        |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1                 |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.3 kNm         |                      | UC(y) = 0.00                    |
| Chi;LT,Z = 1.00                                                                        | Ikip = 1.159 m         |                      | UC(z) = 0.00                    |
| My;begin = 0.3 kNm                                                                     | My;eind = 0.0 kNm      |                      |                                 |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                                 |

#### Stabiliteitstoetsing C68-V1 (0.000-1.159)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Bi.C.1      |                    |                    |                   |
| N;Ed = -0.5 kN                      | Nb;Rd;y = 395.6 kN | Nb;Rd;z = 395.6 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.159 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.159 m  |
| Chi;y = 0.99                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.99                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                    |                    |                   |

#### Buiging & Druk C68-V1 (0.000-1.159)

|                                |                       |                       |  |
|--------------------------------|-----------------------|-----------------------|--|
| Maatgevende combinatie: Bi.C.1 |                       | Profielklasse = 1     |  |
| N;Ed = -0.5 kN                 | My;Ed = 0.3 kNm       | Mz;Ed = 0.0 kNm       |  |
|                                | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                          |                  |                |             |
|------------------------------------------|------------------|----------------|-------------|
| My = 0.3 kNm                             | My;Psi = 0.0 kNm | My;s = 0.2 kNm |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm | Mz;s = 0.0 kNm |             |
| Cmy = 0.60                               | Cmz = 1.00       | CmLT = 0.60    |             |
| Kyy = 0.600                              | Kyz = 0.600      | Kzy = 0.360    | Kzz = 1.000 |
| Chi;y = 0.99                             | Chi;z = 0.99     | Chi;LT = 1.00  |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1 |                  |                |             |

#### Profielgegevens staaf C69-V1 (0.000-1.050)

|                         |                                           |                                           |                                                     |
|-------------------------|-------------------------------------------|-------------------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                                   | Staal S235H(EN10210-1)                    | f <sub>yd</sub> (toegepast) = 235 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>               | Wy;el = 369.3e-07 m <sup>3</sup>          | Wy;pl = 486.9e-07 m <sup>3</sup>                    |
| b = 114.3 mm            | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | Wz;el = 369.3e-07 m <sup>3</sup>          | Wz;pl = 486.9e-07 m <sup>3</sup>                    |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | Aw;y;el = 8.82e-04 m <sup>2</sup>         | Aw;y;pl = 8.82e-04 m <sup>2</sup>                   |
| tw = 4.0 mm             | Massa/m = 10.9 kg/m                       | Aw;z;el = 8.82e-04 m <sup>2</sup>         | Aw;z;pl = 8.82e-04 m <sup>2</sup>                   |
| r = 53.1 mm             |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup> | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C69-V1 (0.000-1.050)

|                                            |                  |                   |  |
|--------------------------------------------|------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.12 op 1.050 m |                  | Profielklasse = 1 |  |
| N;Ed = -0.6 kN                             | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |  |
|                                            | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 325.7 kN                            | Vy;Rd = 119.7 kN | MyRd = 11.4 kNm   |  |
|                                            | Vz;Rd = 119.7 kN | MzRd = 11.4 kNm   |  |
| NEN-EN1993-1-1(6.9): UC = 0.00 < 1         |                  |                   |  |

#### Kiptoetsing C69-V1 (0.000-1.050)

|                                                              |                              |                              |                                             |
|--------------------------------------------------------------|------------------------------|------------------------------|---------------------------------------------|
| Equi. profiel: N114.3/4                                      |                              |                              |                                             |
| Maatgevende combinatie: Bi.C.1                               |                              | Instab. curve Kip:d          |                                             |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                              |                              |                                             |
| Kipsteun bovenflens: N.v.t.                                  |                              |                              |                                             |
| Kipsteun onderflens: N.v.t.                                  |                              |                              |                                             |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund       | b-eff(Begin) = 0.000         | b-eff(Eind) = 0.000                         |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m                  | = 0.0                        |                                             |
| Bovenflens maatgevend                                        | Xb;l <sub>st</sub> = 0.000 m | Xe;l <sub>st</sub> = 1.050 m | l <sub>st</sub> = 1.050 m                   |
| L <sub>sys</sub> = 1.050 m                                   | L <sub>g</sub> = 1.050 m     | S = 0.000 m                  | I <sub>wa</sub> = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)            | C2(toegepast) = 0.00         | C = 0.00                                    |
| M <sub>cr</sub> = 0.0 kNm                                    | k <sub>red</sub> = 1.0       | Lam-rel = 0.00               | Profielklasse 1                             |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm               |                              | UC(y) = 0.00                                |
| Chi;LT,Z = 1.00                                              | I <sub>kip</sub> = 1.050 m   |                              | UC(z) = 0.00                                |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm            |                              |                                             |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                              |                              |                                             |

#### Stabiliteitstoetsing C69-V1 (0.000-1.050)

|                                     |                    |                    |                               |
|-------------------------------------|--------------------|--------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.12     |                    |                    |                               |
| N;Ed = -0.6 kN                      | Nb;Rd;y = 319.4 kN | Nb;Rd;z = 293.1 kN |                               |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | L <sub>knik</sub> Y = 1.050 m |
| Methode Z = Handmatige Invoer       | Ca(z) = N/B        | Cb(z) = N/B        | L <sub>buc</sub> Z = 2.100 m  |
| Chi;y = 0.98                        |                    | Knikcurve: A       |                               |
| Chi;z = 0.90                        |                    | Knikcurve: A       |                               |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                    |                    |                               |

#### Buiging & Druk C69-V1 (0.000-1.050)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.12          |                       | Profielklasse = 1     |             |
| N;Ed = -0.6 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.950                              | Kyz = 0.600           | Kzy = 0.570           | Kzz = 1.001 |
| Chi;y = 0.98                             | Chi;z = 0.90          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |             |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C70-V1 (0.000-1.601)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N139.7/4     | Analyse             | Staal S235H(EN10210-1) | fyd(toegepast) = 235 N/mm2 |
| h = 139.7 mm | A = 1.71e-03 m2     | Wy;el = 562.4e-07 m3   | Wy;pl = 736.8e-07 m3       |
| b = 139.7 mm | Iy = 392.9e-08 m4   | Wz;el = 562.4e-07 m3   | Wz;pl = 736.8e-07 m3       |
| tf = 4.0 mm  | Iz = 392.9e-08 m4   | Aw;y;el = 1.09e-03 m2  | Aw;y;pl = 1.09e-03 m2      |
| tw = 4.0 mm  | Massa/m = 13.4 kg/m | Aw;z;el = 1.09e-03 m2  | Aw;z;pl = 1.09e-03 m2      |
| r = 65.8 mm  |                     | It = 785.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C70-V1 (0.000-1.601)

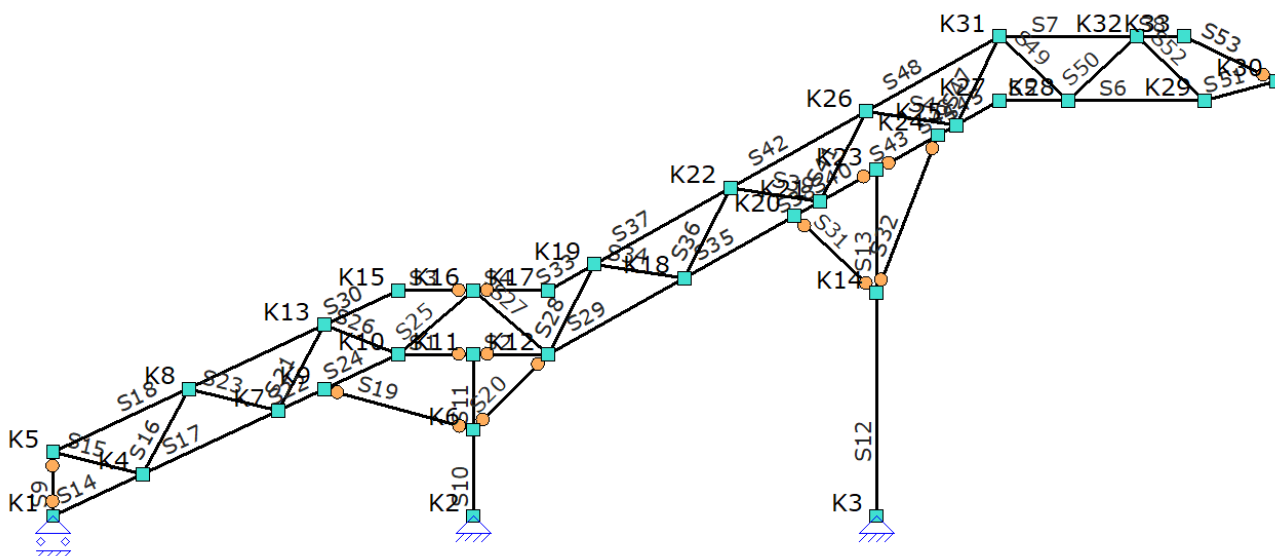
|                                           |                  |                   |
|-------------------------------------------|------------------|-------------------|
| Maatgevende combinatie: Bi.C.1 op 0.000 m |                  | Profielklasse = 1 |
| N;Ed = 0.6 kN                             | Vy;Ed = 0.0 kN   | My;Ed = 0.2 kNm   |
|                                           | Vz;Ed = -0.1 kN  | Mz;Ed = 0.0 kNm   |
| N;Rd = 400.7 kN                           | Vy;Rd = 147.3 kN | MyRd = 17.3 kNm   |
|                                           | Vz;Rd = 147.3 kN | MzRd = 17.3 kNm   |
| NEN-EN1993-1-1(NB.33): UC = 0.01 < 1      |                  |                   |

#### Kiptoetsing C70-V1 (0.000-1.601)

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N139.7/4                                                                |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                                                         |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                                            |                        |                      |                     |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (1)                                                             | M = 0.2kN/m            | MBeta = 0.0          |                     |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 1.601 m     | lst = 1.601 m       |
| Lsys = 1.601 m                                                                         | Lg = 1.601 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.75                                                                              | C2 = 0.00 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.2 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | Ikip = 1.601 m         |                      | UC(z) = 0.00        |
| My;begin = 0.2 kNm                                                                     | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

|                     |                                                                                    |               |                |
|---------------------|------------------------------------------------------------------------------------|---------------|----------------|
|                     |                                                                                    |               |                |
| Projectomschrijving | Zwaluw uitkijkpunt                                                                 | Projectnummer | 520147         |
| Onderdeel           | Trapboom                                                                           | Constructeur  | DaKr           |
| Opdrachtgever       | Wilwy                                                                              | Eenheden      | m, mm, kN, kNm |
| Bestand             | P:\520147\1 - Constructeur\003-A - UPD\520147-A-0 - Trapboom-aangepast ontwerp.mxf |               |                |

Constructie

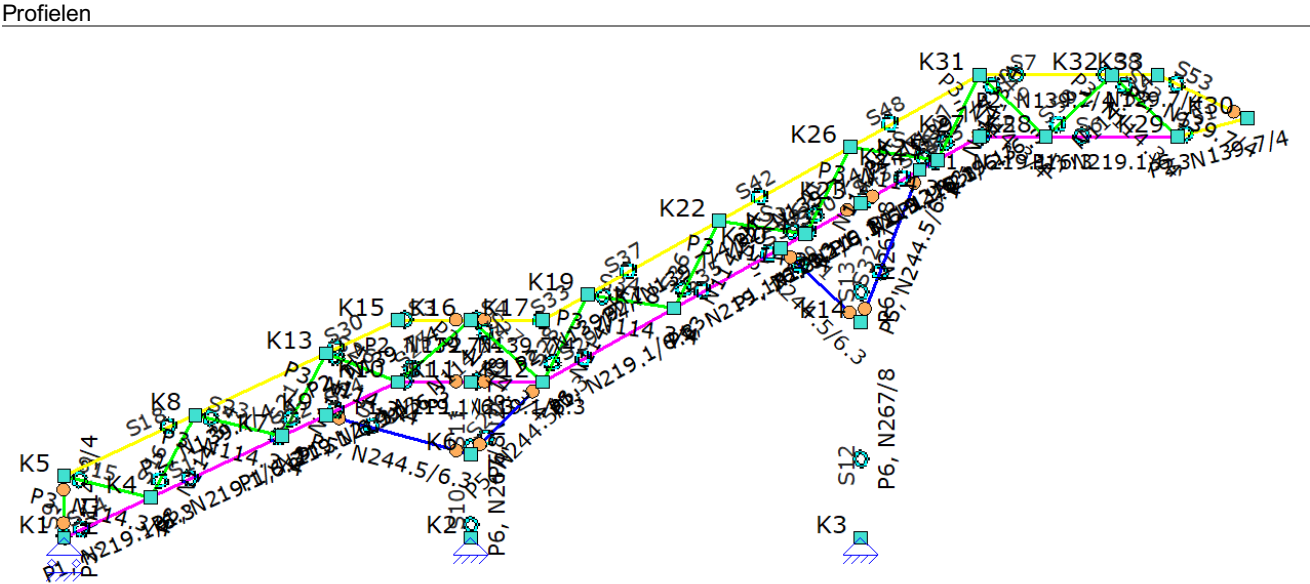


## STAVEN

| Staaf | Knoop-B | Knoop-E | X-B    | X-E    | Z-B    | Z-E    | Lengte | Profiel | Positie           |
|-------|---------|---------|--------|--------|--------|--------|--------|---------|-------------------|
| S1    | K10     | K11     | 5.390  | 6.560  | -2.520 | -2.520 | 1.170  | P1      | 0.000 - 1.170 (L) |
| S2    | K11     | K12     | 6.560  | 7.730  | -2.520 | -2.520 | 1.170  | P1      | 0.000 - 1.170 (L) |
| S3    | K15     | K16     | 5.390  | 6.560  | -3.520 | -3.520 | 1.170  | P2      | 0.000 - 1.170 (L) |
| S4    | K16     | K17     | 6.560  | 7.730  | -3.520 | -3.520 | 1.170  | P2      | 0.000 - 1.170 (L) |
| S5    | K27     | K28     | 14.770 | 15.840 | -6.480 | -6.480 | 1.070  | P1      | 0.000 - 1.070 (L) |
| S6    | K28     | K29     | 15.840 | 17.970 | -6.480 | -6.480 | 2.130  | P1      | 0.000 - 2.130 (L) |
| S7    | K31     | K32     | 14.770 | 16.910 | -7.480 | -7.480 | 2.140  | P2      | 0.000 - 2.140 (L) |
| S8    | K32     | K33     | 16.910 | 17.650 | -7.480 | -7.480 | 0.740  | P2      | 0.000 - 0.740 (L) |
| S9    | K1      | K5      | 0.000  | 0.000  | -0.000 | -1.000 | 1.000  | P3      | 0.000 - 1.000 (L) |
| S10   | K2      | K6      | 6.560  | 6.560  | -0.000 | -1.350 | 1.350  | P6      | 0.000 - 1.350 (L) |
| S11   | K6      | K11     | 6.560  | 6.560  | -1.350 | -2.520 | 1.170  | P6      | 0.000 - 1.170 (L) |
| S12   | K3      | K14     | 12.850 | 12.850 | -0.000 | -3.480 | 3.480  | P6      | 0.000 - 3.480 (L) |
| S13   | K14     | K23     | 12.850 | 12.850 | -3.480 | -5.400 | 1.920  | P6      | 0.000 - 1.920 (L) |
| S14   | K1      | K4      | 0.000  | 1.400  | -0.000 | -0.655 | 1.546  | P1      | 0.000 - 1.546 (L) |
| S15   | K5      | K4      | 0.000  | 1.400  | -1.000 | -0.655 | 1.442  | P3      | 0.000 - 1.442 (L) |
| S16   | K4      | K8      | 1.400  | 2.120  | -0.655 | -1.980 | 1.508  | P3      | 0.000 - 1.508 (L) |
| S17   | K4      | K7      | 1.400  | 3.519  | -0.655 | -1.645 | 2.338  | P1      | 0.000 - 2.338 (L) |
| S18   | K5      | K13     | 0.000  | 4.235  | -1.000 | -2.980 | 4.675  | P2      | 0.000 - 4.675 (L) |
| S19   | K9      | K6      | 4.235  | 6.560  | -1.980 | -1.350 | 2.409  | P5      | 0.000 - 2.409 (L) |
| S20   | K6      | K12     | 6.560  | 7.730  | -1.350 | -2.520 | 1.655  | P5      | 0.000 - 1.655 (L) |
| S21   | K7      | K13     | 3.519  | 4.235  | -1.645 | -2.980 | 1.515  | P3      | 0.000 - 1.515 (L) |
| S22   | K7      | K9      | 3.519  | 4.235  | -1.645 | -1.980 | 0.791  | P1      | 0.000 - 0.791 (L) |
| S23   | K8      | K7      | 2.120  | 3.519  | -1.980 | -1.645 | 1.438  | P3      | 0.000 - 1.438 (L) |
| S24   | K9      | K10     | 4.235  | 5.390  | -1.980 | -2.520 | 1.275  | P1      | 0.000 - 1.275 (L) |
| S25   | K10     | K16     | 5.390  | 6.560  | -2.520 | -3.520 | 1.539  | P3      | 0.000 - 1.539 (L) |
| S26   | K13     | K10     | 4.235  | 5.390  | -2.980 | -2.520 | 1.243  | P3      | 0.000 - 1.243 (L) |
| S27   | K16     | K12     | 6.560  | 7.730  | -3.520 | -2.520 | 1.539  | P3      | 0.000 - 1.539 (L) |
| S28   | K12     | K19     | 7.730  | 8.450  | -2.520 | -3.925 | 1.579  | P3      | 0.000 - 1.579 (L) |
| S29   | K12     | K18     | 7.730  | 9.850  | -2.520 | -3.713 | 2.432  | P1      | 0.000 - 2.432 (L) |
| S30   | K13     | K15     | 4.235  | 5.390  | -2.980 | -3.520 | 1.275  | P2      | 0.000 - 1.275 (L) |
| S31   | K20     | K14     | 11.570 | 12.850 | -4.680 | -3.480 | 1.755  | P5      | 0.000 - 1.755 (L) |
| S32   | K14     | K24     | 12.850 | 13.810 | -3.480 | -5.940 | 2.641  | P5      | 0.000 - 2.641 (L) |
| S33   | K17     | K19     | 7.730  | 8.450  | -3.520 | -3.925 | 0.826  | P2      | 0.000 - 0.826 (L) |
| S34   | K19     | K18     | 8.450  | 9.850  | -3.925 | -3.713 | 1.416  | P3      | 0.000 - 1.416 (L) |
| S35   | K18     | K20     | 9.850  | 11.570 | -3.713 | -4.680 | 1.973  | P1      | 0.000 - 1.973 (L) |
| S36   | K18     | K22     | 9.850  | 10.569 | -3.713 | -5.117 | 1.578  | P3      | 0.000 - 1.578 (L) |
| S37   | K19     | K22     | 8.450  | 10.569 | -3.925 | -5.117 | 2.432  | P2      | 0.000 - 2.432 (L) |
|       |         |         | m      | m      | m      | m      | m      |         | m                 |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Staaf | Knoop-B | Knoop-E | X-B    | X-E    | Z-B    | Z-E    | Lengte | Profiel | Positie           |
|-------|---------|---------|--------|--------|--------|--------|--------|---------|-------------------|
| S38   | K20     | K21     | 11.570 | 11.970 | -4.680 | -4.905 | 0.459  | P1      | 0.000 - 0.459 (L) |
| S39   | K21     | K22     | 11.970 | 10.569 | -4.905 | -5.117 | 1.417  | P3      | 0.000 - 1.417 (L) |
| S40   | K21     | K23     | 11.970 | 12.850 | -4.905 | -5.400 | 1.010  | P1      | 0.000 - 1.010 (L) |
| S41   | K21     | K26     | 11.970 | 12.689 | -4.905 | -6.309 | 1.578  | P3      | 0.000 - 1.578 (L) |
| S42   | K22     | K26     | 10.569 | 12.689 | -5.117 | -6.309 | 2.432  | P2      | 0.000 - 2.432 (L) |
| S43   | K23     | K24     | 12.850 | 13.810 | -5.400 | -5.940 | 1.101  | P1      | 0.000 - 1.101 (L) |
| S44   | K24     | K25     | 13.810 | 14.090 | -5.940 | -6.097 | 0.321  | P1      | 0.000 - 0.321 (L) |
| S45   | K25     | K27     | 14.090 | 14.770 | -6.097 | -6.480 | 0.780  | P1      | 0.000 - 0.780 (L) |
| S46   | K25     | K26     | 14.090 | 12.689 | -6.097 | -6.309 | 1.417  | P3      | 0.000 - 1.417 (L) |
| S47   | K25     | K31     | 14.090 | 14.770 | -6.097 | -7.480 | 1.541  | P3      | 0.000 - 1.541 (L) |
| S48   | K26     | K31     | 12.689 | 14.770 | -6.309 | -7.480 | 2.388  | P2      | 0.000 - 2.388 (L) |
| S49   | K31     | K28     | 14.770 | 15.840 | -7.480 | -6.480 | 1.465  | P3      | 0.000 - 1.465 (L) |
| S50   | K28     | K32     | 15.840 | 16.910 | -6.480 | -7.480 | 1.465  | P3      | 0.000 - 1.465 (L) |
| S51   | K29     | K30     | 17.970 | 19.090 | -6.480 | -6.780 | 1.159  | P2      | 0.000 - 1.159 (L) |
| S52   | K32     | K29     | 16.910 | 17.970 | -7.480 | -6.480 | 1.457  | P3      | 0.000 - 1.457 (L) |
| S53   | K33     | K30     | 17.650 | 19.090 | -7.480 | -6.780 | 1.601  | P2      | 0.000 - 1.601 (L) |
|       |         |         | m      | m      | m      | m      | m      |         | m                 |



PROFIELEN

| Profiel | Profielnaam | Oppervlakte     | Iy              | Materiaal        | Hoek |
|---------|-------------|-----------------|-----------------|------------------|------|
| P1      | N219.1/6.3  | 4212            | 2.3861e+07      | S235H(EN10210-1) | 0    |
| P2      | N139.7/4    | 1705            | 3.9286e+06      | S235H(EN10210-1) | 0    |
| P3      | N114.3/4    | 1386            | 2.1107e+06      | S235H(EN10210-1) | 0    |
| P5      | N244.5/6.3  | 4714            | 3.3460e+07      | S235H(EN10210-1) | 0    |
| P6      | N267/8      | 6509            | 5.4634e+07      | S235H(EN10210-1) | 0    |
|         |             | mm <sup>2</sup> | mm <sup>4</sup> |                  | °    |

MATERIALEN

| Materiaalnaam    | Poison | Dichtheid         | E-Modulus         | Uitzettingcoeff |
|------------------|--------|-------------------|-------------------|-----------------|
| S235H(EN10210-1) | 0.30   | 78.50             | 2.1000e+05        | 12.0000e-06     |
|                  |        | kN/m <sup>3</sup> | N/mm <sup>2</sup> | C°m             |

SCHARNIEREN

| Staaf | Positie | Scharnier | X    | Z    | Yr      |
|-------|---------|-----------|------|------|---------|
| S1    | 0.000   | A1        | Vast | Vast | Vast    |
|       |         | m         | kN/m | kN/m | kNm/rad |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

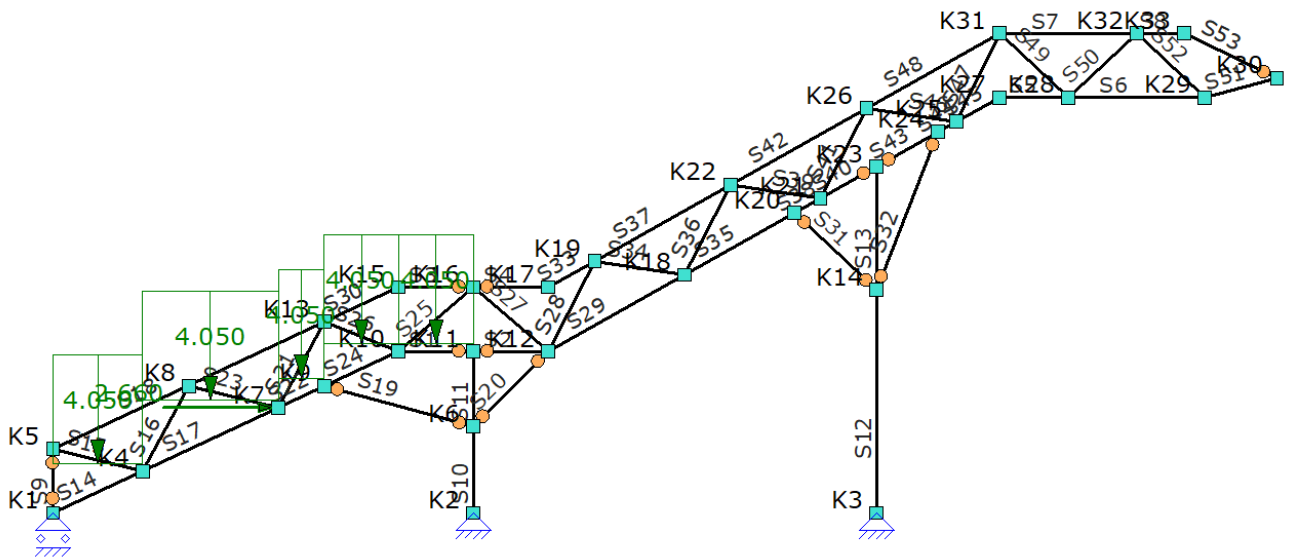
| Staaf | Positie   | Scharnier | X    | Z    | Yr   |
|-------|-----------|-----------|------|------|------|
|       | 1.170 (L) | A2        | Vast | Vast | Vrij |
| S2    | 0.000     | A2        | Vast | Vast | Vrij |
| S3    | 1.170 (L) | A2        | Vast | Vast | Vrij |
| S4    | 0.000     | A2        | Vast | Vast | Vrij |
| S5    | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.070 (L) | A1        | Vast | Vast | Vast |
| S6    | 0.000     | A1        | Vast | Vast | Vast |
|       | 2.130 (L) | A1        | Vast | Vast | Vast |
| S7    | 0.000     | A1        | Vast | Vast | Vast |
|       | 2.140 (L) | A1        | Vast | Vast | Vast |
| S8    | 0.000     | A1        | Vast | Vast | Vast |
|       | 0.740 (L) | A1        | Vast | Vast | Vast |
| S9    | 0.000     | A2        | Vast | Vast | Vrij |
|       | 1.000 (L) | A2        | Vast | Vast | Vrij |
| S10   | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.350 (L) | A1        | Vast | Vast | Vast |
| S11   | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.170 (L) | A1        | Vast | Vast | Vast |
| S12   | 0.000     | A1        | Vast | Vast | Vast |
|       | 3.480 (L) | A1        | Vast | Vast | Vast |
| S13   | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.920 (L) | A1        | Vast | Vast | Vast |
| S14   | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.546 (L) | A1        | Vast | Vast | Vast |
| S17   | 0.000     | A1        | Vast | Vast | Vast |
|       | 2.338 (L) | A1        | Vast | Vast | Vast |
| S18   | 0.000     | A1        | Vast | Vast | Vast |
|       | 4.675 (L) | A1        | Vast | Vast | Vast |
| S19   | 0.000     | A2        | Vast | Vast | Vrij |
|       | 2.409 (L) | A2        | Vast | Vast | Vrij |
| S20   | 0.000     | A2        | Vast | Vast | Vrij |
|       | 1.655 (L) | A2        | Vast | Vast | Vrij |
| S22   | 0.000     | A1        | Vast | Vast | Vast |
|       | 0.791 (L) | A1        | Vast | Vast | Vast |
| S24   | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.275 (L) | A1        | Vast | Vast | Vast |
| S29   | 0.000     | A1        | Vast | Vast | Vast |
|       | 2.432 (L) | A1        | Vast | Vast | Vast |
| S30   | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.275 (L) | A1        | Vast | Vast | Vast |
| S31   | 0.000     | A2        | Vast | Vast | Vrij |
|       | 1.755 (L) | A2        | Vast | Vast | Vrij |
| S32   | 0.000     | A2        | Vast | Vast | Vrij |
|       | 2.641 (L) | A2        | Vast | Vast | Vrij |
| S33   | 0.000     | A1        | Vast | Vast | Vast |
|       | 0.826 (L) | A1        | Vast | Vast | Vast |
| S35   | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.973 (L) | A1        | Vast | Vast | Vast |
| S37   | 0.000     | A1        | Vast | Vast | Vast |
|       | 2.432 (L) | A1        | Vast | Vast | Vast |
| S38   | 0.000     | A1        | Vast | Vast | Vast |
|       | 0.459 (L) | A1        | Vast | Vast | Vast |
| S40   | 0.000     | A1        | Vast | Vast | Vast |
|       | 1.010 (L) | A2        | Vast | Vast | Vrij |
| S42   | 0.000     | A1        | Vast | Vast | Vast |
|       | 2.432 (L) | A1        | Vast | Vast | Vast |
| S43   | 0.000     | A2        | Vast | Vast | Vrij |
|       | 1.101 (L) | A1        | Vast | Vast | Vast |
| S44   | 0.000     | A1        | Vast | Vast | Vast |
|       | 0.321 (L) | A1        | Vast | Vast | Vast |
| S45   | 0.000     | A1        | Vast | Vast | Vast |

m kN/m kN/m kNm/rad

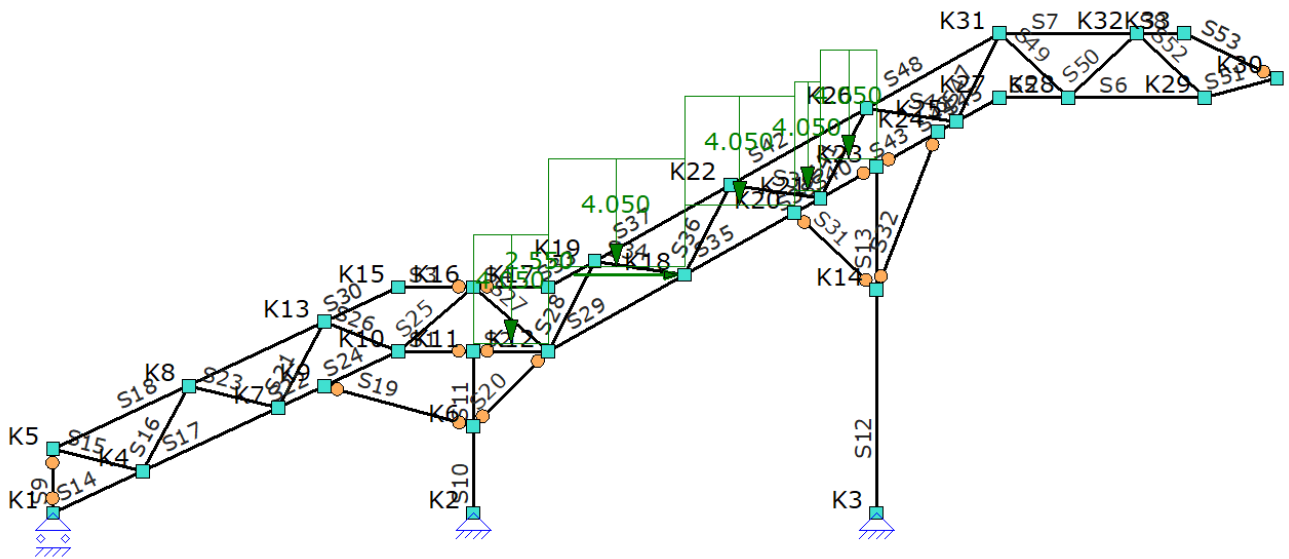


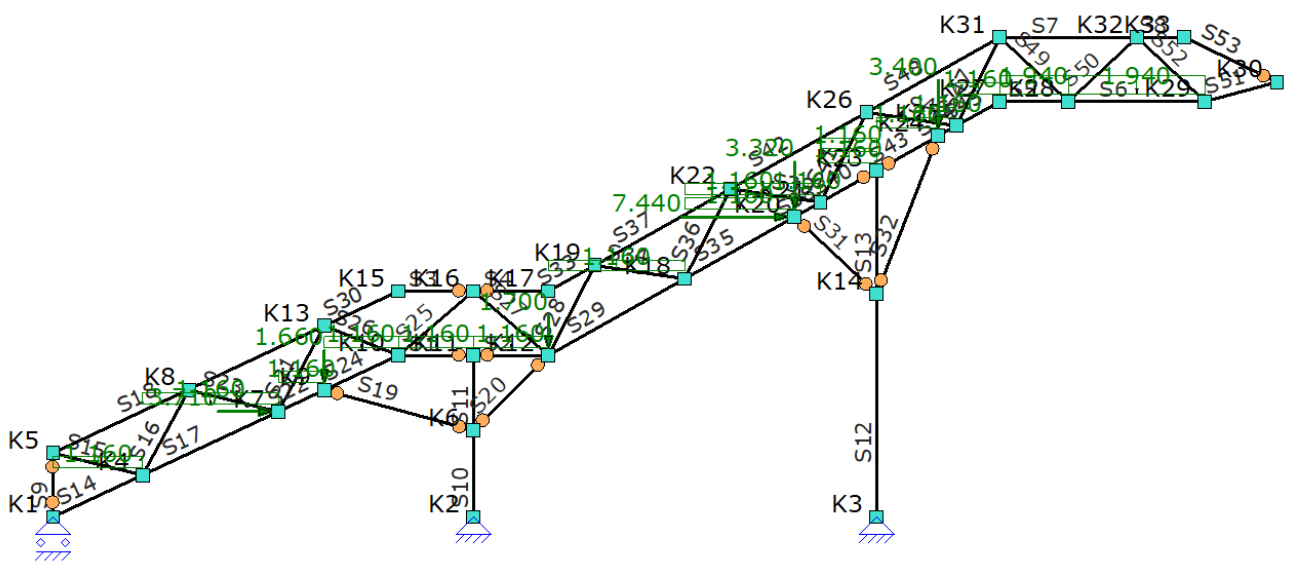
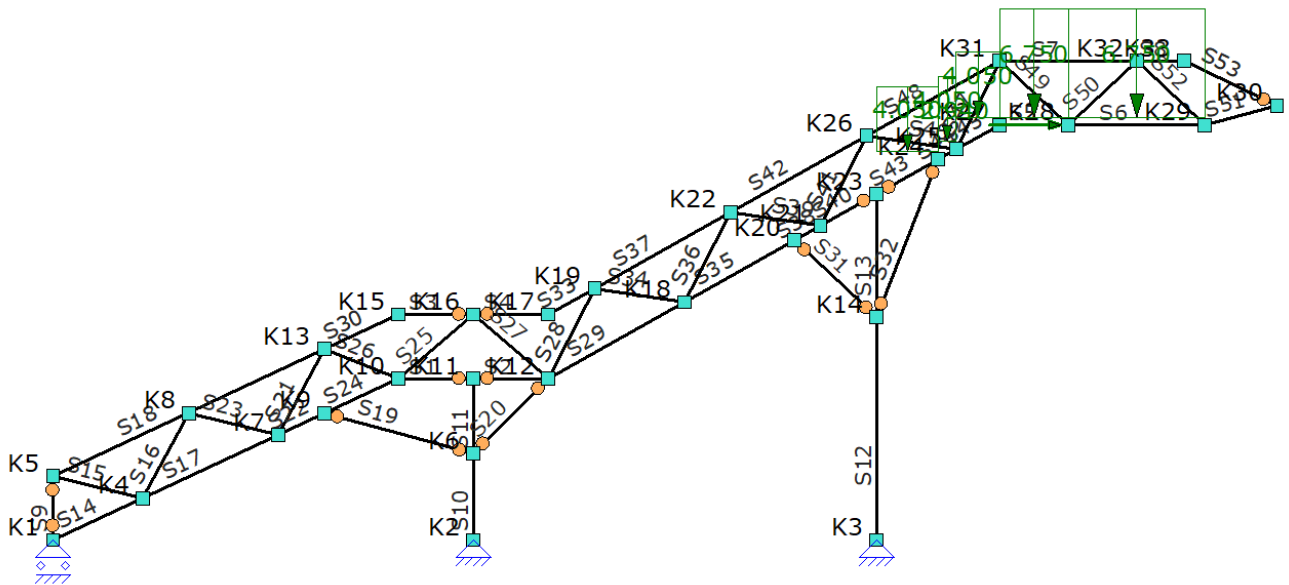


B.G.3: Veranderlijk 1

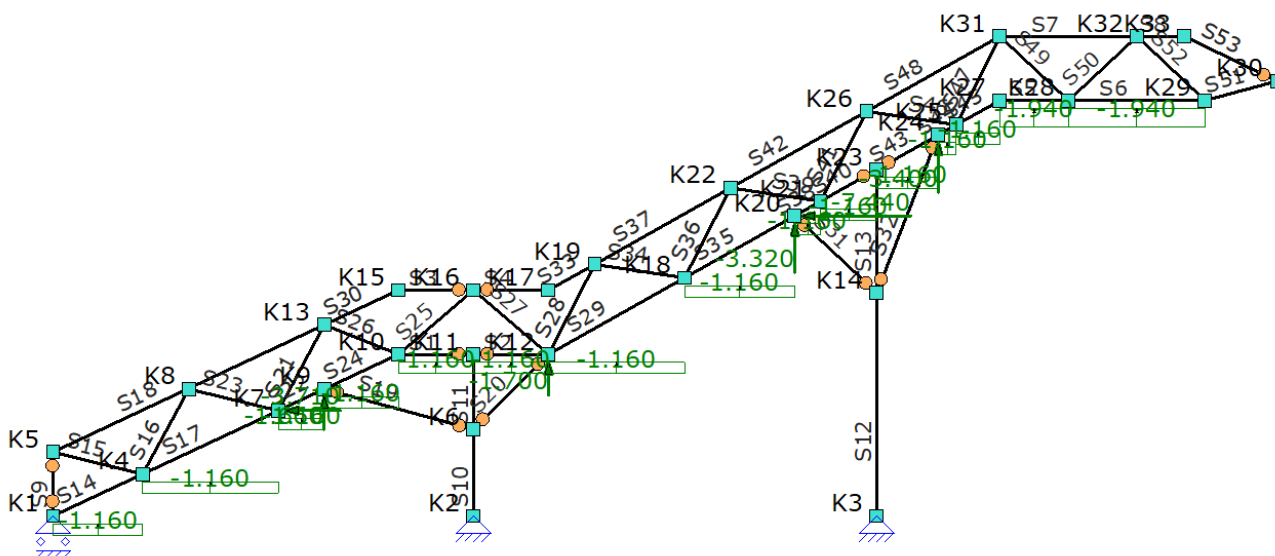


B.G.4: Veranderlijk 2

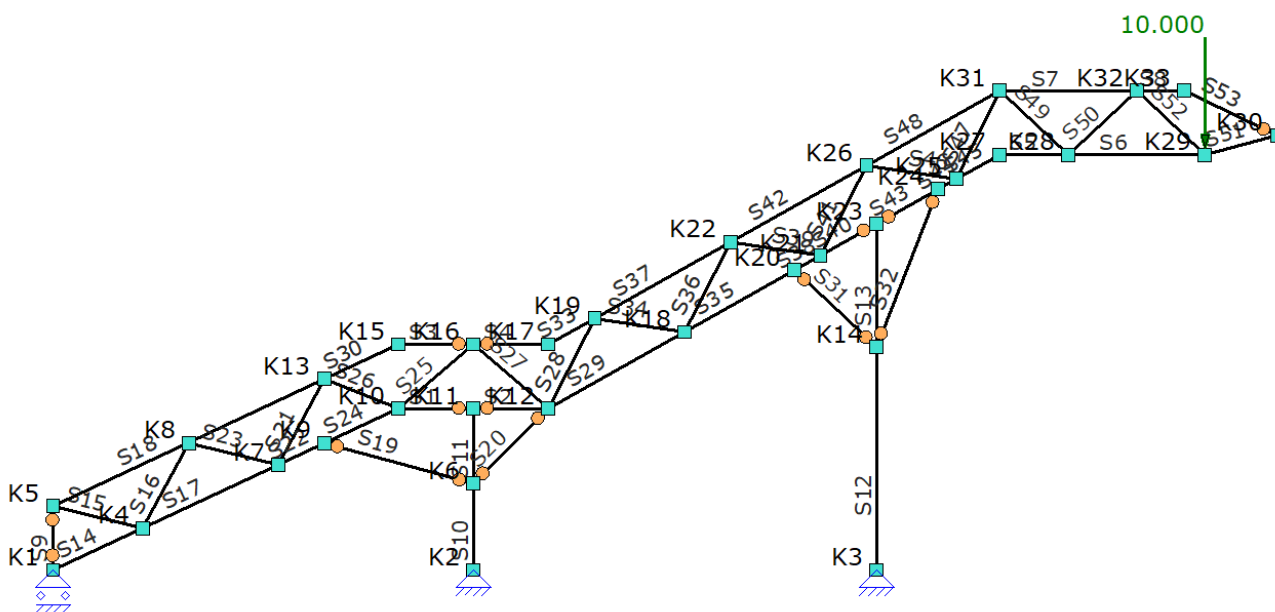




# B.G.7: Wind opwaarts



# B.G.8: Eenheid t.b.v. stijfheid



## BELASTINGSCOMBINATIES

### Fundamenteel

| B.G.  | Omschrijving             | Fu.C.1 | Fu.C.2 | Fu.C.3 | Fu.C.4 | Fu.C.5 | Fu.C.6 | Fu.C.7 | Fu.C.8 | Fu.C.9 | Fu.C.10 |
|-------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| B.G.1 | Eigen gewicht en perm..  | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30    |
| B.G.2 | Permanent                | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30   | 1.30    |
| B.G.3 | Veranderlijk 1           | 0.54   |        |        |        |        | 0.54   | 0.54   | 0.54   | 0.54   |         |
| B.G.4 | Veranderlijk 2           |        | 0.54   |        |        |        | 0.54   |        |        |        | 0.54    |
| B.G.5 | Veranderlijk 3           |        |        | 0.54   |        |        |        | 0.54   |        |        | 0.54    |
| B.G.6 | Wind neerwaarts          |        |        |        | 0.45   |        |        |        | 0.45   |        |         |
| B.G.7 | Wind opwaarts            |        |        |        |        | 0.45   |        |        |        | 0.45   |         |
| B.G.8 | Eenheid t.b.v. stijfheid |        |        |        |        |        |        |        |        |        |         |

| B.G.  | Omschrijving            | Fu.C.11 | Fu.C.12 | Fu.C.13 | Fu.C.14 | Fu.C.15 | Fu.C.16 | Fu.C.17 | Fu.C.18 | Fu.C.19 | Fu.C.20 |
|-------|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| B.G.1 | Eigen gewicht en perm.. | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    |
| B.G.2 | Permanent               | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    | 1.30    |
| B.G.3 | Veranderlijk 1          |         |         |         |         | 0.54    | 0.54    | 0.54    | 0.54    | 0.54    |         |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|             |                          |                |                |                |                |                |                |                |                |                |                |
|-------------|--------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| B.G.4       | Veranderlijk 2           | 0.54           | 0.54           |                |                | 0.54           | 0.54           | 0.54           |                |                | 0.54           |
| B.G.5       | Veranderlijk 3           |                |                | 0.54           | 0.54           | 0.54           |                |                | 0.54           | 0.54           | 0.54           |
| B.G.6       | Wind neerwaarts          | 0.45           |                | 0.45           |                |                | 0.45           |                | 0.45           |                | 0.45           |
| B.G.7       | Wind opwaarts            |                | 0.45           |                | 0.45           |                |                | 0.45           |                | 0.45           |                |
| B.G.8       | Eenheid t.b.v. stijfheid |                |                |                |                |                |                |                |                |                |                |
| <b>B.G.</b> | <b>Omschrijving</b>      | <b>Fu.C.21</b> | <b>Fu.C.22</b> | <b>Fu.C.23</b> | <b>Fu.C.24</b> | <b>Fu.C.25</b> | <b>Fu.C.26</b> | <b>Fu.C.27</b> | <b>Fu.C.28</b> | <b>Fu.C.29</b> | <b>Fu.C.30</b> |
| B.G.1       | Eigen gewicht en perm..  | 1.30           | 1.30           | 1.30           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           |
| B.G.2       | Permanent                | 1.30           | 1.30           | 1.30           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           |
| B.G.3       | Veranderlijk 1           |                | 0.54           | 0.54           | 1.35           |                |                |                |                | 1.35           | 1.35           |
| B.G.4       | Veranderlijk 2           | 0.54           | 0.54           | 0.54           |                | 1.35           |                |                |                | 1.35           |                |
| B.G.5       | Veranderlijk 3           | 0.54           | 0.54           | 0.54           |                |                | 1.35           |                |                |                | 1.35           |
| B.G.6       | Wind neerwaarts          |                | 0.45           |                |                |                |                | 1.50           |                |                |                |
| B.G.7       | Wind opwaarts            | 0.45           |                | 0.45           |                |                |                |                | 1.50           |                |                |
| B.G.8       | Eenheid t.b.v. stijfheid |                |                |                |                |                |                |                |                |                |                |
| <b>B.G.</b> | <b>Omschrijving</b>      | <b>Fu.C.31</b> | <b>Fu.C.32</b> | <b>Fu.C.33</b> | <b>Fu.C.34</b> | <b>Fu.C.35</b> | <b>Fu.C.36</b> | <b>Fu.C.37</b> | <b>Fu.C.38</b> | <b>Fu.C.39</b> | <b>Fu.C.40</b> |
| B.G.1       | Eigen gewicht en perm..  | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           |
| B.G.2       | Permanent                | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           |
| B.G.3       | Veranderlijk 1           | 1.35           | 1.35           |                |                |                |                |                | 1.35           | 1.35           | 1.35           |
| B.G.4       | Veranderlijk 2           |                |                | 1.35           | 1.35           | 1.35           |                |                | 1.35           | 1.35           | 1.35           |
| B.G.5       | Veranderlijk 3           |                |                | 1.35           |                |                | 1.35           | 1.35           | 1.35           |                |                |
| B.G.6       | Wind neerwaarts          | 1.50           |                |                | 1.50           |                | 1.50           |                |                | 1.50           |                |
| B.G.7       | Wind opwaarts            |                | 1.50           |                |                | 1.50           |                | 1.50           |                |                | 1.50           |
| B.G.8       | Eenheid t.b.v. stijfheid |                |                |                |                |                |                |                |                |                |                |
| <b>B.G.</b> | <b>Omschrijving</b>      | <b>Fu.C.41</b> | <b>Fu.C.42</b> | <b>Fu.C.43</b> | <b>Fu.C.44</b> | <b>Fu.C.45</b> | <b>Fu.C.46</b> | <b>Fu.C.47</b> | <b>Fu.C.48</b> | <b>Fu.C.49</b> | <b>Fu.C.50</b> |
| B.G.1       | Eigen gewicht en perm..  | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 0.90           | 0.90           | 0.90           | 0.90           |
| B.G.2       | Permanent                | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 1.20           | 0.90           | 0.90           | 0.90           | 0.90           |
| B.G.3       | Veranderlijk 1           | 1.35           | 1.35           |                |                | 1.35           | 1.35           |                |                |                |                |
| B.G.4       | Veranderlijk 2           |                |                | 1.35           | 1.35           | 1.35           | 1.35           | 1.35           |                |                |                |
| B.G.5       | Veranderlijk 3           | 1.35           | 1.35           | 1.35           | 1.35           | 1.35           | 1.35           |                | 1.35           |                |                |
| B.G.6       | Wind neerwaarts          | 1.50           |                | 1.50           |                | 1.50           |                |                |                | 1.50           |                |
| B.G.7       | Wind opwaarts            |                | 1.50           |                | 1.50           |                | 1.50           |                |                |                | 1.50           |
| B.G.8       | Eenheid t.b.v. stijfheid |                |                |                |                |                |                |                |                |                |                |
| <b>B.G.</b> | <b>Omschrijving</b>      | <b>Fu.C.51</b> | <b>Fu.C.52</b> | <b>Fu.C.53</b> | <b>Fu.C.54</b> | <b>Fu.C.55</b> | <b>Fu.C.56</b> | <b>Fu.C.57</b> | <b>Fu.C.58</b> | <b>Fu.C.59</b> | <b>Fu.C.60</b> |
| B.G.1       | Eigen gewicht en perm..  | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           |
| B.G.2       | Permanent                | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           |
| B.G.3       | Veranderlijk 1           | 1.35           | 1.35           | 1.35           | 1.35           |                |                |                |                |                | 1.35           |
| B.G.4       | Veranderlijk 2           | 1.35           |                |                |                | 1.35           | 1.35           | 1.35           |                |                | 1.35           |
| B.G.5       | Veranderlijk 3           |                | 1.35           |                |                | 1.35           |                |                | 1.35           | 1.35           | 1.35           |
| B.G.6       | Wind neerwaarts          |                |                | 1.50           |                |                | 1.50           |                | 1.50           |                |                |
| B.G.7       | Wind opwaarts            |                |                |                | 1.50           |                |                | 1.50           |                | 1.50           |                |
| B.G.8       | Eenheid t.b.v. stijfheid |                |                |                |                |                |                |                |                |                |                |
| <b>B.G.</b> | <b>Omschrijving</b>      | <b>Fu.C.61</b> | <b>Fu.C.62</b> | <b>Fu.C.63</b> | <b>Fu.C.64</b> | <b>Fu.C.65</b> | <b>Fu.C.66</b> | <b>Fu.C.67</b> | <b>Fu.C.68</b> |                |                |
| B.G.1       | Eigen gewicht en perm..  | 0.90           | 1.20           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           |                |                |
| B.G.2       | Permanent                | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           | 0.90           |                |                |
| B.G.3       | Veranderlijk 1           | 1.35           | 1.35           | 1.35           | 1.35           |                |                | 1.35           | 1.35           |                |                |
| B.G.4       | Veranderlijk 2           | 1.35           | 1.35           |                |                | 1.35           | 1.35           | 1.35           | 1.35           |                |                |
| B.G.5       | Veranderlijk 3           |                |                | 1.35           | 1.35           | 1.35           | 1.35           | 1.35           | 1.35           |                |                |
| B.G.6       | Wind neerwaarts          | 1.50           |                | 1.50           |                | 1.50           |                | 1.50           |                |                |                |
| B.G.7       | Wind opwaarts            |                | 1.50           |                | 1.50           |                | 1.50           |                | 1.50           |                |                |
| B.G.8       | Eenheid t.b.v. stijfheid |                |                |                |                |                |                |                |                |                |                |

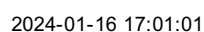
#### Karakteristiek

|             |                          |                  |                |                |                |                |                |                |                |                |                |
|-------------|--------------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>B.G.</b> | <b>Omschrijving</b>      | <b>Ka.C.(w1)</b> | <b>Ka.C.1</b>  | <b>Ka.C.2</b>  | <b>Ka.C.3</b>  | <b>Ka.C.4</b>  | <b>Ka.C.5</b>  | <b>Ka.C.6</b>  | <b>Ka.C.7</b>  | <b>Ka.C.8</b>  | <b>Ka.C.9</b>  |
| B.G.1       | Eigen gewicht en perm..  | 1.00             | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.2       | Permanent                |                  | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.3       | Veranderlijk 1           |                  | 1.00           |                |                |                |                | 1.00           | 1.00           | 1.00           | 1.00           |
| B.G.4       | Veranderlijk 2           |                  |                | 1.00           |                |                |                | 1.00           |                |                |                |
| B.G.5       | Veranderlijk 3           |                  |                |                | 1.00           |                |                |                | 1.00           |                |                |
| B.G.6       | Wind neerwaarts          |                  |                |                |                | 1.00           |                |                |                | 1.00           |                |
| B.G.7       | Wind opwaarts            |                  |                |                |                |                | 1.00           |                |                |                | 1.00           |
| B.G.8       | Eenheid t.b.v. stijfheid |                  |                |                |                |                |                |                |                |                |                |
| <b>B.G.</b> | <b>Omschrijving</b>      | <b>Ka.C.10</b>   | <b>Ka.C.11</b> | <b>Ka.C.12</b> | <b>Ka.C.13</b> | <b>Ka.C.14</b> | <b>Ka.C.15</b> | <b>Ka.C.16</b> | <b>Ka.C.17</b> | <b>Ka.C.18</b> | <b>Ka.C.19</b> |
| B.G.1       | Eigen gewicht en perm..  | 1.00             | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           | 1.00           |

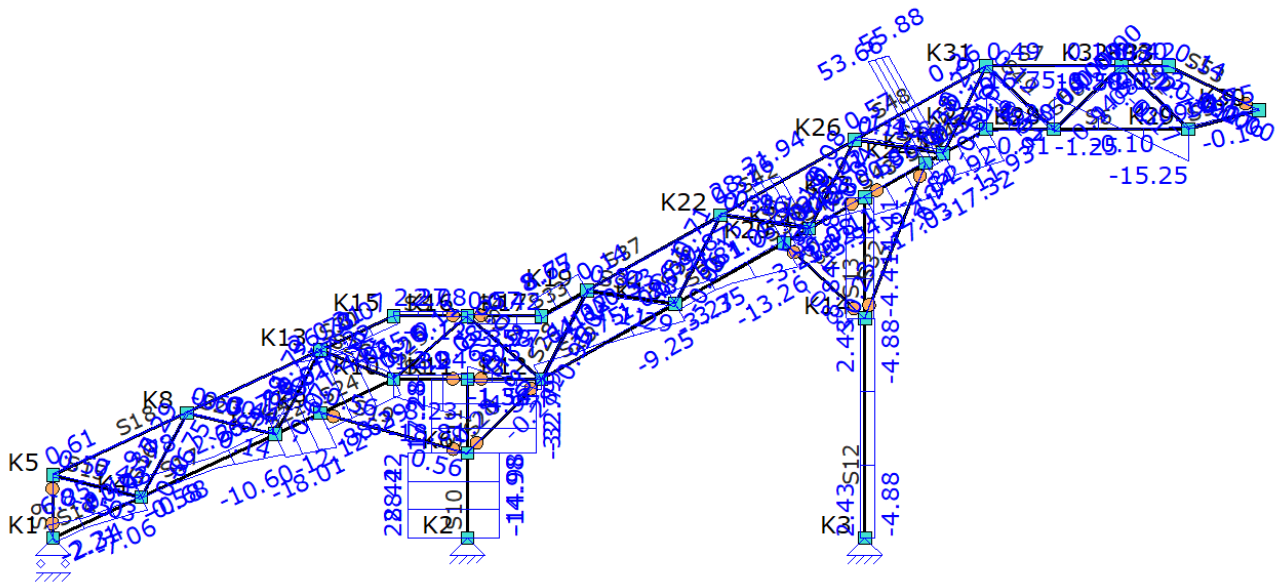
|       |                          |      |      |      |      |      |      |      |      |      |
|-------|--------------------------|------|------|------|------|------|------|------|------|------|
| B.G.2 | Permanent                | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| B.G.3 | Veranderlijk 1           |      |      |      |      | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| B.G.4 | Veranderlijk 2           | 1.00 | 1.00 | 1.00 |      | 1.00 | 1.00 | 1.00 |      |      |
| B.G.5 | Veranderlijk 3           | 1.00 |      |      | 1.00 | 1.00 |      |      | 1.00 | 1.00 |
| B.G.6 | Wind neerwaarts          |      | 1.00 |      | 1.00 |      | 1.00 |      | 1.00 |      |
| B.G.7 | Wind opwaarts            |      |      | 1.00 | 1.00 |      |      | 1.00 |      | 1.00 |
| B.G.8 | Eenheid t.b.v. stijfheid |      |      |      |      |      |      |      |      |      |

### Quasi-permanent

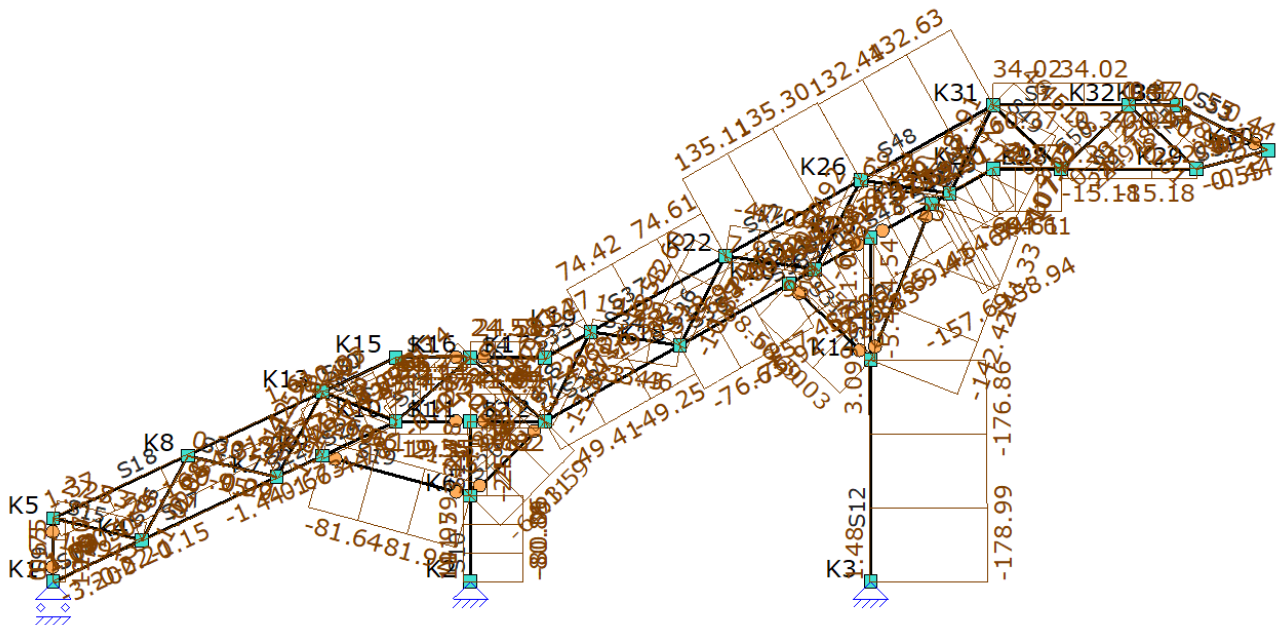
Fu.C. Omhullende Momenten (My)



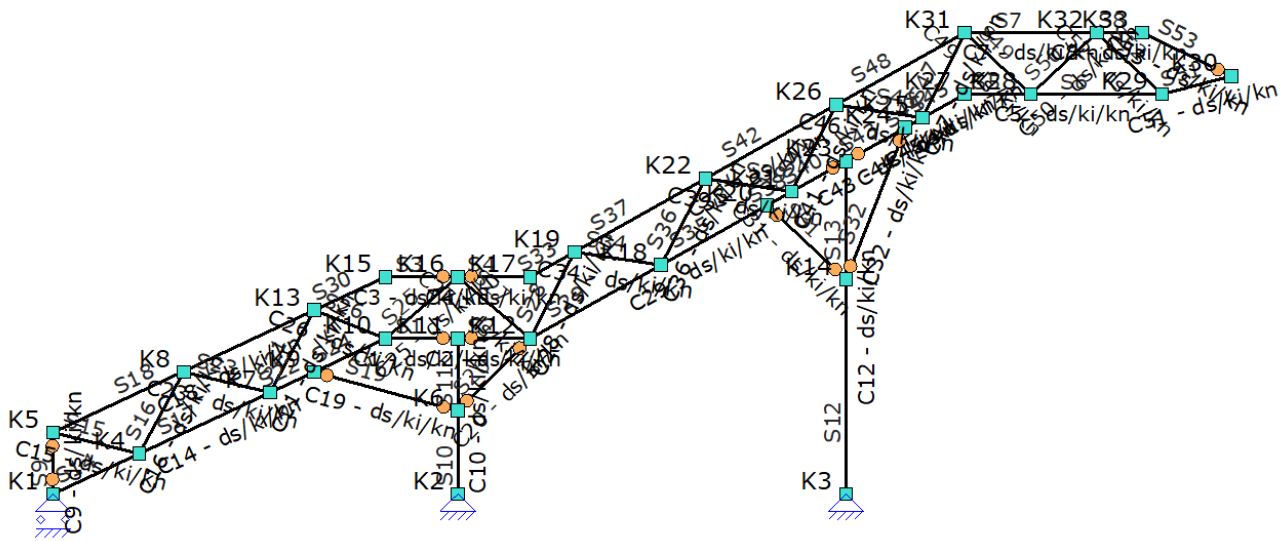
Fu.C. Omhullende Dwarskracht (Vz)



Fu.C. Omhullende Normaalkracht (Nx)







## INVOER GEGEVENS

### KNIKLENGTEGEGEVENS

| Staaf                | Profiel | Lsys  | Lokale Y-as<br>Methode | Lbuc  | Lokale Z-as<br>Methode    | Lbuc   | Lbuc/Lsys |
|----------------------|---------|-------|------------------------|-------|---------------------------|--------|-----------|
| C1-V1 (0.000-1.170)  | P1      | 1.170 | Cons. gesch.           | 1.170 | 1.000 Cons. gesch.        | 1.170  | 1.000     |
| C2-V1 (0.000-1.170)  | P1      | 1.170 | Cons. gesch.           | 1.170 | 1.000 Cons. gesch.        | 1.170  | 1.000     |
| C3-V1 (0.000-1.170)  | P2      | 1.170 | Cons. gesch.           | 1.170 | 1.000 Cons. gesch.        | 1.170  | 1.000     |
| C4-V1 (0.000-1.170)  | P2      | 1.170 | Cons. gesch.           | 1.170 | 1.000 Cons. gesch.        | 1.170  | 1.000     |
| C5-V1 (0.000-3.200)  | P1      | 3.200 | Cons. gesch.           | 3.200 | 1.000 Cons. gesch.        | 3.200  | 1.000     |
| C7-V1 (0.000-2.140)  | P2      | 2.140 | Cons. gesch.           | 2.140 | 1.000 handmatig geschoord | 4.280  | 2.000     |
| C8-V1 (0.000-0.740)  | P2      | 0.740 | Cons. gesch.           | 0.740 | 1.000 Cons. gesch.        | 0.740  | 1.000     |
| C9-V1 (0.000-1.000)  | P3      | 1.000 | Cons. gesch.           | 1.000 | 1.000 Cons. gesch.        | 1.000  | 1.000     |
| C10-V1 (0.000-2.520) | P6      | 2.520 | Cons. gesch.           | 2.520 | 1.000 Cons. gesch.        | 2.520  | 1.000     |
| C12-V1 (0.000-5.400) | P6      | 5.400 | Cons. gesch.           | 5.400 | 1.000 Cons. gesch.        | 5.400  | 1.000     |
| C14-V1 (0.000-5.950) | P1      | 5.950 | Cons. gesch.           | 5.950 | 1.000 handmatig geschoord | 11.900 | 2.000     |
| C15-V1 (0.000-1.442) | P3      | 1.442 | Cons. gesch.           | 1.442 | 1.000 Cons. gesch.        | 1.442  | 1.000     |
| C16-V1 (0.000-1.508) | P3      | 1.508 | Cons. gesch.           | 1.508 | 1.000 Cons. gesch.        | 1.508  | 1.000     |
| C18-V1 (0.000-5.950) | P2      | 5.950 | Cons. gesch.           | 5.950 | 1.000 handmatig geschoord | 11.900 | 2.000     |
| C19-V1 (0.000-2.409) | P5      | 2.409 | Cons. gesch.           | 2.409 | 1.000 Cons. gesch.        | 2.409  | 1.000     |
| C20-V1 (0.000-1.655) | P5      | 1.655 | Cons. gesch.           | 1.655 | 1.000 Cons. gesch.        | 1.655  | 1.000     |
| C21-V1 (0.000-1.515) | P3      | 1.515 | Cons. gesch.           | 1.515 | 1.000 Cons. gesch.        | 1.515  | 1.000     |
| C23-V1 (0.000-1.438) | P3      | 1.438 | Cons. gesch.           | 1.438 | 1.000 Cons. gesch.        | 1.438  | 1.000     |
| C25-V1 (0.000-1.539) | P3      | 1.539 | Cons. gesch.           | 1.539 | 1.000 Cons. gesch.        | 1.539  | 1.000     |
| C26-V1 (0.000-1.243) | P3      | 1.243 | Cons. gesch.           | 1.243 | 1.000 Cons. gesch.        | 1.243  | 1.000     |
| C27-V1 (0.000-1.539) | P3      | 1.539 | Cons. gesch.           | 1.539 | 1.000 Cons. gesch.        | 1.539  | 1.000     |
| C28-V1 (0.000-1.579) | P3      | 1.579 | Cons. gesch.           | 1.579 | 1.000 Cons. gesch.        | 1.579  | 1.000     |
| C29-V1 (0.000-5.874) | P1      | 5.874 | Cons. gesch.           | 5.874 | 1.000 handmatig geschoord | 11.749 | 2.000     |
| C31-V1 (0.000-1.755) | P5      | 1.755 | Cons. gesch.           | 1.755 | 1.000 Cons. gesch.        | 1.755  | 1.000     |
| C32-V1 (0.000-2.641) | P5      | 2.641 | Cons. gesch.           | 2.641 | 1.000 Cons. gesch.        | 2.641  | 1.000     |
| C33-V1 (0.000-8.077) | P2      | 8.077 | Cons. gesch.           | 8.077 | 1.000 handmatig geschoord | 16.155 | 2.000     |
| C34-V1 (0.000-1.416) | P3      | 1.416 | Cons. gesch.           | 1.416 | 1.000 Cons. gesch.        | 1.416  | 1.000     |
| C36-V1 (0.000-1.578) | P3      | 1.578 | Cons. gesch.           | 1.578 | 1.000 Cons. gesch.        | 1.578  | 1.000     |
| C39-V1 (0.000-1.417) | P3      | 1.417 | Cons. gesch.           | 1.417 | 1.000 Cons. gesch.        | 1.417  | 1.000     |
| C41-V1 (0.000-1.578) | P3      | 1.578 | Cons. gesch.           | 1.578 | 1.000 Cons. gesch.        | 1.578  | 1.000     |
| C43-V1 (0.000-1.101) | P1      | 1.101 | Cons. gesch.           | 1.101 | 1.000 Cons. gesch.        | 1.101  | 1.000     |
| C44-V1 (0.000-0.321) | P1      | 0.321 | Cons. gesch.           | 0.321 | 1.000 Cons. gesch.        | 0.321  | 1.000     |
| C45-V1 (0.000-0.780) | P1      | 0.780 | Cons. gesch.           | 0.780 | 1.000 Cons. gesch.        | 0.780  | 1.000     |

m

m

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Staaft               | Profiel | Lsys  | Lokale Y-as<br>Methode | Lbuc  | Lbuc/Lsys | Lokale Z-as<br>Methode | Lbuc  | Lbuc/Lsys |
|----------------------|---------|-------|------------------------|-------|-----------|------------------------|-------|-----------|
| C46-V1 (0.000-1.417) | P3      | 1.417 | Cons. gesch.           | 1.417 | 1.000     | Cons. gesch.           | 1.417 | 1.000     |
| C47-V1 (0.000-1.541) | P3      | 1.541 | Cons. gesch.           | 1.541 | 1.000     | Cons. gesch.           | 1.541 | 1.000     |
| C49-V1 (0.000-1.465) | P3      | 1.465 | Cons. gesch.           | 1.465 | 1.000     | Cons. gesch.           | 1.465 | 1.000     |
| C50-V1 (0.000-1.465) | P3      | 1.465 | Cons. gesch.           | 1.465 | 1.000     | Cons. gesch.           | 1.465 | 1.000     |
| C51-V1 (0.000-1.159) | P2      | 1.159 | Cons. gesch.           | 1.159 | 1.000     | Cons. gesch.           | 1.159 | 1.000     |
| C52-V1 (0.000-1.457) | P3      | 1.457 | Cons. gesch.           | 1.457 | 1.000     | Cons. gesch.           | 1.457 | 1.000     |
| C53-V1 (0.000-1.601) | P2      | 1.601 | Cons. gesch.           | 1.601 | 1.000     | Cons. gesch.           | 1.601 | 1.000     |
|                      |         |       |                        | m     |           |                        | m     |           |

#### KIPSTEUNENGEGEVENS

| Staaft               | Profiel | Begin    | Eind     | Kipsteunen boven | Kipsteunen onder | Aangrijphoogte |
|----------------------|---------|----------|----------|------------------|------------------|----------------|
| C1-V1 (0.000-1.170)  | P1      | Gesteund | Gesteund |                  |                  | Centrum        |
| C2-V1 (0.000-1.170)  | P1      | Gesteund | Gesteund |                  |                  | Centrum        |
| C3-V1 (0.000-1.170)  | P2      | Gesteund | Gesteund |                  |                  | Centrum        |
| C4-V1 (0.000-1.170)  | P2      | Gesteund | Gesteund |                  |                  | Centrum        |
| C5-V1 (0.000-3.200)  | P1      | Gesteund | Gesteund |                  |                  | Centrum        |
| C7-V1 (0.000-2.140)  | P2      | Gesteund | Gesteund |                  |                  | Centrum        |
| C8-V1 (0.000-0.740)  | P2      | Gesteund | Gesteund |                  |                  | Centrum        |
| C9-V1 (0.000-1.000)  | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C10-V1 (0.000-2.520) | P6      | Gesteund | Gesteund |                  |                  | Centrum        |
| C12-V1 (0.000-5.400) | P6      | Gesteund | Gesteund |                  |                  | Centrum        |
| C14-V1 (0.000-5.950) | P1      | Gesteund | Gesteund |                  |                  | Centrum        |
| C15-V1 (0.000-1.442) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C16-V1 (0.000-1.508) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C18-V1 (0.000-5.950) | P2      | Gesteund | Gesteund |                  |                  | Centrum        |
| C19-V1 (0.000-2.409) | P5      | Gesteund | Gesteund |                  |                  | Centrum        |
| C20-V1 (0.000-1.655) | P5      | Gesteund | Gesteund |                  |                  | Centrum        |
| C21-V1 (0.000-1.515) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C23-V1 (0.000-1.438) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C25-V1 (0.000-1.539) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C26-V1 (0.000-1.243) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C27-V1 (0.000-1.539) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C28-V1 (0.000-1.579) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C29-V1 (0.000-5.874) | P1      | Gesteund | Gesteund |                  |                  | Centrum        |
| C31-V1 (0.000-1.755) | P5      | Gesteund | Gesteund |                  |                  | Centrum        |
| C32-V1 (0.000-2.641) | P5      | Gesteund | Gesteund |                  |                  | Centrum        |
| C33-V1 (0.000-8.077) | P2      | Gesteund | Gesteund |                  |                  | Centrum        |
| C34-V1 (0.000-1.416) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C36-V1 (0.000-1.578) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C39-V1 (0.000-1.417) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C41-V1 (0.000-1.578) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C43-V1 (0.000-1.101) | P1      | Gesteund | Gesteund |                  |                  | Centrum        |
| C44-V1 (0.000-0.321) | P1      | Gesteund | Gesteund |                  |                  | Centrum        |
| C45-V1 (0.000-0.780) | P1      | Gesteund | Gesteund |                  |                  | Centrum        |
| C46-V1 (0.000-1.417) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C47-V1 (0.000-1.541) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C49-V1 (0.000-1.465) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C50-V1 (0.000-1.465) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C51-V1 (0.000-1.159) | P2      | Gesteund | Gesteund |                  |                  | Centrum        |
| C52-V1 (0.000-1.457) | P3      | Gesteund | Gesteund |                  |                  | Centrum        |
| C53-V1 (0.000-1.601) | P2      | Gesteund | Gesteund |                  |                  | Centrum        |

#### STAALTOETS RESULTATEN

NEN-EN1993-1-1:2016/NB:2016

Uitgangspunten berekening voor staalcontrole  
Alpha;cr = 37.07 > 10;

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

## DOORSNEDE (#6.2)

Staaf C1-V1 (0.000-1.170)

| Maatgevende combinatie |                   | Fu.C.39   | Doorsnedeklasse  |        |                   | 1         |
|------------------------|-------------------|-----------|------------------|--------|-------------------|-----------|
| Maatgevende positie    |                   | 0.000 m   |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | 66.73 kN  | Ontwerpweerstand | (6.6)  | N <sub>Rd</sub>   | 989.76 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 15.82 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 67.06 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 9.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 67.06 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 5.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 363.79 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -8.23 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 363.79 kN |

## Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 2.3 % | Verhouding         | 1.4 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

## Buig- en normaalkracht #6.2.9

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    |               | 0.067     |                    |               | 0.067     |
| Ontwerpweerstand   | $n$           | 0.067     | Ontwerpweerstand   | $n$           | 0.067     |
|                    | $M_{pl,y,Rd}$ | 67.06 kNm |                    | $M_{pl,z,Rd}$ | 67.06 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 67.06 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 67.06 kNm |

## Dubbele buiging #6.2.10 (7)

|                  |         |                |           |                  |         |                |           |
|------------------|---------|----------------|-----------|------------------|---------|----------------|-----------|
|                  |         | $\alpha_1$     | 2.000     |                  |         | $\alpha_2$     | 2.000     |
|                  |         | $\beta_0$      | 1.000     |                  |         | $\beta_1$      | 1.000     |
| Ontwerpweerstand | (NB.58) | $M_{y,N,V,Rd}$ | 69.03 kNm | Ontwerpweerstand | (NB.59) | $M_{z,N,V,Rd}$ | 69.03 kNm |

## Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.07  
NEN-EN1993-1-1(6.12): UC (y) = 0.24  
NEN-EN1993-1-1(6.12): UC (z) = 0.13  
NEN-EN1993-1-1(6.17): UC (y) = 0.01  
NEN-EN1993-1-1(6.17): UC (z) = 0.02  
NEN-EN1993-1-1(6.31): UC (y) = 0.24  
NEN-EN1993-1-1(6.31): UC (z) = 0.13  
NEN-EN1993-1-1(NB.33): UC = 0.27  
NEN-EN1993-1-1(NB.52): UC = 0.07

## KNIK (#6.3.1)

Staaf C1-V1 (0.000-1.170)

|                             |             |                 |                             |             |                 |  |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|--|
| Profiel                     |             | N219.1/6.3      | Doorsnedeklasse             |             | 1               |  |
| Maatgevende combinatie      |             | Fu.C.42         |                             |             |                 |  |
| Maatgevend veld             |             | 0.000 - 1.170 m | Maatgevend veld             |             | 0.000 - 1.170 m |  |
| Normaalkracht               | $N_{Ed,y}$  | -4.41 kN        | Normaalkracht               | $N_{Ed,z}$  | -4.41 kN        |  |
| Lengte                      | $L_{cr,y}$  | 1.170 m         | Lengte                      | $L_{cr,z}$  | 1.170 m         |  |
| Elastische kritische kracht | $N_{cr,y}$  | 36127.93 kN     | Elastische kritische kracht | $N_{cr,z}$  | 36127.93 kN     |  |
| Slankheid                   | $\lambda_y$ | 0.166           | Slankheid                   | $\lambda_z$ | 0.166           |  |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |  |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |  |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |  |
|                             |             | 0.510           |                             |             | 0.510           |  |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |  |
|                             |             | 1.000           |                             |             | 1.000           |  |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |  |
|                             |             | 989.76 kN       |                             |             | 989.76 kN       |  |

NEN-EN1993-1-1(6.46): UC = 0.00

## KIP (#6.3.2)

Staaf C1-V1 (0.000-1.170)

|                        |            |                                             |         |
|------------------------|------------|---------------------------------------------|---------|
| Equivalente profiel    | N219.1/6.3 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1     | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen       |                                             |         |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.62 kNm |
| Veld einde        |   | 1.170 m | Moment (eind)  | $M_y$ | 0.00 kNm  |
| Lengte            | L | 1.170 m | Moment (max)   | $M_y$ | 0.00 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                    |             |                |               |         |
|----------------|--------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt |                    | NB.NB.1 (1) |                | $\beta$       | -0.00   |
| Lengte         | $L_{st}$           | 1.170 m     |                | $\beta$       | -0.000  |
| Lengte         | $L_{kip}$          | 1.170 m     | (NB.NB.12)     | S             | 0.000 m |
| Coefficient    | $C_1$              | 1.750       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient    | $C_2$ (Berekend)   | 0.000       | Lengte         | $L_g$         | 1.170 m |
| Coefficient    | (NB.NB.11) C       | 5.498       | Reductiefactor | $K_{red}$     | 0.000   |
|                | (NB.NB.6) $M_{cr}$ | 0.00 kNm    |                |               |         |

Ontwerpweerstand (6.55)  $M_{b,Rd,y}$  67.06 kNm

Ontwerpweerstand (6.55)  $M_{b,Rd,z}$  67.06 kNm

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C1-V1 (0.000-1.170)

|                        |            |                 |   |
|------------------------|------------|-----------------|---|
| Profiel                | N219.1/6.3 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.42    |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 3.79 kNm    | M         | 0.00 kNm       | M          | 3.79 kNm    |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | 2.84 kNm    | $\psi$    | 1.000          | $M_s$      | 2.84 kNm    |
| $\psi$     | 0.000       | Belasting | Geconcentreerd | $\psi$     | 0.000       |
| $\alpha_s$ | 0.752       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.752       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.801       |           |                | $C_{mLT}$  | 0.801       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.801           |                  | $k_{yz}$          | 0.600           |
|                  | $k_{zy}$          | 0.481           |                  | $k_{zz}$          | 1.000           |
| Maatgevend veld  |                   | 0.000 - 1.170 m | Maatgevend veld  |                   | 0.000 - 1.170 m |
| Normaalkracht    | $N_{y,Ed}$        | -4.41 kN        | Normaalkracht    | $N_{z,Ed}$        | -4.41 kN        |
| Lengte           | $L_{y,cr}$        | 1.170 m         | Lengte           | $L_{z,cr}$        | 1.170 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 1.000           | Reductiefactor   | (6.49) $\chi_z$   | 1.000           |
| Ontwerpweerstand | $N_{Rk}$          | 989.76 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.170 m | Maatgevend veld  |                   | 0.000 - 1.170 m |
| Buigmoment       | $M_{y,Ed}$        | 3.79 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 67.06 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 67.06 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.05

