KLOEZE bv

ENGINEERING

Statische berekening

Onderdeel : staalconstructie

Opdrachtgever : Fam. Venekamp / van Lingen
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Project naam : Nieuwbouw schuur

Locatie : Hoofdweg 7
Peest

Constructeur : A. de Jong
dd : 08-07-15

Gecontroleerd : P. Coelingh
dd : 08-07-15

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datum : 08-07-15

INHOUDSOPGAVE pagina

1 *Algemeen*

Taal : Nederlands

Toelichting berekening :

Globaal is de berekening opgebouwd uit 3 delen.
-Deel één met hierin aangegeven de algemene zaken zoals normen, opbouw van de belastingen en detailberekeningen.
-Deel twee (**10.1**) met de grafische in- en uitvoer waarin de belastinginvoer in beeld is gebracht en momentenlijnen, dwarskrachtenlijnen en verplaatsingen terug te vinden zijn.
-Deel drie (**10.2**) met hierin nummerieke in- en uitvoer waarin het voornamelijk van belang is te zien waaruit de belastingcombinaties samengesteld zijn en wat de resultaten van de staafcontroles zijn.
Hierin is dus tevens terug te vinden hoe de belastingen van de maatgevende reacties opgebouwd zijn.
De reactiekrachten zelf zijn helemaal achterin de berekening terug te vinden. **blz 37 t/m 38**
Onder de reactiekracht staat vermeld wat het maatgevende belastinggeval is en de opbouw van dit belastingeval is dus in deel **10.2** bij de belastingcombinaties terug te vinden **blz 8 t/m 12**

1.1 Inleiding

Het betreft hier een agrarisch (stal, loods) gebouw , categorie E , CC1
In de gevels en het dak windverband om de constructie in langsrichting te schoren.
In de andere richting wordt de stabiliteit verzorgd door een ongeschoord portaal.
Tijdens de montage zogdragen voor voldoende stabiliteit van de gemonteerde onderdelen dmv het aanbrengen van (tijdelijke) schoren.

1.2 Algemene kwaliteiten, factoren en eisen

Staalkwaliteit : S235 (breuktaaiheid zie blz 5)
Boutkwaliteit : 8.8 t.a.v.
Ankerkwaliteit : 4.6 t.a.v.

Potentiële factoren :		ψ_0	ψ_1	ψ_2
(QK,sn)	sneeuwbelasting :	0,00	0,20	0,00
(QK,w)	windbelasting :	0,00	0,20	0,00

Partiële veilgheids factoren UGT :		ogu	gu
(verg. 6.10a)	γ_G=	1,35	0,90
(verg. 6.10b)	γ_G=	1,20	0,90
	γ_Q=	1,50	
	ξ=	0,89	

Partiële veilgheids factoren BGT :		
	γ_G=	1,00
	γ_Q=	1,00

Partiële factoren γ_M EN-1993-1-1:		
	γ_{M_0}=	1,00
	γ_{M_1}=	1,00
	γ_{M_2}=	1,25

Betrouwbaarheidsdifferentiatie KFI-factor : 0,90

Ontwerplevensduur : 15 jr

			δ_{bij}	δ_{totaal}
Verplaatsingen :	verticaal :	dak ≤	0,004 Lrep	≤ 0,004 Lrep

Verplaatsingen : horizontaal : gevel- H/100 ($\delta_{max.}$= 38,00 mm) (indicatief)

1.3 Belastingcombinaties

Zie ook deel **10.2** nummerieke computerinvoer blz 8 t/m 12
Veranderlijke belastingen : sneeuw + wind

UGT

fundamentele combinatie :

6.10a
$K_{FI} . (\gamma_G . G_{k,eg} + \gamma_G . G_{k,d+w} + \gamma_Q . \psi_0 . q_{k,sn} + \gamma_Q . \psi_0 . q_{k,wi})$
$0,9 . (1,35 . G_{k,eg} + 1,35 . G_{k,d+w} + 1,5 . 0 . q_{k,sn} + 1,5 . 0 . q_{k,wi})$

6.10b
$K_{FI} . (\gamma_G . G_{k,eg} + \gamma_G . G_{k,d+w} + \gamma_Q . q_{k,sn} + \gamma_Q . \psi_0 . q_{k,wi})$
$0,9 . (1,2 . G_{k,eg} + 1,2 . G_{k,d+w} + 1,5 . q_{k,sn} + 1,5 . 0 . q_{k,wi})$

6.10b
$K_{FI} . (\gamma_G . G_{k,eg} + \gamma_G . G_{k,d+w} + \gamma_Q . \psi_0 . q_{k,sn} + \gamma_Q . q_{k,wi})$
$0,9 . (1,2 . G_{k,eg} + 1,2 . G_{k,d+w} + 1,5 . 0 . q_{k,sn} + 1,5 . q_{k,wi})$

6.10b
$\gamma_G . G_{k,eg} + \gamma_G . G_{k,d+w} + K_{FI} . (\gamma_Q . \psi_0 . q_{k,sn} + \gamma_Q . q_{k,wi})$
$0,9 . G_{k,eg} + 0,9 . G_{k,d+w} + 0,9 . (1,5 . 0 . q_{k,sn} + 1,5 . q_{k,wi})$

BGT

karakteristieke combinatie :

* $\gamma_G . G_{k,eg} + \gamma_G . G_{k,d+w} + \gamma_Q . q_{k,sn} + \gamma_Q . \psi_0 . q_{k,wi}$
  $(1 . G_{k,eg} + 1 . G_{k,d+w} + 1 . q_{k,sn} + 1 . 0 . q_{k,wi})$
* $\gamma_G . G_{k,eg} + \gamma_G . G_{k,d+w} + \gamma_Q . \psi_0 . q_{k,sn} + \gamma_Q . q_{k,wi}$
  $(1 . G_{k,eg} + 1 . G_{k,d+w} + 1 . 0 . q_{k,sn} + 1 . q_{k,wi})$

quasi-blijvende combinatie :

1.4 Normen

Gehanteerde normen voor de constructie :

NEN-EN 1090 (nl)
Eurocode - Vervaardigen van staalconstructies — augustus 2011

NEN-EN 1990 (nl) + NB
Eurocode - Grondslagen van het constructief ontwerp — december 2011

NEN-EN 1991 (nl) + NB
Eurocode 1 - Belastingen op constructies , algemene belastingen

1-1	Volumieke gewichten, eigengewicht en opgelegde belastingen voor gebouwen	december 2011
1-3	Sneeuwbelasting	december 2011
1-4	Windbelasting	december 2011

NEN-EN 1993-1-1 (nl) + NB
Eurocode 3 - Ontwerp en berekening van staalconstructies

1-1	Algemene regels en regels voor gebouwen	december 2011

NEN-EN 1993-1-8 (nl) + NB
Eurocode 3 - Ontwerp en berekening van staalconstructies

1-8	Ontwerp en berekening van verbindingen	december 2011

NEN-EN 1995-1-1 + C1 + A1/NB
Eurocode 5 - Ontwerp en berekening van houtconstructies

deel 1-1	Algemeen- Gemeenschappelijke regels en regels voor gebouwen	juli 2013

Programmatuur :	Belastingen+factoren	Excel, Kloeze spreadsheet
	Hoofdberekening	3-D eindige elementen programma STAAD Pro. De doorsnede- en stabiliteitscontrole van de staven wordt binnen het programma uitgevoerd volgens EUROCODE NEN-EN 1993-1-1 Eerste-orde elastische berekening
	Detailberekening	COP csJoint Excel, Kloeze spreadsheets

1.5 Algemene gebouw informatie

Gebouw lokatie :

geografische ligging

Land : Nederland
Plaats : Peest
Aardbevings gebied : nee

Gebouw kenmerken :

bouw situatie : nieuwbouw
soort bouwwerk : agrarisch (stal, loods) gebouw
schoorsysteem : langsgevels geschoord
classificatie bouwwerk : non-sway (α_{cr}= 46,11 ≥ 10) non-sway
omstandigheden staalconstructie : binnen, onverwarmt

ontwerplevensduur : 15 jr
categorie : E
gevolgklasse : CC1
gebruiks-categorie : SC1 (statisch)
productie-categorie : PC1 (staalkwaliteit ≤ S275)
uitvoeringsklasse : EXC1

afmetingen van het gebouw : l= 10,00 m (lengte)
b= 7,50 m (breedte)
$h_{(n)}$= 5,21 m (hoogste punt)

langsgevels : ongelijke hoogten
hA= 3,80 m (hoogte hoge zijgevel)
hB= 3,00 m (hoogte lage gevel)

vorm van het dak : zadeldak α_1= 45,00 ° (hoge gevel)
α_2= 20,00 ° (lage gevel)

oppervlak gevel : zeer ruw (rimpels, ribben, kronkelingen)
oppervlak dak : zeer ruw (rimpels, ribben, kronkelingen)

vloer : nee

kraan : nee

brand : nee

hemelwater afvoer : buitengoot

dakplaat als kipsteun : nee

houten delen : ja (dak + wand)

1.6 Prestatiekenmerken

Constructief :

Methode van verklaren : 2a (MPCS)
Ontwerpkeuze : Eurocode 3: ontwerp en berekening van staalconstructies NEN-EN 1993

Materiaal :

Materiaal keuze : Warmgewalst staal incl koudgewalste kokers conform EN-10025-x en EN 10219-1

Duurzaamheid :

Voorbewerking : niet gespecificeerd
Finishing : verzinken
Finishniveau : C1
Graad van voorbewerking : P1

Kenmerken :

Algemeen :

toleranties op geometrische gegevens : NEN-EN 1090-2
Lasbaarheid : Constructiekoolstofstaal conform EN-10025-x en EN 10219-1 (zie onderdeelspecificaties voor details)
Breuktaaiheid balkstaal : JR (27J bij 20 °C) maximale elementdikte t= 32,5 mm
Breuktaaiheid stripstaal : JR (27J bij 20 °C) maximale elementdikte t= 37,5 mm
Breuktaaiheid kokers : JR (27J bij 20 °C) maximale elementdikte t= 37,2 mm

Reactie op brand : klasse A1
Vrijkomen van cadmium : NPD
Radioactieve starling : NPD
Duurzaamheid : Oppervlaktebehandeling verzinken (ISO 1461)

Constructieve kenmerken :

Draagvermogen : Constructief ontwerp conform Eurocode 3: ontwerp en berekening van staalconstructies NEN-EN 1993 vlgs. de NB van Nederland
Vervorming in bruikbaarheidsgrenstoestand : NPD
Vermoeiingssterkte : NPD
Brandweerstand : NPD

Fabrikage :

producten geleverd : vlgs. onderdelenspecificatie, EN 1090-2, conform EXC1

2 *Belastingen*

De belastingen zijn handmatig ingevoerd in Staad, ter verduidelijking een voorbeeld van iedere belasting.
Voorbeeld veldbreedte dak : b= 5,00 m

2·1 Gk,eg -eigengewicht staal
2·1 Gk,d+w -blijvende belasting dak + wand
2·3 qk,sn -sneeuwbelasting
2·4 qk,wi -windbelasting

2.1 Blijvende belastingen

staalconstructie : behandeling- verzinken, factor EG staal Y-1,08

dakopbouw : sandwichpaneel dak

				gewichten :
sandwichpaneel				
isolatie	PUR	d= 60,00		0,125 kN/m²
gording	hout			0,078 kN/m²
aditioneel	leidingen + licht			0,050 kN/m² +
		Gk,d	totaal :	**0,253 kN/m²**
		(voorbeeld)	*qk,d= 1,27 kN/m*	

gevelopbouw : stalen profielplaat

				gewichten :
staalplaat	type : 35.207.1035x0,63			0,060 kN/m²
isolatie	nee			0,000 kN/m²
wandregel	hout			0,078 kN/m²
aditioneel				0,000 kN/m² +
		Gk,w	totaal :	**0,138 kN/m²**
		(voorbeeld)	*qk,w= 0,69 kN/m*	

eventuele vorstrand : afdracht rechtstreeks naar fundering

2.2 Opgelegde belastingen (n.v.t.)

2.3 Sneeuw belastingen

Sneeuw belastingen NEN-EN 1991 (nl) + NB december 2011

3 **Ontwerpsituaties**

klimaatgebied : Nederland zone : 0

omstandigheden : normale omstandigheden 3.2 (1)

ontwerpsituatie : blijvende/tijdelijke otwerpsituatie (1) verdeeld +(2) herverdeeld

sneeuwbelasting aanpassen aan ontwerplevensduur : ja ontwerplevensduur 15 jr. V= 0,8

volumiek gewicht van sneeuw (γ) : compact 2,00 kN/m³

4 **Sneeuwbelasting op de grond**

4.1 *karakteristiek waarden*

karakteristieke waarde sneeuwbelasting op de grond Sk50= 0,70 kN/m² Sk15= 0,76 Sk50

Sn= 0,53 kN/m²

4.3 *uitzonderlijke sneeuwbelasting op de grond* n.v.t.

5 **Sneeuwbelasting op daken**

5.1 *aard van de belasting*

a) de vorm van het dak : zadeldak

5.2 *belastingschikkingen*

S=μi Ce Ct Sk

b) warmtecoëfficiënt ; ≤ 1 W/m²K Ct= 1,0

d) blootstellingscoëfficiënt ; normaal Ce= 1,0

5.3 *sneeuwbelastingcoëfficiënten* α_1= 45° μ_1= 0,40

α_2= 20° μ_1= 0,80

e) aangrenzende daken ; nee

6 **Lokale effecten**

6.2 *sneeuwophoping*

obstakel ; geen uitstekende delen

Sneeuwbelastingen : S=μi Ce Ct Sk *(grondvlak)*

zadeldak

(α_1) S_1= **0,21 kN/m²** (verdeeld geval (i)) S_1= **0,11 kN/m²** (herverdeeld geval (ii+iii))

(α_2) S_2= **0,42 kN/m²** (verdeeld geval (i)) S_2= **0,21 kN/m²** (herverdeeld geval (ii+iii))

S_2= 0,42 kN/m² *(0,399 kN/m²)* *qsn= 2,00 kN/m* *(dakvlak)*

(voorbeeld) S_1= 0,21 kN/m² *(0,150 kN/m²)* *qsn= 0,75 kN/m* *(dakvlak)*

2.4 Wind belastingen

Wind belasting NEN-EN 1991-1-4 (nl) december 2011

ψ-factoren : ψ_0 ψ_1 ψ_2
0,00 0,20 0,00

luifel : nee

algemeen: ☑ default waarden
ontwerplevensduur : 15 jr.
windgebied : III K= 0,281
n= 0,5
terreincategorie : II onbebouwd Z0= 0,200 m
Zmin= 4 m

windbelasting aanpassen aan ontwerplevensduur : ja

afstand tot grens overgangsgebied ≥ 5,00 km

4 **Windsnelheid en stuwdruk**

4.2 *basiswaarden* Vb= Cdir . Cseason . Cprob . Vb,0 *Cdir*= 1,0 (standaard)
Vb= **22,5 m/s** *Cseason*= 1,0 (standaard)
Cprob= 0,917
Vb,0= 24,5 m/s

4.3 *gemiddelde wind*

ruwheidslengten
*Z*0,II= 0,05 m
Zmax= 200 m

4.3.1 variatie met hoogte Vm(Z)= Cr(Z) . Co(Z) . Vb *Z*= 5,2 m (Zmin > 4 m)

4.3.2 terreinruwheid Kr= 0,209 *Cr(Zs)*= 0,68
4.3.3 terreinorografie vlak (α<3°) *Φ*= 0,000

orografie parameters

parameters niet van toepassing

orografieeffecten hoeven niet meegenomen te worden (4.3.3)
Co(Z)= 1,000

gemiddelde windsnelheid Vm(Zs)= 15,3 m/s

4.3.4 grote en beduidend hogere naburige gebouwen

naburig gebouw minstens twee keer zo hoog als gemiddelde bebouwing nee

bebouwings parameters

parameters niet van toepassing

4.3.5 bebouwingsdichtheid hdis= 0 m

4.4 *windturbulentie*

opm. 1 standaard afwijking van de turbulentie σv

σv= **4,70**

opm. 2 bepaling Lv(Z) Z= 5,2 m

Lv(zs)= **0,3067**

4.5 *extreme stuwdruk*

opm. 1

basisstuwdruk qb= **0,32 kN/m²**

blootstellingsfactor Ce(Z)= 1,47

5 **Windbelastingen**

5.2 *winddruk op de buitenzijde en binnenwanden*

buitenzijde We= qp(Ze) . Cpe (drukcoëfficiënten zie blz 10)

binnenwanden Wi= qp(Zi) . Cpi (drukcoëfficiënten zie blz 11)

5.3 *windkrachten* in

Aref= 10,0 m²

Fw= CsCd . qp(Ze) . Cf . A

Qw= CsCd . qp . Cf . b

6 **Bouwwerkfactor CsCd** H ≤ 15 m gedetaileerde procedure : nee

aangepaste Cd : nee (h<50m en h/b<5)

6.3 *gedetaileerde procedure*

6.3.1 Bouwwerkfactor CsCd > 0,85

constructietype : a verticale constructies zoals gebouwen

constructietype : stalen gebouw

δs= n.v.t.

$Cs_{,l}$= 1,000 $Cs_{,b}$= 1,000

$Cd_{,l;A}$= 1,000 $Cd_{,b;C}$= 1,000

$Cd_{,l;B}$= 1,000 $Cd_{,b;D}$= 1,000

$CsCd_{,l;A}$ =**1,000** (1,000 x 1,000 = 1,00 ≥ 0,85)

$CsCd_{,l;B}$ =**1,000** (1,000 x 1,000 = 1,00 ≥ 0,85)

$CsCd_{,b;C}$ =**1,000** (1,000 x 1,000 = 1,00 ≥ 0,85)

$CsCd_{,b;D}$ =**1,000** (1,000 x 1,000 = 1,00 ≥ 0,85)

Extreme stuwdruk : referentieperiode 15 jr , h= 5,21m, windgebied III, terreincategorie II

qp(5,21)= **0,462 kN/m²** (qp(Z)=0,550 kN/m² ;Cprob=0,917)

Winddruk :

wind op b 0° (gevel A+B) Ze;h;l= 5,2 m QW,l;A= **0,462 . Cf . b**

QW,l;B= **0,462 . Cf . b**

wind op d 90° (gevel C+D) Ze;h;l= 5,2 m QW,b;C= **0,462 . Cf . b**

QW,b;D= **0,462 . Cf . b**

7 **Druk- en krachtcoëfficiënten** (belastingen bepalen vlgs 7.2.9 NEN-EN 1991-1-4)

7.2 *Drukcoëfficiënten voor gebouwen* (zadeldak, lengte 10m, breedte 7,5m, hoogte 5,21m)

Gevels

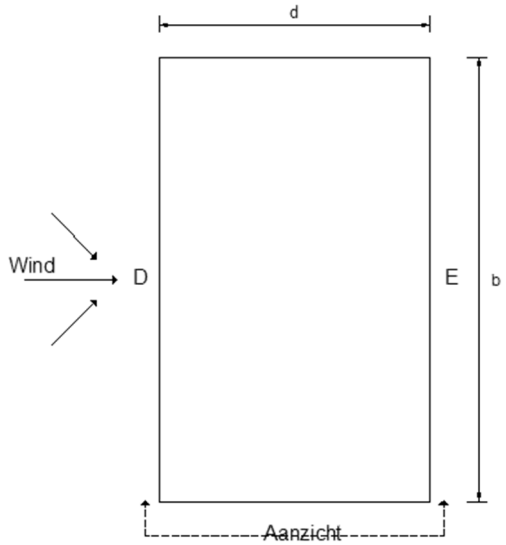
7.2.2 verticale gevels van gebouwen met rechthoekige plattegrond

Opmerking gebrek aan correlatie tussen vlakken D en E in rekening brengen: ja

h/l= 0,52 correlatiefactor= 0,850
h/b= 0,69 correlatiefactor= 0,850

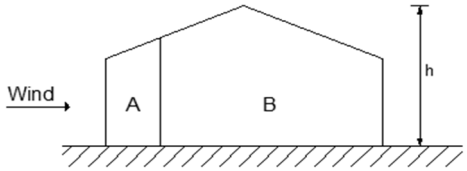
Ze(h)= 5,2 m

-windwrijving C_{fr}= 0,04 (gevels)



-winddruk, windzuiging (gevels)

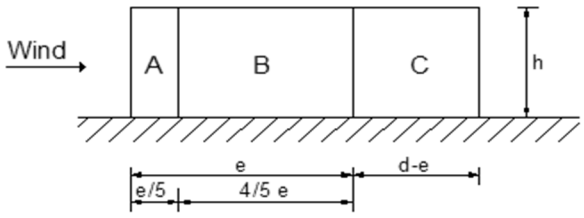
wind (θ=**0**°) QW,l= **0,462 . Cf . b**
e= 10,00 m
d= 7,75 m



	Zone		Cpe		
	A=	2,00 m	**-1,20**		
	B=	5,50 m	**-0,80**		
(+ correlatiefactor)	D=	10,00 m	+0,80	**(+0,80 x 0,850 = +0,680)**	*(voorbeeld)* *qW,l;D= 1,57 kN/m*
(+ correlatiefactor)	E=	10,00 m	-0,50	**(-0,50 x 0,850 = -0,425)**	*(voorbeeld)* *qW,l;E= -0,98 kN/m*

wind (θ=**90**°) QW,b= **0,462 . Cf . b**
e= 7,50 m
d= 10,00 m

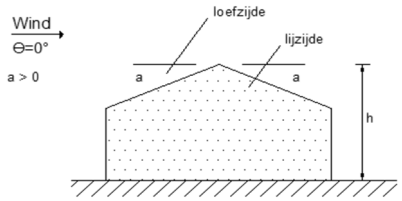
	Zone		Cpe	
	A=	1,50 m	**-1,20**	
	B=	6,00 m	**-0,80**	
	C=	2,50 m	**-0,50**	
(+ correlatiefactor)	D=	7,50 m	+0,80	**(+0,80 x 0,850 = +0,680)**
(+ correlatiefactor)	E=	7,50 m	-0,50	**(-0,50 x 0,850 = -0,425)**



Daken

7.2.5 zadeldak

α_1= 45,0 °
α_2= 20,00 °



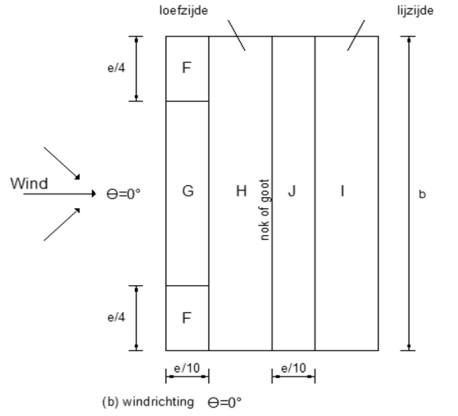
Zadeldak met positieve hellingshoeken

-windwrijving C_{fr}= 0,04

-winddruk, windzuiging (- =zuiging, + =druk)

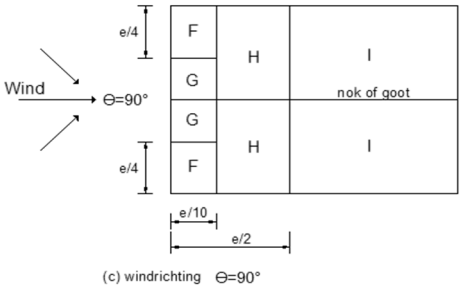
wind (θ=0°)		l (e/4)	b (e/10)	Cpe-	Cpe+
(45,0°)	F=	2,50	1,41	-0,00	+0,70
QW,l= **0,462 . Cf . b**	G=	5,00	1,41	-0,00	+0,70
	H=	10,00	0,59	-0,00	+0,60
	I=	10,00	5,41	-0,40	+0,00
	J=	10,00	1,06	-0,83	+0,00

wind (θ=180°)		l (e/4)	b (e/10)	Cpe-	Cpe+
(20,00 °)	F=	2,50	1,06	-0,77	+0,37
QW,l= **0,462 . Cf . b**	G=	5,00	1,06	-0,70	+0,37
	H=	10,00	5,41	-0,27	+0,27
	I=	10,00	0,59	-0,20	+0,00
	J=	10,00	1,41	-0,30	+0,00



(b) windrichting Θ=0°

wind (θ=90°)		l (e/4)	b (e/10)	Cpe- (45°)	Cpe- (20°)
	F=	2,65	0,75	-1,10	-1,23
	G=	0,00	0,75	-1,40	-1,33
QW,b= **0,462 . Cf . b**	H=	2,00	3,00	-0,90	-0,67
	I=	2,00	6,25	-0,50	-0,50



(c) windrichting Θ=90°

*(voorbeeld) Cpe= **-0,00** QW,l= 0,00 kN/m*

7.2.9 inwendige druk (7.1 + 7.2)
(+ = overdruk, - = onderdruk)

rekening houden met dominate zijde : ja
gevels af te sluiten : nee
gehele gevel geopend : ja ; langsgevel

wind op +X druk Cpi= +0,72
wind op -X zuiging Cpi= -0,45
wind op +/-Z zuiging Cpi= -0,79

3 *Bijlagen* (krachten zie blz 36 ,10.2 nummerieke computeruitvoer)

3.1 Windverband+aansluiting NEN-EN 1993-1-1 + NEN-EN 1993-1-8

windverband **strip :** 50 x 6 S235 fy= 235 N/mm² γM_0= 1,00
fu= 360 N/mm² γM_2= 1,25

trekkracht N,Ed= 21,9 kN excentrische belasting

Nu,Rd= [0,9 Anet fu] / γM_2= 51,3 kN ≥ N,Ed= 21,9 kN **(0,43)** (uitscheuren niet maatgevend)

bout : M16 8.8 gerolde draad aantal : 2 st h.o.h. p_1= 60 mm e_1;$_1$= 30 mm
afschuifvlak : door de draad aantal bouten boven elkaar : 1 st
gaten : normale gaten
d_0= 17 mm
ks= 1,00 αb= 0,59 Fv,Rd= 60,3 kN ≥ Fv,Ed= 11,0 kN **(0,18)**
k_1= 2,42 Fb,Rd= 39,3 kN ≥ Fb,Ed= 11,0 kN **(0,28)**

windverband plaat : d= 10 mm S235 fy= 235 N/mm²
fu= 360 N/mm²

Veff,$_2$,Rd= 0,5 fu Ant / γM_2 + (1 / √3) fy Anv / γM_0= 104,5 kN ≥ N,Ed= 21,9 kN **(0,21)**
e_1;$_1$;min.= 25 mm αd= 0,49 Fv,Rd= 60,3 kN ≥ Fv,Ed= 11,0 kN **(0,18)**
e_2;$_1$;min.= 25 mm k_1= 2,42 Fb,Rd= 54,6 kN ≥ Fb,Ed= 11,0 kN **(0,20)**

windverband **hoek :** 50 x 50 x 5 S235 fy= 235 N/mm² γM_0= 1,00
fu= 360 N/mm² γM_2= 1,25

trekkracht N,Ed= 22,1 kN centrische belasting

Nu,Rd= [β_2 Anet fu] / γM_2= 59,6 kN ≥ N,Ed= 22,1 kN **(0,37)** (uitscheuren maatgevend)

bout : M16 8.8 gerolde draad aantal : 2 st h.o.h. p_1= 60 mm e_1;$_1$= 30 mm
afschuifvlak : door de draad aantal bouten boven elkaar : 1 st
gaten : normale gaten
d_0= 17 mm
ks= 1,00 αb= 0,59 Fv,Rd= 60,3 kN ≥ Fv,Ed= 11,1 kN **(0,18)**
k_1= 2,42 Fb,Rd= 32,8 kN ≥ Fb,Ed= 11,1 kN **(0,34)**

windverband plaat : d= 10 mm S235 fy= 235 N/mm²
fu= 360 N/mm²

Veff,$_1$,Rd= fu Ant / γM_2 + (1 / √3) fy Anv / γM_0= 128,2 kN ≥ N,Ed= 22,1 kN **(0,17)**
e_1;$_1$;min.= 25 mm αd= 0,49 Fv,Rd= 60,3 kN ≥ Fv,Ed= 11,1 kN **(0,18)**
e_2;$_1$;min.= 25 mm k_1= 2,42 Fb,Rd= 54,6 kN ≥ Fb,Ed= 11,1 kN **(0,20)**

3.2 Koppelkokers NEN-EN 1993-1-1 (krachten zie blz 36 ,10.2 nummerieke computeruitvoer)
(controle op druk + buiging)

---

invoer : profiel : KK70X70X3
vervaardiging : gelast
staalkwaliteit : S235
A= 781 mm²
$W_{y;z}$= 16,5.10³mm³
$i_{y;z}$= 27,2 mm

functie : koppelkoker
L= 5000 mm

krachten en momenten :

$N_{,Ed}$=	21,40 kN			$N_{,Rk}$=	183,54 kN
eind moment $M_{y;e}$=	0,00 kN/m	$M_{z;e}$=	0,00 kN/m		
initiele scheefstand :	1/200				
M_y=	0,19 kN/m	M_z=	0,00 kN/m		
$M_{0;Ed}$=	0,54 kN/m			$M_{y,Rk}$=$M_{z,Rk}$=	3,87 kN/m

controles : NEN-EN 1993-1-1 6.3.3

doorsnede klasse:	1	$\alpha_{y;z}$=	0,49							
knikkromme :	c	λ_1=	93,91							
		$\bar{\lambda}$ =	1,89		αh=	0,00	αh=	0,00		
					Cmy=	0,95	Cmz=	0,95		
		Φ =	2,69		CmLT=	0,95	CmLT=	0,95		
		χ=	0,22	≤ 1	Kyy=	1,359	Kzz=	1,359	druk + buiging 6.61 : **0,84**	≤ 1
		χ_{LT}=	1		Kyz=	0,816	Kzy=	0,816	druk + buiging 6.62 : **0,84**	≤ 1

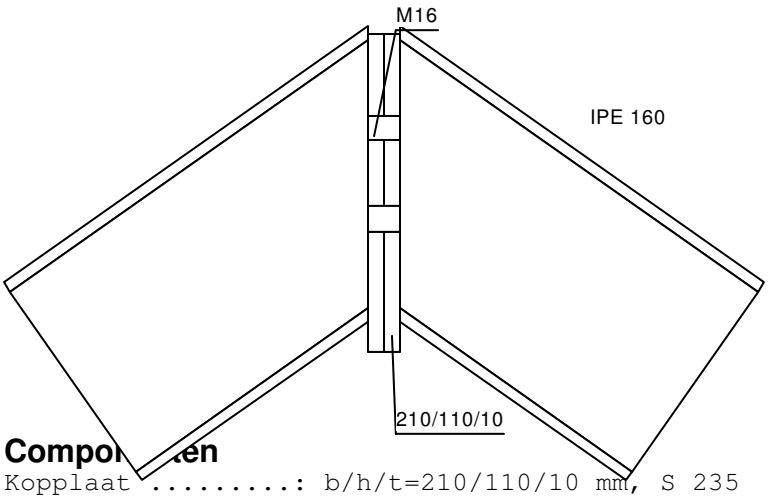
3.3 verbindingen NEN-EN 1993-1-8

Algemeen : Tenzij anders aangegeven in de voetplaatberekening geldt voor verankeringen voetplaten / beton
2x M16 4.6, inboordiepte 130mm met een randafstand >65mm
Voetplaatdikte ≥10mm

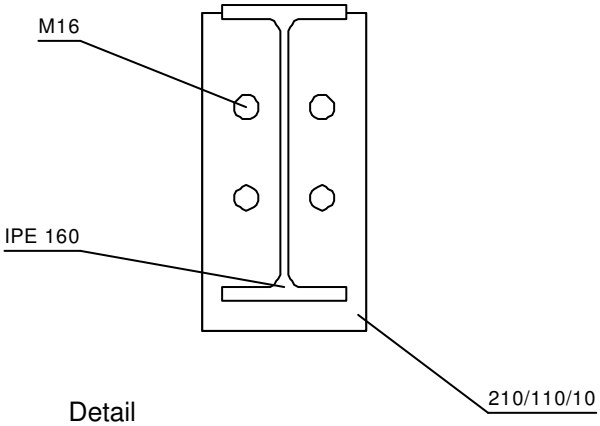
Algemene gegevens

Type constructie .....: Ongeschoord
Corrosieve omgeving .....: Nee
Knoopconfiguratie .....: Ligger stuikverbinding
Ligger .....: IPE 160, S 235, a = -35°, L_b = 6500 mm
Verbindingstype .....: Kopplaat-verbinding
Rekenprocedure .....: Eurocode 3
Berekeningsprocedure .....: EP - Elastische frame analyse / Plastische knooopberekening

Zij-aanzicht



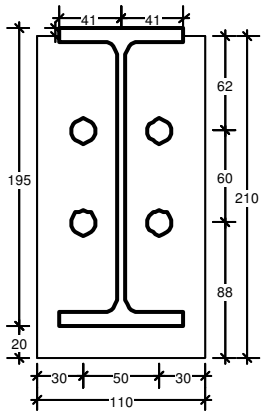
Doorsnede



Componenten

Kopplaat .....: b/h/t=210/110/10 mm, S 235
Bouten .....: 4 M16 8.8
Lassen
Ligger .....: a_f = 4 mm, a_w = 4 mm