NEN-EN1993-1-1(6.62): UC = 0.03

### DOORSNEDE (#6.2)

Staaf C2-V1 (0.000-1.170)

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                        |            |          |                  |        |            |           |
|------------------------|------------|----------|------------------|--------|------------|-----------|
| Maatgevende combinatie |            | Fu.C.39  | Doorsnedeklasse  |        | 1          |           |
| Maatgevende positie    |            | 0.669 m  |                  |        |            |           |
| Normaalkracht          | $N_{Ed}$   | 41.69 kN | Ontwerpweerstand | (6.6)  | $N_{Rd}$   | 989.76 kN |
| Buigmoment             | $M_{y,Ed}$ | 2.03 kNm | Ontwerpweerstand | (6.13) | $M_{y,Rd}$ | 67.06 kNm |
| Buigmoment             | $M_{z,Ed}$ | 9.00 kNm | Ontwerpweerstand | (6.13) | $M_{z,Rd}$ | 67.06 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 5.00 kN  | Ontwerpweerstand | (6.18) | $V_{y,Rd}$ | 363.79 kN |
| Dwarskracht            | $V_{z,Ed}$ | 0.00 kN  | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ | 363.79 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.0 % | Verhouding         | 1.4 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    |               | 0.042     |                    |               | 0.042     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 67.06 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 67.06 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 67.06 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 67.06 kNm |

#### Dubbele buiging #6.2.10 (7)

|                  |         |                |           |                  |         |                |           |
|------------------|---------|----------------|-----------|------------------|---------|----------------|-----------|
|                  |         | $\alpha_1$     | 2.000     |                  |         | $\alpha_2$     | 2.000     |
|                  |         | $\beta_0$      | 1.000     |                  |         | $\beta_1$      | 1.000     |
| Ontwerpweerstand | (NB.58) | $M_{y,N,V,Rd}$ | 69.42 kNm | Ontwerpweerstand | (NB.59) | $M_{z,N,V,Rd}$ | 69.42 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.04  
 NEN-EN1993-1-1(6.12): UC (y) = 0.03  
 NEN-EN1993-1-1(6.12): UC (z) = 0.13  
 NEN-EN1993-1-1(6.17): UC (y) = 0.01  
 NEN-EN1993-1-1(6.17): UC (z) = 0.00  
 NEN-EN1993-1-1(6.31): UC (y) = 0.03  
 NEN-EN1993-1-1(6.31): UC (z) = 0.13  
 NEN-EN1993-1-1(NB.33): UC = 0.14  
 NEN-EN1993-1-1(NB.52): UC = 0.02

#### KNIK (#6.3.1)

Staaf C2-V1 (0.000-1.170)

|                             |             |                 |                             |                  |                 |              |           |
|-----------------------------|-------------|-----------------|-----------------------------|------------------|-----------------|--------------|-----------|
| Profiel                     |             | N219.1/6.3      | Doorsnedeklasse             |                  | 1               |              |           |
| Maatgevende combinatie      |             | Fu.C.59         |                             |                  |                 |              |           |
| Maatgevend veld             |             | 0.000 - 1.170 m | Maatgevend veld             |                  | 0.000 - 1.170 m |              |           |
| Normaalkracht               | $N_{Ed,y}$  | -9.82 kN        | Normaalkracht               | $N_{Ed,z}$       | -9.82 kN        |              |           |
| Lengte                      | $L_{cr,y}$  | 1.170 m         | Lengte                      | $L_{cr,z}$       | 1.170 m         |              |           |
| Elastische kritische kracht | $N_{cr,y}$  | 36127.93 kN     | Elastische kritische kracht | $N_{cr,z}$       | 36127.93 kN     |              |           |
| Slankheid                   | $\lambda_y$ | 0.166           | Slankheid                   | $\lambda_z$      | 0.166           |              |           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2        | a               |              |           |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1        | $\alpha_z$      | 0.210        |           |
|                             |             | $\Phi_y$        |                             |                  | $\Phi_z$        | 0.510        |           |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)           | $\chi_z$        | 1.000        |           |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | 989.76 kN                   | Ontwerpweerstand | (6.47)          | $N_{b,Rd,z}$ | 989.76 kN |

NEN-EN1993-1-1(6.46): UC = 0.01

#### KIP (#6.3.2)

Staaf C2-V1 (0.000-1.170)

|                        |  |            |                                             |  |         |  |
|------------------------|--|------------|---------------------------------------------|--|---------|--|
| Equivalent profiel     |  | N219.1/6.3 | Doorsnedeklasse                             |  | 1       |  |
| Maatgevende combinatie |  | Bi.C.1     | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |  |
| Kipsteunen             |  | Geen       |                                             |  |         |  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm  |
| Veld einde        |   | 1.170 m | Moment (eind)  | $M_y$ | -0.17 kNm |
| Lengte            | L | 1.170 m | Moment (max)   | $M_y$ | 0.00 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |             |                |               |         |
|------------------|---------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt   |                     | NB.NB.1 (1) |                | $\beta$       | 0.00    |
| Lengte           | $L_{st}$            | 1.170 m     | Lengte         | $L_{kip}$     | 1.170 m |
|                  | (NB.NB.12) S        | 0.000 m     |                |               |         |
| Coefficient      | $C_1$               | 1.750       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient      | $C_2$ (Berekend)    | 0.000       | Lengte         | $L_g$         | 1.170 m |
| Coefficient      | (NB.NB.11) C        | 5.498       | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6) $M_{cr}$  | 0.00 kNm    |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 67.06 kNm   |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 67.06 kNm   |                |               |         |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

#### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C2-V1 (0.000-1.170)

|                        |            |                 |   |
|------------------------|------------|-----------------|---|
| Profiel                | N219.1/6.3 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.59    |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -1.55 kNm   | M         | 0.00 kNm       | M          | -1.55 kNm   |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | -0.84 kNm   | $\psi$    | 1.000          | $M_s$      | -0.84 kNm   |
| $\psi$     | -0.000      | Belasting | Geconcentreerd | $\psi$     | -0.000      |
| $\alpha_s$ | 0.540       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.540       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.632       |           |                | $C_{mLT}$  | 0.632       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.632           |                  | $k_{yz}$          | 0.600           |
|                  | $k_{zy}$          | 0.379           |                  | $k_{zz}$          | 1.000           |
| Maatgevend veld  |                   | 0.000 - 1.170 m | Maatgevend veld  |                   | 0.000 - 1.170 m |
| Normaalkracht    | $N_{y,Ed}$        | -9.82 kN        | Normaalkracht    | $N_{z,Ed}$        | -9.82 kN        |
| Lengte           | $L_{y,cr}$        | 1.170 m         | Lengte           | $L_{z,cr}$        | 1.170 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 1.000           | Reductiefactor   | (6.49) $\chi_z$   | 1.000           |
| Ontwerpweerstand | $N_{Rk}$          | 989.76 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.170 m | Maatgevend veld  |                   | 0.000 - 1.170 m |
| Buigmoment       | $M_{y,Ed}$        | 1.55 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 67.06 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 67.06 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.02

NEN-EN1993-1-1(6.62): UC = 0.02

#### DOORSNEDE (#6.2)

Staaf C3-V1 (0.000-1.170)

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                               |            |                    |                  |        |            |           |
|-----------------------------------------------|------------|--------------------|------------------|--------|------------|-----------|
| Maatgevende combinatie<br>Maatgevende positie |            | Fu.C.41<br>0.000 m | Doorsnedeklasse  |        | 1          |           |
| Normaalkracht                                 | $N_{Ed}$   | -14.87 kN          | Ontwerpweerstand | (6.10) | $N_{Rd}$   | 400.74 kN |
| Buigmoment                                    | $M_{y,Ed}$ | -2.54 kNm          | Ontwerpweerstand | (6.13) | $M_{y,Rd}$ | 17.31 kNm |
| Buigmoment                                    | $M_{z,Ed}$ | 7.00 kNm           | Ontwerpweerstand | (6.13) | $M_{z,Rd}$ | 17.31 kNm |
| Dwarskracht                                   | $V_{y,Ed}$ | 4.00 kN            | Ontwerpweerstand | (6.18) | $V_{y,Rd}$ | 147.29 kN |
| Dwarskracht                                   | $V_{z,Ed}$ | 2.27 kN            | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ | 147.29 kN |

### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 1.5 % | Verhouding         | 2.7 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

### Buig- en normaalkracht #6.2.9

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    | n             | 0.037     |                    | n             | 0.037     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 17.31 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 17.31 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 17.31 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 17.31 kNm |

### Dubbele buiging #6.2.10 (7)

|                          |                |           |                          |                |           |
|--------------------------|----------------|-----------|--------------------------|----------------|-----------|
|                          | $\alpha_1$     | 2.000     |                          | $\alpha_2$     | 2.000     |
|                          | $\beta_0$      | 1.000     |                          | $\beta_1$      | 1.000     |
| Ontwerpweerstand (NB.58) | $M_{y,N,V,Rd}$ | 17.94 kNm | Ontwerpweerstand (NB.59) | $M_{z,N,V,Rd}$ | 17.94 kNm |

### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.04  
 NEN-EN1993-1-1(6.12): UC (y) = 0.15  
 NEN-EN1993-1-1(6.12): UC (z) = 0.40  
 NEN-EN1993-1-1(6.17): UC (y) = 0.03  
 NEN-EN1993-1-1(6.17): UC (z) = 0.02  
 NEN-EN1993-1-1(6.31): UC (y) = 0.15  
 NEN-EN1993-1-1(6.31): UC (z) = 0.40  
 NEN-EN1993-1-1(NB.33): UC = 0.43  
 NEN-EN1993-1-1(NB.52): UC = 0.17

### KNIK (#6.3.1)

Staaf C3-V1 (0.000-1.170)

|                             |             |                 |                             |             |                 |  |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|--|
| Profiel                     |             | N139.7/4        | Doorsnedeklasse             |             | 1               |  |
| Maatgevende combinatie      |             | Fu.C.41         |                             |             |                 |  |
| Maatgevend veld             |             | 0.000 - 1.170 m | Maatgevend veld             |             | 0.000 - 1.170 m |  |
| Normaalkracht               | $N_{Ed,y}$  | -14.87 kN       | Normaalkracht               | $N_{Ed,z}$  | -14.87 kN       |  |
| Lengte                      | $L_{cr,y}$  | 1.170 m         | Lengte                      | $L_{cr,z}$  | 1.170 m         |  |
| Elastische kritische kracht | $N_{cr,y}$  | 5948.18 kN      | Elastische kritische kracht | $N_{cr,z}$  | 5948.18 kN      |  |
| Slankheid                   | $\lambda_y$ | 0.260           | Slankheid                   | $\lambda_z$ | 0.260           |  |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |  |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |  |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |  |
|                             |             | 0.540           |                             |             | 0.540           |  |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |  |
|                             |             | 0.987           |                             |             | 0.987           |  |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |  |
|                             |             | 395.44 kN       |                             |             | 395.44 kN       |  |

NEN-EN1993-1-1(6.46): UC = 0.04

### KIP (#6.3.2)

Staaf C3-V1 (0.000-1.170)

|                        |  |          |                                             |         |
|------------------------|--|----------|---------------------------------------------|---------|
| Equivalente profiel    |  | N139.7/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |         |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.24 kNm |
| Veld einde        |   | 1.170 m | Moment (eind)  | $M_y$ | 0.00 kNm  |
| Lengte            | L | 1.170 m | Moment (max)   | $M_y$ | 0.00 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |             |                |               |         |
|------------------|---------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt   |                     | NB.NB.1 (1) |                | $\beta$       | -0.00   |
| Lengte           | $L_{st}$            | 1.170 m     |                | $\beta$       | -0.000  |
| Lengte           | $L_{kip}$           | 1.170 m     | (NB.NB.12)     | S             | 0.000 m |
| Coefficient      | $C_1$               | 1.750       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient      | $C_2$ (Berekend)    | 0.000       | Lengte         | $L_g$         | 1.170 m |
| Coefficient      | (NB.NB.11) C        | 5.498       | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6) $M_{cr}$  | 0.00 kNm    |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 17.31 kNm   |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 17.31 kNm   |                |               |         |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

#### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C3-V1 (0.000-1.170)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N139.7/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.41  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -2.54 kNm   | M         | 0.00 kNm       | M          | -2.54 kNm   |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | -1.24 kNm   | $\psi$    | 1.000          | $M_s$      | -1.24 kNm   |
| $\psi$     | -0.000      | Belasting | Geconcentreerd | $\psi$     | -0.000      |
| $\alpha_s$ | 0.489       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.489       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.591       |           |                | $C_{mLT}$  | 0.591       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.593           |                  | $k_{yz}$          | 0.601           |
|                  | $k_{zy}$          | 0.356           |                  | $k_{zz}$          | 1.002           |
| Maatgevend veld  |                   | 0.000 - 1.170 m | Maatgevend veld  |                   | 0.000 - 1.170 m |
| Normaalkracht    | $N_{y,Ed}$        | -14.87 kN       | Normaalkracht    | $N_{z,Ed}$        | -14.87 kN       |
| Lengte           | $L_{y,cr}$        | 1.170 m         | Lengte           | $L_{z,cr}$        | 1.170 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.987           | Reductiefactor   | (6.49) $\chi_z$   | 0.987           |
| Ontwerpweerstand | $N_{Rk}$          | 400.74 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.170 m | Maatgevend veld  |                   | 0.000 - 1.170 m |
| Buigmoment       | $M_{y,Ed}$        | 2.54 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 17.31 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 17.31 kNm       |
| Reductiefactor   | XLT               | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.12

NEN-EN1993-1-1(6.62): UC = 0.09

#### DOORSNEDE (#6.2)

Staaf C4-V1 (0.000-1.170)

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                        |            |           |                  |        |                      |
|------------------------|------------|-----------|------------------|--------|----------------------|
| Maatgevende combinatie |            | Fu.C.42   | Doorsnedeklasse  |        | 1                    |
| Maatgevende positie    |            | 1.170 m   |                  |        |                      |
| Normaalkracht          | $N_{Ed}$   | 24.58 kN  | Ontwerpweerstand | (6.6)  | $N_{Rd}$ 400.74 kN   |
| Buigmoment             | $M_{y,Ed}$ | -4.30 kNm | Ontwerpweerstand | (6.13) | $M_{y,Rd}$ 17.31 kNm |
| Buigmoment             | $M_{z,Ed}$ | 0.00 kNm  | Ontwerpweerstand | (6.13) | $M_{z,Rd}$ 17.31 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 0.00 kN   | Ontwerpweerstand | (6.18) | $V_{y,Rd}$ 147.29 kN |
| Dwarskracht            | $V_{z,Ed}$ | -3.77 kN  | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ 147.29 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 2.6 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |     |
|--------------------|---------------|--------------------|-----|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee |
|                    | n             |                    |     |
|                    | 0.061         |                    |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 17.31 kNm          |     |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 17.31 kNm          |     |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.06  
NEN-EN1993-1-1(6.12): UC (y) = 0.25  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.03  
NEN-EN1993-1-1(6.31): UC (y) = 0.25  
NEN-EN1993-1-1(NB.33): UC = 0.25

#### KNIK (#6.3.1)

Staaft C4-V1 (0.000-1.170)

|                             |             |                        |                             |             |                        |
|-----------------------------|-------------|------------------------|-----------------------------|-------------|------------------------|
| Profiel                     |             | N139.7/4               | Doorsnedeklasse             |             | 1                      |
| Maatgevende combinatie      |             | Fu.C.56                |                             |             |                        |
| Maatgevend veld             |             | 0.000 - 1.170 m        | Maatgevend veld             |             | 0.000 - 1.170 m        |
| Normaalkracht               | $N_{Ed,y}$  | -2.84 kN               | Normaalkracht               | $N_{Ed,z}$  | -2.84 kN               |
| Lengte                      | $L_{cr,y}$  | 1.170 m                | Lengte                      | $L_{cr,z}$  | 1.170 m                |
| Elastische kritische kracht | $N_{cr,y}$  | 5948.18 kN             | Elastische kritische kracht | $N_{cr,z}$  | 5948.18 kN             |
| Slankheid                   | $\lambda_y$ | 0.260                  | Slankheid                   | $\lambda_z$ | 0.260                  |
| Knikcurve                   | Tabel 6.2   | a                      | Knikcurve                   | Tabel 6.2   | a                      |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$ 0.210       | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$ 0.210       |
|                             |             | $\Phi_y$ 0.540         |                             |             | $\Phi_z$ 0.540         |
| Reductiefactor              | (6.49)      | $\chi_y$ 0.987         | Reductiefactor              | (6.49)      | $\chi_z$ 0.987         |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$ 395.44 kN | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$ 395.44 kN |

NEN-EN1993-1-1(6.46): UC = 0.01

#### KIP (#6.3.2)

Staaft C4-V1 (0.000-1.170)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalent profiel     |  | N139.7/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm  |
| Veld einde        |   | 1.170 m | Moment (eind)  | $M_y$ | -0.21 kNm |
| Lengte            | L | 1.170 m | Moment (max)   | $M_y$ | 0.00 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |            |                  |           |                |                     |
|------------------|------------|------------------|-----------|----------------|---------------------|
| Tabel gebruikt   |            | NB.NB.1 (1)      |           | $\beta$        | 0.00                |
| Lengte           |            | $L_{st}$         | 1.170 m   | Lengte         | $L_{kip}$ 1.170 m   |
|                  | (NB.NB.12) | S                | 0.000 m   |                |                     |
| Coefficient      |            | $C_1$            | 1.750     | Coefficient    | $C_2$ (Tabel) 0.000 |
| Coefficient      |            | $C_2$ (Berekend) | 0.000     | Lengte         | $L_g$ 1.170 m       |
| Coefficient      | (NB.NB.11) | C                | 5.498     | Reductiefactor | $K_{red}$ 0.000     |
|                  | (NB.NB.6)  | $M_{cr}$         | 0.00 kNm  |                |                     |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,y}$     | 17.31 kNm |                |                     |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,z}$     | 17.31 kNm |                |                     |

Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C4-V1 (0.000-1.170)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N139.7/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.56  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.58 kNm    | M         | 0.00 kNm       | M          | 0.58 kNm    |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | 0.31 kNm    | $\psi$    | 1.000          | $M_s$      | 0.31 kNm    |
| $\psi$     | 0.000       | Belasting | Geconcentreerd | $\psi$     | 0.000       |
| $\alpha_s$ | 0.536       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.536       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.628       |           |                | $C_{mLT}$  | 0.628       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.629           |                  | $k_{yz}$          | 0.600           |
|                  | $k_{zy}$          | 0.377           |                  | $k_{zz}$          | 1.000           |
| Maatgevend veld  |                   | 0.000 - 1.170 m | Maatgevend veld  |                   | 0.000 - 1.170 m |
| Normaalkracht    | $N_{y,Ed}$        | -2.84 kN        | Normaalkracht    | $N_{z,Ed}$        | -2.84 kN        |
| Lengte           | $L_{y,cr}$        | 1.170 m         | Lengte           | $L_{z,cr}$        | 1.170 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.987           | Reductiefactor   | (6.49) $\chi_z$   | 0.987           |
| Ontwerpweerstand | $N_{Rk}$          | 400.74 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.170 m | Maatgevend veld  |                   | 0.000 - 1.170 m |
| Buigmoment       | $M_{y,Ed}$        | 0.58 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 17.31 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 17.31 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.03  
NEN-EN1993-1-1(6.62): UC = 0.02

### DOORSNEDE (#6.2)

Staaf C5-V1 (0.000-3.200)

|                        |                   |           |                  |        |                   |           |
|------------------------|-------------------|-----------|------------------|--------|-------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.41   | Doorsnedeklasse  |        | 1                 |           |
| Maatgevende positie    |                   | 0.000 m   |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | -64.41 kN | Ontwerpweerstand | (6.10) | N <sub>Rd</sub>   | 989.76 kN |
| Buigmoment             | M <sub>y,Ed</sub> | -9.83 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 67.06 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 67.06 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 363.79 kN |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|             |            |          |                  |        |            |           |
|-------------|------------|----------|------------------|--------|------------|-----------|
| Dwarskracht | $V_{z,Ed}$ | 16.75 kN | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ | 363.79 kN |
|-------------|------------|----------|------------------|--------|------------|-----------|

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 4.6 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |    |                    |     |
|--------------------|----|--------------------|-----|
| Is reductie nodig? | Ja | Is reductie nodig? | Nee |
|--------------------|----|--------------------|-----|

|                  |               |           |
|------------------|---------------|-----------|
|                  | n             | 0.065     |
| Ontwerpweerstand | $M_{pl,y,Rd}$ | 67.06 kNm |
| Ontwerpweerstand | $M_{N,y,Rd}$  | 67.06 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.07  
NEN-EN1993-1-1(6.12): UC (y) = 0.15  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.05  
NEN-EN1993-1-1(6.31): UC (y) = 0.15  
NEN-EN1993-1-1(NB.33): UC = 0.15

#### KNIK (#6.3.1)

Staaf C5-V1 (0.000-3.200)

|                             |                |                 |                             |                |                 |
|-----------------------------|----------------|-----------------|-----------------------------|----------------|-----------------|
| Profiel                     |                | N219.1/6.3      | Doorsnedeklasse             |                | 1               |
| Maatgevende combinatie      |                | Fu.C.41         |                             |                |                 |
| Maatgevend veld             |                | 0.000 - 3.200 m | Maatgevend veld             |                | 0.000 - 3.200 m |
| Normaalkracht               | $N_{Ed,y}$     | -64.41 kN       | Normaalkracht               | $N_{Ed,z}$     | -64.41 kN       |
| Lengte                      | $L_{\alpha,y}$ | 3.200 m         | Lengte                      | $L_{\alpha,z}$ | 3.200 m         |
| Elastische kritische kracht | $N_{cr,y}$     | 4829.64 kN      | Elastische kritische kracht | $N_{cr,z}$     | 4829.64 kN      |
| Slankheid                   | $\lambda_y$    | 0.453           | Slankheid                   | $\lambda_z$    | 0.453           |
| Knikcurve                   | Tabel 6.2      | a               | Knikcurve                   | Tabel 6.2      | a               |
| Imperfectiefactor           | Tabel 6.1      | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1      | $\alpha_z$      |
|                             |                | $\Phi_y$        |                             |                | $\Phi_z$        |
|                             |                | 0.629           |                             |                | 0.629           |
| Reductiefactor              | (6.49)         | $\chi_y$        | Reductiefactor              | (6.49)         | $\chi_z$        |
|                             |                | 0.938           |                             |                | 0.938           |
| Ontwerpweerstand            | (6.47)         | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)         | $N_{b,Rd,z}$    |
|                             |                | 928.74 kN       |                             |                | 928.74 kN       |

NEN-EN1993-1-1(6.46): UC = 0.07

#### KIP (#6.3.2)

Staaf C5-V1 (0.000-3.200)

|                        |  |            |                                             |  |         |
|------------------------|--|------------|---------------------------------------------|--|---------|
| Equivalente profiel    |  | N219.1/6.3 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1     | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen       |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -5.23 kNm |
| Veld einde        |   | 3.200 m | Moment (eind)  | $M_y$ | 0.08 kNm  |
| Lengte            | L | 3.200 m | Moment (max)   | $M_y$ | 1.46 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                  |           |             |               |          |
|----------------|------------------|-----------|-------------|---------------|----------|
| Tabel gebruikt |                  | NB.NB.4   | Moment      | M             | 5.23 kNm |
| Belasting      | q                | 3.02 kN/m | Lengte      | $L_{st}$      | 3.200 m  |
|                | $B^*$            | -0.57     | Lengte      | $L_{st}$      | 3.200 m  |
|                | $\beta$          | -0.016    | Lengte      | $L_{kip}$     | 3.200 m  |
|                | (NB.NB.12) S     | 0.000 m   |             |               |          |
| Coefficient    | $C_1$            | 2.289     | Coefficient | $C_2$ (Tabel) | 1.083    |
| Coefficient    | $C_2$ (Berekend) | 0.000     | Lengte      | $L_g$         | 3.200 m  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |                            |           |                |                  |       |
|------------------|----------------------------|-----------|----------------|------------------|-------|
| Coefficient      | (NB.NB.11) C               | 7.192     | Reductiefactor | K <sub>red</sub> | 0.000 |
|                  | (NB.NB.6) M <sub>cr</sub>  | 0.00 kNm  |                |                  |       |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,y</sub> | 67.06 kNm |                |                  |       |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,z</sub> | 67.06 kNm |                |                  |       |

**Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C5-V1 (0.000-3.200)

|                        |            |                 |   |
|------------------------|------------|-----------------|---|
| Profiel                | N219.1/6.3 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.41    |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | -9.83 kNm   | M               | 0.00 kNm       | M                | -9.83 kNm   |
| ψM              | -1.92 kNm   | ψM              | 0.00 kNm       | ψM               | -1.92 kNm   |
| M <sub>s</sub>  | 3.97 kNm    | ψ               | 1.000          | M <sub>s</sub>   | 3.97 kNm    |
| ψ               | 0.196       | Belasting       | Geconcentreerd | ψ                | 0.196       |
| α <sub>s</sub>  | -0.404      | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | -0.404      |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.423       |                 |                | C <sub>mLT</sub> | 0.423       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.431           |                  | k <sub>yz</sub>       | 0.611           |
|                  | k <sub>zy</sub>       | 0.258           |                  | k <sub>zz</sub>       | 1.018           |
| Maatgevend veld  |                       | 0.000 - 3.200 m | Maatgevend veld  |                       | 0.000 - 3.200 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -64.41 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -64.41 kN       |
| Lengte           | L <sub>y,cr</sub>     | 3.200 m         | Lengte           | L <sub>z,cr</sub>     | 3.200 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 0.938           | Reductiefactor   | (6.49) X <sub>z</sub> | 0.938           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 989.76 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 3.200 m | Maatgevend veld  |                       | 0.000 - 3.200 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 9.83 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 67.06 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 67.06 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.13

NEN-EN1993-1-1(6.62): UC = 0.11

### DOORSNEDE (#6.2)

Staaf C7-V1 (0.000-2.140)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Maatgevende combinatie | Fu.C.43 | Doorsnedeklasse | 1 |
| Maatgevende positie    | 0.000 m |                 |   |

|               |                   |           |                  |                          |           |
|---------------|-------------------|-----------|------------------|--------------------------|-----------|
| Normaalkracht | N <sub>Ed</sub>   | 33.95 kN  | Ontwerpweerstand | (6.6) N <sub>Rd</sub>    | 400.74 kN |
| Buigmoment    | M <sub>y,Ed</sub> | -0.49 kNm | Ontwerpweerstand | (6.13) M <sub>y,Rd</sub> | 17.31 kNm |
| Buigmoment    | M <sub>z,Ed</sub> | 7.00 kNm  | Ontwerpweerstand | (6.13) M <sub>z,Rd</sub> | 17.31 kNm |
| Dwarskracht   | V <sub>y,Ed</sub> | 4.00 kN   | Ontwerpweerstand | (6.18) V <sub>y,Rd</sub> | 147.29 kN |
| Dwarskracht   | V <sub>z,Ed</sub> | 0.49 kN   | Ontwerpweerstand | (6.18) V <sub>z,Rd</sub> | 147.29 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.3 % | Verhouding         | 2.7 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

### Buig- en normaalkracht #6.2.9

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    | n             | 0.085     |                    | n             | 0.085     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 17.31 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 17.31 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 17.31 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 17.31 kNm |

### Dubbele buiging #6.2.10 (7)

|                          |                |           |                          |                |           |
|--------------------------|----------------|-----------|--------------------------|----------------|-----------|
|                          | $\alpha_1$     | 2.000     |                          | $\alpha_2$     | 2.000     |
|                          | $\beta_0$      | 1.000     |                          | $\beta_1$      | 1.000     |
| Ontwerpweerstand (NB.58) | $M_{y,N,V,Rd}$ | 17.74 kNm | Ontwerpweerstand (NB.59) | $M_{z,N,V,Rd}$ | 17.74 kNm |

### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.08  
NEN-EN1993-1-1(6.12): UC (y) = 0.03  
NEN-EN1993-1-1(6.12): UC (z) = 0.40  
NEN-EN1993-1-1(6.17): UC (y) = 0.03  
NEN-EN1993-1-1(6.17): UC (z) = 0.00  
NEN-EN1993-1-1(6.31): UC (y) = 0.03  
NEN-EN1993-1-1(6.31): UC (z) = 0.40  
NEN-EN1993-1-1(NB.33): UC = 0.41  
NEN-EN1993-1-1(NB.52): UC = 0.16

### KNIK (#6.3.1)

Staaf C7-V1 (0.000-2.140)

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Profiel                     |             | N139.7/4        | Doorsnedeklasse             |             | 1               |
| Maatgevende combinatie      |             | Fu.C.57         |                             |             |                 |
| Maatgevend veld             |             | 0.000 - 2.140 m | Maatgevend veld             |             | 0.000 - 2.140 m |
| Normaalkracht               | $N_{Ed,y}$  | -0.37 kN        | Normaalkracht               | $N_{Ed,z}$  | -0.37 kN        |
| Lengte                      | $L_{cr,y}$  | 2.140 m         | Lengte                      | $L_{cr,z}$  | 4.280 m         |
| Elastische kritische kracht | $N_{cr,y}$  | 1777.94 kN      | Elastische kritische kracht | $N_{cr,z}$  | 444.49 kN       |
| Slankheid                   | $\lambda_y$ | 0.475           | Slankheid                   | $\lambda_z$ | 0.950           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
|                             |             | 0.642           |                             |             | 1.029           |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
|                             |             | 0.932           |                             |             | 0.701           |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |
|                             |             | 373.46 kN       |                             |             | 280.76 kN       |

NEN-EN1993-1-1(6.46): UC = 0.00

### KIP (#6.3.2)

Staaf C7-V1 (0.000-2.140)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalent profiel     | N139.7/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.19 kNm |
| Veld einde        |   | 2.140 m | Moment (eind)  | $M_y$ | 0.03 kNm  |
| Lengte            | L | 2.140 m | Moment (max)   | $M_y$ | 0.03 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                        |                  |         |                |               |         |
|------------------------|------------------|---------|----------------|---------------|---------|
| Tabel gebruikt         |                  |         | NB.NB.1 (1)    | $\beta$       | -0.18   |
| Lengte                 | $L_{st}$         | 2.140 m |                | $\beta$       | -0.180  |
| Lengte                 | $L_{kip}$        | 2.140 m | (NB.NB.12)     | S             | 0.000 m |
| Coefficient            | $C_1$            | 1.949   | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient            | $C_2$ (Berekend) | 0.000   | Lengte         | $L_g$         | 2.140 m |
| Coefficient (NB.NB.11) | C                | 6.123   | Reductiefactor | $K_{red}$     | 0.000   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

(NB.NB.6)  $M_{cr}$  0.00 kNm

Ontwerpweerstand (6.55)  $M_{b,Rd,y}$  17.31 kNm

Ontwerpweerstand (6.55)  $M_{b,Rd,z}$  17.31 kNm

**Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C7-V1 (0.000-2.140)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N139.7/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.57  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -0.09 kNm   | M         | 0.00 kNm       | M          | -0.09 kNm   |
| $\psi M$   | -0.03 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.03 kNm   |
| $M_s$      | 0.01 kNm    | $\psi$    | 1.000          | $M_s$      | 0.01 kNm    |
| $\psi$     | 0.315       | Belasting | Geconcentreerd | $\psi$     | 0.315       |
| $\alpha_s$ | -0.120      | $C_{mz}$  | 1.000          | $\alpha_s$ | -0.120      |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.400       |           |                | $C_{mLT}$  | 0.400       |

#### Interactiefactoren (Tabel B.1)

|                       |                   |                 |                       |                   |                 |
|-----------------------|-------------------|-----------------|-----------------------|-------------------|-----------------|
|                       | $k_{yy}$          | 0.400           |                       | $k_{yz}$          | 0.601           |
|                       | $k_{zy}$          | 0.240           |                       | $k_{zz}$          | 1.001           |
| Maatgevend veld       |                   | 0.000 - 2.140 m | Maatgevend veld       |                   | 0.000 - 2.140 m |
| Normaalkracht         | $N_{y,Ed}$        | -0.37 kN        | Normaalkracht         | $N_{z,Ed}$        | -0.37 kN        |
| Lengte                | $L_{y,cr}$        | 2.140 m         | Lengte                | $L_{z,cr}$        | 4.280 m         |
| Reductiefactor (6.49) | $\chi_y$          | 0.932           | Reductiefactor (6.49) | $\chi_z$          | 0.701           |
| Ontwerpweerstand      | $N_{Rk}$          | 400.74 kN       |                       |                   |                 |
| Maatgevend veld       |                   | 0.000 - 2.140 m | Maatgevend veld       |                   | 0.000 - 2.140 m |
| Buigmoment            | $M_{y,Ed}$        | 0.09 kNm        | Buigmoment            | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment            | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment            | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand      | $M_{y,Rk}$        | 17.31 kNm       | Ontwerpweerstand      | $M_{z,Rk}$        | 17.31 kNm       |
| Reductiefactor        | $\chi_{LT}$       | 1.000           |                       |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.00

NEN-EN1993-1-1(6.62): UC = 0.00

### DOORSNEDE (#6.2)

Staaf C8-V1 (0.000-0.740)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Maatgevende combinatie | Fu.C.62 | Doorsnedeklasse | 1 |
| Maatgevende positie    | 0.000 m |                 |   |

|               |            |           |                         |            |           |
|---------------|------------|-----------|-------------------------|------------|-----------|
| Normaalkracht | $N_{Ed}$   | 0.47 kN   | Ontwerpweerstand (6.6)  | $N_{Rd}$   | 400.74 kN |
| Buigmoment    | $M_{y,Ed}$ | -0.19 kNm | Ontwerpweerstand (6.13) | $M_{y,Rd}$ | 17.31 kNm |
| Buigmoment    | $M_{z,Ed}$ | 7.00 kNm  | Ontwerpweerstand (6.13) | $M_{z,Rd}$ | 17.31 kNm |
| Dwarskracht   | $V_{y,Ed}$ | 4.00 kN   | Ontwerpweerstand (6.18) | $V_{y,Rd}$ | 147.29 kN |
| Dwarskracht   | $V_{z,Ed}$ | 0.42 kN   | Ontwerpweerstand (6.18) | $V_{z,Rd}$ | 147.29 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.3 % | Verhouding         | 2.7 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    | n             | 0.001     |                    | n             | 0.001     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 17.31 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 17.31 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 17.31 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 17.31 kNm |

#### Dubbele buiging #6.2.10 (7)

|                          |                |           |                          |                |           |
|--------------------------|----------------|-----------|--------------------------|----------------|-----------|
|                          | $\alpha_1$     | 2.000     |                          | $\alpha_2$     | 2.000     |
|                          | $\beta_0$      | 1.000     |                          | $\beta_1$      | 1.000     |
| Ontwerpweerstand (NB.58) | $M_{y,N,V,Rd}$ | 18.01 kNm | Ontwerpweerstand (NB.59) | $M_{z,N,V,Rd}$ | 18.01 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.00  
 NEN-EN1993-1-1(6.12): UC (y) = 0.01  
 NEN-EN1993-1-1(6.12): UC (z) = 0.40  
 NEN-EN1993-1-1(6.17): UC (y) = 0.03  
 NEN-EN1993-1-1(6.17): UC (z) = 0.00  
 NEN-EN1993-1-1(6.31): UC (y) = 0.01  
 NEN-EN1993-1-1(6.31): UC (z) = 0.40  
 NEN-EN1993-1-1(NB.33): UC = 0.40  
 NEN-EN1993-1-1(NB.52): UC = 0.15

#### KNIK (#6.3.1)

Staaf C8-V1 (0.000-0.740)

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Profiel                     |             | N139.7/4        | Doorsnedeklasse             |             | 1               |
| Maatgevende combinatie      |             | Fu.C.65         |                             |             |                 |
| Maatgevend veld             |             | 0.000 - 0.740 m | Maatgevend veld             |             | 0.000 - 0.740 m |
| Normaalkracht               | $N_{Ed,y}$  | -0.93 kN        | Normaalkracht               | $N_{Ed,z}$  | -0.93 kN        |
| Lengte                      | $L_{cr,y}$  | 0.740 m         | Lengte                      | $L_{cr,z}$  | 0.740 m         |
| Elastische kritische kracht | $N_{cr,y}$  | 14870.33 kN     | Elastische kritische kracht | $N_{cr,z}$  | 14870.33 kN     |
| Slankheid                   | $\lambda_y$ | 0.164           | Slankheid                   | $\lambda_z$ | 0.164           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
|                             |             | 0.510           |                             |             | 0.510           |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
|                             |             | 1.000           |                             |             | 1.000           |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |
|                             |             | 400.74 kN       |                             |             | 400.74 kN       |

NEN-EN1993-1-1(6.46): UC = 0.00

#### KIP (#6.3.2)

Staaf C8-V1 (0.000-0.740)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalent profiel     |  | N139.7/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.03 kNm |
| Veld einde        |   | 0.740 m | Moment (eind)  | $M_y$ | 0.02 kNm  |
| Lengte            | L | 0.740 m | Moment (max)   | $M_y$ | 0.02 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                    |             |                |               |         |
|----------------|--------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt |                    | NB.NB.3 (1) | Lengte         | $L_{st}$      | 0.740 m |
|                | $\beta$            | -0.710      | Lengte         | $L_{kip}$     | 0.740 m |
|                | (NB.NB.12) S       | 0.000 m     |                |               |         |
| Coefficient    | $C_1$              | 2.300       | Coefficient    | $C_2$ (Tabel) | 1.550   |
| Coefficient    | $C_2$ (Berekend)   | 0.000       | Lengte         | $L_g$         | 0.740 m |
| Coefficient    | (NB.NB.11) C       | 7.226       | Reductiefactor | $K_{red}$     | 0.000   |
|                | (NB.NB.6) $M_{cr}$ | 0.00 kNm    |                |               |         |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |        |              |           |
|------------------|--------|--------------|-----------|
| Ontwerpweerstand | (6.55) | $M_{b,Rd,y}$ | 17.31 kNm |
| Ontwerpweerstand | (6.55) | $M_{b,Rd,z}$ | 17.31 kNm |

Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C8-V1 (0.000-0.740)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N139.7/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.65  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.15 kNm    | M         | 0.00 kNm       | M          | 0.15 kNm    |
| $\psi M$   | -0.06 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.06 kNm   |
| $M_s$      | 0.05 kNm    | $\psi$    | 1.000          | $M_s$      | 0.05 kNm    |
| $\psi$     | -0.372      | Belasting | Geconcentreerd | $\psi$     | -0.372      |
| $\alpha_s$ | 0.369       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.369       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.496       |           |                | $C_{mLT}$  | 0.496       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.496           |                  | $k_{yz}$          | 0.600           |
|                  | $k_{zy}$          | 0.297           |                  | $k_{zz}$          | 1.000           |
| Maatgevend veld  |                   | 0.000 - 0.740 m | Maatgevend veld  |                   | 0.000 - 0.740 m |
| Normaalkracht    | $N_{y,Ed}$        | -0.93 kN        | Normaalkracht    | $N_{z,Ed}$        | -0.93 kN        |
| Lengte           | $L_{y,cr}$        | 0.740 m         | Lengte           | $L_{z,cr}$        | 0.740 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 1.000           | Reductiefactor   | (6.49) $\chi_z$   | 1.000           |
| Ontwerpweerstand | $N_{Rk}$          | 400.74 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 0.740 m | Maatgevend veld  |                   | 0.000 - 0.740 m |
| Buigmoment       | $M_{y,Ed}$        | 0.15 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 17.31 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 17.31 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.01

NEN-EN1993-1-1(6.62): UC = 0.00

### DOORSNEDE (#6.2)

Staaf C9-V1 (0.000-1.000)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Maatgevende combinatie | Fu.C.41 | Doorsnedeklasse | 1 |
| Maatgevende positie    | 0.000 m |                 |   |

|               |            |           |                  |                   |           |
|---------------|------------|-----------|------------------|-------------------|-----------|
| Normaalkracht | $N_{Ed}$   | -19.73 kN | Ontwerpweerstand | (6.10) $N_{Rd}$   | 325.73 kN |
| Buigmoment    | $M_{y,Ed}$ | 0.00 kNm  | Ontwerpweerstand | (6.13) $M_{y,Rd}$ | 11.44 kNm |
| Buigmoment    | $M_{z,Ed}$ | 0.00 kNm  | Ontwerpweerstand | (6.13) $M_{z,Rd}$ | 11.44 kNm |
| Dwarskracht   | $V_{y,Ed}$ | 0.00 kN   | Ontwerpweerstand | (6.18) $V_{y,Rd}$ | 119.72 kN |
| Dwarskracht   | $V_{z,Ed}$ | 0.00 kN   | Ontwerpweerstand | (6.18) $V_{z,Rd}$ | 119.72 kN |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.06

NEN-EN1993-1-1(6.12): UC (y) = 0.00

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.17): UC (z) = 0.00

### KNIK (#6.3.1)

Staaf C9-V1 (0.000-1.000)

|                             |                   |                     |                             |                   |                     |
|-----------------------------|-------------------|---------------------|-----------------------------|-------------------|---------------------|
| Profiel                     |                   | N114.3/4            | Doorsnedeklasse             |                   | 1                   |
| Maatgevende combinatie      |                   | Fu.C.41             |                             |                   |                     |
| Maatgevend veld             |                   | 0.000 - 1.000 m     | Maatgevend veld             |                   | 0.000 - 1.000 m     |
| Normaalkracht               | N <sub>Ed,y</sub> | -19.73 kN           | Normaalkracht               | N <sub>Ed,z</sub> | -19.73 kN           |
| Lengte                      | L <sub>cr,y</sub> | 1.000 m             | Lengte                      | L <sub>cr,z</sub> | 1.000 m             |
| Elastische kritische kracht | N <sub>cr,y</sub> | 4374.58 kN          | Elastische kritische kracht | N <sub>cr,z</sub> | 4374.58 kN          |
| Slankheid                   | λ <sub>y</sub>    | 0.273               | Slankheid                   | λ <sub>z</sub>    | 0.273               |
| Knikcurve                   | Tabel 6.2         | a                   | Knikcurve                   | Tabel 6.2         | a                   |
| Imperfectiefactor           | Tabel 6.1         | α <sub>y</sub>      | Imperfectiefactor           | Tabel 6.1         | α <sub>z</sub>      |
|                             |                   | Φ <sub>y</sub>      |                             |                   | Φ <sub>z</sub>      |
|                             |                   | 0.545               |                             |                   | 0.545               |
| Reductiefactor              | (6.49)            | χ <sub>y</sub>      | Reductiefactor              | (6.49)            | χ <sub>z</sub>      |
|                             |                   | 0.984               |                             |                   | 0.984               |
| Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,y</sub> | Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,z</sub> |
|                             |                   | 320.44 kN           |                             |                   | 320.44 kN           |

NEN-EN1993-1-1(6.46): UC = 0.06

### KIP (#6.3.2)

Staaf C9-V1 (0.000-1.000)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalentente profiel |  | N114.3/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |                |          |
|-------------------|---|---------|----------------|----------------|----------|
| Veld begin        |   | 0.000 m | Moment (begin) | M <sub>y</sub> | 0.00 kNm |
| Veld einde        |   | 1.000 m | Moment (eind)  | M <sub>y</sub> | 0.00 kNm |
| Lengte            | L | 1.000 m | Moment (max)   | M <sub>y</sub> | 0.00 kNm |
| Maatgevende flens |   | Boven   | Moment (max)   | M <sub>z</sub> | 0.00 kNm |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |            |                           |                |                        |         |
|------------------|------------|---------------------------|----------------|------------------------|---------|
| Tabel gebruikt   |            | NB.NB.1 (4)               | Kracht         | F                      | 0.00 kN |
| Lengte           |            | 1.000 m                   | Lengte         | L <sub>kip</sub>       | 1.000 m |
|                  | (NB.NB.12) | S                         |                |                        |         |
|                  |            | 0.000 m                   |                |                        |         |
| Coefficient      |            | C <sub>1</sub>            | Coefficient    | C <sub>2</sub> (Tabel) | 0.420   |
| Coefficient      |            | C <sub>2</sub> (Berekend) | Lengte         | L <sub>g</sub>         | 1.000 m |
| Coefficient      | (NB.NB.11) | C                         | Reductiefactor | K <sub>red</sub>       | 0.000   |
|                  | (NB.NB.6)  | M <sub>cr</sub>           |                |                        |         |
|                  |            | 0.00 kNm                  |                |                        |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,y</sub>       | 11.44 kNm      |                        |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,z</sub>       | 11.44 kNm      |                        |         |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C9-V1 (0.000-1.000)

|                        |  |          |                 |  |   |
|------------------------|--|----------|-----------------|--|---|
| Profiel                |  | N114.3/4 | Doorsnedeklasse |  | 1 |
| Maatgevende combinatie |  | Fu.C.41  |                 |  |   |

#### Equivalentente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |                | C <sub>mz</sub> |                | C <sub>mLT</sub> |                |
|-----------------|----------------|-----------------|----------------|------------------|----------------|
| M               | 0.00 kNm       | M               | 0.00 kNm       | M                | 0.00 kNm       |
| ψM              | 0.00 kNm       | ψM              | 0.00 kNm       | ψM               | 0.00 kNm       |
| ψ               | 1.000          | ψ               | 1.000          | ψ                | 1.000          |
| Belasting       | Geconcentreerd | Belasting       | Geconcentreerd | Belasting        | Geconcentreerd |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

$C_{my}$  1.000  $C_{mz}$  1.000  $C_{mLT}$  1.000

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 1.004           |                  | $k_{yz}$          | 0.603           |
|                  | $k_{zy}$          | 0.603           |                  | $k_{zz}$          | 1.004           |
| Maatgevend veld  |                   | 0.000 - 1.000 m | Maatgevend veld  |                   | 0.000 - 1.000 m |
| Normaalkracht    | $N_{y,Ed}$        | -19.73 kN       | Normaalkracht    | $N_{z,Ed}$        | -19.73 kN       |
| Lengte           | $L_{y,cr}$        | 1.000 m         | Lengte           | $L_{z,cr}$        | 1.000 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.984           | Reductiefactor   | (6.49) $\chi_z$   | 0.984           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.000 m | Maatgevend veld  |                   | 0.000 - 1.000 m |
| Buigmoment       | $M_{y,Ed}$        | 0.00 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.06

NEN-EN1993-1-1(6.62): UC = 0.06

#### DOORSNEDE (#6.2)

Staal C10-V1 (0.000-2.520)

|                        |            |           |                  |                   |            |
|------------------------|------------|-----------|------------------|-------------------|------------|
| Maatgevende combinatie |            | Fu.C.45   | Doorsnedeklasse  |                   | 1          |
| Maatgevende positie    |            | 1.350 m   |                  |                   |            |
| Normaalkracht          | $N_{Ed}$   | -55.04 kN | Ontwerpweerstand | (6.10) $N_{Rd}$   | 1529.70 kN |
| Buigmoment             | $M_{y,Ed}$ | 38.37 kNm | Ontwerpweerstand | (6.13) $M_{y,Rd}$ | 126.15 kNm |
| Buigmoment             | $M_{z,Ed}$ | 0.00 kNm  | Ontwerpweerstand | (6.13) $M_{z,Rd}$ | 126.15 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 0.00 kN   | Ontwerpweerstand | (6.18) $V_{y,Rd}$ | 562.25 kN  |
| Dwarskracht            | $V_{z,Ed}$ | 28.42 kN  | Ontwerpweerstand | (6.18) $V_{z,Rd}$ | 562.25 kN  |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 5.1 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |       |
|--------------------|---------------|--------------------|-------|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee   |
|                    | $n$           |                    | 0.036 |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 126.15 kNm         |       |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 126.15 kNm         |       |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.04  
 NEN-EN1993-1-1(6.12): UC (y) = 0.30  
 NEN-EN1993-1-1(6.12): UC (z) = 0.00  
 NEN-EN1993-1-1(6.17): UC (y) = 0.00  
 NEN-EN1993-1-1(6.17): UC (z) = 0.05  
 NEN-EN1993-1-1(6.31): UC (y) = 0.30  
 NEN-EN1993-1-1(NB.33): UC = 0.30

#### KNIK (#6.3.1)

Staal C10-V1 (0.000-2.520)

|                        |            |                 |                 |            |                 |
|------------------------|------------|-----------------|-----------------|------------|-----------------|
| Profiel                |            | N267/8          | Doorsnedeklasse |            | 1               |
| Maatgevende combinatie |            | Fu.C.45         |                 |            |                 |
| Maatgevend veld        |            | 0.000 - 2.520 m | Maatgevend veld |            | 0.000 - 2.520 m |
| Normaalkracht          | $N_{Ed,y}$ | -55.86 kN       | Normaalkracht   | $N_{Ed,z}$ | -55.86 kN       |
| Lengte                 | $L_{cr,y}$ | 2.520 m         | Lengte          | $L_{cr,z}$ | 2.520 m         |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                             |             |              |                             |             |              |
|-----------------------------|-------------|--------------|-----------------------------|-------------|--------------|
| Elastische kritische kracht | $N_{cr,y}$  | 17831.23 kN  | Elastische kritische kracht | $N_{cr,z}$  | 17831.23 kN  |
| Slankheid                   | $\lambda_y$ | 0.293        | Slankheid                   | $\lambda_z$ | 0.293        |
| Knikcurve                   | Tabel 6.2   | a            | Knikcurve                   | Tabel 6.2   | a            |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$   | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$   |
|                             |             | $\Phi_y$     |                             |             | $\Phi_z$     |
|                             |             | 0.553        |                             |             | 0.553        |
| Reductiefactor              | (6.49)      | $\chi_y$     | Reductiefactor              | (6.49)      | $\chi_z$     |
|                             |             | 0.979        |                             |             | 0.979        |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$ | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$ |
|                             |             | 1497.81 kN   |                             |             | 1497.81 kN   |

NEN-EN1993-1-1(6.46): UC = 0.04

### KIP (#6.3.2)

Staal C10-V1 (0.000-2.520)

|                        |        |                                             |         |
|------------------------|--------|---------------------------------------------|---------|
| Equivalente profiel    | N267/8 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1 | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen   |                                             |         |

### Maatgevend veld

|                   |   |         |                |       |          |
|-------------------|---|---------|----------------|-------|----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm |
| Veld einde        |   | 2.520 m | Moment (eind)  | $M_y$ | 0.00 kNm |
| Lengte            | L | 2.520 m | Moment (max)   | $M_y$ | 1.83 kNm |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |            |                |               |
|------------------|---------------------|------------|----------------|---------------|
| Tabel gebruikt   | NB.NB.1 (3)         | Lengte     | $L_{st}$       | 2.520 m       |
| Lengte           | $L_{kip}$           | 2.520 m    | (NB.NB.12)     | S             |
| Coefficient      | $C_1$               | 1.350      | Coefficient    | $C_2$ (Tabel) |
| Coefficient      | $C_2$ (Berekend)    | 0.000      | Lengte         | $L_g$         |
| Coefficient      | (NB.NB.11) C        | 4.241      | Reductiefactor | $K_{red}$     |
|                  | (NB.NB.6) $M_{cr}$  | 0.00 kNm   |                | 0.000         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 126.15 kNm |                |               |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 126.15 kNm |                |               |

### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C10-V1 (0.000-2.520)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Profiel                | N267/8  | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.45 |                 |   |

### Equivalente gelijkmatige momentfactoren (Tabel B.3)

|            |             |           |                |            |             |
|------------|-------------|-----------|----------------|------------|-------------|
| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
| M          | 0.00 kNm    | M         | 0.00 kNm       | M          | 0.00 kNm    |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | 35.81 kNm   | $\psi$    | 1.000          | $M_s$      | 35.81 kNm   |
| $\psi$     | 0.000       | Belasting | Geconcentreerd | $\psi$     | 0.000       |
| $\alpha_h$ | 0.000       | $C_{mz}$  | 1.000          | $\alpha_h$ | 0.000       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.950       |           |                | $C_{mLT}$  | 0.950       |

### Interactiefactoren (Tabel B.1)

|                 |            |                 |                 |            |                 |
|-----------------|------------|-----------------|-----------------|------------|-----------------|
|                 | $k_{yy}$   | 0.953           |                 | $k_{yz}$   | 0.602           |
|                 | $k_{zy}$   | 0.572           |                 | $k_{zz}$   | 1.003           |
| Maatgevend veld |            | 0.000 - 2.520 m | Maatgevend veld |            | 0.000 - 2.520 m |
| Normaalkracht   | $N_{y,Ed}$ | -55.86 kN       | Normaalkracht   | $N_{z,Ed}$ | -55.86 kN       |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
| Lengte           | $L_{y,cr}$        | 2.520 m         | Lengte           | $L_{z,cr}$        | 2.520 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.979           | Reductiefactor   | (6.49) $\chi_z$   | 0.979           |
| Ontwerpweerstand | $N_{Rk}$          | 1529.70 kN      |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 2.520 m | Maatgevend veld  |                   | 0.000 - 2.520 m |
| Buigmoment       | $M_{y,Ed}$        | 38.37 kNm       | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 126.15 kNm      | Ontwerpweerstand | $M_{z,Rk}$        | 126.15 kNm      |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.33

NEN-EN1993-1-1(6.62): UC = 0.21

## DOORSNEDE (#6.2)

Staal C12-V1 (0.000-5.400)

|                        |            |            |                  |                   |            |
|------------------------|------------|------------|------------------|-------------------|------------|
| Maatgevende combinatie |            | Fu.C.42    | Doorsnedeklasse  |                   | 1          |
| Maatgevende positie    |            | 3.480 m    |                  |                   |            |
| Normaalkracht          | $N_{Ed}$   | -73.46 kN  | Ontwerpweerstand | (6.10) $N_{Rd}$   | 1529.70 kN |
| Buigmoment             | $M_{y,Ed}$ | -16.97 kNm | Ontwerpweerstand | (6.13) $M_{y,Rd}$ | 126.15 kNm |
| Buigmoment             | $M_{z,Ed}$ | 0.00 kNm   | Ontwerpweerstand | (6.13) $M_{z,Rd}$ | 126.15 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 0.00 kN    | Ontwerpweerstand | (6.18) $V_{y,Rd}$ | 562.25 kN  |
| Dwarskracht            | $V_{z,Ed}$ | -4.88 kN   | Ontwerpweerstand | (6.18) $V_{z,Rd}$ | 562.25 kN  |

## Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.9 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

## Buig- en normaalkracht #6.2.9

|                    |               |        |     |                    |  |     |
|--------------------|---------------|--------|-----|--------------------|--|-----|
| Is reductie nodig? |               | Ja     |     | Is reductie nodig? |  | Nee |
|                    | n             | 0.048  |     |                    |  |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 126.15 | kNm |                    |  |     |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 126.15 | kNm |                    |  |     |

## Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.05

NEN-EN1993-1-1(6.12): UC (y) = 0.13

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

NEN-EN1993-1-1(6.17): UC (z) = 0.01

NEN-EN1993-1-1(6.31): UC (y) = 0.13

NEN-EN1993-1-1(NB.33): UC = 0.14

## KNIK (#6.3.1)

Staal C12-V1 (0.000-5.400)

|                             |                      |                 |                             |                      |                 |
|-----------------------------|----------------------|-----------------|-----------------------------|----------------------|-----------------|
| Profiel                     |                      | N267/8          | Doorsnedeklasse             |                      | 1               |
| Maatgevende combinatie      |                      | Fu.C.42         |                             |                      |                 |
| Maatgevend veld             |                      | 0.000 - 5.400 m | Maatgevend veld             |                      | 0.000 - 5.400 m |
| Normaalkracht               | $N_{Ed,y}$           | -75.59 kN       | Normaalkracht               | $N_{Ed,z}$           | -75.59 kN       |
| Lengte                      | $L_{cr,y}$           | 5.400 m         | Lengte                      | $L_{cr,z}$           | 5.400 m         |
| Elastische kritische kracht | $N_{cr,y}$           | 3883.25 kN      | Elastische kritische kracht | $N_{cr,z}$           | 3883.25 kN      |
| Slankheid                   | $\lambda_y$          | 0.628           | Slankheid                   | $\lambda_z$          | 0.628           |
| Knikcurve                   | Tabel 6.2            | a               | Knikcurve                   | Tabel 6.2            | a               |
| Imperfectiefactor           | Tabel 6.1 $\alpha_y$ | 0.210           | Imperfectiefactor           | Tabel 6.1 $\alpha_z$ | 0.210           |
|                             | $\Phi_y$             | 0.742           |                             | $\Phi_z$             | 0.742           |
| Reductiefactor              | (6.49) $\chi_y$      | 0.879           | Reductiefactor              | (6.49) $\chi_z$      | 0.879           |
| Ontwerpweerstand            | (6.47) $N_{b,Rd,y}$  | 1344.93 kN      | Ontwerpweerstand            | (6.47) $N_{b,Rd,z}$  | 1344.93 kN      |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.46): UC = 0.06

### KIP (#6.3.2)

Staaf C12-V1 (0.000-5.400)

|                        |        |                                             |         |
|------------------------|--------|---------------------------------------------|---------|
| Equivalente profiel    | N267/8 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1 | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen   |                                             |         |

### Maatgevend veld

|                   |         |                |       |          |
|-------------------|---------|----------------|-------|----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm |
| Veld einde        | 5.400 m | Moment (eind)  | $M_y$ | 0.00 kNm |
| Lengte            | L       | Moment (max)   | $M_y$ | 0.00 kNm |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$ | 0.00 kNm |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |            |                  |            |                |               |         |
|------------------|------------|------------------|------------|----------------|---------------|---------|
| Tabel gebruikt   |            | NB.NB.1 (2)      | Lengte     | $L_{st}$       | 5.400 m       |         |
| Lengte           |            | $L_{kip}$        | 5.400 m    | (NB.NB.12) S   | 0.000 m       |         |
| Coefficient      |            | $C_1$            | 1.130      | Coefficient    | $C_2$ (Tabel) | 0.450   |
| Coefficient      |            | $C_2$ (Berekend) | 0.000      | Lengte         | $L_g$         | 5.400 m |
| Coefficient      | (NB.NB.11) | C                | 3.550      | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6)  | $M_{cr}$         | 0.00 kNm   |                |               |         |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,y}$     | 126.15 kNm |                |               |         |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,z}$     | 126.15 kNm |                |               |         |

### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C12-V1 (0.000-5.400)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Profiel                | N267/8  | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.42 |                 |   |

### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.00 kNm    | M         | 0.00 kNm       | M          | 0.00 kNm    |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | -13.16 kNm  | $\psi$    | 1.000          | $M_s$      | -13.16 kNm  |
| $\psi$     | 0.000       | Belasting | Geconcentreerd | $\psi$     | 0.000       |
| $\alpha_h$ | -0.000      | $C_{mz}$  | 1.000          | $\alpha_h$ | -0.000      |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.950       |           |                | $C_{mLT}$  | 0.950       |

### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.973           |                  | $k_{yz}$          | 0.614           |
|                  | $k_{zy}$          | 0.584           |                  | $k_{zz}$          | 1.024           |
| Maatgevend veld  |                   | 0.000 - 5.400 m | Maatgevend veld  |                   | 0.000 - 5.400 m |
| Normaalkracht    | $N_{y,Ed}$        | -75.59 kN       | Normaalkracht    | $N_{z,Ed}$        | -75.59 kN       |
| Lengte           | $L_{y,cr}$        | 5.400 m         | Lengte           | $L_{z,cr}$        | 5.400 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.879           | Reductiefactor   | (6.49) $\chi_z$   | 0.879           |
| Ontwerpweerstand | $N_{Rk}$          | 1529.70 kN      |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 5.400 m | Maatgevend veld  |                   | 0.000 - 5.400 m |
| Buigmoment       | $M_{y,Ed}$        | 16.97 kNm       | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 126.15 kNm      | Ontwerpweerstand | $M_{z,Rk}$        | 126.15 kNm      |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Reductiefactor XLT 1.000

NEN-EN1993-1-1(6.61): UC = 0.19

NEN-EN1993-1-1(6.62): UC = 0.13

## DOORSNEDE (#6.2)

Staal C14-V1 (0.000-5.950)

| Maatgevende combinatie |                   | Fu.C.39   | Doorsnedeklasse  |        |                   | 1         |
|------------------------|-------------------|-----------|------------------|--------|-------------------|-----------|
| Maatgevende positie    |                   | 5.950 m   |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | 82.87 kN  | Ontwerpweerstand | (6.6)  | N <sub>Rd</sub>   | 989.76 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 15.01 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 67.06 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 67.06 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 363.79 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | 17.22 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 363.79 kN |

## Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 4.7 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

## Buig- en normaalkracht #6.2.9

|                    |                      |           |                    |     |
|--------------------|----------------------|-----------|--------------------|-----|
| Is reductie nodig? | n                    | Ja        | Is reductie nodig? | Nee |
|                    |                      | 0.084     |                    |     |
| Ontwerpweerstand   | M <sub>pl,y,Rd</sub> | 67.06 kNm |                    |     |
| Ontwerpweerstand   | M <sub>N,y,Rd</sub>  | 67.06 kNm |                    |     |

## Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.08

NEN-EN1993-1-1(6.12): UC (y) = 0.22

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

NEN-EN1993-1-1(6.17): UC (z) = 0.05

NEN-EN1993-1-1(6.31): UC (y) = 0.22

NEN-EN1993-1-1(NB.33): UC = 0.23

## KNIK (#6.3.1)

Staal C14-V1 (0.000-5.950)

|                             |             |                 |                             |             |                 |           |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|-----------|
| Profiel                     |             | N219.1/6.3      | Doorsnedeklasse             |             | 1               |           |
| Maatgevende combinatie      |             | Fu.C.39         |                             |             |                 |           |
| Maatgevend veld             |             | 0.000 - 5.950 m | Maatgevend veld             |             | 0.000 - 5.950 m |           |
| Normaalkracht               | $N_{Ed,y}$  | -3.20 kN        | Normaalkracht               | $N_{Ed,z}$  | -3.20 kN        |           |
| Lengte                      | $L_{cr,y}$  | 5.950 m         | Lengte                      | $L_{cr,z}$  | 11.900 m        |           |
| Elastische kritische kracht | $N_{cr,y}$  | 1396.95 kN      | Elastische kritische kracht | $N_{cr,z}$  | 349.24 kN       |           |
| Slankheid                   | $\lambda_y$ | 0.842           | Slankheid                   | $\lambda_z$ | 1.683           |           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |           |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      | 0.210     |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        | 2.073     |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        | 0.305     |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    | 301.56 kN |

NEN-EN1993-1-1(6.46): UC = 0.01

## KIP (#6.3.2)

Staal C14-V1 (0.000-5.950)

|                        |            |                                             |         |
|------------------------|------------|---------------------------------------------|---------|
| Equivalente profiel    | N219.1/6.3 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1     | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen       |                                             |         |

## Maatgevend veld

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm  |
| Veld einde        |   | 5.950 m | Moment (eind)  | $M_y$ | -0.78 kNm |
| Lengte            | L | 5.950 m | Moment (max)   | $M_y$ | 1.66 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |           |                |               |          |
|------------------|---------------------|-----------|----------------|---------------|----------|
| Tabel gebruikt   |                     | NB.NB.7   | Moment         | M             | 0.78 kNm |
| Kracht           | F                   | 0.03 kN   | Lengte         | $L_{st}$      | 5.950 m  |
|                  | $B^{**}$            | -0.94     | Lengte         | $L_{st}$      | 5.950 m  |
| Lengte           | $L_{kip}$           | 5.950 m   |                | (NB.NB.12) S  | 0.000 m  |
| Coefficient      | $C_1$               | 1.927     | Coefficient    | $C_2$ (Tabel) | 0.041    |
| Coefficient      | $C_2$ (Berekend)    | 0.000     | Lengte         | $L_g$         | 5.950 m  |
| Coefficient      | (NB.NB.11) C        | 6.054     | Reductiefactor | $K_{red}$     | 0.000    |
|                  | (NB.NB.6) $M_{cr}$  | 0.00 kNm  |                |               |          |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 67.06 kNm |                |               |          |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 67.06 kNm |                |               |          |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C14-V1 (0.000-5.950)

|                        |            |                 |   |
|------------------------|------------|-----------------|---|
| Profiel                | N219.1/6.3 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.39    |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 15.01 kNm   | M         | 0.00 kNm       | M          | 15.01 kNm   |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | 3.44 kNm    | $\psi$    | 1.000          | $M_s$      | 3.44 kNm    |
| $\psi$     | 0.000       | Belasting | Geconcentreerd | $\psi$     | 0.000       |
| $\alpha_s$ | 0.229       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.229       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.400       |           |                | $C_{mLT}$  | 0.400       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.401           |                  | $k_{yz}$          | 0.605           |
|                  | $k_{zy}$          | 0.241           |                  | $k_{zz}$          | 1.009           |
| Maatgevend veld  |                   | 0.000 - 5.950 m | Maatgevend veld  |                   | 0.000 - 5.950 m |
| Normaalkracht    | $N_{y,Ed}$        | -3.20 kN        | Normaalkracht    | $N_{z,Ed}$        | -3.20 kN        |
| Lengte           | $L_{y,cr}$        | 5.950 m         | Lengte           | $L_{z,cr}$        | 11.900 m        |
| Reductiefactor   | (6.49) $\chi_y$   | 0.771           | Reductiefactor   | (6.49) $\chi_z$   | 0.305           |
| Ontwerpweerstand | $N_{Rk}$          | 989.76 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 5.950 m | Maatgevend veld  |                   | 0.000 - 5.950 m |
| Buigmoment       | $M_{y,Ed}$        | 15.01 kNm       | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 67.06 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 67.06 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.09

NEN-EN1993-1-1(6.62): UC = 0.06

### DOORSNEDE (#6.2)

Staal C15-V1 (0.000-1.442)



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Maatgevende combinatie |                   | Fu.C.41  | Doorsnedeklasse  |        |                   | 1         |
|------------------------|-------------------|----------|------------------|--------|-------------------|-----------|
| Maatgevende positie    |                   | 0.000 m  |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | 27.83 kN | Ontwerpweerstand | (6.6)  | N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 0.27 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN  | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -0.24 kN | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 119.72 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.2 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |     |
|--------------------|---------------|--------------------|-----|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee |
|                    | n             |                    |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm          |     |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 11.44 kNm          |     |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.09  
 NEN-EN1993-1-1(6.12): UC (y) = 0.02  
 NEN-EN1993-1-1(6.12): UC (z) = 0.00  
 NEN-EN1993-1-1(6.17): UC (y) = 0.00  
 NEN-EN1993-1-1(6.17): UC (z) = 0.00  
 NEN-EN1993-1-1(6.31): UC (y) = 0.02  
 NEN-EN1993-1-1(NB.33): UC = 0.04

#### KNIK (#6.3.1)

Staaf C15-V1 (0.000-1.442)

|                             |             |                 |                             |             |                 |           |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|-----------|
| Profiel                     |             | N114.3/4        | Doorsnedeklasse             |             | 1               |           |
| Maatgevende combinatie      |             | Fu.C.47         |                             |             |                 |           |
| Maatgevend veld             |             | 0.000 - 1.442 m | Maatgevend veld             |             | 0.000 - 1.442 m |           |
| Normaalkracht               | $N_{Ed,y}$  | -0.50 kN        | Normaalkracht               | $N_{Ed,z}$  | -0.50 kN        |           |
| Lengte                      | $L_{cr,y}$  | 1.442 m         | Lengte                      | $L_{cr,z}$  | 1.442 m         |           |
| Elastische kritische kracht | $N_{cr,y}$  | 2103.50 kN      | Elastische kritische kracht | $N_{cr,z}$  | 2103.50 kN      |           |
| Slankheid                   | $\lambda_y$ | 0.394           | Slankheid                   | $\lambda_z$ | 0.394           |           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |           |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      | 0.210     |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        | 0.598     |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        | 0.954     |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    | 310.90 kN |

NEN-EN1993-1-1(6.46): UC = 0.00

#### KIP (#6.3.2)

Staaf C15-V1 (0.000-1.442)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalente profiel    | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | 0.10 kNm  |
| Veld einde        |   | 1.442 m | Moment (eind)  | $M_y$ | -0.14 kNm |
| Lengte            | L | 1.442 m | Moment (max)   | $M_y$ | 0.10 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |                     |             |                |               |         |
|------------------|---------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt   |                     | NB.NB.1 (1) |                | $\beta$       | -0.72   |
| Lengte           | $L_{st}$            | 1.442 m     |                | $\beta$       | -0.722  |
| Lengte           | $L_{kip}$           | 1.442 m     |                | (NB.NB.12) S  | 0.000 m |
| Coefficient      | $C_1$               | 2.300       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient      | $C_2$ (Berekend)    | 0.000       | Lengte         | $L_g$         | 1.442 m |
| Coefficient      | (NB.NB.11) C        | 7.226       | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6) $M_{cr}$  | 0.00 kNm    |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 11.44 kNm   |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 11.44 kNm   |                |               |         |

**Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C15-V1 (0.000-1.442)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.47  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.20 kNm    | M         | 0.00 kNm       | M          | 0.20 kNm    |
| $\psi M$   | -0.06 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.06 kNm   |
| $M_s$      | 0.10 kNm    | $\psi$    | 1.000          | $M_s$      | 0.10 kNm    |
| $\psi$     | -0.300      | Belasting | Geconcentreerd | $\psi$     | -0.300      |
| $\alpha_s$ | 0.472       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.472       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.578       |           |                | $C_{mLT}$  | 0.578       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.578           |                  | $k_{yz}$          | 0.600           |
|                  | $k_{zy}$          | 0.347           |                  | $k_{zz}$          | 1.000           |
| Maatgevend veld  |                   | 0.000 - 1.442 m | Maatgevend veld  |                   | 0.000 - 1.442 m |
| Normaalkracht    | $N_{y,Ed}$        | -0.50 kN        | Normaalkracht    | $N_{z,Ed}$        | -0.50 kN        |
| Lengte           | $L_{y,cr}$        | 1.442 m         | Lengte           | $L_{z,cr}$        | 1.442 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.954           | Reductiefactor   | (6.49) $\chi_z$   | 0.954           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.442 m | Maatgevend veld  |                   | 0.000 - 1.442 m |
| Buigmoment       | $M_{y,Ed}$        | 0.20 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.01  
NEN-EN1993-1-1(6.62): UC = 0.01

### DOORSNEDE (#6.2)

Staaf C16-V1 (0.000-1.508)

|                        |                   |          |                  |        |                   |           |
|------------------------|-------------------|----------|------------------|--------|-------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.39  | Doorsnedeklasse  |        | 1                 |           |
| Maatgevende positie    |                   | 0.000 m  |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | -1.02 kN | Ontwerpweerstand | (6.10) | N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 0.76 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN  | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 119.72 kN |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|             |           |          |                  |        |           |           |
|-------------|-----------|----------|------------------|--------|-----------|-----------|
| Dwarskracht | $V_{zEd}$ | -0.66 kN | Ontwerpweerstand | (6.18) | $V_{zRd}$ | 119.72 kN |
|-------------|-----------|----------|------------------|--------|-----------|-----------|

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.5 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |    |                    |     |
|--------------------|----|--------------------|-----|
| Is reductie nodig? | Ja | Is reductie nodig? | Nee |
|--------------------|----|--------------------|-----|

|                  |               |           |
|------------------|---------------|-----------|
|                  | n             | 0.003     |
| Ontwerpweerstand | $M_{pl,y,Rd}$ | 11.44 kNm |
| Ontwerpweerstand | $M_{N,y,Rd}$  | 11.44 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.00  
NEN-EN1993-1-1(6.12): UC (y) = 0.07  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.01  
NEN-EN1993-1-1(6.31): UC (y) = 0.07  
NEN-EN1993-1-1(NB.33): UC = 0.07

#### KNIK (#6.3.1)

Staaf C16-V1 (0.000-1.508)

|                             |                |                 |                             |                |                 |
|-----------------------------|----------------|-----------------|-----------------------------|----------------|-----------------|
| Profiel                     |                | N114.3/4        | Doorsnedeklasse             |                | 1               |
| Maatgevende combinatie      |                | Fu.C.39         |                             |                |                 |
| Maatgevend veld             |                | 0.000 - 1.508 m | Maatgevend veld             |                | 0.000 - 1.508 m |
| Normaalkracht               | $N_{Ed,y}$     | -1.02 kN        | Normaalkracht               | $N_{Ed,z}$     | -1.02 kN        |
| Lengte                      | $L_{\alpha,y}$ | 1.508 m         | Lengte                      | $L_{\alpha,z}$ | 1.508 m         |
| Elastische kritische kracht | $N_{cr,y}$     | 1924.00 kN      | Elastische kritische kracht | $N_{cr,z}$     | 1924.00 kN      |
| Slankheid                   | $\lambda_y$    | 0.411           | Slankheid                   | $\lambda_z$    | 0.411           |
| Knikcurve                   | Tabel 6.2      | a               | Knikcurve                   | Tabel 6.2      | a               |
| Imperfectiefactor           | Tabel 6.1      | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1      | $\alpha_z$      |
|                             |                | $\Phi_y$        |                             |                | $\Phi_z$        |
|                             |                | 0.607           |                             |                | 0.607           |
| Reductiefactor              | (6.49)         | $\chi_y$        | Reductiefactor              | (6.49)         | $\chi_z$        |
|                             |                | 0.950           |                             |                | 0.950           |
| Ontwerpweerstand            | (6.47)         | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)         | $N_{b,Rd,z}$    |
|                             |                | 309.36 kN       |                             |                | 309.36 kN       |

NEN-EN1993-1-1(6.46): UC = 0.00

#### KIP (#6.3.2)

Staaf C16-V1 (0.000-1.508)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalente profiel    |  | N114.3/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.09 kNm |
| Veld einde        |   | 1.508 m | Moment (eind)  | $M_y$ | 0.02 kNm  |
| Lengte            | L | 1.508 m | Moment (max)   | $M_y$ | 0.02 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                    |             |                |               |         |
|----------------|--------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt |                    | NB.NB.1 (1) |                | $\beta$       | -0.22   |
| Lengte         | $L_{st}$           | 1.508 m     |                | $\beta$       | -0.221  |
| Lengte         | $L_{kip}$          | 1.508 m     | (NB.NB.12)     | S             | 0.000 m |
| Coefficient    | $C_1$              | 1.997       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient    | $C_2$ (Berekend)   | 0.000       | Lengte         | $L_g$         | 1.508 m |
| Coefficient    | (NB.NB.11) C       | 6.274       | Reductiefactor | $K_{red}$     | 0.000   |
|                | (NB.NB.6) $M_{cr}$ | 0.00 kNm    |                |               |         |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |        |              |           |
|------------------|--------|--------------|-----------|
| Ontwerpweerstand | (6.55) | $M_{b,Rd,y}$ | 11.44 kNm |
| Ontwerpweerstand | (6.55) | $M_{b,Rd,z}$ | 11.44 kNm |

Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C16-V1 (0.000-1.508)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.39  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.76 kNm    | M         | 0.00 kNm       | M          | 0.76 kNm    |
| $\psi M$   | -0.30 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.30 kNm   |
| $M_s$      | 0.25 kNm    | $\psi$    | 1.000          | $M_s$      | 0.25 kNm    |
| $\psi$     | -0.393      | Belasting | Geconcentreerd | $\psi$     | -0.393      |
| $\alpha_s$ | 0.327       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.327       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.461       |           |                | $C_{mLT}$  | 0.461       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.462           |                  | $k_{yz}$          | 0.600           |
|                  | $k_{zy}$          | 0.277           |                  | $k_{zz}$          | 1.001           |
| Maatgevend veld  |                   | 0.000 - 1.508 m | Maatgevend veld  |                   | 0.000 - 1.508 m |
| Normaalkracht    | $N_{y,Ed}$        | -1.02 kN        | Normaalkracht    | $N_{z,Ed}$        | -1.02 kN        |
| Lengte           | $L_{y,cr}$        | 1.508 m         | Lengte           | $L_{z,cr}$        | 1.508 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.950           | Reductiefactor   | (6.49) $\chi_z$   | 0.950           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.508 m | Maatgevend veld  |                   | 0.000 - 1.508 m |
| Buigmoment       | $M_{y,Ed}$        | 0.76 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.03

NEN-EN1993-1-1(6.62): UC = 0.02

### DOORSNEDE (#6.2)

Staal C18-V1 (0.000-5.950)

|                        |                   |           |                  |        |                   |           |
|------------------------|-------------------|-----------|------------------|--------|-------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.41   | Doorsnedeklasse  |        |                   | 1         |
| Maatgevende positie    |                   | 4.675 m   |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | -14.52 kN | Ontwerpweerstand | (6.10) | N <sub>Rd</sub>   | 400.74 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 2.75 kNm  | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 17.31 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 17.31 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 147.29 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -4.06 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 147.29 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 2.8 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |    |                    |     |
|--------------------|----|--------------------|-----|
| Is reductie nodig? | Ja | Is reductie nodig? | Nee |
|--------------------|----|--------------------|-----|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |               |           |
|------------------|---------------|-----------|
|                  | n             | 0.036     |
| Ontwerpweerstand | $M_{pl,y,Rd}$ | 17.31 kNm |
| Ontwerpweerstand | $M_{N,y,Rd}$  | 17.31 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.04  
NEN-EN1993-1-1(6.12): UC (y) = 0.16  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.03  
NEN-EN1993-1-1(6.31): UC (y) = 0.16  
NEN-EN1993-1-1(NB.33): UC = 0.16

#### KNIK (#6.3.1)

Staal C18-V1 (0.000-5.950)