Detail



Resultaten

positief moment

Weerstand
$M_{j,Rd}$ = 17.6 kNm
$V_{j,Rd}$ = 68.9 kN
Stijfheid
$S_{j,ini}$ = 14128 kNm/rad
Classificatie
Sterkte : Niet-volledig sterk
Stijfheid : Stijf
Bezwijkvorm
Liggerflens op druk

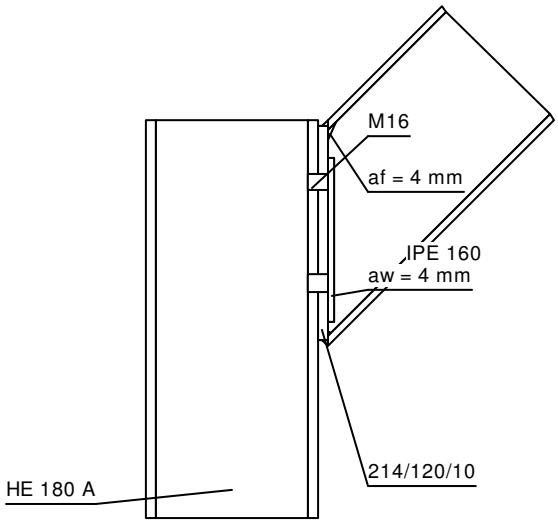
negatief moment

Weerstand
$M_{j,Rd}$ = 17.6 kNm
$V_{j,Rd}$ = 68.9 kN
Stijfheid
$S_{j,ini}$ = 14039 kNm/rad
Classificatie
Sterkte : Niet-volledig sterk
Stijfheid : Stijf
Bezwijkvorm
Liggerflens op druk

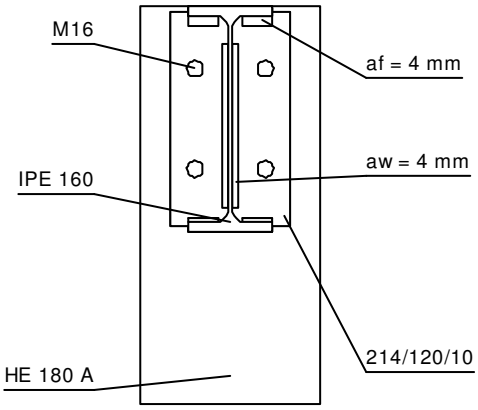
Algemene gegevens

Type constructie .....: Geschoord
Corrosieve omgeving .....: Nee
Knoopconfiguratie .....: Enkelzijdige ligger-kolom verbinding, bovenaan kolom
Ligger .....: IPE 160, S 235, a = 45°, L_b = 2000 mm
Kolom .....: HEA 180, S 235
Verbindingstype .....: Kopplaat-verbinding
Rekenprocedure .....: Eurocode 3
Berekeningsprocedure .....: EP - Elastische frame analyse / Plastische knooopberekening

Zij-aanzicht



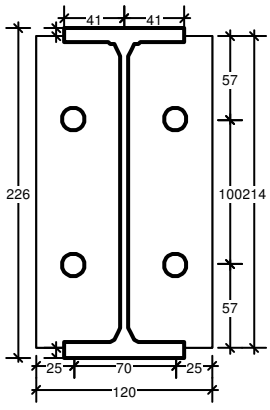
Doorsnede



Componenten

Kopplaat .....: b/h/t=214/120/10 mm, S 235
Bouten .....: 4 M16 8.8
Lassen
Ligger .....: a_f = 4 mm, a_w = 4 mm

Detail



Resultaten

positief moment

Weerstand

$M_{j,Rd}$ = 19.6 kNm
$V_{j,Rd}$ = 68.9 kN

Stijfheid

$S_{j,ini}$ = 4210 kNm/rad

Classificatie

Sterkte : Niet-volledig sterk
Stijfheid : Flexibel

Bezwijkvorm

Liggerflens op druk

negatief moment

Weerstand

$M_{j,Rd}$ = 18.0 kNm
$V_{j,Rd}$ = 155.0 kN

Stijfheid

$S_{j,ini}$ = 3728 kNm/rad

Classificatie

Sterkte : Niet-volledig sterk
Stijfheid : Flexibel

Bezwijkvorm

Kolomlijf op druk

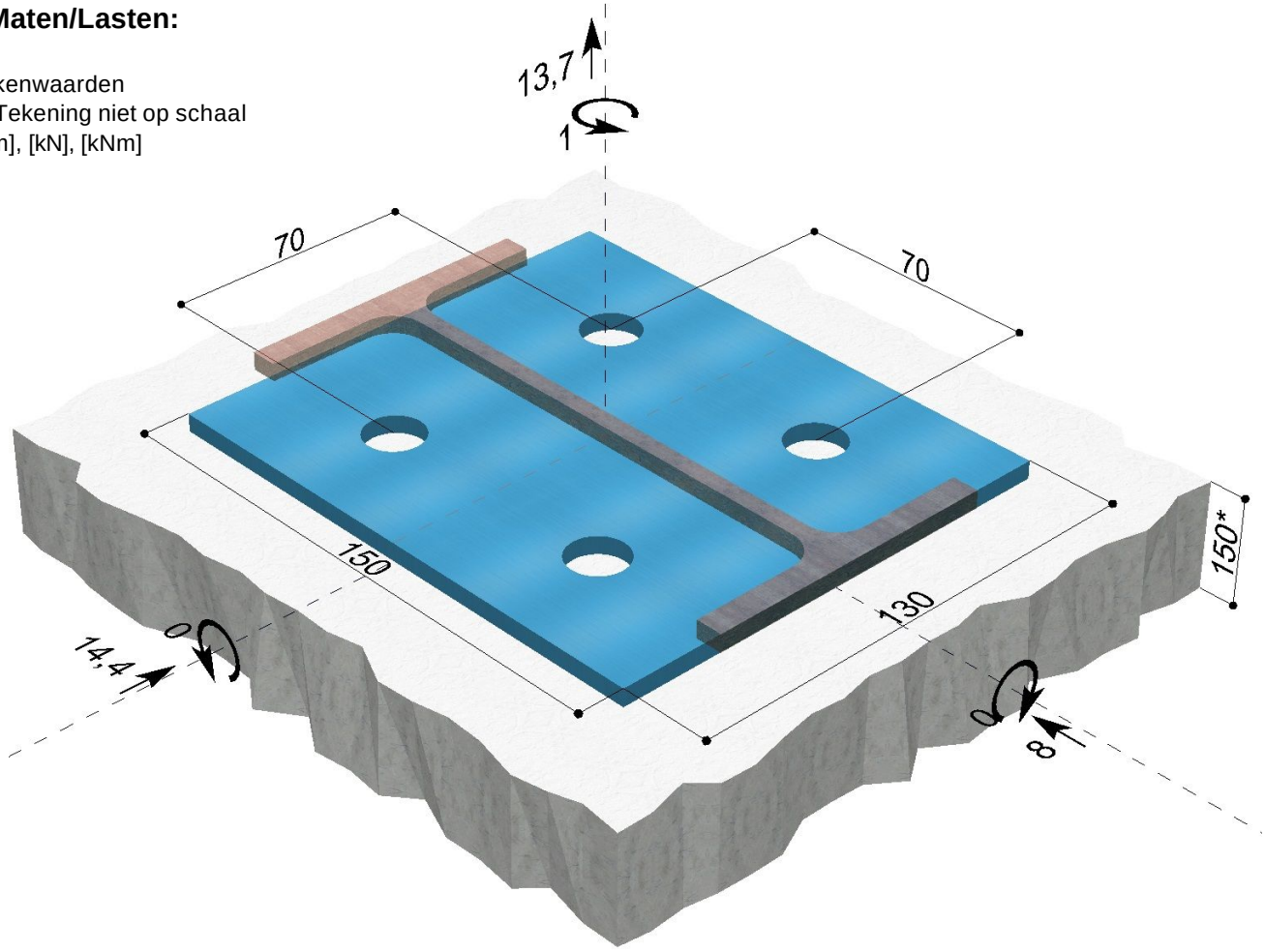
Bedrijf/Opsteller		fischer BEVESTIGINGSSYSTEMEN
Straat		
Postcode / Plaats		COMPUFIX 8.4
Tel. Fax		8.4.4282.27076/22/2746
Project	Schuur Venekamp / van Lingen	Pagina 1 van afdruk nr. 34
Bouwdeel	Voetplaat	Datum: 8-7-2015
Opmerkingen		

fischer COMPUFIX: Berekend volgens ETAG, Technical Report TR 029

Belastingtype:	Statische belasting
Anker:	**fischer Injektionssysteem: FIS A M16x130 (5.8)** (Art. Nr. 44972) uit elektrolytisch verzinkt staal met een verankeringsdiepte van h_{ef} = 80 mm + Injectiemortel FIS EM in verschillende diameters
Ondergrond:	Gescheurd beton, normaal gewapend Betonsterkteklasse: C 20/25
Randwapening:	Zonder invloed
Ankerbuiging:	Niet aanwezig
Temperatuur:	Langeduur temperatuur: 35°C, Korteduur temperatuur: 60°C
Ankerplaat::	Geen berekening beschikbaar

1 Maten/Lasten:

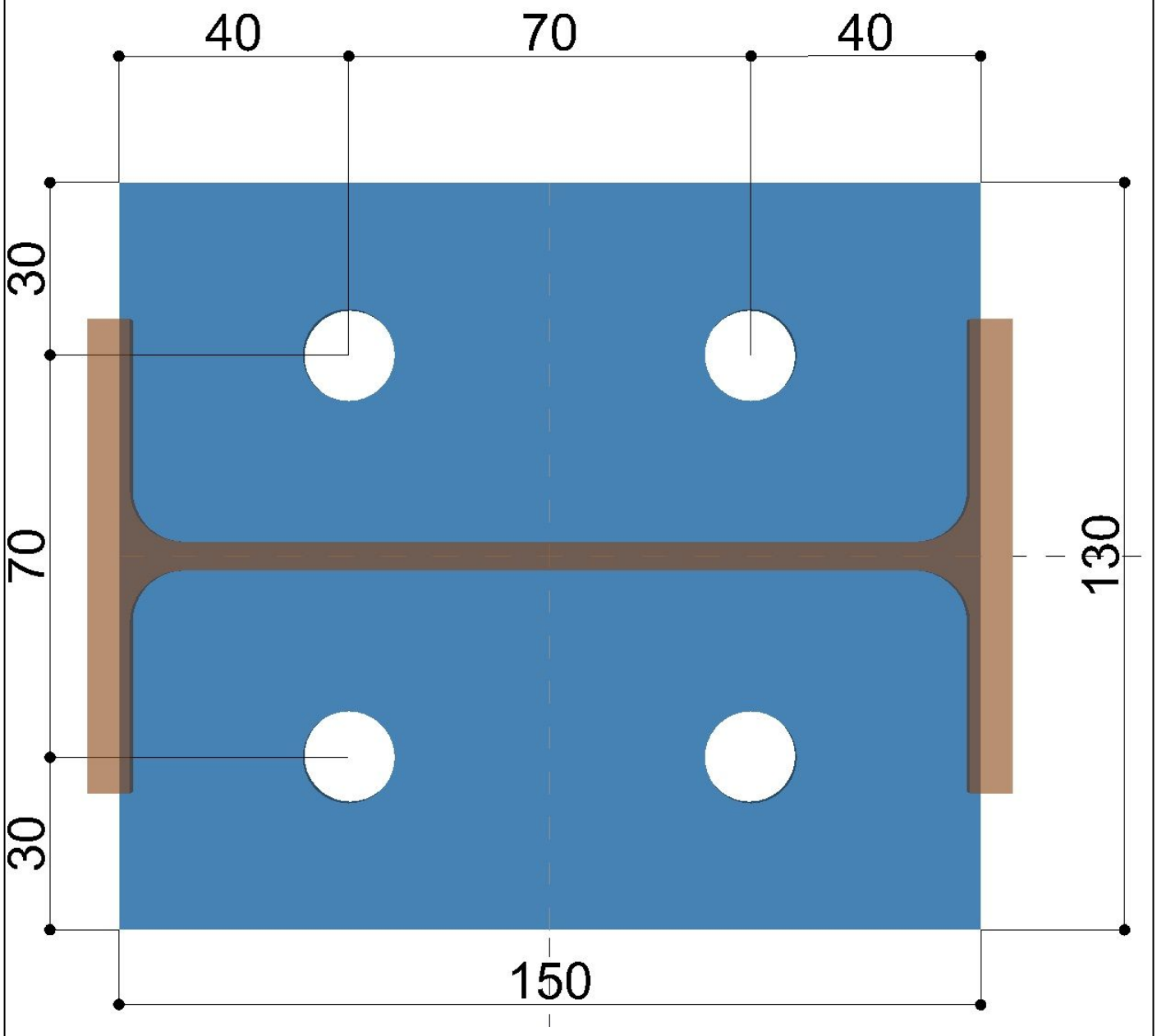
Rekenwaarden
(*) Tekening niet op schaal
[mm], [kN], [kNm]



Trekbelasting	Uitnuttingsgraad	**Afschuifbelasting**	Uitnuttingsgraad	**gecombineerde belasting**	Uitnuttingsgraad
Staalbreuk:	6,5 %	Staalbreuk:	29,1 %		**93,9 %**
Betonkegelbreuk:	**57,4 %**	Betonachteruitbreken:	**63,4 %**		
Combinatie van uittrekken en betonkegelbreuk:	52,5 %				

Resultaat: **Rekentechnische toetsing anker is succesvol**
LET OP: Volledige print van de berekening is noodzakelijk.

Bedrijf/Opsteller		fischer BEVESTIGINGSSYSTEMEN
Project	Schuur Venekamp / van Lingen	
Bouwdeel	Voetplaat	
Anker	fischer Injektionssystem FIS A M16x130 (5.8)	Pagina 2 van afdruk nr. 34



Houten wandregel NEN EN 1995-1-1

INVOER : *wandregel :*

gebruiksfunctie : wandregel
plaatsing : 1-velds
balkmaat : geschaafd 71 x 171 A= 12141,0 mm²
steunpunt : discreet W_y= 346,0.10³ mm³
controle : enkele buiging W_z= 143,7.10³ mm³
I_y= 2958,5.10⁴ mm⁴ i_y= 49,4 mm
I_z= 510,0.10⁴ mm⁴ i_z= 20,5 mm
hout : gezaagd

sterkteklasse : C24
klimaatklasse : 1
belastingduurklasse BB : blijvend
belastingduurklasse OB : kort
h.o.h afstand wandregel : 1,850 m
overspanning wandregel : 5,00 m Wmax.= 33,3 mm (L/150)
opleglengte : 100 mm
dikte beschot : 8 mm sterkteklasse beschot : C18
S= 0,12
uitkapping : ja
uitkapping h= 30 mm boven

γM=	1,30	fm;0;k= 24,00 N/mm²	fm;y;d= 16,62 N/mm²
κmod;BB=	0,60		fm;z;d= 19,30 N/mm²
κmod;BB;t;90=	0,50	ft;0;k= 14,00 N/mm²	ft;0;d= 10,92 N/mm²
κmod;OB=	0,90	ft;90;k= 0,40 N/mm²	ft;90;d= 0,25 N/mm²
κmod;OB;t;90=	0,80	fc;0;k= 21,00 N/mm²	fc;0;d= 14,54 N/mm²
κdef=	0,60	fc;90;k= 2,50 N/mm²	fc;90;d= 1,73 N/mm²
Kh;h=	1,00	fv;0;k= 4,00 N/mm²	fv;d= 2,77 N/mm²
Kh;b=	1,16	E0;mean;k= 11000 N/mm²	E0;mean;d= 11000 N/mm²
Kℓ=	0,97	E90;mean;k= 370 N/mm²	E90;mean;d= 370 N/mm²
Kr=	1,00	E0,05;k= 7400 N/mm²	E0,05;d= 7400 N/mm²
Km=	0,70	Gk= 690 N/mm²	Gd= 690 N/mm²
Kcr=	0,67	ρk= 350 kg/m³	E0;u;d= 7615 N/mm²
			Kc,90= 1

belastingen :

			ogu	gu
(0,70 kN/m²)	wind gevel;trek : 1,299 kN/m¹	UGT druk : 1,690 kN/m¹	γG= 1,35	0,90
(0,68 kN/m²)	wind gevel;druk : 1,252 kN/m¹	UGT trek : 1,754 kN/m¹	γG= 1,20	0,90
		BGT druk : 1,252 kN/m¹	γQ= 1,50	
		BGT trek : 1,299 kN/m¹	CC klasse aanpassen : nee	
			KFI= 0,90	(CC1)

UITVOER :

		maatgevend :
Nt;Ed=	0,00 kN	
Nc;Ed=	0,00 kN	
Vy;Ed=	4,38 kN	wind gevel;trek
My;Ed=	5,48 kNm	wind gevel;trek
W;initial=	32,5 mm	
W;bij=	0,0 mm	
W;fin=	32,5 mm	

TOETSING : NEN EN 1995-1-1

(6.1.2)	σt,0,d=	0,00 N/mm²	≤ 10,92 N/mm²	
(6.1.4)	σc,0,d=	0,00 N/mm²	≤ 14,54 N/mm²	
(6.1.5)	σc,90,d=	0,62 N/mm²	≤ 2,60 N/mm²	
	σm,y;d=	15,84 N/mm²		
	σm,z;d=	0,00 N/mm²		
(6.1.6 (6.11))	uc=	0,953	≤ 1	
(6.1.6 (6.12))	uc=	0,667	≤ 1	
(6.1.7 (6.13))	τy;d=	0,65 N/mm²	≤ 2,77 N/mm²	(Kv=1,00)
(7.2)	uc;bij=	0,00	≤ 1	
(7.2)	uc;net,fin=	0,97	≤ 1	

Houten gording NEN EN 1995-1-1

INVOER : *gording :*

gebruiksfunctie : gording
plaatsing : 1-velds
balkmaat : geschaafd 71 x 221 A= 15691,0 mm²
steunpunt : discreet W_y= 578,0.10³ mm³
controle : enkele buiging W_z= 185,7.10³ mm³
(nokgordingen aan elkaar doorverbinden) I_y= 6386,4.10⁴ mm⁴ i_y= 63,8 mm
I_z= 659,2.10⁴ mm⁴ i_z= 20,5 mm
hout : gezaagd

sterkteklasse : C24
klimaatklasse : 1
belastingduurklasse BB : blijvend
belastingduurklasse OB : kort
h.o.h afstand gording : 2,000 m
overspanning gording : 5,00 m Wmax.= 20,0 mm
opleglengte : 100 mm
dikte beschot : 8 mm sterkteklasse beschot : C18
S= 0,12
uitkapping : ja
uitkapping h= 30 mm boven

γM= 1,30	fm;0;k= 24,00 N/mm²	fm;y;d= 16,62 N/mm²
κmod;BB= 0,60		fm;z;d= 19,30 N/mm²
κmod;BB;t;90= 0,50	ft;0;k= 14,00 N/mm²	ft;0;d= 10,92 N/mm²
κmod;OB= 0,90	ft;90;k= 0,40 N/mm²	ft;90;d= 0,25 N/mm²
κmod;OB;t;90= 0,80	fc;0;k= 21,00 N/mm²	fc;0;d= 14,54 N/mm²
κdef= 0,60	fc;90;k= 2,50 N/mm²	fc;90;d= 1,73 N/mm²
Kh;h= 1,00	fv;0;k= 4,00 N/mm²	fv;d= 2,77 N/mm²
Kh;b= 1,16	E0;mean;k= 11000 N/mm²	E0;mean;d= 11000 N/mm²
Kℓ= 0,97	E90;mean;k= 370 N/mm²	E90;mean;d= 370 N/mm²
Kr= 1,00	E0,05;k= 7400 N/mm²	E0,05;d= 7400 N/mm²
Km= 0,70	Gk= 690 N/mm²	Gd= 690 N/mm²
Kcr= 0,67	ρk= 350 kg/m³	E0;u;d= 7615 N/mm²
		Kc,90= 1

belastingen :	Qk= 2,00 kN		ogu	gu
(0,25 kN/m²)	BB dak : 0,506 kN/m¹	UGT druk : 2,300 kN/m¹	γG= 1,35	0,90
(0,15 kN/m²)	sneeuw : 0,300 kN/m¹	UGT trek : -1,066 kN/m¹	γG= 1,20	0,90
(0,56 kN/m²)	wind dak;trek : 1,127 kN/m¹	BGT druk : 1,805 kN/m¹	γQ= 1,50	
(0,65 kN/m²)	wind dak;druk : 1,299 kN/m¹	BGT trek : -0,621 kN/m¹	CC klasse aanpassen : nee	
			KFI= 0,90	( )

UITVOER : maatgevend :

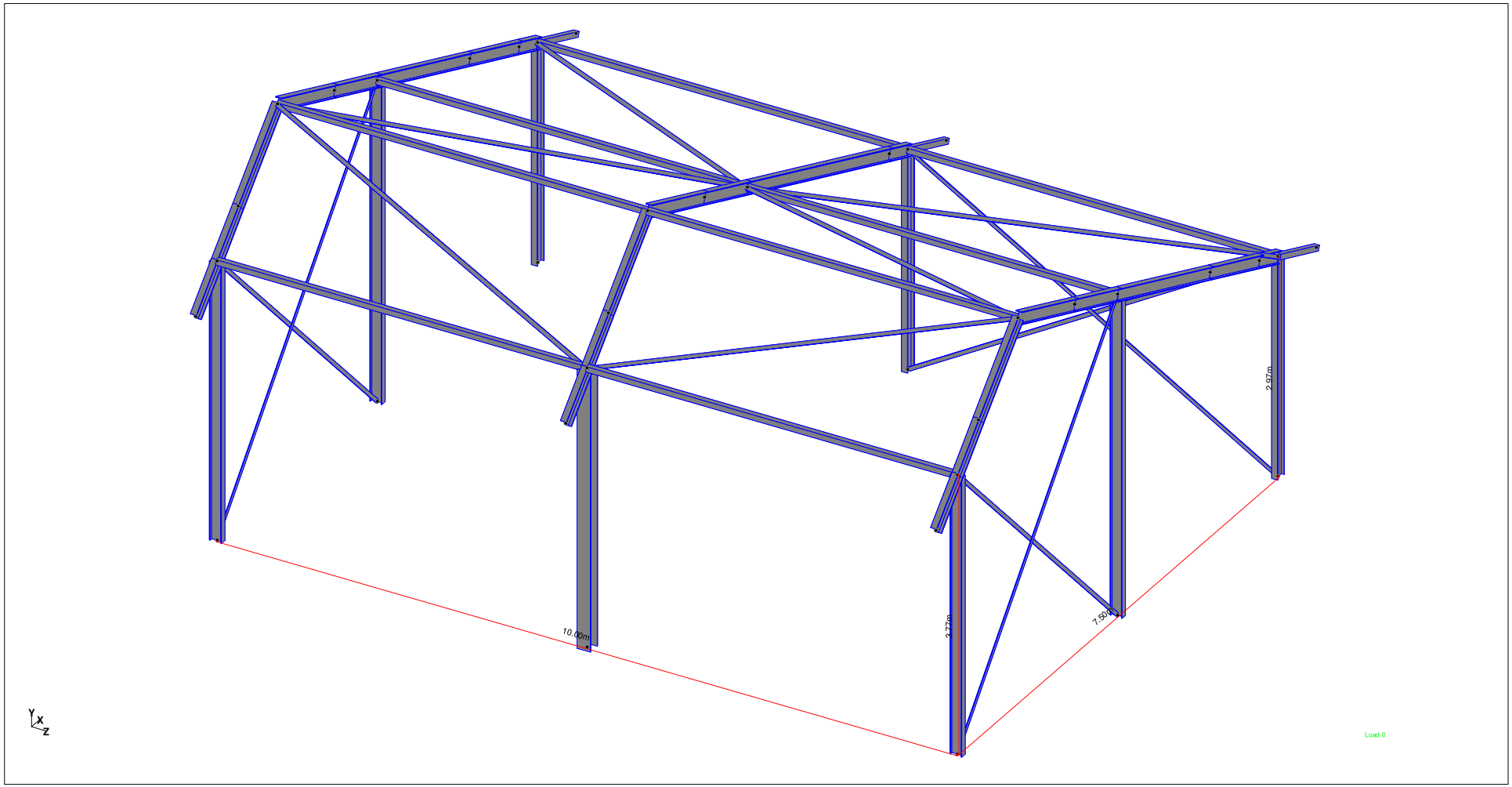
Nt;Ed= 0,00 kN
Nc;Ed= 0,00 kN
Vy;Ed= 5,35 kN BB+wind dak;druk :
My;Ed= 5,96 kNm BB+wind dak;druk :
W;initial= 5,9 mm
W;bij= 7,0 mm
W;fin= 12,9 mm

TOETSING : NEN EN 1995-1-1

(6.1.2)	σt,0,d= 0,00 N/mm²	≤ 10,92 N/mm²	
(6.1.4)	σc,0,d= 0,00 N/mm²	≤ 14,54 N/mm²	
(6.1.5)	σc,90,d= 0,75 N/mm²	≤ 2,60 N/mm²	
	σm,y;d= 10,32 N/mm²		
	σm,z;d= 0,00 N/mm²		
(6.1.6 (6.11))	uc= 0,621	≤ 1	
(6.1.6 (6.12))	uc= 0,435	≤ 1	
(6.1.7 (6.13))	τy;d= 0,59 N/mm²	≤ 2,77 N/mm²	(Kv=1,00)
(7.2)	uc;bij= 0,47	≤ 1	
(7.2)	uc;net,fin= 0,64	≤ 1	

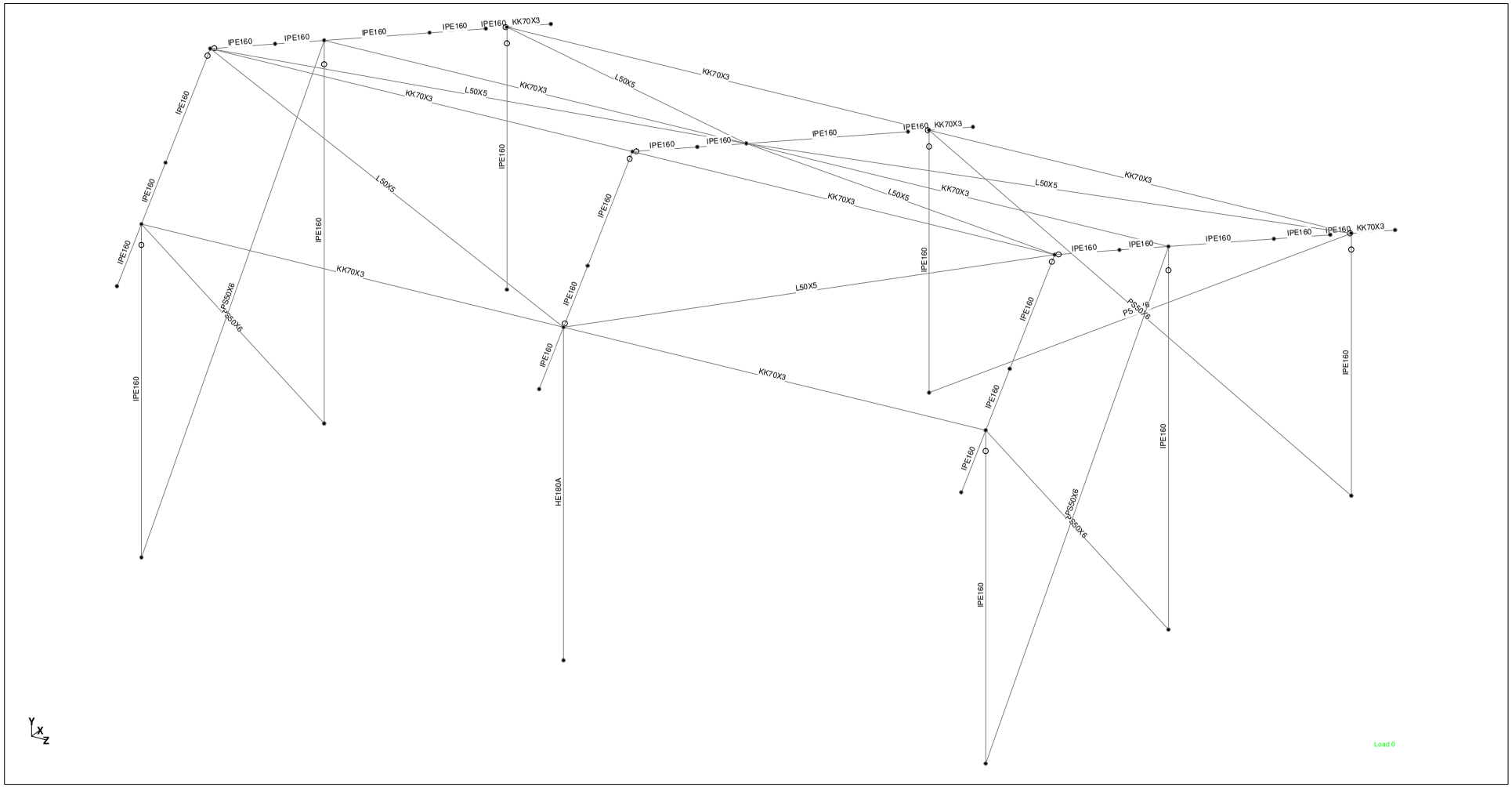
10.1 - grafische computer in- en uitvoer

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **1**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



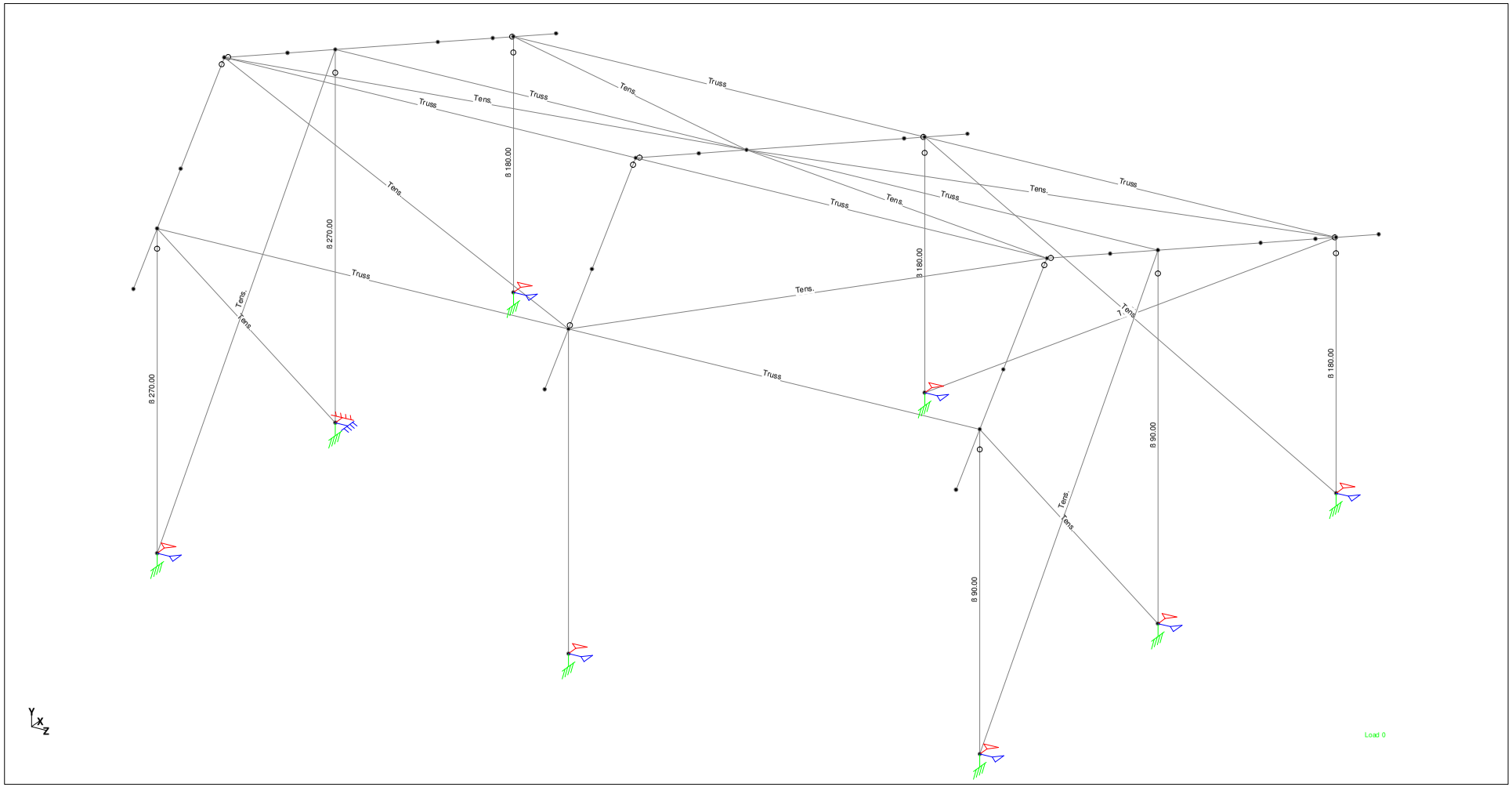
3D staalconstructie

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **2**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