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Profiel                     |             | N139.7/4        | Doorsnedeklasse             |             | 1               |
| Maatgevende combinatie      |             | Fu.C.41         |                             |             |                 |
| Maatgevend veld             |             | 0.000 - 5.950 m | Maatgevend veld             |             | 0.000 - 5.950 m |
| Normaalkracht               | $N_{Ed,y}$  | -30.11 kN       | Normaalkracht               | $N_{Ed,z}$  | -30.11 kN       |
| Lengte                      | $L_{cr,y}$  | 5.950 m         | Lengte                      | $L_{cr,z}$  | 11.900 m        |
| Elastische kritische kracht | $N_{cr,y}$  | 230.00 kN       | Elastische kritische kracht | $N_{cr,z}$  | 57.50 kN        |
| Slankheid                   | $\lambda_y$ | 1.320           | Slankheid                   | $\lambda_z$ | 2.640           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
|                             |             | 1.489           |                             |             | 4.241           |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
|                             |             | 0.459           |                             |             | 0.132           |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |
|                             |             | 184.05 kN       |                             |             | 53.01 kN        |

NEN-EN1993-1-1(6.46): UC = 0.57

#### KIP (#6.3.2)

Staal C18-V1 (0.000-5.950)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalent profiel     |  | N139.7/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.10 kNm |
| Veld einde        |   | 5.950 m | Moment (eind)  | $M_y$ | -0.24 kNm |
| Lengte            | L | 5.950 m | Moment (max)   | $M_y$ | 0.25 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                    |              |                |               |          |
|------------------|--------------------|--------------|----------------|---------------|----------|
| Tabel gebruikt   |                    | NB.NB.4      | Moment         | M             | 0.24 kNm |
| Belasting        | q                  | 0.05 kN/m    | Lengte         | $L_{st}$      | 5.950 m  |
|                  | $B^*$              | -0.50        | Lengte         | $L_{st}$      | 5.950 m  |
|                  | $\beta$            | 0.418        | Lengte         | $L_{kip}$     | 5.950 m  |
|                  | (NB.NB.12) S       | 0.000 m      |                |               |          |
| Coefficient      | $C_1$              | 2.280        | Coefficient    | $C_2$ (Tabel) | 1.275    |
| Coefficient      | $C_2$ (Berekend)   | 0.000        | Lengte         | $L_g$         | 5.950 m  |
| Coefficient      | (NB.NB.11) C       | 7.163        | Reductiefactor | $K_{red}$     | 0.000    |
|                  | (NB.NB.6) $M_{cr}$ | 0.00 kNm     |                |               |          |
| Ontwerpweerstand | (6.55)             | $M_{b,Rd,y}$ |                |               |          |
|                  |                    | 17.31 kNm    |                |               |          |
| Ontwerpweerstand | (6.55)             | $M_{b,Rd,z}$ |                |               |          |
|                  |                    | 17.31 kNm    |                |               |          |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C18-V1 (0.000-5.950)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N139.7/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.41  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | -2.54 kNm   | M               | 0.00 kNm       | M                | -2.54 kNm   |
| ψM              | -0.27 kNm   | ψM              | 0.00 kNm       | ψM               | -0.27 kNm   |
| M <sub>s</sub>  | 0.47 kNm    | ψ               | 1.000          | M <sub>s</sub>   | 0.47 kNm    |
| ψ               | 0.105       | Belasting       | Geconcentreerd | ψ                | 0.105       |
| α <sub>s</sub>  | -0.185      | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | -0.185      |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.400       |                 |                | C <sub>mLT</sub> | 0.400       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.452           |                  | k <sub>yz</sub>       | 0.873           |
|                  | k <sub>zy</sub>       | 0.271           |                  | k <sub>zz</sub>       | 1.454           |
| Maatgevend veld  |                       | 0.000 - 5.950 m | Maatgevend veld  |                       | 0.000 - 5.950 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -30.11 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -30.11 kN       |
| Lengte           | L <sub>y,cr</sub>     | 5.950 m         | Lengte           | L <sub>z,cr</sub>     | 11.900 m        |
| Reductiefactor   | (6.49) X <sub>y</sub> | 0.459           | Reductiefactor   | (6.49) X <sub>z</sub> | 0.132           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 400.74 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 5.950 m | Maatgevend veld  |                       | 0.000 - 5.950 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 2.75 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 17.31 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 17.31 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.24

NEN-EN1993-1-1(6.62): UC = 0.61

### DOORSNEDE (#6.2)

Staal C19-V1 (0.000-2.409)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Maatgevende combinatie | Fu.C.39 | Doorsnedeklasse | 1 |
| Maatgevende positie    | 2.007 m |                 |   |

|               |                   |           |                  |                          |            |
|---------------|-------------------|-----------|------------------|--------------------------|------------|
| Normaalkracht | N <sub>Ed</sub>   | -81.87 kN | Ontwerpweerstand | (6.10) N <sub>Rd</sub>   | 1107.90 kN |
| Buigmoment    | M <sub>y,Ed</sub> | 0.17 kNm  | Ontwerpweerstand | (6.13) M <sub>y,Rd</sub> | 84.02 kNm  |
| Buigmoment    | M <sub>z,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) M <sub>z,Rd</sub> | 84.02 kNm  |
| Dwarskracht   | V <sub>y,Ed</sub> | 0.00 kN   | Ontwerpweerstand | (6.18) V <sub>y,Rd</sub> | 407.21 kN  |
| Dwarskracht   | V <sub>z,Ed</sub> | -0.34 kN  | Ontwerpweerstand | (6.18) V <sub>z,Rd</sub> | 407.21 kN  |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.1 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |                      |                    |       |
|--------------------|----------------------|--------------------|-------|
| Is reductie nodig? | Ja                   | Is reductie nodig? | Nee   |
|                    | n                    |                    | 0.074 |
| Ontwerpweerstand   | M <sub>pl,y,Rd</sub> | 84.02 kNm          |       |
| Ontwerpweerstand   | M <sub>N,y,Rd</sub>  | 84.02 kNm          |       |

#### Uitgevoerde controles

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.9): UC = 0.07  
NEN-EN1993-1-1(6.12): UC (y) = 0.00  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.00  
NEN-EN1993-1-1(6.31): UC (y) = 0.00  
NEN-EN1993-1-1(NB.33): UC = 0.01

### KNIK (#6.3.1)

Staaf C19-V1 (0.000-2.409)

|                             |                   |                     |                             |                   |                     |
|-----------------------------|-------------------|---------------------|-----------------------------|-------------------|---------------------|
| Profiel                     |                   | N244.5/6.3          | Doorsnedeklasse             |                   | 1                   |
| Maatgevende combinatie      |                   | Fu.C.39             |                             |                   |                     |
| Maatgevend veld             |                   | 0.000 - 2.409 m     | Maatgevend veld             |                   | 0.000 - 2.409 m     |
| Normaalkracht               | N <sub>Ed,y</sub> | -81.92 kN           | Normaalkracht               | N <sub>Ed,z</sub> | -81.92 kN           |
| Lengte                      | L <sub>cr,y</sub> | 2.409 m             | Lengte                      | L <sub>cr,z</sub> | 2.409 m             |
| Elastische kritische kracht | N <sub>cr,y</sub> | 11951.75 kN         | Elastische kritische kracht | N <sub>cr,z</sub> | 11951.75 kN         |
| Slankheid                   | λ <sub>y</sub>    | 0.304               | Slankheid                   | λ <sub>z</sub>    | 0.304               |
| Knikcurve                   | Tabel 6.2         | a                   | Knikcurve                   | Tabel 6.2         | a                   |
| Imperfectiefactor           | Tabel 6.1         | α <sub>y</sub>      | Imperfectiefactor           | Tabel 6.1         | α <sub>z</sub>      |
|                             |                   | Φ <sub>y</sub>      |                             |                   | Φ <sub>z</sub>      |
|                             |                   | 0.557               |                             |                   | 0.557               |
| Reductiefactor              | (6.49)            | χ <sub>y</sub>      | Reductiefactor              | (6.49)            | χ <sub>z</sub>      |
|                             |                   | 0.976               |                             |                   | 0.976               |
| Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,y</sub> | Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,z</sub> |
|                             |                   | 1081.81 kN          |                             |                   | 1081.81 kN          |

NEN-EN1993-1-1(6.46): UC = 0.08

### KIP (#6.3.2)

Staaf C19-V1 (0.000-2.409)

|                        |  |            |                                             |  |         |
|------------------------|--|------------|---------------------------------------------|--|---------|
| Equivalente profiel    |  | N244.5/6.3 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1     | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen       |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |                |          |
|-------------------|---|---------|----------------|----------------|----------|
| Veld begin        |   | 0.000 m | Moment (begin) | M <sub>y</sub> | 0.00 kNm |
| Veld einde        |   | 2.409 m | Moment (eind)  | M <sub>y</sub> | 0.00 kNm |
| Lengte            | L | 2.409 m | Moment (max)   | M <sub>y</sub> | 0.00 kNm |
| Maatgevende flens |   | Boven   | Moment (max)   | M <sub>z</sub> | 0.00 kNm |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                           |                 |                |                        |         |
|----------------|---------------------------|-----------------|----------------|------------------------|---------|
| Tabel gebruikt |                           | NB.NB.1 (4)     | Kracht         | F                      | 0.00 kN |
| Lengte         | L <sub>st</sub>           | 2.409 m         | Lengte         | L <sub>kip</sub>       | 2.409 m |
|                | (NB.NB.12)                | S               |                |                        |         |
|                |                           | 0.000 m         |                |                        |         |
| Coefficient    | C <sub>1</sub>            | 1.040           | Coefficient    | C <sub>2</sub> (Tabel) | 0.420   |
| Coefficient    | C <sub>2</sub> (Berekend) | 0.000           | Lengte         | L <sub>g</sub>         | 2.409 m |
| Coefficient    | (NB.NB.11)                | C               | Reductiefactor | K <sub>red</sub>       | 0.000   |
|                | (NB.NB.6)                 | M <sub>cr</sub> |                |                        |         |
|                |                           | 0.00 kNm        |                |                        |         |

|                  |        |                     |           |
|------------------|--------|---------------------|-----------|
| Ontwerpweerstand | (6.55) | M <sub>b,Rd,y</sub> | 84.02 kNm |
| Ontwerpweerstand | (6.55) | M <sub>b,Rd,z</sub> | 84.02 kNm |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C19-V1 (0.000-2.409)

|                        |  |            |                 |  |   |
|------------------------|--|------------|-----------------|--|---|
| Profiel                |  | N244.5/6.3 | Doorsnedeklasse |  | 1 |
| Maatgevende combinatie |  | Fu.C.39    |                 |  |   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| <b>C<sub>my</sub></b> |             | <b>C<sub>mz</sub></b> |                | <b>C<sub>mLT</sub></b> |             |
|-----------------------|-------------|-----------------------|----------------|------------------------|-------------|
| M                     | -0.00 kNm   | M                     | 0.00 kNm       | M                      | -0.00 kNm   |
| ψM                    | 0.00 kNm    | ψM                    | 0.00 kNm       | ψM                     | 0.00 kNm    |
| M <sub>s</sub>        | 0.31 kNm    | ψ                     | 1.000          | M <sub>s</sub>         | 0.31 kNm    |
| ψ                     | -0.000      | Belasting             | Geconcentreerd | ψ                      | -0.000      |
| α <sub>h</sub>        | -0.000      | C <sub>mz</sub>       | 1.000          | α <sub>h</sub>         | -0.000      |
| Belasting             | Gelijkmatig |                       |                | Belasting              | Gelijkmatig |
| C <sub>my</sub>       | 0.950       |                       |                | C <sub>mLT</sub>       | 0.950       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.958           |                  | k <sub>yz</sub>       | 0.605           |
|                  | k <sub>zy</sub>       | 0.575           |                  | k <sub>zz</sub>       | 1.008           |
| Maatgevend veld  |                       | 0.000 - 2.409 m | Maatgevend veld  |                       | 0.000 - 2.409 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -81.92 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -81.92 kN       |
| Lengte           | L <sub>y,cr</sub>     | 2.409 m         | Lengte           | L <sub>z,cr</sub>     | 2.409 m         |
| Reductiefactor   | (6.49) x <sub>y</sub> | 0.976           | Reductiefactor   | (6.49) x <sub>z</sub> | 0.976           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 1107.90 kN      |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 2.409 m | Maatgevend veld  |                       | 0.000 - 2.409 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 0.31 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 84.02 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 84.02 kNm       |
| Reductiefactor   | χ <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.08

NEN-EN1993-1-1(6.62): UC = 0.08

#### DOORSNEDE (#6.2)

Staal C20-V1 (0.000-1.655)

|                        |                   |           |                  |                          |            |
|------------------------|-------------------|-----------|------------------|--------------------------|------------|
| Maatgevende combinatie |                   | Fu.C.40   | Doorsnedeklasse  |                          | 1          |
| Maatgevende positie    |                   | 0.000 m   |                  |                          |            |
| Normaalkracht          | N <sub>Ed</sub>   | -64.11 kN | Ontwerpweerstand | (6.10) N <sub>Rd</sub>   | 1107.90 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) M <sub>y,Rd</sub> | 84.02 kNm  |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) M <sub>z,Rd</sub> | 84.02 kNm  |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN   | Ontwerpweerstand | (6.18) V <sub>y,Rd</sub> | 407.21 kN  |
| Dwarskracht            | V <sub>z,Ed</sub> | 0.26 kN   | Ontwerpweerstand | (6.18) V <sub>z,Rd</sub> | 407.21 kN  |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.06

NEN-EN1993-1-1(6.12): UC (y) = 0.00

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

NEN-EN1993-1-1(6.17): UC (z) = 0.00

NEN-EN1993-1-1(NB.33): UC = 0.01

#### KNIK (#6.3.1)

Staal C20-V1 (0.000-1.655)

|                             |  |                   |                 |                             |  |                               |
|-----------------------------|--|-------------------|-----------------|-----------------------------|--|-------------------------------|
| Profiel                     |  |                   | N244.5/6.3      | Doorsnedeklasse             |  | 1                             |
| Maatgevende combinatie      |  |                   | Fu.C.40         |                             |  |                               |
| Maatgevend veld             |  |                   | 0.000 - 1.655 m | Maatgevend veld             |  | 0.000 - 1.655 m               |
| Normaalkracht               |  | N <sub>Ed,y</sub> | -64.11 kN       | Normaalkracht               |  | N <sub>Ed,z</sub> -64.11 kN   |
| Lengte                      |  | L <sub>cr,y</sub> | 1.655 m         | Lengte                      |  | L <sub>cr,z</sub> 1.655 m     |
| Elastische kritische kracht |  | N <sub>cr,y</sub> | 25330.67 kN     | Elastische kritische kracht |  | N <sub>cr,z</sub> 25330.67 kN |
| Slankheid                   |  | λ <sub>y</sub>    | 0.209           | Slankheid                   |  | λ <sub>z</sub> 0.209          |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                   |           |              |            |                   |           |              |            |
|-------------------|-----------|--------------|------------|-------------------|-----------|--------------|------------|
| Knikcurve         | Tabel 6.2 | a            | Knikcurve  | Tabel 6.2         | a         |              |            |
| Imperfectiefactor | Tabel 6.1 | $\alpha_y$   | 0.210      | Imperfectiefactor | Tabel 6.1 | $\alpha_z$   | 0.210      |
|                   |           | $\Phi_y$     | 0.523      |                   |           | $\Phi_z$     | 0.523      |
| Reductiefactor    | (6.49)    | $\chi_y$     | 0.998      | Reductiefactor    | (6.49)    | $\chi_z$     | 0.998      |
| Ontwerpweerstand  | (6.47)    | $N_{b,Rd,y}$ | 1105.68 kN | Ontwerpweerstand  | (6.47)    | $N_{b,Rd,z}$ | 1105.68 kN |

NEN-EN1993-1-1(6.46): UC = 0.06

### KIP (#6.3.2)

Staaf C20-V1 (0.000-1.655)

|                        |            |                                             |         |
|------------------------|------------|---------------------------------------------|---------|
| Equivalente profiel    | N244.5/6.3 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1     | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen       |                                             |         |

### Maatgevend veld

|                   |         |                |       |          |
|-------------------|---------|----------------|-------|----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm |
| Veld einde        | 1.655 m | Moment (eind)  | $M_y$ | 0.00 kNm |
| Lengte            | L       | Moment (max)   | $M_y$ | 0.00 kNm |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$ | 0.00 kNm |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |                |               |         |
|------------------|---------------------|----------------|---------------|---------|
| Tabel gebruikt   | NB.NB.1 (4)         | Kracht         | F             | 0.00 kN |
| Lengte           | $L_{st}$            | Lengte         | $L_{kip}$     | 1.655 m |
|                  | (NB.NB.12) S        |                |               |         |
| Coefficient      | $C_1$               | Coefficient    | $C_2$ (Tabel) | 0.420   |
| Coefficient      | $C_2$ (Berekend)    | Lengte         | $L_g$         | 1.655 m |
| Coefficient      | (NB.NB.11) C        | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6) $M_{cr}$  |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 84.02 kNm      |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 84.02 kNm      |               |         |

### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C20-V1 (0.000-1.655)

|                        |            |                 |   |
|------------------------|------------|-----------------|---|
| Profiel                | N244.5/6.3 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.40    |                 |   |

### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -0.00 kNm   | M         | 0.00 kNm       | M          | -0.00 kNm   |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | 0.11 kNm    | $\psi$    | 1.000          | $M_s$      | 0.11 kNm    |
| $\psi$     | -0.000      | Belasting | Geconcentreerd | $\psi$     | -0.000      |
| $\alpha_h$ | -0.000      | $C_{mz}$  | 1.000          | $\alpha_h$ | -0.000      |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.950       |           |                | $C_{mLT}$  | 0.950       |

### Interactiefactoren (Tabel B.1)

|                 |            |                 |                 |            |                 |
|-----------------|------------|-----------------|-----------------|------------|-----------------|
|                 | $k_{yy}$   | 0.951           |                 | $k_{yz}$   | 0.600           |
|                 | $k_{zy}$   | 0.570           |                 | $k_{zz}$   | 1.001           |
| Maatgevend veld |            | 0.000 - 1.655 m | Maatgevend veld |            | 0.000 - 1.655 m |
| Normaalkracht   | $N_{y,Ed}$ | -64.11 kN       | Normaalkracht   | $N_{z,Ed}$ | -64.11 kN       |
| Lengte          | $L_{y,cr}$ | 1.655 m         | Lengte          | $L_{z,cr}$ | 1.655 m         |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                 |        |                   |                 |                  |        |                   |                 |
|---------------------------------|--------|-------------------|-----------------|------------------|--------|-------------------|-----------------|
| Reductiefactor                  | (6.49) | $X_y$             | 0.998           | Reductiefactor   | (6.49) | $X_z$             | 0.998           |
| Ontwerpweerstand                |        | $N_{Rk}$          | 1107.90 kN      |                  |        |                   |                 |
| Maatgevend veld                 |        |                   | 0.000 - 1.655 m | Maatgevend veld  |        |                   | 0.000 - 1.655 m |
| Buigmoment                      |        | $M_{y,Ed}$        | 0.11 kNm        | Buigmoment       |        | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment                      |        | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       |        | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand                |        | $M_{y,Rk}$        | 84.02 kNm       | Ontwerpweerstand |        | $M_{z,Rk}$        | 84.02 kNm       |
| Reductiefactor                  |        | $X_{LT}$          | 1.000           |                  |        |                   |                 |
| NEN-EN1993-1-1(6.61): UC = 0.06 |        |                   |                 |                  |        |                   |                 |
| NEN-EN1993-1-1(6.62): UC = 0.06 |        |                   |                 |                  |        |                   |                 |

## DOORSNEDE (#6.2)

Staal C21-V1 (0.000-1.515)

|                        |            |           |                  |        |                      |
|------------------------|------------|-----------|------------------|--------|----------------------|
| Maatgevende combinatie |            | Fu.C.39   | Doorsnedeklasse  |        | 1                    |
| Maatgevende positie    |            | 0.000 m   |                  |        |                      |
| Normaalkracht          | $N_{Ed}$   | 6.94 kN   | Ontwerpweerstand | (6.6)  | $N_{Rd}$ 325.73 kN   |
| Buigmoment             | $M_{y,Ed}$ | -1.56 kNm | Ontwerpweerstand | (6.13) | $M_{y,Rd}$ 11.44 kNm |
| Buigmoment             | $M_{z,Ed}$ | 0.00 kNm  | Ontwerpweerstand | (6.13) | $M_{z,Rd}$ 11.44 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 0.00 kN   | Ontwerpweerstand | (6.18) | $V_{y,Rd}$ 119.72 kN |
| Dwarskracht            | $V_{z,Ed}$ | 1.89 kN   | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ 119.72 kN |

## Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 1.6 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

## Buig- en normaalkracht #6.2.9

|                    |               |                    |       |
|--------------------|---------------|--------------------|-------|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee   |
|                    | n             |                    | 0.021 |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm          |       |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 11.44 kNm          |       |

## Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.02  
NEN-EN1993-1-1(6.12): UC (y) = 0.14  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.02  
NEN-EN1993-1-1(6.31): UC (y) = 0.14  
NEN-EN1993-1-1(NB.33): UC = 0.14

## KNIK (#6.3.1)

Staal C21-V1 (0.000-1.515)

|                             |                |                 |                             |                  |                        |
|-----------------------------|----------------|-----------------|-----------------------------|------------------|------------------------|
| Profiel                     |                | N114.3/4        | Doorsnedeklasse             |                  | 1                      |
| Maatgevende combinatie      |                | Fu.C.56         |                             |                  |                        |
| Maatgevend veld             |                | 0.000 - 1.515 m | Maatgevend veld             |                  | 0.000 - 1.515 m        |
| Normaalkracht               | $N_{Ed,y}$     | -1.94 kN        | Normaalkracht               | $N_{Ed,z}$       | -1.94 kN               |
| Lengte                      | $L_{\alpha,y}$ | 1.515 m         | Lengte                      | $L_{\alpha,z}$   | 1.515 m                |
| Elastische kritische kracht | $N_{cr,y}$     | 1906.23 kN      | Elastische kritische kracht | $N_{cr,z}$       | 1906.23 kN             |
| Slankheid                   | $\lambda_y$    | 0.413           | Slankheid                   | $\lambda_z$      | 0.413                  |
| Knikcurve                   | Tabel 6.2      | a               | Knikcurve                   | Tabel 6.2        | a                      |
| Imperfectiefactor           | Tabel 6.1      | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1        | $\alpha_z$             |
|                             |                | $\Phi_y$        |                             |                  | $\Phi_z$               |
|                             |                | 0.608           |                             |                  | 0.608                  |
| Reductiefactor              | (6.49)         | $X_y$           | Reductiefactor              | (6.49)           | $X_z$                  |
| Ontwerpweerstand            | (6.47)         | $N_{b,Rd,y}$    | 309.19 kN                   | Ontwerpweerstand | (6.47)                 |
|                             |                |                 |                             |                  | $N_{b,Rd,z}$ 309.19 kN |

NEN-EN1993-1-1(6.46): UC = 0.01

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

### KIP (#6.3.2)

Staaf C21-V1 (0.000-1.515)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalent profiel     | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

#### Maatgevend veld

|                   |           |                |       |           |
|-------------------|-----------|----------------|-------|-----------|
| Veld begin        | 0.000 m   | Moment (begin) | $M_y$ | 0.20 kNm  |
| Veld einde        | 1.515 m   | Moment (eind)  | $M_y$ | -0.05 kNm |
| Lengte            | L 1.515 m | Moment (max)   | $M_y$ | 0.20 kNm  |
| Maatgevende flens | Boven     | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                             |                |                     |
|----------------|-----------------------------|----------------|---------------------|
| Tabel gebruikt | NB.NB.1 (1)                 | $\beta$        | -0.25               |
| Lengte         | $L_{st}$ 1.515 m            | $\beta$        | -0.248              |
| Lengte         | $L_{kip}$ 1.515 m           | (NB.NB.12) S   | 0.000 m             |
| Coefficient    | $C_1$ 2.029                 | Coefficient    | $C_2$ (Tabel) 0.000 |
| Coefficient    | $C_2$ (Berekend) 0.000      | Lengte         | $L_g$ 1.515 m       |
| Coefficient    | (NB.NB.11) C 6.373          | Reductiefactor | $K_{red}$ 0.000     |
|                | (NB.NB.6) $M_{cr}$ 0.00 kNm |                |                     |

|                  |        |              |           |
|------------------|--------|--------------|-----------|
| Ontwerpweerstand | (6.55) | $M_{b,Rd,y}$ | 11.44 kNm |
| Ontwerpweerstand | (6.55) | $M_{b,Rd,z}$ | 11.44 kNm |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C21-V1 (0.000-1.515)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.56  |                 |   |

#### Equivalenten gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -1.29 kNm   | M         | 0.00 kNm       | M          | -1.29 kNm   |
| $\psi M$   | 0.78 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.78 kNm    |
| $M_s$      | -0.24 kNm   | $\psi$    | 1.000          | $M_s$      | -0.24 kNm   |
| $\psi$     | -0.604      | Belasting | Geconcentreerd | $\psi$     | -0.604      |
| $\alpha_s$ | 0.188       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.188       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.400       |           |                | $C_{mLT}$  | 0.400       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.401           |                  | $k_{yz}$          | 0.601           |
|                  | $k_{zy}$          | 0.240           |                  | $k_{zz}$          | 1.001           |
| Maatgevend veld  |                   | 0.000 - 1.515 m | Maatgevend veld  |                   | 0.000 - 1.515 m |
| Normaalkracht    | $N_{y,Ed}$        | -1.94 kN        | Normaalkracht    | $N_{z,Ed}$        | -1.94 kN        |
| Lengte           | $L_{y,cr}$        | 1.515 m         | Lengte           | $L_{z,cr}$        | 1.515 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.949           | Reductiefactor   | (6.49) $\chi_z$   | 0.949           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.515 m | Maatgevend veld  |                   | 0.000 - 1.515 m |
| Buigmoment       | $M_{y,Ed}$        | 1.29 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.61): UC = 0.05

NEN-EN1993-1-1(6.62): UC = 0.03

## DOORSNEDE (#6.2)

Staal C23-V1 (0.000-1.438)

| Maatgevende combinatie |                   | Fu.C.41  | Doorsnedeklasse  |        |                   | 1         |
|------------------------|-------------------|----------|------------------|--------|-------------------|-----------|
| Maatgevende positie    |                   | 1.438 m  |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | -0.67 kN | Ontwerpweerstand | (6.10) | N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 0.56 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN  | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | 0.44 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 119.72 kN |

## Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.4 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

## Buig- en normaalkracht #6.2.9

|                    |               |                    |     |
|--------------------|---------------|--------------------|-----|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee |
|                    | 0.002         |                    |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm          |     |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 11.44 kNm          |     |

## Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.00

NEN-EN1993-1-1(6.12): UC (y) = 0.05

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

NEN-EN1993-1-1(6.17): UC (z) = 0.00

NEN-EN1993-1-1(6.31): UC (y) = 0.05

NEN-EN1993-1-1(NB.33): UC = 0.05

## KNIK (#6.3.1)

Staal C23-V1 (0.000-1.438)

|                             |             |                 |                             |             |                 |           |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|-----------|
| Profiel                     |             | N114.3/4        | Doorsnedeklasse             |             | 1               |           |
| Maatgevende combinatie      |             | Fu.C.41         |                             |             |                 |           |
| Maatgevend veld             |             | 0.000 - 1.438 m | Maatgevend veld             |             | 0.000 - 1.438 m |           |
| Normaalkracht               | $N_{Ed,y}$  | -0.67 kN        | Normaalkracht               | $N_{Ed,z}$  | -0.67 kN        |           |
| Lengte                      | $L_{cr,y}$  | 1.438 m         | Lengte                      | $L_{cr,z}$  | 1.438 m         |           |
| Elastische kritische kracht | $N_{cr,y}$  | 2114.99 kN      | Elastische kritische kracht | $N_{cr,z}$  | 2114.99 kN      |           |
| Slankheid                   | $\lambda_y$ | 0.392           | Slankheid                   | $\lambda_z$ | 0.392           |           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |           |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      | 0.210     |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        | 0.597     |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        | 0.955     |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    | 310.99 kN |

NEN-EN1993-1-1(6.46): UC = 0.00

## KIP (#6.3.2)

Staal C23-V1 (0.000-1.438)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalente profiel    | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

## Maatgevend veld

|            |         |                |       |          |
|------------|---------|----------------|-------|----------|
| Veld begin | 0.000 m | Moment (begin) | $M_y$ | 0.02 kNm |
|------------|---------|----------------|-------|----------|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                   |   |         |               |       |          |
|-------------------|---|---------|---------------|-------|----------|
| Veld einde        |   | 1.438 m | Moment (eind) | $M_y$ | 0.02 kNm |
| Lengte            | L | 1.438 m | Moment (max)  | $M_y$ | 0.02 kNm |
| Maatgevende flens |   | Boven   | Moment (max)  | $M_z$ | 0.00 kNm |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                    |             |                |               |         |
|----------------|--------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt |                    | NB.NB.1 (1) |                | $\beta$       | 0.85    |
| Lengte         | $L_{st}$           | 1.438 m     |                | $\beta$       | 0.849   |
| Lengte         | $L_{kip}$          | 1.438 m     | (NB.NB.12)     | S             | 0.000 m |
| Coefficient    | $C_1$              | 1.075       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient    | $C_2$ (Berekend)   | 0.000       | Lengte         | $L_g$         | 1.438 m |
| Coefficient    | (NB.NB.11) C       | 3.377       | Reductiefactor | $K_{red}$     | 0.000   |
|                | (NB.NB.6) $M_{cr}$ | 0.00 kNm    |                |               |         |

|                  |        |              |           |
|------------------|--------|--------------|-----------|
| Ontwerpweerstand | (6.55) | $M_{b,Rd,y}$ | 11.44 kNm |
| Ontwerpweerstand | (6.55) | $M_{b,Rd,z}$ | 11.44 kNm |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C23-V1 (0.000-1.438)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.41  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.56 kNm    | M         | 0.00 kNm       | M          | 0.56 kNm    |
| $\psi M$   | -0.22 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.22 kNm   |
| $M_s$      | 0.20 kNm    | $\psi$    | 1.000          | $M_s$      | 0.20 kNm    |
| $\psi$     | -0.387      | Belasting | Geconcentreerd | $\psi$     | -0.387      |
| $\alpha_s$ | 0.365       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.365       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.492       |           |                | $C_{mLT}$  | 0.492       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.492           |                  | $k_{yz}$          | 0.600           |
|                  | $k_{zy}$          | 0.295           |                  | $k_{zz}$          | 1.000           |
| Maatgevend veld  |                   | 0.000 - 1.438 m | Maatgevend veld  |                   | 0.000 - 1.438 m |
| Normaalkracht    | $N_{y,Ed}$        | -0.67 kN        | Normaalkracht    | $N_{z,Ed}$        | -0.67 kN        |
| Lengte           | $L_{y,cr}$        | 1.438 m         | Lengte           | $L_{z,cr}$        | 1.438 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.955           | Reductiefactor   | (6.49) $\chi_z$   | 0.955           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.438 m | Maatgevend veld  |                   | 0.000 - 1.438 m |
| Buigmoment       | $M_{y,Ed}$        | 0.56 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | XLT               | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.03

NEN-EN1993-1-1(6.62): UC = 0.02

### DOORSNEDE (#6.2)

Staal C25-V1 (0.000-1.539)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Maatgevende combinatie | Fu.C.42 | Doorsnedeklasse | 1 |
| Maatgevende positie    | 1.539 m |                 |   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|               |            |          |                  |        |            |           |
|---------------|------------|----------|------------------|--------|------------|-----------|
| Normaalkracht | $N_{Ed}$   | 28.74 kN | Ontwerpweerstand | (6.6)  | $N_{Rd}$   | 325.73 kN |
| Buigmoment    | $M_{y,Ed}$ | 0.07 kNm | Ontwerpweerstand | (6.13) | $M_{y,Rd}$ | 11.44 kNm |
| Buigmoment    | $M_{z,Ed}$ | 0.00 kNm | Ontwerpweerstand | (6.13) | $M_{z,Rd}$ | 11.44 kNm |
| Dwarskracht   | $V_{y,Ed}$ | 0.00 kN  | Ontwerpweerstand | (6.18) | $V_{y,Rd}$ | 119.72 kN |
| Dwarskracht   | $V_{z,Ed}$ | 0.02 kN  | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ | 119.72 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.0 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |           |
|--------------------|---------------|--------------------|-----------|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee       |
|                    | $n$           |                    | 0.088     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ |                    | 11.44 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  |                    | 11.44 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.09  
NEN-EN1993-1-1(6.12): UC (y) = 0.01  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.00  
NEN-EN1993-1-1(6.31): UC (y) = 0.01  
NEN-EN1993-1-1(NB.33): UC = 0.02

#### KNIK (#6.3.1)

Staal C25-V1 (0.000-1.539)

|                             |                 |                             |                 |
|-----------------------------|-----------------|-----------------------------|-----------------|
| Profiel                     | N114.3/4        | Doorsnedeklasse             | 1               |
| Maatgevende combinatie      | Fu.C.56         |                             |                 |
| Maatgevend veld             | 0.000 - 1.539 m | Maatgevend veld             | 0.000 - 1.539 m |
| Normaalkracht               | $N_{Ed,y}$      | Normaalkracht               | $N_{Ed,z}$      |
|                             | -0.42 kN        |                             | -0.42 kN        |
| Lengte                      | $L_{cr,y}$      | Lengte                      | $L_{cr,z}$      |
|                             | 1.539 m         |                             | 1.539 m         |
| Elastische kritische kracht | $N_{cr,y}$      | Elastische kritische kracht | $N_{cr,z}$      |
|                             | 1846.67 kN      |                             | 1846.67 kN      |
| Slankheid                   | $\lambda_y$     | Slankheid                   | $\lambda_z$     |
|                             | 0.420           |                             | 0.420           |
| Knikcurve                   | Tabel 6.2       | Knikcurve                   | Tabel 6.2       |
|                             | a               |                             | a               |
| Imperfectiefactor           | Tabel 6.1       | Imperfectiefactor           | Tabel 6.1       |
|                             | $\alpha_y$      |                             | $\alpha_z$      |
|                             | 0.210           |                             | 0.210           |
|                             | $\Phi_y$        |                             | $\Phi_z$        |
|                             | 0.611           |                             | 0.611           |
| Reductiefactor              | (6.49)          | Reductiefactor              | (6.49)          |
|                             | $\chi_y$        |                             | $\chi_z$        |
|                             | 0.947           |                             | 0.947           |
| Ontwerpweerstand            | (6.47)          | Ontwerpweerstand            | (6.47)          |
|                             | $N_{b,Rd,y}$    |                             | $N_{b,Rd,z}$    |
|                             | 308.61 kN       |                             | 308.61 kN       |

NEN-EN1993-1-1(6.46): UC = 0.00

#### KIP (#6.3.2)

Staal C25-V1 (0.000-1.539)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalent profiel     | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

#### Maatgevend veld

|                   |         |                |       |           |
|-------------------|---------|----------------|-------|-----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$ | 0.01 kNm  |
| Veld einde        | 1.539 m | Moment (eind)  | $M_y$ | -0.02 kNm |
| Lengte            | $L$     | Moment (max)   | $M_y$ | 0.01 kNm  |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |             |         |        |
|----------------|-------------|---------|--------|
| Tabel gebruikt | NB.NB.1 (1) | $\beta$ | -0.35  |
| Lengte         | $L_{st}$    | $\beta$ | -0.346 |
|                | 1.539 m     |         |        |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |            |                           |           |                |                        |         |
|------------------|------------|---------------------------|-----------|----------------|------------------------|---------|
| Lengte           |            | L <sub>kip</sub>          | 1.539 m   | (NB.NB.12)     | S                      | 0.000 m |
| Coefficient      |            | C <sub>1</sub>            | 2.150     | Coefficient    | C <sub>2</sub> (Tabel) | 0.000   |
| Coefficient      |            | C <sub>2</sub> (Berekend) | 0.000     | Lengte         | L <sub>g</sub>         | 1.539 m |
| Coefficient      | (NB.NB.11) | C                         | 6.754     | Reductiefactor | K <sub>red</sub>       | 0.000   |
|                  | (NB.NB.6)  | M <sub>cr</sub>           | 0.00 kNm  |                |                        |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,y</sub>       | 11.44 kNm |                |                        |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,z</sub>       | 11.44 kNm |                |                        |         |

**Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C25-V1 (0.000-1.539)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.56  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | 0.14 kNm    | M               | 0.00 kNm       | M                | 0.14 kNm    |
| ψM              | 0.04 kNm    | ψM              | 0.00 kNm       | ψM               | 0.04 kNm    |
| M <sub>s</sub>  | 0.11 kNm    | ψ               | 1.000          | M <sub>s</sub>   | 0.11 kNm    |
| ψ               | 0.271       | Belasting       | Geconcentreerd | ψ                | 0.271       |
| α <sub>s</sub>  | 0.793       | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | 0.793       |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.834       |                 |                | C <sub>mLT</sub> | 0.834       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.834           |                  | k <sub>yz</sub>       | 0.600           |
|                  | k <sub>zy</sub>       | 0.501           |                  | k <sub>zz</sub>       | 1.000           |
| Maatgevend veld  |                       | 0.000 - 1.539 m | Maatgevend veld  |                       | 0.000 - 1.539 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -0.42 kN        | Normaalkracht    | N <sub>z,Ed</sub>     | -0.42 kN        |
| Lengte           | L <sub>y,cr</sub>     | 1.539 m         | Lengte           | L <sub>z,cr</sub>     | 1.539 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 0.947           | Reductiefactor   | (6.49) X <sub>z</sub> | 0.947           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 325.73 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 1.539 m | Maatgevend veld  |                       | 0.000 - 1.539 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 0.14 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 11.44 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 11.44 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.01  
NEN-EN1993-1-1(6.62): UC = 0.01

### DOORSNEDE (#6.2)

Staal C26-V1 (0.000-1.243)

|                        |                   |          |                  |        |                   |           |
|------------------------|-------------------|----------|------------------|--------|-------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.42  | Doorsnedeklasse  |        |                   | 1         |
| Maatgevende positie    |                   | 1.243 m  |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | -7.66 kN | Ontwerpweerstand | (6.10) | N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 1.60 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 11.44 kN  |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 11.44 kN  |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN  | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | 2.36 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 119.72 kN |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 2.0 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |           |                    |     |
|--------------------|---------------|-----------|--------------------|-----|
| Is reductie nodig? |               | Ja        | Is reductie nodig? | Nee |
|                    | n             | 0.024     |                    |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm |                    |     |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 11.44 kNm |                    |     |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.02  
NEN-EN1993-1-1(6.12): UC (y) = 0.14  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.02  
NEN-EN1993-1-1(6.31): UC (y) = 0.14  
NEN-EN1993-1-1(NB.33): UC = 0.14

#### KNIK (#6.3.1)

Staaf C26-V1 (0.000-1.243)

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Profiel                     |             | N114.3/4        | Doorsnedeklasse             |             | 1               |
| Maatgevende combinatie      |             | Fu.C.42         |                             |             |                 |
| Maatgevend veld             |             | 0.000 - 1.243 m | Maatgevend veld             |             | 0.000 - 1.243 m |
| Normaalkracht               | $N_{Ed,y}$  | -7.66 kN        | Normaalkracht               | $N_{Ed,z}$  | -7.66 kN        |
| Lengte                      | $L_{cr,y}$  | 1.243 m         | Lengte                      | $L_{cr,z}$  | 1.243 m         |
| Elastische kritische kracht | $N_{cr,y}$  | 2830.30 kN      | Elastische kritische kracht | $N_{cr,z}$  | 2830.30 kN      |
| Slankheid                   | $\lambda_y$ | 0.339           | Slankheid                   | $\lambda_z$ | 0.339           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
|                             |             | 0.572           |                             |             | 0.572           |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
|                             |             | 0.968           |                             |             | 0.968           |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |
|                             |             | 315.35 kN       |                             |             | 315.35 kN       |

NEN-EN1993-1-1(6.46): UC = 0.02

#### KIP (#6.3.2)

Staaf C26-V1 (0.000-1.243)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalent profiel     |  | N114.3/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.15 kNm |
| Veld einde        |   | 1.243 m | Moment (eind)  | $M_y$ | 0.17 kNm  |
| Lengte            | L | 1.243 m | Moment (max)   | $M_y$ | 0.17 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |             |                |               |         |
|------------------|---------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt   |                     | NB.NB.1 (1) |                | $\beta$       | -0.89   |
| Lengte           | $L_{st}$            | 1.243 m     |                | $\beta$       | -0.891  |
| Lengte           | $L_{kip}$           | 1.243 m     | (NB.NB.12)     | S             | 0.000 m |
| Coefficient      | $C_1$               | 2.300       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient      | $C_2$ (Berekend)    | 0.000       | Lengte         | $L_g$         | 1.243 m |
| Coefficient      | (NB.NB.11) C        | 7.226       | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6) $M_{cr}$  | 0.00 kNm    |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 11.44 kNm   |                |               |         |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Ontwerpweerstand (6.55)  $M_{b,Rd,z}$  11.44 kNm

Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C26-V1 (0.000-1.243)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.42  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 1.60 kNm    | M         | 0.00 kNm       | M          | 1.60 kNm    |
| $\psi M$   | -1.43 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -1.43 kNm   |
| $M_s$      | 0.11 kNm    | $\psi$    | 1.000          | $M_s$      | 0.11 kNm    |
| $\psi$     | -0.894      | Belasting | Geconcentreerd | $\psi$     | -0.894      |
| $\alpha_s$ | 0.067       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.067       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.400       |           |                | $C_{mLT}$  | 0.400       |

#### Interactiefactoren (Tabel B.1)

|                       |                   |                 |                       |                   |                 |
|-----------------------|-------------------|-----------------|-----------------------|-------------------|-----------------|
|                       | $k_{yy}$          | 0.401           |                       | $k_{yz}$          | 0.602           |
|                       | $k_{zy}$          | 0.241           |                       | $k_{zz}$          | 1.003           |
| Maatgevend veld       |                   | 0.000 - 1.243 m | Maatgevend veld       |                   | 0.000 - 1.243 m |
| Normaalkracht         | $N_{y,Ed}$        | -7.66 kN        | Normaalkracht         | $N_{z,Ed}$        | -7.66 kN        |
| Lengte                | $L_{y,cr}$        | 1.243 m         | Lengte                | $L_{z,cr}$        | 1.243 m         |
| Reductiefactor (6.49) | $\chi_y$          | 0.968           | Reductiefactor (6.49) | $\chi_z$          | 0.968           |
| Ontwerpweerstand      | $N_{Rk}$          | 325.73 kN       |                       |                   |                 |
| Maatgevend veld       |                   | 0.000 - 1.243 m | Maatgevend veld       |                   | 0.000 - 1.243 m |
| Buigmoment            | $M_{y,Ed}$        | 1.60 kNm        | Buigmoment            | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment            | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment            | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand      | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand      | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor        | $\chi_{LT}$       | 1.000           |                       |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.08

NEN-EN1993-1-1(6.62): UC = 0.06

### DOORSNEDE (#6.2)

Staal C27-V1 (0.000-1.539)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Maatgevende combinatie | Fu.C.39 | Doorsnedeklasse | 1 |
| Maatgevende positie    | 1.539 m |                 |   |

|               |            |           |                         |            |           |
|---------------|------------|-----------|-------------------------|------------|-----------|
| Normaalkracht | $N_{Ed}$   | -11.97 kN | Ontwerpweerstand (6.10) | $N_{Rd}$   | 325.73 kN |
| Buigmoment    | $M_{y,Ed}$ | -0.88 kNm | Ontwerpweerstand (6.13) | $M_{y,Rd}$ | 11.44 kNm |
| Buigmoment    | $M_{z,Ed}$ | 9.00 kNm  | Ontwerpweerstand (6.13) | $M_{z,Rd}$ | 11.44 kNm |
| Dwarskracht   | $V_{y,Ed}$ | 5.00 kN   | Ontwerpweerstand (6.18) | $V_{y,Rd}$ | 119.72 kN |
| Dwarskracht   | $V_{z,Ed}$ | -0.80 kN  | Ontwerpweerstand (6.18) | $V_{z,Rd}$ | 119.72 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.7 % | Verhouding         | 4.2 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |               |
|--------------------|---------------|--------------------|---------------|
| Is reductie nodig? | Ja            | Is reductie nodig? | Ja            |
| n                  | 0.037         | n                  | 0.037         |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | Ontwerpweerstand   | $M_{pl,z,Rd}$ |
|                    | 11.44 kNm     |                    | 11.44 kNm     |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |              |           |                  |              |           |
|------------------|--------------|-----------|------------------|--------------|-----------|
| Ontwerpweerstand | $M_{N,y,Rd}$ | 11.44 kNm | Ontwerpweerstand | $M_{N,z,Rd}$ | 11.44 kNm |
|------------------|--------------|-----------|------------------|--------------|-----------|

#### Dubbele buiging #6.2.10 (7)

|                          |                |           |                          |                |           |
|--------------------------|----------------|-----------|--------------------------|----------------|-----------|
|                          | $\alpha_1$     | 2.000     |                          | $\alpha_2$     | 2.000     |
|                          | $\beta_0$      | 1.000     |                          | $\beta_1$      | 1.000     |
| Ontwerpweerstand (NB.58) | $M_{y,N,V,Rd}$ | 11.86 kNm | Ontwerpweerstand (NB.59) | $M_{z,N,V,Rd}$ | 11.86 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.04  
 NEN-EN1993-1-1(6.12): UC (y) = 0.08  
 NEN-EN1993-1-1(6.12): UC (z) = 0.79  
 NEN-EN1993-1-1(6.17): UC (y) = 0.04  
 NEN-EN1993-1-1(6.17): UC (z) = 0.01  
 NEN-EN1993-1-1(6.31): UC (y) = 0.08  
 NEN-EN1993-1-1(6.31): UC (z) = 0.79  
 NEN-EN1993-1-1(NB.33): UC = 0.79  
 NEN-EN1993-1-1(NB.52): UC = 0.58

#### KNIK (#6.3.1)

Staal C27-V1 (0.000-1.539)

|                             |                |                 |                             |                |                 |
|-----------------------------|----------------|-----------------|-----------------------------|----------------|-----------------|
| Profiel                     |                | N114.3/4        | Doorsnedeklasse             |                | 1               |
| Maatgevende combinatie      |                | Fu.C.41         |                             |                |                 |
| Maatgevend veld             |                | 0.000 - 1.539 m | Maatgevend veld             |                | 0.000 - 1.539 m |
| Normaalkracht               | $N_{Ed,y}$     | -18.43 kN       | Normaalkracht               | $N_{Ed,z}$     | -18.43 kN       |
| Lengte                      | $L_{\alpha,y}$ | 1.539 m         | Lengte                      | $L_{\alpha,z}$ | 1.539 m         |
| Elastische kritische kracht | $N_{cr,y}$     | 1846.67 kN      | Elastische kritische kracht | $N_{cr,z}$     | 1846.67 kN      |
| Slankheid                   | $\lambda_y$    | 0.420           | Slankheid                   | $\lambda_z$    | 0.420           |
| Knikcurve                   | Tabel 6.2      | a               | Knikcurve                   | Tabel 6.2      | a               |
| Imperfectiefactor           | Tabel 6.1      | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1      | $\alpha_z$      |
|                             |                | $\Phi_y$        |                             |                | $\Phi_z$        |
|                             |                | 0.611           |                             |                | 0.611           |
| Reductiefactor              | (6.49)         | $\chi_y$        | Reductiefactor              | (6.49)         | $\chi_z$        |
| Ontwerpweerstand            | (6.47)         | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)         | $N_{b,Rd,z}$    |
|                             |                | 308.61 kN       |                             |                | 308.61 kN       |

NEN-EN1993-1-1(6.46): UC = 0.06

#### KIP (#6.3.2)

Staal C27-V1 (0.000-1.539)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalente profiel    |  | N114.3/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.02 kNm |
| Veld einde        |   | 1.539 m | Moment (eind)  | $M_y$ | 0.05 kNm  |
| Lengte            | L | 1.539 m | Moment (max)   | $M_y$ | 0.05 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |             |                |               |         |
|------------------|---------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt   |                     | NB.NB.1 (1) |                | $\beta$       | -0.46   |
| Lengte           | $L_{st}$            | 1.539 m     |                | $\beta$       | -0.456  |
| Lengte           | $L_{kip}$           | 1.539 m     | (NB.NB.12)     | S             | 0.000 m |
| Coefficient      | $C_1$               | 2.292       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient      | $C_2$ (Berekend)    | 0.000       | Lengte         | $L_g$         | 1.539 m |
| Coefficient      | (NB.NB.11) C        | 7.200       | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6) $M_{cr}$  | 0.00 kNm    |                |               |         |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 11.44 kNm   |                |               |         |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Ontwerpweerstand (6.55)  $M_{b,Rd,z}$  11.44 kNm

Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C27-V1 (0.000-1.539)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.41  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -0.64 kNm   | M         | 0.00 kNm       | M          | -0.64 kNm   |
| $\psi M$   | 0.13 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.13 kNm    |
| $M_s$      | -0.23 kNm   | $\psi$    | 1.000          | $M_s$      | -0.23 kNm   |
| $\psi$     | -0.203      | Belasting | Geconcentreerd | $\psi$     | -0.203      |
| $\alpha_s$ | 0.353       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.353       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.482       |           |                | $C_{mLT}$  | 0.482       |

#### Interactiefactoren (Tabel B.1)

|                       |                   |                 |                       |                   |                 |
|-----------------------|-------------------|-----------------|-----------------------|-------------------|-----------------|
|                       | $k_{yy}$          | 0.488           |                       | $k_{yz}$          | 0.608           |
|                       | $k_{zy}$          | 0.293           |                       | $k_{zz}$          | 1.013           |
| Maatgevend veld       |                   | 0.000 - 1.539 m | Maatgevend veld       |                   | 0.000 - 1.539 m |
| Normaalkracht         | $N_{y,Ed}$        | -18.43 kN       | Normaalkracht         | $N_{z,Ed}$        | -18.43 kN       |
| Lengte                | $L_{y,cr}$        | 1.539 m         | Lengte                | $L_{z,cr}$        | 1.539 m         |
| Reductiefactor (6.49) | $\chi_y$          | 0.947           | Reductiefactor (6.49) | $\chi_z$          | 0.947           |
| Ontwerpweerstand      | $N_{Rk}$          | 325.73 kN       |                       |                   |                 |
| Maatgevend veld       |                   | 0.000 - 1.539 m | Maatgevend veld       |                   | 0.000 - 1.539 m |
| Buigmoment            | $M_{y,Ed}$        | 0.64 kNm        | Buigmoment            | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment            | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment            | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand      | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand      | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor        | $\chi_{LT}$       | 1.000           |                       |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.09

NEN-EN1993-1-1(6.62): UC = 0.08

### DOORSNEDE (#6.2)

Staal C28-V1 (0.000-1.579)

| Maatgevende combinatie |                   | Fu.C.41   | Doorsnedeklasse  |        |                   | 1         |
|------------------------|-------------------|-----------|------------------|--------|-------------------|-----------|
| Maatgevende positie    |                   | 1.315 m   |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | 42.64 kN  | Ontwerpweerstand | (6.6)  | N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | -0.68 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -1.03 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 119.72 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.9 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |     |
|--------------------|---------------|--------------------|-----|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee |
|                    | n             |                    |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm          |     |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Ontwerpweerstand  $M_{N,y,Rd}$  11.44 kNm

#### **Uitgevoerde controles**

NEN-EN1993-1-1(6.5): UC = 0.13  
 NEN-EN1993-1-1(6.12): UC (y) = 0.06  
 NEN-EN1993-1-1(6.12): UC (z) = 0.00  
 NEN-EN1993-1-1(6.17): UC (y) = 0.00  
 NEN-EN1993-1-1(6.17): UC (z) = 0.01  
 NEN-EN1993-1-1(6.31): UC (y) = 0.06  
 NEN-EN1993-1-1(NB.33): UC = 0.09

#### **KNIK (#6.3.1)**

Staaf C28-V1 (0.000-1.579)

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Profiel                     |             | N114.3/4        | Doorsnedeklasse             |             | 1               |
| Maatgevende combinatie      |             | Fu.C.62         |                             |             |                 |
| Maatgevend veld             |             | 0.000 - 1.579 m | Maatgevend veld             |             | 0.000 - 1.579 m |
| Normaalkracht               | $N_{Ed,y}$  | -10.90 kN       | Normaalkracht               | $N_{Ed,z}$  | -10.90 kN       |
| Lengte                      | $L_{cr,y}$  | 1.579 m         | Lengte                      | $L_{cr,z}$  | 1.579 m         |
| Elastische kritische kracht | $N_{cr,y}$  | 1755.57 kN      | Elastische kritische kracht | $N_{cr,z}$  | 1755.57 kN      |
| Slankheid                   | $\lambda_y$ | 0.431           | Slankheid                   | $\lambda_z$ | 0.431           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |

NEN-EN1993-1-1(6.46): UC = 0.04

#### **KIP (#6.3.2)**

Staaf C28-V1 (0.000-1.579)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalent profiel     |  | N114.3/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### **Maatgevend veld**

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.01 kNm |
| Veld einde        |   | 1.579 m | Moment (eind)  | $M_y$ | -0.05 kNm |
| Lengte            | L | 1.579 m | Moment (max)   | $M_y$ | -0.01 kNm |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### **Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)**

|                |                    |             |                |               |         |
|----------------|--------------------|-------------|----------------|---------------|---------|
| Tabel gebruikt |                    | NB.NB.1 (1) |                | $\beta$       | 0.22    |
| Lengte         | $L_{st}$           | 1.579 m     |                | $\beta$       | 0.223   |
| Lengte         | $L_{kip}$          | 1.579 m     | (NB.NB.12)     | S             | 0.000 m |
| Coefficient    | $C_1$              | 1.531       | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient    | $C_2$ (Berekend)   | 0.000       | Lengte         | $L_g$         | 1.579 m |
| Coefficient    | (NB.NB.11) C       | 4.809       | Reductiefactor | $K_{red}$     | 0.000   |
|                | (NB.NB.6) $M_{cr}$ | 0.00 kNm    |                |               |         |

|                  |        |              |           |
|------------------|--------|--------------|-----------|
| Ontwerpweerstand | (6.55) | $M_{b,Rd,y}$ | 11.44 kNm |
| Ontwerpweerstand | (6.55) | $M_{b,Rd,z}$ | 11.44 kNm |

#### **Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**

NEN-EN1993-1-1(6.54): UC = 0.00

#### **BUIGING EN AXIALE DRUK (#6.3.3)**

Staaf C28-V1 (0.000-1.579)

|         |  |          |                 |  |   |
|---------|--|----------|-----------------|--|---|
| Profiel |  | N114.3/4 | Doorsnedeklasse |  | 1 |
|---------|--|----------|-----------------|--|---|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Maatgevende combinatie

Fu.C.62

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| <b>C<sub>my</sub></b> |             | <b>C<sub>mz</sub></b> |                | <b>C<sub>mLT</sub></b> |             |
|-----------------------|-------------|-----------------------|----------------|------------------------|-------------|
| M                     | -0.78 kNm   | M                     | 0.00 kNm       | M                      | -0.78 kNm   |
| ψM                    | 0.39 kNm    | ψM                    | 0.00 kNm       | ψM                     | 0.39 kNm    |
| M <sub>s</sub>        | -0.17 kNm   | ψ                     | 1.000          | M <sub>s</sub>         | -0.17 kNm   |
| ψ                     | -0.506      | Belasting             | Geconcentreerd | ψ                      | -0.506      |
| α <sub>s</sub>        | 0.223       | C <sub>mz</sub>       | 1.000          | α <sub>s</sub>         | 0.223       |
| Belasting             | Gelijkmatig |                       |                | Belasting              | Gelijkmatig |
| C <sub>my</sub>       | 0.400       |                       |                | C <sub>mLT</sub>       | 0.400       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.403           |                  | k <sub>yz</sub>       | 0.605           |
|                  | k <sub>zy</sub>       | 0.242           |                  | k <sub>zz</sub>       | 1.008           |
| Maatgevend veld  |                       | 0.000 - 1.579 m | Maatgevend veld  |                       | 0.000 - 1.579 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -10.90 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -10.90 kN       |
| Lengte           | L <sub>y,cr</sub>     | 1.579 m         | Lengte           | L <sub>z,cr</sub>     | 1.579 m         |
| Reductiefactor   | (6.49) x <sub>y</sub> | 0.945           | Reductiefactor   | (6.49) x <sub>z</sub> | 0.945           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 325.73 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 1.579 m | Maatgevend veld  |                       | 0.000 - 1.579 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 0.78 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 11.44 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 11.44 kNm       |
| Reductiefactor   | χ <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.06

NEN-EN1993-1-1(6.62): UC = 0.05

#### DOORSNEDE (#6.2)

Staaf C29-V1 (0.000-5.874)

|                        |                   |            |                  |                          |           |
|------------------------|-------------------|------------|------------------|--------------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.43    | Doorsnedeklasse  |                          | 1         |
| Maatgevende positie    |                   | 4.406 m    |                  |                          |           |
| Normaalkracht          | N <sub>Ed</sub>   | -44.89 kN  | Ontwerpweerstand | (6.10) N <sub>Rd</sub>   | 989.76 kN |
| Buigmoment             | M <sub>y,Ed</sub> | -11.24 kNm | Ontwerpweerstand | (6.13) M <sub>y,Rd</sub> | 67.06 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm   | Ontwerpweerstand | (6.13) M <sub>z,Rd</sub> | 67.06 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN    | Ontwerpweerstand | (6.18) V <sub>y,Rd</sub> | 363.79 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -13.26 kN  | Ontwerpweerstand | (6.18) V <sub>z,Rd</sub> | 363.79 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 3.6 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |                      |                    |           |
|--------------------|----------------------|--------------------|-----------|
| Is reductie nodig? | Ja                   | Is reductie nodig? | Nee       |
|                    | n                    |                    | 0.045     |
| Ontwerpweerstand   | M <sub>pl,y,Rd</sub> |                    | 67.06 kNm |
| Ontwerpweerstand   | M <sub>N,y,Rd</sub>  |                    | 67.06 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.05

NEN-EN1993-1-1(6.12): UC (y) = 0.17

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

NEN-EN1993-1-1(6.17): UC (z) = 0.04

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.31): UC (y) = 0.17

NEN-EN1993-1-1(NB.33): UC = 0.17

### KNIK (#6.3.1)

Staal C29-V1 (0.000-5.874)

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Profiel                     |             | N219.1/6.3      | Doorsnedeklasse             |             | 1               |
| Maatgevende combinatie      |             | Fu.C.41         |                             |             |                 |
| Maatgevend veld             |             | 0.000 - 5.874 m | Maatgevend veld             |             | 0.000 - 5.874 m |
| Normaalkracht               | $N_{Ed,y}$  | -79.83 kN       | Normaalkracht               | $N_{Ed,z}$  | -79.83 kN       |
| Lengte                      | $L_{cr,y}$  | 5.874 m         | Lengte                      | $L_{cr,z}$  | 11.749 m        |
| Elastische kritische kracht | $N_{cr,y}$  | 1433.13 kN      | Elastische kritische kracht | $N_{cr,z}$  | 358.28 kN       |
| Slankheid                   | $\lambda_y$ | 0.831           | Slankheid                   | $\lambda_z$ | 1.662           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
|                             |             | 0.912           |                             |             | 2.035           |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
|                             |             | 0.777           |                             |             | 0.312           |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |
|                             |             | 769.53 kN       |                             |             | 308.47 kN       |

NEN-EN1993-1-1(6.46): UC = 0.26

### KIP (#6.3.2)

Staal C29-V1 (0.000-5.874)

|                        |  |            |                                             |  |         |
|------------------------|--|------------|---------------------------------------------|--|---------|
| Equivalente profiel    |  | N219.1/6.3 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1     | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen       |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.12 kNm |
| Veld einde        |   | 5.874 m | Moment (eind)  | $M_y$ | 0.00 kNm  |
| Lengte            | L | 5.874 m | Moment (max)   | $M_y$ | 0.10 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |           |                |               |          |
|------------------|---------------------|-----------|----------------|---------------|----------|
| Tabel gebruikt   |                     | NB.NB.7   | Moment         | M             | 0.12 kNm |
| Kracht           | F                   | 0.76 kN   | Lengte         | $L_{st}$      | 5.874 m  |
|                  | $B^{**}$            | 0.10      | Lengte         | $L_{st}$      | 5.874 m  |
|                  | $\beta$             | -0.000    | Lengte         | $L_{kip}$     | 5.874 m  |
|                  | (NB.NB.12) S        | 0.000 m   |                |               |          |
| Coefficient      | $C_1$               | 1.336     | Coefficient    | $C_2$ (Tabel) | 0.516    |
| Coefficient      | $C_2$ (Berekend)    | 0.000     | Lengte         | $L_g$         | 5.874 m  |
| Coefficient      | (NB.NB.11) C        | 4.197     | Reductiefactor | $K_{red}$     | 0.000    |
|                  | (NB.NB.6) $M_{cr}$  | 0.00 kNm  |                |               |          |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 67.06 kNm |                |               |          |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 67.06 kNm |                |               |          |

Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C29-V1 (0.000-5.874)

|                        |  |            |                 |  |   |
|------------------------|--|------------|-----------------|--|---|
| Profiel                |  | N219.1/6.3 | Doorsnedeklasse |  | 1 |
| Maatgevende combinatie |  | Fu.C.41    |                 |  |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

|          |           |          |          |           |           |
|----------|-----------|----------|----------|-----------|-----------|
| $C_{my}$ |           | $C_{mz}$ |          | $C_{mLT}$ |           |
| M        | -0.03 kNm | M        | 0.00 kNm | M         | -0.03 kNm |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|            |             |           |                |            |             |
|------------|-------------|-----------|----------------|------------|-------------|
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | -1.70 kNm   | $\psi$    | 1.000          | $M_s$      | -1.70 kNm   |
| $\psi$     | -0.000      | Belasting | Geconcentreerd | $\psi$     | -0.000      |
| $\alpha_h$ | 0.019       | $C_{mz}$  | 1.000          | $\alpha_h$ | 0.019       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.951       |           |                | $C_{mLT}$  | 0.951       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 1.013           |                  | $k_{yz}$          | 0.724           |
|                  | $k_{zy}$          | 0.608           |                  | $k_{zz}$          | 1.207           |
| Maatgevend veld  |                   | 0.000 - 5.874 m | Maatgevend veld  |                   | 0.000 - 5.874 m |
| Normaalkracht    | $N_{y,Ed}$        | -79.83 kN       | Normaalkracht    | $N_{z,Ed}$        | -79.83 kN       |
| Lengte           | $L_{y,cr}$        | 5.874 m         | Lengte           | $L_{z,cr}$        | 11.749 m        |
| Reductiefactor   | (6.49) $\chi_y$   | 0.777           | Reductiefactor   | (6.49) $\chi_z$   | 0.312           |
| Ontwerpweerstand | $N_{Rk}$          | 989.76 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 5.874 m | Maatgevend veld  |                   | 0.000 - 5.874 m |
| Buigmoment       | $M_{y,Ed}$        | 9.99 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 67.06 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 67.06 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.25

NEN-EN1993-1-1(6.62): UC = 0.35

#### DOORSNEDE (#6.2)

Staal C31-V1 (0.000-1.755)

|                        |                   |           |                  |        |                   |            |
|------------------------|-------------------|-----------|------------------|--------|-------------------|------------|
| Maatgevende combinatie |                   | Fu.C.43   | Doorsnedeklasse  |        |                   | 1          |
| Maatgevende positie    |                   | 1.755 m   |                  |        |                   |            |
| Normaalkracht          | N <sub>Ed</sub>   | -69.03 kN | Ontwerpweerstand | (6.10) | N <sub>Rd</sub>   | 1107.90 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 84.02 kNm  |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 84.02 kNm  |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 407.21 kN  |
| Dwarskracht            | V <sub>z,Ed</sub> | -0.28 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 407.21 kN  |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.1 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |     |
|--------------------|---------------|--------------------|-----|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee |
|                    | n             |                    |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 84.02 kNm          |     |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 84.02 kNm          |     |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.06  
NEN-EN1993-1-1(6.12): UC (y) = 0.00  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.00  
NEN-EN1993-1-1(6.31): UC (y) = 0.00  
NEN-EN1993-1-1(NB.33): UC = 0.01

#### KNIK (#6.3.1)

Staal C31-V1 (0.000-1.755)

|         |            |                 |   |
|---------|------------|-----------------|---|
| Profiel | N244.5/6.3 | Doorsnedeklasse | 1 |
|---------|------------|-----------------|---|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Maatgevende combinatie

Fu.C.43

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Maatgevend veld             |             | 0.000 - 1.755 m | Maatgevend veld             |             | 0.000 - 1.755 m |
| Normaalkracht               | $N_{Ed,y}$  | -69.03 kN       | Normaalkracht               | $N_{Ed,z}$  | -69.03 kN       |
| Lengte                      | $L_{cr,y}$  | 1.755 m         | Lengte                      | $L_{cr,z}$  | 1.755 m         |
| Elastische kritische kracht | $N_{cr,y}$  | 22528.04 kN     | Elastische kritische kracht | $N_{cr,z}$  | 22528.04 kN     |
| Slankheid                   | $\lambda_y$ | 0.222           | Slankheid                   | $\lambda_z$ | 0.222           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
|                             |             | 0.527           |                             |             | 0.527           |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
|                             |             | 0.995           |                             |             | 0.995           |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |
|                             |             | 1102.60 kN      |                             |             | 1102.60 kN      |

NEN-EN1993-1-1(6.46): UC = 0.06

### KIP (#6.3.2)

Staal C31-V1 (0.000-1.755)

|                        |            |                                             |         |
|------------------------|------------|---------------------------------------------|---------|
| Equivalente profiel    | N244.5/6.3 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1     | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen       |                                             |         |

#### Maatgevend veld

|                   |   |         |                |       |          |
|-------------------|---|---------|----------------|-------|----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm |
| Veld einde        |   | 1.755 m | Moment (eind)  | $M_y$ | 0.00 kNm |
| Lengte            | L | 1.755 m | Moment (max)   | $M_y$ | 0.00 kNm |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |            |                                 |                |                        |         |
|----------------|------------|---------------------------------|----------------|------------------------|---------|
| Tabel gebruikt |            | NB.NB.1 (4)                     | Kracht         | F                      | 0.00 kN |
| Lengte         |            | L <sub>st</sub> 1.755 m         | Lengte         | L <sub>kip</sub>       | 1.755 m |
|                | (NB.NB.12) | S 0.000 m                       |                |                        |         |
| Coefficient    |            | C <sub>1</sub> 1.040            | Coefficient    | C <sub>2</sub> (Tabel) | 0.420   |
| Coefficient    |            | C <sub>2</sub> (Berekend) 0.000 | Lengte         | L <sub>g</sub>         | 1.755 m |
| Coefficient    | (NB.NB.11) | C 3.267                         | Reductiefactor | K <sub>red</sub>       | 0.000   |
|                | (NB.NB.6)  | M <sub>cr</sub> 0.00 kNm        |                |                        |         |

Ontwerpweerstand (6.55)  $M_{b,Rd,y}$  84.02 kNm

Ontwerpweerstand (6.55)  $M_{b,Rd,z}$  84.02 kNm

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C31-V1 (0.000-1.755)

|                        |            |                 |   |
|------------------------|------------|-----------------|---|
| Profiel                | N244.5/6.3 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.43    |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.00 kNm    | M         | 0.00 kNm       | M          | 0.00 kNm    |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | 0.12 kNm    | $\psi$    | 1.000          | $M_s$      | 0.12 kNm    |
| $\psi$     | 0.000       | Belasting | Geconcentreerd | $\psi$     | 0.000       |
| $\alpha_h$ | 0.000       | $C_{mz}$  | 1.000          | $\alpha_h$ | 0.000       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.950       |           |                | $C_{mLT}$  | 0.950       |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.951           |                  | $k_{yz}$          | 0.601           |
|                  | $k_{zy}$          | 0.571           |                  | $k_{zz}$          | 1.001           |
| Maatgevend veld  |                   | 0.000 - 1.755 m | Maatgevend veld  |                   | 0.000 - 1.755 m |
| Normaalkracht    | $N_{y,Ed}$        | -69.03 kN       | Normaalkracht    | $N_{z,Ed}$        | -69.03 kN       |
| Lengte           | $L_{y,cr}$        | 1.755 m         | Lengte           | $L_{z,cr}$        | 1.755 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.995           | Reductiefactor   | (6.49) $\chi_z$   | 0.995           |
| Ontwerpweerstand | $N_{Rk}$          | 1107.90 kN      |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.755 m | Maatgevend veld  |                   | 0.000 - 1.755 m |
| Buigmoment       | $M_{y,Ed}$        | 0.12 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 84.02 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 84.02 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.06

NEN-EN1993-1-1(6.62): UC = 0.06

### DOORSNEDE (#6.2)

Staal C32-V1 (0.000-2.641)

|                        |            |            |                  |                   |            |
|------------------------|------------|------------|------------------|-------------------|------------|
| Maatgevende combinatie |            | $F_u.C.43$ | Doorsnedeklasse  |                   | 1          |
| Maatgevende positie    |            | 0.000 m    |                  |                   |            |
| Normaalkracht          | $N_{Ed}$   | -142.42 kN | Ontwerpweerstand | (6.10) $N_{Rd}$   | 1107.90 kN |
| Buigmoment             | $M_{y,Ed}$ | 0.00 kNm   | Ontwerpweerstand | (6.13) $M_{y,Rd}$ | 84.02 kNm  |
| Buigmoment             | $M_{z,Ed}$ | 0.00 kNm   | Ontwerpweerstand | (6.13) $M_{z,Rd}$ | 84.02 kNm  |
| Dwarskracht            | $V_{y,Ed}$ | 0.00 kN    | Ontwerpweerstand | (6.18) $V_{y,Rd}$ | 407.21 kN  |
| Dwarskracht            | $V_{z,Ed}$ | 0.21 kN    | Ontwerpweerstand | (6.18) $V_{z,Rd}$ | 407.21 kN  |

### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.13

NEN-EN1993-1-1(6.12): UC (y) = 0.00

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

NEN-EN1993-1-1(6.17): UC (z) = 0.00

NEN-EN1993-1-1(NB.33): UC = 0.03

### KNIK (#6.3.1)

Staal C32-V1 (0.000-2.641)

|                             |                     |                 |                             |                     |                 |
|-----------------------------|---------------------|-----------------|-----------------------------|---------------------|-----------------|
| Profiel                     |                     | N244.5/6.3      | Doorsnedeklasse             |                     | 1               |
| Maatgevende combinatie      |                     | $F_u.C.43$      |                             |                     |                 |
| Maatgevend veld             |                     | 0.000 - 2.641 m | Maatgevend veld             |                     | 0.000 - 2.641 m |
| Normaalkracht               | $N_{Ed,y}$          | -142.42 kN      | Normaalkracht               | $N_{Ed,z}$          | -142.42 kN      |
| Lengte                      | $L_{cr,y}$          | 2.641 m         | Lengte                      | $L_{cr,z}$          | 2.641 m         |
| Elastische kritische kracht | $N_{cr,y}$          | 9945.26 kN      | Elastische kritische kracht | $N_{cr,z}$          | 9945.26 kN      |
| Slankheid                   | $\lambda_y$         | 0.334           | Slankheid                   | $\lambda_z$         | 0.334           |
| Knikcurve                   | Tabel 6.2           | a               | Knikcurve                   | Tabel 6.2           | a               |
| Imperfectiefactor           | Tabel 6.1           | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1           | $\alpha_z$      |
|                             |                     | $\Phi_y$        |                             |                     | $\Phi_z$        |
| Reductiefactor              | (6.49) $\chi_y$     | 0.969           | Reductiefactor              | (6.49) $\chi_z$     | 0.969           |
| Ontwerpweerstand            | (6.47) $N_{b,Rd,y}$ | 1074.07 kN      | Ontwerpweerstand            | (6.47) $N_{b,Rd,z}$ | 1074.07 kN      |

NEN-EN1993-1-1(6.46): UC = 0.13

### KIP (#6.3.2)

Staal C32-V1 (0.000-2.641)

|                    |            |                 |   |
|--------------------|------------|-----------------|---|
| Equivalent profiel | N244.5/6.3 | Doorsnedeklasse | 1 |
|--------------------|------------|-----------------|---|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                      |                |                                             |         |
|--------------------------------------|----------------|---------------------------------------------|---------|
| Maatgevende combinatie<br>Kipsteunen | Bi.C.1<br>Geen | Aangrijphoogte van de last vanaf het midden | 0.000 m |
|--------------------------------------|----------------|---------------------------------------------|---------|

#### Maatgevend veld

|                   |   |         |                |       |          |
|-------------------|---|---------|----------------|-------|----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm |
| Veld einde        |   | 2.641 m | Moment (eind)  | $M_y$ | 0.00 kNm |
| Lengte            | L | 2.641 m | Moment (max)   | $M_y$ | 0.00 kNm |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |            |                  |                |               |         |
|------------------|------------|------------------|----------------|---------------|---------|
| Tabel gebruikt   |            | NB.NB.1 (4)      | Kracht         | F             | 0.00 kN |
| Lengte           |            | 2.641 m          | Lengte         | $L_{kip}$     | 2.641 m |
|                  | (NB.NB.12) | S                |                |               |         |
| Coefficient      |            | $C_1$            | Coefficient    | $C_2$ (Tabel) | 0.420   |
| Coefficient      |            | $C_2$ (Berekend) | Lengte         | $L_g$         | 2.641 m |
| Coefficient      | (NB.NB.11) | C                | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6)  | $M_{cr}$         |                |               |         |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,y}$     | 84.02 kNm      |               |         |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,z}$     | 84.02 kNm      |               |         |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C32-V1 (0.000-2.641)

|                        |            |                 |   |
|------------------------|------------|-----------------|---|
| Profiel                | N244.5/6.3 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.43    |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -0.00 kNm   | M         | 0.00 kNm       | M          | -0.00 kNm   |
| $\psi M$   | 0.00 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.00 kNm    |
| $M_s$      | 0.14 kNm    | $\psi$    | 1.000          | $M_s$      | 0.14 kNm    |
| $\psi$     | -0.000      | Belasting | Geconcentreerd | $\psi$     | -0.000      |
| $\alpha_h$ | -0.000      | $C_{mz}$  | 1.000          | $\alpha_h$ | -0.000      |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.950       |           |                | $C_{mLT}$  | 0.950       |

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.967           |                  | $k_{yz}$          | 0.611           |
|                  | $k_{zy}$          | 0.580           |                  | $k_{zz}$          | 1.018           |
| Maatgevend veld  |                   | 0.000 - 2.641 m | Maatgevend veld  |                   | 0.000 - 2.641 m |
| Normaalkracht    | $N_{y,Ed}$        | -142.42 kN      | Normaalkracht    | $N_{z,Ed}$        | -142.42 kN      |
| Lengte           | $L_{y,cr}$        | 2.641 m         | Lengte           | $L_{z,cr}$        | 2.641 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.969           | Reductiefactor   | (6.49) $\chi_z$   | 0.969           |
| Ontwerpweerstand | $N_{Rk}$          | 1107.90 kN      |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 2.641 m | Maatgevend veld  |                   | 0.000 - 2.641 m |
| Buigmoment       | $M_{y,Ed}$        | 0.14 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 84.02 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 84.02 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.13

NEN-EN1993-1-1(6.62): UC = 0.13

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

## DOORSNEDE (#6.2)

Staal C33-V1 (0.000-8.077)

|                        |                   |           |                  |        |                             |
|------------------------|-------------------|-----------|------------------|--------|-----------------------------|
| Maatgevende combinatie |                   | Fu.C.41   | Doorsnedeklasse  |        | 1                           |
| Maatgevende positie    |                   | 5.689 m   |                  |        |                             |
| Normaalkracht          | N <sub>Ed</sub>   | 135.30 kN | Ontwerpweerstand | (6.6)  | N <sub>Rd</sub> 400.74 kN   |
| Buigmoment             | M <sub>y,Ed</sub> | -0.50 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> 17.31 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> 17.31 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> 147.29 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -0.08 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> 147.29 kN |

### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.1 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

### Buig- en normaalkracht #6.2.9

|                    |                      |                    |       |
|--------------------|----------------------|--------------------|-------|
| Is reductie nodig? | Ja                   | Is reductie nodig? | Nee   |
|                    | n                    |                    | 0.338 |
| Ontwerpweerstand   | M <sub>pl,y,Rd</sub> | 17.31 kNm          |       |
| Ontwerpweerstand   | M <sub>N,y,Rd</sub>  | 15.16 kNm          |       |

### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.34  
NEN-EN1993-1-1(6.12): UC (y) = 0.03  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.00  
NEN-EN1993-1-1(6.31): UC (y) = 0.03  
NEN-EN1993-1-1(NB.33): UC = 0.19

## KNIK (#6.3.1)

Staal C33-V1 (0.000-8.077)

|                             |                   |                               |                             |                   |                              |
|-----------------------------|-------------------|-------------------------------|-----------------------------|-------------------|------------------------------|
| Profiel                     |                   | N139.7/4                      | Doorsnedeklasse             |                   | 1                            |
| Maatgevende combinatie      |                   | Fu.C.57                       |                             |                   |                              |
| Maatgevend veld             |                   | 0.000 - 8.077 m               | Maatgevend veld             |                   | 0.000 - 8.077 m              |
| Normaalkracht               | N <sub>Ed,y</sub> | -19.05 kN                     | Normaalkracht               | N <sub>Ed,z</sub> | -19.05 kN                    |
| Lengte                      | L <sub>cr,y</sub> | 8.077 m                       | Lengte                      | L <sub>cr,z</sub> | 16.155 m                     |
| Elastische kritische kracht | N <sub>cr,y</sub> | 124.80 kN                     | Elastische kritische kracht | N <sub>cr,z</sub> | 31.20 kN                     |
| Slankheid                   | λ <sub>y</sub>    | 1.792                         | Slankheid                   | λ <sub>z</sub>    | 3.584                        |
| Knikcurve                   | Tabel 6.2         | a                             | Knikcurve                   | Tabel 6.2         | a                            |
| Imperfectiefactor           | Tabel 6.1         | α <sub>y</sub> 0.210          | Imperfectiefactor           | Tabel 6.1         | α <sub>z</sub> 0.210         |
|                             |                   | Φ <sub>y</sub> 2.273          |                             |                   | Φ <sub>z</sub> 7.277         |
| Reductiefactor              | (6.49)            | χ <sub>y</sub> 0.272          | Reductiefactor              | (6.49)            | χ <sub>z</sub> 0.073         |
| Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,y</sub> 109.18 kN | Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,z</sub> 29.44 kN |