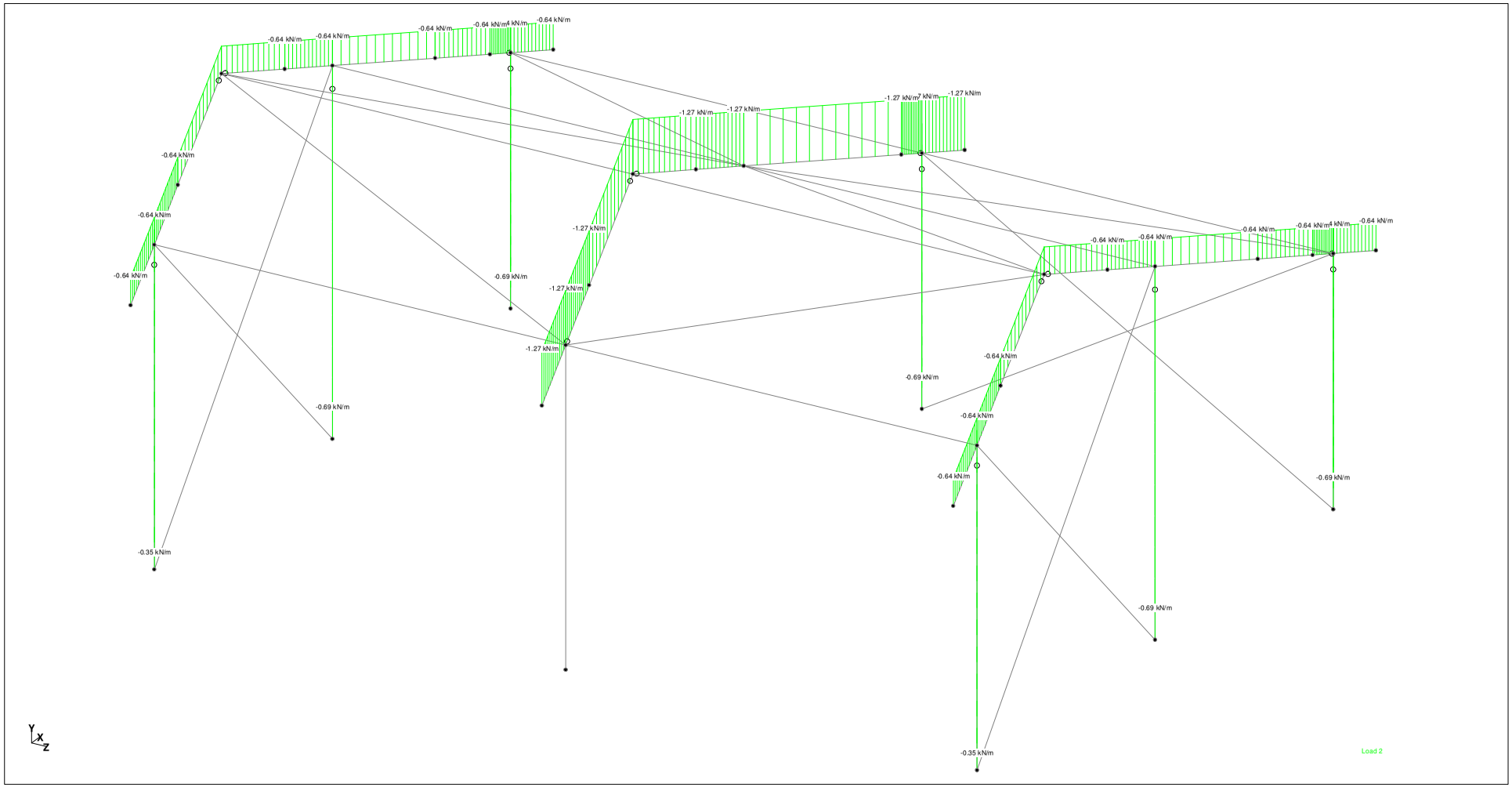
profilering

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **3**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



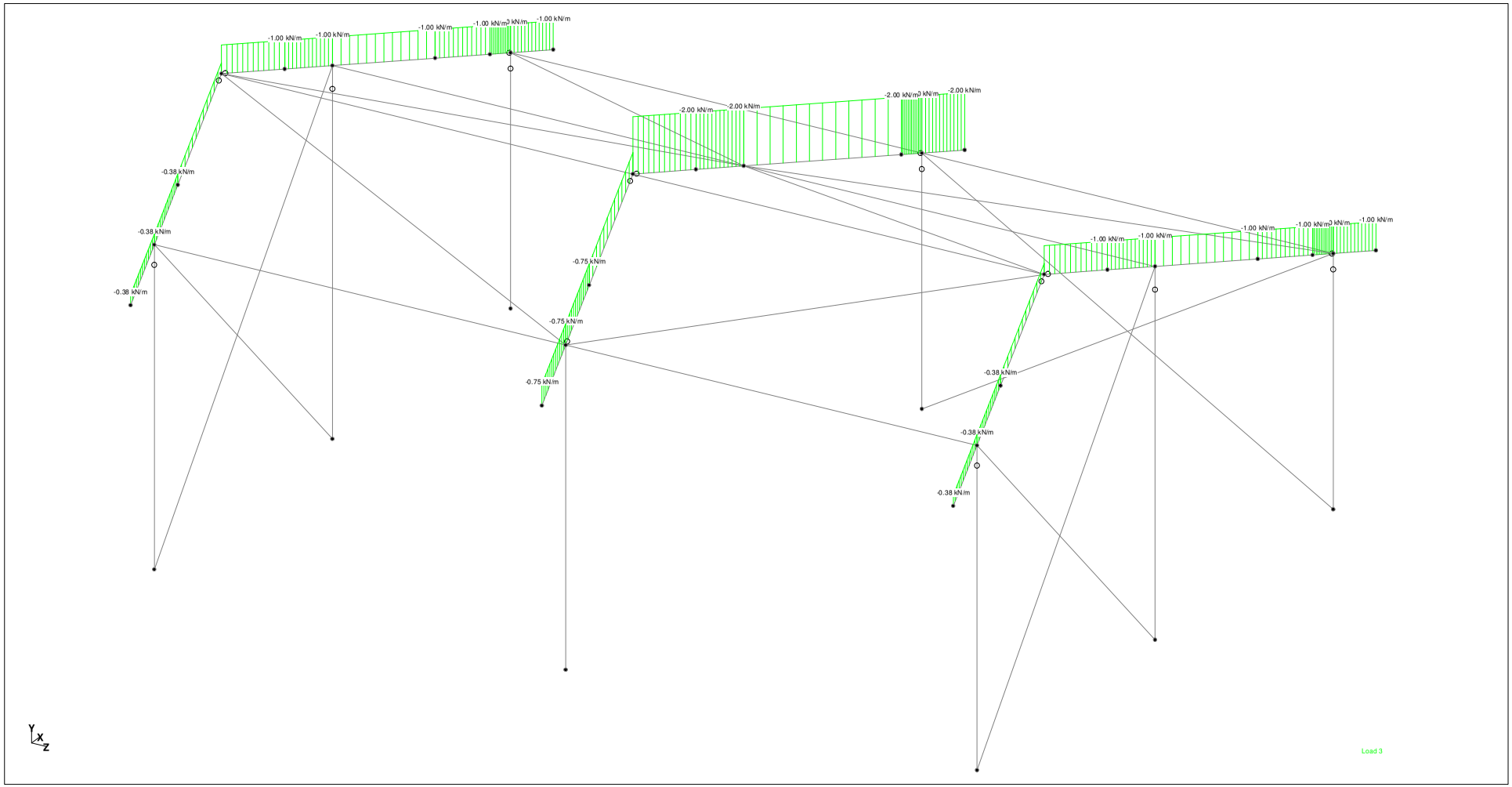
knopen, rotaties, trek- en drukstaven

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **4**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



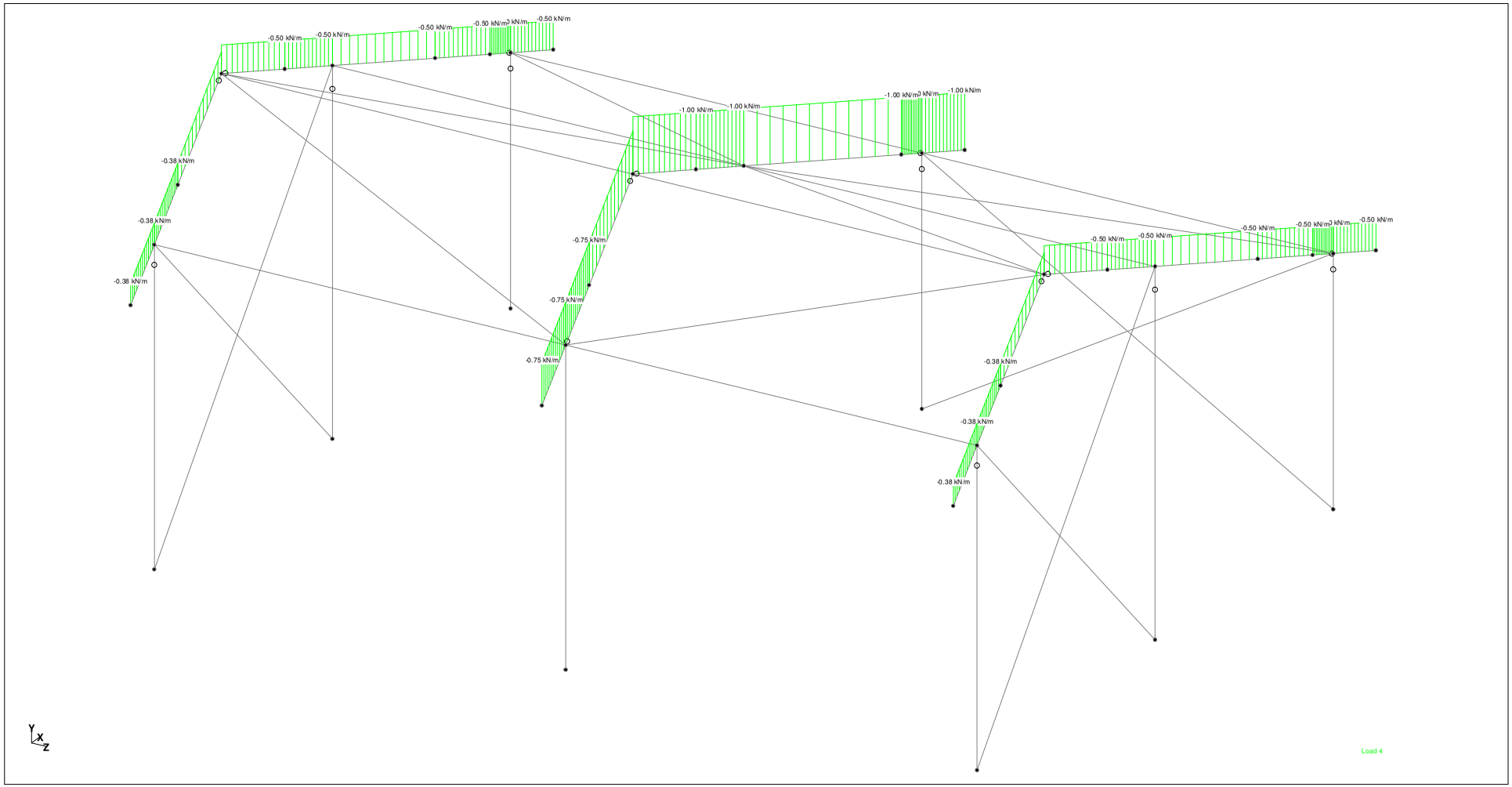
BG2: BB dak + wand

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **5**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



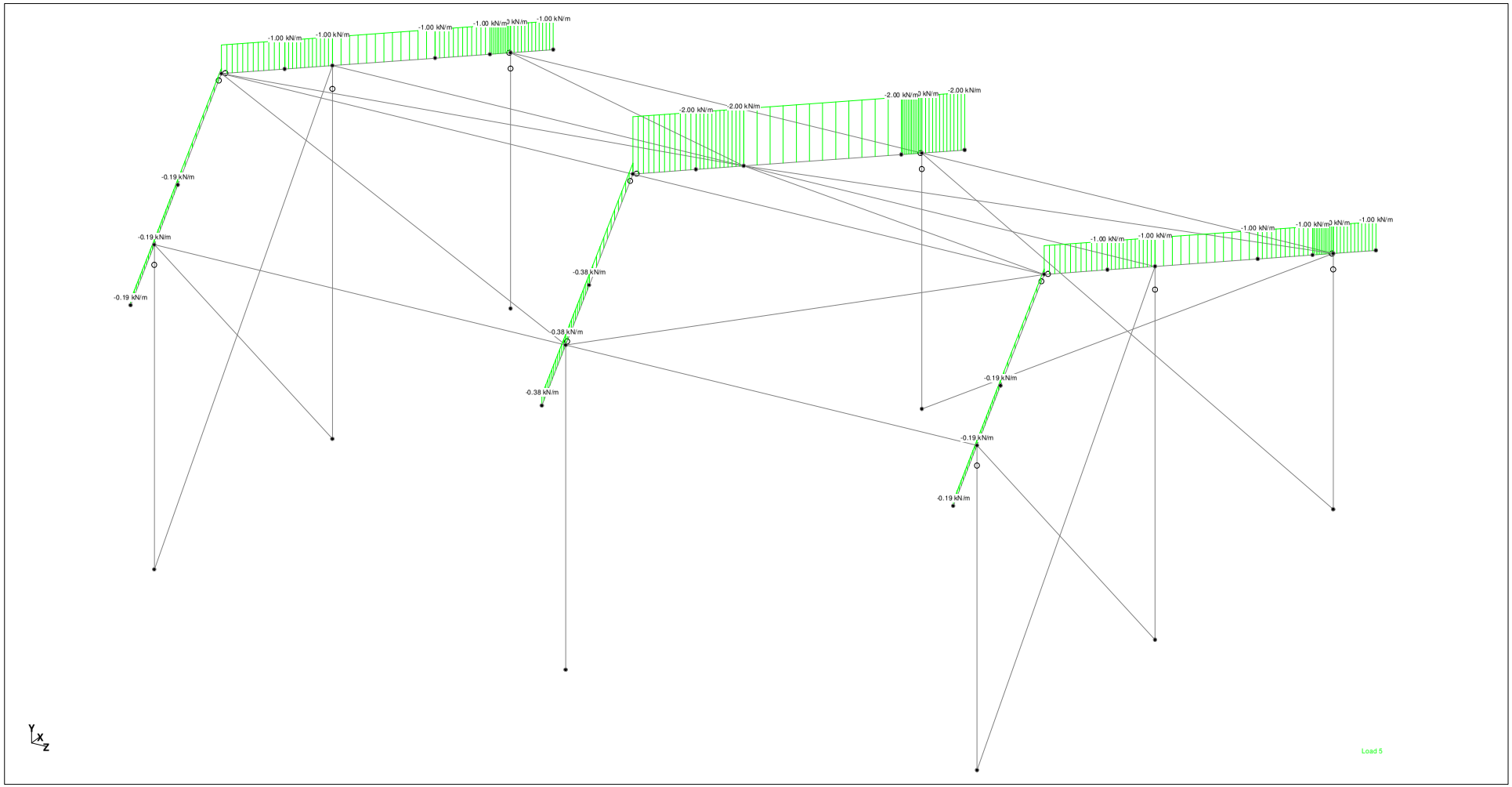
BG3: sneeuw1

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **6**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



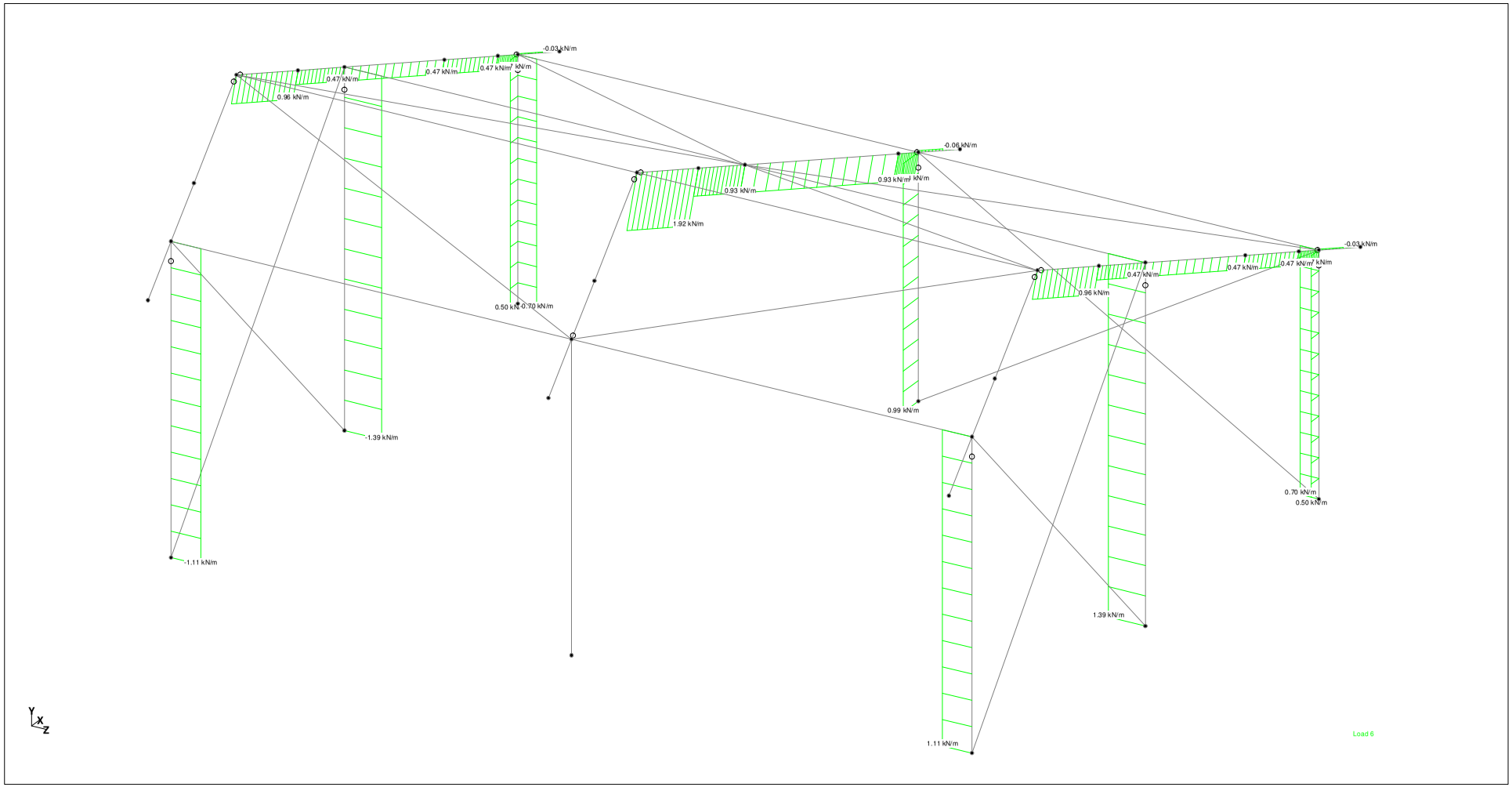
BG4: sneeuw 2

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **7**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



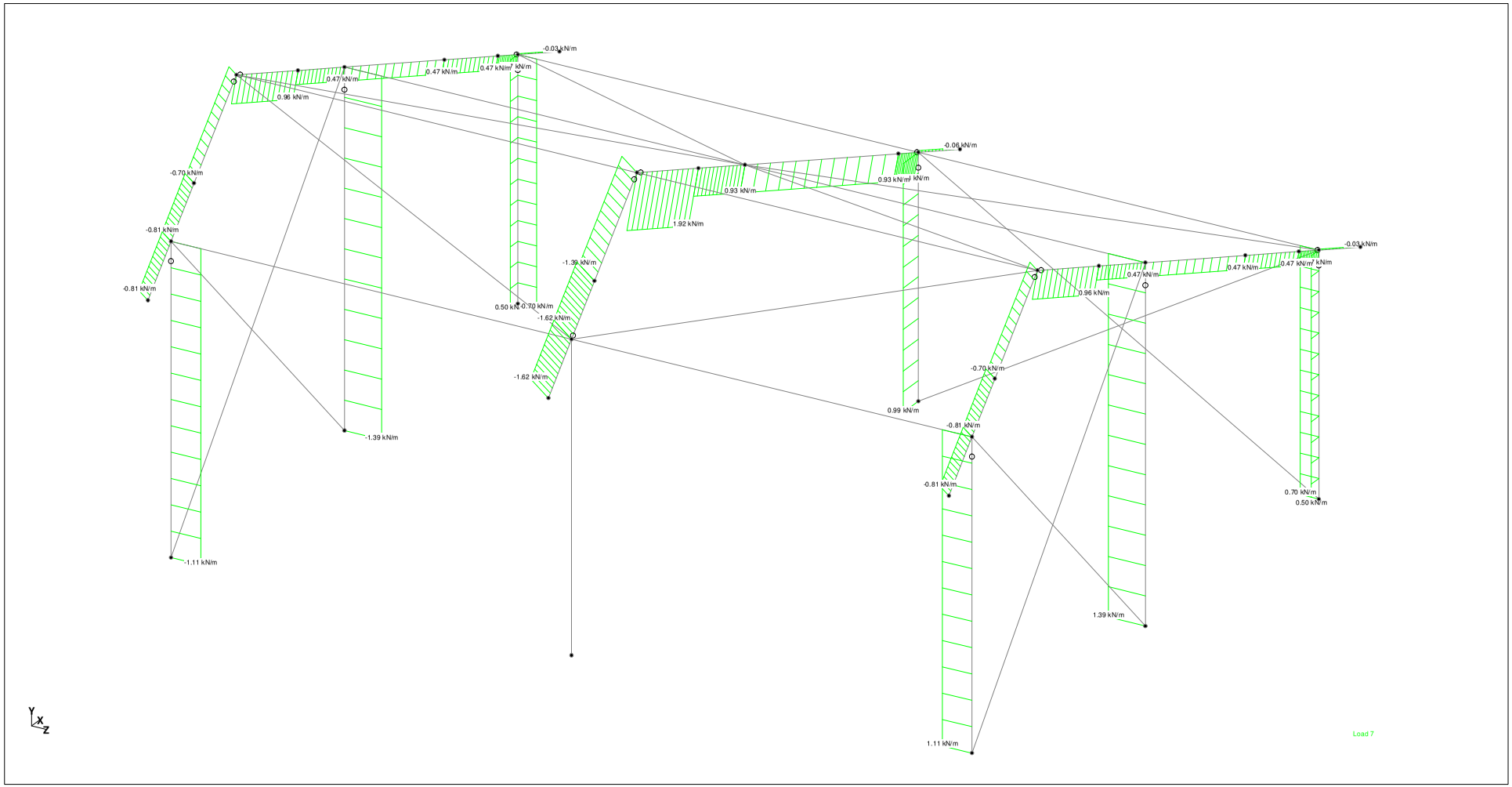
BG5: sneeuw3

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **8**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



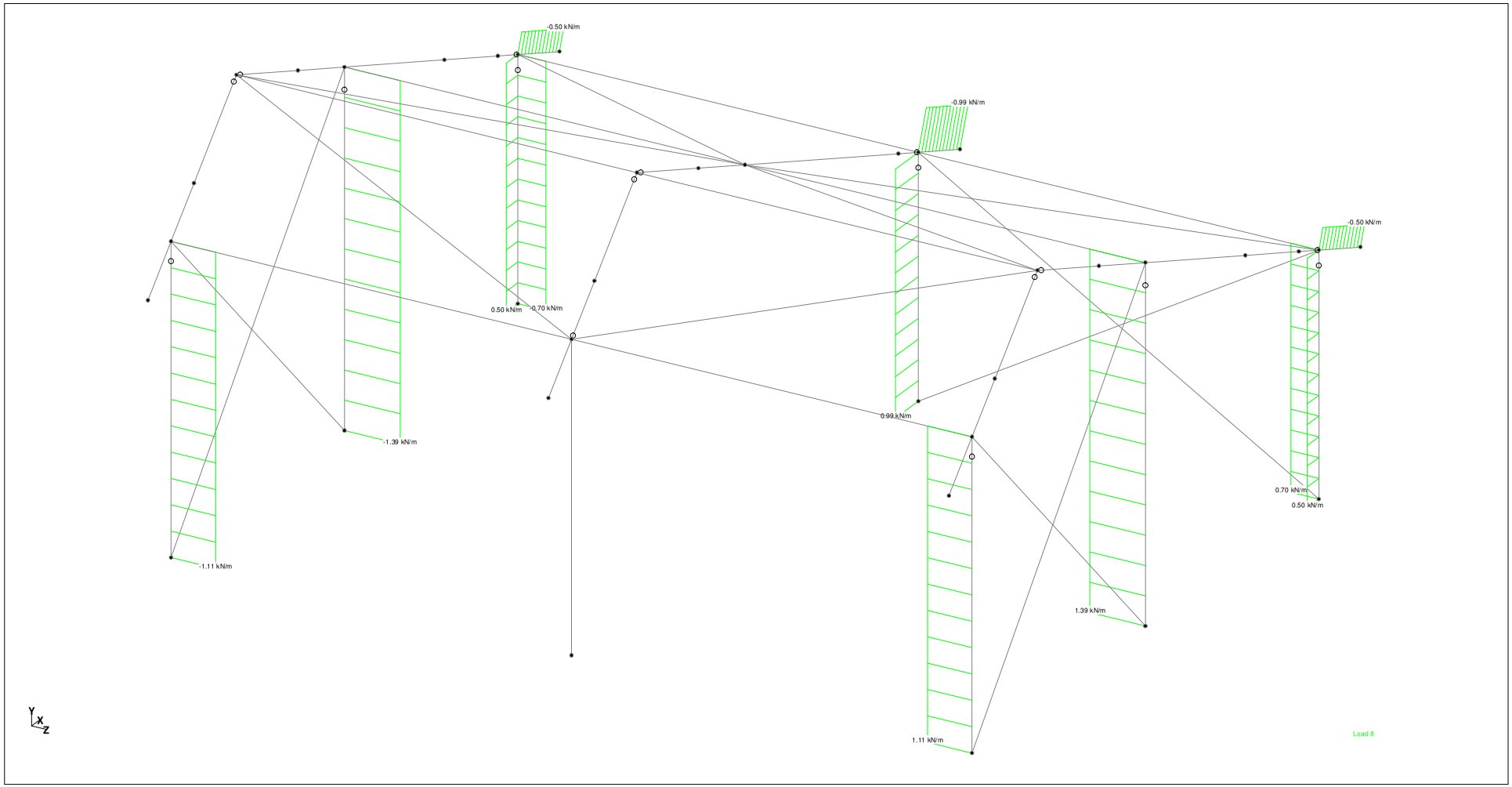
BG6: wind X1

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **9** Rev
		Part Staalconstructie	
Job Title Nieuwbouw schuur		Ref	
		By AdJ	Date 07-Jul-15 Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01



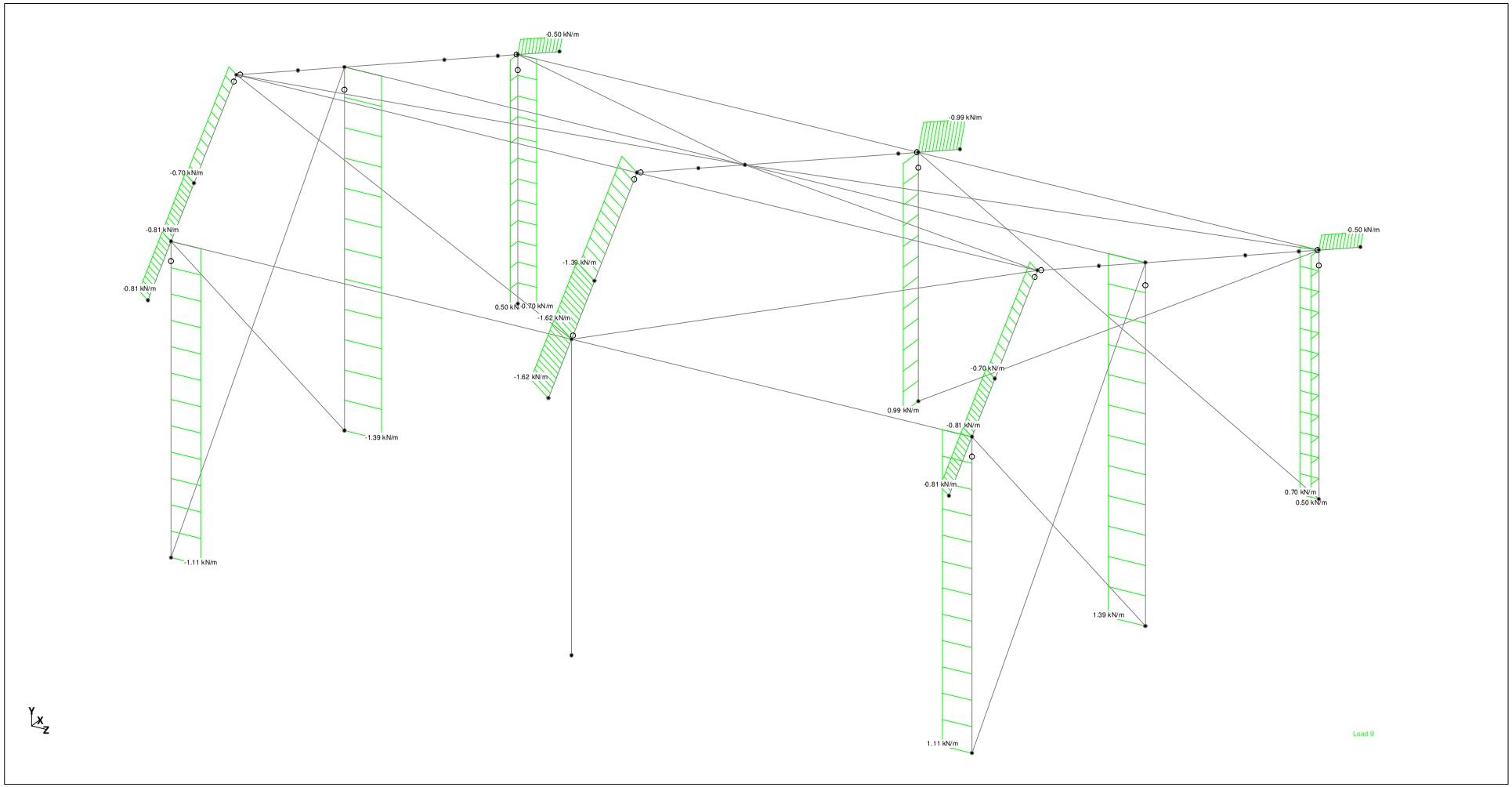
BG7: wind Z2

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **10**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



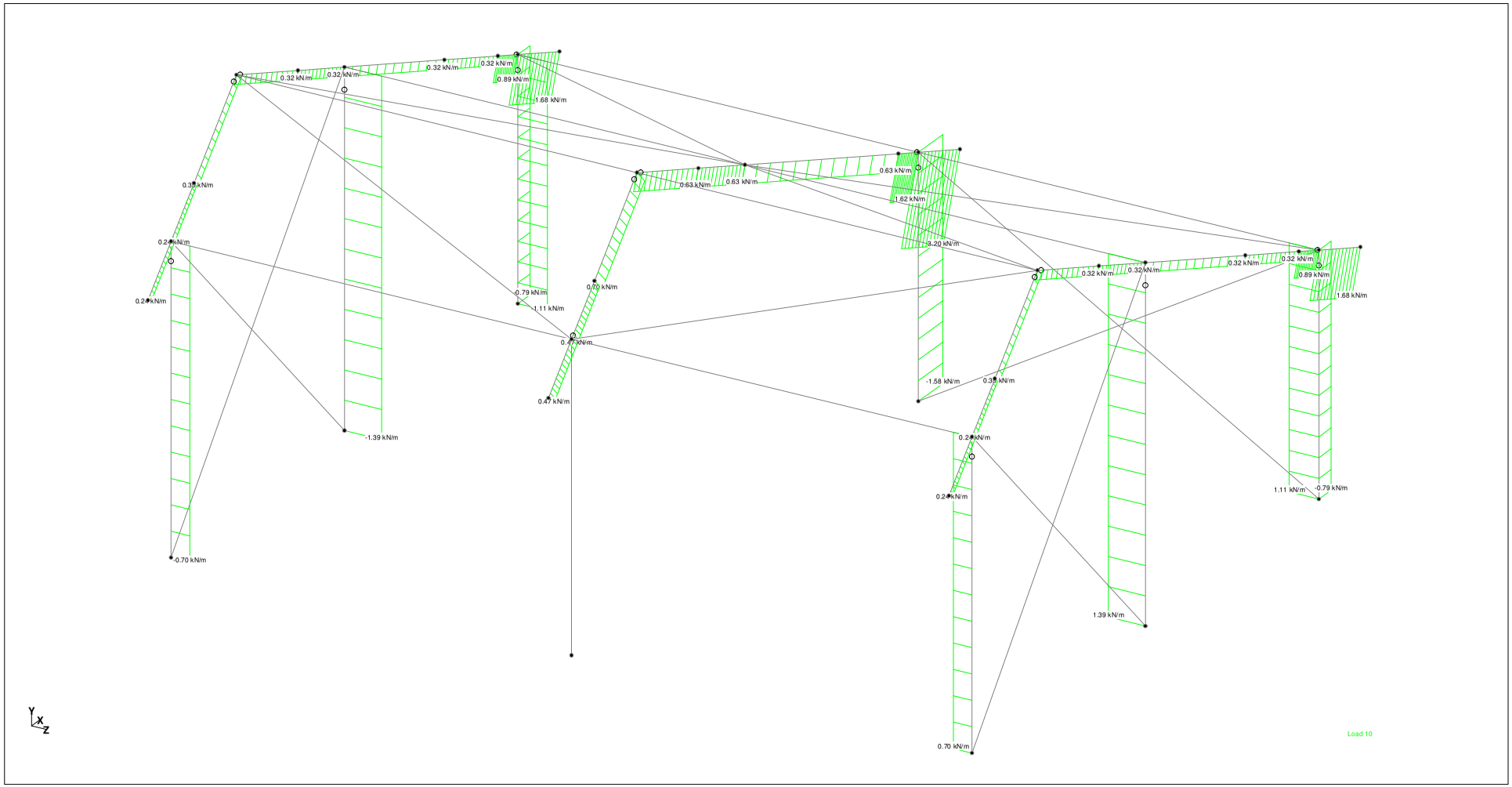
BG8: wind X3

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **11**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