NEN-EN1993-1-1(6.46): UC = 0.65

## KIP (#6.3.2)

Staal C33-V1 (0.000-8.077)

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalente profiel    |  | N139.7/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

### Maatgevend veld

|                   |   |         |                |                |           |
|-------------------|---|---------|----------------|----------------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | M <sub>y</sub> | -0.21 kNm |
| Veld einde        |   | 8.077 m | Moment (eind)  | M <sub>y</sub> | -0.13 kNm |
| Lengte            | L | 8.077 m | Moment (max)   | M <sub>y</sub> | 0.09 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | M <sub>z</sub> | 0.00 kNm  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                            |           |                |                        |          |
|------------------|----------------------------|-----------|----------------|------------------------|----------|
| Tabel gebruikt   |                            | NB.NB.7   | Moment         | M                      | 0.21 kNm |
| Kracht           | F                          | 0.02 kN   | Lengte         | L <sub>st</sub>        | 8.077 m  |
|                  | B**                        | 0.82      | Lengte         | L <sub>st</sub>        | 8.077 m  |
|                  | β                          | 0.603     | Lengte         | L <sub>kip</sub>       | 8.077 m  |
|                  | (NB.NB.12) S               | 0.000 m   |                |                        |          |
| Coefficient      | C <sub>1</sub>             | 1.089     | Coefficient    | C <sub>2</sub> (Tabel) | 0.092    |
| Coefficient      | C <sub>2</sub> (Berekend)  | 0.000     | Lengte         | L <sub>g</sub>         | 8.077 m  |
| Coefficient      | (NB.NB.11) C               | 3.420     | Reductiefactor | K <sub>red</sub>       | 0.000    |
|                  | (NB.NB.6) M <sub>cr</sub>  | 0.00 kNm  |                |                        |          |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,y</sub> | 17.31 kNm |                |                        |          |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,z</sub> | 17.31 kNm |                |                        |          |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

#### BUIGING EN AXIALE DRUK (#6.3.3)

Staaft C33-V1 (0.000-8.077)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N139.7/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.57  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | -0.51 kNm   | M               | 0.00 kNm       | M                | -0.51 kNm   |
| ψM              | -0.05 kNm   | ψM              | 0.00 kNm       | ψM               | -0.05 kNm   |
| M <sub>s</sub>  | 0.07 kNm    | ψ               | 1.000          | M <sub>s</sub>   | 0.07 kNm    |
| ψ               | 0.105       | Belasting       | Geconcentreerd | ψ                | 0.105       |
| α <sub>s</sub>  | -0.137      | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | -0.137      |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.400       |                 |                | C <sub>mLT</sub> | 0.400       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.456           |                  | k <sub>yz</sub>       | 0.911           |
|                  | k <sub>zy</sub>       | 0.274           |                  | k <sub>zz</sub>       | 1.518           |
| Maatgevend veld  |                       | 0.000 - 8.077 m | Maatgevend veld  |                       | 0.000 - 8.077 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -19.05 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -19.05 kN       |
| Lengte           | L <sub>y,cr</sub>     | 8.077 m         | Lengte           | L <sub>z,cr</sub>     | 16.155 m        |
| Reductiefactor   | (6.49) X <sub>y</sub> | 0.272           | Reductiefactor   | (6.49) X <sub>z</sub> | 0.073           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 400.74 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 8.077 m | Maatgevend veld  |                       | 0.000 - 8.077 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 0.51 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 17.31 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 17.31 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.19

NEN-EN1993-1-1(6.62): UC = 0.66

#### DOORSNEDE (#6.2)

Staaft C34-V1 (0.000-1.416)

|                        |                 |           |                  |                        |           |
|------------------------|-----------------|-----------|------------------|------------------------|-----------|
| Maatgevende combinatie |                 | Fu.C.36   | Doorsnedeklasse  | 1                      |           |
| Maatgevende positie    |                 | 0.000 m   |                  |                        |           |
| Normaalkracht          | N <sub>Ed</sub> | -33.43 kN | Ontwerpweerstand | (6.10) N <sub>Rd</sub> | 325.73 kN |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|             |            |          |                  |        |            |           |
|-------------|------------|----------|------------------|--------|------------|-----------|
| Buigmoment  | $M_{y,Ed}$ | 0.01 kNm | Ontwerpweerstand | (6.13) | $M_{y,Rd}$ | 11.44 kNm |
| Buigmoment  | $M_{z,Ed}$ | 0.00 kNm | Ontwerpweerstand | (6.13) | $M_{z,Rd}$ | 11.44 kNm |
| Dwarskracht | $V_{y,Ed}$ | 0.00 kN  | Ontwerpweerstand | (6.18) | $V_{y,Rd}$ | 119.72 kN |
| Dwarskracht | $V_{z,Ed}$ | 0.24 kN  | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ | 119.72 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.2 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |       |
|--------------------|---------------|--------------------|-------|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee   |
|                    | n             |                    | 0.103 |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm          |       |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 11.44 kNm          |       |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.10  
NEN-EN1993-1-1(6.12): UC (y) = 0.00  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.00  
NEN-EN1993-1-1(6.31): UC (y) = 0.00  
NEN-EN1993-1-1(NB.33): UC = 0.02

#### KNIK (#6.3.1)

Staal C34-V1 (0.000-1.416)

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Profiel                     |             | N114.3/4        | Doorsnedeklasse             |             | 1               |
| Maatgevende combinatie      |             | Fu.C.36         |                             |             |                 |
| Maatgevend veld             |             | 0.000 - 1.416 m | Maatgevend veld             |             | 0.000 - 1.416 m |
| Normaalkracht               | $N_{Ed,y}$  | -33.46 kN       | Normaalkracht               | $N_{Ed,z}$  | -33.46 kN       |
| Lengte                      | $L_{cr,y}$  | 1.416 m         | Lengte                      | $L_{cr,z}$  | 1.416 m         |
| Elastische kritische kracht | $N_{cr,y}$  | 2181.11 kN      | Elastische kritische kracht | $N_{cr,z}$  | 2181.11 kN      |
| Slankheid                   | $\lambda_y$ | 0.386           | Slankheid                   | $\lambda_z$ | 0.386           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |

NEN-EN1993-1-1(6.46): UC = 0.11

#### KIP (#6.3.2)

Staal C34-V1 (0.000-1.416)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalent profiel     | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

#### Maatgevend veld

|                   |         |                |              |          |          |
|-------------------|---------|----------------|--------------|----------|----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$        | 0.01 kNm |          |
| Veld einde        | 1.416 m | Moment (eind)  | $M_y$        | 0.02 kNm |          |
| Lengte            | L       | 1.416 m        | Moment (max) | $M_y$    | 0.02 kNm |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$        | 0.00 kNm |          |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                  |             |             |                        |         |
|----------------|------------------|-------------|-------------|------------------------|---------|
| Tabel gebruikt |                  | NB.NB.1 (1) |             | $\beta$                | 0.61    |
| Lengte         | L <sub>st</sub>  | 1.416 m     |             | $\beta$                | 0.614   |
| Lengte         | L <sub>kip</sub> | 1.416 m     | (NB.NB.12)  | S                      | 0.000 m |
| Coefficient    | C <sub>1</sub>   | 1.218       | Coefficient | C <sub>2</sub> (Tabel) | 0.000   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |            |                           |           |                |                  |         |
|------------------|------------|---------------------------|-----------|----------------|------------------|---------|
| Coefficient      |            | C <sub>2</sub> (Berekend) | 0.000     | Lengte         | L <sub>g</sub>   | 1.416 m |
| Coefficient      | (NB.NB.11) | C                         | 3.827     | Reductiefactor | K <sub>red</sub> | 0.000   |
|                  | (NB.NB.6)  | M <sub>cr</sub>           | 0.00 kNm  |                |                  |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,y</sub>       | 11.44 kNm |                |                  |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,z</sub>       | 11.44 kNm |                |                  |         |

**Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C34-V1 (0.000-1.416)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.36  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | 0.22 kNm    | M               | 0.00 kNm       | M                | 0.22 kNm    |
| ψM              | 0.01 kNm    | ψM              | 0.00 kNm       | ψM               | 0.01 kNm    |
| M <sub>s</sub>  | 0.15 kNm    | ψ               | 1.000          | M <sub>s</sub>   | 0.15 kNm    |
| ψ               | 0.064       | Belasting       | Geconcentreerd | ψ                | 0.064       |
| α <sub>s</sub>  | 0.680       | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | 0.680       |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.744       |                 |                | C <sub>mLT</sub> | 0.744       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.759           |                  | k <sub>yz</sub>       | 0.612           |
|                  | k <sub>zy</sub>       | 0.455           |                  | k <sub>zz</sub>       | 1.020           |
| Maatgevend veld  |                       | 0.000 - 1.416 m | Maatgevend veld  |                       | 0.000 - 1.416 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -33.46 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -33.46 kN       |
| Lengte           | L <sub>y,cr</sub>     | 1.416 m         | Lengte           | L <sub>z,cr</sub>     | 1.416 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 0.956           | Reductiefactor   | (6.49) X <sub>z</sub> | 0.956           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 325.73 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 1.416 m | Maatgevend veld  |                       | 0.000 - 1.416 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 0.22 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 11.44 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 11.44 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.12  
NEN-EN1993-1-1(6.62): UC = 0.12

### DOORSNEDE (#6.2)

Staal C36-V1 (0.000-1.578)

|                        |                   |           |                  |        |                   |           |
|------------------------|-------------------|-----------|------------------|--------|-------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.43   | Doorsnedeklasse  |        |                   | 1         |
| Maatgevende positie    |                   | 0.000 m   |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | 53.42 kN  | Ontwerpweerstand | (6.6)  | N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | -0.68 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 7.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 4.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | 0.64 kN   | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 119.72 kN |

#### Buiging en schuif #6.2.8

|            |       |            |       |
|------------|-------|------------|-------|
| Verhouding | 0.5 % | Verhouding | 3.3 % |
|------------|-------|------------|-------|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                      |               |           |                    |               |           |
|--------------------------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig?                   |               | Nee       | Is reductie nodig? |               | Nee       |
| <b>Buig- en normaalkracht #6.2.9</b> |               |           |                    |               |           |
| Is reductie nodig?                   |               | Ja        | Is reductie nodig? |               | Ja        |
|                                      | n             | 0.164     |                    | n             | 0.164     |
| Ontwerpweerstand                     | $M_{pl,y,Rd}$ | 11.44 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 11.44 kNm |
| Ontwerpweerstand                     | $M_{N,y,Rd}$  | 11.35 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 11.35 kNm |

|                                    |                |           |                          |                |           |
|------------------------------------|----------------|-----------|--------------------------|----------------|-----------|
| <b>Dubbele buiging #6.2.10 (7)</b> |                |           |                          |                |           |
|                                    | $\alpha_1$     | 2.000     |                          | $\alpha_2$     | 2.000     |
|                                    | $\beta_0$      | 1.000     |                          | $\beta_1$      | 1.000     |
| Ontwerpweerstand (NB.58)           | $M_{y,N,V,Rd}$ | 11.35 kNm | Ontwerpweerstand (NB.59) | $M_{z,N,V,Rd}$ | 11.35 kNm |

#### **Uitgevoerde controles**

NEN-EN1993-1-1(6.5): UC = 0.16  
NEN-EN1993-1-1(6.12): UC (y) = 0.06  
NEN-EN1993-1-1(6.12): UC (z) = 0.61  
NEN-EN1993-1-1(6.17): UC (y) = 0.03  
NEN-EN1993-1-1(6.17): UC (z) = 0.01  
NEN-EN1993-1-1(6.31): UC (y) = 0.06  
NEN-EN1993-1-1(6.31): UC (z) = 0.62  
NEN-EN1993-1-1(NB.33): UC = 0.64  
NEN-EN1993-1-1(NB.52): UC = 0.38

#### **KNIK (#6.3.1) Staal C36-V1 (0.000-1.578)**

|                             |                      |                 |                             |                      |                 |
|-----------------------------|----------------------|-----------------|-----------------------------|----------------------|-----------------|
| Profiel                     |                      | N114.3/4        | Doorsnedeklasse             |                      | 1               |
| Maatgevende combinatie      |                      | Fu.C.54         |                             |                      |                 |
| Maatgevend veld             |                      | 0.000 - 1.578 m | Maatgevend veld             |                      | 0.000 - 1.578 m |
| Normaalkracht               | $N_{Ed,y}$           | -10.88 kN       | Normaalkracht               | $N_{Ed,z}$           | -10.88 kN       |
| Lengte                      | $L_{\alpha,y}$       | 1.578 m         | Lengte                      | $L_{\alpha,z}$       | 1.578 m         |
| Elastische kritische kracht | $N_{cr,y}$           | 1756.61 kN      | Elastische kritische kracht | $N_{cr,z}$           | 1756.61 kN      |
| Slankheid                   | $\lambda_y$          | 0.431           | Slankheid                   | $\lambda_z$          | 0.431           |
| Knikcurve                   | Tabel 6.2            | a               | Knikcurve                   | Tabel 6.2            | a               |
| Imperfectiefactor           | Tabel 6.1 $\alpha_y$ | 0.210           | Imperfectiefactor           | Tabel 6.1 $\alpha_z$ | 0.210           |
|                             | $\Phi_y$             | 0.617           |                             | $\Phi_z$             | 0.617           |
| Reductiefactor              | (6.49) $\chi_y$      | 0.945           | Reductiefactor              | (6.49) $\chi_z$      | 0.945           |
| Ontwerpweerstand            | (6.47) $N_{b,Rd,y}$  | 307.66 kN       | Ontwerpweerstand            | (6.47) $N_{b,Rd,z}$  | 307.66 kN       |

NEN-EN1993-1-1(6.46): UC = 0.04

#### **KIP (#6.3.2) Staal C36-V1 (0.000-1.578)**

|                        |  |          |                                             |  |         |
|------------------------|--|----------|---------------------------------------------|--|---------|
| Equivalent profiel     |  | N114.3/4 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |  |         |

#### **Maatgevend veld**

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.20 kNm |
| Veld einde        |   | 1.578 m | Moment (eind)  | $M_y$ | 0.08 kNm  |
| Lengte            | L | 1.578 m | Moment (max)   | $M_y$ | 0.08 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### **Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)**

|                |           |             |             |               |         |
|----------------|-----------|-------------|-------------|---------------|---------|
| Tabel gebruikt |           | NB.NB.1 (1) |             | $\beta$       | -0.40   |
| Lengte         | $L_{st}$  | 1.578 m     |             | $\beta$       | -0.397  |
| Lengte         | $L_{kip}$ | 1.578 m     | (NB.NB.12)  | S             | 0.000 m |
| Coefficient    | $C_1$     | 2.215       | Coefficient | $C_2$ (Tabel) | 0.000   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |            |                           |           |                |                  |         |
|------------------|------------|---------------------------|-----------|----------------|------------------|---------|
| Coefficient      |            | C <sub>2</sub> (Berekend) | 0.000     | Lengte         | L <sub>g</sub>   | 1.578 m |
| Coefficient      | (NB.NB.11) | C                         | 6.958     | Reductiefactor | K <sub>red</sub> | 0.000   |
|                  | (NB.NB.6)  | M <sub>cr</sub>           | 0.00 kNm  |                |                  |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,y</sub>       | 11.44 kNm |                |                  |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,z</sub>       | 11.44 kNm |                |                  |         |

**Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C36-V1 (0.000-1.578)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.54  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | 0.07 kNm    | M               | 0.00 kNm       | M                | 0.07 kNm    |
| ψM              | -0.04 kNm   | ψM              | 0.00 kNm       | ψM               | -0.04 kNm   |
| M <sub>s</sub>  | 0.02 kNm    | ψ               | 1.000          | M <sub>s</sub>   | 0.02 kNm    |
| ψ               | -0.669      | Belasting       | Geconcentreerd | ψ                | -0.669      |
| α <sub>s</sub>  | 0.377       | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | 0.377       |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.501       |                 |                | C <sub>mLT</sub> | 0.501       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.505           |                  | k <sub>yz</sub>       | 0.605           |
|                  | k <sub>zy</sub>       | 0.303           |                  | k <sub>zz</sub>       | 1.008           |
| Maatgevend veld  |                       | 0.000 - 1.578 m | Maatgevend veld  |                       | 0.000 - 1.578 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -10.88 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -10.88 kN       |
| Lengte           | L <sub>y,cr</sub>     | 1.578 m         | Lengte           | L <sub>z,cr</sub>     | 1.578 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 0.945           | Reductiefactor   | (6.49) X <sub>z</sub> | 0.945           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 325.73 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 1.578 m | Maatgevend veld  |                       | 0.000 - 1.578 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 0.07 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 11.44 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 11.44 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.04  
NEN-EN1993-1-1(6.62): UC = 0.04

### DOORSNEDE (#6.2)

Staal C39-V1 (0.000-1.417)

| Maatgevende combinatie |                   | Fu.C.43   | Doorsnedeklasse  |        |                   | 1         |
|------------------------|-------------------|-----------|------------------|--------|-------------------|-----------|
| Maatgevende positie    |                   | 0.000 m   |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | -47.04 kN | Ontwerpweerstand | (6.10) | N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 1.09 kNm  | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 7.00 kNm  | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 4.00 kN   | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -1.13 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 119.72 kN |

#### Buiging en schuif #6.2.8

|            |       |            |       |
|------------|-------|------------|-------|
| Verhouding | 0.9 % | Verhouding | 3.3 % |
|------------|-------|------------|-------|



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                                                               |                |                 |                                             |                |                 |
|-------------------------------------------------------------------------------|----------------|-----------------|---------------------------------------------|----------------|-----------------|
| Is reductie nodig?                                                            |                | Nee             | Is reductie nodig?                          |                | Nee             |
| <b>Buig- en normaalkracht #6.2.9</b>                                          |                |                 |                                             |                |                 |
| Is reductie nodig?                                                            |                | Ja              | Is reductie nodig?                          |                | Ja              |
|                                                                               | n              | 0.144           |                                             | n              | 0.144           |
| Ontwerpweerstand                                                              | $M_{pl,y,Rd}$  | 11.44 kNm       | Ontwerpweerstand                            | $M_{pl,z,Rd}$  | 11.44 kNm       |
| Ontwerpweerstand                                                              | $M_{N,y,Rd}$   | 11.44 kNm       | Ontwerpweerstand                            | $M_{N,z,Rd}$   | 11.44 kNm       |
| <b>Dubbele buiging #6.2.10 (7)</b>                                            |                |                 |                                             |                |                 |
|                                                                               | $\alpha_1$     | 2.000           |                                             | $\alpha_2$     | 2.000           |
|                                                                               | $\beta_0$      | 1.000           |                                             | $\beta_1$      | 1.000           |
| Ontwerpweerstand (NB.58)                                                      | $M_{y,N,V,Rd}$ | 11.46 kNm       | Ontwerpweerstand (NB.59)                    | $M_{z,N,V,Rd}$ | 11.46 kNm       |
| <b>Uitgevoerde controles</b>                                                  |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(6.9): UC = 0.14                                                |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(6.12): UC (y) = 0.09                                           |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(6.12): UC (z) = 0.61                                           |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(6.17): UC (y) = 0.03                                           |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(6.17): UC (z) = 0.01                                           |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(6.31): UC (y) = 0.09                                           |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(6.31): UC (z) = 0.61                                           |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(NB.33): UC = 0.63                                              |                |                 |                                             |                |                 |
| NEN-EN1993-1-1(NB.52): UC = 0.38                                              |                |                 |                                             |                |                 |
| <b>KNIK (#6.3.1)</b>                                                          |                |                 | Staal C39-V1 (0.000-1.417)                  |                |                 |
| Profiel                                                                       |                | N114.3/4        | Doorsnedeklasse                             |                | 1               |
| Maatgevende combinatie                                                        |                | Fu.C.43         |                                             |                |                 |
| Maatgevend veld                                                               |                | 0.000 - 1.417 m | Maatgevend veld                             |                | 0.000 - 1.417 m |
| Normaalkracht                                                                 | $N_{Ed,y}$     | -47.04 kN       | Normaalkracht                               | $N_{Ed,z}$     | -47.04 kN       |
| Lengte                                                                        | $L_{\alpha,y}$ | 1.417 m         | Lengte                                      | $L_{\alpha,z}$ | 1.417 m         |
| Elastische kritische kracht                                                   | $N_{cr,y}$     | 2179.75 kN      | Elastische kritische kracht                 | $N_{cr,z}$     | 2179.75 kN      |
| Slankheid                                                                     | $\lambda_y$    | 0.387           | Slankheid                                   | $\lambda_z$    | 0.387           |
| Knikcurve                                                                     | Tabel 6.2      | a               | Knikcurve                                   | Tabel 6.2      | a               |
| Imperfectiefactor                                                             | Tabel 6.1      | $\alpha_y$      | Imperfectiefactor                           | Tabel 6.1      | $\alpha_z$      |
|                                                                               |                | $\Phi_y$        |                                             |                | $\Phi_z$        |
|                                                                               |                | 0.594           |                                             |                | 0.594           |
| Reductiefactor                                                                | (6.49)         | $\chi_y$        | Reductiefactor                              | (6.49)         | $\chi_z$        |
|                                                                               |                | 0.956           |                                             |                | 0.956           |
| Ontwerpweerstand                                                              | (6.47)         | $N_{b,Rd,y}$    | Ontwerpweerstand                            | (6.47)         | $N_{b,Rd,z}$    |
|                                                                               |                | 311.49 kN       |                                             |                | 311.49 kN       |
| NEN-EN1993-1-1(6.46): UC = 0.15                                               |                |                 |                                             |                |                 |
| <b>KIP (#6.3.2)</b>                                                           |                |                 | Staal C39-V1 (0.000-1.417)                  |                |                 |
| Equivalente profiel                                                           |                | N114.3/4        | Doorsnedeklasse                             |                | 1               |
| Maatgevende combinatie                                                        |                | Bi.C.1          | Aangrijphoogte van de last vanaf het midden |                | 0.000 m         |
| Kipsteunen                                                                    |                | Geen            |                                             |                |                 |
| <b>Maatgevend veld</b>                                                        |                |                 |                                             |                |                 |
| Veld begin                                                                    |                | 0.000 m         | Moment (begin)                              | $M_y$          | 0.29 kNm        |
| Veld einde                                                                    |                | 1.417 m         | Moment (eind)                               | $M_y$          | -0.08 kNm       |
| Lengte                                                                        | L              | 1.417 m         | Moment (max)                                | $M_y$          | 0.29 kNm        |
| Maatgevende flens                                                             |                | Boven           | Moment (max)                                | $M_z$          | 0.00 kNm        |
| <b>Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)</b> |                |                 |                                             |                |                 |
| Tabel gebruikt                                                                |                | NB.NB.1 (1)     |                                             | $\beta$        | -0.27           |
| Lengte                                                                        | $L_{st}$       | 1.417 m         |                                             | $\beta$        | -0.271          |
| Lengte                                                                        | $L_{kip}$      | 1.417 m         | (NB.NB.12)                                  | S              | 0.000 m         |
| Coefficient                                                                   | $C_1$          | 2.057           | Coefficient                                 | $C_2$ (Tabel)  | 0.000           |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |            |                           |           |                |                  |         |
|------------------|------------|---------------------------|-----------|----------------|------------------|---------|
| Coefficient      |            | C <sub>2</sub> (Berekend) | 0.000     | Lengte         | L <sub>g</sub>   | 1.417 m |
| Coefficient      | (NB.NB.11) | C                         | 6.462     | Reductiefactor | K <sub>red</sub> | 0.000   |
|                  | (NB.NB.6)  | M <sub>cr</sub>           | 0.00 kNm  |                |                  |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,y</sub>       | 11.44 kNm |                |                  |         |
| Ontwerpweerstand | (6.55)     | M <sub>b,Rd,z</sub>       | 11.44 kNm |                |                  |         |

**Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaft C39-V1 (0.000-1.417)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.43  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | 1.09 kNm    | M               | 0.00 kNm       | M                | 1.09 kNm    |
| ψM              | -0.39 kNm   | ψM              | 0.00 kNm       | ψM               | -0.39 kNm   |
| M <sub>s</sub>  | 0.32 kNm    | ψ               | 1.000          | M <sub>s</sub>   | 0.32 kNm    |
| ψ               | -0.356      | Belasting       | Geconcentreerd | ψ                | -0.356      |
| α <sub>s</sub>  | 0.292       | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | 0.292       |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.434       |                 |                | C <sub>mLT</sub> | 0.434       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.446           |                  | k <sub>yz</sub>       | 0.617           |
|                  | k <sub>zy</sub>       | 0.267           |                  | k <sub>zz</sub>       | 1.028           |
| Maatgevend veld  |                       | 0.000 - 1.417 m | Maatgevend veld  |                       | 0.000 - 1.417 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -47.04 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -47.04 kN       |
| Lengte           | L <sub>y,cr</sub>     | 1.417 m         | Lengte           | L <sub>z,cr</sub>     | 1.417 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 0.956           | Reductiefactor   | (6.49) X <sub>z</sub> | 0.956           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 325.73 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 1.417 m | Maatgevend veld  |                       | 0.000 - 1.417 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 1.09 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 11.44 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 11.44 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.19  
NEN-EN1993-1-1(6.62): UC = 0.18

### DOORSNEDE (#6.2)

Staaft C41-V1 (0.000-1.578)

|                        |                   |          |                  |        |                   |           |
|------------------------|-------------------|----------|------------------|--------|-------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.34  | Doorsnedeklasse  |        |                   | 1         |
| Maatgevende positie    |                   | 1.578 m  |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | 10.92 kN | Ontwerpweerstand | (6.6)  | N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 0.05 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN  | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | 0.08 kN  | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 119.72 kN |

#### Buiging en schuif #6.2.8

|            |       |            |       |
|------------|-------|------------|-------|
| Verhouding | 0.1 % | Verhouding | 0.0 % |
|------------|-------|------------|-------|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Is reductie nodig? Nee Is reductie nodig? Nee

#### Buig- en normaalkracht #6.2.9

Is reductie nodig? Ja Is reductie nodig? Nee

n 0.034  
 Ontwerpweerstand  $M_{pl,y,Rd}$  11.44 kNm  
 Ontwerpweerstand  $M_{N,y,Rd}$  11.44 kNm

#### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.03  
 NEN-EN1993-1-1(6.12): UC (y) = 0.00  
 NEN-EN1993-1-1(6.12): UC (z) = 0.00  
 NEN-EN1993-1-1(6.17): UC (y) = 0.00  
 NEN-EN1993-1-1(6.17): UC (z) = 0.00  
 NEN-EN1993-1-1(6.31): UC (y) = 0.00  
 NEN-EN1993-1-1(NB.33): UC = 0.01

#### KNIK (#6.3.1)

Staal C41-V1 (0.000-1.578)

|                             |             |                 |                             |             |                 |
|-----------------------------|-------------|-----------------|-----------------------------|-------------|-----------------|
| Profiel                     |             | N114.3/4        | Doorsnedeklasse             |             | 1               |
| Maatgevende combinatie      |             | Fu.C.64         |                             |             |                 |
| Maatgevend veld             |             | 0.000 - 1.578 m | Maatgevend veld             |             | 0.000 - 1.578 m |
| Normaalkracht               | $N_{Ed,y}$  | -6.82 kN        | Normaalkracht               | $N_{Ed,z}$  | -6.82 kN        |
| Lengte                      | $L_{cr,y}$  | 1.578 m         | Lengte                      | $L_{cr,z}$  | 1.578 m         |
| Elastische kritische kracht | $N_{cr,y}$  | 1757.65 kN      | Elastische kritische kracht | $N_{cr,z}$  | 1757.65 kN      |
| Slankheid                   | $\lambda_y$ | 0.430           | Slankheid                   | $\lambda_z$ | 0.430           |
| Knikcurve                   | Tabel 6.2   | a               | Knikcurve                   | Tabel 6.2   | a               |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$      |
|                             |             | $\Phi_y$        |                             |             | $\Phi_z$        |
| Reductiefactor              | (6.49)      | $\chi_y$        | Reductiefactor              | (6.49)      | $\chi_z$        |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$    |

NEN-EN1993-1-1(6.46): UC = 0.02

#### KIP (#6.3.2)

Staal C41-V1 (0.000-1.578)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalente profiel    | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

#### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | -0.02 kNm |
| Veld einde        |   | 1.578 m | Moment (eind)  | $M_y$ | -0.05 kNm |
| Lengte            | L | 1.578 m | Moment (max)   | $M_y$ | -0.02 kNm |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |            |                  |           |                |               |         |
|------------------|------------|------------------|-----------|----------------|---------------|---------|
| Tabel gebruikt   |            | NB.NB.1 (1)      |           | $\beta$        | 0.29          |         |
| Lengte           |            | $L_{st}$         | 1.578 m   | $\beta$        | 0.294         |         |
| Lengte           |            | $L_{kip}$        | 1.578 m   | (NB.NB.12) S   | 0.000 m       |         |
| Coefficient      |            | $C_1$            | 1.467     | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient      |            | $C_2$ (Berekend) | 0.000     | Lengte         | $L_g$         | 1.578 m |
| Coefficient      | (NB.NB.11) | C                | 4.609     | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6)  | $M_{Cr}$         | 0.00 kNm  |                |               |         |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,y}$     | 11.44 kNm |                |               |         |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,z}$     | 11.44 kNm |                |               |         |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C41-V1 (0.000-1.578)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.64  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | -0.08 kNm   | M               | 0.00 kNm       | M                | -0.08 kNm   |
| ψM              | -0.07 kNm   | ψM              | 0.00 kNm       | ψM               | -0.07 kNm   |
| M <sub>s</sub>  | -0.06 kNm   | ψ               | 1.000          | M <sub>s</sub>   | -0.06 kNm   |
| ψ               | 0.931       | Belasting       | Geconcentreerd | ψ                | 0.931       |
| α <sub>s</sub>  | 0.783       | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | 0.783       |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.827       |                 |                | C <sub>mLT</sub> | 0.827       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.831           |                  | k <sub>yz</sub>       | 0.603           |
|                  | k <sub>zy</sub>       | 0.498           |                  | k <sub>zz</sub>       | 1.005           |
| Maatgevend veld  |                       | 0.000 - 1.578 m | Maatgevend veld  |                       | 0.000 - 1.578 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -6.82 kN        | Normaalkracht    | N <sub>z,Ed</sub>     | -6.82 kN        |
| Lengte           | L <sub>y,cr</sub>     | 1.578 m         | Lengte           | L <sub>z,cr</sub>     | 1.578 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 0.945           | Reductiefactor   | (6.49) X <sub>z</sub> | 0.945           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 325.73 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 1.578 m | Maatgevend veld  |                       | 0.000 - 1.578 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 0.08 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 11.44 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 11.44 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.03

NEN-EN1993-1-1(6.62): UC = 0.03

### DOORSNEDE (#6.2)

Staal C43-V1 (0.000-1.101)

|                        |         |                 |   |
|------------------------|---------|-----------------|---|
| Maatgevende combinatie | Fu.C.43 | Doorsnedeklasse | 1 |
| Maatgevende positie    | 1.101 m |                 |   |

|               |                   |            |                  |                          |           |
|---------------|-------------------|------------|------------------|--------------------------|-----------|
| Normaalkracht | N <sub>Ed</sub>   | -53.71 kN  | Ontwerpweerstand | (6.10) N <sub>Rd</sub>   | 989.76 kN |
| Buigmoment    | M <sub>y,Ed</sub> | -14.56 kNm | Ontwerpweerstand | (6.13) M <sub>y,Rd</sub> | 67.06 kNm |
| Buigmoment    | M <sub>z,Ed</sub> | 9.00 kNm   | Ontwerpweerstand | (6.13) M <sub>z,Rd</sub> | 67.06 kNm |
| Dwarskracht   | V <sub>y,Ed</sub> | 5.00 kN    | Ontwerpweerstand | (6.18) V <sub>y,Rd</sub> | 363.79 kN |
| Dwarskracht   | V <sub>z,Ed</sub> | -17.03 kN  | Ontwerpweerstand | (6.18) V <sub>z,Rd</sub> | 363.79 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 4.7 % | Verhouding         | 1.4 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    | n             | 0.054     |                    | n             | 0.054     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 67.06 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 67.06 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 67.06 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 67.06 kNm |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

### Dubbele buiging #6.2.10 (7)

|                  |         |                |           |                  |         |                |           |
|------------------|---------|----------------|-----------|------------------|---------|----------------|-----------|
|                  |         | $\alpha_1$     | 2.000     |                  |         | $\alpha_2$     | 2.000     |
|                  |         | $\beta_0$      | 1.000     |                  |         | $\beta_1$      | 1.000     |
| Ontwerpweerstand | (NB.58) | $M_{y,N,V,Rd}$ | 69.25 kNm | Ontwerpweerstand | (NB.59) | $M_{z,N,V,Rd}$ | 69.25 kNm |

### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.05  
 NEN-EN1993-1-1(6.12): UC (y) = 0.22  
 NEN-EN1993-1-1(6.12): UC (z) = 0.13  
 NEN-EN1993-1-1(6.17): UC (y) = 0.01  
 NEN-EN1993-1-1(6.17): UC (z) = 0.05  
 NEN-EN1993-1-1(6.31): UC (y) = 0.22  
 NEN-EN1993-1-1(6.31): UC (z) = 0.13  
 NEN-EN1993-1-1(NB.33): UC = 0.26  
 NEN-EN1993-1-1(NB.52): UC = 0.06

### KNIK (#6.3.1)

Staal C43-V1 (0.000-1.101)

|                             |                |                 |                             |                |                 |
|-----------------------------|----------------|-----------------|-----------------------------|----------------|-----------------|
| Profiel                     |                | N219.1/6.3      | Doorsnedeklasse             |                | 1               |
| Maatgevende combinatie      |                | Fu.C.41         |                             |                |                 |
| Maatgevend veld             |                | 0.000 - 1.101 m | Maatgevend veld             |                | 0.000 - 1.101 m |
| Normaalkracht               | $N_{Ed,y}$     | -69.42 kN       | Normaalkracht               | $N_{Ed,z}$     | -69.42 kN       |
| Lengte                      | $L_{\alpha,y}$ | 1.101 m         | Lengte                      | $L_{\alpha,z}$ | 1.101 m         |
| Elastische kritische kracht | $N_{cr,y}$     | 40764.53 kN     | Elastische kritische kracht | $N_{cr,z}$     | 40764.53 kN     |
| Slankheid                   | $\lambda_y$    | 0.156           | Slankheid                   | $\lambda_z$    | 0.156           |
| Knikcurve                   | Tabel 6.2      | a               | Knikcurve                   | Tabel 6.2      | a               |
| Imperfectiefactor           | Tabel 6.1      | $\alpha_y$      | Imperfectiefactor           | Tabel 6.1      | $\alpha_z$      |
|                             |                | $\Phi_y$        |                             |                | $\Phi_z$        |
|                             |                | 0.508           |                             |                | 0.508           |
| Reductiefactor              | (6.49)         | $\chi_y$        | Reductiefactor              | (6.49)         | $\chi_z$        |
|                             |                | 1.000           |                             |                | 1.000           |
| Ontwerpweerstand            | (6.47)         | $N_{b,Rd,y}$    | Ontwerpweerstand            | (6.47)         | $N_{b,Rd,z}$    |
|                             |                | 989.76 kN       |                             |                | 989.76 kN       |

NEN-EN1993-1-1(6.46): UC = 0.07

### KIP (#6.3.2)

Staal C43-V1 (0.000-1.101)

|                        |  |            |                                             |  |         |
|------------------------|--|------------|---------------------------------------------|--|---------|
| Equivalente profiel    |  | N219.1/6.3 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1     | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen       |                                             |  |         |

### Maatgevend veld

|                   |   |         |                |       |           |
|-------------------|---|---------|----------------|-------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ | 0.00 kNm  |
| Veld einde        |   | 1.101 m | Moment (eind)  | $M_y$ | -2.94 kNm |
| Lengte            | L | 1.101 m | Moment (max)   | $M_y$ | 0.00 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                    |              |                |               |          |
|------------------|--------------------|--------------|----------------|---------------|----------|
| Tabel gebruikt   |                    | NB.NB.4      | Moment         | M             | 2.94 kNm |
| Belasting        | q                  | 0.01 kN/m    | Lengte         | $L_{st}$      | 1.101 m  |
|                  | $B^*$              | 1.00         | Lengte         | $L_{st}$      | 1.101 m  |
| Lengte           | $L_{kip}$          | 1.101 m      |                | S             | 0.000 m  |
| Coefficient      | $C_1$              | 1.802        | Coefficient    | $C_2$ (Tabel) | 0.000    |
| Coefficient      | $C_2$ (Berekend)   | 0.000        | Lengte         | $L_g$         | 1.101 m  |
| Coefficient      | (NB.NB.11) C       | 5.660        | Reductiefactor | $K_{red}$     | 0.000    |
|                  | (NB.NB.6) $M_{cr}$ | 0.00 kNm     |                |               |          |
| Ontwerpweerstand | (6.55)             | $M_{b,Rd,y}$ | 67.06 kNm      |               |          |
| Ontwerpweerstand | (6.55)             | $M_{b,Rd,z}$ | 67.06 kNm      |               |          |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)  
NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C43-V1 (0.000-1.101)

|                        |            |                 |   |
|------------------------|------------|-----------------|---|
| Profiel                | N219.1/6.3 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.41    |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | -13.76 kNm  | M               | 0.00 kNm       | M                | -13.76 kNm  |
| ψM              | 0.00 kNm    | ψM              | 0.00 kNm       | ψM               | 0.00 kNm    |
| M <sub>s</sub>  | -5.83 kNm   | ψ               | 1.000          | M <sub>s</sub>   | -5.83 kNm   |
| ψ               | -0.000      | Belasting       | Geconcentreerd | ψ                | -0.000      |
| α <sub>s</sub>  | 0.424       | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | 0.424       |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.539       |                 |                | C <sub>mLT</sub> | 0.539       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.537           |                  | k <sub>yz</sub>       | 0.598           |
|                  | k <sub>zy</sub>       | 0.322           |                  | k <sub>zz</sub>       | 0.997           |
| Maatgevend veld  |                       | 0.000 - 1.101 m | Maatgevend veld  |                       | 0.000 - 1.101 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -69.42 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -69.42 kN       |
| Lengte           | L <sub>y,cr</sub>     | 1.101 m         | Lengte           | L <sub>z,cr</sub>     | 1.101 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 1.000           | Reductiefactor   | (6.49) X <sub>z</sub> | 1.000           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 989.76 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 1.101 m | Maatgevend veld  |                       | 0.000 - 1.101 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 13.76 kNm       | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 67.06 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 67.06 kNm       |
| Reductiefactor   | X <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.18

NEN-EN1993-1-1(6.62): UC = 0.14

### DOORSNEDE (#6.2)

Staaf C44-V1 (0.000-0.321)

| Maatgevende combinatie |                   | Fu.C.43    | Doorsnedeklasse  |        |                   | 1         |
|------------------------|-------------------|------------|------------------|--------|-------------------|-----------|
| Maatgevende positie    |                   | 0.000 m    |                  |        |                   |           |
| Normaalkracht          | N <sub>Ed</sub>   | -153.90 kN | Ontwerpweerstand | (6.10) | N <sub>Rd</sub>   | 989.76 kN |
| Buigmoment             | M <sub>y,Ed</sub> | -14.56 kNm | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> | 67.06 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm   | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> | 67.06 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN    | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> | 363.79 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | 55.88 kN   | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> | 363.79 kN |

#### Buiging en schuif #6.2.8

|                    |        |                    |       |
|--------------------|--------|--------------------|-------|
| Verhouding         | 15.4 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee    | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |                      |           |                    |     |
|--------------------|----------------------|-----------|--------------------|-----|
| Is reductie nodig? |                      | Ja        | Is reductie nodig? | Nee |
|                    | n                    | 0.155     |                    |     |
| Ontwerpweerstand   | M <sub>pl,y,Rd</sub> | 67.06 kNm |                    |     |
| Ontwerpweerstand   | M <sub>N,y,Rd</sub>  | 66.80 kNm |                    |     |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### **Uitgevoerde controles**

NEN-EN1993-1-1(6.9): UC = 0.16  
NEN-EN1993-1-1(6.12): UC (y) = 0.22  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.15  
NEN-EN1993-1-1(6.31): UC (y) = 0.22  
NEN-EN1993-1-1(NB.33): UC = 0.25

#### **KNIK (#6.3.1)**

Staaf C44-V1 (0.000-0.321)

|                             |                   |                     |                             |                   |                     |
|-----------------------------|-------------------|---------------------|-----------------------------|-------------------|---------------------|
| Profiel                     |                   | N219.1/6.3          | Doorsnedeklasse             |                   | 1                   |
| Maatgevende combinatie      |                   | Fu.C.41             |                             |                   |                     |
| Maatgevend veld             |                   | 0.000 - 0.321 m     | Maatgevend veld             |                   | 0.000 - 0.321 m     |
| Normaalkracht               | N <sub>Ed,y</sub> | -158.94 kN          | Normaalkracht               | N <sub>Ed,z</sub> | -158.94 kN          |
| Lengte                      | L <sub>cr,y</sub> | 0.321 m             | Lengte                      | L <sub>cr,z</sub> | 0.321 m             |
| Elastische kritische kracht | N <sub>cr,y</sub> | 480084.36 kN        | Elastische kritische kracht | N <sub>cr,z</sub> | 480084.36 kN        |
| Slankheid                   | λ <sub>y</sub>    | 0.045               | Slankheid                   | λ <sub>z</sub>    | 0.045               |
| Knikcurve                   | Tabel 6.2         | a                   | Knikcurve                   | Tabel 6.2         | a                   |
| Imperfectiefactor           | Tabel 6.1         | α <sub>y</sub>      | Imperfectiefactor           | Tabel 6.1         | α <sub>z</sub>      |
|                             |                   | Φ <sub>y</sub>      |                             |                   | Φ <sub>z</sub>      |
|                             |                   | 0.485               |                             |                   | 0.485               |
| Reductiefactor              | (6.49)            | X <sub>y</sub>      | Reductiefactor              | (6.49)            | X <sub>z</sub>      |
|                             |                   | 1.000               |                             |                   | 1.000               |
| Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,y</sub> | Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,z</sub> |
|                             |                   | 989.76 kN           |                             |                   | 989.76 kN           |

NEN-EN1993-1-1(6.46): UC = 0.16

#### **KIP (#6.3.2)**

Staaf C44-V1 (0.000-0.321)

|                        |  |            |                                             |  |         |
|------------------------|--|------------|---------------------------------------------|--|---------|
| Equivalent profiel     |  | N219.1/6.3 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1     | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen       |                                             |  |         |

#### **Maatgevend veld**

|                   |   |         |                |                |           |
|-------------------|---|---------|----------------|----------------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | M <sub>y</sub> | -2.94 kNm |
| Veld einde        |   | 0.321 m | Moment (eind)  | M <sub>y</sub> | 0.65 kNm  |
| Lengte            | L | 0.321 m | Moment (max)   | M <sub>y</sub> | 0.65 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | M <sub>z</sub> | 0.00 kNm  |

#### **Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)**

|                  |                            |             |                |                        |         |
|------------------|----------------------------|-------------|----------------|------------------------|---------|
| Tabel gebruikt   |                            | NB.NB.1 (1) |                | β                      | -0.22   |
| Lengte           | L <sub>st</sub>            | 0.321 m     |                | β                      | -0.219  |
| Lengte           | L <sub>kip</sub>           | 0.321 m     | (NB.NB.12)     | S                      | 0.000 m |
| Coefficient      | C <sub>1</sub>             | 1.995       | Coefficient    | C <sub>2</sub> (Tabel) | 0.000   |
| Coefficient      | C <sub>2</sub> (Berekend)  | 0.000       | Lengte         | L <sub>g</sub>         | 0.321 m |
| Coefficient      | (NB.NB.11) C               | 6.267       | Reductiefactor | K <sub>red</sub>       | 0.000   |
|                  | (NB.NB.6) M <sub>cr</sub>  | 0.00 kNm    |                |                        |         |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,y</sub> | 67.06 kNm   |                |                        |         |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,z</sub> | 67.06 kNm   |                |                        |         |

#### **Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)**

NEN-EN1993-1-1(6.54): UC = 0.00

#### **BUIGING EN AXIALE DRUK (#6.3.3)**

Staaf C44-V1 (0.000-0.321)

|                        |  |            |                 |  |   |
|------------------------|--|------------|-----------------|--|---|
| Profiel                |  | N219.1/6.3 | Doorsnedeklasse |  | 1 |
| Maatgevende combinatie |  | Fu.C.41    |                 |  |   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| C <sub>my</sub> |             | C <sub>mz</sub> |                | C <sub>mLT</sub> |             |
|-----------------|-------------|-----------------|----------------|------------------|-------------|
| M               | -13.76 kNm  | M               | 0.00 kNm       | M                | -13.76 kNm  |
| ψM              | 2.37 kNm    | ψM              | 0.00 kNm       | ψM               | 2.37 kNm    |
| M <sub>s</sub>  | -5.60 kNm   | ψ               | 1.000          | M <sub>s</sub>   | -5.60 kNm   |
| ψ               | -0.172      | Belasting       | Geconcentreerd | ψ                | -0.172      |
| α <sub>s</sub>  | 0.407       | C <sub>mz</sub> | 1.000          | α <sub>s</sub>   | 0.407       |
| Belasting       | Gelijkmatig |                 |                | Belasting        | Gelijkmatig |
| C <sub>my</sub> | 0.526       |                 |                | C <sub>mLT</sub> | 0.526       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.513           |                  | k <sub>yz</sub>       | 0.585           |
|                  | k <sub>zy</sub>       | 0.308           |                  | k <sub>zz</sub>       | 0.975           |
| Maatgevend veld  |                       | 0.000 - 0.321 m | Maatgevend veld  |                       | 0.000 - 0.321 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -158.94 kN      | Normaalkracht    | N <sub>z,Ed</sub>     | -158.94 kN      |
| Lengte           | L <sub>y,cr</sub>     | 0.321 m         | Lengte           | L <sub>z,cr</sub>     | 0.321 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 1.000           | Reductiefactor   | (6.49) X <sub>z</sub> | 1.000           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 989.76 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 0.321 m | Maatgevend veld  |                       | 0.000 - 0.321 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 13.76 kNm       | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 67.06 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 67.06 kNm       |
| Reductiefactor   | χ <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.27

NEN-EN1993-1-1(6.62): UC = 0.22

#### DOORSNEDE (#6.2)

Staal C45-V1 (0.000-0.780)

|                        |                   |           |                  |                          |           |
|------------------------|-------------------|-----------|------------------|--------------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.41   | Doorsnedeklasse  |                          | 1         |
| Maatgevende positie    |                   | 0.780 m   |                  |                          |           |
| Normaalkracht          | N <sub>Ed</sub>   | -64.35 kN | Ontwerpweerstand | (6.10) N <sub>Rd</sub>   | 989.76 kN |
| Buigmoment             | M <sub>y,Ed</sub> | -9.83 kNm | Ontwerpweerstand | (6.13) M <sub>y,Rd</sub> | 67.06 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 7.00 kNm  | Ontwerpweerstand | (6.13) M <sub>z,Rd</sub> | 67.06 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 4.00 kN   | Ontwerpweerstand | (6.18) V <sub>y,Rd</sub> | 363.79 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -16.98 kN | Ontwerpweerstand | (6.18) V <sub>z,Rd</sub> | 363.79 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 4.7 % | Verhouding         | 1.1 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

| Is reductie nodig? |               |           | Is reductie nodig? |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
|                    | n             | 0.065     |                    | n             | 0.065     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 67.06 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 67.06 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 67.06 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 67.06 kNm |

#### Dubbele buiging #6.2.10 (7)

|                  |                               |           |                  |                               |           |
|------------------|-------------------------------|-----------|------------------|-------------------------------|-----------|
|                  | α <sub>1</sub>                | 2.000     |                  | α <sub>2</sub>                | 2.000     |
|                  | β <sub>0</sub>                | 1.000     |                  | β <sub>1</sub>                | 1.000     |
| Ontwerpweerstand | (NB.58) M <sub>y,N,V,Rd</sub> | 69.08 kNm | Ontwerpweerstand | (NB.59) M <sub>z,N,V,Rd</sub> | 69.08 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.07

NEN-EN1993-1-1(6.12): UC (y) = 0.15



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.12): UC (z) = 0.10  
NEN-EN1993-1-1(6.17): UC (y) = 0.01  
NEN-EN1993-1-1(6.17): UC (z) = 0.05  
NEN-EN1993-1-1(6.31): UC (y) = 0.15  
NEN-EN1993-1-1(6.31): UC (z) = 0.10  
NEN-EN1993-1-1(NB.33): UC = 0.18  
NEN-EN1993-1-1(NB.52): UC = 0.03

### KNIK (#6.3.1)

Staal C45-V1 (0.000-0.780)

|                             |                   |                     |                             |                   |                     |
|-----------------------------|-------------------|---------------------|-----------------------------|-------------------|---------------------|
| Profiel                     |                   | N219.1/6.3          | Doorsnedeklasse             |                   | 1                   |
| Maatgevende combinatie      |                   | Fu.C.41             |                             |                   |                     |
| Maatgevend veld             |                   | 0.000 - 0.780 m     | Maatgevend veld             |                   | 0.000 - 0.780 m     |
| Normaalkracht               | N <sub>Ed,y</sub> | -67.39 kN           | Normaalkracht               | N <sub>Ed,z</sub> | -67.39 kN           |
| Lengte                      | L <sub>cr,y</sub> | 0.780 m             | Lengte                      | L <sub>cr,z</sub> | 0.780 m             |
| Elastische kritische kracht | N <sub>cr,y</sub> | 81184.71 kN         | Elastische kritische kracht | N <sub>cr,z</sub> | 81184.71 kN         |
| Slankheid                   | λ <sub>y</sub>    | 0.110               | Slankheid                   | λ <sub>z</sub>    | 0.110               |
| Knikcurve                   | Tabel 6.2         | a                   | Knikcurve                   | Tabel 6.2         | a                   |
| Imperfectiefactor           | Tabel 6.1         | α <sub>y</sub>      | Imperfectiefactor           | Tabel 6.1         | α <sub>z</sub>      |
|                             |                   | Φ <sub>y</sub>      |                             |                   | Φ <sub>z</sub>      |
|                             |                   | 0.497               |                             |                   | 0.497               |
| Reductiefactor              | (6.49)            | χ <sub>y</sub>      | Reductiefactor              | (6.49)            | χ <sub>z</sub>      |
|                             |                   | 1.000               |                             |                   | 1.000               |
| Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,y</sub> | Ontwerpweerstand            | (6.47)            | N <sub>b,Rd,z</sub> |
|                             |                   | 989.76 kN           |                             |                   | 989.76 kN           |

NEN-EN1993-1-1(6.46): UC = 0.07

### KIP (#6.3.2)

Staal C45-V1 (0.000-0.780)

|                        |  |            |                                             |  |         |
|------------------------|--|------------|---------------------------------------------|--|---------|
| Equivalente profiel    |  | N219.1/6.3 | Doorsnedeklasse                             |  | 1       |
| Maatgevende combinatie |  | Bi.C.1     | Aangrijphoogte van de last vanaf het midden |  | 0.000 m |
| Kipsteunen             |  | Geen       |                                             |  |         |

#### Maatgevend veld

|                   |   |         |                |                |           |
|-------------------|---|---------|----------------|----------------|-----------|
| Veld begin        |   | 0.000 m | Moment (begin) | M <sub>y</sub> | 0.75 kNm  |
| Veld einde        |   | 0.780 m | Moment (eind)  | M <sub>y</sub> | -5.23 kNm |
| Lengte            | L | 0.780 m | Moment (max)   | M <sub>y</sub> | 0.75 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | M <sub>z</sub> | 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                            |           |                |                        |          |
|------------------|----------------------------|-----------|----------------|------------------------|----------|
| Tabel gebruikt   |                            | NB.NB.4   | Moment         | M                      | 5.23 kNm |
| Belasting        | q                          | 0.04 kN/m | Lengte         | L <sub>st</sub>        | 0.780 m  |
|                  | B*                         | 1.00      | Lengte         | L <sub>st</sub>        | 0.780 m  |
|                  | β                          | -0.144    | Lengte         | L <sub>kip</sub>       | 0.780 m  |
|                  | (NB.NB.12) S               | 0.000 m   |                |                        |          |
| Coefficient      | C <sub>1</sub>             | 1.945     | Coefficient    | C <sub>2</sub> (Tabel) | 0.000    |
| Coefficient      | C <sub>2</sub> (Berekend)  | 0.000     | Lengte         | L <sub>g</sub>         | 0.780 m  |
| Coefficient      | (NB.NB.11) C               | 6.111     | Reductiefactor | K <sub>red</sub>       | 0.000    |
|                  | (NB.NB.6) M <sub>cr</sub>  | 0.00 kNm  |                |                        |          |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,y</sub> | 67.06 kNm |                |                        |          |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,z</sub> | 67.06 kNm |                |                        |          |

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C45-V1 (0.000-0.780)

|                        |  |            |                 |  |   |
|------------------------|--|------------|-----------------|--|---|
| Profiel                |  | N219.1/6.3 | Doorsnedeklasse |  | 1 |
| Maatgevende combinatie |  | Fu.C.41    |                 |  |   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| <b>C<sub>my</sub></b> |             | <b>C<sub>mz</sub></b> |                | <b>C<sub>mLT</sub></b> |             |
|-----------------------|-------------|-----------------------|----------------|------------------------|-------------|
| M                     | -9.83 kNm   | M                     | 0.00 kNm       | M                      | -9.83 kNm   |
| ψM                    | 1.31 kNm    | ψM                    | 0.00 kNm       | ψM                     | 1.31 kNm    |
| M <sub>s</sub>        | -3.73 kNm   | ψ                     | 1.000          | M <sub>s</sub>         | -3.73 kNm   |
| ψ                     | -0.134      | Belasting             | Geconcentreerd | ψ                      | -0.134      |
| α <sub>s</sub>        | 0.380       | C <sub>mz</sub>       | 1.000          | α <sub>s</sub>         | 0.380       |
| Belasting             | Gelijkmatig |                       |                | Belasting              | Gelijkmatig |
| C <sub>my</sub>       | 0.504       |                       |                | C <sub>mLT</sub>       | 0.504       |

#### Interactiefactoren (Tabel B.1)

|                  |                       |                 |                  |                       |                 |
|------------------|-----------------------|-----------------|------------------|-----------------------|-----------------|
|                  | k <sub>yy</sub>       | 0.501           |                  | k <sub>yz</sub>       | 0.596           |
|                  | k <sub>zy</sub>       | 0.300           |                  | k <sub>zz</sub>       | 0.994           |
| Maatgevend veld  |                       | 0.000 - 0.780 m | Maatgevend veld  |                       | 0.000 - 0.780 m |
| Normaalkracht    | N <sub>y,Ed</sub>     | -67.39 kN       | Normaalkracht    | N <sub>z,Ed</sub>     | -67.39 kN       |
| Lengte           | L <sub>y,cr</sub>     | 0.780 m         | Lengte           | L <sub>z,cr</sub>     | 0.780 m         |
| Reductiefactor   | (6.49) X <sub>y</sub> | 1.000           | Reductiefactor   | (6.49) X <sub>z</sub> | 1.000           |
| Ontwerpweerstand | N <sub>Rk</sub>       | 989.76 kN       |                  |                       |                 |
| Maatgevend veld  |                       | 0.000 - 0.780 m | Maatgevend veld  |                       | 0.000 - 0.780 m |
| Buigmoment       | M <sub>y,Ed</sub>     | 9.83 kNm        | Buigmoment       | M <sub>z,Ed</sub>     | 0.00 kNm        |
| Buigmoment       | ΔM <sub>y,Ed</sub>    | 0.00 kNm        | Buigmoment       | ΔM <sub>z,Ed</sub>    | 0.00 kNm        |
| Ontwerpweerstand | M <sub>y,Rk</sub>     | 67.06 kNm       | Ontwerpweerstand | M <sub>z,Rk</sub>     | 67.06 kNm       |
| Reductiefactor   | χ <sub>LT</sub>       | 1.000           |                  |                       |                 |

NEN-EN1993-1-1(6.61): UC = 0.14

NEN-EN1993-1-1(6.62): UC = 0.11

#### DOORSNEDE (#6.2)

Staal C46-V1 (0.000-1.417)

|                        |                   |          |                  |                          |           |
|------------------------|-------------------|----------|------------------|--------------------------|-----------|
| Maatgevende combinatie |                   | Fu.C.43  | Doorsnedeklasse  |                          | 1         |
| Maatgevende positie    |                   | 0.000 m  |                  |                          |           |
| Normaalkracht          | N <sub>Ed</sub>   | -5.30 kN | Ontwerpweerstand | (6.10) N <sub>Rd</sub>   | 325.73 kN |
| Buigmoment             | M <sub>y,Ed</sub> | 1.54 kNm | Ontwerpweerstand | (6.13) M <sub>y,Rd</sub> | 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 0.00 kNm | Ontwerpweerstand | (6.13) M <sub>z,Rd</sub> | 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 0.00 kN  | Ontwerpweerstand | (6.18) V <sub>y,Rd</sub> | 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | -1.61 kN | Ontwerpweerstand | (6.18) V <sub>z,Rd</sub> | 119.72 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 1.3 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |                      |                    |     |
|--------------------|----------------------|--------------------|-----|
| Is reductie nodig? | Ja                   | Is reductie nodig? | Nee |
|                    | 0.016                |                    |     |
| Ontwerpweerstand   | n                    |                    |     |
|                    | M <sub>pl,y,Rd</sub> | 11.44 kNm          |     |
| Ontwerpweerstand   | M <sub>N,y,Rd</sub>  | 11.44 kNm          |     |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.02

NEN-EN1993-1-1(6.12): UC (y) = 0.13

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

NEN-EN1993-1-1(6.17): UC (z) = 0.01

NEN-EN1993-1-1(6.31): UC (y) = 0.13

NEN-EN1993-1-1(NB.33): UC = 0.13

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

### KNIK (#6.3.1)

Staaf C46-V1 (0.000-1.417)

|                             |             |                        |                             |                               |
|-----------------------------|-------------|------------------------|-----------------------------|-------------------------------|
| Profiel                     |             | N114.3/4               | Doorsnedeklasse             | 1                             |
| Maatgevende combinatie      |             | Fu.C.43                |                             |                               |
| Maatgevend veld             |             | 0.000 - 1.417 m        | Maatgevend veld             | 0.000 - 1.417 m               |
| Normaalkracht               | $N_{Ed,y}$  | -5.30 kN               | Normaalkracht               | $N_{Ed,z}$ -5.30 kN           |
| Lengte                      | $L_{cr,y}$  | 1.417 m                | Lengte                      | $L_{cr,z}$ 1.417 m            |
| Elastische kritische kracht | $N_{cr,y}$  | 2179.12 kN             | Elastische kritische kracht | $N_{cr,z}$ 2179.12 kN         |
| Slankheid                   | $\lambda_y$ | 0.387                  | Slankheid                   | $\lambda_z$ 0.387             |
| Knikcurve                   | Tabel 6.2   | a                      | Knikcurve                   | Tabel 6.2 a                   |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$ 0.210       | Imperfectiefactor           | Tabel 6.1 $\alpha_z$ 0.210    |
|                             |             | $\Phi_y$ 0.594         |                             | $\Phi_z$ 0.594                |
| Reductiefactor              | (6.49)      | $\chi_y$ 0.956         | Reductiefactor              | (6.49) $\chi_z$ 0.956         |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$ 311.48 kN | Ontwerpweerstand            | (6.47) $N_{b,Rd,z}$ 311.48 kN |

NEN-EN1993-1-1(6.46): UC = 0.02

### KIP (#6.3.2)

Staaf C46-V1 (0.000-1.417)

|                        |  |          |                                             |         |
|------------------------|--|----------|---------------------------------------------|---------|
| Equivalent profiel     |  | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |         |

#### Maatgevend veld

|                   |   |         |                |                 |
|-------------------|---|---------|----------------|-----------------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ 0.21 kNm  |
| Veld einde        |   | 1.417 m | Moment (eind)  | $M_y$ -0.07 kNm |
| Lengte            | L | 1.417 m | Moment (max)   | $M_y$ 0.21 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                    |             |                |                     |
|----------------|--------------------|-------------|----------------|---------------------|
| Tabel gebruikt |                    | NB.NB.1 (1) |                | $\beta$ -0.32       |
| Lengte         | $L_{st}$           | 1.417 m     |                | $\beta$ -0.320      |
| Lengte         | $L_{kip}$          | 1.417 m     | (NB.NB.12)     | S 0.000 m           |
| Coefficient    | $C_1$              | 2.117       | Coefficient    | $C_2$ (Tabel) 0.000 |
| Coefficient    | $C_2$ (Berekend)   | 0.000       | Lengte         | $L_g$ 1.417 m       |
| Coefficient    | (NB.NB.11) C       | 6.652       | Reductiefactor | $K_{red}$ 0.000     |
|                | (NB.NB.6) $M_{cr}$ | 0.00 kNm    |                |                     |

Ontwerpweerstand (6.55)  $M_{b,Rd,y}$  11.44 kNm

Ontwerpweerstand (6.55)  $M_{b,Rd,z}$  11.44 kNm

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C46-V1 (0.000-1.417)

|                        |  |          |                 |   |
|------------------------|--|----------|-----------------|---|
| Profiel                |  | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie |  | Fu.C.43  |                 |   |

#### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 1.54 kNm    | M         | 0.00 kNm       | M          | 1.54 kNm    |
| $\psi M$   | -0.61 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.61 kNm   |
| $M_s$      | 0.43 kNm    | $\psi$    | 1.000          | $M_s$      | 0.43 kNm    |
| $\psi$     | -0.396      | Belasting | Geconcentreerd | $\psi$     | -0.396      |
| $\alpha_s$ | 0.281       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.281       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

$C_{my}$

0.425

$C_{mLT}$

0.425

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.426           |                  | $k_{yz}$          | 0.602           |
|                  | $k_{zy}$          | 0.256           |                  | $k_{zz}$          | 1.003           |
| Maatgevend veld  |                   | 0.000 - 1.417 m | Maatgevend veld  |                   | 0.000 - 1.417 m |
| Normaalkracht    | $N_{y,Ed}$        | -5.30 kN        | Normaalkracht    | $N_{z,Ed}$        | -5.30 kN        |
| Lengte           | $L_{y,cr}$        | 1.417 m         | Lengte           | $L_{z,cr}$        | 1.417 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.956           | Reductiefactor   | (6.49) $\chi_z$   | 0.956           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.417 m | Maatgevend veld  |                   | 0.000 - 1.417 m |
| Buigmoment       | $M_{y,Ed}$        | 1.54 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.07

NEN-EN1993-1-1(6.62): UC = 0.05

#### DOORSNEDE (#6.2)

Staal C47-V1 (0.000-1.541)

|                        |                   |         |                 |                  |        |                             |
|------------------------|-------------------|---------|-----------------|------------------|--------|-----------------------------|
| Maatgevende combinatie |                   | Fu.C.43 | Doorsnedeklasse |                  |        | 1                           |
| Maatgevende positie    |                   | 0.000   | m               |                  |        |                             |
| Normaalkracht          | N <sub>Ed</sub>   | -107.45 | kN              | Ontwerpweerstand | (6.10) | N <sub>Rd</sub> 325.73 kN   |
| Buigmoment             | M <sub>y,Ed</sub> | -0.33   | kNm             | Ontwerpweerstand | (6.13) | M <sub>y,Rd</sub> 11.44 kNm |
| Buigmoment             | M <sub>z,Ed</sub> | 9.00    | kNm             | Ontwerpweerstand | (6.13) | M <sub>z,Rd</sub> 11.44 kNm |
| Dwarskracht            | V <sub>y,Ed</sub> | 5.00    | kN              | Ontwerpweerstand | (6.18) | V <sub>y,Rd</sub> 119.72 kN |
| Dwarskracht            | V <sub>z,Ed</sub> | 0.34    | kN              | Ontwerpweerstand | (6.18) | V <sub>z,Rd</sub> 119.72 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.3 % | Verhouding         | 4.2 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |                         |                    |                         |
|--------------------|-------------------------|--------------------|-------------------------|
| Is reductie nodig? | Ja                      | Is reductie nodig? | Ja                      |
| n                  | 0.330                   | n                  | 0.330                   |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ 11.44 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ 11.44 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$ 10.09 kNm  | Ontwerpweerstand   | $M_{N,z,Rd}$ 10.09 kNm  |

#### Dubbele buiging #6.2.10 (7)

|                                         |            |           |                                         |            |           |
|-----------------------------------------|------------|-----------|-----------------------------------------|------------|-----------|
|                                         | $\alpha_1$ | 2.000     |                                         | $\alpha_2$ | 2.000     |
|                                         | $\beta_0$  | 1.000     |                                         | $\beta_1$  | 1.000     |
| Ontwerpweerstand (NB.58) $M_{y,N,V,Rd}$ |            | 10.09 kNm | Ontwerpweerstand (NB.59) $M_{z,N,V,Rd}$ |            | 10.09 kNm |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.33

NEN-EN1993-1-1(6.12): UC (y) = 0.03

NEN-EN1993-1-1(6.12): UC (z) = 0.79

NEN-EN1993-1-1(6.17): UC (y) = 0.04

NEN-EN1993-1-1(6.17): UC (z) = 0.00

NEN-EN1993-1-1(6.31): UC (y) = 0.03

NEN-EN1993-1-1(6.31): UC (z) = 0.89

NEN-EN1993-1-1(NB.33): UC = 0.91

NEN-EN1993-1-1(NB.52): UC = 0.80

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

### KNIK (#6.3.1)

Staal C47-V1 (0.000-1.541)

|                             |                |                        |                             |                               |
|-----------------------------|----------------|------------------------|-----------------------------|-------------------------------|
| Profiel                     |                | N114.3/4               | Doorsnedeklasse             | 1                             |
| Maatgevende combinatie      |                | Fu.C.41                |                             |                               |
| Maatgevend veld             |                | 0.000 - 1.541 m        | Maatgevend veld             | 0.000 - 1.541 m               |
| Normaalkracht               | $N_{Ed,y}$     | -106.80 kN             | Normaalkracht               | $N_{Ed,z}$ -106.80 kN         |
| Lengte                      | $L_{\alpha,y}$ | 1.541 m                | Lengte                      | $L_{\alpha,z}$ 1.541 m        |
| Elastische kritische kracht | $N_{cr,y}$     | 1842.34 kN             | Elastische kritische kracht | $N_{cr,z}$ 1842.34 kN         |
| Slankheid                   | $\lambda_y$    | 0.420                  | Slankheid                   | $\lambda_z$ 0.420             |
| Knikcurve                   | Tabel 6.2      | a                      | Knikcurve                   | Tabel 6.2 a                   |
| Imperfectiefactor           | Tabel 6.1      | $\alpha_y$ 0.210       | Imperfectiefactor           | Tabel 6.1 $\alpha_z$ 0.210    |
|                             |                | $\Phi_y$ 0.612         |                             | $\Phi_z$ 0.612                |
| Reductiefactor              | (6.49)         | $\chi_y$ 0.947         | Reductiefactor              | (6.49) $\chi_z$ 0.947         |
| Ontwerpweerstand            | (6.47)         | $N_{b,Rd,y}$ 308.57 kN | Ontwerpweerstand            | (6.47) $N_{b,Rd,z}$ 308.57 kN |

NEN-EN1993-1-1(6.46): UC = 0.35

### KIP (#6.3.2)

Staal C47-V1 (0.000-1.541)

|                        |  |          |                                             |         |
|------------------------|--|----------|---------------------------------------------|---------|
| Equivalentente profiel |  | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie |  | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             |  | Geen     |                                             |         |

#### Maatgevend veld

|                   |   |         |                |                 |
|-------------------|---|---------|----------------|-----------------|
| Veld begin        |   | 0.000 m | Moment (begin) | $M_y$ -0.32 kNm |
| Veld einde        |   | 1.541 m | Moment (eind)  | $M_y$ 0.11 kNm  |
| Lengte            | L | 1.541 m | Moment (max)   | $M_y$ 0.11 kNm  |
| Maatgevende flens |   | Boven   | Moment (max)   | $M_z$ 0.00 kNm  |

#### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                    |             |                |                     |
|----------------|--------------------|-------------|----------------|---------------------|
| Tabel gebruikt |                    | NB.NB.1 (1) |                | $\beta$ -0.35       |
| Lengte         | $L_{st}$           | 1.541 m     |                | $\beta$ -0.347      |
| Lengte         | $L_{kip}$          | 1.541 m     | (NB.NB.12)     | S 0.000 m           |
| Coefficient    | $C_1$              | 2.150       | Coefficient    | $C_2$ (Tabel) 0.000 |
| Coefficient    | $C_2$ (Berekend)   | 0.000       | Lengte         | $L_g$ 1.541 m       |
| Coefficient    | (NB.NB.11) C       | 6.755       | Reductiefactor | $K_{red}$ 0.000     |
|                | (NB.NB.6) $M_{cr}$ | 0.00 kNm    |                |                     |

Ontwerpweerstand (6.55)  $M_{b,Rd,y}$  11.44 kNm

Ontwerpweerstand (6.55)  $M_{b,Rd,z}$  11.44 kNm

#### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staal C47-V1 (0.000-1.541)

|                        |  |          |                 |   |
|------------------------|--|----------|-----------------|---|
| Profiel                |  | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie |  | Fu.C.41  |                 |   |

#### Equivalentente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -0.38 kNm   | M         | 0.00 kNm       | M          | -0.38 kNm   |
| $\psi M$   | 0.14 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.14 kNm    |
| $M_s$      | -0.10 kNm   | $\psi$    | 1.000          | $M_s$      | -0.10 kNm   |
| $\psi$     | -0.370      | Belasting | Geconcentreerd | $\psi$     | -0.370      |
| $\alpha_s$ | 0.270       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.270       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

$C_{my}$  0.416

$C_{mLT}$  0.416

#### Interactiefactoren (Tabel B.1)

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
|                  | $k_{yy}$          | 0.448           |                  | $k_{yz}$          | 0.646           |
|                  | $k_{zy}$          | 0.269           |                  | $k_{zz}$          | 1.076           |
| Maatgevend veld  |                   | 0.000 - 1.541 m | Maatgevend veld  |                   | 0.000 - 1.541 m |
| Normaalkracht    | $N_{y,Ed}$        | -106.80 kN      | Normaalkracht    | $N_{z,Ed}$        | -106.80 kN      |
| Lengte           | $L_{y,cr}$        | 1.541 m         | Lengte           | $L_{z,cr}$        | 1.541 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.947           | Reductiefactor   | (6.49) $\chi_z$   | 0.947           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.541 m | Maatgevend veld  |                   | 0.000 - 1.541 m |
| Buigmoment       | $M_{y,Ed}$        | 0.38 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.36

NEN-EN1993-1-1(6.62): UC = 0.36

#### DOORSNEDE (#6.2)

Staal C49-V1 (0.000-1.465)

|                        |            |          |                  |                   |           |
|------------------------|------------|----------|------------------|-------------------|-----------|
| Maatgevende combinatie |            | Fu.C.43  | Doorsnedeklasse  |                   | 1         |
| Maatgevende positie    |            | 0.000 m  |                  |                   |           |
| Normaalkracht          | $N_{Ed}$   | 46.51 kN | Ontwerpweerstand | (6.6) $N_{Rd}$    | 325.73 kN |
| Buigmoment             | $M_{y,Ed}$ | 0.43 kNm | Ontwerpweerstand | (6.13) $M_{y,Rd}$ | 11.44 kNm |
| Buigmoment             | $M_{z,Ed}$ | 0.00 kNm | Ontwerpweerstand | (6.13) $M_{z,Rd}$ | 11.44 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 0.00 kN  | Ontwerpweerstand | (6.18) $V_{y,Rd}$ | 119.72 kN |
| Dwarskracht            | $V_{z,Ed}$ | -0.96 kN | Ontwerpweerstand | (6.18) $V_{z,Rd}$ | 119.72 kN |

#### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.8 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

#### Buig- en normaalkracht #6.2.9

|                    |               |                    |     |
|--------------------|---------------|--------------------|-----|
| Is reductie nodig? | Ja            | Is reductie nodig? | Nee |
|                    | $n$           |                    |     |
|                    | 0.143         |                    |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm          |     |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 11.44 kNm          |     |

#### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.14

NEN-EN1993-1-1(6.12): UC (y) = 0.04

NEN-EN1993-1-1(6.12): UC (z) = 0.00

NEN-EN1993-1-1(6.17): UC (y) = 0.00

NEN-EN1993-1-1(6.17): UC (z) = 0.01

NEN-EN1993-1-1(6.31): UC (y) = 0.04

NEN-EN1993-1-1(NB.33): UC = 0.07

#### KNIK (#6.3.1)

Staal C49-V1 (0.000-1.465)

|                        |            |                 |                 |            |                 |
|------------------------|------------|-----------------|-----------------|------------|-----------------|
| Profiel                |            | N114.3/4        | Doorsnedeklasse |            | 1               |
| Maatgevende combinatie |            | Fu.C.54         |                 |            |                 |
| Maatgevend veld        |            | 0.000 - 1.465 m | Maatgevend veld |            | 0.000 - 1.465 m |
| Normaalkracht          | $N_{Ed,y}$ | -2.58 kN        | Normaalkracht   | $N_{Ed,z}$ | -2.58 kN        |
| Lengte                 | $L_{cr,y}$ | 1.465 m         | Lengte          | $L_{cr,z}$ | 1.465 m         |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                             |             |              |                             |             |              |
|-----------------------------|-------------|--------------|-----------------------------|-------------|--------------|
| Elastische kritische kracht | $N_{cr,y}$  | 2039.53 kN   | Elastische kritische kracht | $N_{cr,z}$  | 2039.53 kN   |
| Slankheid                   | $\lambda_y$ | 0.400        | Slankheid                   | $\lambda_z$ | 0.400        |
| Knikcurve                   | Tabel 6.2   | a            | Knikcurve                   | Tabel 6.2   | a            |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$   | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$   |
|                             |             | 0.210        |                             |             | 0.210        |
|                             |             | $\Phi_y$     |                             |             | 0.601        |
|                             |             | 0.601        |                             |             | 0.601        |
| Reductiefactor              | (6.49)      | $\chi_y$     | Reductiefactor              | (6.49)      | $\chi_z$     |
|                             |             | 0.953        |                             |             | 0.953        |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$ | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$ |
|                             |             | 310.38 kN    |                             |             | 310.38 kN    |

NEN-EN1993-1-1(6.46): UC = 0.01

### KIP (#6.3.2)

Staaf C49-V1 (0.000-1.465)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalente profiel    | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

### Maatgevend veld

|                   |         |                |       |           |
|-------------------|---------|----------------|-------|-----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$ | 0.17 kNm  |
| Veld einde        | 1.465 m | Moment (eind)  | $M_y$ | -0.41 kNm |
| Lengte            | L       | Moment (max)   | $M_y$ | 0.17 kNm  |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |                |               |
|------------------|---------------------|----------------|---------------|
| Tabel gebruikt   | NB.NB.1 (1)         | $\beta$        | -0.43         |
| Lengte           | $L_{st}$            | $\beta$        | -0.430        |
| Lengte           | $L_{kip}$           | (NB.NB.12) S   | 0.000 m       |
| Coefficient      | $C_1$               | Coefficient    | $C_2$ (Tabel) |
|                  |                     |                | 0.000         |
| Coefficient      | $C_2$ (Berekend)    | Lengte         | $L_g$         |
|                  |                     |                | 1.465 m       |
| Coefficient      | (NB.NB.11) C        | Reductiefactor | $K_{red}$     |
|                  |                     |                | 0.000         |
|                  | (NB.NB.6) $M_{cr}$  |                |               |
|                  |                     |                |               |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 11.44 kNm      |               |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 11.44 kNm      |               |

### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C49-V1 (0.000-1.465)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.54  |                 |   |

### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -0.03 kNm   | M         | 0.00 kNm       | M          | -0.03 kNm   |
| $\psi M$   | 0.03 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.03 kNm    |
| $M_s$      | 0.02 kNm    | $\psi$    | 1.000          | $M_s$      | 0.02 kNm    |
| $\psi$     | -0.892      | Belasting | Geconcentreerd | $\psi$     | -0.892      |
| $\alpha_s$ | -0.499      | $C_{mz}$  | 1.000          | $\alpha_s$ | -0.499      |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.588       |           |                | $C_{mLT}$  | 0.588       |

### Interactiefactoren (Tabel B.1)

|          |       |          |       |
|----------|-------|----------|-------|
| $k_{yy}$ | 0.589 | $k_{yz}$ | 0.601 |
| $k_{zy}$ | 0.354 | $k_{zz}$ | 1.002 |

|                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|
| Maatgevend veld | 0.000 - 1.465 m | Maatgevend veld | 0.000 - 1.465 m |
|-----------------|-----------------|-----------------|-----------------|

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|--|--|--|--|--|--|

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
| Normaalkracht    | $N_{y,Ed}$        | -2.58 kN        | Normaalkracht    | $N_{z,Ed}$        | -2.58 kN        |
| Lengte           | $L_{y,cr}$        | 1.465 m         | Lengte           | $L_{z,cr}$        | 1.465 m         |
| Reductiefactor   | (6.49) $X_y$      | 0.953           | Reductiefactor   | (6.49) $X_z$      | 0.953           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.465 m | Maatgevend veld  |                   | 0.000 - 1.465 m |
| Buigmoment       | $M_{y,Ed}$        | 0.03 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | $X_{LT}$          | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.01

NEN-EN1993-1-1(6.62): UC = 0.01

## DOORSNEDE (#6.2)

Staal C50-V1 (0.000-1.465)

|                        |            |           |                  |                   |           |
|------------------------|------------|-----------|------------------|-------------------|-----------|
| Maatgevende combinatie |            | Fu.C.41   | Doorsnedeklasse  |                   | 1         |
| Maatgevende positie    |            | 0.000 m   |                  |                   |           |
| Normaalkracht          | $N_{Ed}$   | -24.91 kN | Ontwerpweerstand | (6.10) $N_{Rd}$   | 325.73 kN |
| Buigmoment             | $M_{y,Ed}$ | 0.96 kNm  | Ontwerpweerstand | (6.13) $M_{y,Rd}$ | 11.44 kNm |
| Buigmoment             | $M_{z,Ed}$ | 7.00 kNm  | Ontwerpweerstand | (6.13) $M_{z,Rd}$ | 11.44 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 4.00 kN   | Ontwerpweerstand | (6.18) $V_{y,Rd}$ | 119.72 kN |
| Dwarskracht            | $V_{z,Ed}$ | -0.94 kN  | Ontwerpweerstand | (6.18) $V_{z,Rd}$ | 119.72 kN |

## Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.8 % | Verhouding         | 3.3 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

## Buig- en normaalkracht #6.2.9

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    | $n$           | 0.076     |                    | $n$           | 0.076     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 11.44 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 11.44 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 11.44 kNm |

## Dubbele buiging #6.2.10 (7)

|                  |                        |           |                  |                        |           |
|------------------|------------------------|-----------|------------------|------------------------|-----------|
|                  | $\alpha_1$             | 2.000     |                  | $\alpha_2$             | 2.000     |
|                  | $\beta_0$              | 1.000     |                  | $\beta_1$              | 1.000     |
| Ontwerpweerstand | (NB.58) $M_{y,N,V,Rd}$ | 11.75 kNm | Ontwerpweerstand | (NB.59) $M_{z,N,V,Rd}$ | 11.75 kNm |

## Uitgevoerde controles

NEN-EN1993-1-1(6.9): UC = 0.08

NEN-EN1993-1-1(6.12): UC (y) = 0.08

NEN-EN1993-1-1(6.12): UC (z) = 0.61

NEN-EN1993-1-1(6.17): UC (y) = 0.03

NEN-EN1993-1-1(6.17): UC (z) = 0.01

NEN-EN1993-1-1(6.31): UC (y) = 0.08

NEN-EN1993-1-1(6.31): UC (z) = 0.61

NEN-EN1993-1-1(NB.33): UC = 0.62

NEN-EN1993-1-1(NB.52): UC = 0.36

## KNIK (#6.3.1)

Staal C50-V1 (0.000-1.465)

|                        |            |                 |                 |            |                 |
|------------------------|------------|-----------------|-----------------|------------|-----------------|
| Profiel                |            | N114.3/4        | Doorsnedeklasse |            | 1               |
| Maatgevende combinatie |            | Fu.C.41         |                 |            |                 |
| Maatgevend veld        |            | 0.000 - 1.465 m | Maatgevend veld |            | 0.000 - 1.465 m |
| Normaalkracht          | $N_{Ed,y}$ | -24.91 kN       | Normaalkracht   | $N_{Ed,z}$ | -24.91 kN       |
| Lengte                 | $L_{cr,y}$ | 1.465 m         | Lengte          | $L_{cr,z}$ | 1.465 m         |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                             |             |              |                             |             |              |
|-----------------------------|-------------|--------------|-----------------------------|-------------|--------------|
| Elastische kritische kracht | $N_{cr,y}$  | 2039.48 kN   | Elastische kritische kracht | $N_{cr,z}$  | 2039.48 kN   |
| Slankheid                   | $\lambda_y$ | 0.400        | Slankheid                   | $\lambda_z$ | 0.400        |
| Knikcurve                   | Tabel 6.2   | a            | Knikcurve                   | Tabel 6.2   | a            |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$   | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$   |
|                             |             | 0.210        |                             |             | 0.210        |
|                             |             | $\Phi_y$     |                             |             | 0.601        |
|                             |             | 0.601        |                             |             | 0.601        |
| Reductiefactor              | (6.49)      | $\chi_y$     | Reductiefactor              | (6.49)      | $\chi_z$     |
|                             |             | 0.953        |                             |             | 0.953        |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$ | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$ |
|                             |             | 310.38 kN    |                             |             | 310.38 kN    |

NEN-EN1993-1-1(6.46): UC = 0.08

### KIP (#6.3.2)

Staaf C50-V1 (0.000-1.465)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalente profiel    | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

### Maatgevend veld

|                   |         |                |       |           |
|-------------------|---------|----------------|-------|-----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$ | 0.22 kNm  |
| Veld einde        | 1.465 m | Moment (eind)  | $M_y$ | -0.11 kNm |
| Lengte            | L       | Moment (max)   | $M_y$ | 0.22 kNm  |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                     |                |               |
|------------------|---------------------|----------------|---------------|
| Tabel gebruikt   | NB.NB.1 (1)         | $\beta$        | -0.51         |
| Lengte           | $L_{st}$            | $\beta$        | -0.509        |
| Lengte           | $L_{kip}$           | (NB.NB.12) S   | 0.000 m       |
| Coefficient      | $C_1$               | Coefficient    | $C_2$ (Tabel) |
|                  |                     |                | 0.000         |
| Coefficient      | $C_2$ (Berekend)    | Lengte         | $L_g$         |
|                  |                     |                | 1.465 m       |
| Coefficient      | (NB.NB.11) C        | Reductiefactor | $K_{red}$     |
|                  |                     |                | 0.000         |
|                  | (NB.NB.6) $M_{cr}$  |                |               |
|                  |                     |                |               |
| Ontwerpweerstand | (6.55) $M_{b,Rd,y}$ | 11.44 kNm      |               |
| Ontwerpweerstand | (6.55) $M_{b,Rd,z}$ | 11.44 kNm      |               |

### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C50-V1 (0.000-1.465)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.41  |                 |   |

### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.96 kNm    | M         | 0.00 kNm       | M          | 0.96 kNm    |
| $\psi M$   | -0.52 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.52 kNm   |
| $M_s$      | 0.25 kNm    | $\psi$    | 1.000          | $M_s$      | 0.25 kNm    |
| $\psi$     | -0.540      | Belasting | Geconcentreerd | $\psi$     | -0.540      |
| $\alpha_s$ | 0.257       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.257       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.405       |           |                | $C_{mLT}$  | 0.405       |

### Interactiefactoren (Tabel B.1)

|          |       |          |       |
|----------|-------|----------|-------|
| $k_{yy}$ | 0.412 | $k_{yz}$ | 0.610 |
| $k_{zy}$ | 0.247 | $k_{zz}$ | 1.016 |

|                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|
| Maatgevend veld | 0.000 - 1.465 m | Maatgevend veld | 0.000 - 1.465 m |
|-----------------|-----------------|-----------------|-----------------|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |                   |                 |                  |                   |                 |
|------------------|-------------------|-----------------|------------------|-------------------|-----------------|
| Normaalkracht    | $N_{y,Ed}$        | -24.91 kN       | Normaalkracht    | $N_{z,Ed}$        | -24.91 kN       |
| Lengte           | $L_{y,cr}$        | 1.465 m         | Lengte           | $L_{z,cr}$        | 1.465 m         |
| Reductiefactor   | (6.49) $\chi_y$   | 0.953           | Reductiefactor   | (6.49) $\chi_z$   | 0.953           |
| Ontwerpweerstand | $N_{Rk}$          | 325.73 kN       |                  |                   |                 |
| Maatgevend veld  |                   | 0.000 - 1.465 m | Maatgevend veld  |                   | 0.000 - 1.465 m |
| Buigmoment       | $M_{y,Ed}$        | 0.96 kNm        | Buigmoment       | $M_{z,Ed}$        | 0.00 kNm        |
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm        | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm        |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm       | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm       |
| Reductiefactor   | $\chi_{LT}$       | 1.000           |                  |                   |                 |

NEN-EN1993-1-1(6.61): UC = 0.11

NEN-EN1993-1-1(6.62): UC = 0.10

## DOORSNEDE (#6.2)

Staaf C51-V1 (0.000-1.159)

|                        |            |           |                  |                   |           |
|------------------------|------------|-----------|------------------|-------------------|-----------|
| Maatgevende combinatie |            | Fu.C.41   | Doorsnedeklasse  |                   | 1         |
| Maatgevende positie    |            | 0.000 m   |                  |                   |           |
| Normaalkracht          | $N_{Ed}$   | 0.61 kN   | Ontwerpweerstand | (6.6) $N_{Rd}$    | 400.74 kN |
| Buigmoment             | $M_{y,Ed}$ | -1.12 kNm | Ontwerpweerstand | (6.13) $M_{y,Rd}$ | 17.31 kNm |
| Buigmoment             | $M_{z,Ed}$ | 0.00 kNm  | Ontwerpweerstand | (6.13) $M_{z,Rd}$ | 17.31 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 0.00 kN   | Ontwerpweerstand | (6.18) $V_{y,Rd}$ | 147.29 kN |
| Dwarskracht            | $V_{z,Ed}$ | 1.19 kN   | Ontwerpweerstand | (6.18) $V_{z,Rd}$ | 147.29 kN |

## Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.8 % | Verhouding         | 0.0 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

## Buig- en normaalkracht #6.2.9

|                    |               |           |                    |     |
|--------------------|---------------|-----------|--------------------|-----|
| Is reductie nodig? |               | Ja        | Is reductie nodig? | Nee |
|                    | $n$           | 0.002     |                    |     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 17.31 kNm |                    |     |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 17.31 kNm |                    |     |

## Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.00  
NEN-EN1993-1-1(6.12): UC (y) = 0.06  
NEN-EN1993-1-1(6.12): UC (z) = 0.00  
NEN-EN1993-1-1(6.17): UC (y) = 0.00  
NEN-EN1993-1-1(6.17): UC (z) = 0.01  
NEN-EN1993-1-1(6.31): UC (y) = 0.06  
NEN-EN1993-1-1(NB.33): UC = 0.06

## KNIK (#6.3.1)

Staaf C51-V1 (0.000-1.159)

|                             |                      |                 |                             |                      |                 |
|-----------------------------|----------------------|-----------------|-----------------------------|----------------------|-----------------|
| Profiel                     |                      | N139.7/4        | Doorsnedeklasse             |                      | 1               |
| Maatgevende combinatie      |                      | Fu.C.22         |                             |                      |                 |
| Maatgevend veld             |                      | 0.000 - 1.159 m | Maatgevend veld             |                      | 0.000 - 1.159 m |
| Normaalkracht               | $N_{Ed,y}$           | -0.00 kN        | Normaalkracht               | $N_{Ed,z}$           | -0.00 kN        |
| Lengte                      | $L_{cr,y}$           | 1.159 m         | Lengte                      | $L_{cr,z}$           | 1.159 m         |
| Elastische kritische kracht | $N_{cr,y}$           | 6056.58 kN      | Elastische kritische kracht | $N_{cr,z}$           | 6056.58 kN      |
| Slankheid                   | $\lambda_y$          | 0.257           | Slankheid                   | $\lambda_z$          | 0.257           |
| Knikcurve                   | Tabel 6.2            | a               | Knikcurve                   | Tabel 6.2            | a               |
| Imperfectiefactor           | Tabel 6.1 $\alpha_y$ | 0.210           | Imperfectiefactor           | Tabel 6.1 $\alpha_z$ | 0.210           |
|                             | $\Phi_y$             | 0.539           |                             | $\Phi_z$             | 0.539           |
| Reductiefactor              | (6.49) $\chi_y$      | 0.987           | Reductiefactor              | (6.49) $\chi_z$      | 0.987           |
| Ontwerpweerstand            | (6.47) $N_{b,Rd,y}$  | 395.65 kN       | Ontwerpweerstand            | (6.47) $N_{b,Rd,z}$  | 395.65 kN       |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.46): UC = 0.00

### KIP (#6.3.2)

Staaf C51-V1 (0.000-1.159)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalente profiel    | N139.7/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

### Maatgevend veld

|                   |         |                |       |          |
|-------------------|---------|----------------|-------|----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$ | 0.14 kNm |
| Veld einde        | 1.159 m | Moment (eind)  | $M_y$ | 0.00 kNm |
| Lengte            | L       | Moment (max)   | $M_y$ | 0.14 kNm |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$ | 0.00 kNm |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                |                    |                |               |
|----------------|--------------------|----------------|---------------|
| Tabel gebruikt | NB.NB.1 (1)        | $\beta$        | 0.00          |
| Lengte         | $L_{st}$           | $\beta$        | 0.000         |
| Lengte         | $L_{kip}$          | (NB.NB.12) S   | 0.000 m       |
| Coefficient    | $C_1$              | Coefficient    | $C_2$ (Tabel) |
| Coefficient    | $C_2$ (Berekend)   | Lengte         | $L_g$         |
| Coefficient    | (NB.NB.11) C       | Reductiefactor | $K_{red}$     |
|                | (NB.NB.6) $M_{cr}$ |                | 0.000         |

|                  |        |              |           |
|------------------|--------|--------------|-----------|
| Ontwerpweerstand | (6.55) | $M_{b,Rd,y}$ | 17.31 kNm |
| Ontwerpweerstand | (6.55) | $M_{b,Rd,z}$ | 17.31 kNm |

### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C51-V1 (0.000-1.159)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N139.7/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.22  |                 |   |

### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -0.62 kNm   | M         | 0.00 kNm       | M          | -0.62 kNm   |
| $\psi M$   | -0.00 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.00 kNm   |
| $M_s$      | -0.24 kNm   | $\psi$    | 1.000          | $M_s$      | -0.24 kNm   |
| $\psi$     | 0.000       | Belasting | Geconcentreerd | $\psi$     | 0.000       |
| $\alpha_s$ | 0.388       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.388       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.511       |           |                | $C_{mLT}$  | 0.511       |

### Interactiefactoren (Tabel B.1)

|                  |                 |                 |                 |                 |                 |
|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                  | $k_{yy}$        | 0.511           |                 | $k_{yz}$        | 0.600           |
|                  | $k_{zy}$        | 0.306           |                 | $k_{zz}$        | 1.000           |
| Maatgevend veld  |                 | 0.000 - 1.159 m | Maatgevend veld |                 | 0.000 - 1.159 m |
| Normaalkracht    | $N_{y,Ed}$      | -0.00 kN        | Normaalkracht   | $N_{z,Ed}$      | -0.00 kN        |
| Lengte           | $L_{y,cr}$      | 1.159 m         | Lengte          | $L_{z,cr}$      | 1.159 m         |
| Reductiefactor   | (6.49) $\chi_y$ | 0.987           | Reductiefactor  | (6.49) $\chi_z$ | 0.987           |
| Ontwerpweerstand | $N_{Rk}$        | 400.74 kN       |                 |                 |                 |
| Maatgevend veld  |                 | 0.000 - 1.159 m | Maatgevend veld |                 | 0.000 - 1.159 m |
| Buigmoment       | $M_{y,Ed}$      | 0.62 kNm        | Buigmoment      | $M_{z,Ed}$      | 0.00 kNm        |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |                   |           |                  |                   |           |
|------------------|-------------------|-----------|------------------|-------------------|-----------|
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm  | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm  |
| Ontwerpweerstand | $M_{y,Rk}$        | 17.31 kNm | Ontwerpweerstand | $M_{z,Rk}$        | 17.31 kNm |
| Reductiefactor   | XLT               | 1.000     |                  |                   |           |

NEN-EN1993-1-1(6.61): UC = 0.02

NEN-EN1993-1-1(6.62): UC = 0.01

## DOORSNEDE (#6.2)

Staal C52-V1 (0.000-1.457)

|                        |            |          |                  |        |                      |
|------------------------|------------|----------|------------------|--------|----------------------|
| Maatgevende combinatie |            | Fu.C.41  | Doorsnedeklasse  |        | 1                    |
| Maatgevende positie    |            | 1.457 m  |                  |        |                      |
| Normaalkracht          | $N_{Ed}$   | 22.83 kN | Ontwerpweerstand | (6.6)  | $N_{Rd}$ 325.73 kN   |
| Buigmoment             | $M_{y,Ed}$ | 0.81 kNm | Ontwerpweerstand | (6.13) | $M_{y,Rd}$ 11.44 kNm |
| Buigmoment             | $M_{z,Ed}$ | 9.00 kNm | Ontwerpweerstand | (6.13) | $M_{z,Rd}$ 11.44 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 5.00 kN  | Ontwerpweerstand | (6.18) | $V_{y,Rd}$ 119.72 kN |
| Dwarskracht            | $V_{z,Ed}$ | 0.79 kN  | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ 119.72 kN |

## Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.7 % | Verhouding         | 4.2 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

## Buig- en normaalkracht #6.2.9

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    | n             | 0.070     |                    | n             | 0.070     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 11.44 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 11.44 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 11.44 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 11.44 kNm |

## Dubbele buiging #6.2.10 (7)

|                          |                |           |                          |                |           |
|--------------------------|----------------|-----------|--------------------------|----------------|-----------|
|                          | $\alpha_1$     | 2.000     |                          | $\alpha_2$     | 2.000     |
|                          | $\beta_0$      | 1.000     |                          | $\beta_1$      | 1.000     |
| Ontwerpweerstand (NB.58) | $M_{y,N,V,Rd}$ | 11.77 kNm | Ontwerpweerstand (NB.59) | $M_{z,N,V,Rd}$ | 11.77 kNm |

## Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.07

NEN-EN1993-1-1(6.12): UC (y) = 0.07

NEN-EN1993-1-1(6.12): UC (z) = 0.79

NEN-EN1993-1-1(6.17): UC (y) = 0.04

NEN-EN1993-1-1(6.17): UC (z) = 0.01

NEN-EN1993-1-1(6.31): UC (y) = 0.07

NEN-EN1993-1-1(6.31): UC (z) = 0.79

NEN-EN1993-1-1(NB.33): UC = 0.79

NEN-EN1993-1-1(NB.52): UC = 0.59

## KNIK (#6.3.1)

Staal C52-V1 (0.000-1.457)

|                             |             |                        |                             |             |                        |
|-----------------------------|-------------|------------------------|-----------------------------|-------------|------------------------|
| Profiel                     |             | N114.3/4               | Doorsnedeklasse             |             | 1                      |
| Maatgevende combinatie      |             | Fu.C.57                |                             |             |                        |
| Maatgevend veld             |             | 0.000 - 1.457 m        | Maatgevend veld             |             | 0.000 - 1.457 m        |
| Normaalkracht               | $N_{Ed,y}$  | -1.01 kN               | Normaalkracht               | $N_{Ed,z}$  | -1.01 kN               |
| Lengte                      | $L_{cr,y}$  | 1.457 m                | Lengte                      | $L_{cr,z}$  | 1.457 m                |
| Elastische kritische kracht | $N_{cr,y}$  | 2060.03 kN             | Elastische kritische kracht | $N_{cr,z}$  | 2060.03 kN             |
| Slankheid                   | $\lambda_y$ | 0.398                  | Slankheid                   | $\lambda_z$ | 0.398                  |
| Knikcurve                   | Tabel 6.2   | a                      | Knikcurve                   | Tabel 6.2   | a                      |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$ 0.210       | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$ 0.210       |
|                             |             | $\Phi_y$ 0.600         |                             |             | $\Phi_z$ 0.600         |
| Reductiefactor              | (6.49)      | $\chi_y$ 0.953         | Reductiefactor              | (6.49)      | $\chi_z$ 0.953         |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$ 310.55 kN | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$ 310.55 kN |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.46): UC = 0.00

### KIP (#6.3.2)

Staaf C52-V1 (0.000-1.457)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalente profiel    | N114.3/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

### Maatgevend veld

|                   |         |                |       |           |
|-------------------|---------|----------------|-------|-----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$ | -0.05 kNm |
| Veld einde        | 1.457 m | Moment (eind)  | $M_y$ | 0.06 kNm  |
| Lengte            | L       | Moment (max)   | $M_y$ | 0.06 kNm  |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |            |                  |           |                |               |         |
|------------------|------------|------------------|-----------|----------------|---------------|---------|
| Tabel gebruikt   |            | NB.NB.1 (1)      |           | $\beta$        | -0.87         |         |
| Lengte           |            | $L_{st}$         | 1.457 m   | $\beta$        | -0.871        |         |
| Lengte           |            | $L_{kip}$        | 1.457 m   | (NB.NB.12) S   | 0.000 m       |         |
| Coefficient      |            | $C_1$            | 2.300     | Coefficient    | $C_2$ (Tabel) | 0.000   |
| Coefficient      |            | $C_2$ (Berekend) | 0.000     | Lengte         | $L_g$         | 1.457 m |
| Coefficient      | (NB.NB.11) | C                | 7.226     | Reductiefactor | $K_{red}$     | 0.000   |
|                  | (NB.NB.6)  | $M_{Cr}$         | 0.00 kNm  |                |               |         |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,y}$     | 11.44 kNm |                |               |         |
| Ontwerpweerstand | (6.55)     | $M_{b,Rd,z}$     | 11.44 kNm |                |               |         |

### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C52-V1 (0.000-1.457)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N114.3/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.57  |                 |   |

### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | -0.10 kNm   | M         | 0.00 kNm       | M          | -0.10 kNm   |
| $\psi M$   | 0.05 kNm    | $\psi M$  | 0.00 kNm       | $\psi M$   | 0.05 kNm    |
| $M_s$      | -0.00 kNm   | $\psi$    | 1.000          | $M_s$      | -0.00 kNm   |
| $\psi$     | -0.552      | Belasting | Geconcentreerd | $\psi$     | -0.552      |
| $\alpha_s$ | 0.032       | $C_{mz}$  | 1.000          | $\alpha_s$ | 0.032       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.400       |           |                | $C_{mLT}$  | 0.400       |

### Interactiefactoren (Tabel B.1)

|                  |                 |                 |                 |                 |                 |
|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                  | $k_{yy}$        | 0.400           |                 | $k_{yz}$        | 0.600           |
|                  | $k_{zy}$        | 0.240           |                 | $k_{zz}$        | 1.001           |
| Maatgevend veld  |                 | 0.000 - 1.457 m | Maatgevend veld |                 | 0.000 - 1.457 m |
| Normaalkracht    | $N_{y,Ed}$      | -1.01 kN        | Normaalkracht   | $N_{z,Ed}$      | -1.01 kN        |
| Lengte           | $L_{y,cr}$      | 1.457 m         | Lengte          | $L_{z,cr}$      | 1.457 m         |
| Reductiefactor   | (6.49) $\chi_y$ | 0.953           | Reductiefactor  | (6.49) $\chi_z$ | 0.953           |
| Ontwerpweerstand | $N_{Rk}$        | 325.73 kN       |                 |                 |                 |
| Maatgevend veld  |                 | 0.000 - 1.457 m | Maatgevend veld |                 | 0.000 - 1.457 m |
| Buigmoment       | $M_{y,Ed}$      | 0.10 kNm        | Buigmoment      | $M_{z,Ed}$      | 0.00 kNm        |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |                   |           |                  |                   |           |
|------------------|-------------------|-----------|------------------|-------------------|-----------|
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm  | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm  |
| Ontwerpweerstand | $M_{y,Rk}$        | 11.44 kNm | Ontwerpweerstand | $M_{z,Rk}$        | 11.44 kNm |
| Reductiefactor   | XLT               | 1.000     |                  |                   |           |

NEN-EN1993-1-1(6.61): UC = 0.01

NEN-EN1993-1-1(6.62): UC = 0.01

## DOORSNEDE (#6.2)

Staal C53-V1 (0.000-1.601)

|                        |            |          |                  |        |                      |
|------------------------|------------|----------|------------------|--------|----------------------|
| Maatgevende combinatie |            | Fu.C.35  | Doorsnedeklasse  |        | 1                    |
| Maatgevende positie    |            | 0.000 m  |                  |        |                      |
| Normaalkracht          | $N_{Ed}$   | 0.54 kN  | Ontwerpweerstand | (6.6)  | $N_{Rd}$ 400.74 kN   |
| Buigmoment             | $M_{y,Ed}$ | 0.08 kNm | Ontwerpweerstand | (6.13) | $M_{y,Rd}$ 17.31 kNm |
| Buigmoment             | $M_{z,Ed}$ | 7.00 kNm | Ontwerpweerstand | (6.13) | $M_{z,Rd}$ 17.31 kNm |
| Dwarskracht            | $V_{y,Ed}$ | 4.00 kN  | Ontwerpweerstand | (6.18) | $V_{y,Rd}$ 147.29 kN |
| Dwarskracht            | $V_{z,Ed}$ | 0.07 kN  | Ontwerpweerstand | (6.18) | $V_{z,Rd}$ 147.29 kN |

### Buiging en schuif #6.2.8

|                    |       |                    |       |
|--------------------|-------|--------------------|-------|
| Verhouding         | 0.0 % | Verhouding         | 2.7 % |
| Is reductie nodig? | Nee   | Is reductie nodig? | Nee   |

### Buig- en normaalkracht #6.2.9

|                    |               |           |                    |               |           |
|--------------------|---------------|-----------|--------------------|---------------|-----------|
| Is reductie nodig? |               | Ja        | Is reductie nodig? |               | Ja        |
|                    | n             | 0.001     |                    | n             | 0.001     |
| Ontwerpweerstand   | $M_{pl,y,Rd}$ | 17.31 kNm | Ontwerpweerstand   | $M_{pl,z,Rd}$ | 17.31 kNm |
| Ontwerpweerstand   | $M_{N,y,Rd}$  | 17.31 kNm | Ontwerpweerstand   | $M_{N,z,Rd}$  | 17.31 kNm |

### Dubbele buiging #6.2.10 (7)

|                  |                        |           |                  |                        |           |
|------------------|------------------------|-----------|------------------|------------------------|-----------|
|                  | $\alpha_1$             | 2.000     |                  | $\alpha_2$             | 2.000     |
|                  | $\beta_0$              | 1.000     |                  | $\beta_1$              | 1.000     |
| Ontwerpweerstand | (NB.58) $M_{y,N,V,Rd}$ | 18.01 kNm | Ontwerpweerstand | (NB.59) $M_{z,N,V,Rd}$ | 18.01 kNm |

### Uitgevoerde controles

NEN-EN1993-1-1(6.5): UC = 0.00

NEN-EN1993-1-1(6.12): UC (y) = 0.00

NEN-EN1993-1-1(6.12): UC (z) = 0.40

NEN-EN1993-1-1(6.17): UC (y) = 0.03

NEN-EN1993-1-1(6.17): UC (z) = 0.00

NEN-EN1993-1-1(6.31): UC (y) = 0.00

NEN-EN1993-1-1(6.31): UC (z) = 0.40

NEN-EN1993-1-1(NB.33): UC = 0.40

NEN-EN1993-1-1(NB.52): UC = 0.15

## KNIK (#6.3.1)

Staal C53-V1 (0.000-1.601)

|                             |             |                        |                             |             |                        |
|-----------------------------|-------------|------------------------|-----------------------------|-------------|------------------------|
| Profiel                     |             | N139.7/4               | Doorsnedeklasse             |             | 1                      |
| Maatgevende combinatie      |             | Fu.C.21                |                             |             |                        |
| Maatgevend veld             |             | 0.000 - 1.601 m        | Maatgevend veld             |             | 0.000 - 1.601 m        |
| Normaalkracht               | $N_{Ed,y}$  | -0.12 kN               | Normaalkracht               | $N_{Ed,z}$  | -0.12 kN               |
| Lengte                      | $L_{cr,y}$  | 1.601 m                | Lengte                      | $L_{cr,z}$  | 1.601 m                |
| Elastische kritische kracht | $N_{cr,y}$  | 3176.18 kN             | Elastische kritische kracht | $N_{cr,z}$  | 3176.18 kN             |
| Slankheid                   | $\lambda_y$ | 0.355                  | Slankheid                   | $\lambda_z$ | 0.355                  |
| Knikcurve                   | Tabel 6.2   | a                      | Knikcurve                   | Tabel 6.2   | a                      |
| Imperfectiefactor           | Tabel 6.1   | $\alpha_y$ 0.210       | Imperfectiefactor           | Tabel 6.1   | $\alpha_z$ 0.210       |
|                             |             | $\Phi_y$ 0.579         |                             |             | $\Phi_z$ 0.579         |
| Reductiefactor              | (6.49)      | $\chi_y$ 0.964         | Reductiefactor              | (6.49)      | $\chi_z$ 0.964         |
| Ontwerpweerstand            | (6.47)      | $N_{b,Rd,y}$ 386.40 kN | Ontwerpweerstand            | (6.47)      | $N_{b,Rd,z}$ 386.40 kN |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.46): UC = 0.00

### KIP (#6.3.2)

Staaf C53-V1 (0.000-1.601)

|                        |          |                                             |         |
|------------------------|----------|---------------------------------------------|---------|
| Equivalente profiel    | N139.7/4 | Doorsnedeklasse                             | 1       |
| Maatgevende combinatie | Bi.C.1   | Aangrijphoogte van de last vanaf het midden | 0.000 m |
| Kipsteunen             | Geen     |                                             |         |

### Maatgevend veld

|                   |         |                |       |           |
|-------------------|---------|----------------|-------|-----------|
| Veld begin        | 0.000 m | Moment (begin) | $M_y$ | 0.02 kNm  |
| Veld einde        | 1.601 m | Moment (eind)  | $M_y$ | -0.00 kNm |
| Lengte            | L       | Moment (max)   | $M_y$ | 0.02 kNm  |
| Maatgevende flens | Boven   | Moment (max)   | $M_z$ | 0.00 kNm  |

### Elastisch kritiek moment voor kip (NEN-EN 1993-1-1+C2+A1:2016 NB.NB.4)

|                  |                            |       |                |                        |         |
|------------------|----------------------------|-------|----------------|------------------------|---------|
| Tabel gebruikt   |                            |       | NB.NB.1 (1)    | $\beta$                | -0.00   |
| Lengte           | L <sub>st</sub>            | 1.601 | m              | $\beta$                | -0.000  |
| Lengte           | L <sub>kip</sub>           | 1.601 | m              | (NB.NB.12) S           | 0.000 m |
| Coefficient      | C <sub>1</sub>             | 1.750 | Coefficient    | C <sub>2</sub> (Tabel) | 0.000   |
| Coefficient      | C <sub>2</sub> (Berekend)  | 0.000 | Lengte         | L <sub>g</sub>         | 1.601 m |
| Coefficient      | (NB.NB.11) C               | 5.498 | Reductiefactor | K <sub>red</sub>       | 0.000   |
|                  | (NB.NB.6) M <sub>cr</sub>  | 0.00  | kNm            |                        |         |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,y</sub> | 17.31 | kNm            |                        |         |
| Ontwerpweerstand | (6.55) M <sub>b,Rd,z</sub> | 17.31 | kNm            |                        |         |

### Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

NEN-EN1993-1-1(6.54): UC = 0.00

### BUIGING EN AXIALE DRUK (#6.3.3)

Staaf C53-V1 (0.000-1.601)

|                        |          |                 |   |
|------------------------|----------|-----------------|---|
| Profiel                | N139.7/4 | Doorsnedeklasse | 1 |
| Maatgevende combinatie | Fu.C.21  |                 |   |

### Equivalente gelijkmatige momentfactoren (Tabel B.3)

| $C_{my}$   |             | $C_{mz}$  |                | $C_{mLT}$  |             |
|------------|-------------|-----------|----------------|------------|-------------|
| M          | 0.04 kNm    | M         | 0.00 kNm       | M          | 0.04 kNm    |
| $\psi M$   | -0.00 kNm   | $\psi M$  | 0.00 kNm       | $\psi M$   | -0.00 kNm   |
| $M_s$      | 0.07 kNm    | $\psi$    | 1.000          | $M_s$      | 0.07 kNm    |
| $\psi$     | -0.000      | Belasting | Geconcentreerd | $\psi$     | -0.000      |
| $\alpha_h$ | 0.539       | $C_{mz}$  | 1.000          | $\alpha_h$ | 0.539       |
| Belasting  | Gelijkmatig |           |                | Belasting  | Gelijkmatig |
| $C_{my}$   | 0.977       |           |                | $C_{mLT}$  | 0.977       |

### Interactiefactoren (Tabel B.1)

|                  |                 |                 |                 |                 |                 |
|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                  | $k_{yy}$        | 0.977           |                 | $k_{yz}$        | 0.600           |
|                  | $k_{zy}$        | 0.586           |                 | $k_{zz}$        | 1.000           |
| Maatgevend veld  |                 | 0.000 - 1.601 m | Maatgevend veld |                 | 0.000 - 1.601 m |
| Normaalkracht    | $N_{y,Ed}$      | -0.12 kN        | Normaalkracht   | $N_{z,Ed}$      | -0.12 kN        |
| Lengte           | $L_{y,cr}$      | 1.601 m         | Lengte          | $L_{z,cr}$      | 1.601 m         |
| Reductiefactor   | (6.49) $\chi_y$ | 0.964           | Reductiefactor  | (6.49) $\chi_z$ | 0.964           |
| Ontwerpweerstand | $N_{Rk}$        | 400.74 kN       |                 |                 |                 |
| Maatgevend veld  |                 | 0.000 - 1.601 m | Maatgevend veld |                 | 0.000 - 1.601 m |
| Buigmoment       | $M_{y,Ed}$      | 0.07 kNm        | Buigmoment      | $M_{z,Ed}$      | 0.00 kNm        |

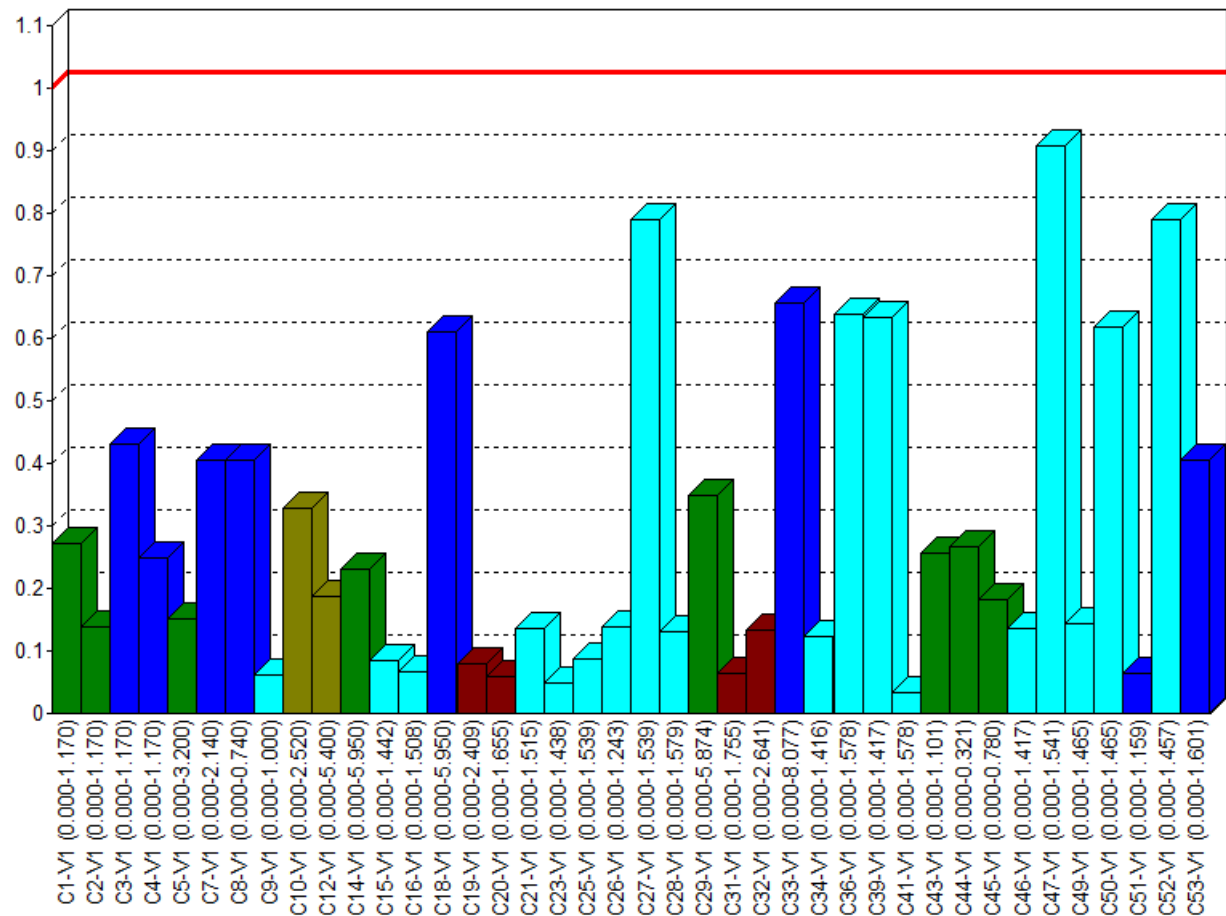
|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                  |                   |           |                  |                   |           |
|------------------|-------------------|-----------|------------------|-------------------|-----------|
| Buigmoment       | $\Delta M_{y,Ed}$ | 0.00 kNm  | Buigmoment       | $\Delta M_{z,Ed}$ | 0.00 kNm  |
| Ontwerpweerstand | $M_{y,Rk}$        | 17.31 kNm | Ontwerpweerstand | $M_{z,Rk}$        | 17.31 kNm |
| Reductiefactor   | XLT               | 1.000     |                  |                   |           |

NEN-EN1993-1-1(6.61): UC = 0.00

NEN-EN1993-1-1(6.62): UC = 0.00

Afb. Staal UC Diagram



## EXTREME UNITY CHECK

| Label                | Toetsing       | Combinatie | Artikel                   | Unity Check |
|----------------------|----------------|------------|---------------------------|-------------|
| C1-V1 (0.000-1.170)  | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.27        |
| C10-V1 (0.000-2.520) | Buiging & Druk | Fu.C.45    | NEN-EN1993-1-1(6.61&6.62) | 0.33        |
| C12-V1 (0.000-5.400) | Buiging & Druk | Fu.C.42    | NEN-EN1993-1-1(6.61&6.62) | 0.19        |
| C14-V1 (0.000-5.950) | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.23        |
| C15-V1 (0.000-1.442) | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(6.5)       | 0.09        |
| C16-V1 (0.000-1.508) | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.07        |
| C18-V1 (0.000-5.950) | Buiging & Druk | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.61        |
| C19-V1 (0.000-2.409) | Buiging & Druk | Fu.C.39    | NEN-EN1993-1-1(6.61&6.62) | 0.08        |
| C2-V1 (0.000-1.170)  | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.14        |
| C20-V1 (0.000-1.655) | Buiging & Druk | Fu.C.40    | NEN-EN1993-1-1(6.61&6.62) | 0.06        |
| C21-V1 (0.000-1.515) | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.14        |
| C23-V1 (0.000-1.438) | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.05        |
| C25-V1 (0.000-1.539) | Doorsnede      | Fu.C.42    | NEN-EN1993-1-1(6.5)       | 0.09        |
| C26-V1 (0.000-1.243) | Doorsnede      | Fu.C.42    | NEN-EN1993-1-1(NB.33)     | 0.14        |
| C27-V1 (0.000-1.539) | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.79        |
| C28-V1 (0.000-1.579) | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(6.5)       | 0.13        |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Label                | Toetsing       | Combinatie | Artikel                   | Unity Check |
|----------------------|----------------|------------|---------------------------|-------------|
| C29-V1 (0.000-5.874) | Buiging & Druk | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.35        |
| C3-V1 (0.000-1.170)  | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.43        |
| C31-V1 (0.000-1.755) | Buiging & Druk | Fu.C.43    | NEN-EN1993-1-1(6.61&6.62) | 0.06        |
| C32-V1 (0.000-2.641) | Buiging & Druk | Fu.C.43    | NEN-EN1993-1-1(6.61&6.62) | 0.13        |
| C33-V1 (0.000-8.077) | Buiging & Druk | Fu.C.57    | NEN-EN1993-1-1(6.61&6.62) | 0.66        |
| C34-V1 (0.000-1.416) | Buiging & Druk | Fu.C.36    | NEN-EN1993-1-1(6.61&6.62) | 0.12        |
| C36-V1 (0.000-1.578) | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.64        |
| C39-V1 (0.000-1.417) | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.63        |
| C4-V1 (0.000-1.170)  | Doorsnede      | Fu.C.42    | NEN-EN1993-1-1(NB.33)     | 0.25        |
| C41-V1 (0.000-1.578) | Doorsnede      | Fu.C.34    | NEN-EN1993-1-1(6.5)       | 0.03        |
| C43-V1 (0.000-1.101) | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.26        |
| C44-V1 (0.000-0.321) | Buiging & Druk | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.27        |
| C45-V1 (0.000-0.780) | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.18        |
| C46-V1 (0.000-1.417) | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.13        |
| C47-V1 (0.000-1.541) | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.91        |
| C49-V1 (0.000-1.465) | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(6.5)       | 0.14        |
| C5-V1 (0.000-3.200)  | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.15        |
| C50-V1 (0.000-1.465) | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.62        |
| C51-V1 (0.000-1.159) | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.06        |
| C52-V1 (0.000-1.457) | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.79        |
| C53-V1 (0.000-1.601) | Doorsnede      | Fu.C.35    | NEN-EN1993-1-1(NB.33)     | 0.40        |
| C7-V1 (0.000-2.140)  | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.41        |
| C8-V1 (0.000-0.740)  | Doorsnede      | Fu.C.62    | NEN-EN1993-1-1(NB.33)     | 0.40        |
| C9-V1 (0.000-1.000)  | Buiging & Druk | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.06        |

#### EXTREME UC'S PER CONSTRUCTIEDEEL

| Label | Toetsing       | Combinatie | Artikel                   | Unity Check |
|-------|----------------|------------|---------------------------|-------------|
| C1    | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.27        |
| C10   | Buiging & Druk | Fu.C.45    | NEN-EN1993-1-1(6.61&6.62) | 0.33        |
| C12   | Buiging & Druk | Fu.C.42    | NEN-EN1993-1-1(6.61&6.62) | 0.19        |
| C14   | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.23        |
| C15   | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(6.5)       | 0.09        |
| C16   | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.07        |
| C18   | Buiging & Druk | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.61        |
| C19   | Buiging & Druk | Fu.C.39    | NEN-EN1993-1-1(6.61&6.62) | 0.08        |
| C2    | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.14        |
| C20   | Buiging & Druk | Fu.C.40    | NEN-EN1993-1-1(6.61&6.62) | 0.06        |
| C21   | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.14        |
| C23   | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.05        |
| C25   | Doorsnede      | Fu.C.42    | NEN-EN1993-1-1(6.5)       | 0.09        |
| C26   | Doorsnede      | Fu.C.42    | NEN-EN1993-1-1(NB.33)     | 0.14        |
| C27   | Doorsnede      | Fu.C.39    | NEN-EN1993-1-1(NB.33)     | 0.79        |
| C28   | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(6.5)       | 0.13        |
| C29   | Buiging & Druk | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.35        |
| C3    | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.43        |
| C31   | Buiging & Druk | Fu.C.43    | NEN-EN1993-1-1(6.61&6.62) | 0.06        |
| C32   | Buiging & Druk | Fu.C.43    | NEN-EN1993-1-1(6.61&6.62) | 0.13        |
| C33   | Buiging & Druk | Fu.C.57    | NEN-EN1993-1-1(6.61&6.62) | 0.66        |
| C34   | Buiging & Druk | Fu.C.36    | NEN-EN1993-1-1(6.61&6.62) | 0.12        |
| C36   | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.64        |
| C39   | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.63        |
| C4    | Doorsnede      | Fu.C.42    | NEN-EN1993-1-1(NB.33)     | 0.25        |
| C41   | Doorsnede      | Fu.C.34    | NEN-EN1993-1-1(6.5)       | 0.03        |
| C43   | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.26        |
| C44   | Buiging & Druk | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.27        |
| C45   | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.18        |
| C46   | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.13        |
| C47   | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.91        |
| C49   | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(6.5)       | 0.14        |
| C5    | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.15        |
| C50   | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.62        |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

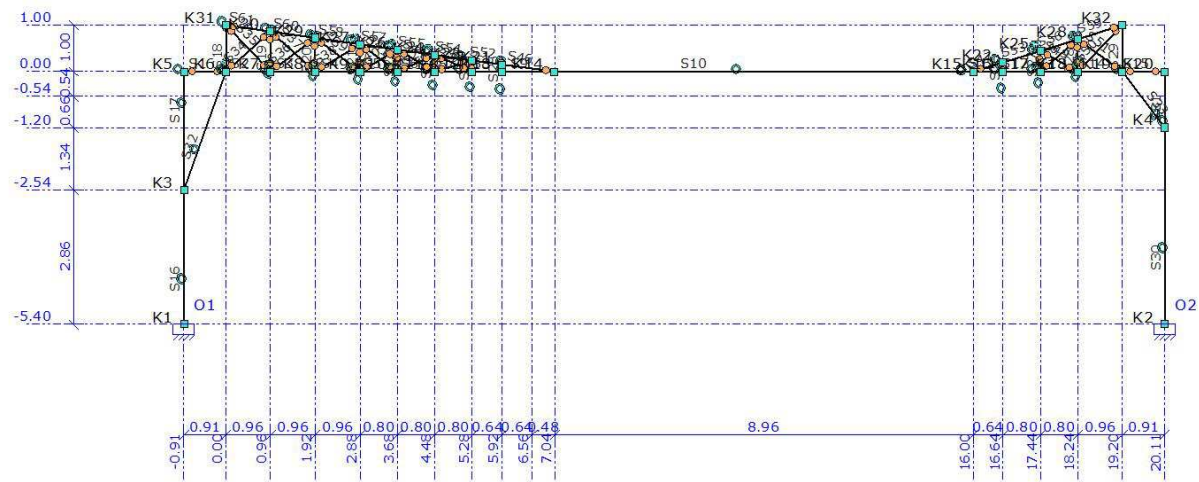
| Label | Toetsing       | Combinatie | Artikel                   | Unity Check |
|-------|----------------|------------|---------------------------|-------------|
| C51   | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.06        |
| C52   | Doorsnede      | Fu.C.41    | NEN-EN1993-1-1(NB.33)     | 0.79        |
| C53   | Doorsnede      | Fu.C.35    | NEN-EN1993-1-1(NB.33)     | 0.40        |
| C7    | Doorsnede      | Fu.C.43    | NEN-EN1993-1-1(NB.33)     | 0.41        |
| C8    | Doorsnede      | Fu.C.62    | NEN-EN1993-1-1(NB.33)     | 0.40        |
| C9    | Buiging & Druk | Fu.C.41    | NEN-EN1993-1-1(6.61&6.62) | 0.06        |

|               |                                                                            |               |            |
|---------------|----------------------------------------------------------------------------|---------------|------------|
| Projectnaam   | Zwaluw uitkijkpunt                                                         | Projectnummer | 520147     |
| Omschrijving  | Vleugel uitkragend                                                         | Constructeur  | DaKr       |
| Opdrachtgever | Wilwy                                                                      | Eenheden      | m, kN, kNm |
| Bestand       | P:\520147\1 - Constructeur\003-A - UPD\520147-A-0 - Vleugel uitkragend.mxf |               |            |

## CONSTRUCTIEGEGEVENS

| Projecttype | Knopen | Staven | Opleggingsen | Profielen | Bel.gev. | Bel.comb. |
|-------------|--------|--------|--------------|-----------|----------|-----------|
| 2D-Raamwerk | 32     | 61     | 2            | 6         | 4        | 10        |

### AFB. GEOMETRIE RAAMWERK



## STAVEN

| Staaf | Knoop B | Knoop E | X-B    | Z-B   | X-E    | Z-E    | Lengte Profiel | Positie          |
|-------|---------|---------|--------|-------|--------|--------|----------------|------------------|
| S1    | K5      | K6      | -0.905 | 0.000 | 0.000  | 0.000  | 0.905 P1       | 0.000 - L(0.905) |
| S2    | K6      | K7      | 0.000  | 0.000 | 0.960  | 0.000  | 0.960 P1       | 0.000 - L(0.960) |
| S3    | K7      | K8      | 0.960  | 0.000 | 1.920  | 0.000  | 0.960 P1       | 0.000 - L(0.960) |
| S4    | K8      | K9      | 1.920  | 0.000 | 2.880  | 0.000  | 0.960 P1       | 0.000 - L(0.960) |
| S5    | K9      | K10     | 2.880  | 0.000 | 3.680  | 0.000  | 0.800 P1       | 0.000 - L(0.800) |
| S6    | K10     | K11     | 3.680  | 0.000 | 4.480  | 0.000  | 0.800 P1       | 0.000 - L(0.800) |
| S7    | K11     | K12     | 4.480  | 0.000 | 5.280  | 0.000  | 0.800 P1       | 0.000 - L(0.800) |
| S8    | K12     | K13     | 5.280  | 0.000 | 5.920  | 0.000  | 0.640 P1       | 0.000 - L(0.640) |
| S9    | K13     | K14     | 5.920  | 0.000 | 7.040  | 0.000  | 1.120 P1       | 0.000 - L(1.120) |
| S10   | K14     | K15     | 7.040  | 0.000 | 16.000 | 0.000  | 8.960 P1       | 0.000 - L(8.960) |
| S11   | K15     | K16     | 16.000 | 0.000 | 16.640 | 0.000  | 0.640 P1       | 0.000 - L(0.640) |
| S12   | K16     | K17     | 16.640 | 0.000 | 17.440 | 0.000  | 0.800 P1       | 0.000 - L(0.800) |
| S13   | K17     | K18     | 17.440 | 0.000 | 18.240 | 0.000  | 0.800 P1       | 0.000 - L(0.800) |
| S14   | K18     | K19     | 18.240 | 0.000 | 19.200 | 0.000  | 0.960 P1       | 0.000 - L(0.960) |
| S15   | K19     | K20     | 19.200 | 0.000 | 20.105 | 0.000  | 0.905 P1       | 0.000 - L(0.905) |
| S16   | K1      | K3      | -0.905 | 5.400 | -0.905 | 2.540  | 2.860 P6       | 0.000 - L(2.860) |
| S17   | K5      | K3      | -0.905 | 0.000 | -0.905 | 2.540  | 2.540 P6       | 0.000 - L(2.540) |
| S18   | K6      | K31     | 0.000  | 0.000 | 0.000  | -1.000 | 1.000 P5       | 0.000 - L(1.000) |
| S19   | K7      | K30     | 0.960  | 0.000 | 0.960  | -0.864 | 0.864 P3       | 0.000 - L(0.864) |
| S20   | K8      | K29     | 1.920  | 0.000 | 1.920  | -0.727 | 0.727 P3       | 0.000 - L(0.727) |
| S21   | K9      | K27     | 2.880  | 0.000 | 2.880  | -0.591 | 0.591 P3       | 0.000 - L(0.591) |
| S22   | K10     | K26     | 3.680  | 0.000 | 3.680  | -0.477 | 0.477 P3       | 0.000 - L(0.477) |
| S23   | K11     | K24     | 4.480  | 0.000 | 4.480  | -0.364 | 0.364 P3       | 0.000 - L(0.364) |
| S24   | K12     | K23     | 5.280  | 0.000 | 5.280  | -0.250 | 0.250 P3       | 0.000 - L(0.250) |
| S25   | K13     | K21     | 5.920  | 0.000 | 5.920  | -0.159 | 0.159 P3       | 0.000 - L(0.159) |
| S26   | K16     | K22     | 16.640 | 0.000 | 16.640 | -0.200 | 0.200 P3       | 0.000 - L(0.200) |
| S27   | K17     | K25     | 17.440 | 0.000 | 17.440 | -0.450 | 0.450 P3       | 0.000 - L(0.450) |
| S28   | K18     | K28     | 18.240 | 0.000 | 18.240 | -0.700 | 0.700 P3       | 0.000 - L(0.700) |
| S29   | K19     | K32     | 19.200 | 0.000 | 19.200 | -1.000 | 1.000 P5       | 0.000 - L(1.000) |
| S30   | K2      | K4      | 20.105 | 5.400 | 20.105 | 1.200  | 4.200 P6       | 0.000 - L(4.200) |
| S31   | K4      | K20     | 20.105 | 1.200 | 20.105 | 0.000  | 1.200 P6       | 0.000 - L(1.200) |
| S32   | K3      | K6      | -0.905 | 2.540 | 0.000  | 0.000  | 2.696 P5       | 0.000 - L(2.696) |
| S33   | K4      | K19     | 20.105 | 1.200 | 19.200 | 0.000  | 1.503 P5       | 0.000 - L(1.503) |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Staaf | Knoop B | Knoop E | X-B    | Z-B    | X-E    | Z-E    | Lengte Profiel | Positie          |
|-------|---------|---------|--------|--------|--------|--------|----------------|------------------|
| S34   | K6      | K30     | 0.000  | 0.000  | 0.960  | -0.864 | 1.291 P4       | 0.000 - L(1.291) |
| S35   | K31     | K7      | 0.000  | -1.000 | 0.960  | 0.000  | 1.386 P4       | 0.000 - L(1.386) |
| S36   | K7      | K29     | 0.960  | 0.000  | 1.920  | -0.727 | 1.204 P4       | 0.000 - L(1.204) |
| S37   | K30     | K8      | 0.960  | -0.864 | 1.920  | 0.000  | 1.291 P4       | 0.000 - L(1.291) |
| S38   | K8      | K27     | 1.920  | 0.000  | 2.880  | -0.591 | 1.127 P4       | 0.000 - L(1.127) |
| S39   | K29     | K9      | 1.920  | -0.727 | 2.880  | 0.000  | 1.204 P4       | 0.000 - L(1.204) |
| S40   | K9      | K26     | 2.880  | 0.000  | 3.680  | -0.477 | 0.932 P4       | 0.000 - L(0.932) |
| S41   | K27     | K10     | 2.880  | -0.591 | 3.680  | 0.000  | 0.995 P4       | 0.000 - L(0.995) |
| S42   | K10     | K24     | 3.680  | 0.000  | 4.480  | -0.364 | 0.879 P4       | 0.000 - L(0.879) |
| S43   | K11     | K23     | 4.480  | 0.000  | 5.280  | -0.250 | 0.838 P4       | 0.000 - L(0.838) |
| S44   | K26     | K11     | 3.680  | -0.477 | 4.480  | 0.000  | 0.932 P4       | 0.000 - L(0.932) |
| S45   | K24     | K12     | 4.480  | -0.364 | 5.280  | 0.000  | 0.879 P4       | 0.000 - L(0.879) |
| S46   | K21     | K14     | 5.920  | -0.159 | 7.040  | 0.000  | 1.131 P2       | 0.000 - L(1.131) |
| S47   | K15     | K22     | 16.000 | 0.000  | 16.640 | -0.200 | 0.671 P2       | 0.000 - L(0.671) |
| S48   | K17     | K28     | 17.440 | 0.000  | 18.240 | -0.700 | 1.063 P4       | 0.000 - L(1.063) |
| S49   | K25     | K18     | 17.440 | -0.450 | 18.240 | 0.000  | 0.918 P4       | 0.000 - L(0.918) |
| S50   | K18     | K32     | 18.240 | 0.000  | 19.200 | -1.000 | 1.386 P4       | 0.000 - L(1.386) |
| S51   | K28     | K19     | 18.240 | -0.700 | 19.200 | 0.000  | 1.188 P4       | 0.000 - L(1.188) |
| S52   | K23     | K21     | 5.280  | -0.250 | 5.920  | -0.159 | 0.646 P2       | 0.000 - L(0.646) |
| S53   | K22     | K25     | 16.640 | -0.200 | 17.440 | -0.450 | 0.838 P2       | 0.000 - L(0.838) |
| S54   | K24     | K23     | 4.480  | -0.364 | 5.280  | -0.250 | 0.808 P2       | 0.000 - L(0.808) |
| S55   | K26     | K24     | 3.680  | -0.477 | 4.480  | -0.364 | 0.808 P2       | 0.000 - L(0.808) |
| S56   | K25     | K28     | 17.440 | -0.450 | 18.240 | -0.700 | 0.838 P2       | 0.000 - L(0.838) |
| S57   | K27     | K26     | 2.880  | -0.591 | 3.680  | -0.477 | 0.808 P2       | 0.000 - L(0.808) |
| S58   | K29     | K27     | 1.920  | -0.727 | 2.880  | -0.591 | 0.970 P2       | 0.000 - L(0.970) |
| S59   | K28     | K32     | 18.240 | -0.700 | 19.200 | -1.000 | 1.006 P2       | 0.000 - L(1.006) |
| S60   | K30     | K29     | 0.960  | -0.864 | 1.920  | -0.727 | 0.970 P2       | 0.000 - L(0.970) |
| S61   | K31     | K30     | 0.000  | -1.000 | 0.960  | -0.864 | 0.970 P2       | 0.000 - L(0.970) |
| -     | -       | -       | m      | m      | m      | m      | m -            | -                |

## PROFIELEN

| Profiel | Profielnaam | Oppervlakte | Iy Materiaal                | Hoek |
|---------|-------------|-------------|-----------------------------|------|
| P1      | N219.1/8    | 5.3055e-03  | 2.9596e-05 S275H(EN10210-1) | 0.0  |
| P2      | N139.7/4    | 1.7053e-03  | 3.9286e-06 S275H(EN10210-1) | 0.0  |
| P3      | N114.3/4    | 1.3861e-03  | 2.1107e-06 S275H(EN10210-1) | 0.0  |
| P4      | N88.9/4     | 1.0669e-03  | 9.6340e-07 S275H(EN10210-1) | 0.0  |
| P5      | N244.5/6.3  | 4.7145e-03  | 3.3460e-05 S275H(EN10210-1) | 0.0  |
| P6      | N267/8      | 6.5094e-03  | 5.4634e-05 S275H(EN10210-1) | 0.0  |
| -       | -           | m2          | m4 -                        | °    |

## MATERIALEN

| Materiaal        | Dichtheid | E-Modulus  | Uitzettingcoeff |
|------------------|-----------|------------|-----------------|
| S275H(EN10210-1) | 78.50     | 2.1000e+08 | 12.0000e-06     |
| -                | kN/m3     | kN/m2      | C°m             |

## OPLEGGINGEN

| Oplegging | Object | Positie | X    | Z    | Yr      | HoekYr |
|-----------|--------|---------|------|------|---------|--------|
| O1        | K1     | 0.000   | Vast | Vast | Vast    | 0      |
| O2        | K2     | 0.000   | Vast | Vast | Vast    | 0      |
| -         | -      | m       | kN/m | kN/m | kNm/rad | °      |



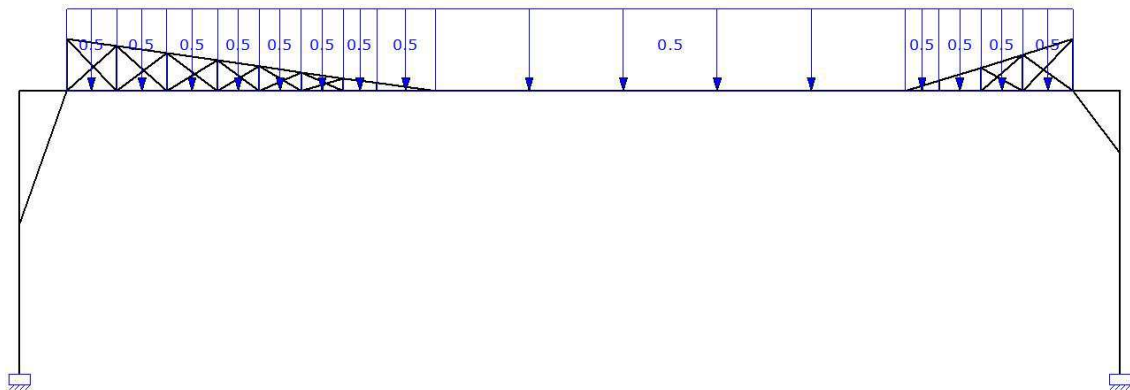


|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

### B.G.3: WIND

| Type        | Beginwaarde | Eindwaarde | Beginafstand | Eindafstand | Richting Staaf of knoop |
|-------------|-------------|------------|--------------|-------------|-------------------------|
| B.G.3: Wind |             |            |              |             |                         |
| q           | 0.35        | 0.35       | 0.000        | 0.960(L)    | Z' S2-S14               |
| Som lasten  | X: 0.00     | kN Z: 6.72 | kN           |             |                         |
| -           | -           | -          | m            | m           | - -                     |

### B.G.4: EENHEID



### B.G.4: EENHEID

| Type           | Beginwaarde | Eindwaarde | Beginafstand | Eindafstand | Richting Staaf of knoop |
|----------------|-------------|------------|--------------|-------------|-------------------------|
| B.G.4: Eenheid |             |            |              |             |                         |
| q              | 0.50        | 0.50       | 0.000        | 0.960(L)    | Z' S2-S14               |
| Som lasten     | X: 0.00     | kN Z: 9.60 | kN           |             |                         |
| -              | -           | -          | m            | m           | - -                     |

### UITGANGSPUNTEN VAN DE ANALYSE

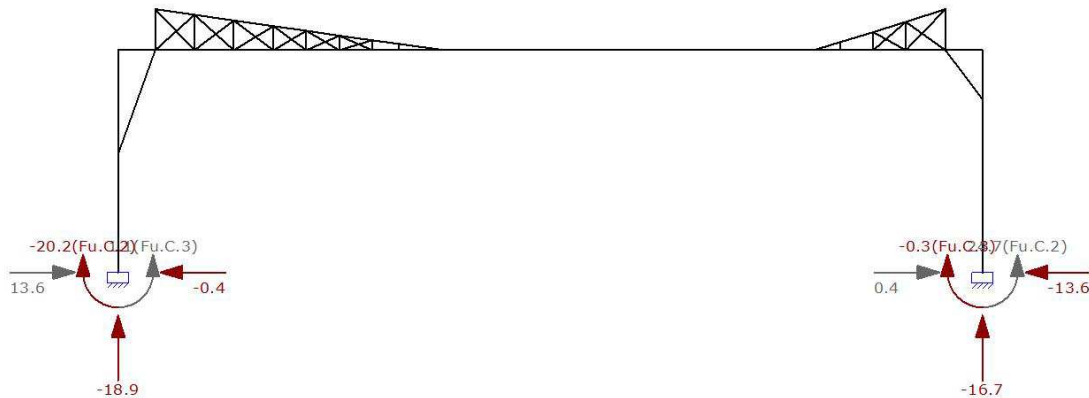
Lineaire Elastische Analyse uitgevoerd

### FUNDAMENTEEL BELASTINGSCOMBINATIES (TABEL)

| B.G.  | Omschrijving  | Fu.C.1 | Fu.C.2 | Fu.C.3 |
|-------|---------------|--------|--------|--------|
| B.G.1 | Eigen gewicht | 1.30   | 1.20   | 0.90   |
| B.G.2 | Permanent     | 1.30   | 1.20   | -      |
| B.G.3 | Wind          | 0.45   | 1.50   | -1.50  |
| B.G.4 | Eenheid       | -      | -      | -      |

### FU.C. EXTREME OPLEGREACTIES

| Oplegging                      | Knoop | B.C.   | Xmax          | Z      | My B.C.      | X      | Zmax          | My B.C.       | X      | Z      | Mymax         |
|--------------------------------|-------|--------|---------------|--------|--------------|--------|---------------|---------------|--------|--------|---------------|
| O1                             | K1    | Fu.C.2 | <b>13.62</b>  | -18.87 | -20.22       |        |               | Fu.C.3        | -0.37  | -4.51  | <b>1.08</b>   |
| O1                             | K1    | Fu.C.3 | <b>-0.37</b>  | -4.51  | 1.08 Fu.C.2  | 13.62  | <b>-18.87</b> | -20.22 Fu.C.2 | 13.62  | -18.87 | <b>-20.22</b> |
| O2                             | K2    | Fu.C.3 | <b>0.37</b>   | -3.37  | -0.26        |        |               | Fu.C.2        | -13.62 | -16.73 | <b>24.70</b>  |
| O2                             | K2    | Fu.C.2 | <b>-13.62</b> | -16.73 | 24.70 Fu.C.2 | -13.62 | <b>-16.73</b> | 24.70 Fu.C.3  | 0.37   | -3.37  | <b>-0.26</b>  |
| <b>Globale extreme waarden</b> |       |        |               |        |              |        |               |               |        |        |               |
| O1                             | K1    | Fu.C.2 | <b>13.62</b>  | -18.87 | -20.22       |        |               |               |        |        |               |
| O2                             | K2    | Fu.C.2 | <b>-13.62</b> | -16.73 | 24.70        |        |               |               |        |        |               |
| O1                             | K1    |        |               |        | Fu.C.2       | 13.62  | <b>-18.87</b> | -20.22        |        |        |               |
| O2                             | K2    |        |               |        |              |        |               | Fu.C.2        | -13.62 | -16.73 | <b>24.70</b>  |
| O1                             | K1    |        |               |        |              |        |               | Fu.C.2        | 13.62  | -18.87 | <b>-20.22</b> |
| -                              | -     | -      | kN            | kN     | kNm          | -      | kN            | kN            | kNm    | kN     | kNm           |



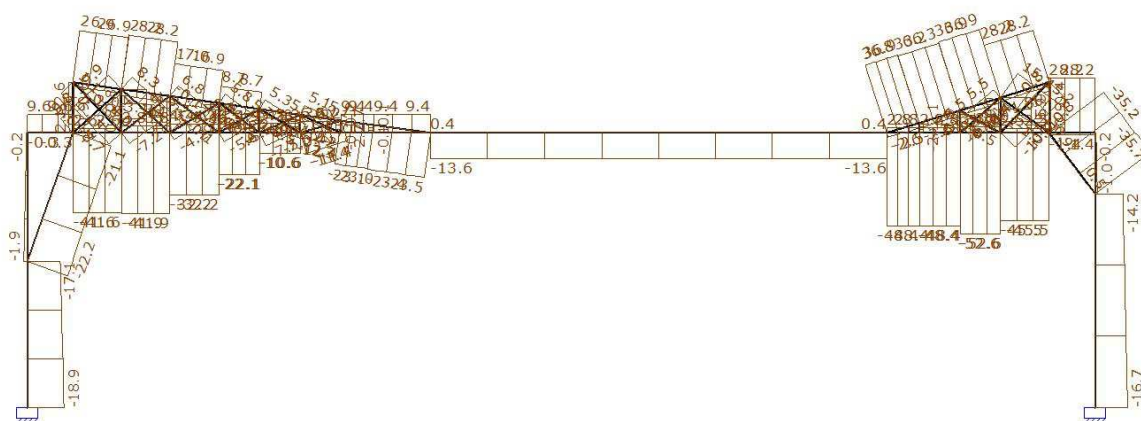
## FU.C. EXTREME STAAFKRACHTEN

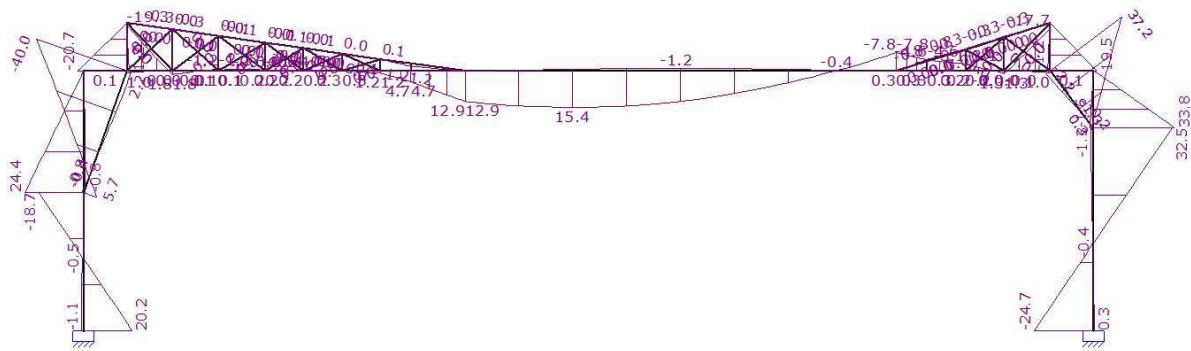
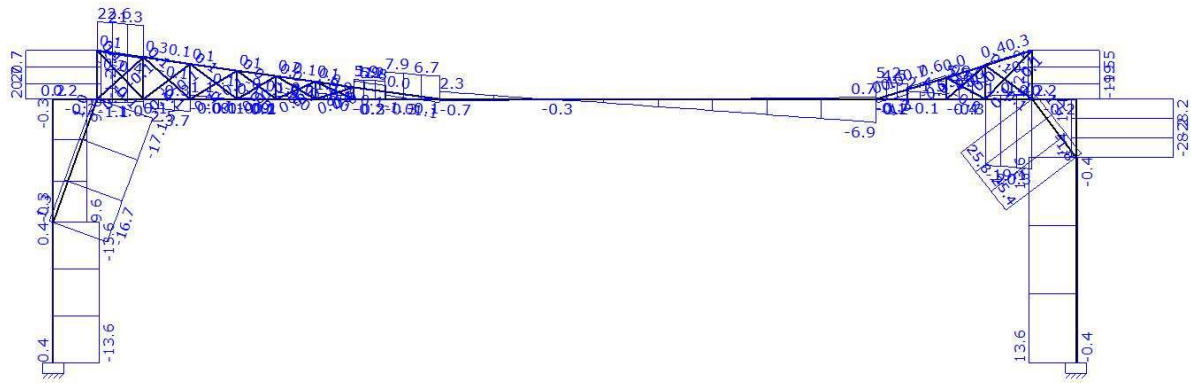
| Staat | B.C.   | Mb            | Mmax         | xMmax | Me            | x-M0  | x-M0 T/D | Nmax          | Vb            | Vmax          | Ve            |
|-------|--------|---------------|--------------|-------|---------------|-------|----------|---------------|---------------|---------------|---------------|
| S1    | Fu.C.1 | 0.00          | <b>0.06</b>  | 0.452 | 0.00          | 0.000 | 0.000 T  | 7.18          | <b>0.24</b>   | <b>0.24</b>   | <b>-0.24</b>  |
|       | Fu.C.2 | 0.00          | 0.05         | 0.452 | 0.00          | 0.000 | 0.000 T  | <b>9.61</b>   | 0.23          | 0.23          | -0.23         |
|       | Fu.C.3 | 0.00          | 0.04         | 0.452 | 0.00          | 0.000 | 0.000 D  | <b>-0.30</b>  | 0.17          | 0.17          | -0.17         |
| S2    | Fu.C.2 | <b>-19.28</b> | 0.00         | 0.000 | <b>1.80</b>   | 0.876 | 0.000 D  | <b>-41.64</b> | <b>22.56</b>  | <b>22.56</b>  | <b>21.35</b>  |
|       | Fu.C.3 | <b>0.99</b>   | 0.00         | 0.000 | <b>-0.04</b>  | 0.921 | 0.000 T  | <b>2.62</b>   | <b>-1.15</b>  | <b>-1.15</b>  | <b>-1.00</b>  |
| S3    | Fu.C.2 | <b>1.80</b>   | 0.00         | 0.000 | <b>-1.17</b>  | 0.625 | 0.000 D  | <b>-41.89</b> | <b>-2.48</b>  | <b>-3.69</b>  | <b>-3.69</b>  |
|       | Fu.C.3 | <b>-0.04</b>  | 0.00         | 0.000 | <b>0.14</b>   | 0.288 | 0.000 T  | <b>3.78</b>   | <b>0.11</b>   | <b>0.26</b>   | <b>0.26</b>   |
| S4    | Fu.C.2 | <b>-1.17</b>  | <b>-0.62</b> | 0.948 | <b>-0.62</b>  | 0.000 | 0.000 D  | <b>-32.21</b> | <b>1.14</b>   | <b>1.14</b>   | <b>-0.01</b>  |
|       | Fu.C.3 | <b>0.14</b>   | <b>0.14</b>  | 0.235 | <b>0.18</b>   | 0.000 | 0.000 T  | <b>4.43</b>   | <b>-0.04</b>  | <b>0.11</b>   | <b>0.11</b>   |
| S5    | Fu.C.2 | <b>-0.62</b>  | <b>-0.41</b> | 0.596 | <b>-0.44</b>  | 0.000 | 0.000 D  | <b>-22.06</b> | <b>0.72</b>   | <b>0.72</b>   | <b>-0.25</b>  |
|       | Fu.C.3 | <b>0.18</b>   | <b>0.18</b>  | 0.038 | <b>0.22</b>   | 0.000 | 0.000 T  | <b>4.89</b>   | <b>-0.01</b>  | <b>0.11</b>   | <b>0.11</b>   |
| S6    | Fu.C.1 | -0.21         | 0.00         | 0.000 | 0.18          | 0.306 | 0.000 D  | -5.18         | 0.82          | 0.82          | <b>0.16</b>   |
|       | Fu.C.2 | <b>-0.44</b>  | 0.00         | 0.000 | 0.02          | 0.685 | 0.000 D  | <b>-10.61</b> | <b>1.03</b>   | <b>1.03</b>   | 0.11          |
|       | Fu.C.3 | <b>0.22</b>   | 0.00         | 0.000 | <b>0.29</b>   | 0.000 | 0.000 T  | <b>5.20</b>   | 0.03          | 0.15          | 0.15          |
| S7    | Fu.C.1 | 0.18          | 0.00         | 0.000 | <b>1.20</b>   | 0.000 | 0.000 T  | <b>6.24</b>   | 1.61          | 1.61          | 0.94          |
|       | Fu.C.2 | 0.02          | 0.00         | 0.000 | 1.14          | 0.000 | 0.000 T  | 4.80          | <b>1.86</b>   | <b>1.86</b>   | <b>0.94</b>   |
|       | Fu.C.3 | <b>0.29</b>   | 0.00         | 0.000 | 0.58          | 0.000 | 0.000 T  | 4.57          | 0.30          | 0.42          | 0.42          |
| S8    | Fu.C.1 | <b>1.20</b>   | 0.00         | 0.000 | 3.84          | 0.000 | 0.000 T  | 9.18          | 4.37          | 4.37          | 3.88          |
|       | Fu.C.2 | 1.14          | 0.00         | 0.000 | <b>4.69</b>   | 0.000 | 0.000 T  | <b>9.45</b>   | <b>5.90</b>   | <b>5.90</b>   | <b>5.20</b>   |
|       | Fu.C.3 | 0.58          | 0.00         | 0.000 | 0.45          | 0.000 | 0.000 T  | 3.49          | <b>-0.26</b>  | <b>-0.26</b>  | <b>-0.16</b>  |
| S9    | Fu.C.2 | <b>4.69</b>   | 0.00         | 0.000 | <b>12.89</b>  | 0.000 | 0.000 T  | <b>9.45</b>   | <b>7.92</b>   | <b>7.92</b>   | <b>6.71</b>   |
|       | Fu.C.3 | 0.45          | 0.00         | 0.000 | 0.24          | 0.000 | 0.000 T  | 3.49          | <b>-0.27</b>  | <b>-0.27</b>  | <b>-0.10</b>  |
| S10   | Fu.C.2 | <b>12.89</b>  | <b>15.44</b> | 2.232 | <b>-7.76</b>  | 7.721 | 0.000 D  | <b>-13.62</b> | <b>2.29</b>   | <b>-6.90</b>  | <b>-6.90</b>  |
|       | Fu.C.3 | 0.24          | <b>-1.22</b> | 4.400 | <b>0.34</b>   | 0.373 | 8.427 T  | <b>0.37</b>   | <b>-0.66</b>  | <b>0.68</b>   | <b>0.68</b>   |
| S11   | Fu.C.2 | <b>-7.76</b>  | 0.00         | 0.000 | <b>-4.64</b>  | 0.000 | 0.000 D  | <b>-48.43</b> | <b>5.22</b>   | <b>5.22</b>   | <b>4.53</b>   |
|       | Fu.C.3 | <b>0.34</b>   | 0.00         | 0.000 | <b>0.27</b>   | 0.000 | 0.000 T  | <b>2.78</b>   | <b>-0.17</b>  | <b>-0.17</b>  | <b>-0.07</b>  |
| S12   | Fu.C.2 | <b>-4.64</b>  | 0.00         | 0.000 | <b>-3.08</b>  | 0.000 | 0.000 D  | <b>-48.43</b> | <b>2.41</b>   | <b>2.41</b>   | <b>1.49</b>   |
|       | Fu.C.3 | <b>0.27</b>   | <b>0.24</b>  | 0.662 | <b>0.24</b>   | 0.000 | 0.000 T  | <b>2.78</b>   | <b>-0.10</b>  | <b>-0.10</b>  | 0.02          |
| S13   | Fu.C.2 | <b>-3.08</b>  | 0.00         | 0.000 | <b>1.27</b>   | 0.552 | 0.000 D  | <b>-52.56</b> | <b>5.92</b>   | <b>5.92</b>   | <b>4.95</b>   |
|       | Fu.C.3 | <b>0.24</b>   | 0.00         | 0.000 | <b>-0.04</b>  | 0.661 | 0.000 T  | <b>3.07</b>   | <b>-0.41</b>  | <b>-0.41</b>  | <b>-0.29</b>  |
| S14   | Fu.C.2 | <b>1.27</b>   | 0.00         | 0.000 | <b>-17.68</b> | 0.066 | 0.000 D  | <b>-45.47</b> | <b>-19.13</b> | <b>-20.34</b> | <b>-20.34</b> |
|       | Fu.C.3 | <b>-0.04</b>  | 0.00         | 0.000 | <b>1.01</b>   | 0.041 | 0.000 T  | <b>2.48</b>   | <b>1.02</b>   | <b>1.17</b>   | <b>1.17</b>   |
| S15   | Fu.C.1 | 0.00          | <b>0.06</b>  | 0.452 | 0.00          | 0.000 | 0.000 T  | 20.80         | <b>0.24</b>   | <b>0.24</b>   | <b>-0.24</b>  |
|       | Fu.C.2 | 0.00          | 0.05         | 0.452 | 0.00          | 0.000 | 0.000 T  | <b>28.20</b>  | 0.23          | 0.23          | -0.23         |
|       | Fu.C.3 | 0.00          | 0.04         | 0.452 | 0.00          | 0.000 | 0.000 D  | <b>-1.35</b>  | 0.17          | 0.17          | -0.17         |
| S16   | Fu.C.2 | <b>20.22</b>  | 0.00         | 0.000 | <b>-18.73</b> | 1.485 | 0.000 D  | <b>-18.87</b> | <b>-13.62</b> | <b>-13.62</b> | <b>-13.62</b> |
|       | Fu.C.3 | <b>-1.08</b>  | 0.00         | 0.000 | -0.01         | 0.000 | 0.000 D  | -4.51         | <b>0.37</b>   | <b>0.37</b>   | <b>0.37</b>   |
| S17   | Fu.C.1 | 0.00          | 0.00         | 0.000 | 18.25         | 0.000 | 0.000 D  | <b>-1.93</b>  | 7.18          | 7.18          | 7.18          |
|       | Fu.C.2 | 0.00          | 0.00         | 0.000 | <b>24.42</b>  | 0.000 | 0.000 D  | -1.78         | <b>9.61</b>   | <b>9.61</b>   | <b>9.61</b>   |
|       | Fu.C.3 | 0.00          | 0.00         | 0.000 | <b>-0.76</b>  | 0.000 | 0.000 D  | -1.34         | <b>-0.30</b>  | <b>-0.30</b>  | <b>-0.30</b>  |
| S18   | Fu.C.2 | <b>-20.71</b> | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>2.59</b>   | <b>20.71</b>  | <b>20.71</b>  | <b>20.71</b>  |
|       | Fu.C.3 | <b>1.21</b>   | 0.00         | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-0.94</b>  | <b>-1.21</b>  | <b>-1.21</b>  | <b>-1.21</b>  |