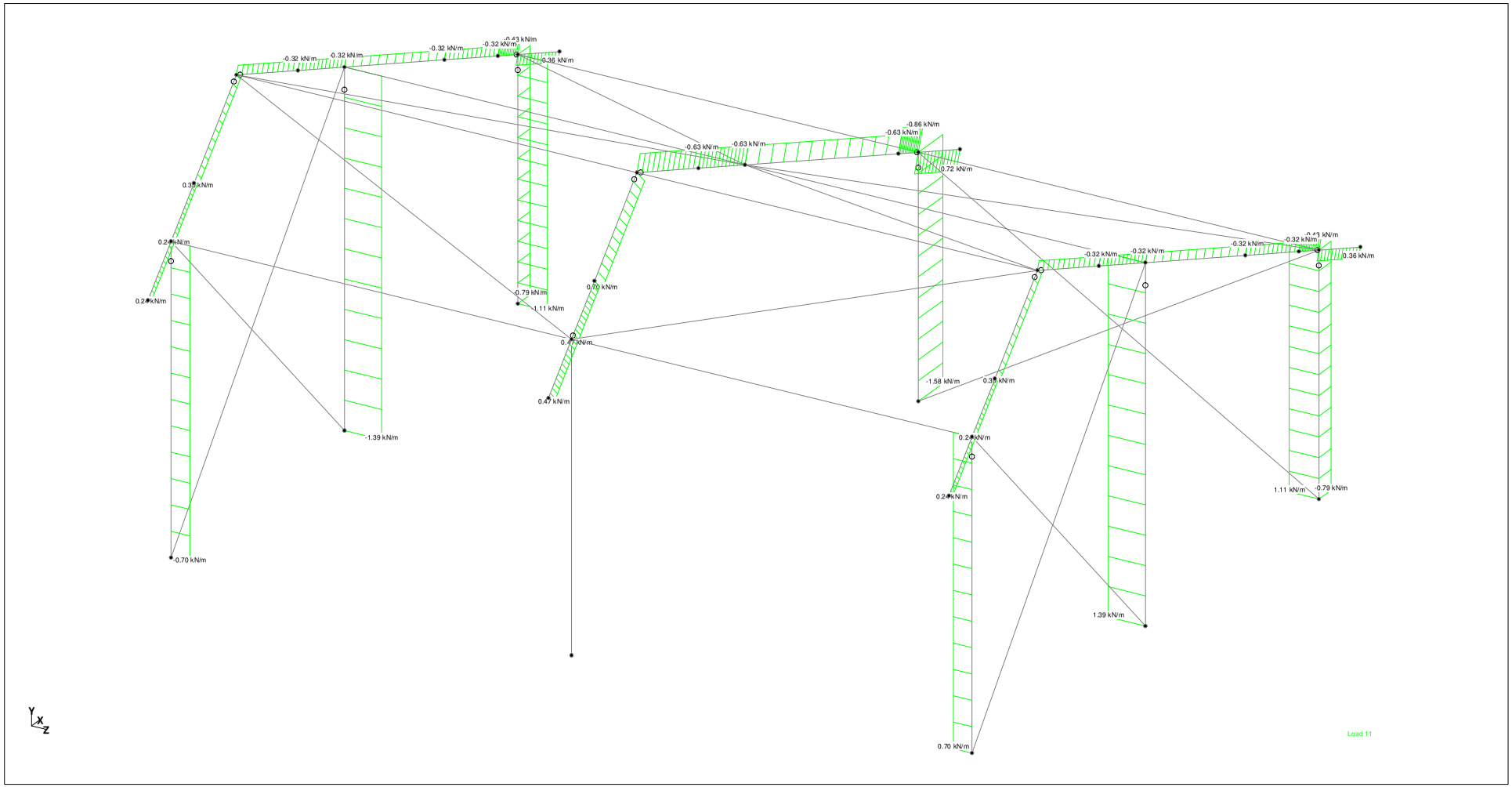
BG9: wind X4

KLOEZE bv ENGINEERING	Job No 9111-011	Sheet No 12	Rev
Software licensed to Engineering	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	



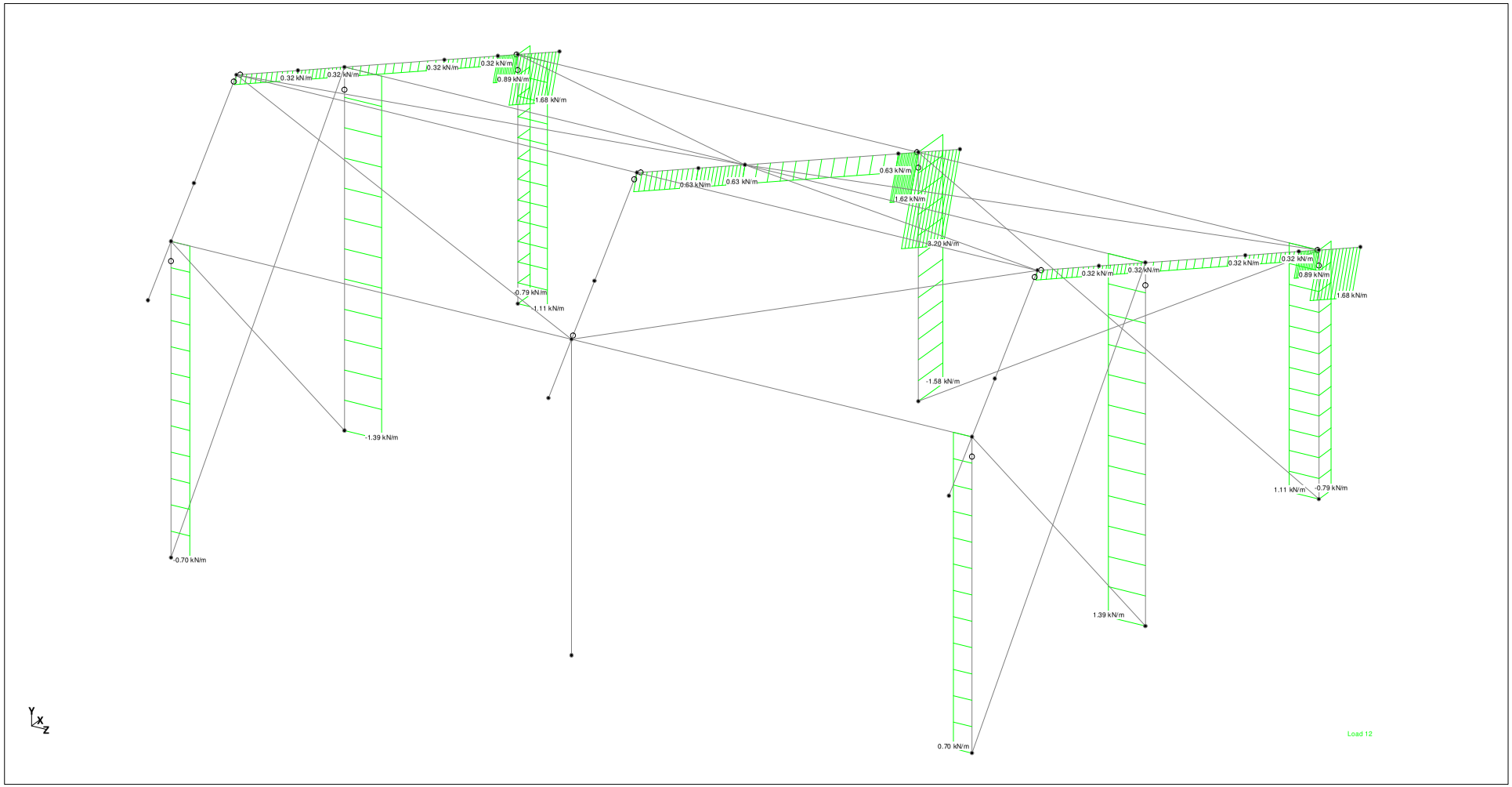
BG10: wind -X1

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **13**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



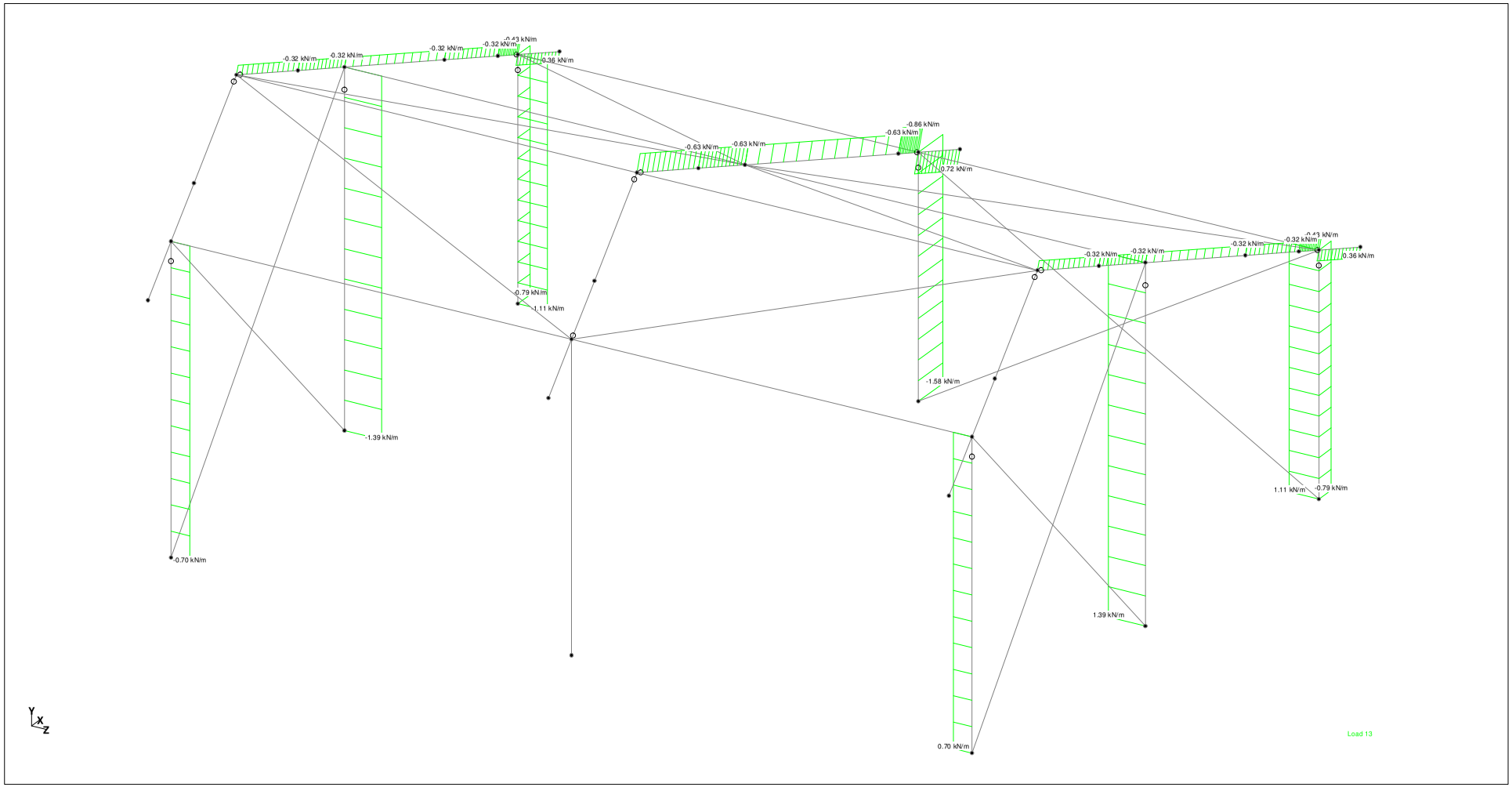
BG11: wind -X2

Software licensed to Engineering **KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **14**	Rev
	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	



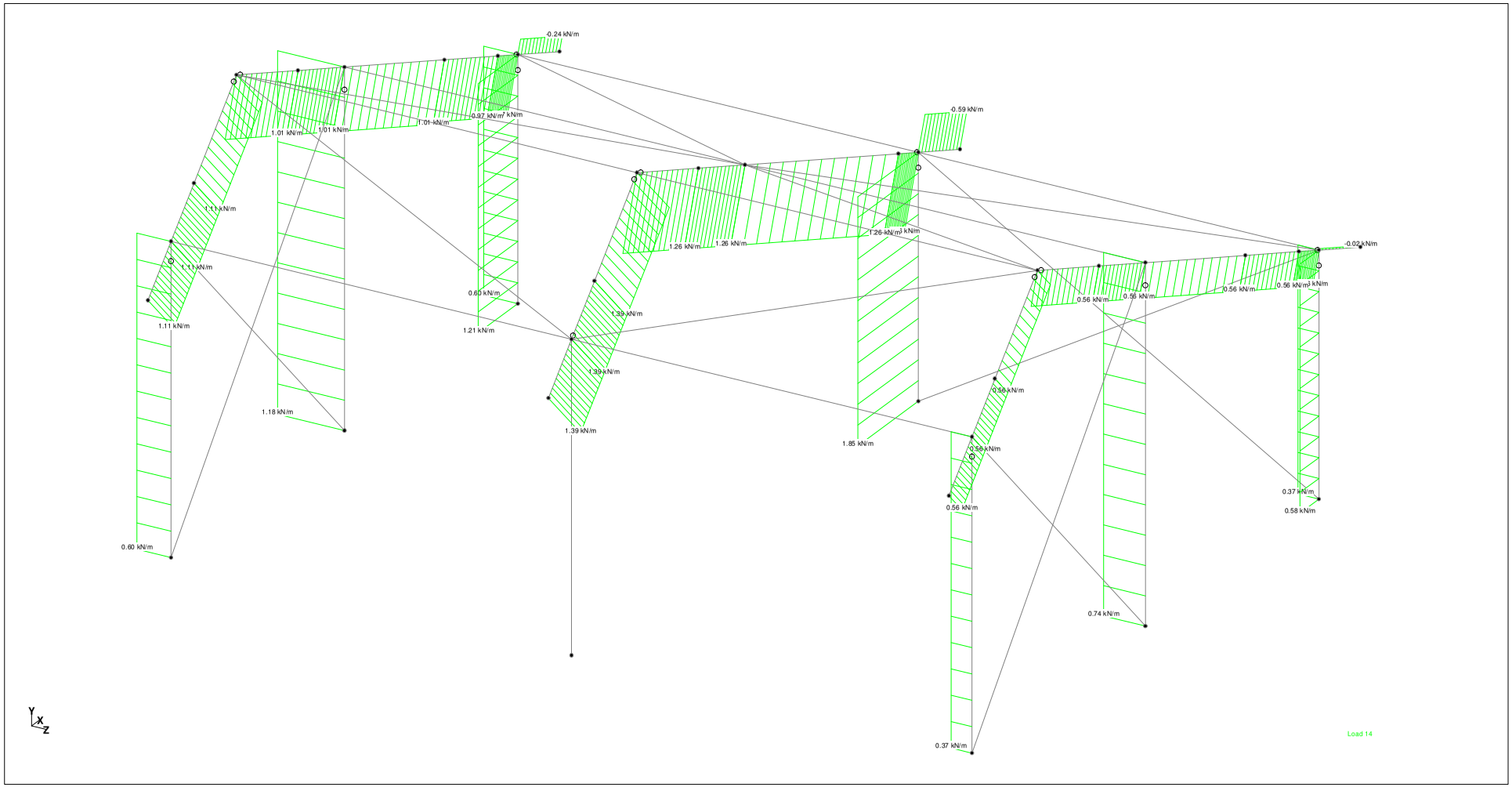
BG12: wind -X3

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **15**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



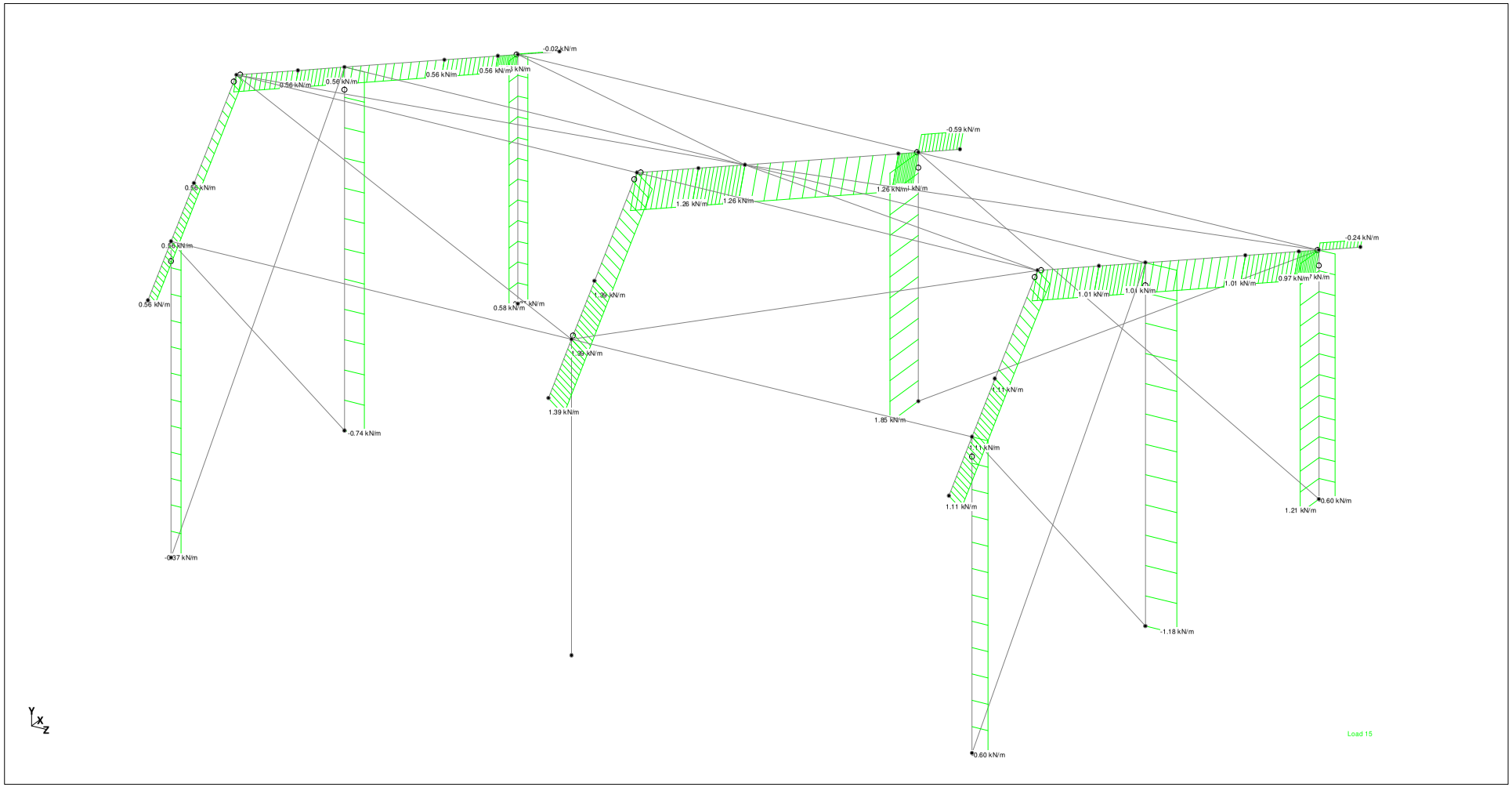
BG13: wind -X4

Software licensed to Engineering **KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **16**	Rev
	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	

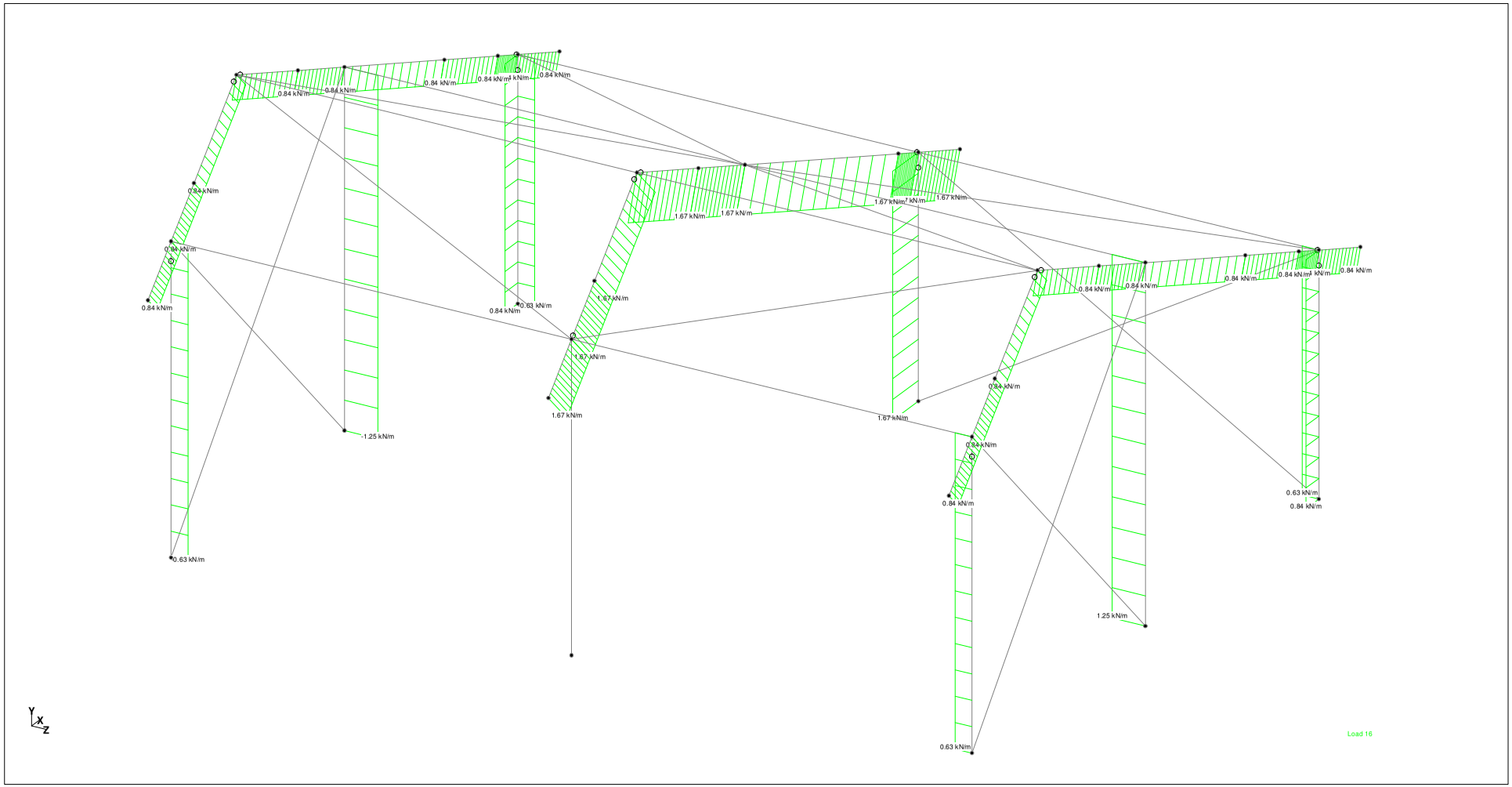


BG14: wind Z

KLOEZE bv ENGINEERING	Job No 9111-011	Sheet No 17	Rev
Software licensed to Engineering	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	

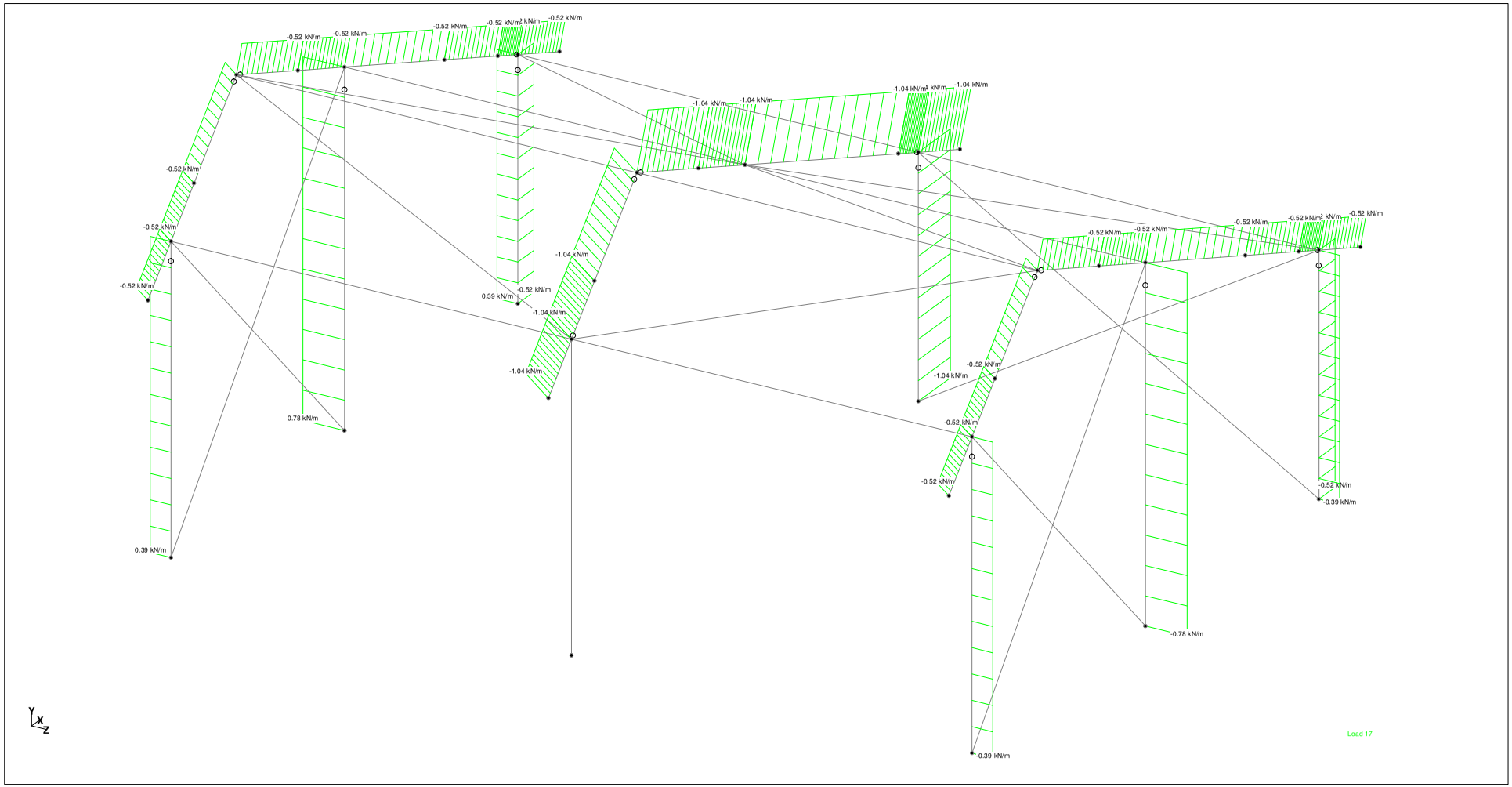


BG15: wind -Z



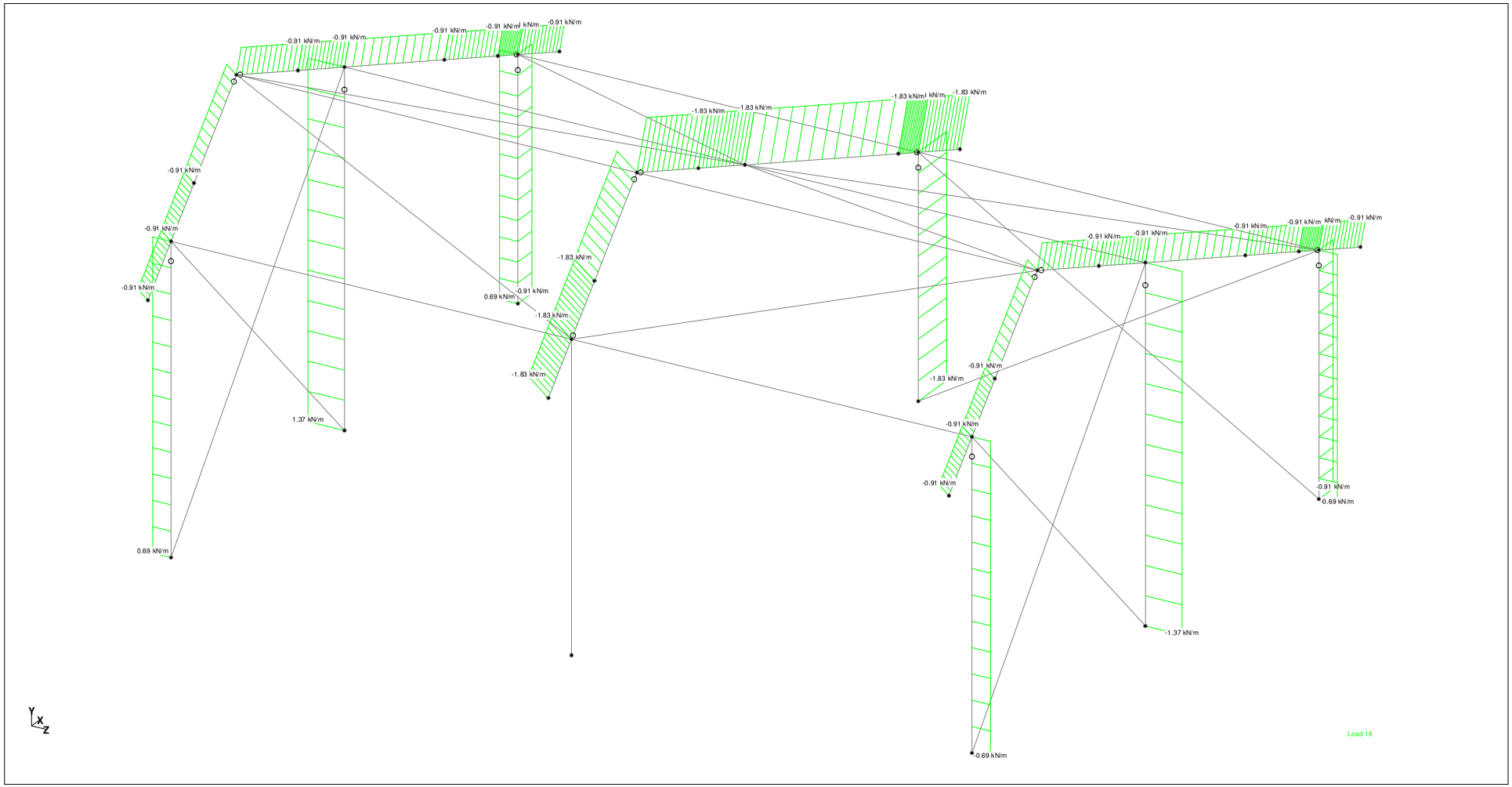
BG16: overdruk wind X

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **19**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



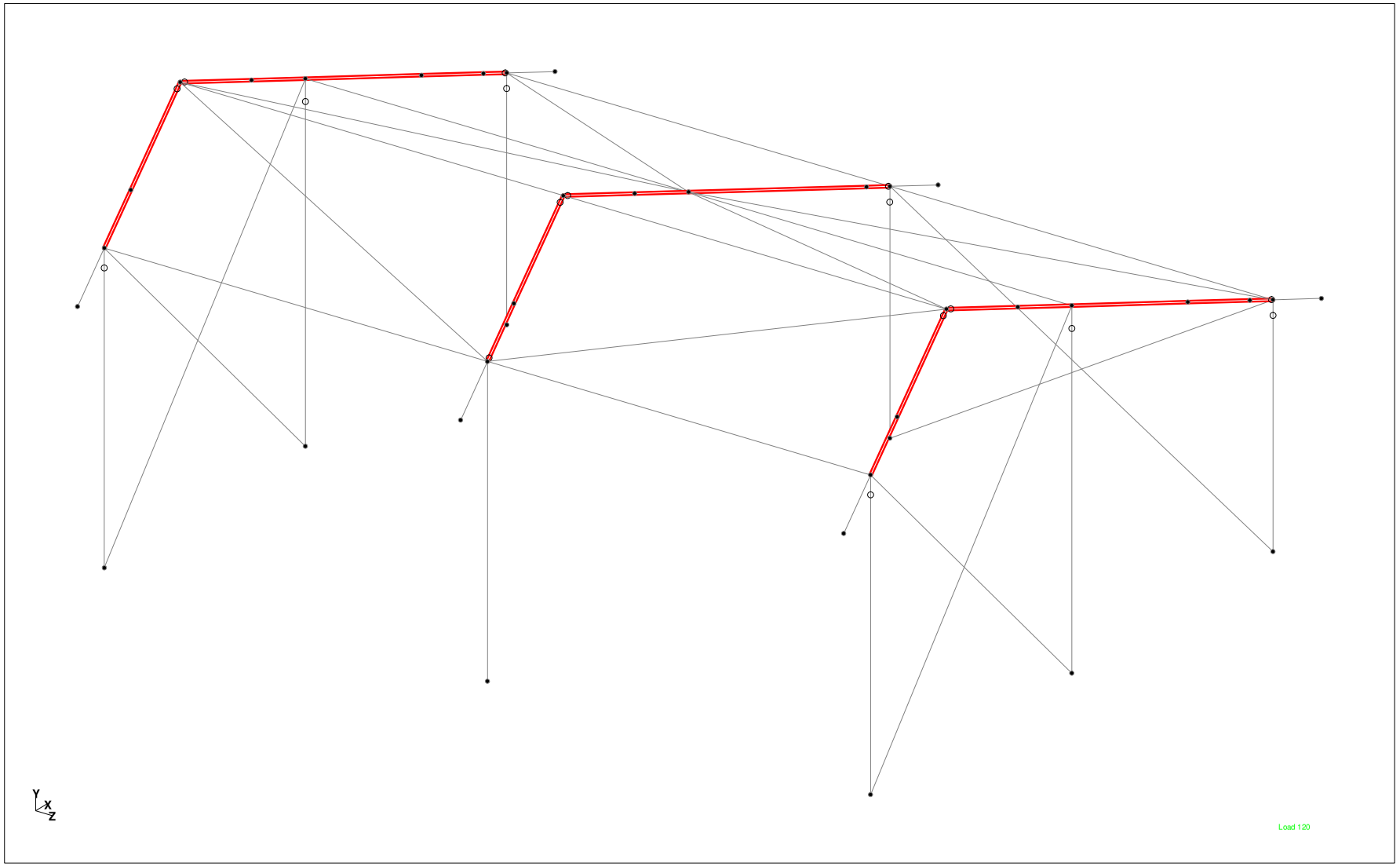
BG17: onderdruk wind -X

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **20**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



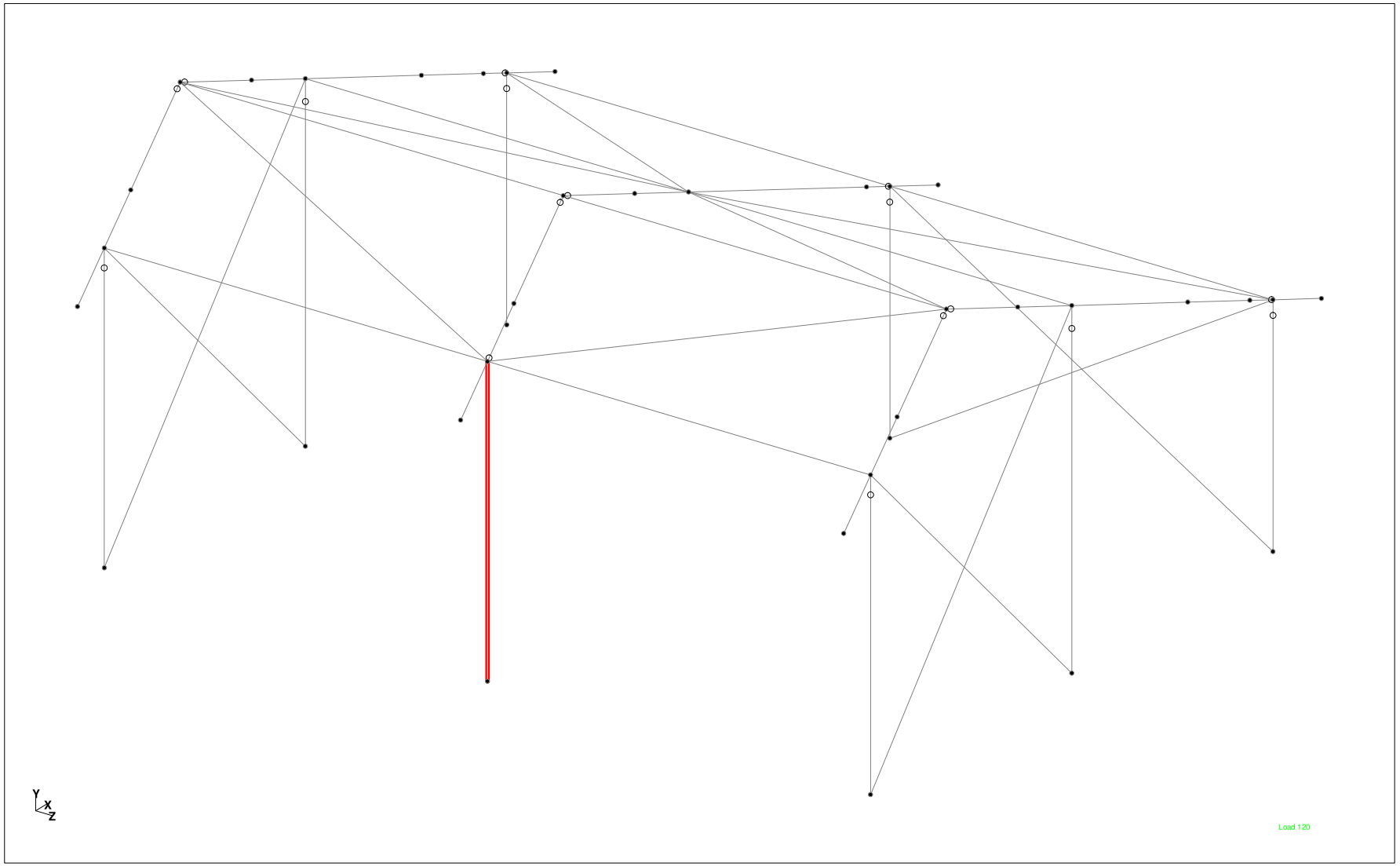
BG18: onderdruk wind Z en -Z

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **21**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



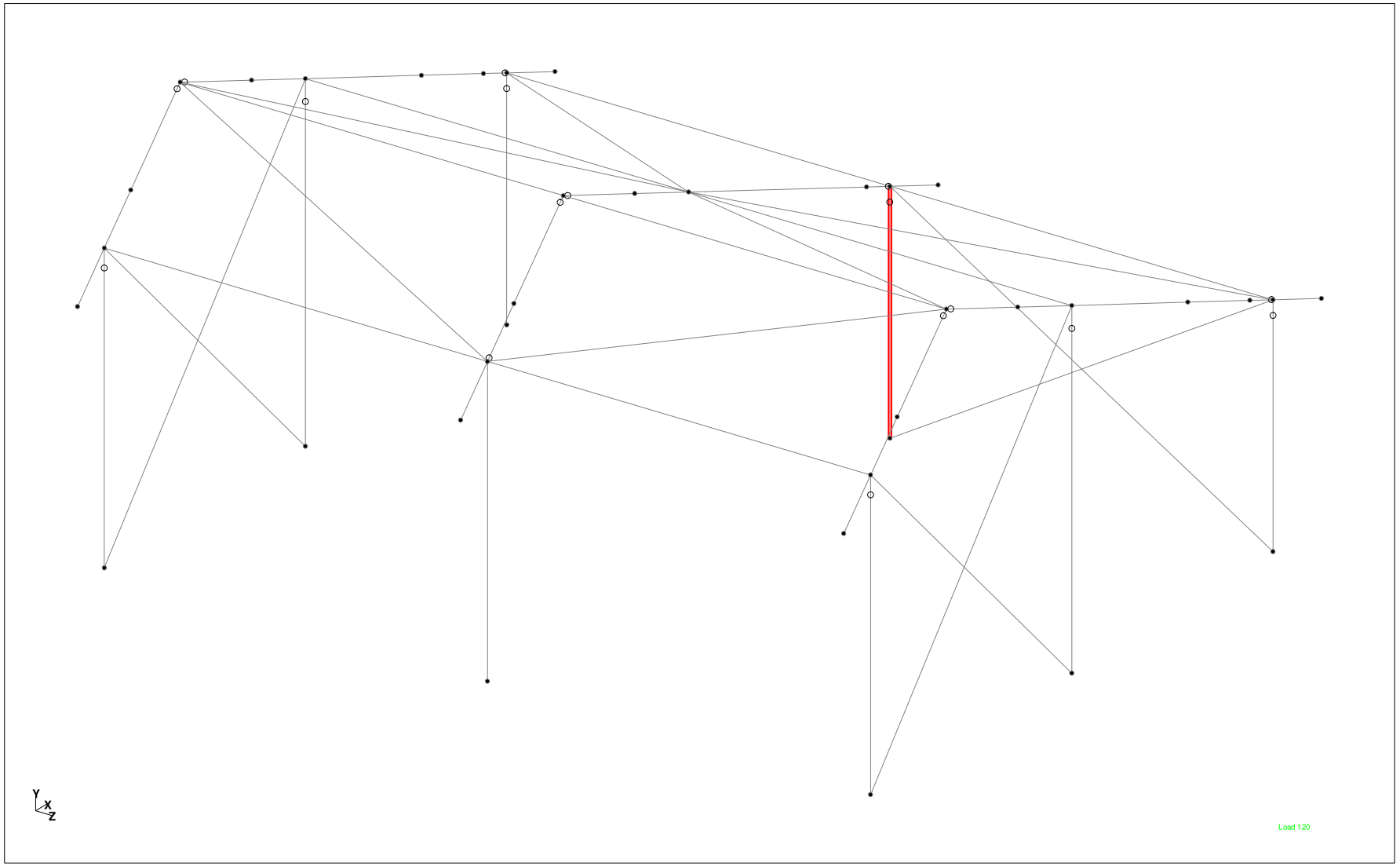
kniklengte zwakke as L=2.0m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **22** Rev
		Part Staalconstructie	
Job Title Nieuwbouw schuur		Ref	
		By AdJ	Date 07-Jul-15 Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01



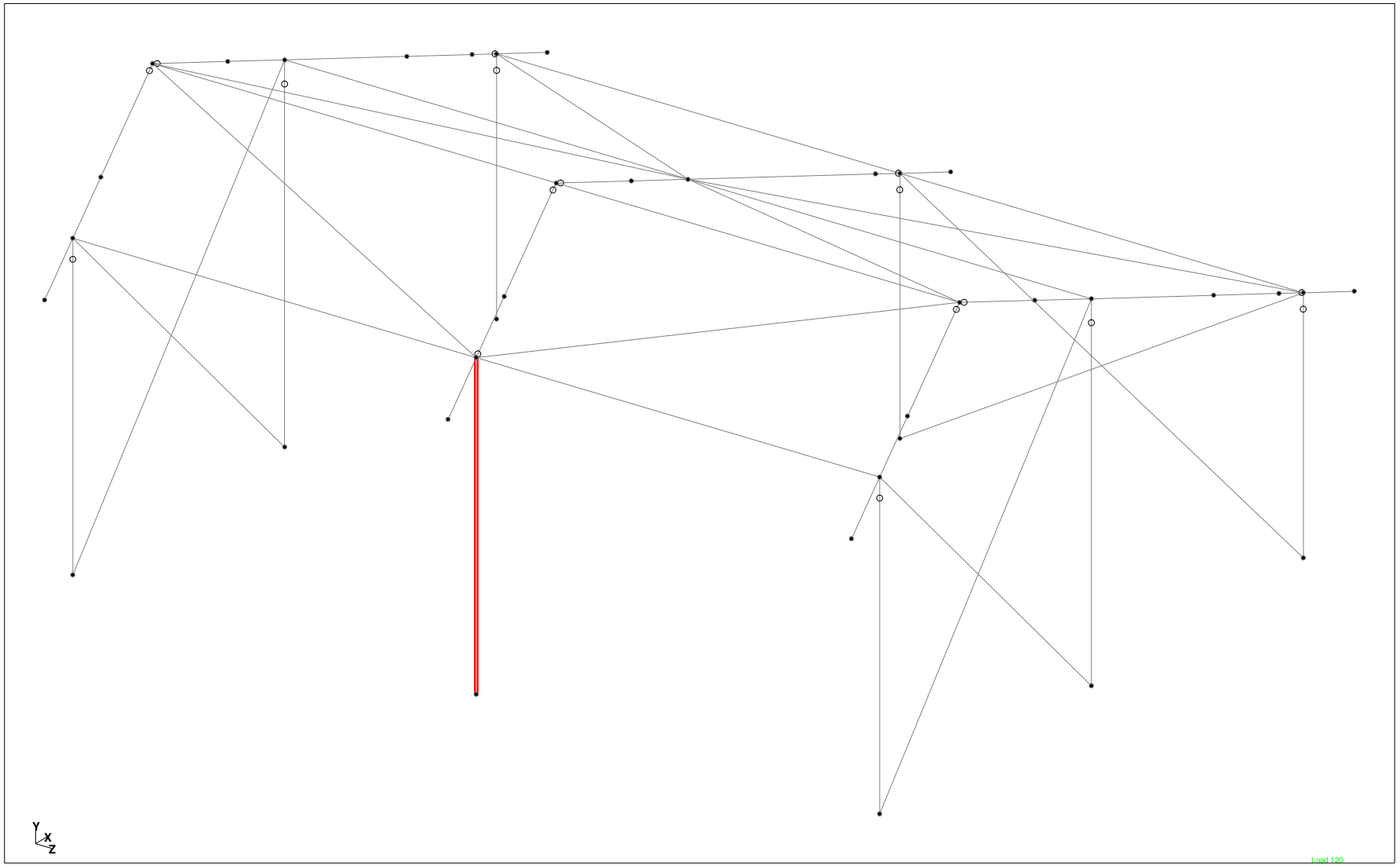
kniklengte zwakke as L=3.66m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **23**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



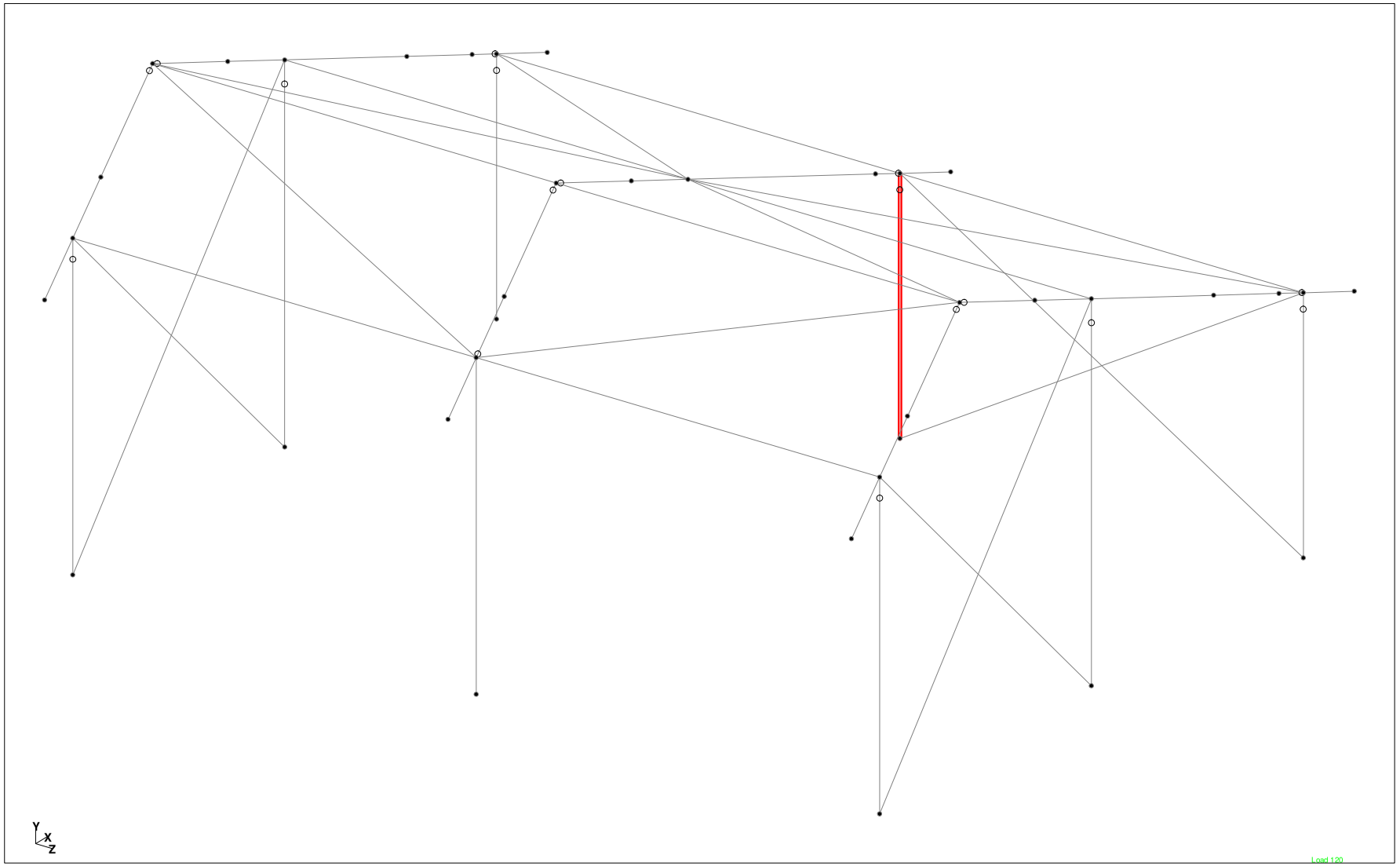
kniklengte zwakke as L=2.89m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **24**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



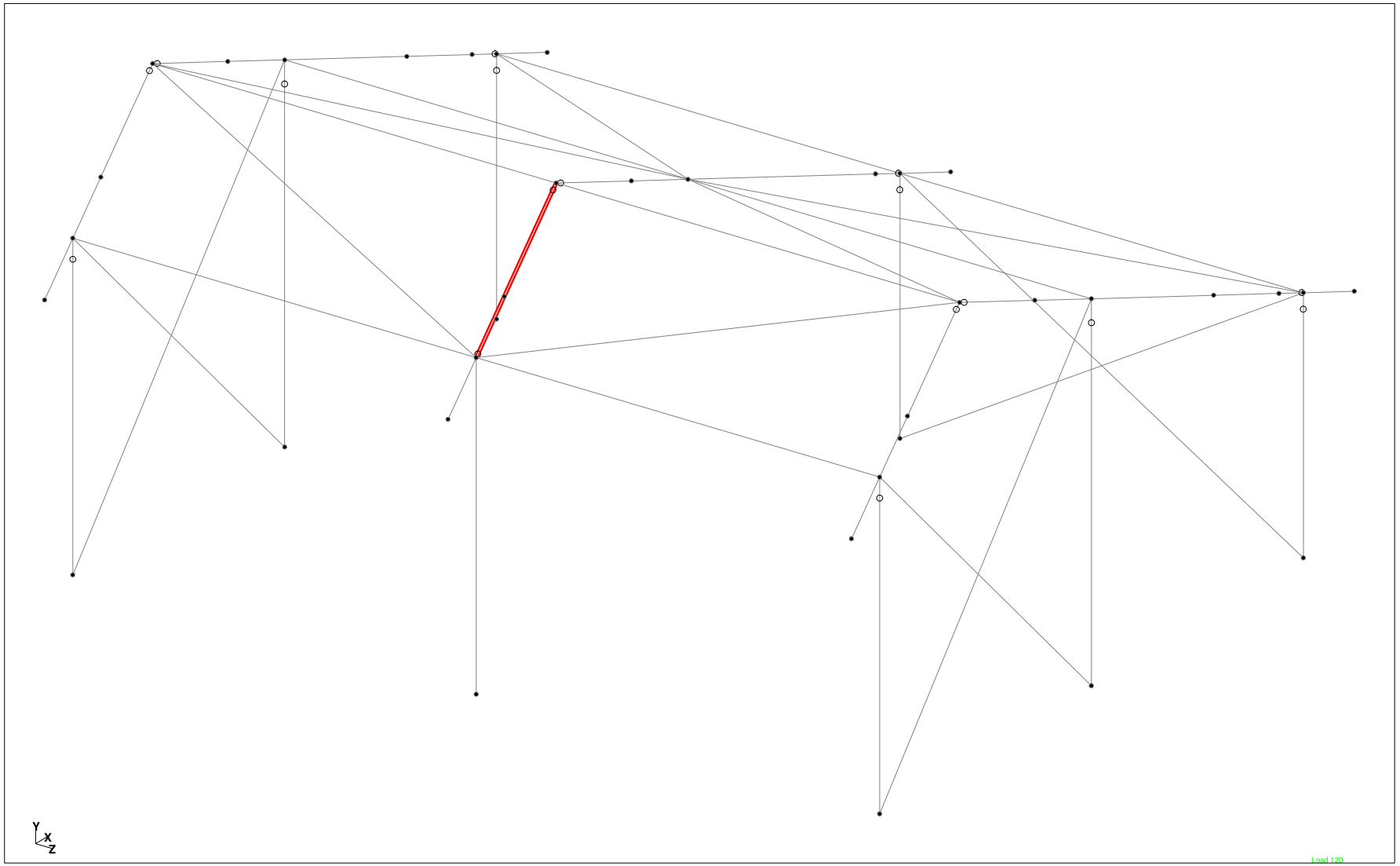
kniklengte sterke as L=8.59m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **25**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



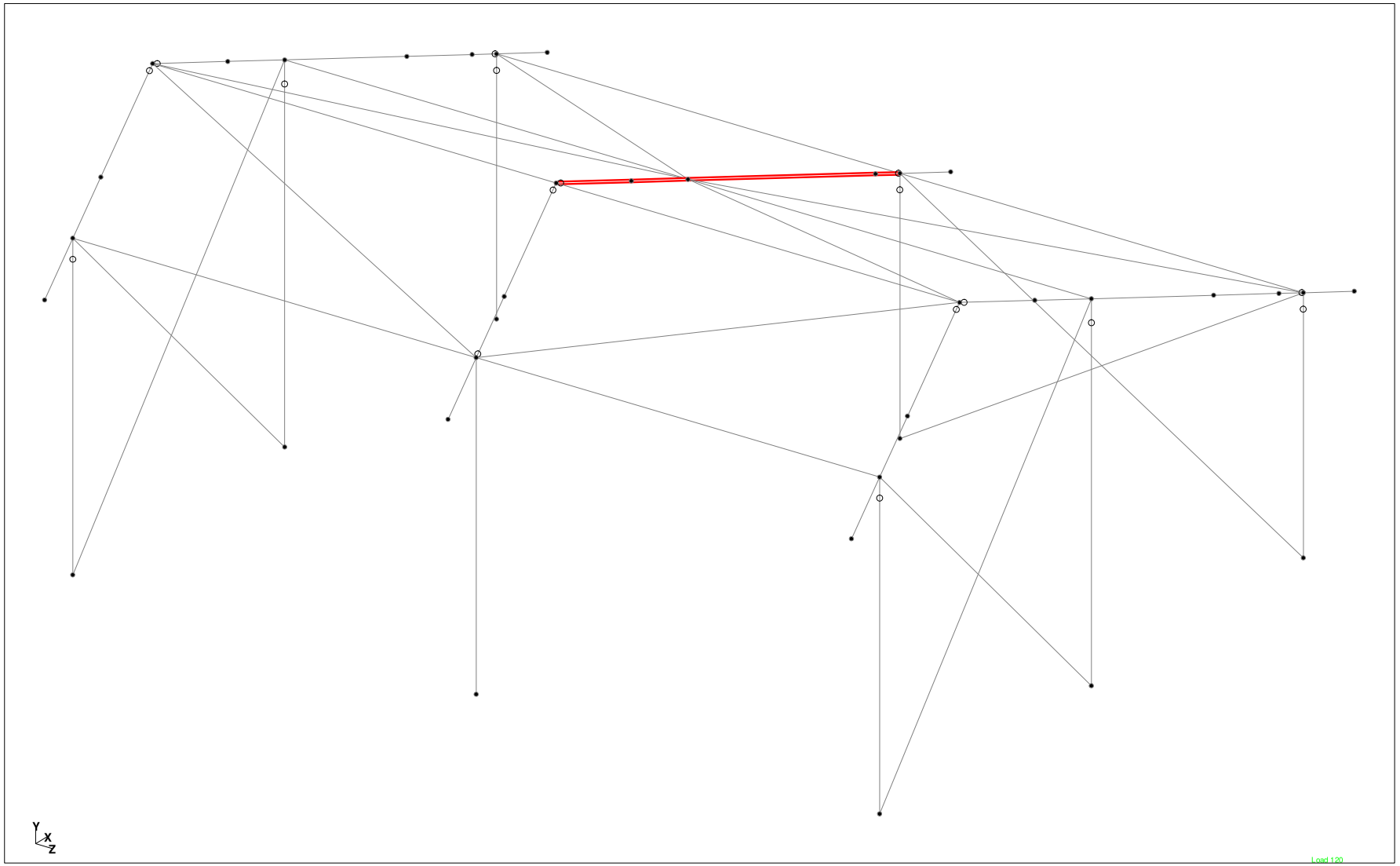
kniklengte sterke as L=7.79m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **26**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



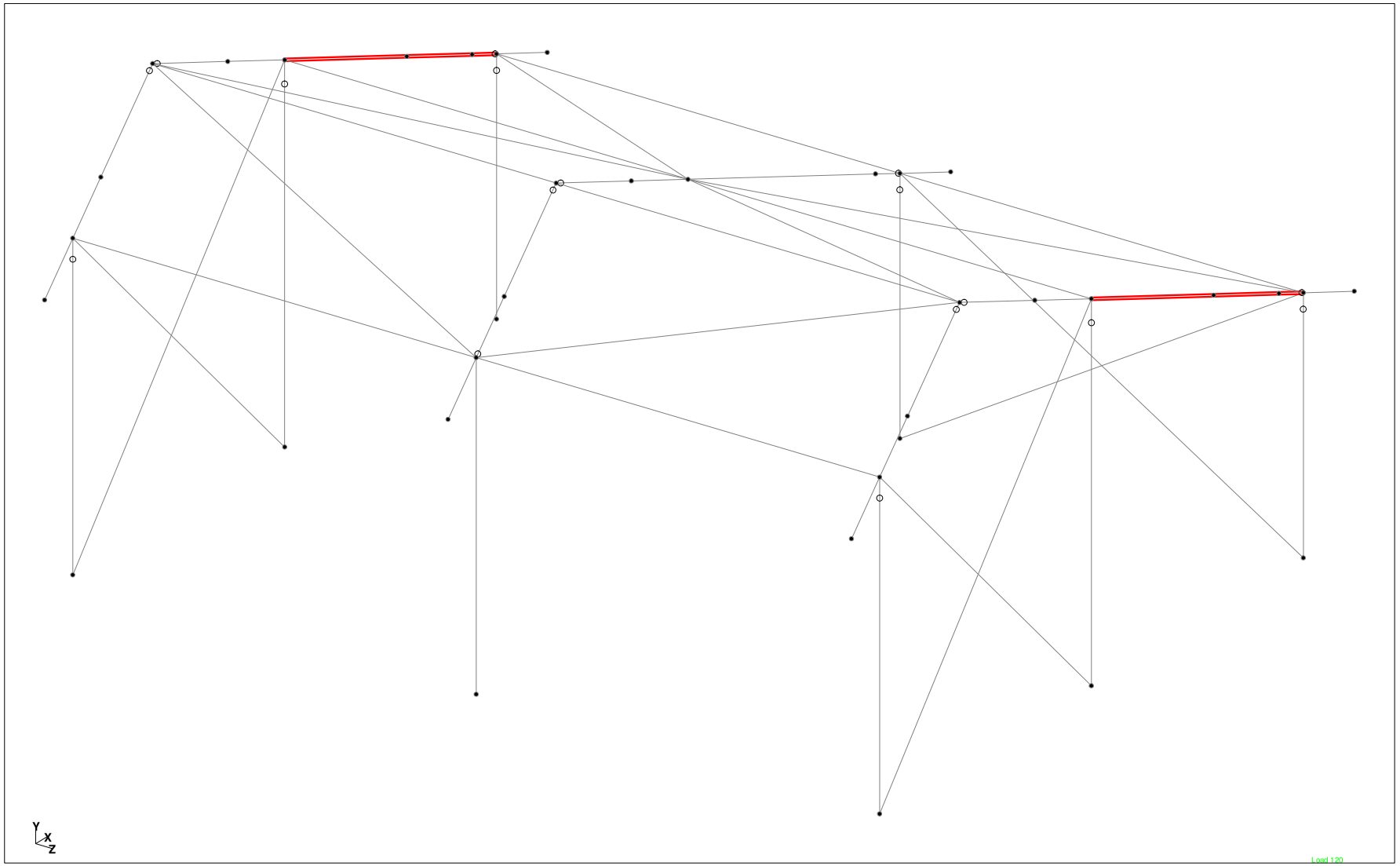
kniklengte sterke as L=3.05m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **27**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



kniklengte sterke as L=10.81m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **28**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



kniklengte sterke as L=3.99m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **29**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
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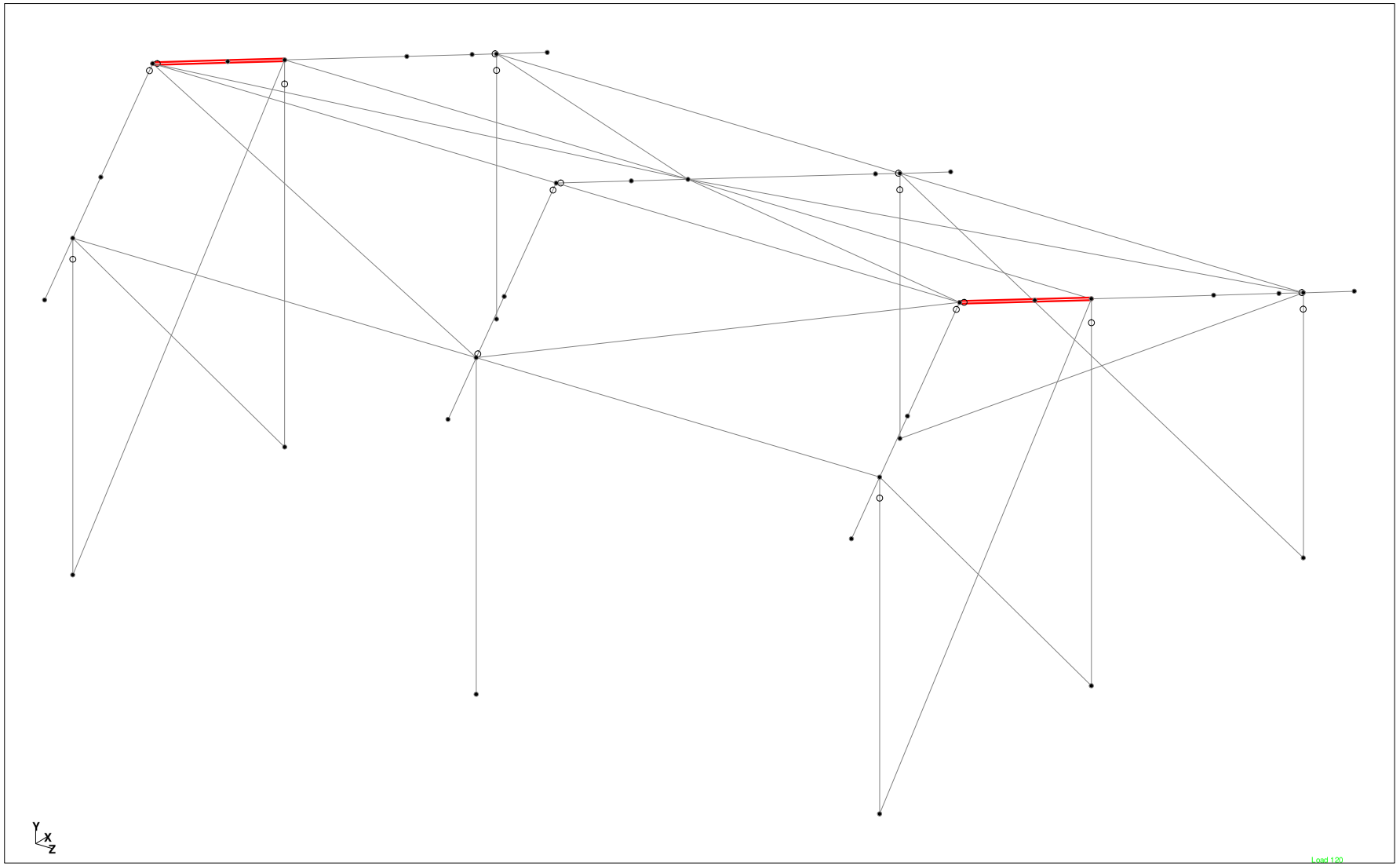
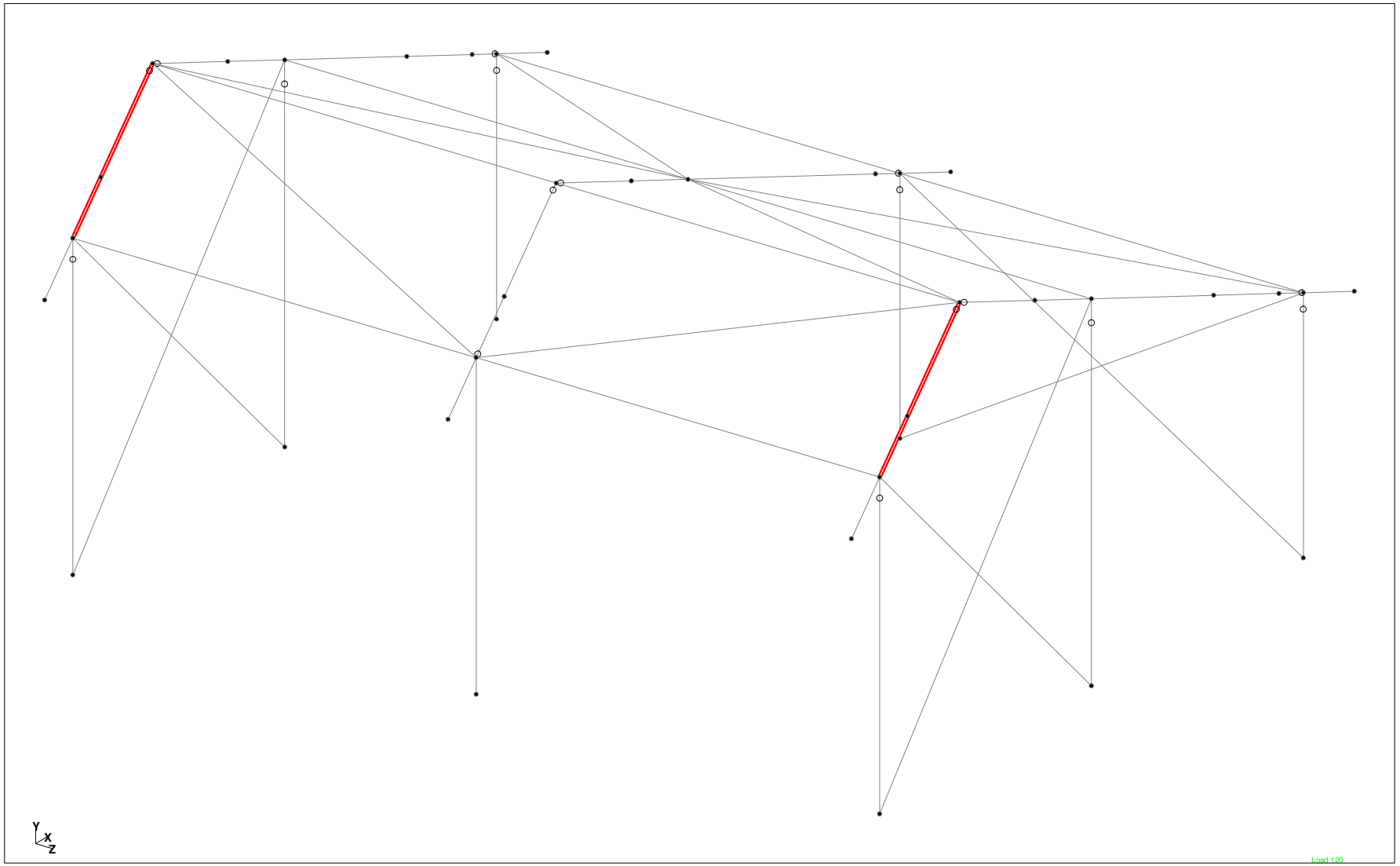
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