|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|

| Staaf | B.C.   | Mb            | Mmax        | xMmax | Me            | x-M0  | x-M0 T/D | Nmax          | Vb            | Vmax          | Ve            |
|-------|--------|---------------|-------------|-------|---------------|-------|----------|---------------|---------------|---------------|---------------|
| S19   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-13.17</b> | 0.00          | 0.00          | 0.00          |
|       | Fu.C.3 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>0.85</b>   | 0.00          | 0.00          | 0.00          |
| S20   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>1.77</b>   | 0.00          | 0.00          | 0.00          |
| S21   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-0.40</b>  | 0.00          | 0.00          | 0.00          |
|       | Fu.C.3 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>0.39</b>   | 0.00          | 0.00          | 0.00          |
| S22   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>1.12</b>   | 0.00          | 0.00          | 0.00          |
| S23   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>2.55</b>   | 0.00          | 0.00          | 0.00          |
| S24   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>2.92</b>   | 0.00          | 0.00          | 0.00          |
|       | Fu.C.3 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-0.16</b>  | 0.00          | 0.00          | 0.00          |
| S25   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>2.74</b>   | 0.00          | 0.00          | 0.00          |
|       | Fu.C.3 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-0.11</b>  | 0.00          | 0.00          | 0.00          |
| S26   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-2.12</b>  | 0.00          | 0.00          | 0.00          |
| S27   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>0.92</b>   | 0.00          | 0.00          | 0.00          |
|       | Fu.C.3 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-0.14</b>  | 0.00          | 0.00          | 0.00          |
| S28   | Fu.C.2 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-15.94</b> | 0.00          | 0.00          | 0.00          |
|       | Fu.C.3 | 0.00          | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 T  | <b>0.95</b>   | 0.00          | 0.00          | 0.00          |
| S29   | Fu.C.1 | 14.29         | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-0.89</b>  | -14.29        | -14.29        | -14.29        |
|       | Fu.C.2 | <b>19.53</b>  | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | -0.88         | <b>-19.53</b> | <b>-19.53</b> | <b>-19.53</b> |
|       | Fu.C.3 | <b>-1.16</b>  | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | -0.48         | <b>1.16</b>   | <b>1.16</b>   | <b>1.16</b>   |
| S30   | Fu.C.2 | <b>-24.70</b> | 0.00        | 0.000 | <b>32.50</b>  | 1.814 | 0.000 D  | <b>-16.73</b> | <b>13.62</b>  | <b>13.62</b>  | <b>13.62</b>  |
|       | Fu.C.3 | <b>0.26</b>   | 0.00        | 0.000 | <b>-1.30</b>  | 0.703 | 0.000 D  | -3.37         | <b>-0.37</b>  | <b>-0.37</b>  | <b>-0.37</b>  |
| S31   | Fu.C.1 | 24.96         | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-1.04</b>  | -20.80        | -20.80        | -20.80        |
|       | Fu.C.2 | <b>33.84</b>  | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | -0.96         | <b>-28.20</b> | <b>-28.20</b> | <b>-28.20</b> |
|       | Fu.C.3 | <b>-1.63</b>  | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | -0.72         | <b>1.35</b>   | <b>1.35</b>   | <b>1.35</b>   |
| S32   | Fu.C.2 | <b>5.69</b>   | 0.00        | 0.000 | <b>-39.99</b> | 0.339 | 0.000 D  | <b>-22.25</b> | <b>-16.74</b> | <b>-17.14</b> | <b>-17.14</b> |
|       | Fu.C.3 | <b>-0.77</b>  | 0.00        | 0.000 | <b>2.20</b>   | 0.632 | 0.000 D  | -1.52         | <b>1.25</b>   | <b>1.25</b>   | <b>0.95</b>   |
| S33   | Fu.C.2 | <b>-1.34</b>  | 0.00        | 0.000 | <b>37.21</b>  | 0.052 | 0.000 D  | <b>-35.71</b> | <b>25.44</b>  | <b>25.85</b>  | <b>25.85</b>  |
|       | Fu.C.3 | <b>0.33</b>   | 0.00        | 0.000 | <b>-2.17</b>  | 0.182 | 0.000 T  | <b>0.87</b>   | <b>-1.81</b>  | <b>-1.81</b>  | <b>-1.51</b>  |
| S34   | Fu.C.1 | 0.00          | <b>0.02</b> | 0.646 | 0.00          | 0.000 | 0.000 T  | 6.77          | <b>0.05</b>   | <b>-0.05</b>  | <b>-0.05</b>  |
|       | Fu.C.2 | 0.00          | 0.02        | 0.646 | 0.00          | 0.000 | 0.000 T  | <b>9.87</b>   | 0.05          | -0.05         | -0.05         |
|       | Fu.C.3 | 0.00          | 0.01        | 0.646 | 0.00          | 0.000 | 0.000 D  | <b>-1.44</b>  | 0.04          | -0.04         | -0.04         |
| S35   | Fu.C.1 | 0.00          | <b>0.02</b> | 0.693 | 0.00          | 0.000 | 0.000 D  | -6.02         | <b>0.05</b>   | <b>-0.05</b>  | <b>-0.05</b>  |
|       | Fu.C.2 | 0.00          | 0.02        | 0.693 | 0.00          | 0.000 | 0.000 D  | <b>-8.66</b>  | 0.05          | -0.05         | -0.05         |
|       | Fu.C.3 | 0.00          | 0.01        | 0.693 | 0.00          | 0.000 | 0.000 T  | <b>1.11</b>   | 0.04          | -0.04         | -0.04         |
| S36   | Fu.C.1 | 0.00          | <b>0.02</b> | 0.602 | 0.00          | 0.000 | 0.000 D  | -5.81         | <b>0.05</b>   | <b>0.05</b>   | <b>-0.05</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.602 | 0.00          | 0.000 | 0.000 D  | <b>-7.19</b>  | 0.05          | 0.05          | -0.05         |
| S37   | Fu.C.1 | 0.00          | <b>0.02</b> | 0.646 | 0.00          | 0.000 | 0.000 T  | 6.38          | <b>0.05</b>   | <b>-0.05</b>  | <b>-0.05</b>  |
|       | Fu.C.2 | 0.00          | 0.02        | 0.646 | 0.00          | 0.000 | 0.000 T  | <b>8.25</b>   | 0.05          | -0.05         | -0.05         |
| S38   | Fu.C.1 | 0.00          | <b>0.01</b> | 0.564 | 0.00          | 0.000 | 0.000 D  | -3.64         | <b>0.05</b>   | <b>-0.05</b>  | <b>-0.05</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.564 | 0.00          | 0.000 | 0.000 D  | <b>-4.24</b>  | 0.05          | -0.05         | -0.05         |
| S39   | Fu.C.1 | 0.00          | <b>0.02</b> | 0.602 | 0.00          | 0.000 | 0.000 T  | 5.16          | <b>0.05</b>   | <b>0.05</b>   | <b>-0.05</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.602 | 0.00          | 0.000 | 0.000 T  | <b>6.79</b>   | 0.05          | 0.05          | -0.05         |
|       | Fu.C.3 | 0.00          | 0.01        | 0.602 | 0.00          | 0.000 | 0.000 D  | <b>-0.11</b>  | 0.04          | 0.04          | -0.04         |
| S40   | Fu.C.1 | 0.00          | <b>0.01</b> | 0.466 | 0.00          | 0.000 | 0.000 D  | -4.60         | <b>0.04</b>   | <b>0.04</b>   | <b>-0.04</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.466 | 0.00          | 0.000 | 0.000 D  | <b>-5.57</b>  | 0.04          | <b>-0.04</b>  | -0.04         |
| S41   | Fu.C.1 | 0.00          | <b>0.01</b> | 0.497 | 0.00          | 0.000 | 0.000 T  | 4.28          | <b>0.04</b>   | <b>-0.04</b>  | <b>-0.04</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.497 | 0.00          | 0.000 | 0.000 T  | <b>5.77</b>   | 0.04          | <b>0.04</b>   | -0.04         |
|       | Fu.C.3 | 0.00          | 0.01        | 0.497 | 0.00          | 0.000 | 0.000 D  | <b>-0.27</b>  | 0.03          | -0.03         | -0.03         |
| S42   | Fu.C.1 | 0.00          | <b>0.01</b> | 0.439 | 0.00          | 0.000 | 0.000 D  | -6.05         | <b>0.04</b>   | <b>0.04</b>   | <b>-0.04</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.439 | 0.00          | 0.000 | 0.000 D  | <b>-7.52</b>  | 0.04          | 0.04          | -0.04         |
| S43   | Fu.C.1 | 0.00          | <b>0.01</b> | 0.419 | 0.00          | 0.000 | 0.000 D  | -8.57         | <b>0.04</b>   | <b>0.04</b>   | <b>-0.04</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.419 | 0.00          | 0.000 | 0.000 D  | <b>-11.38</b> | 0.04          | 0.04          | -0.04         |
|       | Fu.C.3 | 0.00          | 0.01        | 0.419 | 0.00          | 0.000 | 0.000 T  | <b>0.23</b>   | 0.03          | 0.03          | -0.03         |
| S44   | Fu.C.1 | 0.00          | <b>0.01</b> | 0.466 | 0.00          | 0.000 | 0.000 T  | 3.82          | <b>0.04</b>   | <b>0.04</b>   | <b>-0.04</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.466 | 0.00          | 0.000 | 0.000 T  | <b>5.34</b>   | 0.04          | 0.04          | -0.04         |
|       | Fu.C.3 | 0.00          | 0.01        | 0.466 | 0.00          | 0.000 | 0.000 D  | <b>-0.49</b>  | 0.03          | 0.03          | -0.03         |
| S45   | Fu.C.1 | 0.00          | <b>0.01</b> | 0.439 | 0.00          | 0.000 | 0.000 T  | 3.25          | <b>0.04</b>   | <b>0.04</b>   | <b>-0.04</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.439 | 0.00          | 0.000 | 0.000 T  | <b>5.12</b>   | 0.04          | <b>-0.04</b>  | -0.04         |
|       | Fu.C.3 | 0.00          | 0.01        | 0.439 | 0.00          | 0.000 | 0.000 D  | <b>-1.21</b>  | 0.03          | 0.03          | -0.03         |
| S46   | Fu.C.2 | <b>1.18</b>   | 0.00        | 0.000 | 0.00          | 0.000 | 0.000 D  | <b>-23.46</b> | <b>-0.95</b>  | <b>-1.13</b>  | <b>-1.13</b>  |
|       | Fu.C.3 | 0.05          | <b>0.05</b> | 0.178 | 0.00          | 0.000 | 0.000 D  | -3.16         | <b>0.02</b>   | -0.11         | -0.11         |
| S47   | Fu.C.2 | 0.00          | 0.00        | 0.000 | <b>-0.83</b>  | 0.000 | 0.000 T  | <b>36.87</b>  | <b>-1.18</b>  | <b>-1.28</b>  | <b>-1.28</b>  |
|       | Fu.C.3 | 0.00          | 0.00        | 0.000 | <b>0.04</b>   | 0.000 | 0.000 D  | <b>-2.55</b>  | <b>0.09</b>   | <b>0.09</b>   | <b>0.02</b>   |
| S48   | Fu.C.1 | 0.00          | <b>0.01</b> | 0.532 | 0.00          | 0.000 | 0.000 T  | 4.04          | <b>0.04</b>   | <b>0.04</b>   | <b>-0.04</b>  |
|       | Fu.C.2 | 0.00          | 0.01        | 0.532 | 0.00          | 0.000 | 0.000 T  | <b>5.52</b>   | 0.04          | 0.04          | -0.04         |
|       | Fu.C.3 | 0.00          | 0.01        | 0.532 | 0.00          | 0.000 | 0.000 D  | <b>-0.41</b>  | 0.03          | 0.03          | -0.03         |

AFB. FU.C. NORMAALKRACHT (NX) OMHULLENDE Fundamenteel Belastingscombinaties



| B.G.  | Omschrijving  | Ka.C.(w1) | Ka.C.1 | Ka.C.2 |
|-------|---------------|-----------|--------|--------|
| B.G.1 | Eigen gewicht | 1.00      | 1.00   | 1.00   |
| B.G.2 | Permanent     | -         | 1.00   | -      |
| B.G.3 | Wind          | -         | 1.00   | -1.00  |
| B.G.4 | Eenheid       | -         | -      | -      |

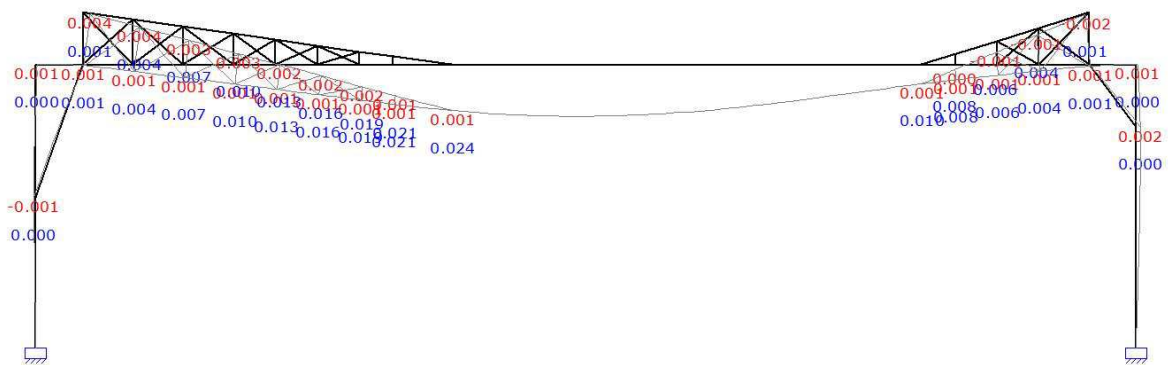
| Knoop | B.C.      | X              | Z             | Ry                |
|-------|-----------|----------------|---------------|-------------------|
| K3    | Ka.C.(w1) | -0.0011        | <b>0.0000</b> | 0.037e-03         |
|       | Ka.C.1    | <b>-0.0019</b> | 0.0000        | <b>0.127e-03</b>  |
|       | Ka.C.2    | -0.0003        | 0.0000        | <b>-0.075e-03</b> |
| K4    | Ka.C.1    | <b>0.0033</b>  | <b>0.0000</b> | <b>1.070e-03</b>  |
| K5    | Ka.C.(w1) | 0.0008         | <b>0.0000</b> | -1.158e-03        |
|       | Ka.C.1    | <b>0.0012</b>  | 0.0000        | <b>-1.933e-03</b> |
| K6    | Ka.C.1    | <b>0.0012</b>  | <b>0.0012</b> | <b>-4.850e-03</b> |
| K7    | Ka.C.1    | <b>0.0012</b>  | <b>0.0065</b> | <b>-5.864e-03</b> |
| K8    | Ka.C.1    | <b>0.0012</b>  | <b>0.0121</b> | <b>-5.814e-03</b> |
| K9    | Ka.C.1    | <b>0.0012</b>  | <b>0.0178</b> | <b>-5.906e-03</b> |
| K10   | Ka.C.1    | <b>0.0011</b>  | <b>0.0225</b> | <b>-5.949e-03</b> |
| K11   | Ka.C.1    | <b>0.0011</b>  | <b>0.0273</b> | <b>-5.960e-03</b> |
| K12   | Ka.C.1    | <b>0.0011</b>  | <b>0.0320</b> | <b>-5.890e-03</b> |
| K13   | Ka.C.1    | <b>0.0011</b>  | <b>0.0357</b> | <b>-5.651e-03</b> |
| K14   | Ka.C.1    | <b>0.0011</b>  | <b>0.0415</b> | <b>-4.415e-03</b> |
| K15   | Ka.C.1    | <b>0.0011</b>  | <b>0.0180</b> | <b>5.859e-03</b>  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Knoop | B.C.   | X       | Z      | Ry         |
|-------|--------|---------|--------|------------|
| K16   | Ka.C.1 | 0.0010  | 0.0144 | 5.377e-03  |
| K17   | Ka.C.1 | 0.0010  | 0.0103 | 5.007e-03  |
| K18   | Ka.C.1 | 0.0010  | 0.0063 | 4.925e-03  |
| K19   | Ka.C.1 | 0.0010  | 0.0019 | 3.975e-03  |
| K20   | Ka.C.1 | 0.0010  | 0.0000 | 2.415e-03  |
| K21   | Ka.C.1 | 0.0020  | 0.0357 | -5.560e-03 |
| K22   | Ka.C.1 | 0.0000  | 0.0144 | 5.403e-03  |
|       | Ka.C.2 | 0.0005  | 0.0023 | 0.883e-03  |
| K23   | Ka.C.1 | 0.0026  | 0.0320 | -5.926e-03 |
| K24   | Ka.C.1 | 0.0033  | 0.0273 | -5.954e-03 |
| K25   | Ka.C.1 | -0.0012 | 0.0103 | 4.982e-03  |
|       | Ka.C.2 | 0.0003  | 0.0016 | 0.811e-03  |
| K26   | Ka.C.1 | 0.0040  | 0.0225 | -5.949e-03 |
| K27   | Ka.C.1 | 0.0046  | 0.0178 | -5.898e-03 |
| K28   | Ka.C.1 | -0.0024 | 0.0064 | 4.747e-03  |
|       | Ka.C.2 | 0.0001  | 0.0010 | 0.771e-03  |
| K29   | Ka.C.1 | 0.0054  | 0.0121 | -5.832e-03 |
| K30   | Ka.C.1 | 0.0061  | 0.0066 | -5.671e-03 |
| K31   | Ka.C.1 | 0.0068  | 0.0012 | -5.968e-03 |
| K32   | Ka.C.1 | -0.0037 | 0.0019 | 5.029e-03  |
| -     | -      | m       | m      | rad        |

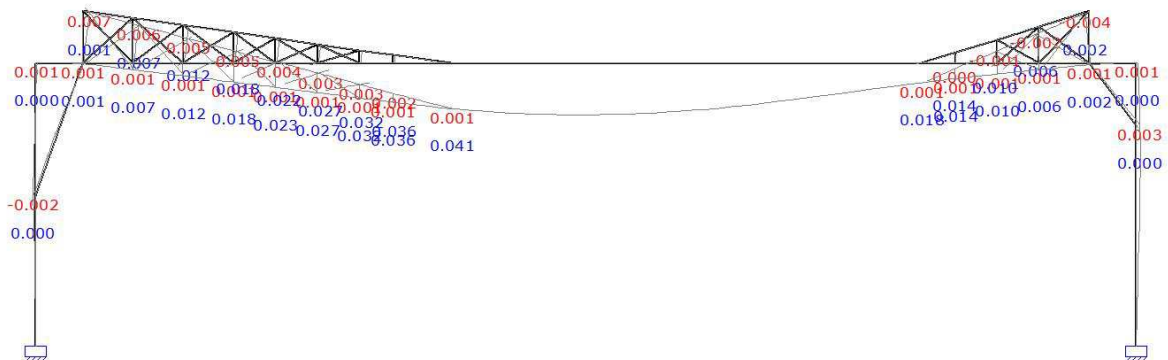
AFB. KA.C.(W1) VERPLAATSINGEN

Ka.C.(w1) Belastingscombinaties



AFB. KA.C. VERPLAATSINGEN OMHULLENDE

Karakteristiek Belastingscombinaties



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

## KA.C. EXTREME DOORBUIGINGEN

| Staaf | B.C.      | Knoop Begin |       | Staaf  |         | Knoop Eind |       |
|-------|-----------|-------------|-------|--------|---------|------------|-------|
|       |           | X           | Z     | Z'afst | Z'      | X          | Z     |
| S2    | Ka.C.1    | 0.001       | 0.001 | 0.392  | -0.0001 | 0.001      | 0.007 |
| S3    | Ka.C.1    | 0.001       | 0.007 | 0.316  | 0.0000  | 0.001      | 0.012 |
| S4    | Ka.C.1    | 0.001       | 0.012 | 0.451  | 0.0000  | 0.001      | 0.018 |
| S5    | Ka.C.1    | 0.001       | 0.018 | 0.384  | 0.0000  | 0.001      | 0.023 |
| S6    | Ka.C.1    | 0.001       | 0.023 | 0.269  | 0.0000  | 0.001      | 0.027 |
| S6    | Ka.C.2    | 0.001       | 0.005 | 0.427  | 0.0000  | 0.001      | 0.006 |
| S7    | Ka.C.1    | 0.001       | 0.027 | 0.450  | 0.0000  | 0.001      | 0.032 |
| S8    | Ka.C.1    | 0.001       | 0.032 | 0.350  | 0.0000  | 0.001      | 0.036 |
| S9    | Ka.C.1    | 0.001       | 0.036 | 0.602  | 0.0002  | 0.001      | 0.041 |
| S10   | Ka.C.1    | 0.001       | 0.041 | 3.900  | 0.0139  | 0.001      | 0.018 |
| S11   | Ka.C.1    | 0.001       | 0.018 | 0.306  | 0.0000  | 0.001      | 0.014 |
| S12   | Ka.C.1    | 0.001       | 0.014 | 0.386  | 0.0000  | 0.001      | 0.010 |
| S13   | Ka.C.1    | 0.001       | 0.010 | 0.274  | 0.0000  | 0.001      | 0.006 |
| S14   | Ka.C.1    | 0.001       | 0.006 | 0.565  | -0.0001 | 0.001      | 0.002 |
| S16   | Ka.C.1    | 0.000       | 0.000 | 0.652  | 0.0002  | -0.002     | 0.000 |
| S16   | Ka.C.2    | 0.000       | 0.000 | 2.128  | -0.0001 | 0.000      | 0.000 |
| S17   | Ka.C.1    | 0.001       | 0.000 | 1.466  | 0.0007  | -0.002     | 0.000 |
| S18   | Ka.C.1    | 0.001       | 0.001 | 0.423  | -0.0001 | 0.007      | 0.001 |
| S29   | Ka.C.1    | 0.001       | 0.002 | 0.423  | 0.0001  | -0.004     | 0.002 |
| S30   | Ka.C.1    | 0.000       | 0.000 | 3.063  | 0.0009  | 0.003      | 0.000 |
| S31   | Ka.C.1    | 0.003       | 0.000 | 0.507  | 0.0002  | 0.001      | 0.000 |
| S32   | Ka.C.1    | -0.002      | 0.000 | 1.614  | -0.0018 | 0.001      | 0.001 |
| S33   | Ka.C.1    | 0.003       | 0.000 | 0.875  | 0.0006  | 0.001      | 0.002 |
| S34   | Ka.C.2    | 0.001       | 0.000 | 0.646  | 0.0000  | 0.002      | 0.001 |
| S35   | Ka.C.1    | 0.007       | 0.001 | 0.693  | 0.0000  | 0.001      | 0.007 |
| S36   | Ka.C.2    | 0.001       | 0.001 | 0.602  | 0.0000  | 0.001      | 0.003 |
| S37   | Ka.C.2    | 0.002       | 0.001 | 0.646  | 0.0000  | 0.001      | 0.003 |
| S38   | Ka.C.1    | 0.001       | 0.012 | 0.564  | 0.0000  | 0.005      | 0.018 |
| S39   | Ka.C.(w1) | 0.003       | 0.007 | 0.602  | 0.0000  | 0.001      | 0.010 |
| S40   | Ka.C.(w1) | 0.001       | 0.010 | 0.466  | 0.0000  | 0.002      | 0.013 |
| S41   | Ka.C.1    | 0.005       | 0.018 | 0.497  | 0.0000  | 0.001      | 0.023 |
| S42   | Ka.C.1    | 0.001       | 0.023 | 0.439  | 0.0000  | 0.003      | 0.027 |
| S43   | Ka.C.1    | 0.001       | 0.027 | 0.419  | 0.0000  | 0.003      | 0.032 |
| S44   | Ka.C.2    | 0.001       | 0.005 | 0.466  | 0.0000  | 0.001      | 0.006 |
| S45   | Ka.C.2    | 0.001       | 0.006 | 0.439  | 0.0000  | 0.001      | 0.007 |
| S46   | Ka.C.1    | 0.002       | 0.036 | 0.481  | 0.0001  | 0.001      | 0.041 |
| S47   | Ka.C.1    | 0.001       | 0.018 | 0.388  | 0.0000  | 0.000      | 0.014 |
| S48   | Ka.C.2    | 0.001       | 0.002 | 0.532  | 0.0000  | 0.000      | 0.001 |
| S49   | Ka.C.1    | -0.001      | 0.010 | 0.459  | 0.0000  | 0.001      | 0.006 |
| S50   | Ka.C.1    | 0.001       | 0.006 | 0.693  | 0.0000  | -0.004     | 0.002 |
| S51   | Ka.C.1    | -0.002      | 0.006 | 0.594  | 0.0000  | 0.001      | 0.002 |
| S52   | Ka.C.1    | 0.003       | 0.032 | 0.371  | 0.0000  | 0.002      | 0.036 |
| S53   | Ka.C.1    | 0.000       | 0.014 | 0.385  | 0.0000  | -0.001     | 0.010 |
| S54   | Ka.C.2    | 0.001       | 0.006 | 0.423  | 0.0000  | 0.001      | 0.007 |
| S55   | Ka.C.2    | 0.001       | 0.005 | 0.433  | 0.0000  | 0.001      | 0.006 |
| S56   | Ka.C.1    | -0.001      | 0.010 | 0.426  | 0.0000  | -0.002     | 0.006 |
| S57   | Ka.C.1    | 0.005       | 0.018 | 0.393  | 0.0000  | 0.004      | 0.022 |
| S58   | Ka.C.1    | 0.005       | 0.012 | 0.486  | 0.0000  | 0.005      | 0.018 |
| S59   | Ka.C.1    | -0.002      | 0.006 | 0.416  | 0.0000  | -0.004     | 0.002 |
| S60   | Ka.C.1    | 0.006       | 0.007 | 0.436  | 0.0000  | 0.005      | 0.012 |
| S61   | Ka.C.1    | 0.007       | 0.001 | 0.570  | 0.0000  | 0.006      | 0.007 |
| -     | -         | m           | m     | m      | m       | m          | m     |

## FREQUENT BELASTINGSCOMBINATIES (TABEL)

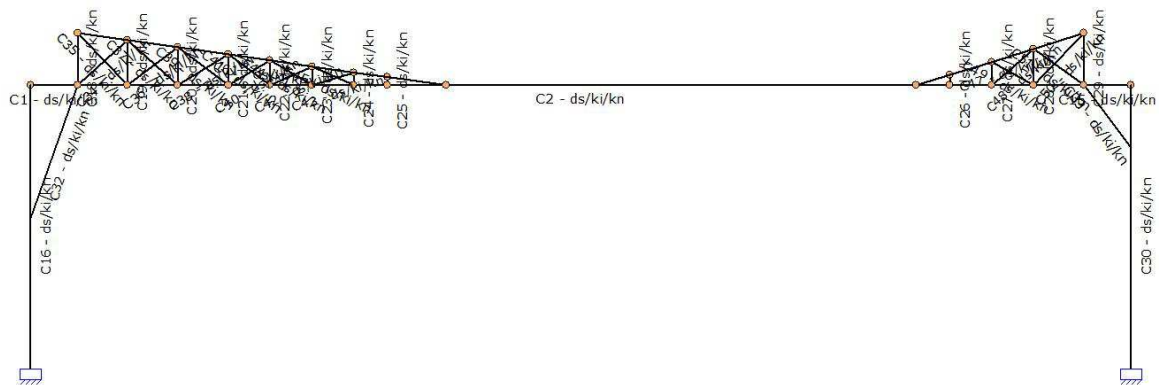
| B.G.  | Omschrijving  | Fr.C.(w1) | Fr.C.1 |
|-------|---------------|-----------|--------|
| B.G.1 | Eigen gewicht | 1.00      | 1.00   |
| B.G.2 | Permanent     | -         | 1.00   |
| B.G.3 | Wind          | -         | 0.60   |
| B.G.4 | Eenheid       | -         | -      |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

## QUASI-PERMANENT BELASTINGSCOMBINATIES (TABEL)

| B.G.  | Omschrijving  | Qu.C.1 |
|-------|---------------|--------|
| B.G.1 | Eigen gewicht | 1.00   |
| B.G.2 | Permanent     | 1.00   |
| B.G.3 | Wind          | -      |
| B.G.4 | Eenheid       | -      |

## AFB. STAALCONTROLE



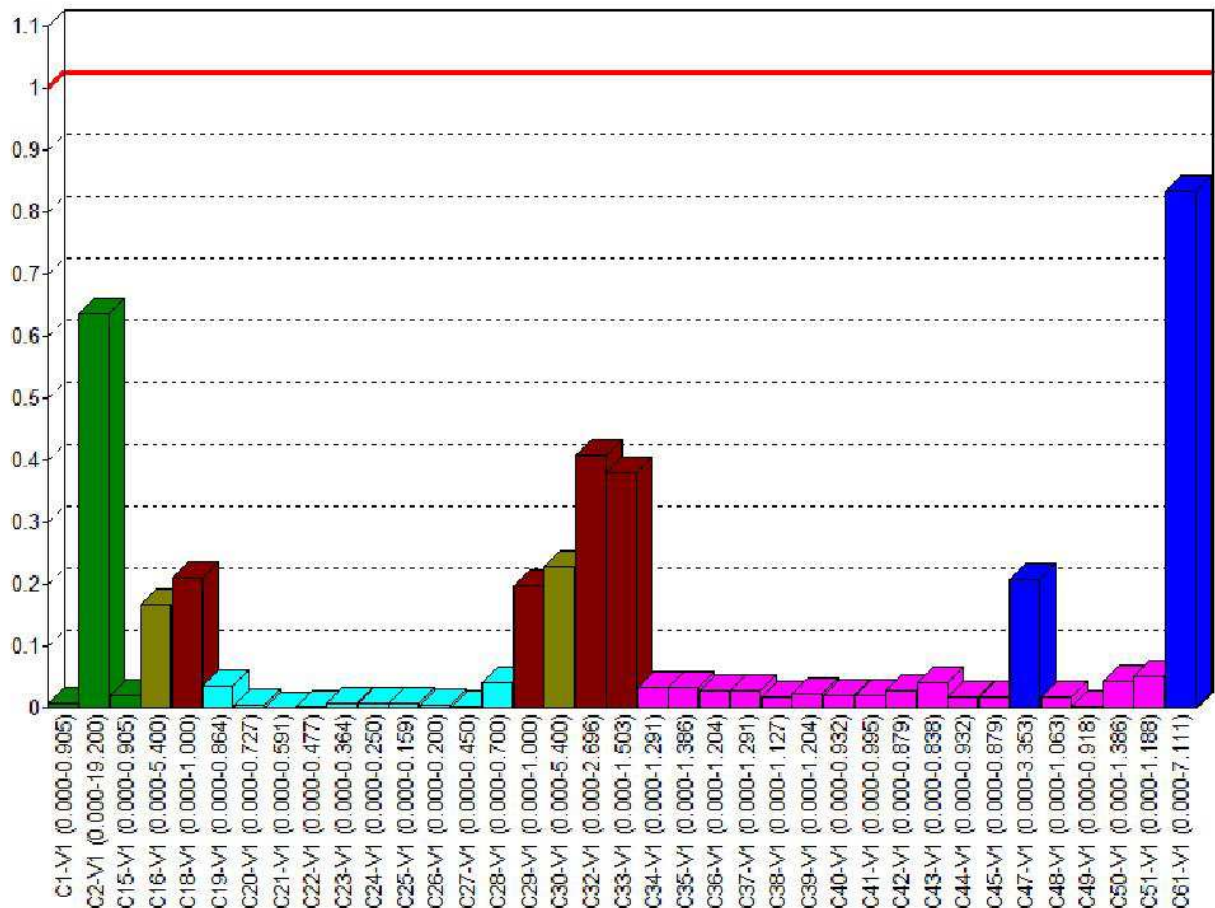
## EXTREME UNITY CHECK NEN-EN1993-1-1:2016/NB:2016

| Veld                 | Toetsing    | Combinatie | Artikel                   | UC max |
|----------------------|-------------|------------|---------------------------|--------|
| C1-V1 (0.000-0.905)  | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.01   |
| C2-V1 (0.000-19.200) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.64   |
| C15-V1 (0.000-0.905) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.02   |
| C16-V1 (0.000-5.400) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(NB.33)     | 0.17   |
| C18-V1 (0.000-1.000) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(NB.33)     | 0.21   |
| C19-V1 (0.000-0.864) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.46)      | 0.03   |
| C20-V1 (0.000-0.727) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.00   |
| C21-V1 (0.000-0.591) | Doorsnede   | Bi.C.1     | NEN-EN1993-1-1(6.9)       | 0.00   |
| C21-V1 (0.000-0.591) | Stabiliteit | Bi.C.1     | NEN-EN1993-1-1(6.46)      | 0.00   |
| C22-V1 (0.000-0.477) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.00   |
| C23-V1 (0.000-0.364) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.01   |
| C24-V1 (0.000-0.250) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.01   |
| C25-V1 (0.000-0.159) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.01   |
| C26-V1 (0.000-0.200) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.9)       | 0.01   |
| C26-V1 (0.000-0.200) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.46)      | 0.01   |
| C27-V1 (0.000-0.450) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.00   |
| C28-V1 (0.000-0.700) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.46)      | 0.04   |
| C29-V1 (0.000-1.000) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(NB.33)     | 0.20   |
| C30-V1 (0.000-5.400) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(NB.33)     | 0.23   |
| C32-V1 (0.000-2.696) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(NB.33)     | 0.41   |
| C33-V1 (0.000-1.503) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(NB.33)     | 0.38   |
| C34-V1 (0.000-1.291) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.03   |
| C35-V1 (0.000-1.386) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.03   |
| C36-V1 (0.000-1.204) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.03   |
| C37-V1 (0.000-1.291) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.03   |
| C38-V1 (0.000-1.127) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.02   |
| C39-V1 (0.000-1.204) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.02   |
| C40-V1 (0.000-0.932) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.02   |
| C41-V1 (0.000-0.995) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.02   |
| C42-V1 (0.000-0.879) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.03   |
| C43-V1 (0.000-0.838) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.04   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

| Veld                 | Toetsing    | Combinatie | Artikel                   | UC max |
|----------------------|-------------|------------|---------------------------|--------|
| C44-V1 (0.000-0.932) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.02   |
| C45-V1 (0.000-0.879) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.02   |
| C47-V1 (0.000-3.353) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(NB.33)     | 0.21   |
| C48-V1 (0.000-1.063) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.02   |
| C49-V1 (0.000-0.918) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.00   |
| C50-V1 (0.000-1.386) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.04   |
| C51-V1 (0.000-1.188) | Doorsnede   | Fu.C.2     | NEN-EN1993-1-1(6.5)       | 0.05   |
| C61-V1 (0.000-7.111) | Stabiliteit | Fu.C.2     | NEN-EN1993-1-1(6.61&6.62) | 0.83   |

#### AFB. STAAL UC DIAGRAM



#### STAALTOETS RESULTATEN MET PROFIELGEGEVENS NEN-EN1993-1-1:2016/NB:2016

Uitgangspunten berekening voor staalcontrole

Alpha;cr = 60.42 > 10;

Profielgegevens staaf C1-V1 (0.000-0.905)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N219.1/8                | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 219.1 mm            | A = 5.31e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 270.2e-06 m <sup>3</sup>  | W <sub>y</sub> ;pl = 356.7e-06 m <sup>3</sup>       |
| b = 219.1 mm            | I <sub>y</sub> = 296.0e-07 m <sup>4</sup> | W <sub>z</sub> ;el = 270.2e-06 m <sup>3</sup>  | W <sub>z</sub> ;pl = 356.7e-06 m <sup>3</sup>       |
| t <sub>f</sub> = 8.0 mm | I <sub>z</sub> = 296.0e-07 m <sup>4</sup> | A <sub>w</sub> ;y;el = 3.38e-03 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 3.38e-03 m <sup>2</sup>      |
| t <sub>w</sub> = 8.0 mm | Massa/m = 41.6 kg/m                       | A <sub>w</sub> ;z;el = 3.38e-03 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 3.38e-03 m <sup>2</sup>      |
| r = 101.5 mm            |                                           | I <sub>t</sub> = 591.9e-07 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

Doorsnedetoetsing C1-V1 (0.000-0.905)

|                                           |                  |                   |
|-------------------------------------------|------------------|-------------------|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                  | Profielklasse = 1 |
| N;Ed = 9.6 kN                             | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |
|                                           | Vz;Ed = 0.2 kN   | Mz;Ed = 0.0 kNm   |
| N;Rd = 1,459.0 kN                         | Vy;Rd = 536.3 kN | MyRd = 98.1 kNm   |
|                                           | Vz;Rd = 536.3 kN | MzRd = 98.1 kNm   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

NEN-EN1993-1-1(6.5): UC = 0.01 < 1

#### Kiptoetsing C1-V1 (0.000-0.905)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N219.1/8                                      |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.905 m     | lst = 0.905 m       |
| Lsys = 0.905 m                                               | Lg = 0.905 m           | S = 0.000 m          | lwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 0.905 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C1-V1 (0.000-0.905)

|                                     |                      |                      |                   |
|-------------------------------------|----------------------|----------------------|-------------------|
| Maatgevende combinatie: Fu.C.3      |                      |                      |                   |
| N;Ed = -0.3 kN                      | Nb;Rd;y = 1,459.0 kN | Nb;Rd;z = 1,459.0 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000        | Cb(y) = 0.000        | Lknik Y = 0.905 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B          | Cb(z) = N/B          | Lbuc Z = 0.905 m  |
| Chi;y = 1.00                        |                      | Knikcurve: A         |                   |
| Chi;z = 1.00                        |                      | Knikcurve: A         |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                      |                      |                   |

#### Buiging & Druk C1-V1 (0.000-0.905)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.3           |                       | Profielklasse = 1     |             |
| N;Ed = -0.3 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.950                              | Kyz = 0.600           | Kzy = 0.570           | Kzz = 1.000 |
| Chi;y = 1.00                             | Chi;z = 1.00          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |             |

#### Profielgegevens staaf C2-V1 (0.000-19.200)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N219.1/8     | Analyse             | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 219.1 mm | A = 5.31e-03 m2     | Wy;el = 270.2e-06 m3   | Wy;pl = 356.7e-06 m3       |
| b = 219.1 mm | Iy = 296.0e-07 m4   | Wz;el = 270.2e-06 m3   | Wz;pl = 356.7e-06 m3       |
| tf = 8.0 mm  | Iz = 296.0e-07 m4   | Aw;y;el = 3.38e-03 m2  | Aw;y;pl = 3.38e-03 m2      |
| tw = 8.0 mm  | Massa/m = 41.6 kg/m | Aw;z;el = 3.38e-03 m2  | Aw;z;pl = 3.38e-03 m2      |
| r = 101.5 mm |                     | It = 591.9e-07 m4      | lwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C2-V1 (0.000-19.200)

|                                           |                  |                   |  |
|-------------------------------------------|------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                  | Profielklasse = 1 |  |
| N;Ed = -41.6 kN                           | Vy;Ed = 5.0 kN   | My;Ed = -19.3 kNm |  |
|                                           | Vz;Ed = 22.6 kN  | Mz;Ed = 24.0 kNm  |  |
| N;Rd = 1,459.0 kN                         | Vy;Rd = 536.3 kN | MyRd = 98.1 kNm   |  |
|                                           | Vz;Rd = 536.3 kN | MzRd = 98.1 kNm   |  |
| NEN-EN1993-1-1(NB.33): UC = 0.31 < 1      |                  |                   |  |

#### Kiptoetsing C2-V1 (0.000-19.200)

|                                                        |  |                     |
|--------------------------------------------------------|--|---------------------|
| Equi. profiel: N219.1/8                                |  |                     |
| Maatgevende combinatie: Bi.C.1                         |  | Instab. curve Kip:d |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel |  |                     |
| Kipsteun bovenflens: N.v.t.                            |  |                     |
| Kipsteun onderflens: N.v.t.                            |  |                     |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                                                                        |                        |                      |                     |
|----------------------------------------------------------------------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.004 | b-eff(Eind) = 0.004 |
| Tabel gebruikt NB.NB.7                                                                 | M = -8.1kN/m           | MBeta = -7.5         | F = 2.1             |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 19.200 m    | lst = 19.200 m      |
| Lsys = 19.200 m                                                                        | Lg = 19.200 m          | S = 0.000 m          | lwa = 0.0000e+00 m6 |
| C1 = 2.30                                                                              | C2 = 1.56 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 6.6 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                                                        | lkip = 19.200 m        |                      | UC(z) = 0.00        |
| My;begin = -8.1 kNm                                                                    | My;eind = -7.5 kNm     |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                      |                     |

#### Stabiliteitstoetsing C2-V1 (0.000-19.200)

Maatgevende combinatie: Fu.C.2

|                                     |                    |                    |                    |
|-------------------------------------|--------------------|--------------------|--------------------|
| N;Ed = -52.6 kN                     | Nb;Rd;y = 154.9 kN | Nb;Rd;z = 154.9 kN |                    |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 19.200 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 19.200 m  |
| Chi;y = 0.11                        |                    | Knikcurve: A       |                    |
| Chi;z = 0.11                        |                    | Knikcurve: A       |                    |
| NEN-EN1993-1-1(6.46): UC = 0.34 < 1 |                    |                    |                    |

#### Buiging & Druk C2-V1 (0.000-19.200)

Maatgevende combinatie: Fu.C.2

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -52.6 kN                          | My;Ed = 19.3 kNm      | Profielklasse = 1     |             |
|                                          | Delta;My;Ed = 0.0 kNm | Mz;Ed = 24.0 kNm      |             |
|                                          |                       | Delta;Mz;Ed = 0.0 kNm |             |
| My = -19.3 kNm                           | My;Psi = -17.7 kNm    | My;s = 15.4 kNm       |             |
| Mz = 24.0 kNm                            | Mz;Psi = 0.0 kNm      | Mz;s = 12.0 kNm       |             |
| Cmy = 0.74                               | Cmz = 0.60            | CmLT = 0.74           |             |
| Kyy = 0.939                              | Kyz = 0.458           | Kzy = 0.563           | Kzz = 0.763 |
| Chi;y = 0.11                             | Chi;z = 0.11          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.64 < 1 |                       |                       |             |

#### Profielgegevens staaf C15-V1 (0.000-0.905)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N219.1/8     | Analyse             | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 219.1 mm | A = 5.31e-03 m2     | Wy;el = 270.2e-06 m3   | Wy;pl = 356.7e-06 m3       |
| b = 219.1 mm | Iy = 296.0e-07 m4   | Wz;el = 270.2e-06 m3   | Wz;pl = 356.7e-06 m3       |
| tf = 8.0 mm  | Iz = 296.0e-07 m4   | Aw;y;el = 3.38e-03 m2  | Aw;y;pl = 3.38e-03 m2      |
| tw = 8.0 mm  | Massa/m = 41.6 kg/m | Aw;z;el = 3.38e-03 m2  | Aw;z;pl = 3.38e-03 m2      |
| r = 101.5 mm |                     | It = 591.9e-07 m4      | lwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C15-V1 (0.000-0.905)

Maatgevende combinatie: Fu.C.2 op 0.000 m

|                   |                  |                 |                   |
|-------------------|------------------|-----------------|-------------------|
| N;Ed = 28.2 kN    | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm | Profielklasse = 1 |
|                   | Vz;Ed = 0.2 kN   | Mz;Ed = 0.0 kNm |                   |
| N;Rd = 1,459.0 kN | Vy;Rd = 536.3 kN | MyRd = 98.1 kNm |                   |
|                   | Vz;Rd = 536.3 kN | MzRd = 98.1 kNm |                   |

NEN-EN1993-1-1(6.5): UC = 0.02 < 1

#### Kiptoetsing C15-V1 (0.000-0.905)

Equi. profiel: N219.1/8

Maatgevende combinatie: Bi.C.1

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                            |                        |                      |                     |
|----------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund    | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4) | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend      | Xb;lst = 0.000 m       | Xe;lst = 0.905 m     | lst = 0.905 m       |
| Lsys = 0.905 m             | Lg = 0.905 m           | S = 0.000 m          | lwa = 0.0000e+00 m6 |
| C1 = 1.04                  | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm              | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00      | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00            | lkip = 0.905 m         |                      | UC(z) = 0.00        |

|                                                                                        |                                           |                                           |                                         |
|----------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------|-----------------------------------------|
|                                                                                        |                                           |                                           |                                         |
| My;begin = 0.0 kNm<br>NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging     |                                           |                                           |                                         |
| Stabiliteitstoetsing C15-V1 (0.000-0.905)                                              |                                           |                                           |                                         |
| Maatgevende combinatie: Fu.C.3                                                         |                                           |                                           |                                         |
| N;Ed = -1.4 kN                                                                         | Nb;Rd;y = 1,459.0 kN                      | Nb;Rd;z = 1,459.0 kN                      |                                         |
| Methode Y = Cons. gesch.                                                               | Ca(y) = 0.000                             | Cb(y) = 0.000                             | Lknik Y = 0.905 m                       |
| Methode Z = Cons. gesch.                                                               | Ca(z) = N/B                               | Cb(z) = N/B                               | Lbuc Z = 0.905 m                        |
| Chi;y = 1.00                                                                           |                                           | Knikcurve: A                              |                                         |
| Chi;z = 1.00                                                                           |                                           | Knikcurve: A                              |                                         |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1                                                    |                                           |                                           |                                         |
| Buiging & Druk C15-V1 (0.000-0.905)                                                    |                                           |                                           |                                         |
| Maatgevende combinatie: Fu.C.3                                                         |                                           | Profielklasse = 1                         |                                         |
| N;Ed = -1.4 kN                                                                         | My;Ed = 0.0 kNm                           | Mz;Ed = 0.0 kNm                           |                                         |
|                                                                                        | Delta;My;Ed = 0.0 kNm                     | Delta;Mz;Ed = 0.0 kNm                     |                                         |
| My = 0.0 kNm                                                                           | My;Psi = 0.0 kNm                          | My;s = 0.0 kNm                            |                                         |
| Mz = 0.0 kNm                                                                           | Mz;Psi = 0.0 kNm                          | Mz;s = 0.0 kNm                            |                                         |
| Cmy = 0.95                                                                             | Cmz = 1.00                                | CmLT = 0.95                               |                                         |
| Kyy = 0.950                                                                            | Kyz = 0.600                               | Kzy = 0.570                               | Kzz = 1.000                             |
| Chi;y = 1.00                                                                           | Chi;z = 1.00                              | Chi;LT = 1.00                             |                                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1                                               |                                           |                                           |                                         |
| Profielgegevens staaf C16-V1 (0.000-5.400)                                             |                                           |                                           |                                         |
| N267/8                                                                                 | Analyse                                   | Staal S275H(EN10210-1)                    | f <sub>yd</sub> (toegepast) = 275 N/mm2 |
| h = 267.0 mm                                                                           | A = 6.51e-03 m2                           | Wy;el = 409.2e-06 m3                      | Wy;pl = 536.8e-06 m3                    |
| b = 267.0 mm                                                                           | I <sub>y</sub> = 546.3e-07 m4             | Wz;el = 409.2e-06 m3                      | Wz;pl = 536.8e-06 m3                    |
| t <sub>f</sub> = 8.0 mm                                                                | I <sub>z</sub> = 546.3e-07 m4             | Aw;y;el = 4.14e-03 m2                     | Aw;y;pl = 4.14e-03 m2                   |
| tw = 8.0 mm                                                                            | Massa/m = 51.1 kg/m                       | Aw;z;el = 4.14e-03 m2                     | Aw;z;pl = 4.14e-03 m2                   |
| r = 125.5 mm                                                                           |                                           | I <sub>t</sub> = 109.3e-06 m4             | I <sub>wa</sub> = 0.0e-02 m6            |
| Doorsnedetoetsing C16-V1 (0.000-5.400)                                                 |                                           |                                           |                                         |
| Maatgevende combinatie: Fu.C.2 op 2.860 m                                              |                                           | Profielklasse = 1                         |                                         |
| N;Ed = -1.8 kN                                                                         | V <sub>y</sub> ;Ed = 0.0 kN               | My;Ed = 24.4 kNm                          |                                         |
|                                                                                        | V <sub>z</sub> ;Ed = 9.6 kN               | Mz;Ed = 0.0 kNm                           |                                         |
| N;Rd = 1,790.1 kN                                                                      | V <sub>y</sub> ;Rd = 657.9 kN             | MyRd = 147.6 kNm                          |                                         |
|                                                                                        | V <sub>z</sub> ;Rd = 657.9 kN             | MzRd = 147.6 kNm                          |                                         |
| NEN-EN1993-1-1(NB.33): UC = 0.17 < 1                                                   |                                           |                                           |                                         |
| Kiptoetsing C16-V1 (0.000-5.400)                                                       |                                           |                                           |                                         |
| Equi. profiel: N267/8                                                                  |                                           |                                           |                                         |
| Maatgevende combinatie: Bi.C.1                                                         |                                           | Instab. curve Kip:d                       |                                         |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                                           |                                           |                                         |
| Kipsteun bovenflens: N.v.t.                                                            |                                           |                                           |                                         |
| Kipsteun onderflens: N.v.t.                                                            |                                           |                                           |                                         |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund                    | b-eff(Begin) = 0.000                      | b-eff(Eind) = 0.000                     |
| Tabel gebruikt NB.NB.7                                                                 | M = 8.6kN/m                               | MBeta = 0.0                               | F = 6.0                                 |
| Bovenflens maatgevend                                                                  | X <sub>b</sub> ;I <sub>st</sub> = 0.000 m | X <sub>e</sub> ;I <sub>st</sub> = 5.400 m | I <sub>st</sub> = 5.400 m               |
| L <sub>sys</sub> = 5.400 m                                                             | L <sub>g</sub> = 5.400 m                  | S = 0.000 m                               | I <sub>wa</sub> = 0.0000e+00 m6         |
| C1 = 2.30                                                                              | C2 = 1.10 (tabel)                         | C2(toegepast) = 0.00                      | C = 0.00                                |
| M <sub>cr</sub> = 0.0 kNm                                                              | k <sub>red</sub> = 1.0                    | Lam-rel = 0.00                            | Profielklasse 1                         |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 10.0 kNm                           |                                           | UC(y) = 0.00                            |
| Chi;LT,Z = 1.00                                                                        | I <sub>kip</sub> = 5.400 m                |                                           | UC(z) = 0.00                            |
| My;begin = 8.6 kNm                                                                     | My;eind = 0.0 kNm                         |                                           |                                         |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                                           |                                           |                                         |
| Stabiliteitstoetsing C16-V1 (0.000-5.400)                                              |                                           |                                           |                                         |
| Maatgevende combinatie: Fu.C.2                                                         |                                           |                                           |                                         |
| N;Ed = -18.9 kN                                                                        | Nb;Rd;y = 786.0 kN                        | Nb;Rd;z = 786.0 kN                        |                                         |
| Methode Y = Handmatige Invoer                                                          | Ca(y) = 0.000                             | Cb(y) = 0.000                             | Lknik Y = 10.800 m                      |
| Methode Z = Handmatige Invoer                                                          | Ca(z) = N/B                               | Cb(z) = N/B                               | Lbuc Z = 10.800 m                       |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Chi;y = 0.44  
Chi;z = 0.44  
NEN-EN1993-1-1(6.46): UC = 0.02 < 1

Knikcurve: A  
Knikcurve: A

#### Buiging & Druk C16-V1 (0.000-5.400)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.2           |                       | Profielklasse = 1     |             |
| N;Ed = -18.9 kN                          | My;Ed = 24.4 kNm      | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 20.2 kNm                            | My;Psi = 0.0 kNm      | My;s = -16.6 kNm      |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.75                               | Cmz = 1.00            | CmLT = 0.75           |             |
| Kyy = 0.769                              | Kyz = 0.612           | Kzy = 0.462           | Kzz = 1.019 |
| Chi;y = 0.44                             | Chi;z = 0.44          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.15 < 1 |                       |                       |             |

#### Profielgegevens staaf C18-V1 (0.000-1.000)

|              |                               |                                   |                                                     |
|--------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N244.5/6.3   | Analyse                       | Staal S275H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 244.5 mm | A = 4.71e-03 m <sup>2</sup>   | Wy;el = 273.7e-06 m <sup>3</sup>  | Wy;pl = 357.5e-06 m <sup>3</sup>                    |
| b = 244.5 mm | Iy = 334.6e-07 m <sup>4</sup> | Wz;el = 273.7e-06 m <sup>3</sup>  | Wz;pl = 357.5e-06 m <sup>3</sup>                    |
| tf = 6.3 mm  | Iz = 334.6e-07 m <sup>4</sup> | Aw;y;el = 3.00e-03 m <sup>2</sup> | Aw;y;pl = 3.00e-03 m <sup>2</sup>                   |
| tw = 6.3 mm  | Massa/m = 37.0 kg/m           | Aw;z;el = 3.00e-03 m <sup>2</sup> | Aw;z;pl = 3.00e-03 m <sup>2</sup>                   |
| r = 116.0 mm |                               | It = 669.2e-07 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C18-V1 (0.000-1.000)

|                                           |                     |                    |                    |
|-------------------------------------------|---------------------|--------------------|--------------------|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                     | Profielklasse = 1  |                    |
| Nx;Ed = 2.1 kN                            | Vy;Ed = 0.0 kN      | My;Ed = -20.7 kNm  |                    |
|                                           | Vz;Ed = 20.7 kN     | Mz;Ed = 0.0 kNm    |                    |
| Nc;Rd = 1,296.5 kN                        | Vy;Rd = 476.5 kN    | My;Rd = 98.3 kNm   |                    |
|                                           | Vz;Rd = 476.5 kN    | Mz;Rd = 98.3 kNm   |                    |
| NVy;Rd = 1,296.5 kN                       | NVz;Rd = 1,296.5 kN | MV;y;Rd = 98.3 kNm | MV;z;Rd = 98.3 kNm |
| NEN-EN1993-1-1(NB.33): UC = 0.21 < 1      |                     |                    |                    |

#### Kiptoetsing C18-V1 (0.000-1.000)

|                                                                  |                        |                      |                                 |
|------------------------------------------------------------------|------------------------|----------------------|---------------------------------|
| Equi. profiel: N244.5/6.3                                        |                        |                      |                                 |
| Maatgevende combinatie: Bi.C.1                                   |                        | Instab. curve Kip:d  |                                 |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel           |                        |                      |                                 |
| Kipsteun bovenflens: N.v.t.                                      |                        |                      |                                 |
| Kipsteun onderflens: N.v.t.                                      |                        |                      |                                 |
| Inklem. begin: Gesteund                                          | Beperk. eind: Gesteund | b-eff(Begin) = 0.005 | b-eff(Eind) = 0.005             |
| Tabel gebruikt NB.NB.1 (1)                                       | M = -8.8kN/m           | MBeta = 0.0          |                                 |
| Bovenflens maatgevend                                            | Xb;lst = 0.000 m       | Xe;lst = 1.000 m     | lst = 1.000 m                   |
| Lsys = 1.000 m                                                   | Lg = 1.000 m           | S = 0.000 m          | Iwa = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.75                                                        | C2 = 0.00 (tabel)      | C2(toegepast) = 0.00 | C = 0.00                        |
| Mcr = 0.0 kNm                                                    | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1                 |
| Chi;LT(Bi.C.1) = 1.00                                            | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00                    |
| Chi;LT,Z = 1.00                                                  | Ikip = 1.000 m         |                      | UC(z) = 0.00                    |
| My;begin = -8.8 kNm                                              | My;eind = 0.0 kNm      |                      |                                 |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: flens onder trek |                        |                      |                                 |

#### Stabiliteitstoetsing C18-V1 (0.000-1.000)

|                                     |                      |                      |                   |
|-------------------------------------|----------------------|----------------------|-------------------|
| Maatgevende combinatie: Fu.C.3      |                      |                      |                   |
| N;Ed = -0.9 kN                      | Nb;Rd;y = 1,296.5 kN | Nb;Rd;z = 1,296.5 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000        | Cb(y) = 0.000        | Lknik Y = 1.000 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B          | Cb(z) = N/B          | Lbuc Z = 1.000 m  |
| Chi;y = 1.00                        |                      | Knikcurve: A         |                   |
| Chi;z = 1.00                        |                      | Knikcurve: A         |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                      |                      |                   |

#### Buiging & Druk C18-V1 (0.000-1.000)

|                                |                 |                   |  |
|--------------------------------|-----------------|-------------------|--|
| Maatgevende combinatie: Fu.C.3 |                 | Profielklasse = 1 |  |
| N;Ed = -0.9 kN                 | My;Ed = 1.2 kNm | Mz;Ed = 0.0 kNm   |  |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 1.2 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.6 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.60                               | Cmz = 1.00            | CmLT = 0.60           |             |
| Kyy = 0.600                              | Kyz = 0.600           | Kzy = 0.360           | Kzz = 1.000 |
| Chi;y = 1.00                             | Chi;z = 1.00          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1 |                       |                       |             |

#### Profielgegevens staaf C19-V1 (0.000-0.864)

|              |                                           |                                           |                                                     |
|--------------|-------------------------------------------|-------------------------------------------|-----------------------------------------------------|
| N114.3/4     | Analyse                                   | Staal S275H(EN10210-1)                    | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 114.3 mm | A = 1.39e-03 m <sup>2</sup>               | Wy;el = 369.3e-07 m <sup>3</sup>          | Wy;pl = 486.9e-07 m <sup>3</sup>                    |
| b = 114.3 mm | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | Wz;el = 369.3e-07 m <sup>3</sup>          | Wz;pl = 486.9e-07 m <sup>3</sup>                    |
| tf = 4.0 mm  | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | Aw;y;el = 8.82e-04 m <sup>2</sup>         | Aw;y;pl = 8.82e-04 m <sup>2</sup>                   |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m                       | Aw;z;el = 8.82e-04 m <sup>2</sup>         | Aw;z;pl = 8.82e-04 m <sup>2</sup>                   |
| r = 53.1 mm  |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup> | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C19-V1 (0.000-0.864)

|                                           |                  |                   |                  |
|-------------------------------------------|------------------|-------------------|------------------|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                  | Profielklasse = 1 |                  |
| Nx;Ed = -13.2 kN                          | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |                  |
|                                           | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |                  |
| Nc;Rd = 381.2 kN                          | Vy;Rd = 140.1 kN | My;Rd = 13.4 kNm  |                  |
|                                           | Vz;Rd = 140.1 kN | Mz;Rd = 13.4 kNm  |                  |
| NVy;Rd = 0.0 kN                           | NVz;Rd = 0.0 kN  | MVy;Rd = 0.0 kNm  | MVz;Rd = 0.0 kNm |
| NEN-EN1993-1-1(6.9): UC = 0.03 < 1        |                  |                   |                  |

#### Kiptoetsing C19-V1 (0.000-0.864)

|                                                              |                        |                      |                                             |
|--------------------------------------------------------------|------------------------|----------------------|---------------------------------------------|
| Equi. profiel: N114.3/4                                      |                        | Instab. curve Kip:d  |                                             |
| Maatgevende combinatie: Bi.C.1                               |                        |                      |                                             |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                                             |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                                             |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                                             |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000                         |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                                             |
| Bovenflens maatgevend                                        | Xb;Ist = 0.000 m       | Xe;Ist = 0.864 m     | Ist = 0.864 m                               |
| Lsys = 0.864 m                                               | Lg = 0.864 m           | S = 0.000 m          | I <sub>wa</sub> = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00                                    |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1                             |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00                                |
| Chi;LT,Z = 1.00                                              | Ikip = 0.864 m         |                      | UC(z) = 0.00                                |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                                             |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                                             |

#### Stabiliteitstoetsing C19-V1 (0.000-0.864)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.2      |                    |                    |                   |
| N;Ed = -13.2 kN                     | Nb;Rd;y = 376.5 kN | Nb;Rd;z = 376.5 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.864 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 0.864 m  |
| Chi;y = 0.99                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.99                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.03 < 1 |                    |                    |                   |

#### Buiging & Druk C19-V1 (0.000-0.864)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.2           |                       | Profielklasse = 1     |             |
| N;Ed = -13.2 kN                          | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |             |
| Kyy = 1.002                              | Kyz = 0.601           | Kzy = 0.601           | Kzz = 1.002 |
| Chi;y = 0.99                             | Chi;z = 0.99          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.03 < 1 |                       |                       |             |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C20-V1 (0.000-0.727)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| b = 114.3 mm            | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | W <sub>z</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | A <sub>w</sub> ;y;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 8.82e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 10.9 kg/m                       | A <sub>w</sub> ;z;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 8.82e-04 m <sup>2</sup>      |
| r = 53.1 mm             |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C20-V1 (0.000-0.727)

|                                           |                               |                               |                               |
|-------------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.2 op 0.606 m |                               | Profielklasse = 1             |                               |
| N <sub>x</sub> ;Ed = 1.8 kN               | V <sub>y</sub> ;Ed = 0.0 kN   | M <sub>y</sub> ;Ed = 0.0 kNm  |                               |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN   | M <sub>z</sub> ;Ed = 0.0 kNm  |                               |
| N <sub>c</sub> ;Rd = 381.2 kN             | V <sub>y</sub> ;Rd = 140.1 kN | M <sub>y</sub> ;Rd = 13.4 kNm |                               |
|                                           | V <sub>z</sub> ;Rd = 140.1 kN | M <sub>z</sub> ;Rd = 13.4 kNm |                               |
| NV <sub>y</sub> ;Rd = 0.0 kN              | NV <sub>z</sub> ;Rd = 0.0 kN  | MV <sub>y</sub> ;Rd = 0.0 kNm | MV <sub>z</sub> ;Rd = 0.0 kNm |
| NEN-EN1993-1-1(6.5): UC = 0.00 < 1        |                               |                               |                               |

#### Kiptoetsing C20-V1 (0.000-0.727)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                      |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.727 m     | lst = 0.727 m       |
| Lsys = 0.727 m                                               | Lg = 0.727 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 0.727 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Profielgegevens staaf C21-V1 (0.000-0.591)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| b = 114.3 mm            | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | W <sub>z</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | A <sub>w</sub> ;y;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 8.82e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 10.9 kg/m                       | A <sub>w</sub> ;z;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 8.82e-04 m <sup>2</sup>      |
| r = 53.1 mm             |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C21-V1 (0.000-0.591)

|                                           |                                |                                |                                |
|-------------------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Maatgevende combinatie: Bi.C.1 op 0.000 m |                                | Profielklasse = 1              |                                |
| N <sub>x</sub> ;Ed = -0.4 kN              | V <sub>y</sub> ;Ed = 0.0 kN    | M <sub>y</sub> ;Ed = 0.0 kNm   |                                |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN    | M <sub>z</sub> ;Ed = 0.0 kNm   |                                |
| N <sub>c</sub> ;Rd = 381.2 kN             | V <sub>y</sub> ;Rd = 140.1 kN  | M <sub>y</sub> ;Rd = 13.4 kNm  |                                |
|                                           | V <sub>z</sub> ;Rd = 140.1 kN  | M <sub>z</sub> ;Rd = 13.4 kNm  |                                |
| NV <sub>y</sub> ;Rd = 381.2 kN            | NV <sub>z</sub> ;Rd = 381.2 kN | MV <sub>y</sub> ;Rd = 13.4 kNm | MV <sub>z</sub> ;Rd = 13.4 kNm |
| NEN-EN1993-1-1(6.9): UC = 0.00 < 1        |                                |                                |                                |

#### Kiptoetsing C21-V1 (0.000-0.591)

|                                                        |                        |                      |                     |
|--------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                         |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                            |                        |                      |                     |
| Inklem. begin: Gesteund                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                             | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                  | Xb;lst = 0.000 m       | Xe;lst = 0.591 m     | lst = 0.591 m       |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                                              |                   |                      |                     |
|--------------------------------------------------------------|-------------------|----------------------|---------------------|
| Lsys = 0.591 m                                               | Lg = 0.591 m      | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel) | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0        | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm    |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 0.591 m    |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                   |                      |                     |

#### Stabiliteitstoetsing C21-V1 (0.000-0.591)

Maatgevende combinatie: Bi.C.1

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| N;Ed = -0.4 kN                      | Nb;Rd;y = 381.2 kN | Nb;Rd;z = 381.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.591 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 0.591 m  |
| Chi;y = 1.00                        |                    | Knikcurve: A       |                   |
| Chi;z = 1.00                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                    |                    |                   |

#### Buiging & Druk C21-V1 (0.000-0.591)

Maatgevende combinatie: Bi.C.1

|                                          |                       |                       |                   |
|------------------------------------------|-----------------------|-----------------------|-------------------|
| N;Ed = -0.4 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       | Profielklasse = 1 |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |                   |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |                   |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |                   |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |                   |
| Kyy = 1.000                              | Kyz = 0.600           | Kzy = 0.600           | Kzz = 1.000       |
| Chi;y = 1.00                             | Chi;z = 1.00          | Chi;LT = 1.00         |                   |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |                   |

#### Profielgegevens staaf C22-V1 (0.000-0.477)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | Iy = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | Iz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C22-V1 (0.000-0.477)

Maatgevende combinatie: Fu.C.2 op 0.318 m

|                 |                  |                 |
|-----------------|------------------|-----------------|
| N;Ed = 1.1 kN   | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm |
|                 | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm |
| N;Rd = 381.2 kN | Vy;Rd = 140.1 kN | MyRd = 13.4 kNm |
|                 | Vz;Rd = 140.1 kN | MzRd = 13.4 kNm |

NEN-EN1993-1-1(6.5): UC = 0.00 < 1

#### Kiptoetsing C22-V1 (0.000-0.477)

Equi. profiel: N114.3/4

Maatgevende combinatie: Bi.C.1

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.477 m     | lst = 0.477 m       |
| Lsys = 0.477 m                                               | Lg = 0.477 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 0.477 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C23-V1 (0.000-0.364)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| b = 114.3 mm            | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | W <sub>z</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | A <sub>w</sub> ;y;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 8.82e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 10.9 kg/m                       | A <sub>w</sub> ;z;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 8.82e-04 m <sup>2</sup>      |
| r = 53.1 mm             |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C23-V1 (0.000-0.364)

|                                           |                               |                              |  |
|-------------------------------------------|-------------------------------|------------------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.303 m |                               | Profielklasse = 1            |  |
| N;Ed = 2.5 kN                             | V <sub>y</sub> ;Ed = 0.0 kN   | M <sub>y</sub> ;Ed = 0.0 kNm |  |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN   | M <sub>z</sub> ;Ed = 0.0 kNm |  |
| N;Rd = 381.2 kN                           | V <sub>y</sub> ;Rd = 140.1 kN | M <sub>y</sub> Rd = 13.4 kNm |  |
|                                           | V <sub>z</sub> ;Rd = 140.1 kN | M <sub>z</sub> Rd = 13.4 kNm |  |
| NEN-EN1993-1-1(6.5): UC = 0.01 < 1        |                               |                              |  |

#### Kiptoetsing C23-V1 (0.000-0.364)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                      |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.364 m     | lst = 0.364 m       |
| Lsys = 0.364 m                                               | Lg = 0.364 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 0.364 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Profielgegevens staaf C24-V1 (0.000-0.250)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| b = 114.3 mm            | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | W <sub>z</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | A <sub>w</sub> ;y;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 8.82e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 10.9 kg/m                       | A <sub>w</sub> ;z;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 8.82e-04 m <sup>2</sup>      |
| r = 53.1 mm             |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C24-V1 (0.000-0.250)

|                                           |                               |                              |  |
|-------------------------------------------|-------------------------------|------------------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                               | Profielklasse = 1            |  |
| N;Ed = 2.9 kN                             | V <sub>y</sub> ;Ed = 0.0 kN   | M <sub>y</sub> ;Ed = 0.0 kNm |  |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN   | M <sub>z</sub> ;Ed = 0.0 kNm |  |
| N;Rd = 381.2 kN                           | V <sub>y</sub> ;Rd = 140.1 kN | M <sub>y</sub> Rd = 13.4 kNm |  |
|                                           | V <sub>z</sub> ;Rd = 140.1 kN | M <sub>z</sub> Rd = 13.4 kNm |  |
| NEN-EN1993-1-1(6.5): UC = 0.01 < 1        |                               |                              |  |

#### Kiptoetsing C24-V1 (0.000-0.250)

|                                                        |                        |                      |                     |
|--------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                         |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                            |                        |                      |                     |
| Inklem. begin: Gesteund                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                             | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                  | Xb;lst = 0.000 m       | Xe;lst = 0.250 m     | lst = 0.250 m       |
| Lsys = 0.250 m                                         | Lg = 0.250 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                              | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                  | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Chi;LT,Z = 1.00                      lkip = 0.250 m                      UC(z) = 0.00  
My;begin = 0.0 kNm                      My;eind = 0.0 kNm  
NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging

#### Stabiliteitstoetsing C24-V1 (0.000-0.250)

Maatgevende combinatie: Fu.C.3

|                          |                    |                    |                   |
|--------------------------|--------------------|--------------------|-------------------|
| N;Ed = -0.2 kN           | Nb;Rd;y = 381.2 kN | Nb;Rd;z = 381.2 kN |                   |
| Methode Y = Cons. gesch. | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.250 m |
| Methode Z = Cons. gesch. | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 0.250 m  |
| Chi;y = 1.00             |                    | Knikcurve: A       |                   |
| Chi;z = 1.00             |                    | Knikcurve: A       |                   |

NEN-EN1993-1-1(6.46): UC = 0.00 < 1

#### Buiging & Druk C24-V1 (0.000-0.250)

|                                |                       |                       |
|--------------------------------|-----------------------|-----------------------|
| Maatgevende combinatie: Fu.C.3 |                       | Profielklasse = 1     |
| N;Ed = -0.2 kN                 | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |
|                                | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |
| My = 0.0 kNm                   | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |
| Mz = 0.0 kNm                   | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |
| Cmy = 1.00                     | Cmz = 1.00            | CmLT = 1.00           |
| Kyy = 1.000                    | Kyz = 0.600           | Kzy = 0.600           |
| Chi;y = 1.00                   | Chi;z = 1.00          | Chi;LT = 1.00         |

NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1

Kzz = 1.000

#### Profielgegevens staaf C25-V1 (0.000-0.159)

|              |                     |                        |                            |
|--------------|---------------------|------------------------|----------------------------|
| N114.3/4     | Analyse             | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 114.3 mm | A = 1.39e-03 m2     | Wy;el = 369.3e-07 m3   | Wy;pl = 486.9e-07 m3       |
| b = 114.3 mm | Iy = 211.1e-08 m4   | Wz;el = 369.3e-07 m3   | Wz;pl = 486.9e-07 m3       |
| tf = 4.0 mm  | Iz = 211.1e-08 m4   | Aw;y;el = 8.82e-04 m2  | Aw;y;pl = 8.82e-04 m2      |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m | Aw;z;el = 8.82e-04 m2  | Aw;z;pl = 8.82e-04 m2      |
| r = 53.1 mm  |                     | It = 422.1e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C25-V1 (0.000-0.159)

|                                           |                  |                   |
|-------------------------------------------|------------------|-------------------|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                  | Profielklasse = 1 |
| N;Ed = 2.7 kN                             | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |
|                                           | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |
| N;Rd = 381.2 kN                           | Vy;Rd = 140.1 kN | MyRd = 13.4 kNm   |
|                                           | Vz;Rd = 140.1 kN | MzRd = 13.4 kNm   |

NEN-EN1993-1-1(6.5): UC = 0.01 < 1

#### Kiptoetsing C25-V1 (0.000-0.159)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                      |                        | Instab. curve Kip:d  |                     |
| Maatgevende combinatie: Bi.C.1                               |                        |                      |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.159 m     | lst = 0.159 m       |
| Lsys = 0.159 m                                               | Lg = 0.159 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 0.159 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C25-V1 (0.000-0.159)

|                                |                    |                    |                   |
|--------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.3 |                    |                    |                   |
| N;Ed = -0.1 kN                 | Nb;Rd;y = 381.2 kN | Nb;Rd;z = 381.2 kN |                   |
| Methode Y = Cons. gesch.       | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.159 m |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Methode Z = Cons. gesch.      Ca(z) = N/B      Cb(z) = N/B      Lbuc Z = 0.159 m  
Chi;y = 1.00      Knikcurve: A  
Chi;z = 1.00      Knikcurve: A  
NEN-EN1993-1-1(6.46): UC = 0.00 < 1

#### Buiging & Druk C25-V1 (0.000-0.159)

|                                          |                       |                       |
|------------------------------------------|-----------------------|-----------------------|
| Maatgevende combinatie: Fu.C.3           |                       | Profielklasse = 1     |
| N;Ed = -0.1 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |
| Kyy = 1.000                              | Kyz = 0.600           | Kzy = 0.600           |
| Chi;y = 1.00                             | Chi;z = 1.00          | Chi;LT = 1.00         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       | Kzz = 1.000           |

#### Profielgegevens staaf C26-V1 (0.000-0.200)

|                         |                               |                                   |                                                     |
|-------------------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                       | Staal S275H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>   | Wy;el = 369.3e-07 m <sup>3</sup>  | Wy;pl = 486.9e-07 m <sup>3</sup>                    |
| b = 114.3 mm            | Iy = 211.1e-08 m <sup>4</sup> | Wz;el = 369.3e-07 m <sup>3</sup>  | Wz;pl = 486.9e-07 m <sup>3</sup>                    |
| t <sub>f</sub> = 4.0 mm | Iz = 211.1e-08 m <sup>4</sup> | Aw;y;el = 8.82e-04 m <sup>2</sup> | Aw;y;pl = 8.82e-04 m <sup>2</sup>                   |
| tw = 4.0 mm             | Massa/m = 10.9 kg/m           | Aw;z;el = 8.82e-04 m <sup>2</sup> | Aw;z;pl = 8.82e-04 m <sup>2</sup>                   |
| r = 53.1 mm             |                               | It = 422.1e-08 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C26-V1 (0.000-0.200)

|                                           |                  |                   |
|-------------------------------------------|------------------|-------------------|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                  | Profielklasse = 1 |
| N;Ed = -2.1 kN                            | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |
|                                           | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |
| N;Rd = 381.2 kN                           | Vy;Rd = 140.1 kN | MyRd = 13.4 kNm   |
|                                           | Vz;Rd = 140.1 kN | MzRd = 13.4 kNm   |
| NEN-EN1993-1-1(6.9): UC = 0.01 < 1        |                  |                   |

#### Kiptoetsing C26-V1 (0.000-0.200)

|                                                              |                        |                      |                                 |
|--------------------------------------------------------------|------------------------|----------------------|---------------------------------|
| Equi. profiel: N114.3/4                                      |                        | Instab. curve Kip:d  |                                 |
| Maatgevende combinatie: Bi.C.1                               |                        |                      |                                 |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                                 |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                                 |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                                 |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000             |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                                 |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.200 m     | Ist = 0.200 m                   |
| Lsys = 0.200 m                                               | Lg = 0.200 m           | S = 0.000 m          | Iwa = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00                        |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1                 |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00                    |
| Chi;LT,Z = 1.00                                              | lkip = 0.200 m         |                      | UC(z) = 0.00                    |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                                 |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                                 |

#### Stabiliteitstoetsing C26-V1 (0.000-0.200)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.2      |                    |                    |                   |
| N;Ed = -2.1 kN                      | Nb;Rd;y = 381.2 kN | Nb;Rd;z = 381.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.200 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 0.200 m  |
| Chi;y = 1.00                        |                    | Knikcurve: A       |                   |
| Chi;z = 1.00                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.01 < 1 |                    |                    |                   |

#### Buiging & Druk C26-V1 (0.000-0.200)

|                                |                 |                   |
|--------------------------------|-----------------|-------------------|
| Maatgevende combinatie: Fu.C.2 |                 | Profielklasse = 1 |
| N;Ed = -2.1 kN                 | My;Ed = 0.0 kNm | Mz;Ed = 0.0 kNm   |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |             |
| Kyy = 0.999                              | Kyz = 0.600           | Kzy = 0.600           | Kzz = 0.999 |
| Chi;y = 1.00                             | Chi;z = 1.00          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1 |                       |                       |             |