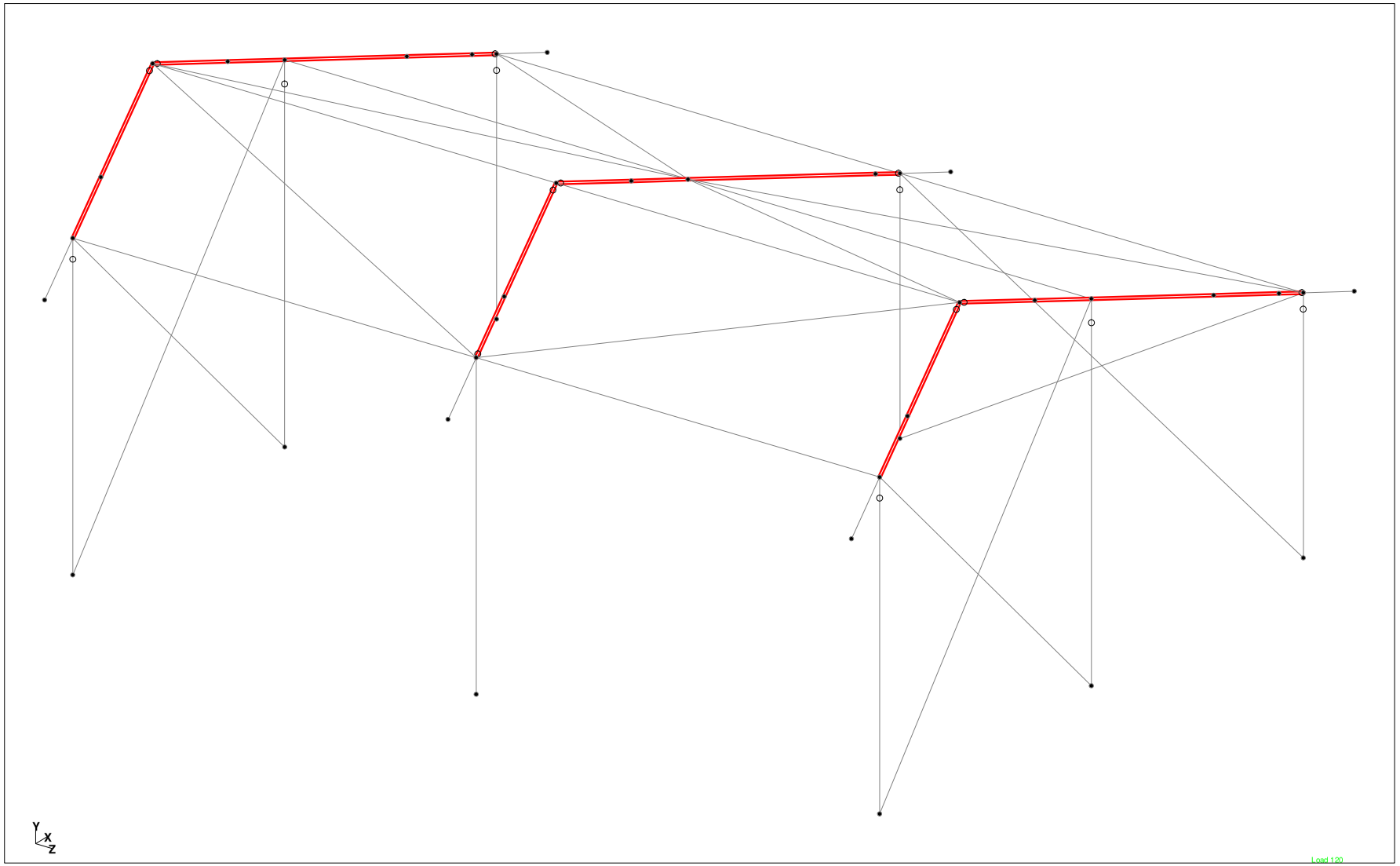
kniklengte sterke as L=2.49m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **30** Rev
		Part Staalconstructie	
Job Title Nieuwbouw schuur		Ref	
		By AdJ	Date 07-Jul-15 Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01



kniklengte sterke as L=2.0m

Software licensed to Engineering **KLOEZE bv** ENGINEERING		Job No **9111-011**	Sheet No **31**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



kiplengte L=2.0m

Software licensed to Engineering **KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **32**	Rev
	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
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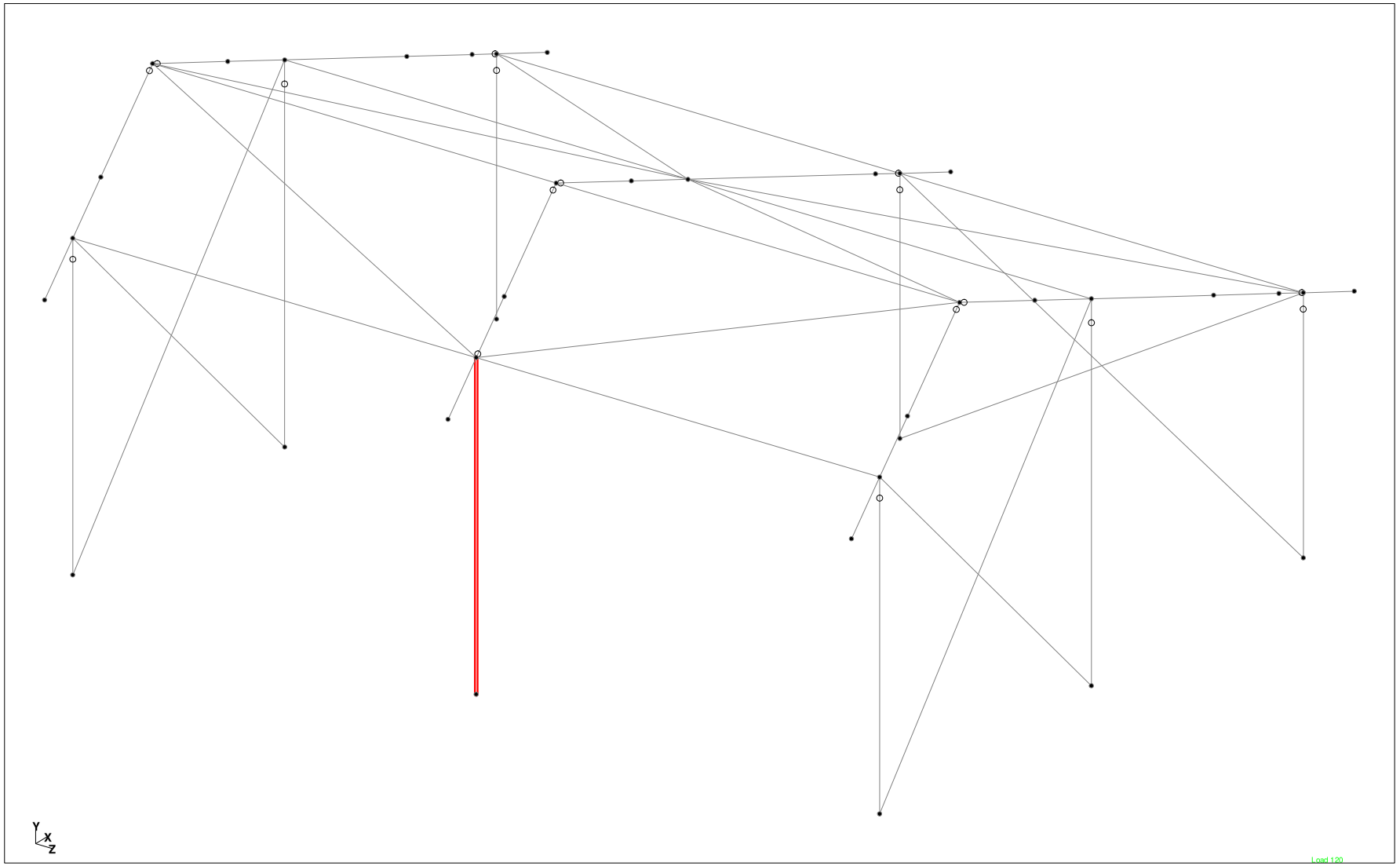
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	



kiplengte L=3.66m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **33**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
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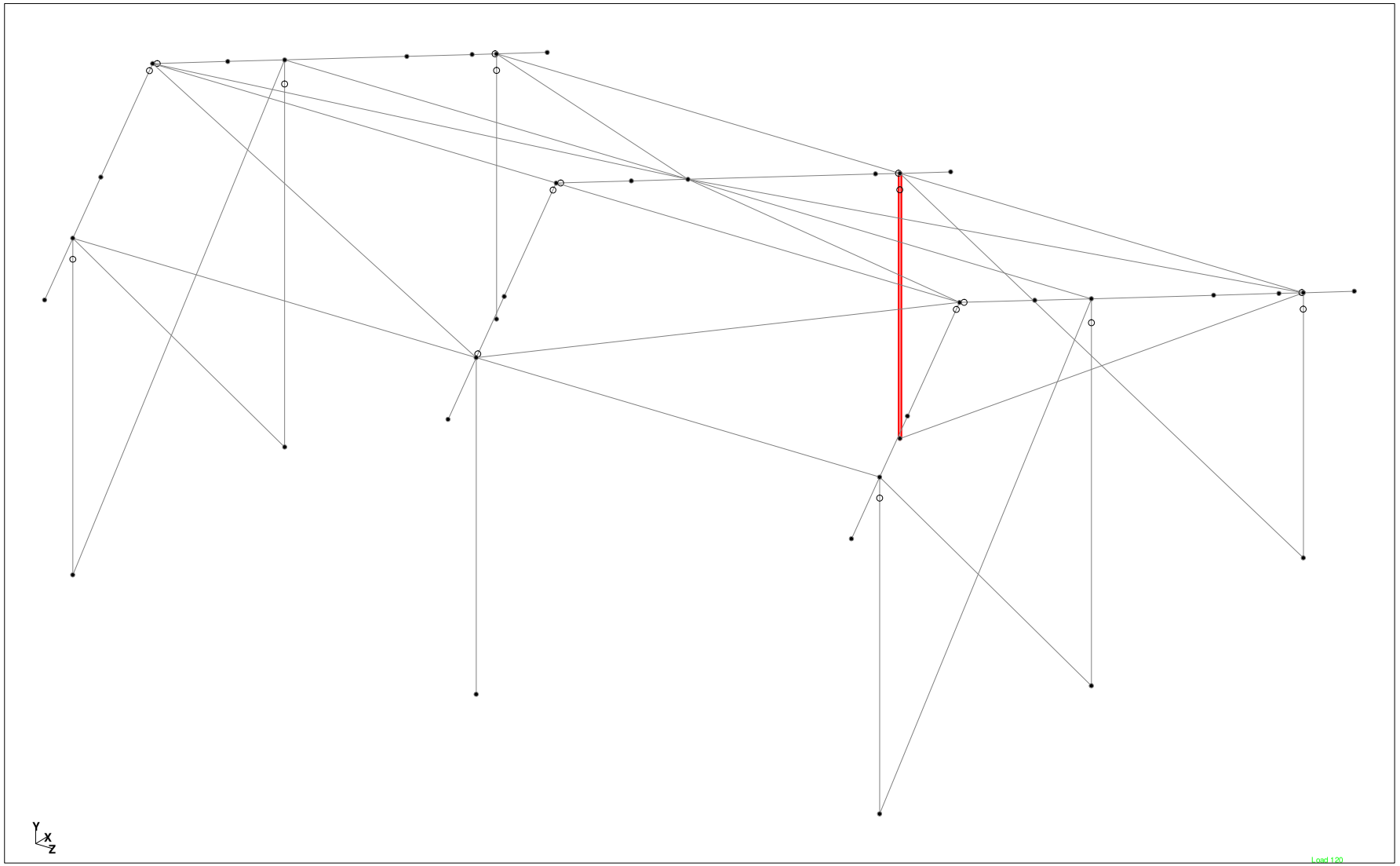
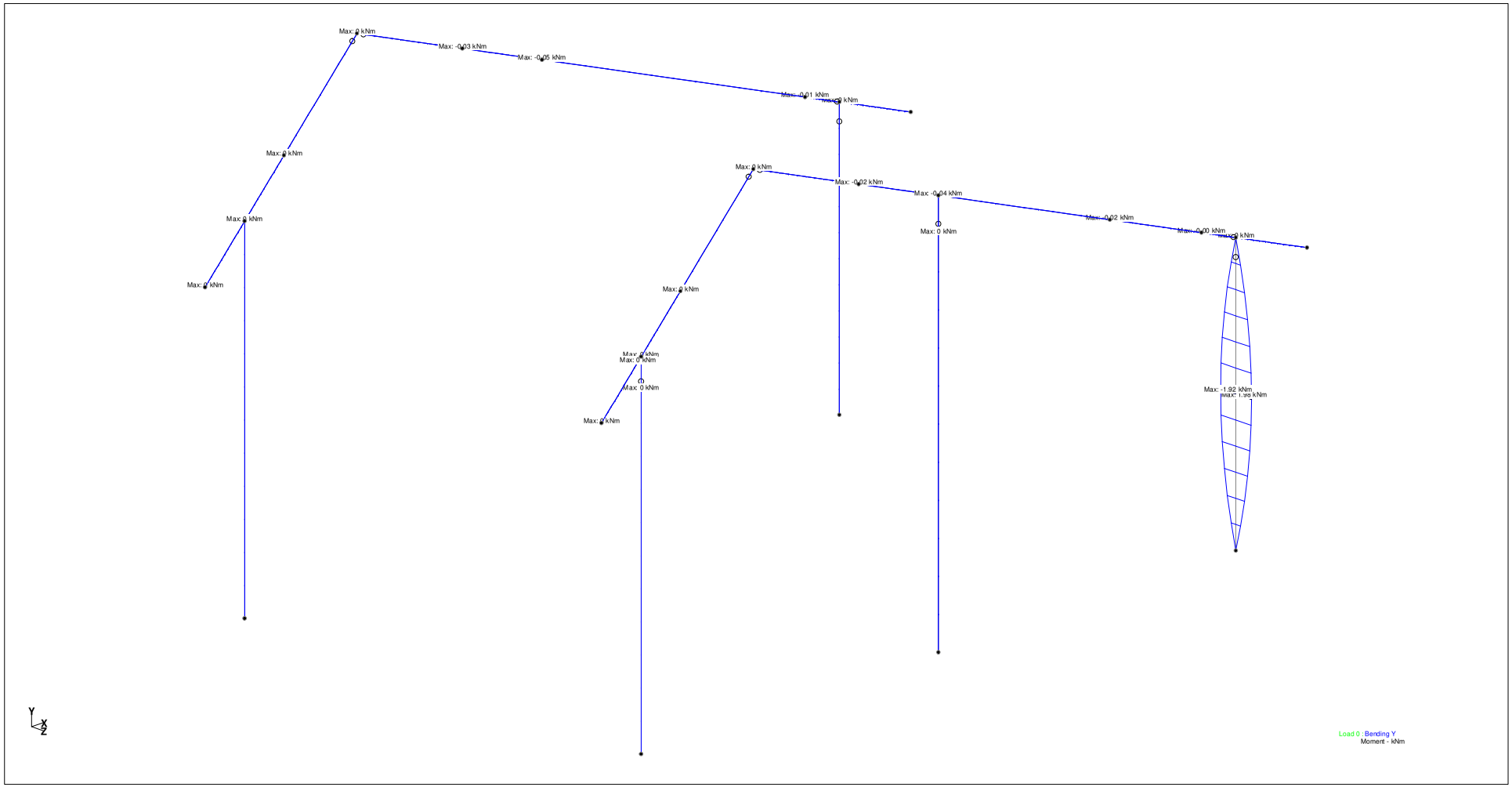
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



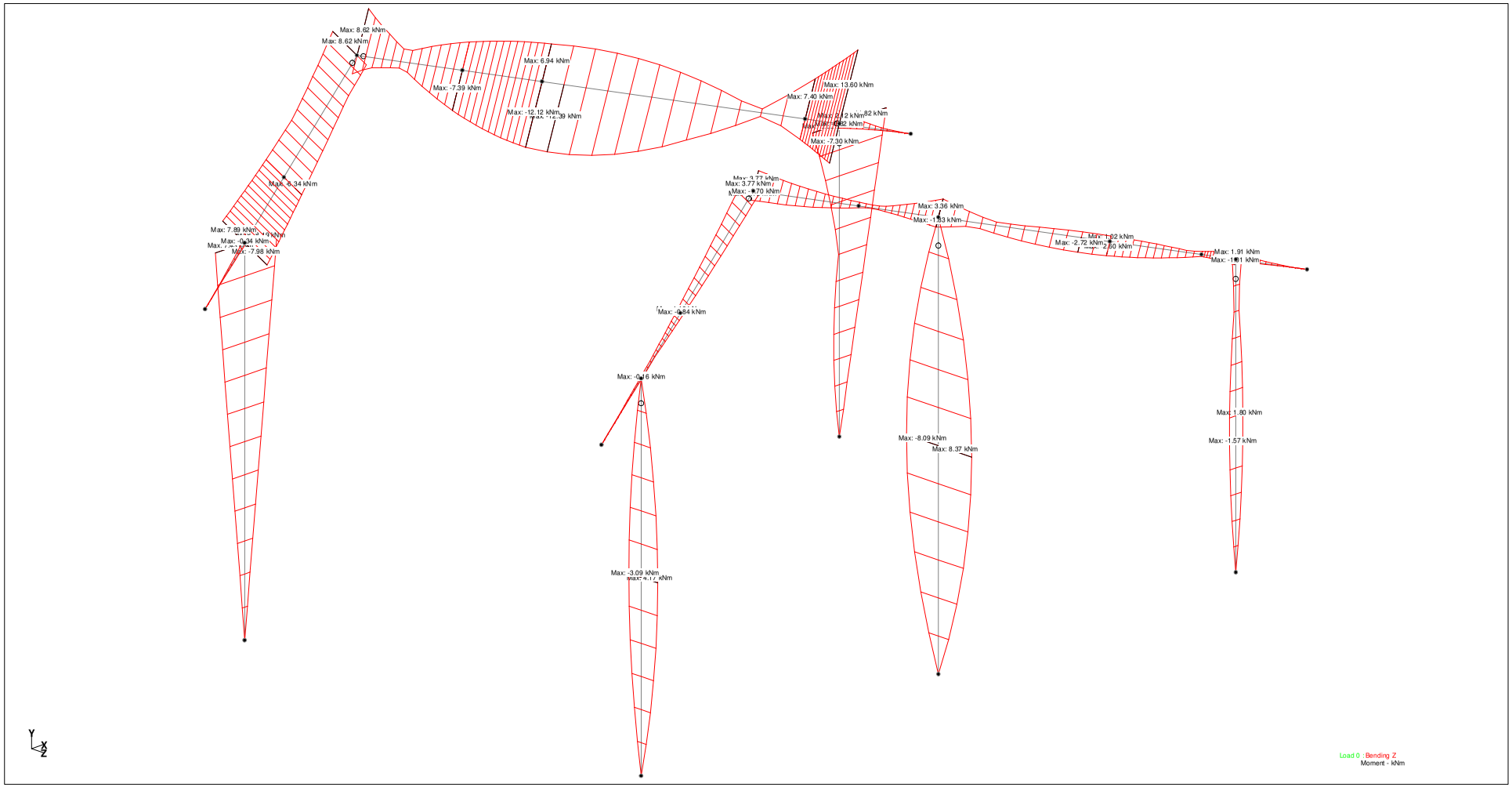
kiplengte L=2.89m

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **34**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



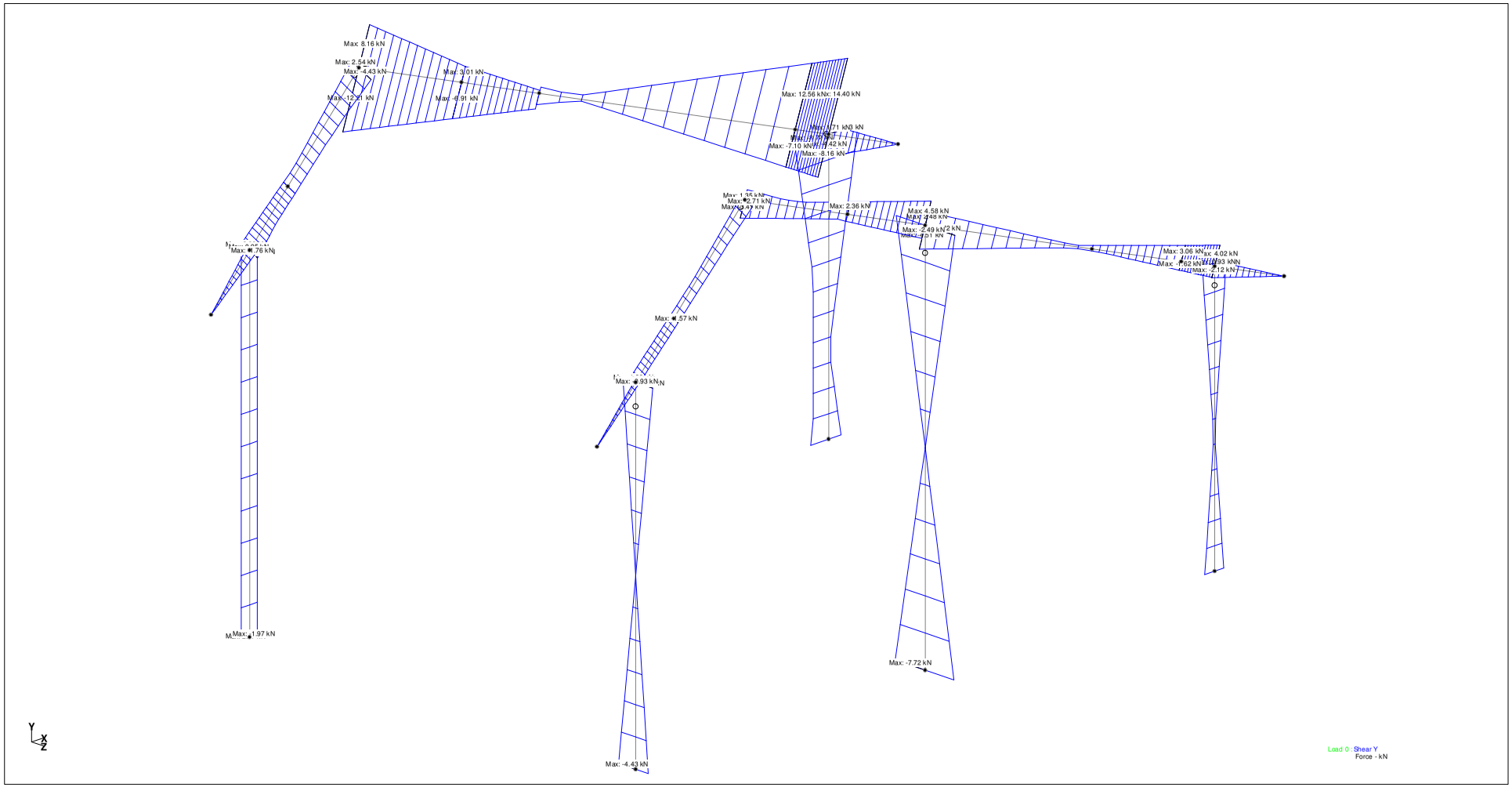
omhullende momentenlijnen My

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **35**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



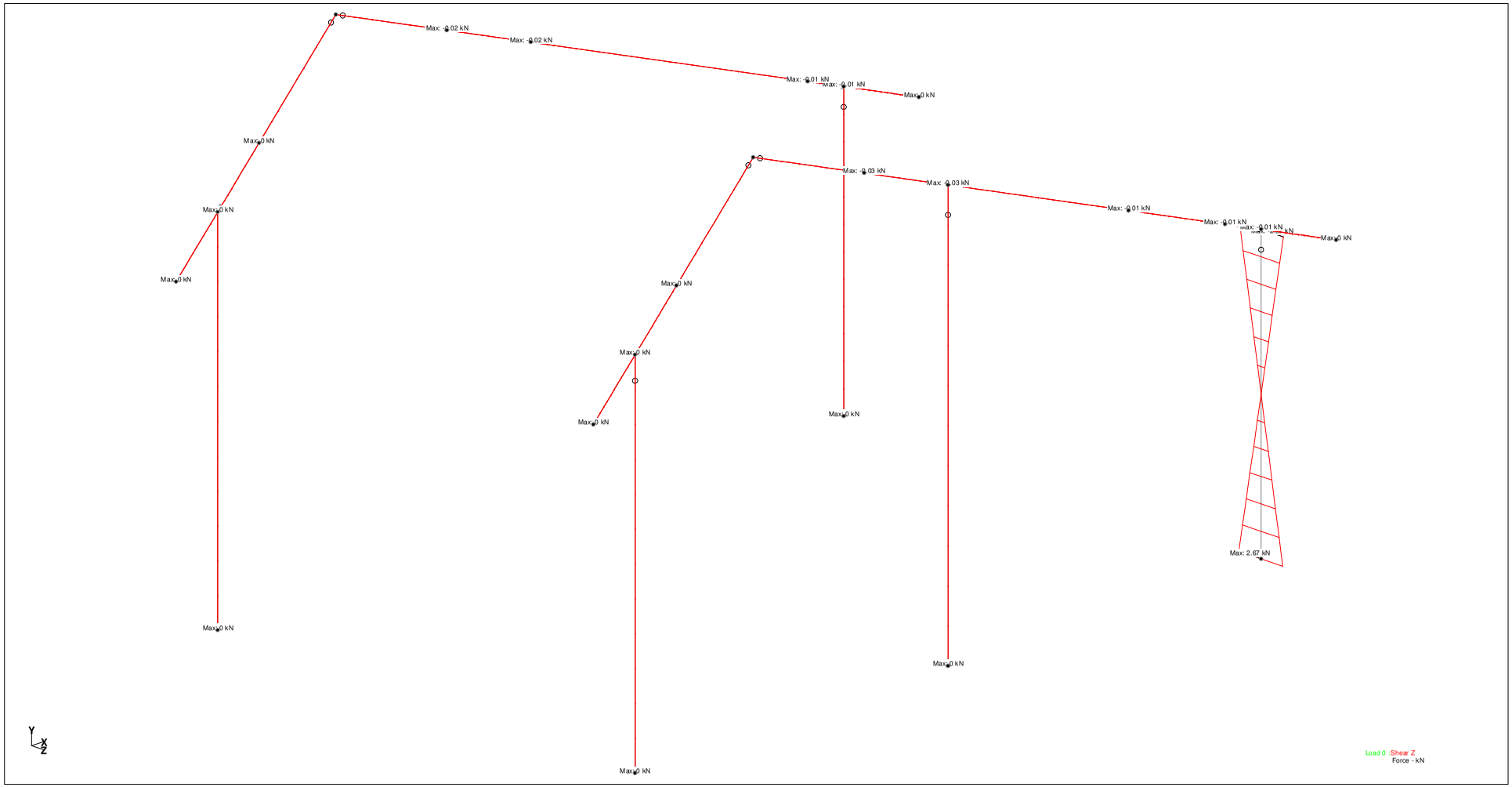
omhullende momentenlijnen M_Z

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **36**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



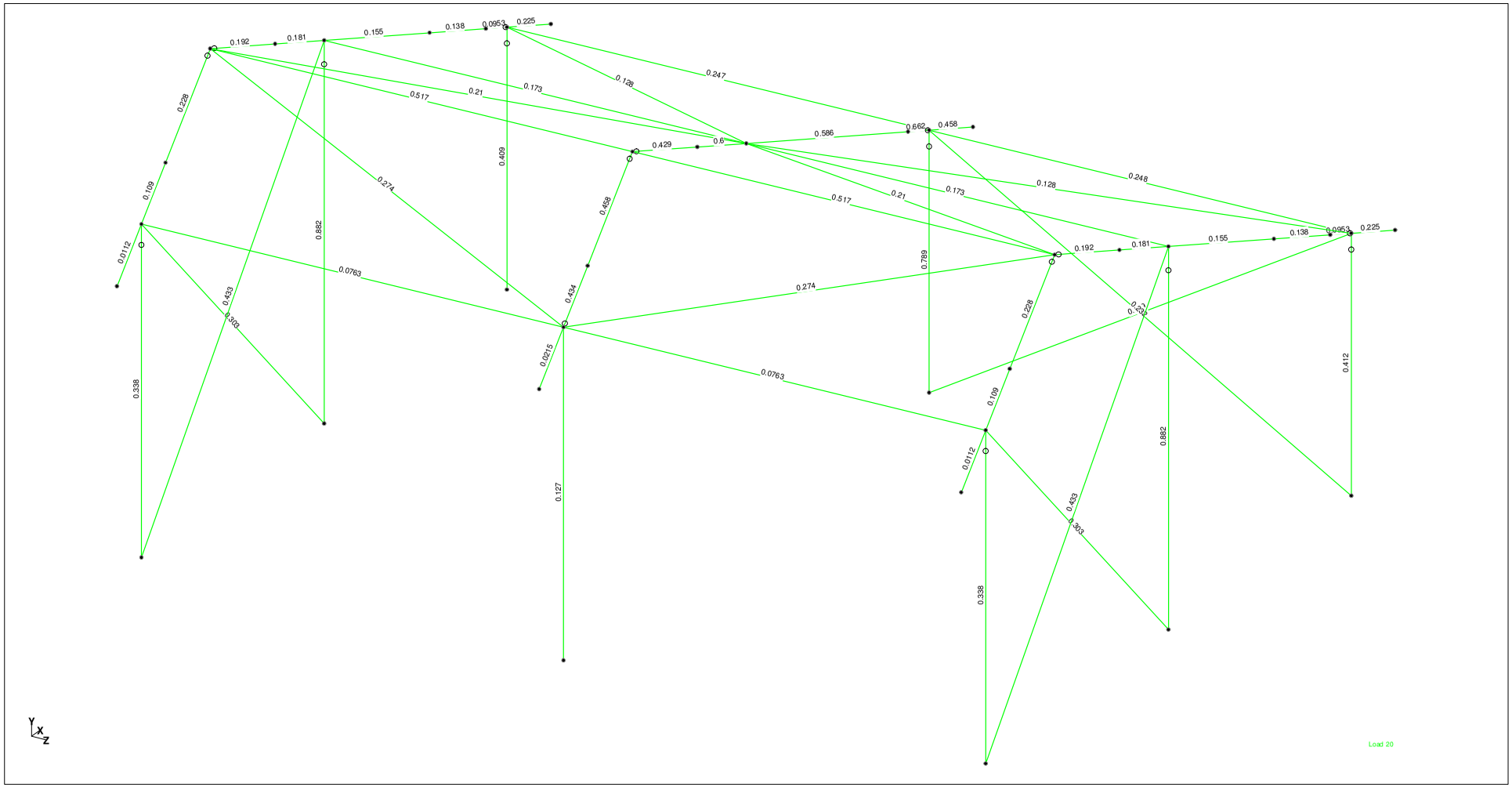
omhullende dwarskrachtenlijnen Fy

Software licensed to Engineering **KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **37**	Rev
	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	



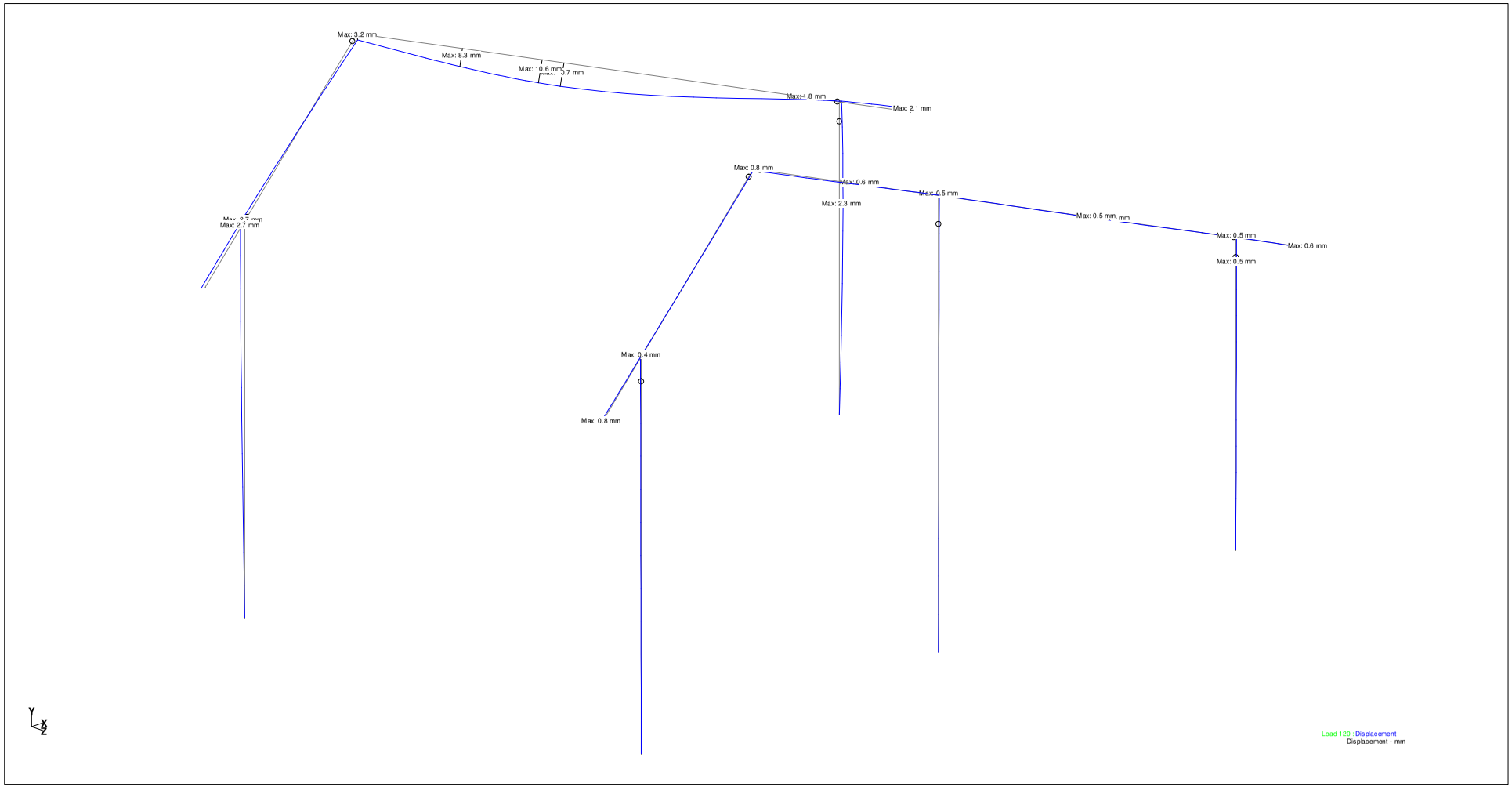
omhullende dwarskrachtenlijnen F_Z

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **38**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



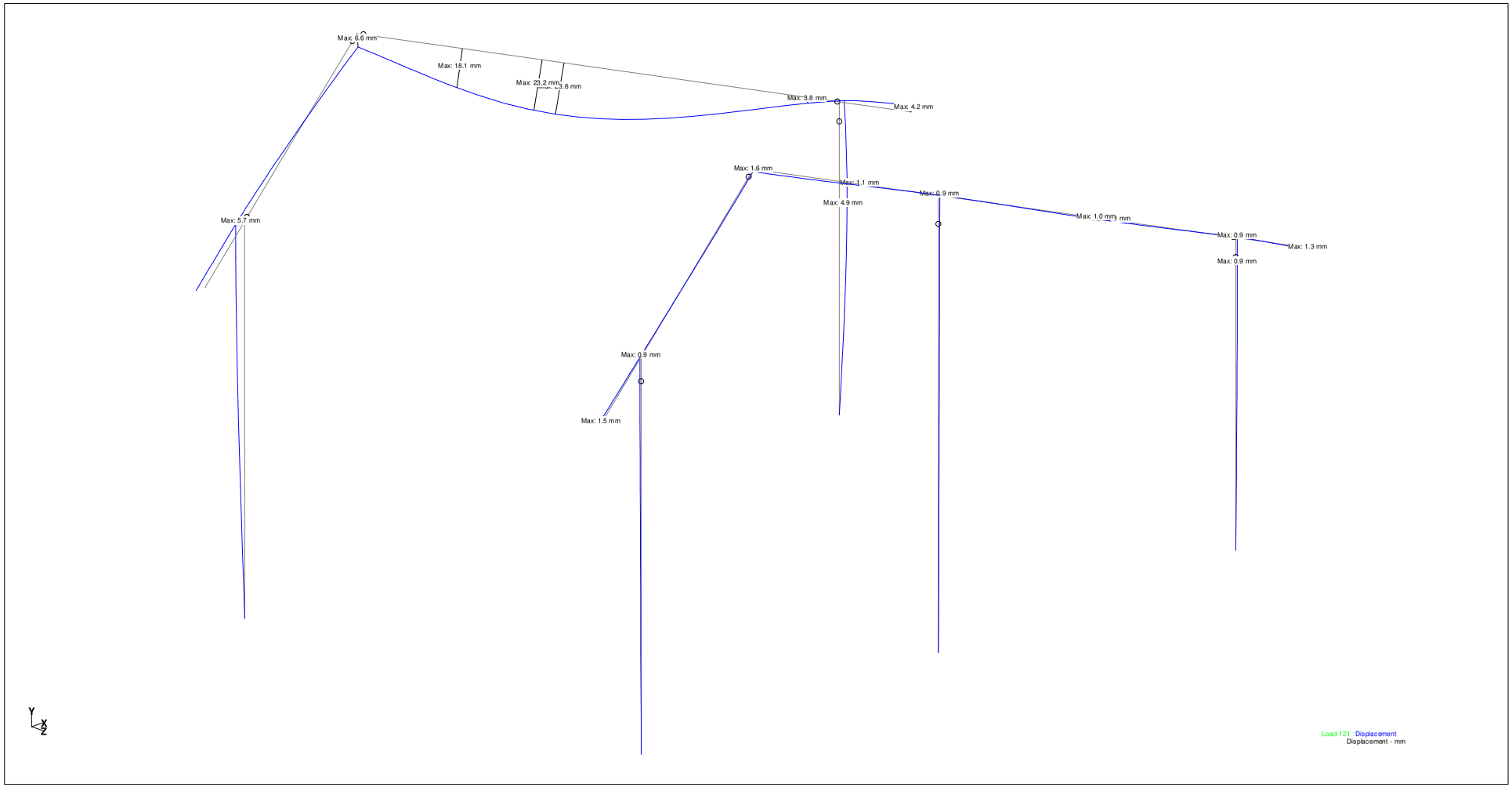
unity checks

Software licensed to Engineering **KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **39**	Rev
	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	



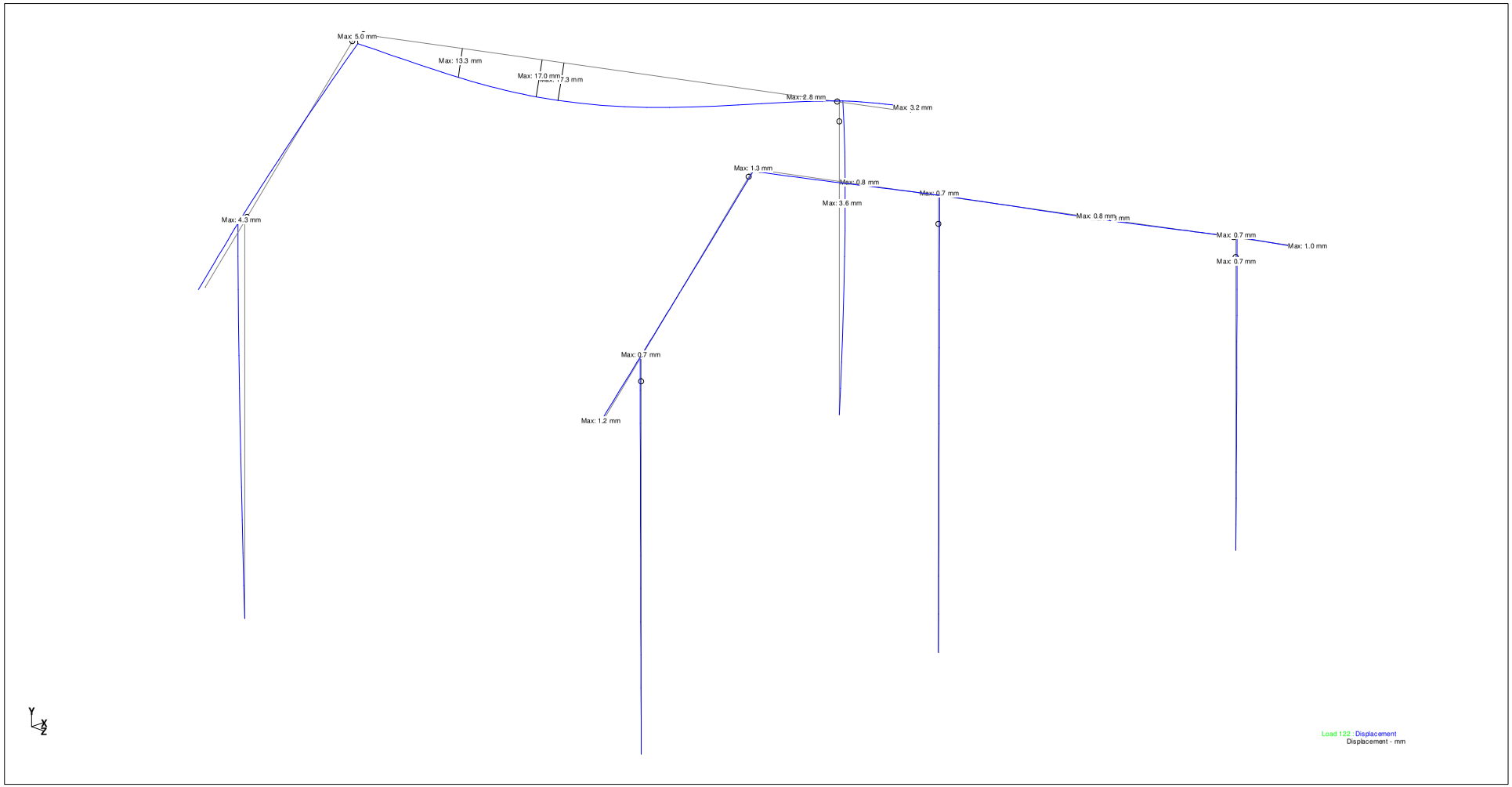
verplaatsingen tgv BG120: BGT1

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **40**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



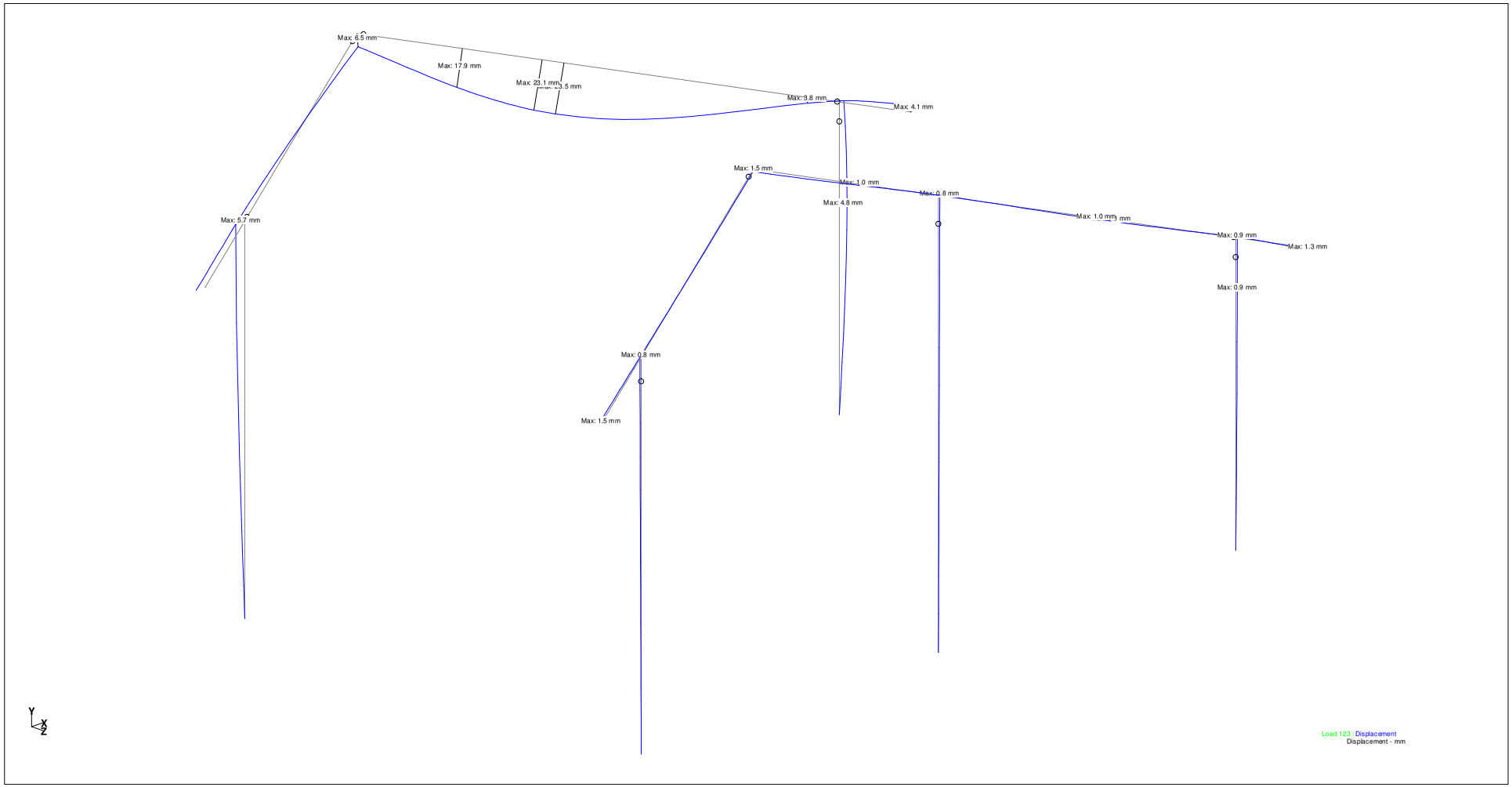
verplaatsingen tgv BG121: BGT2

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **41**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



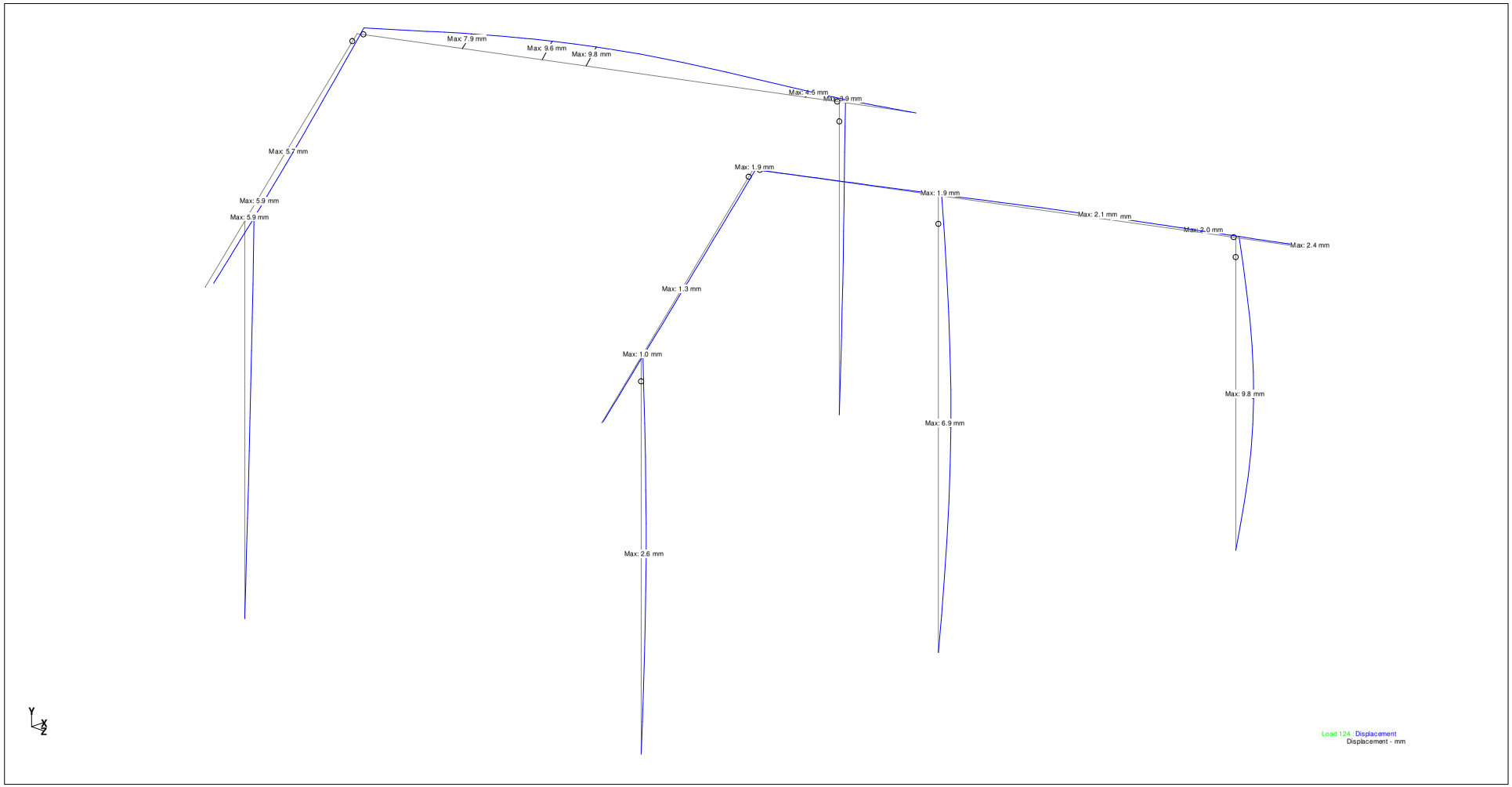
verplaatsingen tgv BG122: BGT3

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **42**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



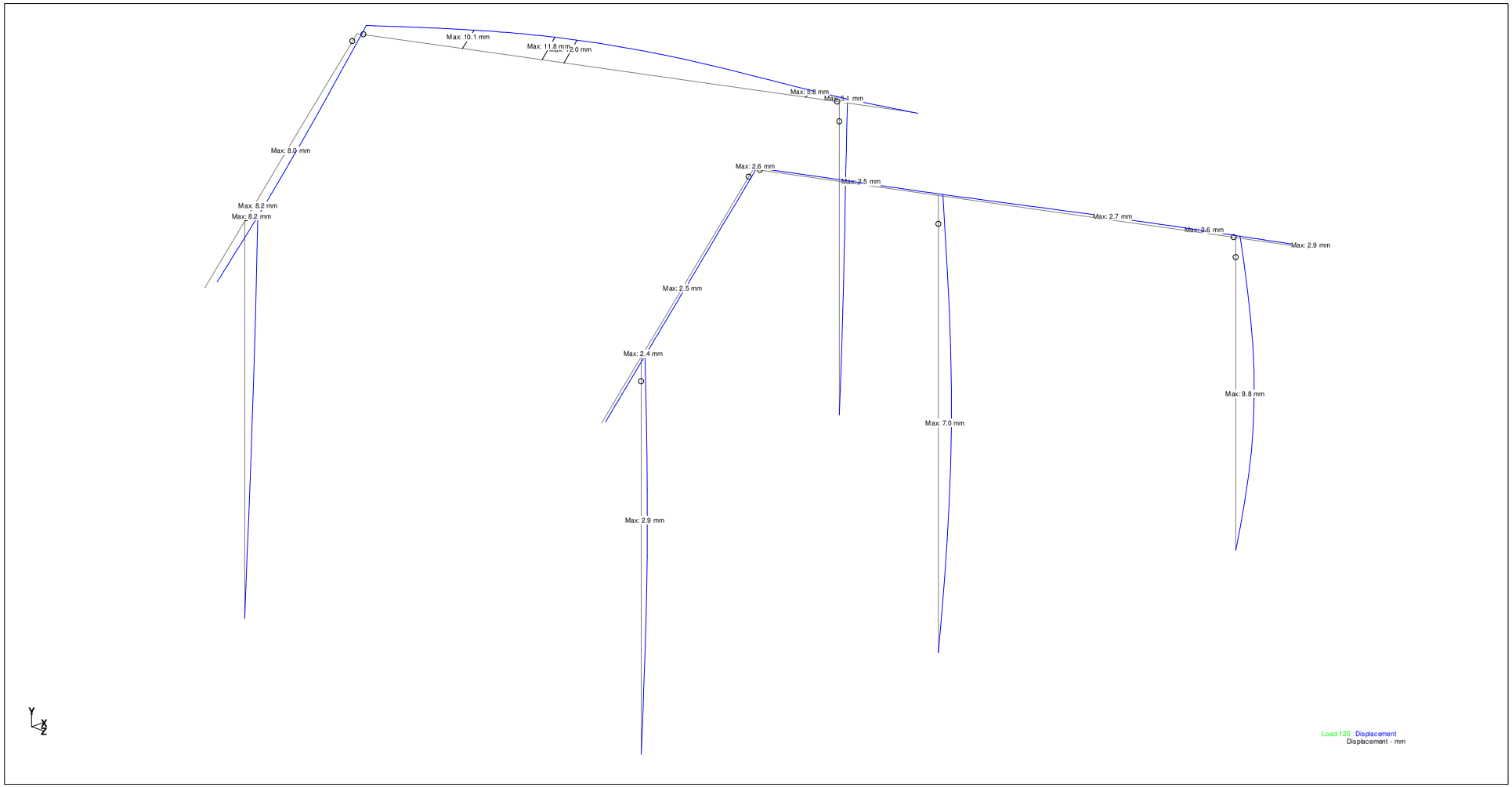
verplaatsingen tgv BG123: BGT4

Software licensed to Engineering **KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **43**	Rev
	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	



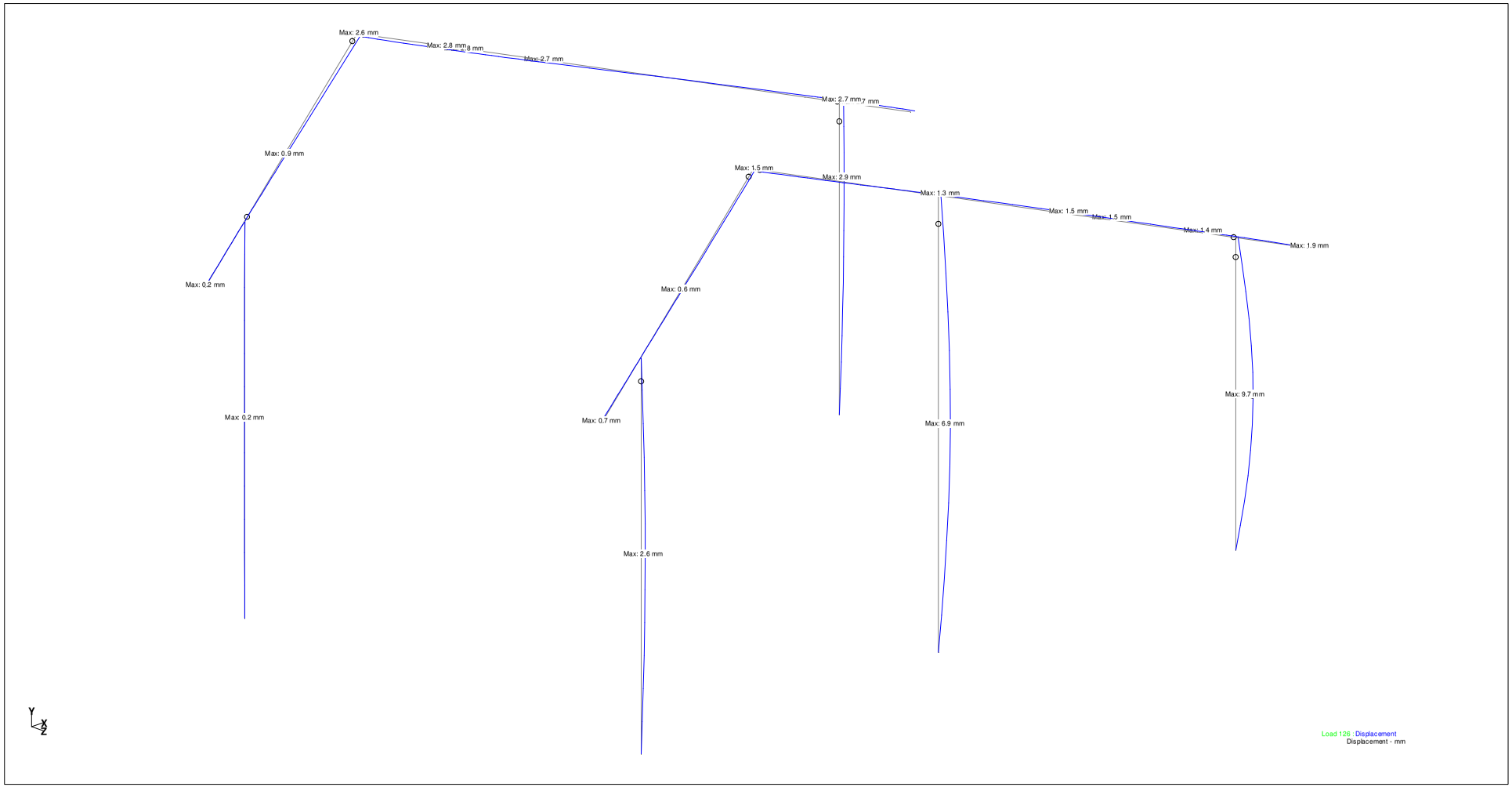
verplaatsingen tgv BG124: BGT5

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **44**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



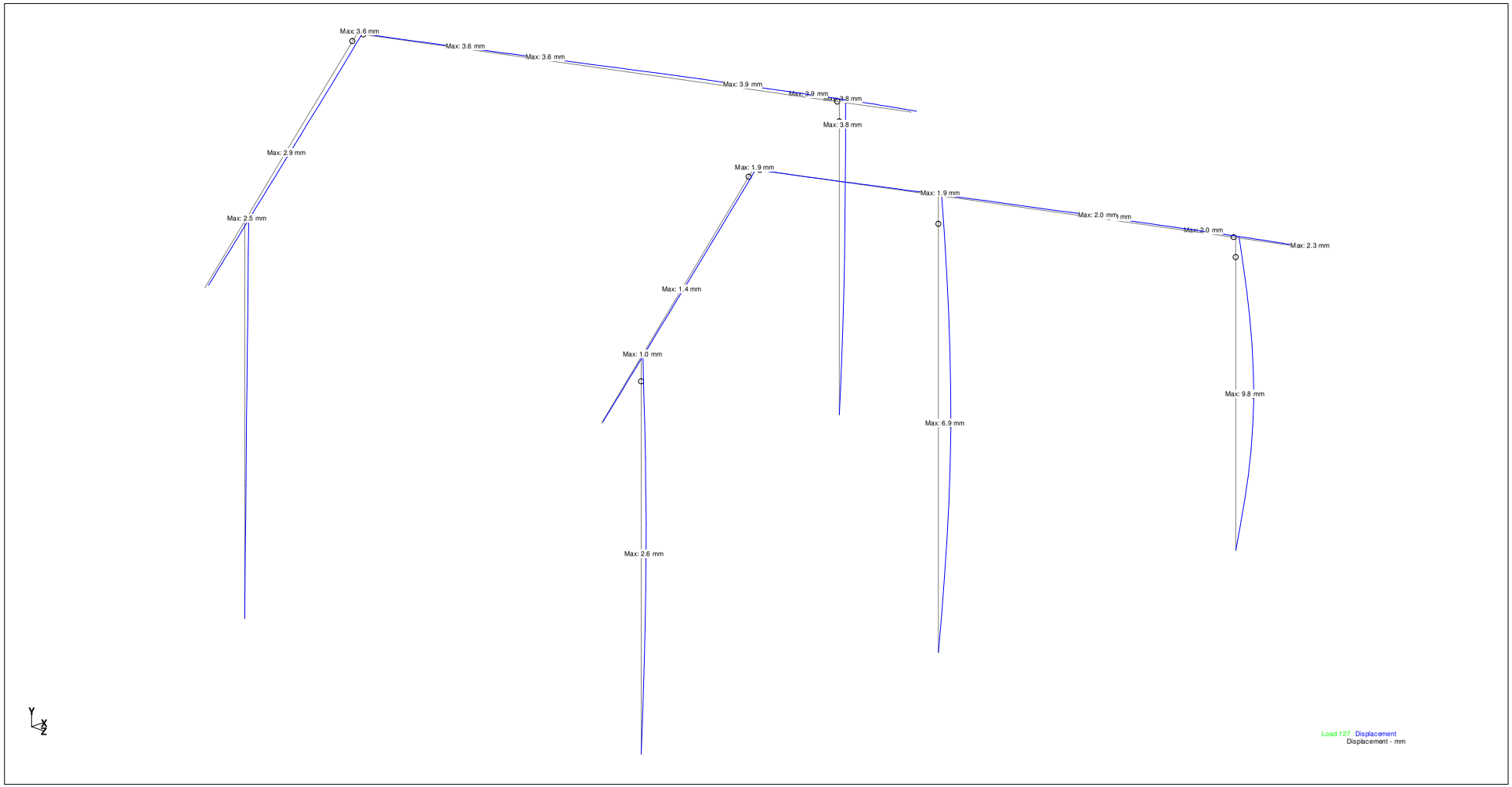
verplaatsingen tgv BG125: BGT6

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **45**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