#### Profielgegevens staaf C27-V1 (0.000-0.450)

|              |                                           |                                           |                                                     |
|--------------|-------------------------------------------|-------------------------------------------|-----------------------------------------------------|
| N114.3/4     | Analyse                                   | Staal S275H(EN10210-1)                    | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 114.3 mm | A = 1.39e-03 m <sup>2</sup>               | Wy;el = 369.3e-07 m <sup>3</sup>          | Wy;pl = 486.9e-07 m <sup>3</sup>                    |
| b = 114.3 mm | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | Wz;el = 369.3e-07 m <sup>3</sup>          | Wz;pl = 486.9e-07 m <sup>3</sup>                    |
| tf = 4.0 mm  | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | Aw;y;el = 8.82e-04 m <sup>2</sup>         | Aw;y;pl = 8.82e-04 m <sup>2</sup>                   |
| tw = 4.0 mm  | Massa/m = 10.9 kg/m                       | Aw;z;el = 8.82e-04 m <sup>2</sup>         | Aw;z;pl = 8.82e-04 m <sup>2</sup>                   |
| r = 53.1 mm  |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup> | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C27-V1 (0.000-0.450)

|                                           |                   |                    |                    |
|-------------------------------------------|-------------------|--------------------|--------------------|
| Maatgevende combinatie: Fu.C.2 op 0.300 m |                   | Profielklasse = 1  |                    |
| Nx;Ed = 0.9 kN                            | Vy;Ed = 0.0 kN    | My;Ed = 0.0 kNm    |                    |
|                                           | Vz;Ed = 0.0 kN    | Mz;Ed = 0.0 kNm    |                    |
| Nc;Rd = 381.2 kN                          | Vy;Rd = 140.1 kN  | My;Rd = 13.4 kNm   |                    |
|                                           | Vz;Rd = 140.1 kN  | Mz;Rd = 13.4 kNm   |                    |
| NVy;Rd = 381.2 kN                         | NVz;Rd = 381.2 kN | MV;y;Rd = 13.4 kNm | MV;z;Rd = 13.4 kNm |
| NEN-EN1993-1-1(6.5): UC = 0.00 < 1        |                   |                    |                    |

#### Kiptoetsing C27-V1 (0.000-0.450)

|                                                              |                        |                      |                                             |
|--------------------------------------------------------------|------------------------|----------------------|---------------------------------------------|
| Equi. profiel: N114.3/4                                      |                        | Instab. curve Kip:d  |                                             |
| Maatgevende combinatie: Bi.C.1                               |                        |                      |                                             |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                                             |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                                             |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                                             |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000                         |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                                             |
| Bovenflens maatgevend                                        | Xb;Ist = 0.000 m       | Xe;Ist = 0.450 m     | Ist = 0.450 m                               |
| Lsys = 0.450 m                                               | Lg = 0.450 m           | S = 0.000 m          | I <sub>wa</sub> = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00                                    |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1                             |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00                                |
| Chi;LT,Z = 1.00                                              | Ikip = 0.450 m         |                      | UC(z) = 0.00                                |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                                             |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                                             |

#### Stabiliteitstoetsing C27-V1 (0.000-0.450)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.3      |                    |                    |                   |
| N;Ed = -0.1 kN                      | Nb;Rd;y = 381.2 kN | Nb;Rd;z = 381.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.450 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 0.450 m  |
| Chi;y = 1.00                        |                    | Knikcurve: A       |                   |
| Chi;z = 1.00                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                    |                    |                   |

#### Buiging & Druk C27-V1 (0.000-0.450)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.3           |                       | Profielklasse = 1     |             |
| N;Ed = -0.1 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 1.00                               | Cmz = 1.00            | CmLT = 1.00           |             |
| Kyy = 1.000                              | Kyz = 0.600           | Kzy = 0.600           | Kzz = 1.000 |
| Chi;y = 1.00                             | Chi;z = 1.00          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |             |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C28-V1 (0.000-0.700)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N114.3/4                | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 114.3 mm            | A = 1.39e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| b = 114.3 mm            | I <sub>y</sub> = 211.1e-08 m <sup>4</sup> | W <sub>z</sub> ;el = 369.3e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 486.9e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 211.1e-08 m <sup>4</sup> | A <sub>w</sub> ;y;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 8.82e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 10.9 kg/m                       | A <sub>w</sub> ;z;el = 8.82e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 8.82e-04 m <sup>2</sup>      |
| r = 53.1 mm             |                                           | I <sub>t</sub> = 422.1e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C28-V1 (0.000-0.700)

|                                           |                               |                              |  |
|-------------------------------------------|-------------------------------|------------------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                               | Profielklasse = 1            |  |
| N;Ed = -15.9 kN                           | V <sub>y</sub> ;Ed = 0.0 kN   | M <sub>y</sub> ;Ed = 0.0 kNm |  |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN   | M <sub>z</sub> ;Ed = 0.0 kNm |  |
| N;Rd = 381.2 kN                           | V <sub>y</sub> ;Rd = 140.1 kN | M <sub>y</sub> Rd = 13.4 kNm |  |
|                                           | V <sub>z</sub> ;Rd = 140.1 kN | M <sub>z</sub> Rd = 13.4 kNm |  |
| NEN-EN1993-1-1(6.9): UC = 0.04 < 1        |                               |                              |  |

#### Kiptoetsing C28-V1 (0.000-0.700)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N114.3/4                                      |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.700 m     | lst = 0.700 m       |
| Lsys = 0.700 m                                               | Lg = 0.700 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 0.700 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C28-V1 (0.000-0.700)

|                                     |                                              |                                              |                               |
|-------------------------------------|----------------------------------------------|----------------------------------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.2      |                                              |                                              |                               |
| N;Ed = -15.9 kN                     | N <sub>b</sub> ;R <sub>d</sub> ;y = 380.6 kN | N <sub>b</sub> ;R <sub>d</sub> ;z = 380.6 kN |                               |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000                                | C <sub>b</sub> (y) = 0.000                   | L <sub>knik</sub> Y = 0.700 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B                                  | C <sub>b</sub> (z) = N/B                     | L <sub>buc</sub> Z = 0.700 m  |
| Chi;y = 1.00                        |                                              | K <sub>nik</sub> curve: A                    |                               |
| Chi;z = 1.00                        |                                              | K <sub>nik</sub> curve: A                    |                               |
| NEN-EN1993-1-1(6.46): UC = 0.04 < 1 |                                              |                                              |                               |

#### Buiging & Druk C28-V1 (0.000-0.700)

|                                          |                                    |                                    |                         |
|------------------------------------------|------------------------------------|------------------------------------|-------------------------|
| Maatgevende combinatie: Fu.C.2           |                                    | Profielklasse = 1                  |                         |
| N;Ed = -15.9 kN                          | M <sub>y</sub> ;Ed = 0.0 kNm       | M <sub>z</sub> ;Ed = 0.0 kNm       |                         |
|                                          | Delta;M <sub>y</sub> ;Ed = 0.0 kNm | Delta;M <sub>z</sub> ;Ed = 0.0 kNm |                         |
| M <sub>y</sub> = 0.0 kNm                 | M <sub>y</sub> ;Psi = 0.0 kNm      | M <sub>y</sub> ;s = 0.0 kNm        |                         |
| M <sub>z</sub> = 0.0 kNm                 | M <sub>z</sub> ;Psi = 0.0 kNm      | M <sub>z</sub> ;s = 0.0 kNm        |                         |
| C <sub>m</sub> y = 1.00                  | C <sub>m</sub> z = 1.00            | C <sub>m</sub> LT = 1.00           |                         |
| K <sub>yy</sub> = 1.000                  | K <sub>yz</sub> = 0.600            | K <sub>zy</sub> = 0.600            | K <sub>zz</sub> = 1.000 |
| Chi;y = 1.00                             | Chi;z = 1.00                       | Chi;LT = 1.00                      |                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.04 < 1 |                                    |                                    |                         |

#### Profielgegevens staaf C29-V1 (0.000-1.000)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N244.5/6.3              | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 244.5 mm            | A = 4.71e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 273.7e-06 m <sup>3</sup>  | W <sub>y</sub> ;pl = 357.5e-06 m <sup>3</sup>       |
| b = 244.5 mm            | I <sub>y</sub> = 334.6e-07 m <sup>4</sup> | W <sub>z</sub> ;el = 273.7e-06 m <sup>3</sup>  | W <sub>z</sub> ;pl = 357.5e-06 m <sup>3</sup>       |
| t <sub>f</sub> = 6.3 mm | I <sub>z</sub> = 334.6e-07 m <sup>4</sup> | A <sub>w</sub> ;y;el = 3.00e-03 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 3.00e-03 m <sup>2</sup>      |
| t <sub>w</sub> = 6.3 mm | Massa/m = 37.0 kg/m                       | A <sub>w</sub> ;z;el = 3.00e-03 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 3.00e-03 m <sup>2</sup>      |

|                                                                                        |                        |                        |                            |
|----------------------------------------------------------------------------------------|------------------------|------------------------|----------------------------|
|                                                                                        |                        |                        |                            |
| r = 116.0 mm                                                                           |                        | It = 669.2e-07 m4      |                            |
|                                                                                        |                        | Iwa = 0.0e-02 m6       |                            |
| <b>Doorsnedetoetsing C29-V1 (0.000-1.000)</b>                                          |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2 op 0.000 m                                              |                        | Profielklasse = 1      |                            |
| N;Ed = -0.9 kN                                                                         | Vy;Ed = 0.0 kN         | My;Ed = 19.5 kNm       |                            |
|                                                                                        | Vz;Ed = -19.5 kN       | Mz;Ed = 0.0 kNm        |                            |
| N;Rd = 1,296.5 kN                                                                      | Vy;Rd = 476.5 kN       | MyRd = 98.3 kNm        |                            |
|                                                                                        | Vz;Rd = 476.5 kN       | MzRd = 98.3 kNm        |                            |
| NEN-EN1993-1-1(NB.33): UC = 0.20 < 1                                                   |                        |                        |                            |
| <b>Kiptoetsing C29-V1 (0.000-1.000)</b>                                                |                        |                        |                            |
| Equi. profiel: N244.5/6.3                                                              |                        |                        |                            |
| Maatgevende combinatie: Bi.C.1                                                         |                        | Instab. curve Kip:d    |                            |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                        |                            |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                        |                            |
| Kipsteun onderflens: N.v.t.                                                            |                        |                        |                            |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.005   | b-eff(Eind) = 0.005        |
| Tabel gebruikt NB.NB.1 (1)                                                             | M = 8.4kN/m            | MBeta = 0.0            |                            |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 1.000 m       | lst = 1.000 m              |
| Lsys = 1.000 m                                                                         | Lg = 1.000 m           | S = 0.000 m            | Iwa = 0.0000e+00 m6        |
| C1 = 1.75                                                                              | C2 = 0.00 (tabel)      | C2(toegepast) = 0.00   | C = 0.00                   |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00         | Profielklasse 1            |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 8.4 kNm         |                        | UC(y) = 0.00               |
| Chi;LT,Z = 1.00                                                                        | lkip = 1.000 m         |                        | UC(z) = 0.00               |
| My;begin = 8.4 kNm                                                                     | My;eind = 0.0 kNm      |                        |                            |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                        |                            |
| <b>Stabiliteitstoetsing C29-V1 (0.000-1.000)</b>                                       |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2                                                         |                        |                        |                            |
| N;Ed = -0.9 kN                                                                         | Nb;Rd;y = 1,296.5 kN   | Nb;Rd;z = 1,296.5 kN   |                            |
| Methode Y = Cons. gesch.                                                               | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 1.000 m          |
| Methode Z = Cons. gesch.                                                               | Ca(z) = N/B            | Cb(z) = N/B            | Lbuc Z = 1.000 m           |
| Chi;y = 1.00                                                                           |                        | Knikcurve: A           |                            |
| Chi;z = 1.00                                                                           |                        | Knikcurve: A           |                            |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1                                                    |                        |                        |                            |
| <b>Buiging &amp; Druk C29-V1 (0.000-1.000)</b>                                         |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2                                                         |                        | Profielklasse = 1      |                            |
| N;Ed = -0.9 kN                                                                         | My;Ed = 19.5 kNm       | Mz;Ed = 0.0 kNm        |                            |
|                                                                                        | Delta;My;Ed = 0.0 kNm  | Delta;Mz;Ed = 0.0 kNm  |                            |
| My = 19.5 kNm                                                                          | My;Psi = 0.0 kNm       | My;s = 9.8 kNm         |                            |
| Mz = 0.0 kNm                                                                           | Mz;Psi = 0.0 kNm       | Mz;s = 0.0 kNm         |                            |
| Cmy = 0.60                                                                             | Cmz = 1.00             | CmLT = 0.60            |                            |
| Kyy = 0.600                                                                            | Kyz = 0.600            | Kzy = 0.360            | Kzz = 1.000                |
| Chi;y = 1.00                                                                           | Chi;z = 1.00           | Chi;LT = 1.00          |                            |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.12 < 1                                               |                        |                        |                            |
| <b>Profielgegevens staaf C30-V1 (0.000-5.400)</b>                                      |                        |                        |                            |
| N267/8                                                                                 | Analyse                | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 267.0 mm                                                                           | A = 6.51e-03 m2        | Wy;el = 409.2e-06 m3   | Wy;pl = 536.8e-06 m3       |
| b = 267.0 mm                                                                           | Iy = 546.3e-07 m4      | Wz;el = 409.2e-06 m3   | Wz;pl = 536.8e-06 m3       |
| tf = 8.0 mm                                                                            | Iz = 546.3e-07 m4      | Aw;y;el = 4.14e-03 m2  | Aw;y;pl = 4.14e-03 m2      |
| tw = 8.0 mm                                                                            | Massa/m = 51.1 kg/m    | Aw;z;el = 4.14e-03 m2  | Aw;z;pl = 4.14e-03 m2      |
| r = 125.5 mm                                                                           |                        | It = 109.3e-06 m4      | Iwa = 0.0e-02 m6           |
| <b>Doorsnedetoetsing C30-V1 (0.000-5.400)</b>                                          |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2 op 4.200 m                                              |                        | Profielklasse = 1      |                            |
| N;Ed = -1.0 kN                                                                         | Vy;Ed = 0.0 kN         | My;Ed = 33.8 kNm       |                            |
|                                                                                        | Vz;Ed = -28.2 kN       | Mz;Ed = 0.0 kNm        |                            |
| N;Rd = 1,790.1 kN                                                                      | Vy;Rd = 657.9 kN       | MyRd = 147.6 kNm       |                            |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Vz;Rd = 657.9 kN

MzRd = 147.6 kNm

NEN-EN1993-1-1(NB.33): UC = 0.23 < 1

#### Kiptoetsing C30-V1 (0.000-5.400)

Equi. profiel: N267/8

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.005

Tabel gebruikt NB.NB.4

M = -9.8kN/m

MBeta = 0.0

q = 3.1

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 5.400 m

lst = 5.400 m

Lsys = 5.400 m

Lg = 5.400 m

S = 0.000 m

lwa = 0.0000e+00 m6

C1 = 1.73

C2 = 0.81 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 14.2 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 5.400 m

UC(z) = 0.00

My;begin = -9.8 kNm

My;eind = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C30-V1 (0.000-5.400)

Maatgevende combinatie: Fu.C.2

N;Ed = -16.7 kN

Nb;Rd;y = 786.0 kN

Nb;Rd;z = 786.0 kN

Methode Y = Handmatige Invoer

Ca(y) = 0.000

Cb(y) = 0.000

Lknik Y = 10.800 m

Methode Z = Handmatige Invoer

Ca(z) = N/B

Cb(z) = N/B

Lbuc Z = 10.800 m

Chi;y = 0.44

Knikcurve: A

Chi;z = 0.44

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.02 < 1

#### Buiging & Druk C30-V1 (0.000-5.400)

Maatgevende combinatie: Fu.C.2

N;Ed = -16.7 kN

My;Ed = 33.8 kNm

Profielklasse = 1

Delta;My;Ed = 0.0 kNm

Mz;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = -24.7 kNm

My;Psi = 0.0 kNm

My;s = 12.1 kNm

Mz = 0.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 0.0 kNm

Cmy = 0.49

Cmz = 1.00

CmLT = 0.49

Kyy = 0.499

Kyz = 0.610

Kzy = 0.300

Kzz = 1.017

Chi;y = 0.44

Chi;z = 0.44

Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.14 < 1

#### Profielgegevens staaf C32-V1 (0.000-2.696)

N244.5/6.3

Analyse

Staal S275H(EN10210-1)

fyd(toegepast) = 275 N/mm2

h = 244.5 mm

A = 4.71e-03 m2

Wy;el = 273.7e-06 m3

Wy;pl = 357.5e-06 m3

b = 244.5 mm

Iy = 334.6e-07 m4

Wz;el = 273.7e-06 m3

Wz;pl = 357.5e-06 m3

tf = 6.3 mm

Iz = 334.6e-07 m4

Aw;y;el = 3.00e-03 m2

Aw;y;pl = 3.00e-03 m2

tw = 6.3 mm

Massa/m = 37.0 kg/m

Aw;z;el = 3.00e-03 m2

Aw;z;pl = 3.00e-03 m2

r = 116.0 mm

It = 669.2e-07 m4

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C32-V1 (0.000-2.696)

Maatgevende combinatie: Fu.C.2 op 2.696 m

Profielklasse = 1

N;Ed = -21.1 kN

Vy;Ed = 0.0 kN

My;Ed = -40.0 kNm

Vz;Ed = -17.1 kN

Mz;Ed = 0.0 kNm

N;Rd = 1,296.5 kN

Vy;Rd = 476.5 kN

MyRd = 98.3 kNm

Vz;Rd = 476.5 kN

MzRd = 98.3 kNm

NEN-EN1993-1-1(NB.33): UC = 0.41 < 1

#### Kiptoetsing C32-V1 (0.000-2.696)

Equi. profiel: N244.5/6.3

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Tabel gebruikt NB.NB.1 (1)

Bovenflens maatgevend

Lsys = 2.696 m

C1 = 1.92

Mcr = 0.0 kNm

Chi;LT(Bi.C.1) = 1.00

Chi;LT,Z = 1.00

My;begin = 2.7 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

Beperk. eind: Gesteund

M = -17.0kN/m

Xb;lst = 0.000 m

Lg = 2.696 m

C2 = 0.00 (tabel)

kred = 1.0

M;Ed = 2.7 kNm

lkip = 2.696 m

My;eind = -17.0 kNm

b-eff(Begin) = 0.000

MBeta = 2.7

Xe;lst = 2.696 m

S = 0.000 m

C2(toegepast) = 0.00

Lam-rel = 0.00

b-eff(Eind) = 0.004

lst = 2.696 m

lwa = 0.0000e+00 m6

C = 0.00

Profielklasse 1

UC(y) = 0.00

UC(z) = 0.00

#### Stabiliteitstoetsing C32-V1 (0.000-2.696)

Maatgevende combinatie: Fu.C.2

N;Ed = -22.2 kN

Methode Y = Cons. gesch.

Methode Z = Cons. gesch.

Chi;y = 0.96

Chi;z = 0.96

NEN-EN1993-1-1(6.46): UC = 0.02 < 1

Nb;Rd;y = 1,245.7 kN

Ca(y) = 0.000

Ca(z) = N/B

Nb;Rd;z = 1,245.7 kN

Cb(y) = 0.000

Cb(z) = N/B

Knikcurve: A

Knikcurve: A

Lknik Y = 2.696 m

Lbuc Z = 2.696 m

#### Buiging & Druk C32-V1 (0.000-2.696)

Maatgevende combinatie: Fu.C.2

N;Ed = -22.2 kN

My = -40.0 kNm

Mz = 0.0 kNm

Cmy = 0.54

Kyy = 0.542

Chi;y = 0.96

NEN-EN1993-1-1(6.61&6.62): UC = 0.24 < 1

My;Ed = 40.0 kNm

Delta;My;Ed = 0.0 kNm

My;Psi = 5.7 kNm

Mz;Psi = 0.0 kNm

Cmz = 1.00

Kyz = 0.602

Chi;z = 0.96

Profielklasse = 1

Mz;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My;s = -17.0 kNm

Mz;s = 0.0 kNm

CmLT = 0.54

Kzy = 0.325

Chi;LT = 1.00

Kzz = 1.003

#### Profielgegevens staaf C33-V1 (0.000-1.503)

N244.5/6.3

h = 244.5 mm

b = 244.5 mm

tf = 6.3 mm

tw = 6.3 mm

r = 116.0 mm

Analyse

A = 4.71e-03 m2

Iy = 334.6e-07 m4

Iz = 334.6e-07 m4

Massa/m = 37.0 kg/m

Staal S275H(EN10210-1)

Wy;el = 273.7e-06 m3

Wz;el = 273.7e-06 m3

Aw;y;el = 3.00e-03 m2

Aw;z;el = 3.00e-03 m2

It = 669.2e-07 m4

fyd(toegepast) = 275 N/mm2

Wy;pl = 357.5e-06 m3

Wz;pl = 357.5e-06 m3

Aw;y;pl = 3.00e-03 m2

Aw;z;pl = 3.00e-03 m2

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C33-V1 (0.000-1.503)

Maatgevende combinatie: Fu.C.2 op 1.503 m

N;Ed = -35.2 kN

N;Rd = 1,296.5 kN

NEN-EN1993-1-1(NB.33): UC = 0.38 < 1

Vy;Ed = 0.0 kN

Vz;Ed = 25.8 kN

Vy;Rd = 476.5 kN

Vz;Rd = 476.5 kN

Profielklasse = 1

My;Ed = 37.2 kNm

Mz;Ed = 0.0 kNm

MyRd = 98.3 kNm

MzRd = 98.3 kNm

#### Kiptoetsing C33-V1 (0.000-1.503)

Equi. profiel: N244.5/6.3

Maatgevende combinatie: Bi.C.1

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Tabel gebruikt NB.NB.1 (1)

Bovenflens maatgevend

Lsys = 1.503 m

C1 = 1.80

Mcr = 0.0 kNm

Chi;LT(Bi.C.1) = 1.00

Beperk. eind: Gesteund

M = 15.9kN/m

Xb;lst = 0.000 m

Lg = 1.503 m

C2 = 0.00 (tabel)

kred = 1.0

M;Ed = 15.9 kNm

Instab. curve Kip:d

b-eff(Begin) = 0.000

MBeta = -0.7

Xe;lst = 1.503 m

S = 0.000 m

C2(toegepast) = 0.00

Lam-rel = 0.00

b-eff(Eind) = 0.006

lst = 1.503 m

lwa = 0.0000e+00 m6

C = 0.00

Profielklasse 1

UC(y) = 0.00

|                                                                                        |                        |                        |                            |
|----------------------------------------------------------------------------------------|------------------------|------------------------|----------------------------|
|                                                                                        |                        |                        |                            |
|                                                                                        |                        |                        |                            |
|                                                                                        |                        |                        |                            |
| Chi;LT,Z = 1.00                                                                        | Ikip = 1.503 m         | UC(z) = 0.00           |                            |
| My;begin = -0.7 kNm                                                                    | My;eind = 15.9 kNm     |                        |                            |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2) |                        |                        |                            |
| <b>Stabiliteitstoetsing C33-V1 (0.000-1.503)</b>                                       |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2                                                         |                        |                        |                            |
| N;Ed = -35.7 kN                                                                        | Nb;Rd;y = 1,294.9 kN   | Nb;Rd;z = 1,294.9 kN   |                            |
| Methode Y = Cons. gesch.                                                               | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 1.503 m          |
| Methode Z = Cons. gesch.                                                               | Ca(z) = N/B            | Cb(z) = N/B            | Lbuc Z = 1.503 m           |
| Chi;y = 1.00                                                                           |                        | Knikcurve: A           |                            |
| Chi;z = 1.00                                                                           |                        | Knikcurve: A           |                            |
| NEN-EN1993-1-1(6.46): UC = 0.03 < 1                                                    |                        |                        |                            |
| <b>Buiging &amp; Druk C33-V1 (0.000-1.503)</b>                                         |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2                                                         |                        | Profielklasse = 1      |                            |
| N;Ed = -35.7 kN                                                                        | My;Ed = 37.2 kNm       | Mz;Ed = 0.0 kNm        |                            |
|                                                                                        | Delta;My;Ed = 0.0 kNm  | Delta;Mz;Ed = 0.0 kNm  |                            |
| My = 37.2 kNm                                                                          | My;Psi = -1.3 kNm      | My;s = 17.9 kNm        |                            |
| Mz = 0.0 kNm                                                                           | Mz;Psi = 0.0 kNm       | Mz;s = 0.0 kNm         |                            |
| Cmy = 0.58                                                                             | Cmz = 1.00             | CmLT = 0.58            |                            |
| Kyy = 0.584                                                                            | Kyz = 0.600            | Kzy = 0.350            | Kzz = 1.000                |
| Chi;y = 1.00                                                                           | Chi;z = 1.00           | Chi;LT = 1.00          |                            |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.25 < 1                                               |                        |                        |                            |
| <b>Profielgegevens staaf C34-V1 (0.000-1.291)</b>                                      |                        |                        |                            |
| N88.9/4                                                                                | Analyse                | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 88.9 mm                                                                            | A = 1.07e-03 m2        | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm                                                                            | Iy = 963.4e-09 m4      | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm                                                                            | Iz = 963.4e-09 m4      | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm                                                                            | Massa/m = 8.4 kg/m     | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm                                                                            |                        | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |
| <b>Doorsnedetoetsing C34-V1 (0.000-1.291)</b>                                          |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2 op 1.076 m                                              |                        | Profielklasse = 1      |                            |
| N;Ed = 9.9 kN                                                                          | Vy;Ed = 0.0 kN         | My;Ed = 0.0 kNm        |                            |
|                                                                                        | Vz;Ed = 0.0 kN         | Mz;Ed = 0.0 kNm        |                            |
| N;Rd = 293.4 kN                                                                        | Vy;Rd = 107.8 kN       | MyRd = 7.9 kNm         |                            |
|                                                                                        | Vz;Rd = 107.8 kN       | MzRd = 7.9 kNm         |                            |
| NEN-EN1993-1-1(6.5): UC = 0.03 < 1                                                     |                        |                        |                            |
| <b>Kiptoetsing C34-V1 (0.000-1.291)</b>                                                |                        |                        |                            |
| Equi. profiel: N88.9/4                                                                 |                        |                        |                            |
| Maatgevende combinatie: Bi.C.1                                                         |                        | Instab. curve Kip:d    |                            |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel                                 |                        |                        |                            |
| Kipsteun bovenflens: N.v.t.                                                            |                        |                        |                            |
| Kipsteun onderflens: N.v.t.                                                            |                        |                        |                            |
| Inklem. begin: Gesteund                                                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000   | b-eff(Eind) = 0.000        |
| Tabel gebruikt NB.NB.1 (4)                                                             | F = 0.0kN/m            | = 0.0                  |                            |
| Bovenflens maatgevend                                                                  | Xb;lst = 0.000 m       | Xe;lst = 1.291 m       | lst = 1.291 m              |
| Lsys = 1.291 m                                                                         | Lg = 1.291 m           | S = 0.000 m            | Iwa = 0.0000e+00 m6        |
| C1 = 1.04                                                                              | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00   | C = 0.00                   |
| Mcr = 0.0 kNm                                                                          | kred = 1.0             | Lam-rel = 0.00         | Profielklasse 1            |
| Chi;LT(Bi.C.1) = 1.00                                                                  | M;Ed = 0.0 kNm         |                        | UC(y) = 0.00               |
| Chi;LT,Z = 1.00                                                                        | Ikip = 1.291 m         |                        | UC(z) = 0.00               |
| My;begin = 0.0 kNm                                                                     | My;eind = 0.0 kNm      |                        |                            |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging                           |                        |                        |                            |
| <b>Stabiliteitstoetsing C34-V1 (0.000-1.291)</b>                                       |                        |                        |                            |
| Maatgevende combinatie: Fu.C.3                                                         |                        |                        |                            |
| N;Ed = -1.4 kN                                                                         | Nb;Rd;y = 271.6 kN     | Nb;Rd;z = 271.6 kN     |                            |
| Methode Y = Cons. gesch.                                                               | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 1.291 m          |
| 30-5-2022 10:13:48                                                                     |                        |                        |                            |

MatrixFrame 5.5 SP5

29

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Methode Z = Cons. gesch.      Ca(z) = N/B      Cb(z) = N/B      Lbuc Z = 1.291 m  
Chi;y = 0.93      Knikcurve: A  
Chi;z = 0.93      Knikcurve: A  
NEN-EN1993-1-1(6.46): UC = 0.01 < 1

#### Buiging & Druk C34-V1 (0.000-1.291)

|                                          |                       |
|------------------------------------------|-----------------------|
| Maatgevende combinatie: Fu.C.3           | Profielklasse = 1     |
| N;Ed = -1.4 kN                           | Mz;Ed = 0.0 kNm       |
|                                          | Delta;Mz;Ed = 0.0 kNm |
| My = 0.0 kNm                             | My;s = 0.0 kNm        |
| Mz = 0.0 kNm                             | Mz;s = 0.0 kNm        |
| Cmy = 0.95                               | CmLT = 0.95           |
| Kyy = 0.951                              | Kzy = 0.571           |
| Chi;y = 0.93                             | Chi;LT = 1.00         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1 | Kzz = 1.002           |

#### Profielgegevens staaf C35-V1 (0.000-1.386)

|             |                               |                                   |                                                     |
|-------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N88.9/4     | Analyse                       | Staal S275H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 88.9 mm | A = 1.07e-03 m <sup>2</sup>   | Wy;el = 216.7e-07 m <sup>3</sup>  | Wy;pl = 288.5e-07 m <sup>3</sup>                    |
| b = 88.9 mm | Iy = 963.4e-09 m <sup>4</sup> | Wz;el = 216.7e-07 m <sup>3</sup>  | Wz;pl = 288.5e-07 m <sup>3</sup>                    |
| tf = 4.0 mm | Iz = 963.4e-09 m <sup>4</sup> | Aw;y;el = 6.79e-04 m <sup>2</sup> | Aw;y;pl = 6.79e-04 m <sup>2</sup>                   |
| tw = 4.0 mm | Massa/m = 8.4 kg/m            | Aw;z;el = 6.79e-04 m <sup>2</sup> | Aw;z;pl = 6.79e-04 m <sup>2</sup>                   |
| r = 40.4 mm |                               | It = 192.7e-08 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C35-V1 (0.000-1.386)

|                                           |                   |
|-------------------------------------------|-------------------|
| Maatgevende combinatie: Fu.C.2 op 1.386 m | Profielklasse = 1 |
| N;Ed = -8.7 kN                            | My;Ed = 0.0 kNm   |
|                                           | Mz;Ed = 0.0 kNm   |
| N;Rd = 293.4 kN                           | MyRd = 7.9 kNm    |
|                                           | MzRd = 7.9 kNm    |
| NEN-EN1993-1-1(6.9): UC = 0.03 < 1        |                   |

#### Kiptoetsing C35-V1 (0.000-1.386)

|                                                        |                                 |
|--------------------------------------------------------|---------------------------------|
| Equi. profiel: N88.9/4                                 | Instab. curve Kip:d             |
| Maatgevende combinatie: Bi.C.1                         |                                 |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel |                                 |
| Kipsteun bovenflens: N.v.t.                            |                                 |
| Kipsteun onderflens: N.v.t.                            |                                 |
| Inklem. begin: Gesteund                                | Beperk. eind: Gesteund          |
| Tabel gebruikt NB.NB.1 (4)                             | F = 0.0kN/m                     |
| Bovenflens maatgevend                                  | Xb;lst = 0.000 m                |
| Lsys = 1.386 m                                         | Lg = 1.386 m                    |
| C1 = 1.04                                              | C2 = 0.42 (tabel)               |
| Mcr = 0.0 kNm                                          | kred = 1.0                      |
| Chi;LT(Bi.C.1) = 1.00                                  | M;Ed = 0.0 kNm                  |
| Chi;LT,Z = 1.00                                        | lkip = 1.386 m                  |
| My;begin = 0.0 kNm                                     | My;eind = 0.0 kNm               |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1                    | Kip n.v.t.: geen buiging        |
|                                                        | b-eff(Begin) = 0.000            |
|                                                        | b-eff(Eind) = 0.000             |
|                                                        | l <sub>st</sub> = 1.386 m       |
|                                                        | Iwa = 0.0000e+00 m <sup>6</sup> |
|                                                        | C = 0.00                        |
|                                                        | Profielklasse 1                 |
|                                                        | UC(y) = 0.00                    |
|                                                        | UC(z) = 0.00                    |

#### Stabiliteitstoetsing C35-V1 (0.000-1.386)

|                                     |                    |                    |
|-------------------------------------|--------------------|--------------------|
| Maatgevende combinatie: Fu.C.2      | Nb;Rd;y = 268.2 kN | Nb;Rd;z = 268.2 kN |
| N;Ed = -8.7 kN                      | Ca(y) = 0.000      | Cb(y) = 0.000      |
| Methode Y = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        |
| Methode Z = Cons. gesch.            |                    | Knikcurve: A       |
| Chi;y = 0.91                        |                    | Knikcurve: A       |
| Chi;z = 0.91                        |                    |                    |
| NEN-EN1993-1-1(6.46): UC = 0.03 < 1 |                    |                    |
|                                     |                    | Lknik Y = 1.386 m  |
|                                     |                    | Lbuc Z = 1.386 m   |

#### Buiging & Druk C35-V1 (0.000-1.386)

|                                |                   |
|--------------------------------|-------------------|
| Maatgevende combinatie: Fu.C.2 | Profielklasse = 1 |
| N;Ed = -8.7 kN                 | Mz;Ed = 0.0 kNm   |



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.960                              | Kyz = 0.606           | Kzy = 0.576           | Kzz = 1.011 |
| Chi;y = 0.91                             | Chi;z = 0.91          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.03 < 1 |                       |                       |             |

#### Profielgegevens staaf C36-V1 (0.000-1.204)

|                         |                                           |                                           |                                                     |
|-------------------------|-------------------------------------------|-------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S275H(EN10210-1)                    | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | Wy;el = 216.7e-07 m <sup>3</sup>          | Wy;pl = 288.5e-07 m <sup>3</sup>                    |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | Wz;el = 216.7e-07 m <sup>3</sup>          | Wz;pl = 288.5e-07 m <sup>3</sup>                    |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | Aw;y;el = 6.79e-04 m <sup>2</sup>         | Aw;y;pl = 6.79e-04 m <sup>2</sup>                   |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | Aw;z;el = 6.79e-04 m <sup>2</sup>         | Aw;z;pl = 6.79e-04 m <sup>2</sup>                   |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup> | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C36-V1 (0.000-1.204)

|                                           |                  |                   |
|-------------------------------------------|------------------|-------------------|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                  | Profielklasse = 1 |
| N;Ed = -7.2 kN                            | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |
|                                           | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |
| N;Rd = 293.4 kN                           | Vy;Rd = 107.8 kN | MyRd = 7.9 kNm    |
|                                           | Vz;Rd = 107.8 kN | MzRd = 7.9 kNm    |

NEN-EN1993-1-1(6.9): UC = 0.02 < 1

#### Kiptoetsing C36-V1 (0.000-1.204)

|                                                              |                        |                      |                                             |
|--------------------------------------------------------------|------------------------|----------------------|---------------------------------------------|
| Equi. profiel: N88.9/4                                       |                        | Instab. curve Kip:d  |                                             |
| Maatgevende combinatie: Bi.C.1                               |                        |                      |                                             |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                                             |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                                             |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                                             |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000                         |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                                             |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.204 m     | lst = 1.204 m                               |
| Lsys = 1.204 m                                               | Lg = 1.204 m           | S = 0.000 m          | I <sub>wa</sub> = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00                                    |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1                             |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00                                |
| Chi;LT,Z = 1.00                                              | Ikip = 1.204 m         |                      | UC(z) = 0.00                                |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                                             |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                                             |

#### Stabiliteitstoetsing C36-V1 (0.000-1.204)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.2      |                    |                    |                   |
| N;Ed = -7.2 kN                      | Nb;Rd;y = 274.5 kN | Nb;Rd;z = 274.5 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.204 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.204 m  |
| Chi;y = 0.94                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.94                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.03 < 1 |                    |                    |                   |

#### Buiging & Druk C36-V1 (0.000-1.204)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.2           |                       | Profielklasse = 1     |             |
| N;Ed = -7.2 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.957                              | Kyz = 0.604           | Kzy = 0.574           | Kzz = 1.007 |
| Chi;y = 0.94                             | Chi;z = 0.94          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.03 < 1 |                       |                       |             |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C37-V1 (0.000-1.291)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | W <sub>z</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | A <sub>w</sub> ;y;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 6.79e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | A <sub>w</sub> ;z;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 6.79e-04 m <sup>2</sup>      |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C37-V1 (0.000-1.291)

|                                           |                               |                   |  |
|-------------------------------------------|-------------------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                               | Profielklasse = 1 |  |
| N;Ed = 8.3 kN                             | V <sub>y</sub> ;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |  |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 293.4 kN                           | V <sub>y</sub> ;Rd = 107.8 kN | MyRd = 7.9 kNm    |  |
|                                           | V <sub>z</sub> ;Rd = 107.8 kN | MzRd = 7.9 kNm    |  |
| NEN-EN1993-1-1(6.5): UC = 0.03 < 1        |                               |                   |  |

#### Kiptoetsing C37-V1 (0.000-1.291)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.291 m     | lst = 1.291 m       |
| Lsys = 1.291 m                                               | Lg = 1.291 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 1.291 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Profielgegevens staaf C38-V1 (0.000-1.127)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | W <sub>z</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | A <sub>w</sub> ;y;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 6.79e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | A <sub>w</sub> ;z;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 6.79e-04 m <sup>2</sup>      |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C38-V1 (0.000-1.127)

|                                           |                               |                   |  |
|-------------------------------------------|-------------------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                               | Profielklasse = 1 |  |
| N;Ed = -4.2 kN                            | V <sub>y</sub> ;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |  |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 293.4 kN                           | V <sub>y</sub> ;Rd = 107.8 kN | MyRd = 7.9 kNm    |  |
|                                           | V <sub>z</sub> ;Rd = 107.8 kN | MzRd = 7.9 kNm    |  |
| NEN-EN1993-1-1(6.9): UC = 0.01 < 1        |                               |                   |  |

#### Kiptoetsing C38-V1 (0.000-1.127)

|                                                        |                        |                      |                     |
|--------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                 |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                         |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                            |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                            |                        |                      |                     |
| Inklem. begin: Gesteund                                | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                             | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                  | Xb;lst = 0.000 m       | Xe;lst = 1.127 m     | lst = 1.127 m       |
| Lsys = 1.127 m                                         | Lg = 1.127 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                              | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                          | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |

|                                                              |                        |                        |                                         |
|--------------------------------------------------------------|------------------------|------------------------|-----------------------------------------|
|                                                              |                        |                        |                                         |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         | UC(y) = 0.00           |                                         |
| Chi;LT,Z = 1.00                                              | lkip = 1.127 m         | UC(z) = 0.00           |                                         |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                        |                                         |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                        |                                         |
| Stabiliteitstoetsing C38-V1 (0.000-1.127)                    |                        |                        |                                         |
| Maatgevende combinatie: Fu.C.2                               |                        |                        |                                         |
| N;Ed = -4.2 kN                                               | Nb;Rd;y = 277.0 kN     | Nb;Rd;z = 277.0 kN     |                                         |
| Methode Y = Cons. gesch.                                     | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 1.127 m                       |
| Methode Z = Cons. gesch.                                     | Ca(z) = N/B            | Cb(z) = N/B            | Lbuc Z = 1.127 m                        |
| Chi;y = 0.94                                                 |                        | Knikcurve: A           |                                         |
| Chi;z = 0.94                                                 |                        | Knikcurve: A           |                                         |
| NEN-EN1993-1-1(6.46): UC = 0.02 < 1                          |                        |                        |                                         |
| Buiging & Druk C38-V1 (0.000-1.127)                          |                        |                        |                                         |
| Maatgevende combinatie: Fu.C.2                               |                        | Profielklasse = 1      |                                         |
| N;Ed = -4.2 kN                                               | My;Ed = 0.0 kNm        | Mz;Ed = 0.0 kNm        |                                         |
|                                                              | Delta;My;Ed = 0.0 kNm  | Delta;Mz;Ed = 0.0 kNm  |                                         |
| My = 0.0 kNm                                                 | My;Psi = 0.0 kNm       | My;s = 0.0 kNm         |                                         |
| Mz = 0.0 kNm                                                 | Mz;Psi = 0.0 kNm       | Mz;s = 0.0 kNm         |                                         |
| Cmy = 0.95                                                   | Cmz = 1.00             | CmLT = 0.95            |                                         |
| Kyy = 0.953                                                  | Kyz = 0.602            | Kzy = 0.572            | Kzz = 1.004                             |
| Chi;y = 0.94                                                 | Chi;z = 0.94           | Chi;LT = 1.00          |                                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.02 < 1                     |                        |                        |                                         |
| Profielgegevens staaf C39-V1 (0.000-1.204)                   |                        |                        |                                         |
| N88.9/4                                                      | Analyse                | Staal S275H(EN10210-1) | f <sub>yd</sub> (toegepast) = 275 N/mm2 |
| h = 88.9 mm                                                  | A = 1.07e-03 m2        | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3                    |
| b = 88.9 mm                                                  | Iy = 963.4e-09 m4      | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3                    |
| tf = 4.0 mm                                                  | Iz = 963.4e-09 m4      | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2                   |
| tw = 4.0 mm                                                  | Massa/m = 8.4 kg/m     | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2                   |
| r = 40.4 mm                                                  |                        | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6                        |
| Doorsnedetoetsing C39-V1 (0.000-1.204)                       |                        |                        |                                         |
| Maatgevende combinatie: Fu.C.2 op 0.000 m                    |                        | Profielklasse = 1      |                                         |
| N;Ed = 6.8 kN                                                | Vy;Ed = 0.0 kN         | My;Ed = 0.0 kNm        |                                         |
|                                                              | Vz;Ed = 0.0 kN         | Mz;Ed = 0.0 kNm        |                                         |
| N;Rd = 293.4 kN                                              | Vy;Rd = 107.8 kN       | MyRd = 7.9 kNm         |                                         |
|                                                              | Vz;Rd = 107.8 kN       | MzRd = 7.9 kNm         |                                         |
| NEN-EN1993-1-1(6.5): UC = 0.02 < 1                           |                        |                        |                                         |
| Kiptoetsing C39-V1 (0.000-1.204)                             |                        |                        |                                         |
| Equi. profiel: N88.9/4                                       |                        |                        |                                         |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d    |                                         |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                        |                                         |
| Kipsteun bovenflens: N.v.t.                                  |                        |                        |                                         |
| Kipsteun onderflens: N.v.t.                                  |                        |                        |                                         |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000   | b-eff(Eind) = 0.000                     |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                  |                                         |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.204 m       | lst = 1.204 m                           |
| Lsys = 1.204 m                                               | Lg = 1.204 m           | S = 0.000 m            | Iwa = 0.0000e+00 m6                     |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00   | C = 0.00                                |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00         | Profielklasse 1                         |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                        | UC(y) = 0.00                            |
| Chi;LT,Z = 1.00                                              | lkip = 1.204 m         |                        | UC(z) = 0.00                            |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                        |                                         |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                        |                                         |
| Stabiliteitstoetsing C39-V1 (0.000-1.204)                    |                        |                        |                                         |
| Maatgevende combinatie: Fu.C.3                               |                        |                        |                                         |
| N;Ed = -0.1 kN                                               | Nb;Rd;y = 274.5 kN     | Nb;Rd;z = 274.5 kN     |                                         |

30-5-2022 10:13:48

MatrixFrame 5.5 SP5

33

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                     |               |               |                   |
|-------------------------------------|---------------|---------------|-------------------|
| Methode Y = Cons. gesch.            | Ca(y) = 0.000 | Cb(y) = 0.000 | Lknik Y = 1.204 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B   | Cb(z) = N/B   | Lbuc Z = 1.204 m  |
| Chi;y = 0.94                        |               | Knikcurve: A  |                   |
| Chi;z = 0.94                        |               | Knikcurve: A  |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |               |               |                   |

#### Buiging & Druk C39-V1 (0.000-1.204)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.3           |                       | Profielklasse = 1     |             |
| N;Ed = -0.1 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.950                              | Kyz = 0.600           | Kzy = 0.570           | Kzz = 1.000 |
| Chi;y = 0.94                             | Chi;z = 0.94          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |             |

#### Profielgegevens staaf C40-V1 (0.000-0.932)

|             |                    |                        |                            |
|-------------|--------------------|------------------------|----------------------------|
| N88.9/4     | Analyse            | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 88.9 mm | A = 1.07e-03 m2    | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm | Iy = 963.4e-09 m4  | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm | Iz = 963.4e-09 m4  | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm | Massa/m = 8.4 kg/m | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm |                    | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C40-V1 (0.000-0.932)

|                                           |                  |                   |  |
|-------------------------------------------|------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                  | Profielklasse = 1 |  |
| N;Ed = -5.6 kN                            | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |  |
|                                           | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 293.4 kN                           | Vy;Rd = 107.8 kN | MyRd = 7.9 kNm    |  |
|                                           | Vz;Rd = 107.8 kN | MzRd = 7.9 kNm    |  |
| NEN-EN1993-1-1(6.9): UC = 0.02 < 1        |                  |                   |  |

#### Kiptoetsing C40-V1 (0.000-0.932)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.932 m     | lst = 0.932 m       |
| Lsys = 0.932 m                                               | Lg = 0.932 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 0.932 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C40-V1 (0.000-0.932)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.2      |                    |                    |                   |
| N;Ed = -5.6 kN                      | Nb;Rd;y = 282.8 kN | Nb;Rd;z = 282.8 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.932 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 0.932 m  |
| Chi;y = 0.96                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.96                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.02 < 1 |                    |                    |                   |

#### Buiging & Druk C40-V1 (0.000-0.932)

|                                |                   |
|--------------------------------|-------------------|
| Maatgevende combinatie: Fu.C.2 | Profielklasse = 1 |
|--------------------------------|-------------------|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                          |                                          |                                          |             |
|------------------------------------------|------------------------------------------|------------------------------------------|-------------|
| N;Ed = -5.6 kN                           | My;Ed = 0.0 kNm<br>Delta;My;Ed = 0.0 kNm | Mz;Ed = 0.0 kNm<br>Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm                         | My;s = 0.0 kNm                           |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm                         | Mz;s = 0.0 kNm                           |             |
| Cmy = 0.95                               | Cmz = 1.00                               | CmLT = 0.95                              |             |
| Kyy = 0.953                              | Kyz = 0.602                              | Kzy = 0.572                              | Kzz = 1.003 |
| Chi;y = 0.96                             | Chi;z = 0.96                             | Chi;LT = 1.00                            |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.02 < 1 |                                          |                                          |             |

#### Profielgegevens staaf C41-V1 (0.000-0.995)

|             |                    |                        |                            |
|-------------|--------------------|------------------------|----------------------------|
| N88.9/4     | Analyse            | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 88.9 mm | A = 1.07e-03 m2    | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm | Iy = 963.4e-09 m4  | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm | Iz = 963.4e-09 m4  | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm | Massa/m = 8.4 kg/m | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm |                    | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C41-V1 (0.000-0.995)

|                                           |                                      |                                    |  |
|-------------------------------------------|--------------------------------------|------------------------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                                      | Profielklasse = 1                  |  |
| N;Ed = 5.8 kN                             | Vy;Ed = 0.0 kN<br>Vz;Ed = 0.0 kN     | My;Ed = 0.0 kNm<br>Mz;Ed = 0.0 kNm |  |
| N;Rd = 293.4 kN                           | Vy;Rd = 107.8 kN<br>Vz;Rd = 107.8 kN | MyRd = 7.9 kNm<br>MzRd = 7.9 kNm   |  |
| NEN-EN1993-1-1(6.5): UC = 0.02 < 1        |                                      |                                    |  |

#### Kiptoetsing C41-V1 (0.000-0.995)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.995 m     | lst = 0.995 m       |
| Lsys = 0.995 m                                               | Lg = 0.995 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 0.995 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C41-V1 (0.000-0.995)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.3      |                    |                    |                   |
| N;Ed = -0.3 kN                      | Nb;Rd;y = 281.0 kN | Nb;Rd;z = 281.0 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.995 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 0.995 m  |
| Chi;y = 0.96                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.96                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                    |                    |                   |

#### Buiging & Druk C41-V1 (0.000-0.995)

|                                          |                                          |                                          |             |
|------------------------------------------|------------------------------------------|------------------------------------------|-------------|
| Maatgevende combinatie: Fu.C.3           |                                          | Profielklasse = 1                        |             |
| N;Ed = -0.3 kN                           | My;Ed = 0.0 kNm<br>Delta;My;Ed = 0.0 kNm | Mz;Ed = 0.0 kNm<br>Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm                         | My;s = 0.0 kNm                           |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm                         | Mz;s = 0.0 kNm                           |             |
| Cmy = 0.95                               | Cmz = 1.00                               | CmLT = 0.95                              |             |
| Kyy = 0.950                              | Kyz = 0.600                              | Kzy = 0.570                              | Kzz = 1.000 |
| Chi;y = 0.96                             | Chi;z = 0.96                             | Chi;LT = 1.00                            |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                                          |                                          |             |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C42-V1 (0.000-0.879)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | W <sub>z</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | A <sub>w</sub> ;y;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 6.79e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | A <sub>w</sub> ;z;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 6.79e-04 m <sup>2</sup>      |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C42-V1 (0.000-0.879)

|                                           |                               |                              |  |
|-------------------------------------------|-------------------------------|------------------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                               | Profielklasse = 1            |  |
| N;Ed = -7.5 kN                            | V <sub>y</sub> ;Ed = 0.0 kN   | M <sub>y</sub> ;Ed = 0.0 kNm |  |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN   | M <sub>z</sub> ;Ed = 0.0 kNm |  |
| N;Rd = 293.4 kN                           | V <sub>y</sub> ;Rd = 107.8 kN | M <sub>y</sub> Rd = 7.9 kNm  |  |
|                                           | V <sub>z</sub> ;Rd = 107.8 kN | M <sub>z</sub> Rd = 7.9 kNm  |  |
| NEN-EN1993-1-1(6.9): UC = 0.03 < 1        |                               |                              |  |

#### Kiptoetsing C42-V1 (0.000-0.879)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.879 m     | lst = 0.879 m       |
| Lsys = 0.879 m                                               | Lg = 0.879 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 0.879 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C42-V1 (0.000-0.879)

|                                     |                                              |                                              |                               |
|-------------------------------------|----------------------------------------------|----------------------------------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.2      |                                              |                                              |                               |
| N;Ed = -7.5 kN                      | N <sub>b</sub> ;R <sub>d</sub> ;y = 284.2 kN | N <sub>b</sub> ;R <sub>d</sub> ;z = 284.2 kN |                               |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000                                | C <sub>b</sub> (y) = 0.000                   | L <sub>knik</sub> Y = 0.879 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B                                  | C <sub>b</sub> (z) = N/B                     | L <sub>buc</sub> Z = 0.879 m  |
| Chi;y = 0.97                        |                                              | K <sub>nik</sub> curve: A                    |                               |
| Chi;z = 0.97                        |                                              | K <sub>nik</sub> curve: A                    |                               |
| NEN-EN1993-1-1(6.46): UC = 0.03 < 1 |                                              |                                              |                               |

#### Buiging & Druk C42-V1 (0.000-0.879)

|                                          |                                    |                                    |                         |
|------------------------------------------|------------------------------------|------------------------------------|-------------------------|
| Maatgevende combinatie: Fu.C.2           |                                    | Profielklasse = 1                  |                         |
| N;Ed = -7.5 kN                           | M <sub>y</sub> ;Ed = 0.0 kNm       | M <sub>z</sub> ;Ed = 0.0 kNm       |                         |
|                                          | Delta;M <sub>y</sub> ;Ed = 0.0 kNm | Delta;M <sub>z</sub> ;Ed = 0.0 kNm |                         |
| M <sub>y</sub> = 0.0 kNm                 | M <sub>y</sub> ;Psi = 0.0 kNm      | M <sub>y</sub> ;s = 0.0 kNm        |                         |
| M <sub>z</sub> = 0.0 kNm                 | M <sub>z</sub> ;Psi = 0.0 kNm      | M <sub>z</sub> ;s = 0.0 kNm        |                         |
| C <sub>my</sub> = 0.95                   | C <sub>mz</sub> = 1.00             | C <sub>mLT</sub> = 0.95            |                         |
| K <sub>yy</sub> = 0.953                  | K <sub>yz</sub> = 0.602            | K <sub>zy</sub> = 0.572            | K <sub>zz</sub> = 1.004 |
| Chi;y = 0.97                             | Chi;z = 0.97                       | Chi;LT = 1.00                      |                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.03 < 1 |                                    |                                    |                         |

#### Profielgegevens staaf C43-V1 (0.000-0.838)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | W <sub>z</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | A <sub>w</sub> ;y;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 6.79e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | A <sub>w</sub> ;z;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 6.79e-04 m <sup>2</sup>      |

|                                                              |                        |                        |                            |
|--------------------------------------------------------------|------------------------|------------------------|----------------------------|
|                                                              |                        |                        |                            |
| r = 40.4 mm                                                  |                        | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |
| <b>Doorsnedetoetsing C43-V1 (0.000-0.838)</b>                |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2 op 0.000 m                    |                        | Profielklasse = 1      |                            |
| N;Ed = -11.4 kN                                              | Vy;Ed = 0.0 kN         | My;Ed = 0.0 kNm        |                            |
|                                                              | Vz;Ed = 0.0 kN         | Mz;Ed = 0.0 kNm        |                            |
| N;Rd = 293.4 kN                                              | Vy;Rd = 107.8 kN       | MyRd = 7.9 kNm         |                            |
|                                                              | Vz;Rd = 107.8 kN       | MzRd = 7.9 kNm         |                            |
| NEN-EN1993-1-1(6.9): UC = 0.04 < 1                           |                        |                        |                            |
| <b>Kiptoetsing C43-V1 (0.000-0.838)</b>                      |                        |                        |                            |
| Equi. profiel: N88.9/4                                       |                        |                        |                            |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d    |                            |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                        |                            |
| Kipsteun bovenflens: N.v.t.                                  |                        |                        |                            |
| Kipsteun onderflens: N.v.t.                                  |                        |                        |                            |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000   | b-eff(Eind) = 0.000        |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                  |                            |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.838 m       | lst = 0.838 m              |
| Lsys = 0.838 m                                               | Lg = 0.838 m           | S = 0.000 m            | Iwa = 0.0000e+00 m6        |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00   | C = 0.00                   |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00         | Profielklasse 1            |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                        | UC(y) = 0.00               |
| Chi;LT,Z = 1.00                                              | lkip = 0.838 m         |                        | UC(z) = 0.00               |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                        |                            |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                        |                            |
| <b>Stabiliteitstoetsing C43-V1 (0.000-0.838)</b>             |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2                               |                        |                        |                            |
| N;Ed = -11.4 kN                                              | Nb;Rd;y = 285.3 kN     | Nb;Rd;z = 285.3 kN     |                            |
| Methode Y = Cons. gesch.                                     | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 0.838 m          |
| Methode Z = Cons. gesch.                                     | Ca(z) = N/B            | Cb(z) = N/B            | Lbuc Z = 0.838 m           |
| Chi;y = 0.97                                                 |                        | Knikcurve: A           |                            |
| Chi;z = 0.97                                                 |                        | Knikcurve: A           |                            |
| NEN-EN1993-1-1(6.46): UC = 0.04 < 1                          |                        |                        |                            |
| <b>Buiging &amp; Druk C43-V1 (0.000-0.838)</b>               |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2                               |                        | Profielklasse = 1      |                            |
| N;Ed = -11.4 kN                                              | My;Ed = 0.0 kNm        | Mz;Ed = 0.0 kNm        |                            |
|                                                              | Delta;My;Ed = 0.0 kNm  | Delta;Mz;Ed = 0.0 kNm  |                            |
| My = 0.0 kNm                                                 | My;Psi = 0.0 kNm       | My;s = 0.0 kNm         |                            |
| Mz = 0.0 kNm                                                 | Mz;Psi = 0.0 kNm       | Mz;s = 0.0 kNm         |                            |
| Cmy = 0.95                                                   | Cmz = 1.00             | CmLT = 0.95            |                            |
| Kyy = 0.955                                                  | Kyz = 0.603            | Kzy = 0.573            | Kzz = 1.005                |
| Chi;y = 0.97                                                 | Chi;z = 0.97           | Chi;LT = 1.00          |                            |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.04 < 1                     |                        |                        |                            |
| <b>Profielgegevens staaf C44-V1 (0.000-0.932)</b>            |                        |                        |                            |
| N88.9/4                                                      | Analyse                | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 88.9 mm                                                  | A = 1.07e-03 m2        | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm                                                  | Iy = 963.4e-09 m4      | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm                                                  | Iz = 963.4e-09 m4      | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm                                                  | Massa/m = 8.4 kg/m     | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm                                                  |                        | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |
| <b>Doorsnedetoetsing C44-V1 (0.000-0.932)</b>                |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2 op 0.000 m                    |                        | Profielklasse = 1      |                            |
| N;Ed = 5.3 kN                                                | Vy;Ed = 0.0 kN         | My;Ed = 0.0 kNm        |                            |
|                                                              | Vz;Ed = 0.0 kN         | Mz;Ed = 0.0 kNm        |                            |
| N;Rd = 293.4 kN                                              | Vy;Rd = 107.8 kN       | MyRd = 7.9 kNm         |                            |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Vz;Rd = 107.8 kN

MzRd = 7.9 kNm

NEN-EN1993-1-1(6.5): UC = 0.02 < 1

#### Kiptoetsing C44-V1 (0.000-0.932)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (4)

F = 0.0kN/m

= 0.0

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 0.932 m

lst = 0.932 m

Lsys = 0.932 m

Lg = 0.932 m

S = 0.000 m

lwa = 0.0000e+00 m6

C1 = 1.04

C2 = 0.42 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.0 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 0.932 m

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging

#### Stabiliteitstoetsing C44-V1 (0.000-0.932)

Maatgevende combinatie: Fu.C.3

N;Ed = -0.5 kN

Nb;Rd;y = 282.8 kN

Nb;Rd;z = 282.8 kN

Methode Y = Cons. gesch.

Ca(y) = 0.000

Cb(y) = 0.000

Lknik Y = 0.932 m

Methode Z = Cons. gesch.

Ca(z) = N/B

Cb(z) = N/B

Lbuc Z = 0.932 m

Chi;y = 0.96

Knikcurve: A

Chi;z = 0.96

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.00 < 1

#### Buiging & Druk C44-V1 (0.000-0.932)

Maatgevende combinatie: Fu.C.3

N;Ed = -0.5 kN

My;Ed = 0.0 kNm

Profielklasse = 1

Delta;My;Ed = 0.0 kNm

Mz;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = 0.0 kNm

My;Psi = 0.0 kNm

My;s = 0.0 kNm

Mz = 0.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 0.0 kNm

Cmy = 0.95

Cmz = 1.00

CmLT = 0.95

Kyy = 0.950

Kyz = 0.600

Kzy = 0.570

Kzz = 1.000

Chi;y = 0.96

Chi;z = 0.96

Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1

#### Profielgegevens staaf C45-V1 (0.000-0.879)

N88.9/4

Analyse

Staal S275H(EN10210-1)

fyd(toegepast) = 275 N/mm2

h = 88.9 mm

A = 1.07e-03 m2

Wy;el = 216.7e-07 m3

Wy;pl = 288.5e-07 m3

b = 88.9 mm

Iy = 963.4e-09 m4

Wz;el = 216.7e-07 m3

Wz;pl = 288.5e-07 m3

tf = 4.0 mm

Iz = 963.4e-09 m4

Aw;y;el = 6.79e-04 m2

Aw;y;pl = 6.79e-04 m2

tw = 4.0 mm

Massa/m = 8.4 kg/m

Aw;z;el = 6.79e-04 m2

Aw;z;pl = 6.79e-04 m2

r = 40.4 mm

It = 192.7e-08 m4

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C45-V1 (0.000-0.879)

Maatgevende combinatie: Fu.C.2 op 0.000 m

Profielklasse = 1

N;Ed = 5.1 kN

Vy;Ed = 0.0 kN

My;Ed = 0.0 kNm

Vz;Ed = 0.0 kN

Mz;Ed = 0.0 kNm

N;Rd = 293.4 kN

Vy;Rd = 107.8 kN

MyRd = 7.9 kNm

Vz;Rd = 107.8 kN

MzRd = 7.9 kNm

NEN-EN1993-1-1(6.5): UC = 0.02 < 1

#### Kiptoetsing C45-V1 (0.000-0.879)

Equi. profiel: N88.9/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.



|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Tabel gebruikt NB.NB.1 (4)

Bovenflens maatgevend

Lsys = 0.879 m

C1 = 1.04

Mcr = 0.0 kNm

Chi;LT(Bi.C.1) = 1.00

Chi;LT,Z = 1.00

My;begin = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging

Beperk. eind: Gesteund

F = 0.0kN/m

Xb;lst = 0.000 m

Lg = 0.879 m

C2 = 0.42 (tabel)

kred = 1.0

M;Ed = 0.0 kNm

lkip = 0.879 m

My;eind = 0.0 kNm

b-eff(Begin) = 0.000

= 0.0

Xe;lst = 0.879 m

S = 0.000 m

C2(toegepast) = 0.00

Lam-rel = 0.00

b-eff(Eind) = 0.000

lst = 0.879 m

lwa = 0.0000e+00 m6

C = 0.00

Profielklasse 1

UC(y) = 0.00

UC(z) = 0.00

#### Stabiliteitstoetsing C45-V1 (0.000-0.879)

Maatgevende combinatie: Fu.C.3

N;Ed = -1.2 kN

Methode Y = Cons. gesch.

Methode Z = Cons. gesch.

Chi;y = 0.97

Chi;z = 0.97

NEN-EN1993-1-1(6.46): UC = 0.00 < 1

Nb;Rd;y = 284.2 kN

Ca(y) = 0.000

Ca(z) = N/B

Nb;Rd;z = 284.2 kN

Cb(y) = 0.000

Cb(z) = N/B

Knikcurve: A

Knikcurve: A

Lknik Y = 0.879 m

Lbuc Z = 0.879 m

#### Buiging & Druk C45-V1 (0.000-0.879)

Maatgevende combinatie: Fu.C.3

N;Ed = -1.2 kN

My = 0.0 kNm

Mz = 0.0 kNm

Cmy = 0.95

Kyy = 0.951

Chi;y = 0.97

NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1

My;Ed = 0.0 kNm

Delta;My;Ed = 0.0 kNm

My;Psi = 0.0 kNm

Mz;Psi = 0.0 kNm

Cmz = 1.00

Kyz = 0.600

Chi;z = 0.97

Profielklasse = 1

Mz;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My;s = 0.0 kNm

Mz;s = 0.0 kNm

CmLT = 0.95

Kzy = 0.570

Chi;LT = 1.00

Kzz = 1.001

#### Profielgegevens staaf C47-V1 (0.000-3.353)

N139.7/4

h = 139.7 mm

b = 139.7 mm

tf = 4.0 mm

tw = 4.0 mm

r = 65.8 mm

Analyse

A = 1.71e-03 m2

Iy = 392.9e-08 m4

Iz = 392.9e-08 m4

Massa/m = 13.4 kg/m

Staal S275H(EN10210-1)

Wy;el = 562.4e-07 m3

Wz;el = 562.4e-07 m3

Aw;y;el = 1.09e-03 m2

Aw;z;el = 1.09e-03 m2

It = 785.7e-08 m4

fyd(toegepast) = 275 N/mm2

Wy;pl = 736.8e-07 m3

Wz;pl = 736.8e-07 m3

Aw;y;pl = 1.09e-03 m2

Aw;z;pl = 1.09e-03 m2

lwa = 0.0e-02 m6

#### Doorsnedetoetsing C47-V1 (0.000-3.353)

Maatgevende combinatie: Fu.C.2 op 0.671 m

N;Ed = 36.9 kN

N;Rd = 468.9 kN

Vy;Ed = 2.0 kN

Vz;Ed = -1.3 kN

Vy;Rd = 172.4 kN

Vz;Rd = 172.4 kN

Profielklasse = 1

My;Ed = -0.8 kNm

Mz;Ed = 4.0 kNm

MyRd = 20.3 kNm

MzRd = 20.3 kNm

NEN-EN1993-1-1(NB.33): UC = 0.21 < 1

#### Kipstoetsing C47-V1 (0.000-3.353)

Equi. profiel: N139.7/4

Maatgevende combinatie: Bi.C.1

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Tabel gebruikt NB.NB.1 (2)

Bovenflens maatgevend

Lsys = 3.353 m

C1 = 1.13

Mcr = 0.0 kNm

Chi;LT(Bi.C.1) = 1.00

Beperk. eind: Gesteund

q = 0.1kN/m

Xb;lst = 0.000 m

Lg = 3.353 m

C2 = 0.45 (tabel)

kred = 1.0

M;Ed = 0.0 kNm

Instab. curve Kip:d

b-eff(Begin) = 0.000

= 0.0

Xe;lst = 3.353 m

S = 0.000 m

C2(toegepast) = 0.00

Lam-rel = 0.00

b-eff(Eind) = 0.000

lst = 3.353 m

lwa = 0.0000e+00 m6

C = 0.00

Profielklasse 1

UC(y) = 0.00

|                                                                  |                        |                        |                            |
|------------------------------------------------------------------|------------------------|------------------------|----------------------------|
|                                                                  |                        |                        |                            |
|                                                                  |                        |                        |                            |
|                                                                  |                        |                        |                            |
| Chi;LT,Z = 1.00                                                  | Ikip = 3.353 m         | UC(z) = 0.00           |                            |
| My;begin = 0.0 kNm                                               | My;eind = 0.0 kNm      |                        |                            |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: flens onder trek |                        |                        |                            |
| Stabiliteitstoetsing C47-V1 (0.000-3.353)                        |                        |                        |                            |
| Maatgevende combinatie: Fu.C.3                                   |                        |                        |                            |
| N;Ed = -2.6 kN                                                   | Nb;Rd;y = 371.9 kN     | Nb;Rd;z = 154.7 kN     |                            |
| Methode Y = Cons. gesch.                                         | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 3.353 m          |
| Methode Z = Handmatige Invoer                                    | Ca(z) = N/B            | Cb(z) = N/B            | Lbuc Z = 6.706 m           |
| Chi;y = 0.79                                                     |                        | Knikcurve: A           |                            |
| Chi;z = 0.33                                                     |                        | Knikcurve: A           |                            |
| NEN-EN1993-1-1(6.46): UC = 0.02 < 1                              |                        |                        |                            |
| Buiging & Druk C47-V1 (0.000-3.353)                              |                        |                        |                            |
| Maatgevende combinatie: Fu.C.3                                   |                        | Profielklasse = 1      |                            |
| N;Ed = -2.6 kN                                                   | My;Ed = 0.0 kNm        | Mz;Ed = 4.0 kNm        |                            |
|                                                                  | Delta;My;Ed = 0.0 kNm  | Delta;Mz;Ed = 0.0 kNm  |                            |
| My = 0.0 kNm                                                     | My;Psi = 0.0 kNm       | My;s = 0.0 kNm         |                            |
| Mz = 4.0 kNm                                                     | Mz;Psi = 0.0 kNm       | Mz;s = 2.0 kNm         |                            |
| Cmy = 0.95                                                       | Cmz = 0.60             | CmLT = 0.95            |                            |
| Kyy = 0.954                                                      | Kyz = 0.365            | Kzy = 0.572            | Kzz = 0.608                |
| Chi;y = 0.79                                                     | Chi;z = 0.33           | Chi;LT = 1.00          |                            |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.14 < 1                         |                        |                        |                            |
| Profielgegevens staaf C48-V1 (0.000-1.063)                       |                        |                        |                            |
| N88.9/4                                                          | Analyse                | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 88.9 mm                                                      | A = 1.07e-03 m2        | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm                                                      | Iy = 963.4e-09 m4      | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm                                                      | Iz = 963.4e-09 m4      | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm                                                      | Massa/m = 8.4 kg/m     | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm                                                      |                        | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |
| Doorsnedetoetsing C48-V1 (0.000-1.063)                           |                        |                        |                            |
| Maatgevende combinatie: Fu.C.2 op 1.063 m                        |                        | Profielklasse = 1      |                            |
| N;Ed = 5.5 kN                                                    | Vy;Ed = 0.0 kN         | My;Ed = 0.0 kNm        |                            |
|                                                                  | Vz;Ed = 0.0 kN         | Mz;Ed = 0.0 kNm        |                            |
| N;Rd = 293.4 kN                                                  | Vy;Rd = 107.8 kN       | MyRd = 7.9 kNm         |                            |
|                                                                  | Vz;Rd = 107.8 kN       | MzRd = 7.9 kNm         |                            |
| NEN-EN1993-1-1(6.5): UC = 0.02 < 1                               |                        |                        |                            |
| Kiptoetsing C48-V1 (0.000-1.063)                                 |                        |                        |                            |
| Equi. profiel: N88.9/4                                           |                        | Instab. curve Kip:d    |                            |
| Maatgevende combinatie: Bi.C.1                                   |                        |                        |                            |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel           |                        |                        |                            |
| Kipsteun bovenflens: N.v.t.                                      |                        |                        |                            |
| Kipsteun onderflens: N.v.t.                                      |                        |                        |                            |
| Inklem. begin: Gesteund                                          | Beperk. eind: Gesteund | b-eff(Begin) = 0.000   | b-eff(Eind) = 0.000        |
| Tabel gebruikt NB.NB.1 (4)                                       | F = 0.0kN/m            | = 0.0                  |                            |
| Bovenflens maatgevend                                            | Xb;lst = 0.000 m       | Xe;lst = 1.063 m       | lst = 1.063 m              |
| Lsys = 1.063 m                                                   | Lg = 1.063 m           | S = 0.000 m            | Iwa = 0.0000e+00 m6        |
| C1 = 1.04                                                        | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00   | C = 0.00                   |
| Mcr = 0.0 kNm                                                    | kred = 1.0             | Lam-rel = 0.00         | Profielklasse 1            |
| Chi;LT(Bi.C.1) = 1.00                                            | M;Ed = 0.0 kNm         |                        | UC(y) = 0.00               |
| Chi;LT,Z = 1.00                                                  | Ikip = 1.063 m         |                        | UC(z) = 0.00               |
| My;begin = 0.0 kNm                                               | My;eind = 0.0 kNm      |                        |                            |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging     |                        |                        |                            |
| Stabiliteitstoetsing C48-V1 (0.000-1.063)                        |                        |                        |                            |
| Maatgevende combinatie: Fu.C.3                                   |                        |                        |                            |
| N;Ed = -0.4 kN                                                   | Nb;Rd;y = 279.0 kN     | Nb;Rd;z = 279.0 kN     |                            |
| Methode Y = Cons. gesch.                                         | Ca(y) = 0.000          | Cb(y) = 0.000          | Lknik Y = 1.063 m          |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

Methode Z = Cons. gesch. Ca(z) = N/B Cb(z) = N/B Lbuc Z = 1.063 m  
Chi;y = 0.95 Knikcurve: A  
Chi;z = 0.95 Knikcurve: A  
NEN-EN1993-1-1(6.46): UC = 0.00 < 1

#### Buiging & Druk C48-V1 (0.000-1.063)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.3           |                       | Profielklasse = 1     |             |
| N;Ed = -0.4 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.950                              | Kyz = 0.600           | Kzy = 0.570           | Kzz = 1.000 |
| Chi;y = 0.95                             | Chi;z = 0.95          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |             |

#### Profielgegevens staaf C49-V1 (0.000-0.918)

|             |                               |                                   |                                                     |
|-------------|-------------------------------|-----------------------------------|-----------------------------------------------------|
| N88.9/4     | Analyse                       | Staal S275H(EN10210-1)            | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 88.9 mm | A = 1.07e-03 m <sup>2</sup>   | Wy;el = 216.7e-07 m <sup>3</sup>  | Wy;pl = 288.5e-07 m <sup>3</sup>                    |
| b = 88.9 mm | Iy = 963.4e-09 m <sup>4</sup> | Wz;el = 216.7e-07 m <sup>3</sup>  | Wz;pl = 288.5e-07 m <sup>3</sup>                    |
| tf = 4.0 mm | Iz = 963.4e-09 m <sup>4</sup> | Aw;y;el = 6.79e-04 m <sup>2</sup> | Aw;y;pl = 6.79e-04 m <sup>2</sup>                   |
| tw = 4.0 mm | Massa/m = 8.4 kg/m            | Aw;z;el = 6.79e-04 m <sup>2</sup> | Aw;z;pl = 6.79e-04 m <sup>2</sup>                   |
| r = 40.4 mm |                               | It = 192.7e-08 m <sup>4</sup>     | Iwa = 0.0e-02 m <sup>6</sup>                        |

#### Doorsnedetoetsing C49-V1 (0.000-0.918)

|                                           |                   |                   |                   |
|-------------------------------------------|-------------------|-------------------|-------------------|
| Maatgevende combinatie: Fu.C.2 op 0.612 m |                   | Profielklasse = 1 |                   |
| Nx;Ed = -0.5 kN                           | Vy;Ed = 0.0 kN    | My;Ed = 0.0 kNm   |                   |
|                                           | Vz;Ed = 0.0 kN    | Mz;Ed = 0.0 kNm   |                   |
| Nc;Rd = 293.4 kN                          | Vy;Rd = 107.8 kN  | My;Rd = 7.9 kNm   |                   |
|                                           | Vz;Rd = 107.8 kN  | Mz;Rd = 7.9 kNm   |                   |
| NVy;Rd = 293.4 kN                         | NVz;Rd = 293.4 kN | MV;y;Rd = 7.9 kNm | MV;z;Rd = 7.9 kNm |
| NEN-EN1993-1-1(6.9): UC = 0.00 < 1        |                   |                   |                   |

#### Kiptoetsing C49-V1 (0.000-0.918)

|                                                              |                        |                      |                                 |
|--------------------------------------------------------------|------------------------|----------------------|---------------------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                                 |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                                 |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                                 |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                                 |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                                 |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000             |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                                 |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 0.918 m     | lst = 0.918 m                   |
| Lsys = 0.918 m                                               | Lg = 0.918 m           | S = 0.000 m          | Iwa = 0.0000e+00 m <sup>6</sup> |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00                        |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1                 |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00                    |
| Chi;LT,Z = 1.00                                              | Ikip = 0.918 m         |                      | UC(z) = 0.00                    |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                                 |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                                 |

#### Stabiliteitstoetsing C49-V1 (0.000-0.918)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.2      |                    |                    |                   |
| N;Ed = -0.5 kN                      | Nb;Rd;y = 283.1 kN | Nb;Rd;z = 283.1 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 0.918 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 0.918 m  |
| Chi;y = 0.97                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.97                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                    |                    |                   |

#### Buiging & Druk C49-V1 (0.000-0.918)

|                                |  |                   |  |
|--------------------------------|--|-------------------|--|
| Maatgevende combinatie: Fu.C.2 |  | Profielklasse = 1 |  |
|--------------------------------|--|-------------------|--|

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| N;Ed = -0.5 kN                           | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.950                              | Kyz = 0.600           | Kzy = 0.570           | Kzz = 1.000 |
| Chi;y = 0.97                             | Chi;z = 0.97          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.00 < 1 |                       |                       |             |

#### Profielgegevens staaf C50-V1 (0.000-1.386)

|             |                    |                        |                            |
|-------------|--------------------|------------------------|----------------------------|
| N88.9/4     | Analyse            | Staal S275H(EN10210-1) | fyd(toegepast) = 275 N/mm2 |
| h = 88.9 mm | A = 1.07e-03 m2    | Wy;el = 216.7e-07 m3   | Wy;pl = 288.5e-07 m3       |
| b = 88.9 mm | Iy = 963.4e-09 m4  | Wz;el = 216.7e-07 m3   | Wz;pl = 288.5e-07 m3       |
| tf = 4.0 mm | Iz = 963.4e-09 m4  | Aw;y;el = 6.79e-04 m2  | Aw;y;pl = 6.79e-04 m2      |
| tw = 4.0 mm | Massa/m = 8.4 kg/m | Aw;z;el = 6.79e-04 m2  | Aw;z;pl = 6.79e-04 m2      |
| r = 40.4 mm |                    | It = 192.7e-08 m4      | Iwa = 0.0e-02 m6           |

#### Doorsnedetoetsing C50-V1 (0.000-1.386)

|                                           |                  |                   |  |
|-------------------------------------------|------------------|-------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                  | Profielklasse = 1 |  |
| N;Ed = -10.9 kN                           | Vy;Ed = 0.0 kN   | My;Ed = 0.0 kNm   |  |
|                                           | Vz;Ed = 0.0 kN   | Mz;Ed = 0.0 kNm   |  |
| N;Rd = 293.4 kN                           | Vy;Rd = 107.8 kN | MyRd = 7.9 kNm    |  |
|                                           | Vz;Rd = 107.8 kN | MzRd = 7.9 kNm    |  |
| NEN-EN1993-1-1(6.9): UC = 0.04 < 1        |                  |                   |  |

#### Kiptoetsing C50-V1 (0.000-1.386)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.386 m     | lst = 1.386 m       |
| Lsys = 1.386 m                                               | Lg = 1.386 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | lkip = 1.386 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C50-V1 (0.000-1.386)

|                                     |                    |                    |                   |
|-------------------------------------|--------------------|--------------------|-------------------|
| Maatgevende combinatie: Fu.C.2      |                    |                    |                   |
| N;Ed = -10.9 kN                     | Nb;Rd;y = 268.2 kN | Nb;Rd;z = 268.2 kN |                   |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000      | Cb(y) = 0.000      | Lknik Y = 1.386 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B        | Cb(z) = N/B        | Lbuc Z = 1.386 m  |
| Chi;y = 0.91                        |                    | Knikcurve: A       |                   |
| Chi;z = 0.91                        |                    | Knikcurve: A       |                   |
| NEN-EN1993-1-1(6.46): UC = 0.04 < 1 |                    |                    |                   |

#### Buiging & Druk C50-V1 (0.000-1.386)

|                                          |                       |                       |             |
|------------------------------------------|-----------------------|-----------------------|-------------|
| Maatgevende combinatie: Fu.C.2           |                       | Profielklasse = 1     |             |
| N;Ed = -10.9 kN                          | My;Ed = 0.0 kNm       | Mz;Ed = 0.0 kNm       |             |
|                                          | Delta;My;Ed = 0.0 kNm | Delta;Mz;Ed = 0.0 kNm |             |
| My = 0.0 kNm                             | My;Psi = 0.0 kNm      | My;s = 0.0 kNm        |             |
| Mz = 0.0 kNm                             | Mz;Psi = 0.0 kNm      | Mz;s = 0.0 kNm        |             |
| Cmy = 0.95                               | Cmz = 1.00            | CmLT = 0.95           |             |
| Kyy = 0.963                              | Kyz = 0.608           | Kzy = 0.578           | Kzz = 1.013 |
| Chi;y = 0.91                             | Chi;z = 0.91          | Chi;LT = 1.00         |             |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.04 < 1 |                       |                       |             |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

#### Profielgegevens staaf C51-V1 (0.000-1.188)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N88.9/4                 | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 88.9 mm             | A = 1.07e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| b = 88.9 mm             | I <sub>y</sub> = 963.4e-09 m <sup>4</sup> | W <sub>z</sub> ;el = 216.7e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 288.5e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 963.4e-09 m <sup>4</sup> | A <sub>w</sub> ;y;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 6.79e-04 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 8.4 kg/m                        | A <sub>w</sub> ;z;el = 6.79e-04 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 6.79e-04 m <sup>2</sup>      |
| r = 40.4 mm             |                                           | I <sub>t</sub> = 192.7e-08 m <sup>4</sup>      | I <sub>wa</sub> = 0.0e-02 m <sup>6</sup>            |

#### Doorsnedetoetsing C51-V1 (0.000-1.188)

|                                           |                               |                              |  |
|-------------------------------------------|-------------------------------|------------------------------|--|
| Maatgevende combinatie: Fu.C.2 op 0.000 m |                               | Profielklasse = 1            |  |
| N;Ed = 15.3 kN                            | V <sub>y</sub> ;Ed = 0.0 kN   | M <sub>y</sub> ;Ed = 0.0 kNm |  |
|                                           | V <sub>z</sub> ;Ed = 0.0 kN   | M <sub>z</sub> ;Ed = 0.0 kNm |  |
| N;Rd = 293.4 kN                           | V <sub>y</sub> ;Rd = 107.8 kN | M <sub>y</sub> Rd = 7.9 kNm  |  |
|                                           | V <sub>z</sub> ;Rd = 107.8 kN | M <sub>z</sub> Rd = 7.9 kNm  |  |
| NEN-EN1993-1-1(6.5): UC = 0.05 < 1        |                               |                              |  |

#### Kiptoetsing C51-V1 (0.000-1.188)

|                                                              |                        |                      |                     |
|--------------------------------------------------------------|------------------------|----------------------|---------------------|
| Equi. profiel: N88.9/4                                       |                        |                      |                     |
| Maatgevende combinatie: Bi.C.1                               |                        | Instab. curve Kip:d  |                     |
| Aangrijphoogte van de last: 0.000 m vanaf hart profiel       |                        |                      |                     |
| Kipsteun bovenflens: N.v.t.                                  |                        |                      |                     |
| Kipsteun onderflens: N.v.t.                                  |                        |                      |                     |
| Inklem. begin: Gesteund                                      | Beperk. eind: Gesteund | b-eff(Begin) = 0.000 | b-eff(Eind) = 0.000 |
| Tabel gebruikt NB.NB.1 (4)                                   | F = 0.0kN/m            | = 0.0                |                     |
| Bovenflens maatgevend                                        | Xb;lst = 0.000 m       | Xe;lst = 1.188 m     | lst = 1.188 m       |
| Lsys = 1.188 m                                               | Lg = 1.188 m           | S = 0.000 m          | Iwa = 0.0000e+00 m6 |
| C1 = 1.04                                                    | C2 = 0.42 (tabel)      | C2(toegepast) = 0.00 | C = 0.00            |
| Mcr = 0.0 kNm                                                | kred = 1.0             | Lam-rel = 0.00       | Profielklasse 1     |
| Chi;LT(Bi.C.1) = 1.00                                        | M;Ed = 0.0 kNm         |                      | UC(y) = 0.00        |
| Chi;LT,Z = 1.00                                              | Ikip = 1.188 m         |                      | UC(z) = 0.00        |
| My;begin = 0.0 kNm                                           | My;eind = 0.0 kNm      |                      |                     |
| NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: geen buiging |                        |                      |                     |

#### Stabiliteitstoetsing C51-V1 (0.000-1.188)

|                                     |                                              |                                              |                               |
|-------------------------------------|----------------------------------------------|----------------------------------------------|-------------------------------|
| Maatgevende combinatie: Fu.C.3      |                                              |                                              |                               |
| N;Ed = -1.2 kN                      | N <sub>b</sub> ;R <sub>d</sub> ;y = 275.1 kN | N <sub>b</sub> ;R <sub>d</sub> ;z = 275.1 kN |                               |
| Methode Y = Cons. gesch.            | Ca(y) = 0.000                                | C <sub>b</sub> (y) = 0.000                   | L <sub>knik</sub> Y = 1.188 m |
| Methode Z = Cons. gesch.            | Ca(z) = N/B                                  | C <sub>b</sub> (z) = N/B                     | L <sub>buc</sub> Z = 1.188 m  |
| Chi;y = 0.94                        |                                              | K <sub>nik</sub> curve: A                    |                               |
| Chi;z = 0.94                        |                                              | K <sub>nik</sub> curve: A                    |                               |
| NEN-EN1993-1-1(6.46): UC = 0.00 < 1 |                                              |                                              |                               |

#### Buiging & Druk C51-V1 (0.000-1.188)

|                                          |                                    |                                    |                         |
|------------------------------------------|------------------------------------|------------------------------------|-------------------------|
| Maatgevende combinatie: Fu.C.3           |                                    | Profielklasse = 1                  |                         |
| N;Ed = -1.2 kN                           | M <sub>y</sub> ;Ed = 0.0 kNm       | M <sub>z</sub> ;Ed = 0.0 kNm       |                         |
|                                          | Delta;M <sub>y</sub> ;Ed = 0.0 kNm | Delta;M <sub>z</sub> ;Ed = 0.0 kNm |                         |
| M <sub>y</sub> = 0.0 kNm                 | M <sub>y</sub> ;Psi = 0.0 kNm      | M <sub>y</sub> ;s = 0.0 kNm        |                         |
| M <sub>z</sub> = 0.0 kNm                 | M <sub>z</sub> ;Psi = 0.0 kNm      | M <sub>z</sub> ;s = 0.0 kNm        |                         |
| C <sub>m</sub> y = 0.95                  | C <sub>m</sub> z = 1.00            | C <sub>m</sub> LT = 0.95           |                         |
| K <sub>yy</sub> = 0.951                  | K <sub>yz</sub> = 0.601            | K <sub>zy</sub> = 0.571            | K <sub>zz</sub> = 1.001 |
| Chi;y = 0.94                             | Chi;z = 0.94                       | Chi;LT = 1.00                      |                         |
| NEN-EN1993-1-1(6.61&6.62): UC = 0.01 < 1 |                                    |                                    |                         |

#### Profielgegevens staaf C61-V1 (0.000-7.111)

|                         |                                           |                                                |                                                     |
|-------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| N139.7/4                | Analyse                                   | Staal S275H(EN10210-1)                         | f <sub>yd</sub> (toegepast) = 275 N/mm <sup>2</sup> |
| h = 139.7 mm            | A = 1.71e-03 m <sup>2</sup>               | W <sub>y</sub> ;el = 562.4e-07 m <sup>3</sup>  | W <sub>y</sub> ;pl = 736.8e-07 m <sup>3</sup>       |
| b = 139.7 mm            | I <sub>y</sub> = 392.9e-08 m <sup>4</sup> | W <sub>z</sub> ;el = 562.4e-07 m <sup>3</sup>  | W <sub>z</sub> ;pl = 736.8e-07 m <sup>3</sup>       |
| t <sub>f</sub> = 4.0 mm | I <sub>z</sub> = 392.9e-08 m <sup>4</sup> | A <sub>w</sub> ;y;el = 1.09e-03 m <sup>2</sup> | A <sub>w</sub> ;y;pl = 1.09e-03 m <sup>2</sup>      |
| t <sub>w</sub> = 4.0 mm | Massa/m = 13.4 kg/m                       | A <sub>w</sub> ;z;el = 1.09e-03 m <sup>2</sup> | A <sub>w</sub> ;z;pl = 1.09e-03 m <sup>2</sup>      |

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|

r = 65.8 mm

It = 785.7e-08 m<sup>4</sup>

Iwa = 0.0e-02 m<sup>6</sup>

#### Doorsnedetoetsing C61-V1 (0.000-7.111)

Maatgevende combinatie: Fu.C.2 op 5.979 m

Profielklasse = 1

N;Ed = -23.1 kN

Vy;Ed = 2.0 kN

My;Ed = 1.2 kNm

Vz;Ed = 1.8 kN

Mz;Ed = 4.0 kNm

N;Rd = 468.9 kN

Vy;Rd = 172.4 kN

MyRd = 20.3 kNm

Vz;Rd = 172.4 kN

MzRd = 20.3 kNm

NEN-EN1993-1-1(NB.33): UC = 0.21 < 1

#### Kiptoetsing C61-V1 (0.000-7.111)

Equi. profiel: N139.7/4

Maatgevende combinatie: Bi.C.1

Instab. curve Kip:d

Aangrijphoogte van de last: 0.000 m vanaf hart profiel

Kipsteun bovenflens: N.v.t.

Kipsteun onderflens: N.v.t.

Inklem. begin: Gesteund

Beperk. eind: Gesteund

b-eff(Begin) = 0.000

b-eff(Eind) = 0.000

Tabel gebruikt NB.NB.1 (3)

F = 0.0kN/m

= 0.0

Bovenflens maatgevend

Xb;lst = 0.000 m

Xe;lst = 7.111 m

lst = 7.111 m

Lsys = 7.111 m

Lg = 7.111 m

S = 0.000 m

Iwa = 0.0000e+00 m<sup>6</sup>

C1 = 1.35

C2 = 0.55 (tabel)

C2(toegepast) = 0.00

C = 0.00

Mcr = 0.0 kNm

kred = 1.0

Lam-rel = 0.00

Profielklasse 1

Chi;LT(Bi.C.1) = 1.00

M;Ed = 0.4 kNm

UC(y) = 0.00

Chi;LT,Z = 1.00

lkip = 7.111 m

UC(z) = 0.00

My;begin = 0.0 kNm

My;eind = 0.0 kNm

NEN-EN1993-1-1(6.54): UC = 0.00 < 1 Kip n.v.t.: buis/koker NEN-EN 1993-1-1 #6.3.2.1(2)

#### Stabiliteitstoetsing C61-V1 (0.000-7.111)

Maatgevende combinatie: Fu.C.2

N;Ed = -23.5 kN

Nb;Rd;y = 139.5 kN

Nb;Rd;z = 37.9 kN

Methode Y = Cons. gesch.

Ca(y) = 0.000

Cb(y) = 0.000

Lknik Y = 7.111 m

Methode Z = Handmatige Invoer

Ca(z) = N/B

Cb(z) = N/B

Lbuc Z = 14.222 m

Chi;y = 0.30

Knikcurve: A

Chi;z = 0.08

Knikcurve: A

NEN-EN1993-1-1(6.46): UC = 0.62 < 1

#### Buiging & Druk C61-V1 (0.000-7.111)

Maatgevende combinatie: Fu.C.2

Profielklasse = 1

N;Ed = -23.5 kN

My;Ed = 1.2 kNm

Mz;Ed = 4.0 kNm

Delta;My;Ed = 0.0 kNm

Delta;Mz;Ed = 0.0 kNm

My = 0.0 kNm

My;Psi = 0.0 kNm

My;s = -0.1 kNm

Mz = 4.0 kNm

Mz;Psi = 0.0 kNm

Mz;s = 2.0 kNm

Cmy = 0.95

Cmz = 0.60

CmLT = 0.95

Kyy = 1.078

Kyz = 0.538

Kzy = 0.647

Kzz = 0.897

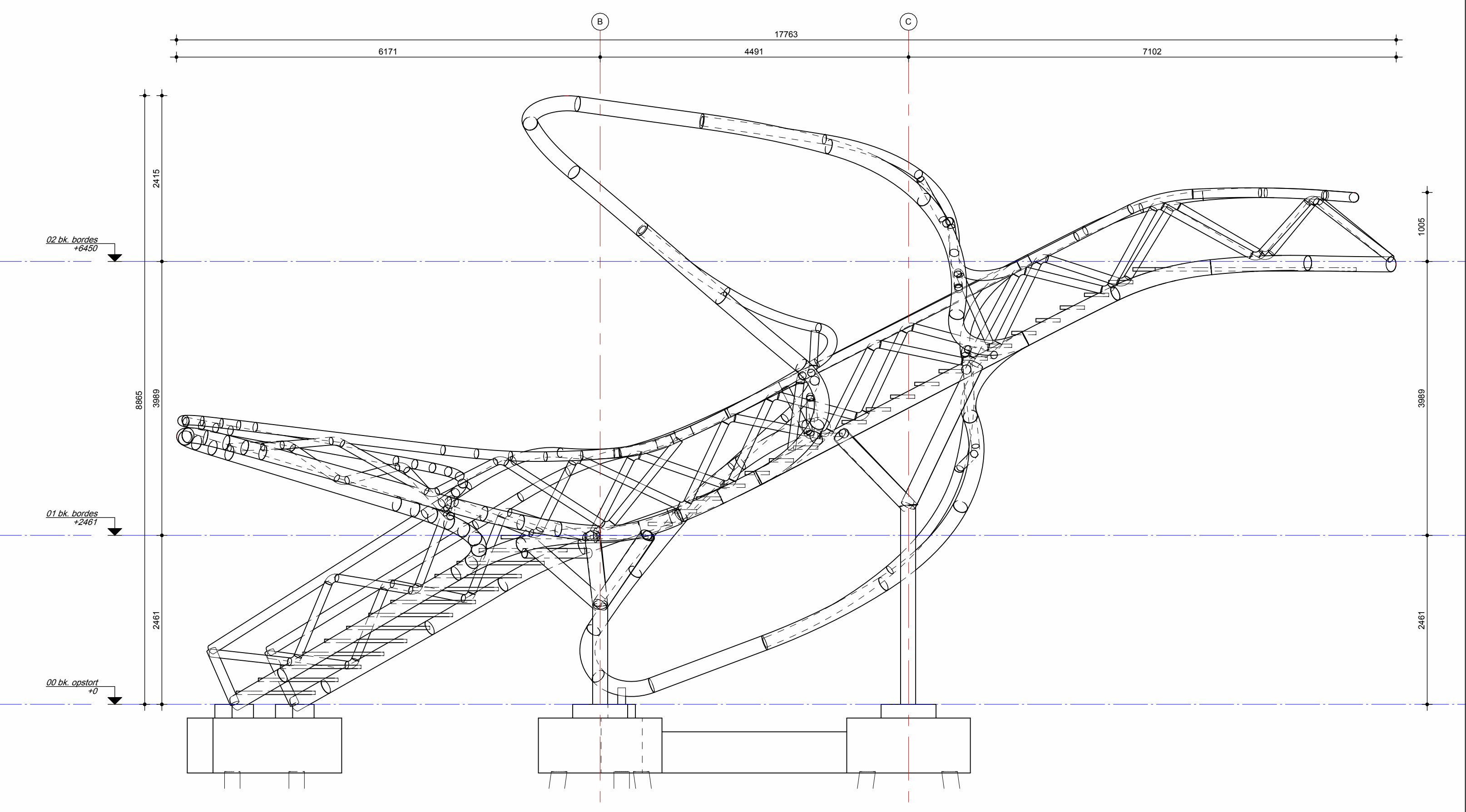
Chi;y = 0.30

Chi;z = 0.08

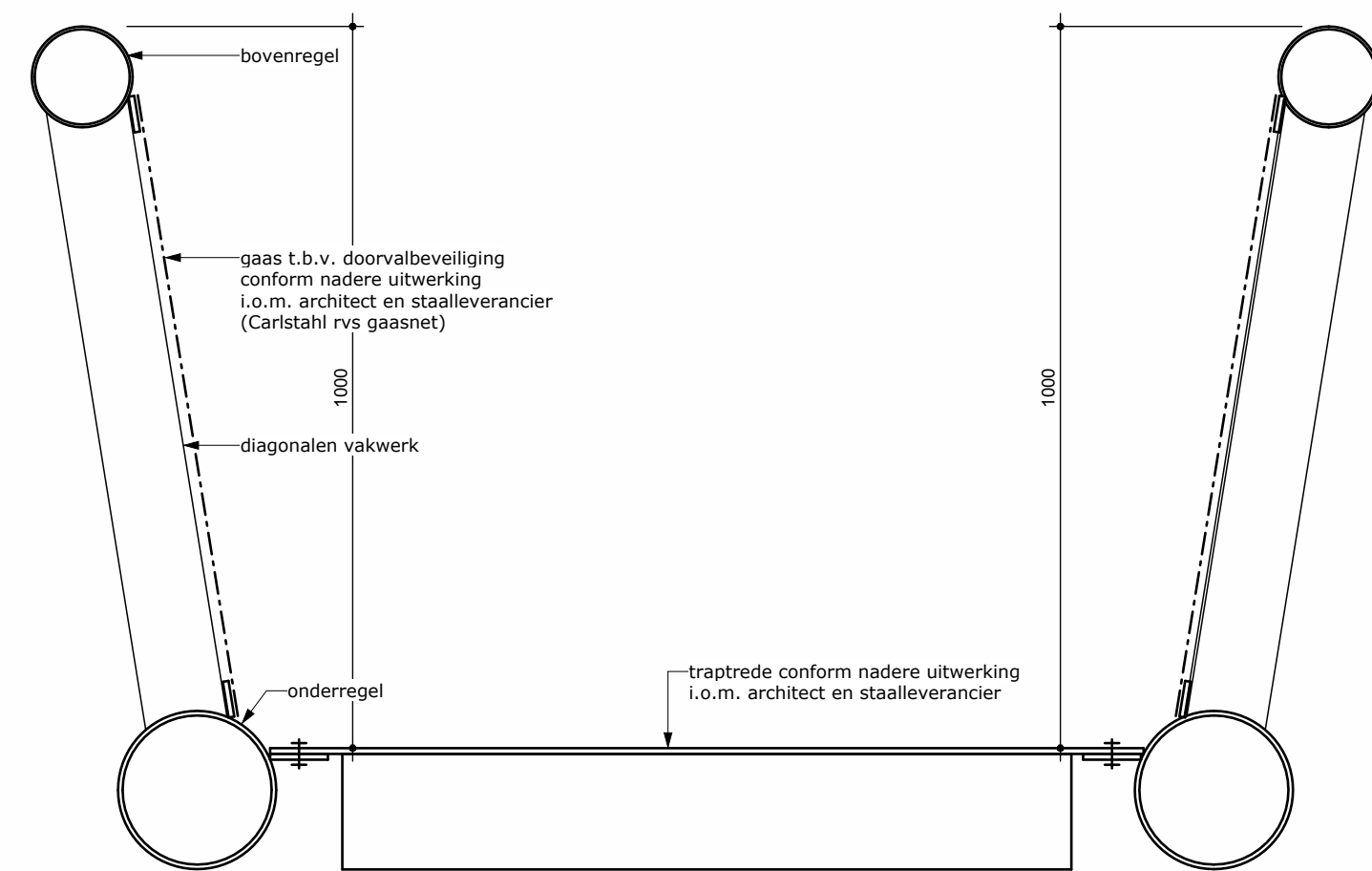
Chi;LT = 1.00

NEN-EN1993-1-1(6.61&6.62): UC = 0.83 < 1

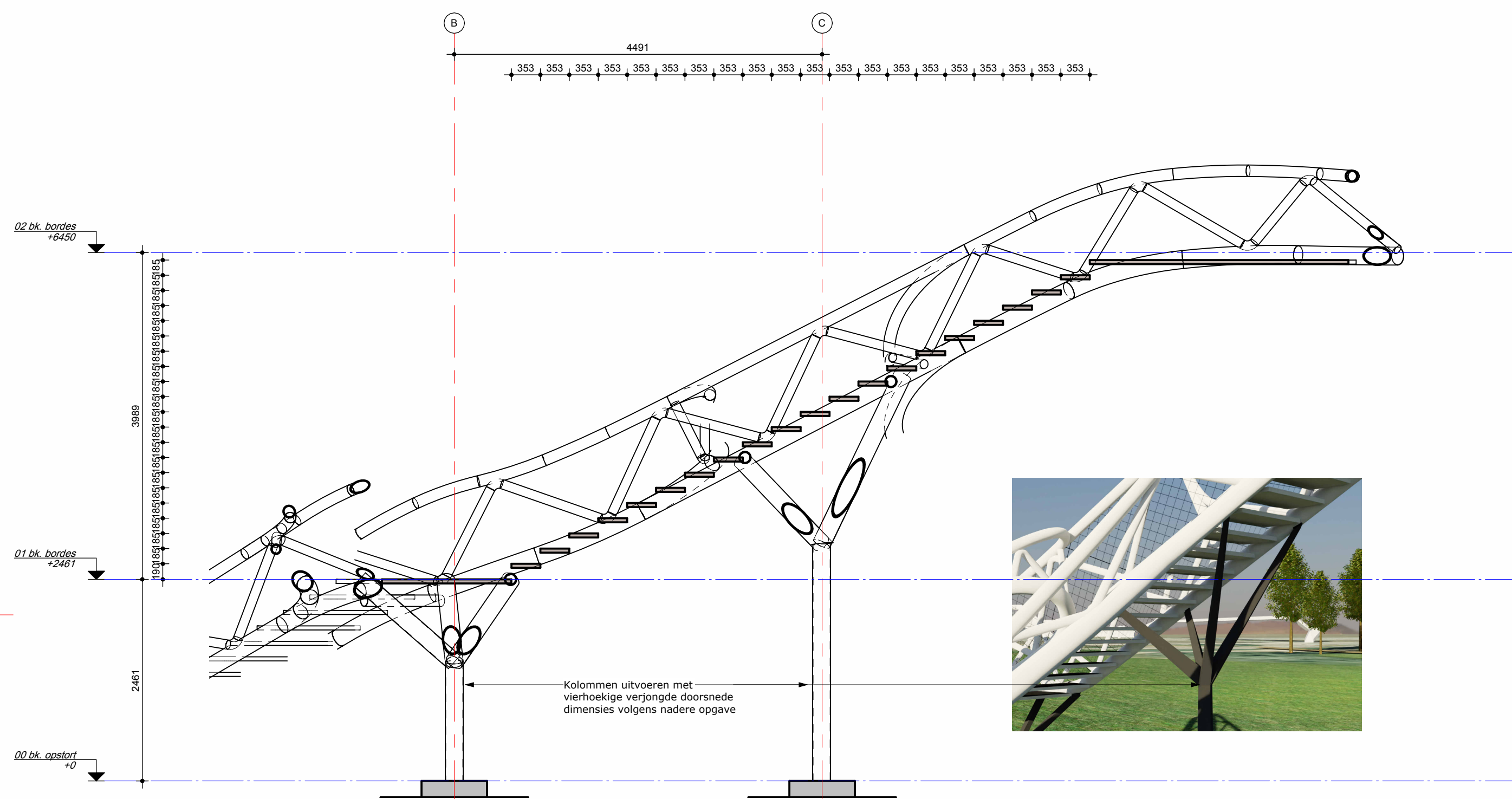




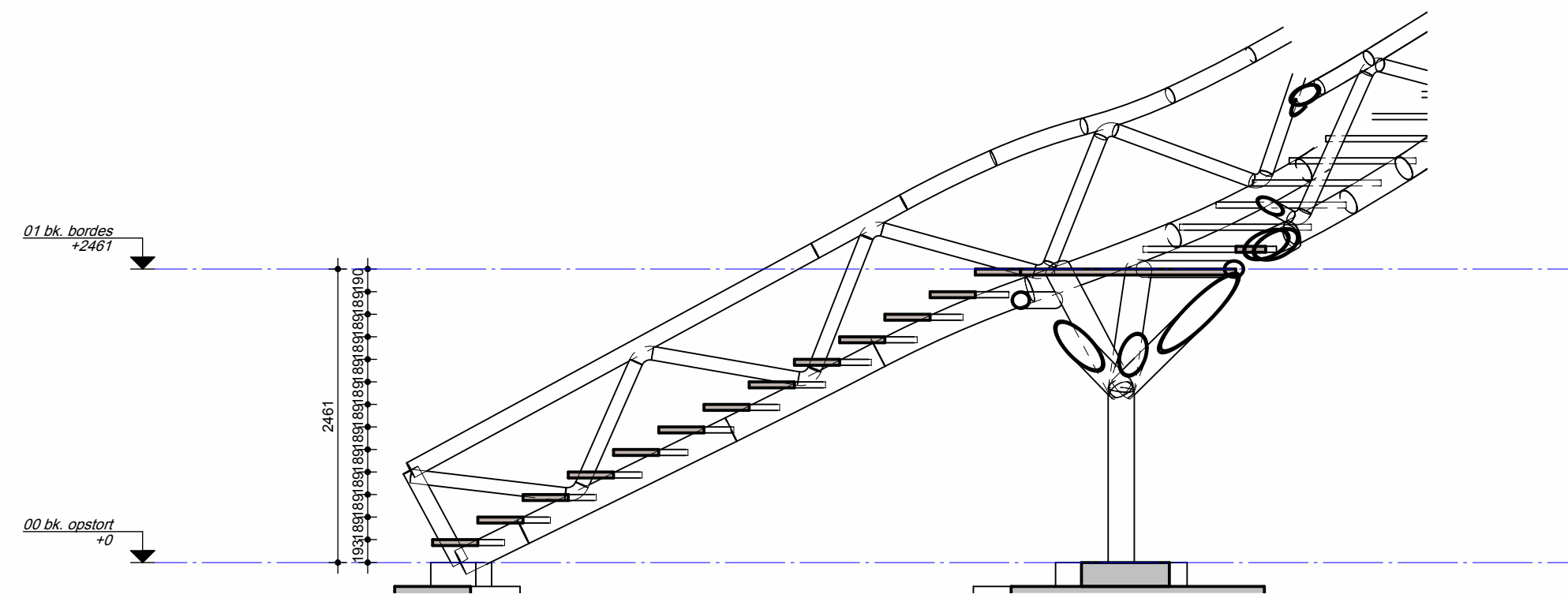
1 : 50



1 : 10



1 : 50



1 : 50



**ALGEMENE GEGEVENS**

- Belastingen en uitgavenstructuren volgens:  
- Uitgaven: uitsluitend: 'centraal' ontwerp/ hoofd/berekening van Pater  
- NEN-EN1990+A1+C1+C2:2019+N-B1:2019  
- NEN-EN1991-1-1+C1+C2+A1+N-B1:2019  
- NEN-EN1991-1-1+C2:2019+N-B1  
- NEN-EN1991-1-3+C1+A1:2019+N-B1:2019  
- NEN-EN1991-1-4+A1+C2:2011+N-B1:2019  
- NEN-EN1991-1-5+C2:2019+N-B1:2019  
- NEN-EN1991-1-7+C1+A1:2019+N-B1:2019  
- boekwettige belastingen volgens tekening van architect  
- Afwijking 10%  
- Geheel of gedeeltelijk ... NEN-EN1997-1+C1+A1:2016  
- Afwijking 10%  
- Prijs = 0,000 ... NAP (nader te bepalen door opdrachtgever)  
- Voor overige boekwettige voorzieningen en sprinklers, zie tekeningen van A. van der Wal  
- Wervingskosten: 10% (niet tekenen over funkties)  
- Brandwerende hoofdtraagconstructie 0 minuten.

### TEKENINGEN EN BEREKENINGEN DERDEN

- Elementen van vooraf vervaardigd constructief beton dienen te worden uitgewerkt volgens categorie 4 van de Criteria 73/06 uitgegeven door Kiwa.

**ALGEMENE GEGEVENS STAALCONSTRUCTIE**  
Eenlaagconstructie, uniform:

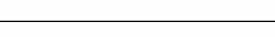
[illegible]**ALGEMENE GEGEVENS GEHEIDE STALEN BUISPALEN**

Prefin conform NEN9997:1+2:2017. Geotechnisch ontwerp van constructies-DE1: Algemeen regels  
 NEN9997:2017, 2019:2015. Uitbreiding van bijzonder geotechnisch werk – Verdringingsproeven  
 -Betrokt/waak min. C25/25, milieuklasse XA3, tenzij anders kan worden aangegeven. (bijvoorbeeld door middel van een milieutechnisch bodemkwaliteits-  
 onderzoek met min. 400mm in fundering openen)  
 -Bodemkwaliteits min. S235, tenzij anders vermeld.  
 -Bij tekeningen en berekeningen: tekenaar, Tekening en berekening ter controle overleggen aan hoofdconstructeur.  
 -Plaatsaanduiding door 10° diameter malden aan hoofdconstructeur. De hierdoor ontstane meerwerkkosten zijn voor rekening van de aannemer.  
 -Hietrek starten ter plaatse van sondering en lagste laagpaastruiveling.  
 -Bij zwaarwerk hietrek constructies waarborgen.  
 -Geotechnisch hietrek ter controle overleggen aan hoofdconstructeur.  
 -Geotechnisch advies GEOFHE: 2302054-1 d.d. 13-12-2023

[illegible]

| Rev.               | Datum                               | Omschrijving wijziging |                          |                           |                          | Get. | Acc. |
|--------------------|-------------------------------------|------------------------|--------------------------|---------------------------|--------------------------|------|------|
| Definitief Ontwerp |                                     | Technisch Ontwerp      |                          | Uitvoeringsgereed Ontwerp |                          |      |      |
| Voorlopig          | <input checked="" type="checkbox"/> | Voorlopig              | <input type="checkbox"/> | Voorlopig                 | <input type="checkbox"/> |      |      |
| Definitief         | <input type="checkbox"/>            | Definitief             | <input type="checkbox"/> | Definitief                | <input type="checkbox"/> |      |      |

## Constructieoverzicht

|                     |                                                                                                 |                                 |
|---------------------|-------------------------------------------------------------------------------------------------|---------------------------------|
| Bed:<br><b>D002</b> | Getekend: A. Eurlings<br>Gecontroleerd: D. Loo<br>Vrijgegeven: D. Loo<br>Formaat: A0+           | Projectnummer:<br><b>520147</b> |
| Datum: 24-01-2024   |                                                                                                 |                                 |
| Wijziging:          | Benzenraderweg 1<br>6411 EC Heerlen<br>T +3188 2027200<br>@ info@paltebv.nl<br>I www.paltebv.nl |                                 |
| Datum wijziging:    |            |                                 |





# Toelichting op de aanvraag

## Uitkijktoren 'Flying High'

Goede Buren windpark Streepland B.V.

720074 | Definitief

5-6-2023





## Pondera

Hoofdvestiging Nederland  
Amsterdamseweg 13  
6814 CM Arnhem  
088 – pondera (088-7663372)  
info@ponderaconsult.com

Postadres  
Postbus 919  
6800 AX Arnhem

Vestiging South East Asia  
Jl. Mampang Prapatan XV no 18  
Mampang  
Jakarta Selatan 12790  
Indonesia

Vestiging North East Asia  
Suite 1718, Officia Building 92  
Saemunan-ro, Jongno-gu  
Seoul Province  
Republic of Korea

## Colofon

Soort document  
Toelichting op de aanvraag

Projectnaam  
Uitkijktoren 'Flying High'

Versienummer  
Definitief

Datum  
5-6-2023

Project nummer  
720074

Opdrachtgever  
Goede Buren windpark Streepland B.V.

Auteur  
Richelle Roozenboom

Nagekeken door  
Martijn Edink

## Disclaimer

In het onderzoek is gebruik gemaakt van algemeen geaccepteerde uitgangspunten, modellen en informatie die ten tijde van het opstellen van dit rapport ter beschikking stonden. Aanpassingen in de uitgangspunten, modellen of gebruikte gegevens kunnen leiden tot andere uitkomsten. De aard en de nauwkeurigheid van de gebruikte gegevens voor het onderzoek bepalen in belangrijke mate de nauwkeurigheid en de onzekerheden van de berekende uitkomsten. Pondera is niet aansprakelijk voor gederfde inkomsten of schade die wordt geleden door opdrachtgever(s) en/of derden uit conclusies die gebaseerd zijn op gegevens die niet van Pondera afkomstig zijn. Deze rapportage is opgesteld met de intentie dat deze alleen gebruikt wordt door de opdrachtgever en slechts voor het doel waarvoor de rapportage is opgesteld. Er mag geen beroep worden gedaan op de informatie uit deze rapportage voor andere doeleinden zonder schriftelijke toestemming van Pondera. Pondera is niet verantwoordelijk voor de consequenties die kunnen voortvloeien uit het oneigenlijk gebruik van de rapportage. De verantwoordelijkheid voor het gebruik van (de analyse, resultaten en bevindingen in) de rapportage blijft bij de opdrachtgever. De Rechtsverhouding opdrachtgevers – architect, ingenieur en adviseur conform DNR 2011 is te allen tijde van toepassing. Pondera werkt met een kwaliteitsmanagementsysteem dat door EIK gecertificeerd is volgens de ISO 9001:2015 norm.

## Inhoudsopgave

|     |                                              |    |
|-----|----------------------------------------------|----|
| 1   | Toelichting op de aanvraag                   | 2  |
| 1.1 | Aanleiding                                   | 2  |
| 1.2 | Procedure en bevoegd gezag                   | 2  |
| 1.3 | Geldend bestemmingsplan                      | 2  |
| 1.4 | Onderdelen van de aanvraag                   | 3  |
| 1.5 | Gegevens initiatiefnemer                     | 4  |
| 1.6 | Leeswijzer                                   | 5  |
| 2   | Locatie                                      | 6  |
| 2.1 | Inleiding                                    | 6  |
| 2.2 | Omschrijving locatie                         | 6  |
| 2.3 | Eigendomssituatie                            | 7  |
| 3   | Omgevingsvergunning bouwen                   | 8  |
| 3.1 | Inleiding                                    | 8  |
| 3.2 | De uitkijktoren                              | 8  |
| 3.3 | Informatieborden                             | 11 |
| 3.4 | Bouwkosten                                   | 12 |
| 4   | Omgevingsvergunning afwijken bestemmingsplan | 13 |
| 4.1 | Inleiding                                    | 13 |
| 4.2 | Huidige bestemming                           | 13 |
| 4.3 | Afwijking van het bestemmingsplan            | 13 |

## 1 Toelichting op de aanvraag

### 1.1 Aanleiding

Op 1 oktober 2018<sup>1</sup> is een omgevingsvergunning verleend voor het oprichten en in werking hebben van de inrichting van Windpark Streepland. Dit windpark bestaat uit drie windmolens die aan de oostzijde van de A16, nabij treinstation Lage Zwaluwe en verzorgingsplaats Streepland gerealiseerd worden. Vanwege de aanleg van de civiele werken bij windturbine 2 (WTG-02) is er een waterpoel gedempt. Ter compensatie is er nabij de meest zuidelijke windturbine (WTG-03) een nieuwe waterpoel aangelegd. Deze waterpoel heeft de vorm van een zwaluw. Initiatiefnemer Goede Buren windpark Streepland B.V. is voornemens om naast deze waterpoel een uitkijktoren, genaamd Flying High, te realiseren. De uitkijktoren is specifiek ontworpen voor deze locatie. De uitkijktoren zal eveneens de vorm van een zwaluw krijgen, zodat deze aansluit bij het ontwerp van de poel. Naast de uitkijktoren zelf wordt er ook een educatief wandelpad naar de uitkijktoren gerealiseerd. Achter de vorm van de waterpoel en van de uitkijktoren zit een uitgebreide gedachtegang. Hetzelfde geldt voor het educatieve wandelpad. In paragraaf 3.2 wordt deze gedachtegang nader toegelicht.

Voor de realisatie van de uitkijktoren is een Omgevingsvergunning vereist. Dit document betreft een toelichting op de aanvraag om Omgevingsvergunning voor de realisatie van de uitkijktoren.

### 1.2 Procedure en bevoegd gezag

De realisatie van de uitkijktoren is vergunningplichtig op grond van artikel 2.1 lid 1 onder c van de Wet algemene bepalingen omgevingsrecht (Wabo). De gemeente Moerdijk is het bevoegd gezag voor het verlenen van de betreffende omgevingsvergunning. Op de aanvraag is de uitgebreide voorbereidingsprocedure conform afdeling 3.4 van de Algemene wet bestuursrecht (Awb) van toepassing.

Initiatiefnemer heeft op 5 juni 2022 een conceptaanvraag ingediend voor dit planvoornemen. Op basis van een vooroverleg heeft het college van gemeente Moerdijk besloten dat initiatiefnemer een omgevingsvergunning mag indienen. Middels een ambtelijke terugkoppeling is aangegeven dat het planvoornemen moest worden omgeschreven naar een ruimtelijke onderbouwing. Onderhavig document betreft deze ruimtelijke onderbouwing.

### 1.3 Geldend bestemmingsplan

Ter plaatse van de beoogde uitkijktoren geldt het bestemmingsplan “Stationsgebied Lage Zwaluwe” (vastgesteld op 22 september 2005). Volgens dit bestemmingsplan rust op het deel van het perceel waar de uitkijktoren wordt gerealiseerd de bestemming ‘Agrarische doeleinden’. In Figuur 1.1 is een uitsnede weergegeven van het geldende bestemmingsplan.

De gronden die zijn aangewezen voor ‘Agrarische doeleinden’ zijn bestemd voor:

1. volwaardige of reële agrarische bedrijven, als bedoeld in artikel 1 lid 5 sub a, b, c, f, g en i.

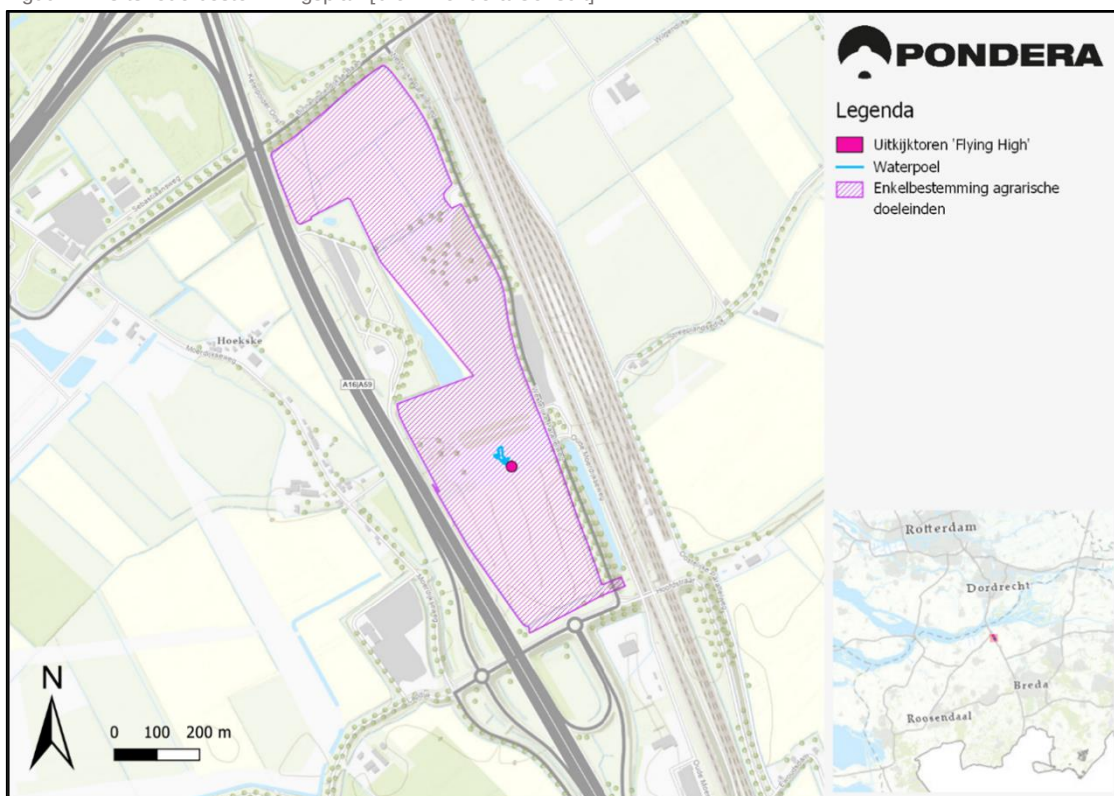
De bouwvoorschriften zijn als volgt:

2. Op deze gronden mogen uitsluitend bouwwerken, geen gebouwen zijnde, ten dienste van de bestemming worden gebouwd.
3. Voor het bouwen geldt het volgende:

<sup>1</sup> Zaaknummer 18051469

- a) Op de gronden mogen uitsluitend terrein- en erfafscheidingen, en voorzieningen ten behoeve van de waterbeheersing worden gebouwd;
- b) Overigens geldt het volgende:
  - Terrein- en erfafscheidingen: maximaal 2 meter hoog;
  - Overige bouwwerken, geen gebouw zijnde: maximaal 4 meter hoog.

Figuur 1.1 Uitsnede bestemmingsplan [bron: Pondera Consult]



Het geldende bestemmingsplan laat de realisatie van de uitkijktoren niet toe. Derhalve is er een afwijking van het bestemmingsplan noodzakelijk.

#### 1.4 Onderdelen van de aanvraag

Ten behoeve van het bovenstaande vraagt Goede Buren windpark Streepland B.V. een omgevingsvergunning in het kader van Wet algemene bepalingen omgevingsrecht (Wabo) voor onbepaalde tijd aan voor:

- het bouwen van een bouwwerk (een uitkijktoren) (artikel 2.1, lid 1, onder a Wabo);
- het afwijken van het geldende bestemmingsplan (artikel 2.1, lid 1, onder c juncto artikel 2.12, lid 1, onder a, sub 3 Wabo).

De aanvraag omgevingsvergunning is namens Goede Buren windpark Streepland B.V. ingediend via het Omgevingsloket Online (OLO). Voorliggend document vormt een toelichting op de via het OLO ingediende aanvraag. In het aanvraagformulier wordt op verschillende plekken naar onderhavige document verwezen (bijlage 1). Daar waar in het OLO een 0 is opgegeven, kan dit op twee manieren geïnterpreteerd worden:

1. Het betreft daadwerkelijk een hoeveelheid van 0 of het komt 0 keer voor;

- In dit document is een toelichting op de gevraagde informatie opgenomen, omdat deze informatie niet met enkel een getal is te beschrijven.

De voor het OLO benodigde tabellen zijn zoveel mogelijk in dit document opgenomen, of als bijlage aan het OLO toegevoegd.

## 1.5 Gegevens initiatiefnemer

In onderstaande tabel worden de gegevens van de initiatiefnemer weergegeven. De initiatiefnemer is gelijk aan de aanvrager van de omgevingsvergunning.

Tabel 1.1 Gegevens initiatiefnemer

| Bedrijf                 |                                      |
|-------------------------|--------------------------------------|
| KvK-nummer              | 72761741                             |
| Vestigingsnummer        | 000040851451                         |
| Statutaire naam         | Goede Buren windpark Streepland B.V. |
| Handelsnaam             | Goede Buren windpark Streepland B.V. |
| Contactpersoon          |                                      |
| Voorletters             | M                                    |
| Achternaam              | Struijk                              |
| Functie                 |                                      |
| Geslacht                | vrouw                                |
| Vestigingsadres bedrijf |                                      |
| Straatnaam + Huisnummer | Van Deventerlaan 30                  |
| Postcode                | 3528AE                               |
| Woonplaats              | Utrecht                              |
| Contactgegevens         |                                      |
| Telefoonnummer          | 030 753 3100                         |
| E-mailadres             | Maartje.struijk@windunie.nl          |

De initiatiefnemers worden bijgestaan door een adviesbureau. De aangegeven contactpersoon van het adviesbureau, in onderstaande tabel, is tevens de gemachtigde voor het indienen van de omgevingsvergunning.

Tabel 1.2 Gegevens gemachtigde

| Bedrijf     | Pondera Consult B.V. |
|-------------|----------------------|
| Gemachtigde |                      |
| Voorletters | M.                   |
| Achternaam  | ten Klooster         |
| Functie     | Directeur            |
|             |                      |

|                         |                                 |
|-------------------------|---------------------------------|
| Vestigingsadres bedrijf |                                 |
| Postcode                | 6814 CM                         |
| Huisnummer              | 13                              |
| Straatnaam              | Amsterdamseweg                  |
| Plaats                  | Arnhem                          |
|                         |                                 |
| Contactpersoon          |                                 |
| Naam                    | R. Roozenboom                   |
| Functie                 | Adviseur                        |
| Telefoonnummer          | 088-7663372                     |
| E-mailadres             | r.roozenboom@ponderaconsult.com |

### 1.6 Leeswijzer

Dit document volgt de opbouw van het aanvraagformulier van het Omgevingsloket. In deze 'Toelichting op de aanvraag', waarnaar in het formulier wordt verwezen, wordt in hoofdstuk 1 ingegaan op het algemene deel van de aanvraag. Ook bevat dit hoofdstuk de informatie over aanvrager en indiener. Vervolgens wordt in het tweede hoofdstuk de locatie van de voorgenomen werkzaamheden en inrichting nader beschreven. In het derde hoofdstuk wordt de aanvraag voor de activiteit bouwen toegelicht. Tot slot wordt in het vierde en tevens laatste hoofdstuk een toelichting gegeven op aanvraag voor de activiteit 'afwijken bestemmingsplan'.

## 2 Locatie

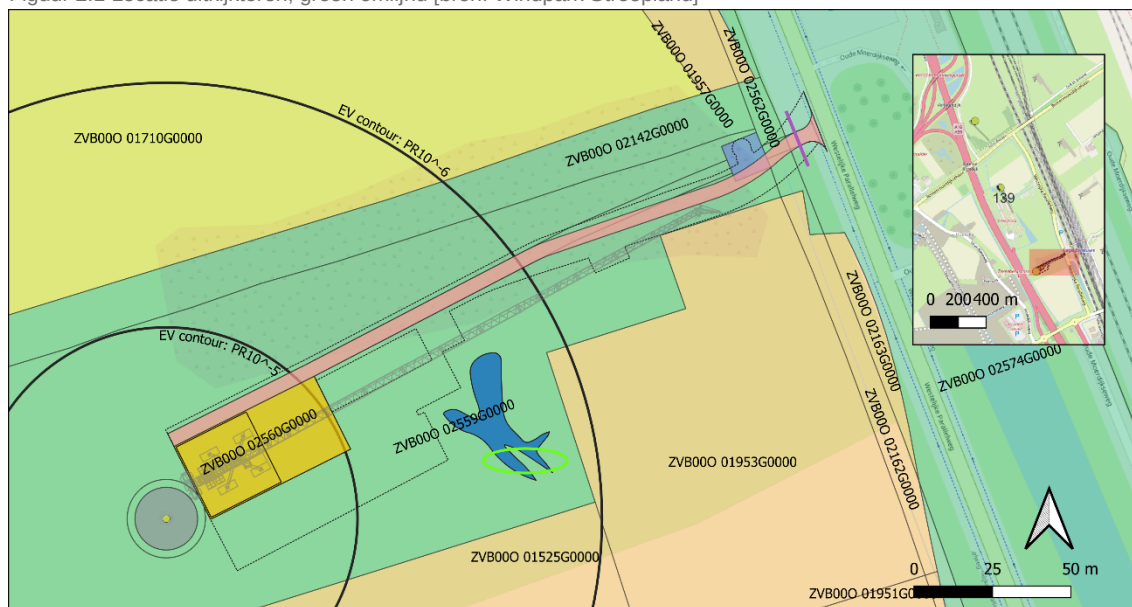
### 2.1 Inleiding

Dit hoofdstuk beschrijft de locatie van de uitkijktoren.

### 2.2 Omschrijving locatie

De uitkijktoren zal ten oosten van de derde windturbine (WTG-03) gerealiseerd worden naast de nieuwe waterpoel. Deze locatie bevindt zich aan de Westelijke Parallelweg in Zevenbergschen Hoek. Ten noorden van de locatie is een houtopstand aanwezig en verzorgingsplaats Streepland. Ten westen bevindt zich de A16 en ten oosten station Lage Zwaluwe. De uitkijktoren wordt gerealiseerd op perceelnummer ZVB00-O-2559. In Figuur 2.1 is de locatie weergegeven. In Figuur 2.2 is een afbeelding weergegeven van hoe het perceel er nu bij ligt.

Figuur 2.1 Locatie uitkijktoren, groen omlijnd [bron: Windpark Streepland]



Titel: Locatie waterpoel en kunstwerk  
bij WTG-03 Windpark Streepland  
Datum: 31-05-2023  
Auteur: M. Struijk



#### Legenda

- |                                  |                                 |                                  |
|----------------------------------|---------------------------------|----------------------------------|
| ● Hart van de turbine            | ■ Permanente kraanopstelplaats  | □ PR10^6 contour (radius: 139 m) |
| ■ Fundatie WTG-03 (radius: 10 m) | ■ Permanente weg                | ■ PERCELEN                       |
| — Hekwerk                        | □ Contour overige werken        | ■ BUSINESSPARK LAGE ZWALUWE B.V. |
| — Kraanuitleg                    | ■ Waterpoel compensatie         | ■ DE STAAT (I&W)                 |
|                                  | □ PR10^5 contour (radius: 61 m) | ■ GEMEENTE MOERDIJK              |
|                                  |                                 | ■ SWANENBERG'S IJZER B.V.        |



Figuur 2.2 Perceel planvoornemen/ huidige situatie (excl. waterpoel en windturbine) [bron: Google Maps]



### 2.3 Eigendomssituatie

De grond is in eigendom van de Staat (Infrastructuur en Water). De grondeigenaar heeft toestemming gegeven omtrent het gebruik van deze grond. Initiatiefnemer regelt het gebruik hiervan met het Rijksvastgoedbedrijf middels een opstalakte.



## 3 Omgevingsvergunning bouwen

### 3.1 Inleiding

Dit hoofdstuk bevat de informatie ten behoeve van de aanvraag voor het bouwen van de uitkijktoren.

### 3.2 De uitkijktoren

#### 3.2.1 Het ontwerp

Achter de uitkijktoren en de vorm ervan zit een uitgebreide gedachtegang. Zelden kun je dicht bij een windturbine komen, terwijl dat wel een heel bijzondere ervaring is. De uitkijktoren brengt het publiek op een veilige en bijzondere manier dichtbij de windturbine. Op een hoogte van ruim zes meter kan er genoten worden van het uitzicht. Wanneer er naar beneden wordt gekeken ligt daar de waterpoel als een waterschaduw onder de uitkijktoren. Dit is een bijzondere en leuke ervaring.

Uiteraard ligt het planvoornemen nabij treinstation Lage Zwaluwe. Daarnaast staat de zwaluw symbool voor de komst van 'het nieuwe'. Dit sluit perfect aan bij het planvoornemen, namelijk nieuwe energie voor een nieuw tijdperk. Tevens worden veiligheid en geluk geassocieerd met de zwaluw. Gelet op de ontwikkelingen zijn dat toepasselijke onderwerpen. Wanneer zwaluwen vliegen lijken het net pijlen, gedreven door de wind. De wind die ze transporteert is de kracht die de windmolens van Windpark Streepland in beweging zet. De vorm van de zwaluw past dan ook bijzonder goed bij het planvoornemen.

Om de ervaring nog rijker te maken is ervoor gekozen om een educatief wandelpad aan te leggen naar de uitkijktoren toe. De wandelroute loopt vanaf de Westelijke Parallelweg langs het bestaande en her te planten groen, via de onderhoudsweg van de windturbine, naar een pad van houtsnipper of schelpen naar de uitkijktoren en de waterpoel. Langst deze wandelroute van ongeveer 400 meter en bij de uitkijktoren komen verschillende informatieborden te staan met uitleg over het opwekken en gebruik van duurzame energie en de energietransitie in het algemeen.

In onderstaande figuren 3.1 t/m 3.3 is de uitkijktoren vanuit verschillende oogpunten weergegeven. In Figuur 3.4 is een impressie weergegeven van het totaalplaatje inclusief de educatieve wandelroute.

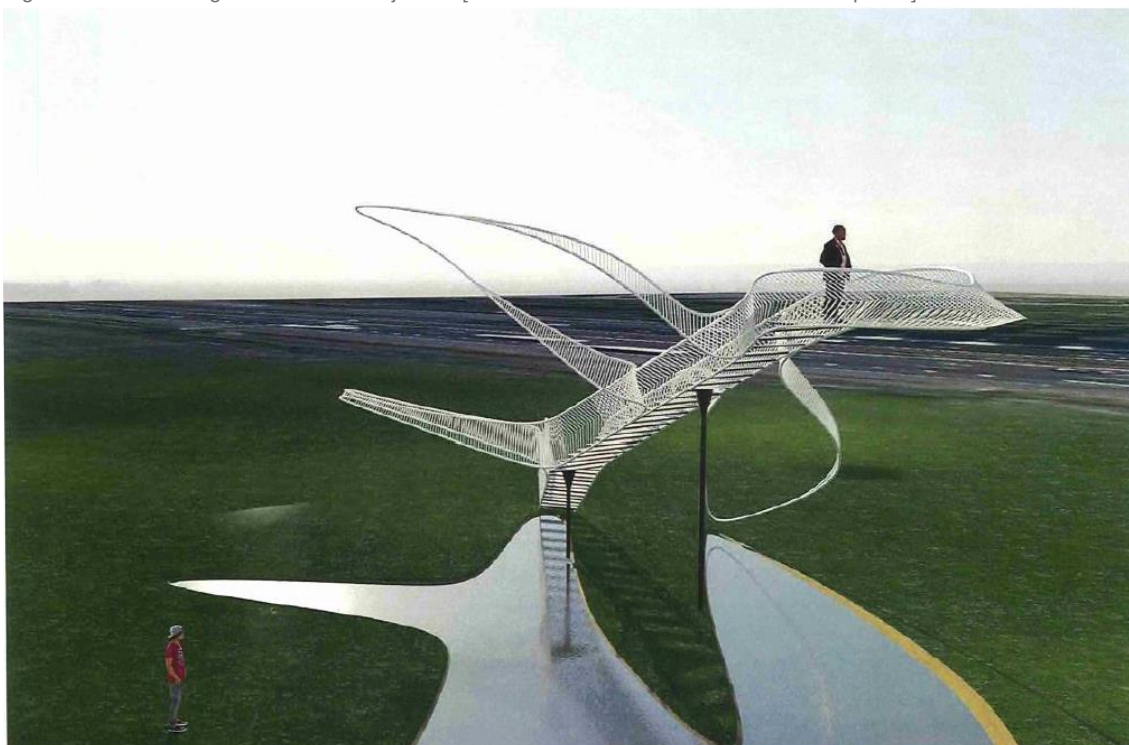
Figuur 3.1 Achteraanzicht uitkijktoren met uitzicht op windturbine [bron: MAUC architectuur i.o.v. Mothership B.V.]



Figuur 3.2 3D-tekening zijaanzicht uitkijktoren en waterpoel [bron: MAUC architectuur i.o.v. Mothership B.V.]



Figuur 3.3 3D-tekening vooraanzicht uitkijktoren [bron: MAUC architectuur i.o.v. Mothership B.V.]



Figuur 3.4 Impressie van het totaalplaatje inclusief de educatieve wandelroute [bron: MAUC architectuur i.o.v. Mothership B.V.]

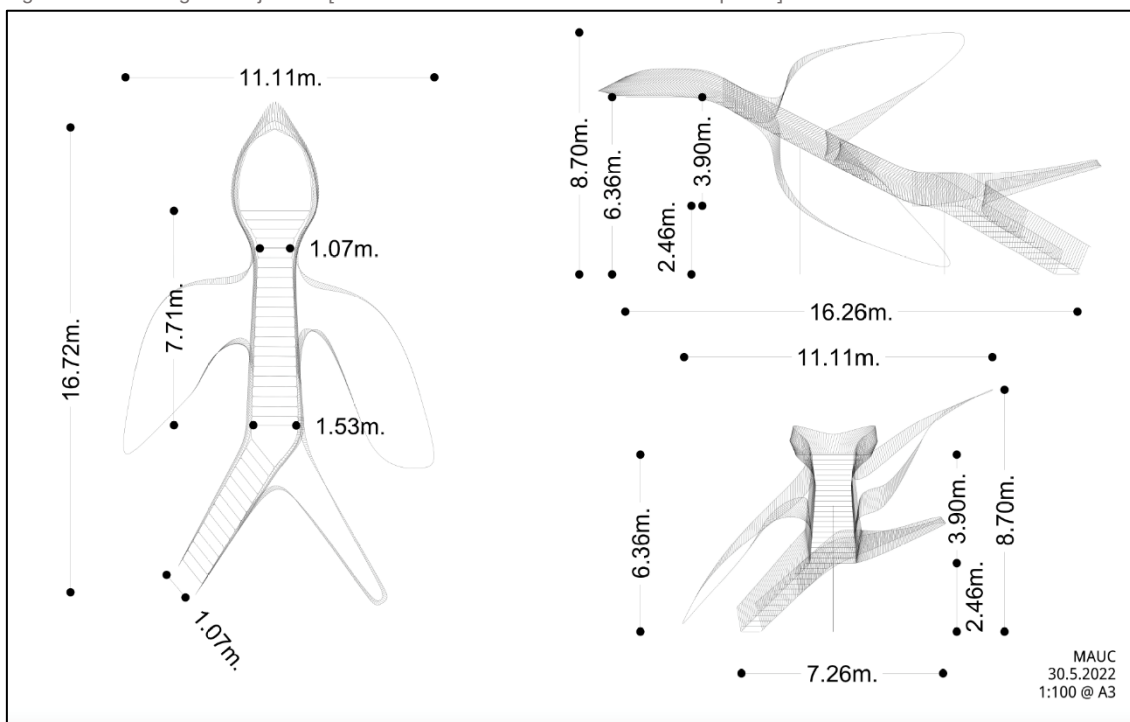




### 3.2.2 Afmetingen

In onderstaande afbeelding zijn de voorlopige afmetingen weergegeven. De definitieve afmetingen kunnen iets afwijken op basis van detailengineering, maar deze afwijking zal minimaal zijn en niet van invloed op het ontwerp of de stabiliteit zelf.

Figuur 3.5 Afmetingen uitkijktoren [bron: MAUC architectuur i.o.v. Mothership B.V.]



De uitkijktoren zal circa 8,7 meter hoog worden, dit is vanaf het maaiveld tot aan het hoogste punt van de vleugel. Het gedeelte tot waar je kan staan zal circa 6,5 meter hoog worden. De uitkijktoren wordt circa 17,5 meter lang.

### 3.2.3 Fundatie

In deze fase van het project is nog geen funderingsadvies beschikbaar. In een latere fase zal worden gekozen voor een fundering op “staal” of voor een fundering op, trillingvrij, aan te brengen palen. Ons uitgangspunt is een fundering op “staal” middels een betonnen plaat (al dan niet prefab) op zand. De keuze is afhankelijk van het benodigd geotechnisch draagvermogen ten behoeve van de sterkte, stabiliteit en de benodigde stijfheid van de fundering en uitkijktoren.

De aangenomen, te realiseren fundering en het benodigde geotechnisch draagvermogen worden in een latere fase vastgesteld aan de hand van (hand)sonderingen.

## 3.3 Informatieborden

Het ontwerp van de educatieve wandelroute is tot op heden als concept vormgegeven. Het is nog niet zeker of het ook daadwerkelijk op deze manier wordt ingevuld. Om verwarring hierover te voorkomen is er voor nu voor gekozen om dit concept eerst verder uit te werken. Wat wel vastgesteld kan worden is dat er

een wandelpad naar de uitkijktoren wordt gerealiseerd en dat langs dit wandelpad educatieve elementen zullen worden geplaatst.

### 3.4 Bouwkosten

De bouwkosten zijn nog niet definitief vastgesteld, maar liggen tussen de € 200.000,- en € 250.000,-.

## 4 Omgevingsvergunning afwijken bestemmingsplan

### 4.1 Inleiding

Omdat het planvoornemen niet past in het geldende ruimtelijk kader is een planologische procedure benodigd om het plan mogelijk te maken. De initiatiefnemer vraagt om die reden een bouwplan aan in afwijking van het ruimtelijk kader (omgevingsvergunning voor de activiteit het gebruiken van gronden of bouwwerken in strijd met het ruimtelijk plan, artikel 2.1 lid 1 onder c Wabo). Via deze procedure (ex artikel 2.12, lid 1, sub a, onder 3 Wabo) is het mogelijk om af te wijken van het geldende planologisch regime. Voorwaarde voor verlening van de vergunning is dat de activiteit niet in strijd mag zijn met een goede ruimtelijke ordening. Bijlage 3 betreft een 'goede ruimtelijke onderbouwing' die voorziet in de onderbouwing daarvan.

### 4.2 Huidige bestemming

Ter plaatse van de beoogde uitkijktoren geldt het bestemmingsplan "Stationsgebied Lage Zwaluwe" (vastgesteld op 22 september 2005). Volgens dit bestemmingsplan rust op het deel van het perceel waar de uitkijktoren wordt gerealiseerd de bestemming 'Agrarische doeleinden'. In Figuur 1.1 is een uitsnede weergegeven van het geldende bestemmingsplan.

De gronden die zijn aangewezen voor 'Agrarische doeleinden' zijn bestemd voor:

1. volwaardige of reële agrarische bedrijven, als bedoeld in artikel 1 lid 5 sub a, b, c, f, g en i.

De bouwvoorschriften zijn als volgt:

2. Op deze gronden mogen uitsluitend bouwwerken, geen gebouwen zijnde, ten dienste van de bestemming worden gebouwd.
3. Voor het bouwen geldt het volgende:
  - c) Op de gronden mogen uitsluitend terrein- en erfafscheidingen, en voorzieningen ten behoeve van de waterbeheersing worden gebouwd;
  - d) Overigens geldt het volgende:
    - Terrein- en erfafscheidingen: maximaal 2 meter hoog;
    - Overige bouwwerken, geen gebouw zijnde: maximaal 4 meter hoog.

### 4.3 Afwijking van het bestemmingsplan

Zoals in voorgaande paragraaf aangegeven zijn de gronden aangewezen voor 'Agrarische doeleinden' bestemd voor agrarische bedrijven. Er mogen enkel bouwwerken, geen gebouw zijnde, ten dienste van deze bestemming worden gebouwd. De maximale bouwhoogte hiervoor bedraagt 4 meter.

De uitkijktoren is een bouwwerk geen gebouw zijnde, maar staat niet ten dienste van de bestemming 'Agrarisch doeleinden'. Tevens wordt de uitkijktoren hoger dan 4 meter, namelijk circa 9,3 meter.

Voor het voorgenomen plan dient dus te worden afgeweken van het huidige bestemmingsplan, omdat de beoogde activiteit qua gebruik en afmetingen niet past binnen de geldende planregels. Voor het afwijken van het bestemmingsplan is een goede ruimtelijke onderbouwing opgesteld welke is toegevoegd als bijlage 3 bij deze aanvraag.

---

**ADVIES WELSTANDSCOMMISSIE** op verzoek van de gemeente **MOERDIJK** over onder vermeld plan:

Betreft : **AANVRAAG OMGEVINGSVERGUNNING**  
nummer gemeente : V 2023/998  
omschrijving : bouwen van een uitkijktoren nabij Windpark Streepland  
adres : Westelijke Parallelweg, Zevenbergschen Hoek  
datum vergadering : 8 februari 2024

De commissie heeft zich bij deze advisering gebaseerd op het beleid van de gemeente zoals dat is vastgelegd in haar welstandsnota.

Welstandsgebied : kern Buitengebied T4 Op zichzelf staande bebouwing  
Behandeling : 2

---

**Conclusie**

Het plan voldoet WEL aan de gebiedscriteria van de welstandnota.

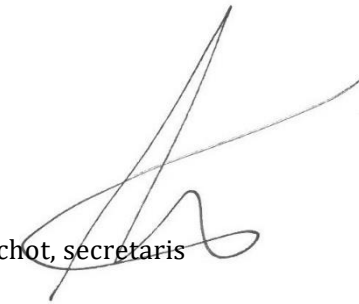
**Motivering**

Het plan is akkoord, gezien de voor dit gebied geldende criteria.

Namens de commissie,



J.A. Couwenberg, voorzitter



A. Welschot, secretaris

# Projectberekening

Dit document geeft een overzicht van de invoer en rekenresultaten van een Projectberekening met AERIUS Calculator. De berekening is uitgevoerd binnen stikstofgevoelige Natura 2000-gebieden, op rekenpunten die overlappen met habitattypen en/of leefgebieden die aangewezen zijn in het kader van de Wet natuurbescherming, gekoppeld aan een aangewezen soort, of nog onbekend maar mogelijk wel relevant, en waar tevens sprake is van een overbelaste of bijna overbelaste situatie voor stikstof.



- [Overzicht](#)
- [Samenvatting situaties](#)
- [Resultaten](#)
- [Detailgegevens per emissiebron](#)

*Deze PDF is een digitaal bestand dat weer in te lezen is in AERIUS. Meer toelichting over deze PDF kunt u vinden in een bijbehorende leeswijzer. Deze leeswijzer en overige documentatie is te raadplegen via:  
[www.aerius.nl/handleidingen-en-leeswijzers](http://www.aerius.nl/handleidingen-en-leeswijzers)*





### Contactgegevens

Rechtspersoon

Inrichtingslocatie

Econsultancy

Westelijke Parallelweg,

4926 PK Zevenbergschen Hoek

### Activiteit

Omschrijving

Toelichting

23804.002

D1 aanlegfase en gebruik 2024

### Berekening

AERIUS kenmerk

Datum berekening

Rekenconfiguratie

RjvaXMLLbzy

29 november 2023, 09:25

Wnb-rekengrid

### Totale emissie

D1 aanlegfase en gebruik 2024 - Beoogd

Rekenjaar

2024

Emissie NH<sub>3</sub>

31,1 g/j

Emissie NO<sub>x</sub>

6,8 kg/j

### Resultaten

D1 aanlegfase en gebruik 2024 - Beoogd

Gekarteerd oppervlak met toename (ha)

Gekarteerd oppervlak met afname (ha)

Grootste toename

Grootste afname

Hoogste bijdrage

-

-

-

-

-

Hexagon

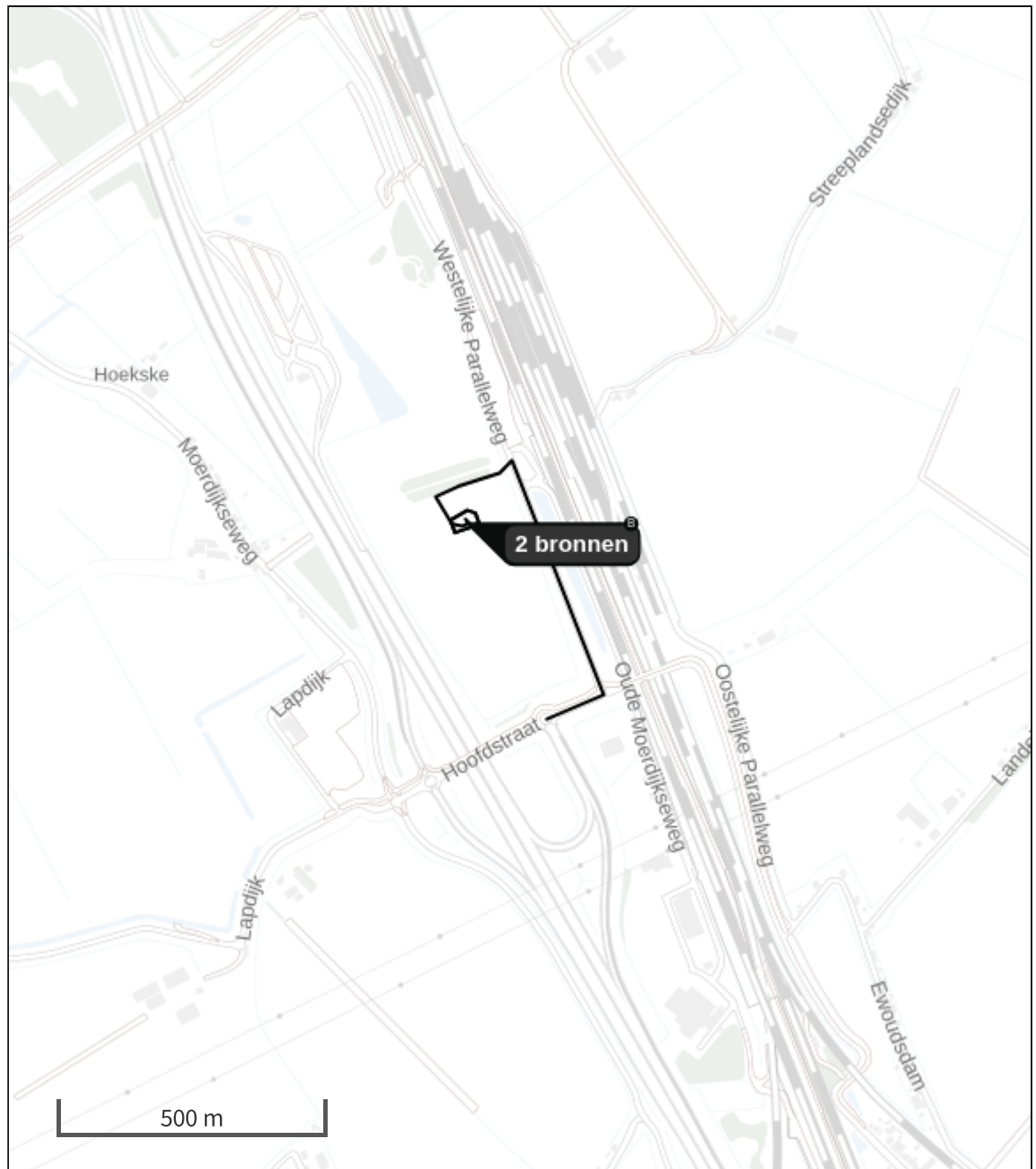
Gebied

## D1 aanlegfase en gebruik 2024 (Beoogd), rekenjaar 2024

## Emissiebronnen

|                                                                                                   | Emissie NH <sub>3</sub> | Emissie NO <sub>x</sub> |
|---------------------------------------------------------------------------------------------------|-------------------------|-------------------------|
| <b>1</b> Mobiele werktuigen   Bouw, Industrie en Delfstoffenwinning  <br>hijskraan                | 3,0 g/j                 | 6,2 kg/j                |
| <b>3</b> Anders...   Anders...   stationair vrachtverkeer                                         | 3,0 g/j                 | 0,3 kg/j                |
|  Verkeersnetwerk | 25,1 g/j                | 0,3 kg/j                |

Hoogste af- en toename op (bijna) overbelaste stikstofgevoelige Natura 2000 gebieden.



- |                                                                                                                     |                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|  Habitatrictlijn                 |  Grootste toename (projectberekening)             |
|  Vogelrichtlijn                  |  Grootste afname (projectberekening)              |
|  Vogelrichtlijn, Habitatrictlijn |  Hoogste totaal (achtergrond + projectberekening) |
|  Niet bepaald                    |                                                                                                                                      |

De letters bij de bronlabels op de kaart geven bij welke type situaties de bronnen horen: beoogde situatie (B), referentiesituatie (R) en/of salderingssituatie (S).

Resultaten stikstofgevoelige Natura 2000 gebieden situatie "D1 aanlegfase en gebruik 2024" (Beoogd) incl. saldering e/o referentie

|        | Berekend (ha<br>gekarteed) | Hoogste totale<br>depositie (mol<br>N/ha/jr) | Met toename<br>(ha gekarteed) | Grootste<br>toename (mol<br>N/ha/jr) | Met afname (ha<br>gekarteed) | Grootste afname<br>(mol N/ha/jr) |
|--------|----------------------------|----------------------------------------------|-------------------------------|--------------------------------------|------------------------------|----------------------------------|
| Totaal | -                          | -                                            | -                             | -                                    | -                            | -                                |

## D1 aanlegfase en gebruik 2024, Rekenjaar 2024

## 1 Mobiele werktuigen | Bouw, Industrie en Delfstoffenwinning

|             |                            |                 |          |
|-------------|----------------------------|-----------------|----------|
| Naam        | hijskraan                  | NO <sub>x</sub> | 6,2 kg/j |
| Locatie     | X:104783,11<br>Y:411330,86 | NH <sub>3</sub> | 3,0 g/j  |
| Oppervlakte | 0,14 ha                    |                 |          |

| Naam      | Stageklasse                                        | Brandstof-<br>verbruik | Draaiuren | AdBlue<br>verbruik | Stof            | Emissie  |
|-----------|----------------------------------------------------|------------------------|-----------|--------------------|-----------------|----------|
| hijskraan | Stage-IIIA, 2006-2010, 75-560 kW, diesel, SCR: nee | 400 l/j                | 40 u/j    |                    | NO <sub>x</sub> | 6,2 kg/j |
|           |                                                    |                        |           |                    | NH <sub>3</sub> | 3,0 g/j  |

## 2 Wegverkeer | Weg

|                           |                                  |                    |       |        |                 |          |
|---------------------------|----------------------------------|--------------------|-------|--------|-----------------|----------|
| Naam                      | verkeer aanlegfase (bouwverkeer) |                    | Links | Rechts | NO <sub>x</sub> | 69,3 g/j |
| Locatie                   | X:104932,73 Y:411293,79          | Type scherm        | -     | -      | NO <sub>2</sub> | 17,3 g/j |
| Lengte                    | 864,53 m                         | Hoogte             | -     | -      | NH <sub>3</sub> | 2,5 g/j  |
| Wegtype                   | Buitenweg                        | Afstand tot de weg | -     | -      |                 |          |
| Rijrichting               | Beide richtingen                 |                    |       |        |                 |          |
| Tunnelfactor              | 1                                |                    |       |        |                 |          |
| Type hoogteligging        | Normaal                          |                    |       |        |                 |          |
| Weghoogte t.o.v. maaiveld | 0 m                              |                    |       |        |                 |          |

| Verkeer                   | Max. snelheid           | Aantal voertuigbewegingen | In file |
|---------------------------|-------------------------|---------------------------|---------|
| Licht verkeer             | Voorgeschreven factoren | 30,0 /jaar                | 0,0 %   |
| Middelzwaar vrachtverkeer | Voorgeschreven factoren | 20,0 /jaar                | 0,0 %   |
| Zwaar vrachtverkeer       | Voorgeschreven factoren | 12,0 /jaar                | 0,0 %   |
| Busverkeer                | Voorgeschreven factoren | 0,0 /jaar                 | 0,0 %   |

## 3 Anders... | Anders...

|                      |                            |                |                 |                 |          |
|----------------------|----------------------------|----------------|-----------------|-----------------|----------|
| Naam                 | stationair vrachtverkeer   | Uittreedhoogte | <u>0,0 m</u>    | NO <sub>x</sub> | 0,3 kg/j |
|                      |                            | Warmteinhoud   | <u>0,000 MW</u> | NH <sub>3</sub> | 3,0 g/j  |
| Locatie              | X:104783,11<br>Y:411330,86 | Spreiding      | 0 m             |                 |          |
| Oppervlakte          | 0,14 ha                    |                |                 |                 |          |
| Wijze van ventilatie | Niet geforceerd            |                |                 |                 |          |
| Temporele variatie   | <u>Continue Emissie</u>    |                |                 |                 |          |

## 4 Wegverkeer | Weg

|                           |                                   |                    |       |        |                 |          |
|---------------------------|-----------------------------------|--------------------|-------|--------|-----------------|----------|
| Naam                      | verkeer gebruiksfase (recreanten) |                    | Links | Rechts | NO <sub>x</sub> | 0,2 kg/j |
| Locatie                   | X:104932,74 Y:411293,79           | Type scherm        | -     | -      | NO <sub>2</sub> | 48,1 g/j |
| Lengte                    | 864,53 m                          | Hoogte             | -     | -      | NH <sub>3</sub> | 22,6 g/j |
| Wegtype                   | Buitenweg                         | Afstand tot de weg | -     | -      |                 |          |
| Rijrichting               | Beide richtingen                  |                    |       |        |                 |          |
| Tunnelfactor              | 1                                 |                    |       |        |                 |          |
| Type hoogteligging        | Normaal                           |                    |       |        |                 |          |
| Weghoogte t.o.v. maaiveld | 0 m                               |                    |       |        |                 |          |

| Verkeer                   | Max. snelheid           | Aantal voertuigbewegingen | In file |
|---------------------------|-------------------------|---------------------------|---------|
| Licht verkeer             | Voorgeschreven factoren | 4,0 /etmaal               | 0,0 %   |
| Middelzwaar vrachtverkeer | Voorgeschreven factoren | 0,0 /etmaal               | 0,0 %   |
| Zwaar vrachtverkeer       | Voorgeschreven factoren | 0,0 /etmaal               | 0,0 %   |
| Busverkeer                | Voorgeschreven factoren | 0,0 /etmaal               | 0,0 %   |

**Disclaimer**

Hoewel verstrekte gegevens kunnen dienen ter onderbouwing van een vergunningaanvraag, kunnen er geen rechten aan worden ontleend. De eigenaar van AERIUS aanvaardt geen aansprakelijkheid voor de inhoud van de door de gebruiker aangeboden informatie. Bovenstaande gegevens zijn enkel bruikbaar tot er een nieuwe versie van AERIUS beschikbaar is. AERIUS is een geregistreerd handelsmerk in Europa. Alle rechten die niet expliciet worden verleend, zijn voorbehouden.

**Rekenbasis**

Deze berekening is tot stand gekomen op basis van

AERIUS versie 2023.0.1\_20231106\_3125d8b3c1

Database versie 2023.0.1\_3125d8b3c1\_calculator\_nl\_stable

Voor meer informatie over de gebruikte methodiek en data zie:

<https://www.aerius.nl/>