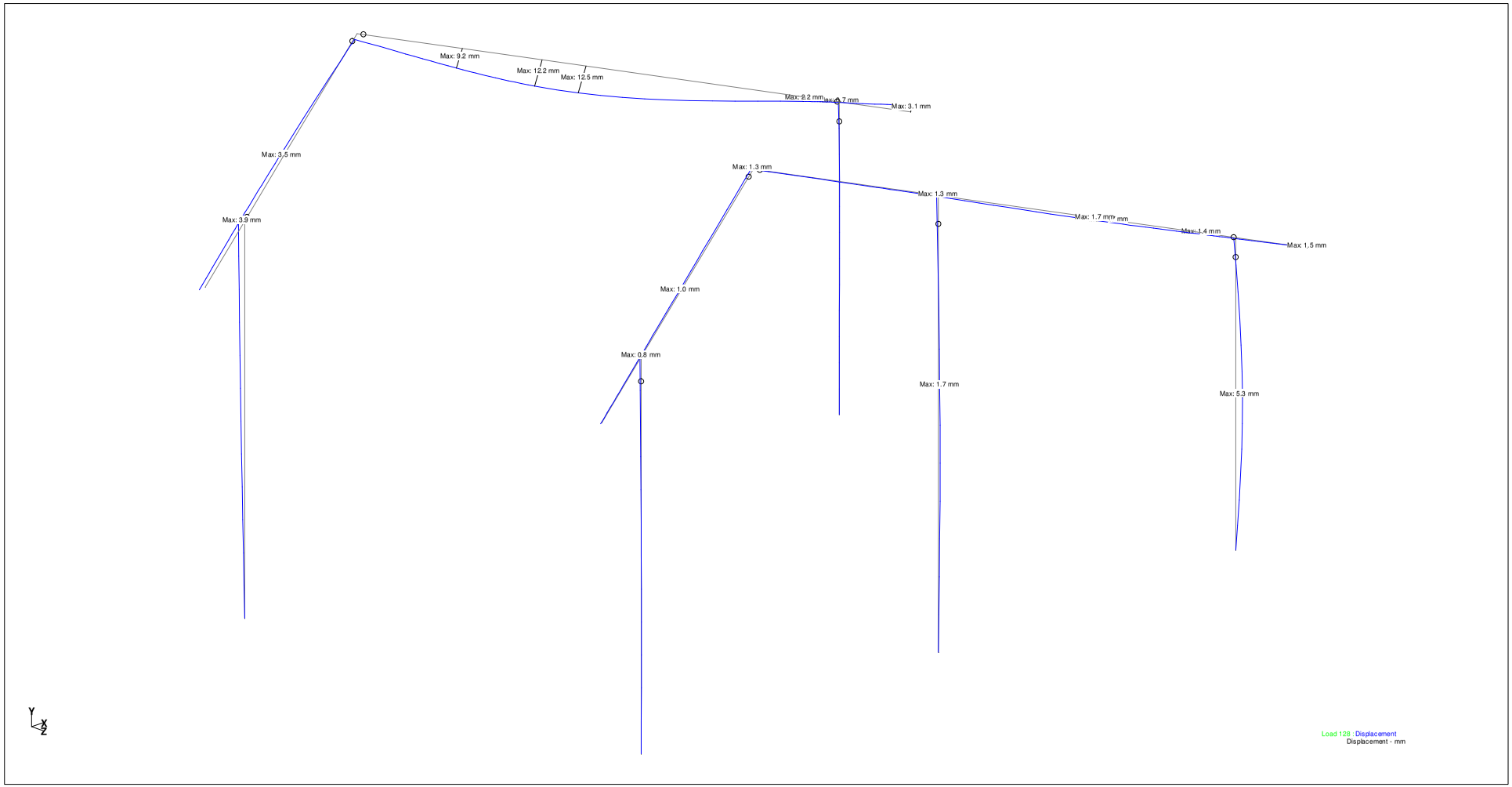
verplaatsingen tgv BG126: BGT7

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **46**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



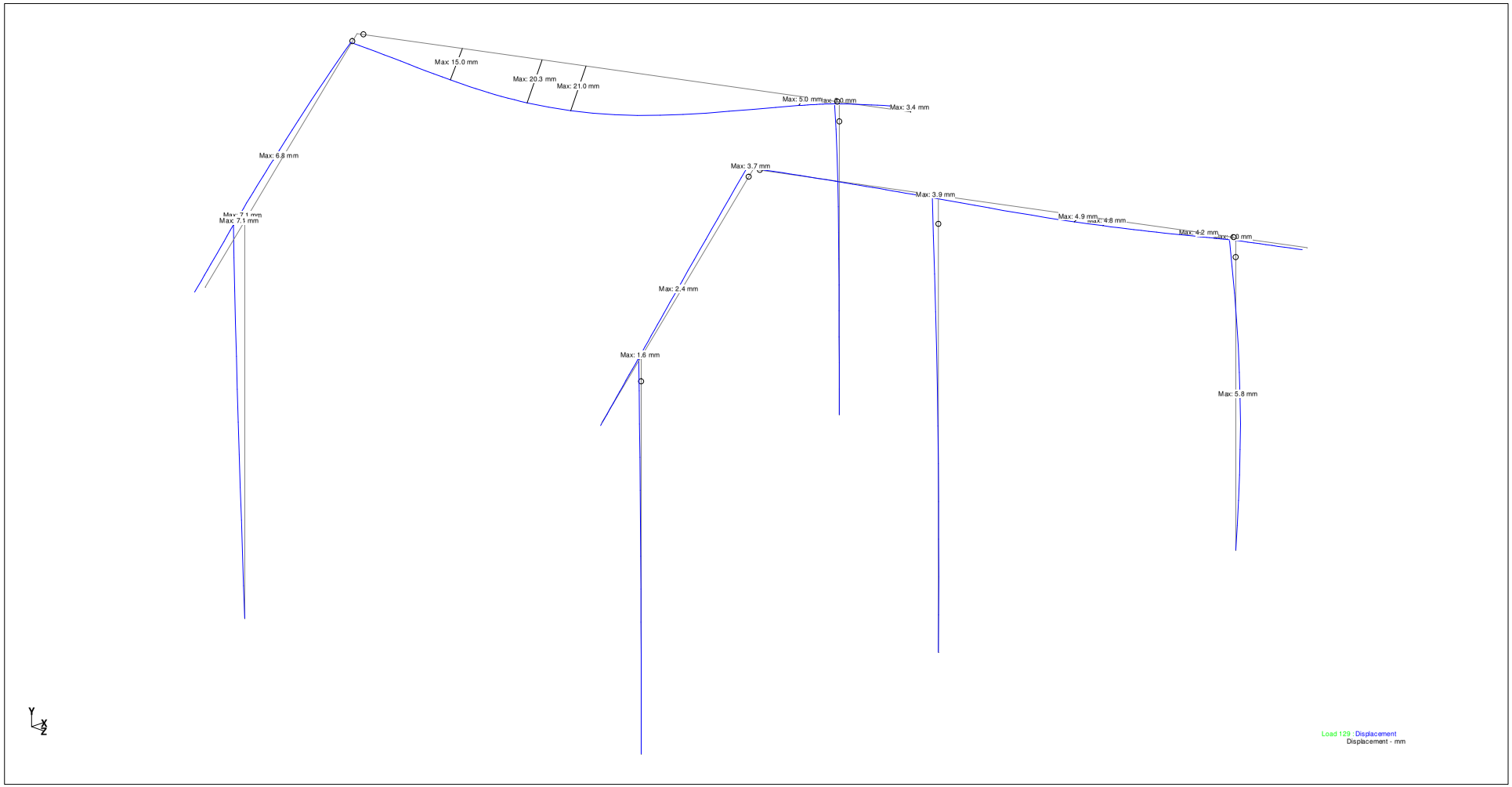
verplaatsingen tgv BG127: BGT8

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **47**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



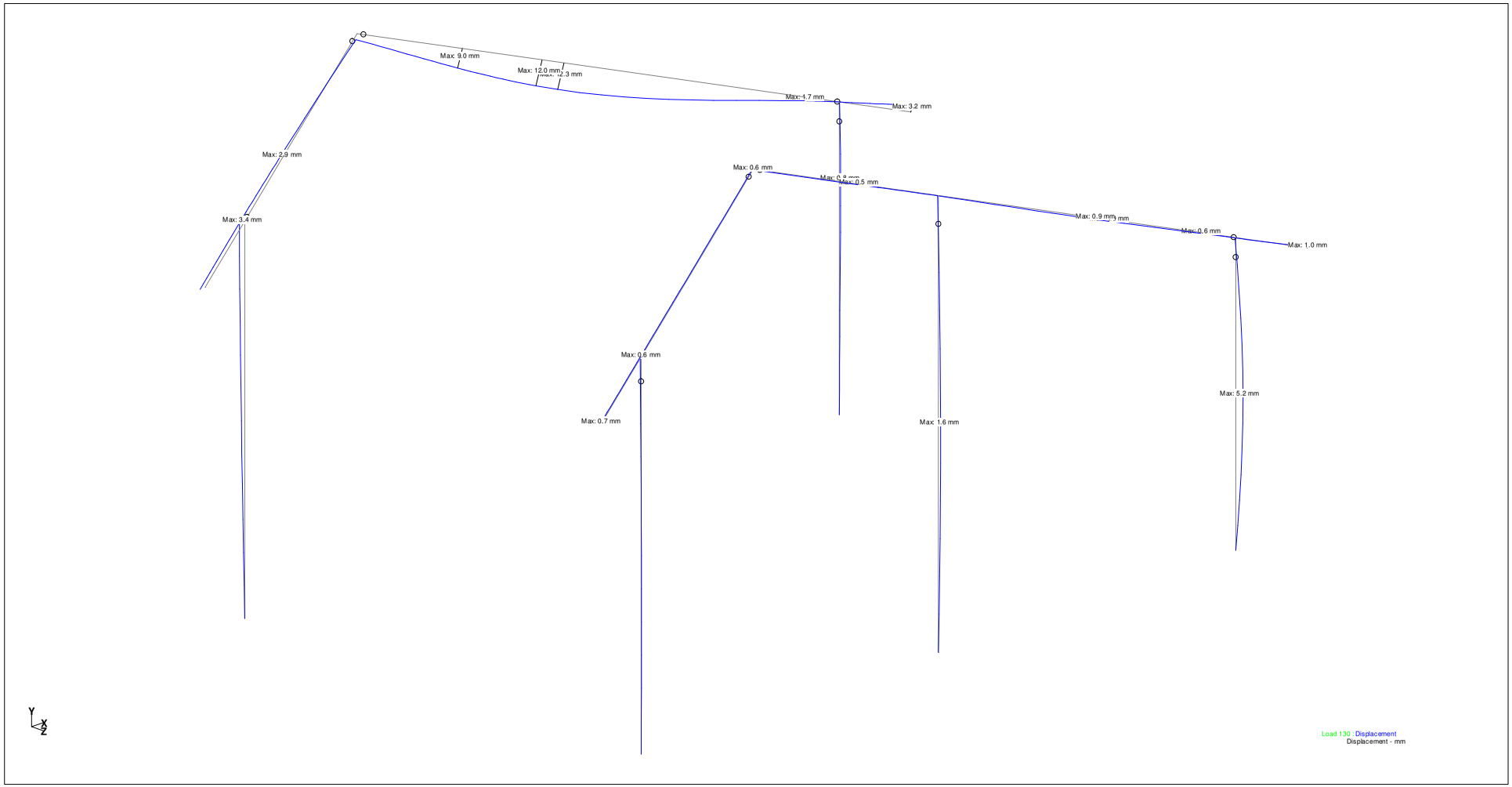
verplaatsingen tgv BG128: BGT9

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **48**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



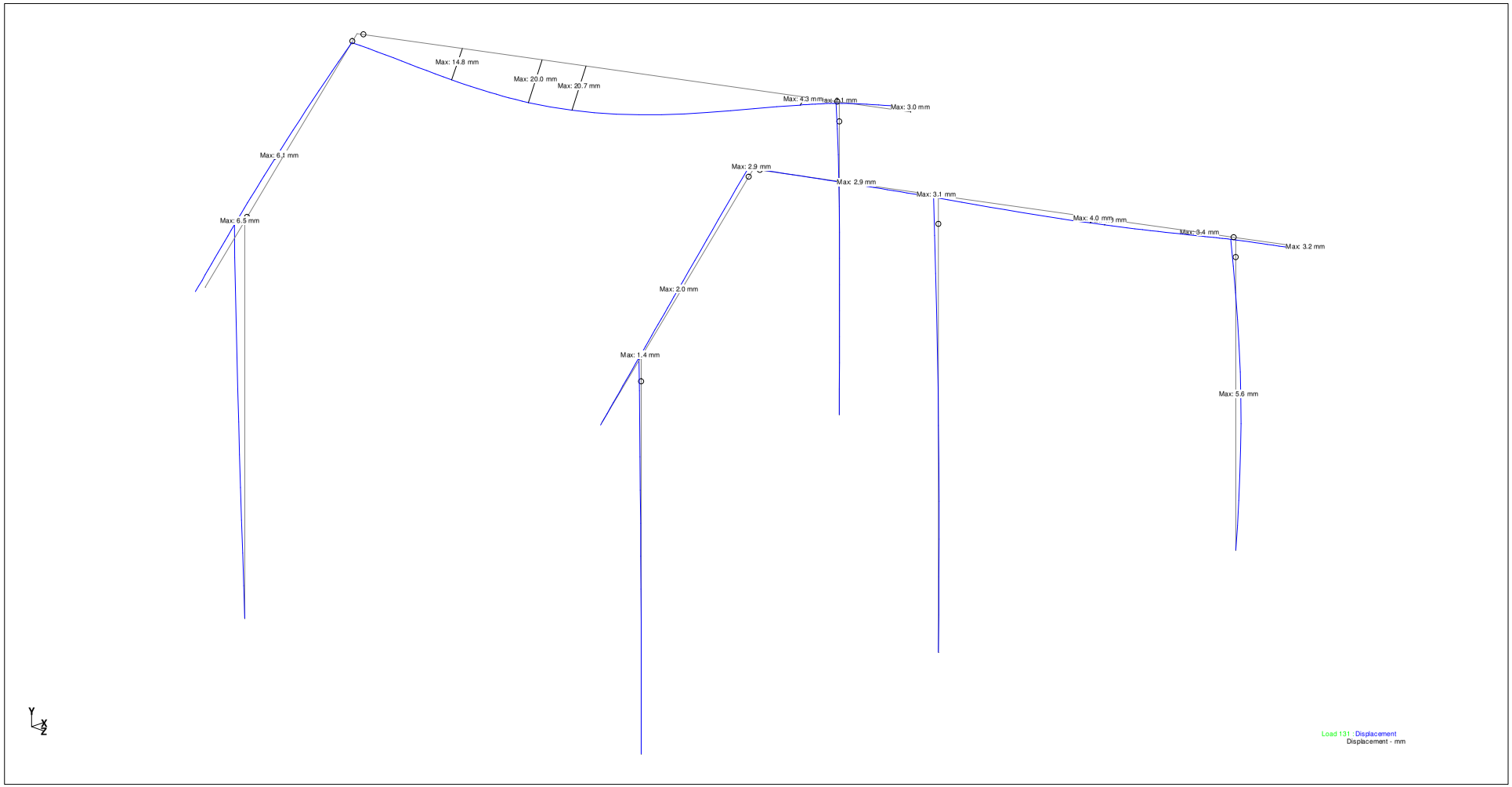
verplaatsingen tgv BG129: BGT10

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **49**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



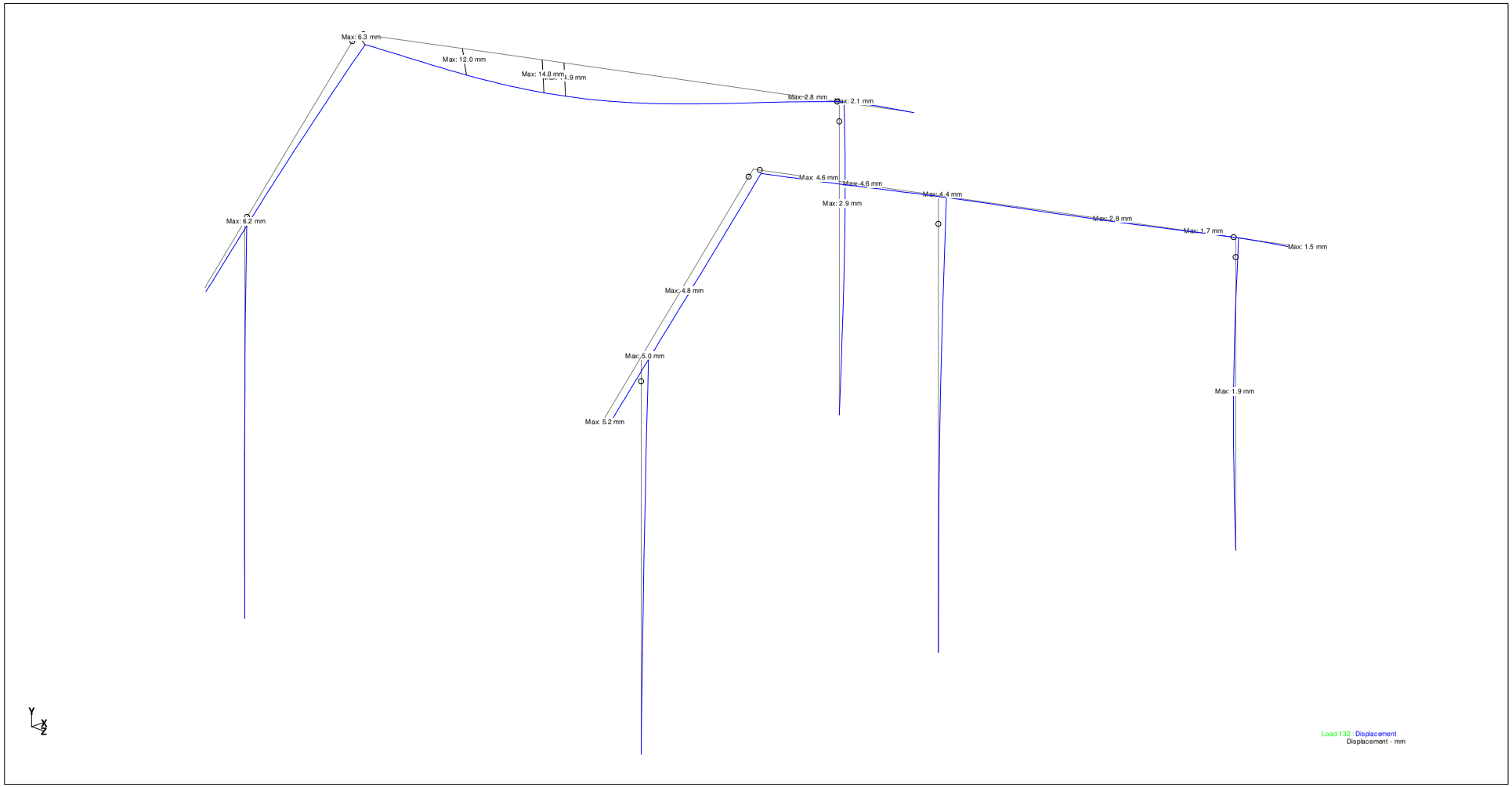
verplaatsingen tgv BG130: BGT11

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **50**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



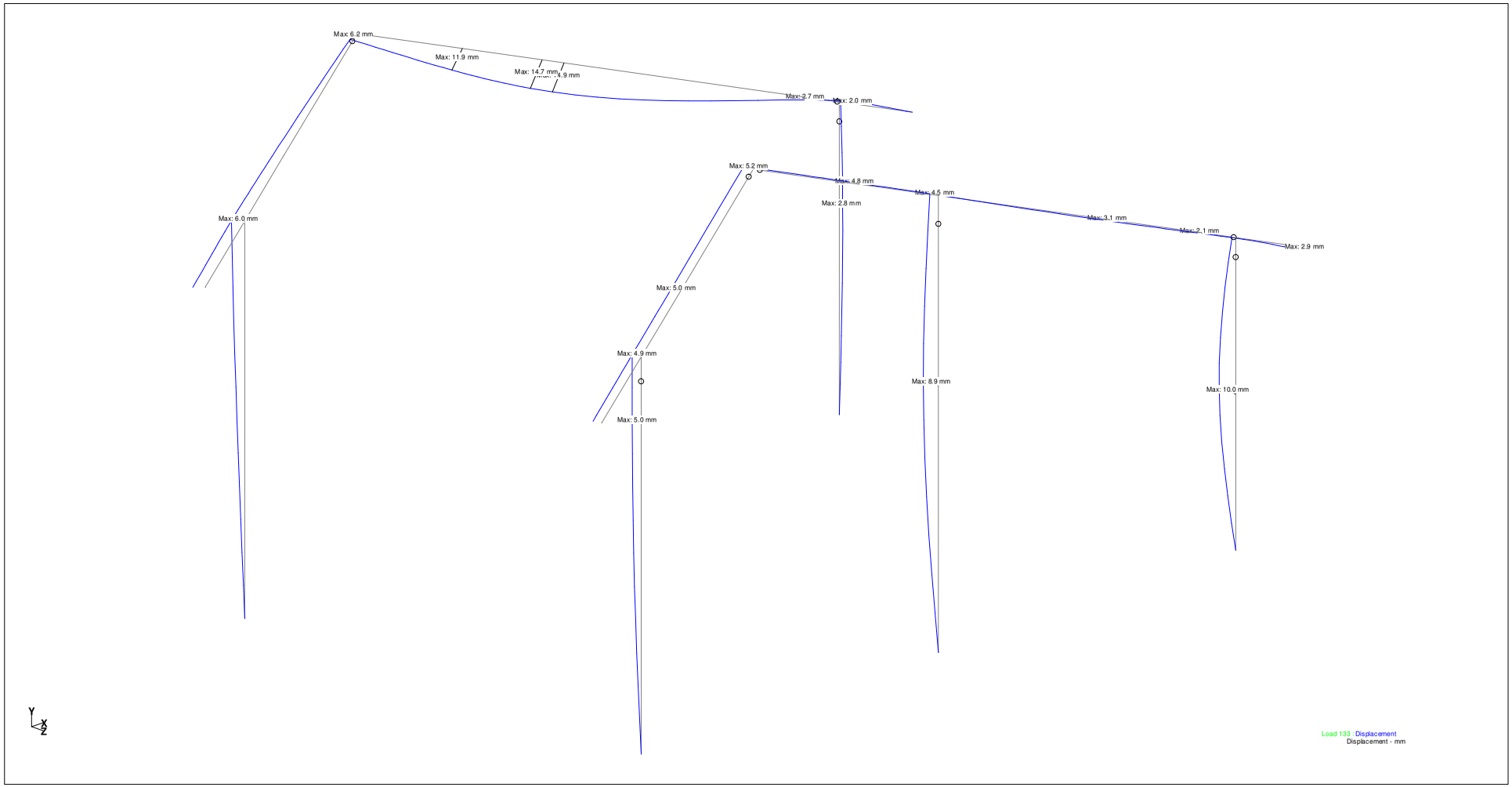
verplaatsingen tgv BG131: BGT12

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **51**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



verplaatsingen tgv BG132: BGT13

Software licensed to Engineering **KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **52**	Rev
	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	



verplaatsingen tgv BG133: BGT14

10.2 - nummerieke computer in- en uitvoer

KLOEZE bv ENGINEERING Software licensed to Engineering	Job No 9111-011	Sheet No 1	Rev
	Part Staalconstructie		
Job Title Nieuwbouw schuur	Ref		
	By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen	File 9111-011.std	Date/Time 08-Jul-2015 14:01	

Job Information

	Engineer	Checked	Approved
Name:	AdJ	PC	PC
Date:	07-Jul-15	08-Jul-15	08-Jul-15

Structure Type	SPACE FRAME

Number of Nodes	37	Highest Node	44
Number of Elements	54	Highest Beam	68

Number of Basic Load Cases	56
Number of Combination Load Cases	0

Included in this printout are data for:

View	staafnummers tbv staafcontroles

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	EG
Primary	2	BB DAK + WAND
Primary	3	SNEEUW1
Primary	4	SNEEUW2
Primary	5	SNEEUW3
Primary	6	WIND X1
Primary	7	WIND X2
Primary	8	WIND X3
Primary	9	WIND X4
Primary	10	WIND -X1
Primary	11	WIND -X2
Primary	12	WIND -X3
Primary	13	WIND -X4
Primary	14	WIND Z
Primary	15	WIND -Z
Primary	16	OVERDRUK WIND X
Primary	17	ONDERDRUK WIND -X
Primary	18	ONDERDRUK WIND Z
Primary	20	UGT1
Primary	21	UGT2
Primary	22	UGT3
Primary	23	UGT4
Primary	24	UGT5
Primary	25	UGT6
Primary	26	UGT7
Primary	27	UGT8
Primary	28	UGT9
Primary	29	UGT10
Primary	30	UGT11
Primary	31	UGT12
Primary	32	UGT13
Primary	33	UGT14
Primary	34	UGT15
Primary	35	UGT16
Primary	36	UGT17
Primary	37	UGT18
Primary	38	UGT19
Primary	39	UGT20
Primary	40	UGT21
Primary	41	UGT22
Primary	42	UGT23
Primary	43	UGT24
Primary	120	BGT1
Primary	121	BGT2
Primary	122	BGT3
Primary	123	BGT4
Primary	124	BGT5
Primary	125	BGT6
Primary	126	BGT7
Primary	127	BGT8
Primary	128	BGT9
Primary	129	BGT10
Primary	130	BGT11
Primary	131	BGT12
Primary	132	BGT13
Primary	133	BGT14

Section Properties

Prop	Section	Area (cm^2)	I_{yy} (cm^4)	I_{zz} (cm^4)	J (cm^4)	Material
1	IPE160	20.100	68.000	869.000	2.851	STEEL
2	PS50X6	0.000	0.000	0.000	0.000	MATERIAL1
3	IPE160	20.100	68.000	869.000	2.851	STEEL
4	HE180A	45.300	925.000	2.51E+3	11.451	MATERIAL1
5	IPE160	20.100	68.000	869.000	2.851	STEEL
6	L50X5	4.800	17.811	4.692	0.406	MATERIAL1
7	KK70X3	7.880	58.460	58.460	90.229	STEEL
8	KK70X3	7.880	58.460	58.460	90.229	STEEL

Materials

Mat	Name	E (kN/mm²)	v	Density (kg/m³)	α (/°C)
1	STEEL	205.000	0.300	7.83E+3	12E -6
2	STAINLESSSTEEL	197.930	0.300	7.83E+3	18E -6
3	ALUMINUM	68.948	0.330	2.71E+3	23E -6
4	MATERIAL1	205.000	0.300	7.85E+3	12E-12
5	CONCRETE	21.718	0.170	2.4E+3	10E -6

Supports

Node	X (kN/mm)	Y (kN/mm)	Z (kN/mm)	rX (kN˙m/deg)	rY (kN˙m/deg)	rZ (kN˙m/deg)
25	Fixed	Fixed	Fixed	-	0.001	-
26	Fixed	Fixed	Fixed	-	0.001	-
27	Fixed	Fixed	Fixed	-	0.001	-
28	Fixed	Fixed	Fixed	-	0.001	-
29	Fixed	Fixed	Fixed	-	0.001	-

Releases

Beam ends not shown in this table are fixed in all directions.

Beam	Node	x	y	z	rx	ry	rz
25	4	Fixed	Fixed	Fixed	Spring	Spring	Spring
26	2	Fixed	Fixed	Fixed	Spring	Spring	Spring
27	21	Fixed	Fixed	Fixed	Fixed	Pin	Pin
28	13	Fixed	Fixed	Fixed	Fixed	Pin	Pin
44	2	Fixed	Fixed	Fixed	Spring	Spring	Spring
48	4	Fixed	Fixed	Fixed	Spring	Spring	Spring
55	23	Fixed	Fixed	Fixed	Fixed	Pin	Spring
56	17	Fixed	Fixed	Fixed	Spring	Spring	Spring
58	16	Fixed	Fixed	Fixed	Spring	Spring	Spring
62	17	Fixed	Fixed	Fixed	Spring	Spring	Spring
64	16	Fixed	Fixed	Fixed	Spring	Spring	Spring

Primary Load Cases

Number	Name	Type
1	EG	None
2	BB DAK + WAND	None
3	SNEEUW1	None
4	SNEEUW2	None
5	SNEEUW3	None
6	WIND X1	None
7	WIND X2	None
8	WIND X3	None
9	WIND X4	None
10	WIND -X1	None
11	WIND -X2	None
12	WIND -X3	None
13	WIND -X4	None
14	WIND Z	None
15	WIND -Z	None
16	OVERDRUK WIND X	None
17	ONDERDRUK WIND -X	None
18	ONDERDRUK WIND Z	None
20	UGT1	None
21	UGT2	None
22	UGT3	None
23	UGT4	None
24	UGT5	None
25	UGT6	None
26	UGT7	None
27	UGT8	None
28	UGT9	None
29	UGT10	None
30	UGT11	None
31	UGT12	None
32	UGT13	None
33	UGT14	None
34	UGT15	None
35	UGT16	None
36	UGT17	None
37	UGT18	None
38	UGT19	None
39	UGT20	None
40	UGT21	None
41	UGT22	None
42	UGT23	None
43	UGT24	None
120	BGT1	None
121	BGT2	None
122	BGT3	None
123	BGT4	None
124	BGT5	None
125	BGT6	None

Primary Load Cases Cont...

Number	Name	Type
126	BGT7	None
127	BGT8	None
128	BGT9	None
129	BGT10	None
130	BGT11	None
131	BGT12	None
132	BGT13	None
133	BGT14	None

1 EG : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.020	ALL

2 BB DAK + WAND : Beam Loads

Beam	Type	Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI kN/m	GY	-1.270	-	-	-	-
8	UNI kN/m	GY	-0.640	-	-	-	-
15	UNI kN/m	GY	-0.640	-	-	-	-
16	UNI kN/m	GY	-1.270	-	-	-	-
25	UNI kN/m	GY	-0.690	-	-	-	-
26	UNI kN/m	GY	-0.690	-	-	-	-
27	UNI kN/m	GY	-0.690	-	-	-	-
28	UNI kN/m	GY	-0.350	-	-	-	-
44	UNI kN/m	GY	-0.640	-	-	-	-
45	UNI kN/m	GY	-0.640	-	-	-	-
48	UNI kN/m	GY	-1.270	-	-	-	-
49	UNI kN/m	GY	-1.270	-	-	-	-
50	UNI kN/m	GY	-0.640	-	-	-	-
55	UNI kN/m	GY	-1.270	-	-	-	-
56	UNI kN/m	GY	-0.640	-	-	-	-
58	UNI kN/m	GY	-1.270	-	-	-	-
59	UNI kN/m	GY	-0.640	-	-	-	-
61	UNI kN/m	GY	-1.270	-	-	-	-
62	UNI kN/m	GY	-0.640	-	-	-	-
64	UNI kN/m	GY	-1.270	-	-	-	-
65	UNI kN/m	GY	-0.640	-	-	-	-

3 SNEEUW1 : Beam Loads

Beam	Type	Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI kN/m	GY	-2.000	-	-	-	-
8	UNI kN/m	GY	-0.380	-	-	-	-
15	UNI kN/m	GY	-1.000	-	-	-	-
16	UNI kN/m	GY	-0.750	-	-	-	-
44	UNI kN/m	GY	-1.000	-	-	-	-
45	UNI kN/m	GY	-1.000	-	-	-	-
48	UNI kN/m	GY	-2.000	-	-	-	-
49	UNI kN/m	GY	-2.000	-	-	-	-
50	UNI kN/m	GY	-0.380	-	-	-	-
55	UNI kN/m	GY	-0.750	-	-	-	-
56	UNI kN/m	GY	-0.380	-	-	-	-
58	UNI kN/m	GY	-0.750	-	-	-	-
59	UNI kN/m	GY	-1.000	-	-	-	-
61	UNI kN/m	GY	-2.000	-	-	-	-
62	UNI kN/m	GY	-1.000	-	-	-	-
64	UNI kN/m	GY	-2.000	-	-	-	-
65	UNI kN/m	GY	-1.000	-	-	-	-

4 SNEEUW2 : Beam Loads

Beam	Type	Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI kN/m	GY	-1.000	-	-	-	-
8	UNI kN/m	GY	-0.380	-	-	-	-
15	UNI kN/m	GY	-0.500	-	-	-	-
16	UNI kN/m	GY	-0.750	-	-	-	-
44	UNI kN/m	GY	-0.500	-	-	-	-
45	UNI kN/m	GY	-0.500	-	-	-	-
48	UNI kN/m	GY	-1.000	-	-	-	-
49	UNI kN/m	GY	-1.000	-	-	-	-
50	UNI kN/m	GY	-0.380	-	-	-	-
55	UNI kN/m	GY	-0.750	-	-	-	-
56	UNI kN/m	GY	-0.380	-	-	-	-
58	UNI kN/m	GY	-0.750	-	-	-	-
59	UNI kN/m	GY	-0.500	-	-	-	-
61	UNI kN/m	GY	-1.000	-	-	-	-
62	UNI kN/m	GY	-0.500	-	-	-	-
64	UNI kN/m	GY	-1.000	-	-	-	-
65	UNI kN/m	GY	-0.500	-	-	-	-

5 SNEEUW3 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	GY	-2.000	-	-	-	-
8	UNI	kN/m	GY	-0.190	-	-	-	-
15	UNI	kN/m	GY	-1.000	-	-	-	-
16	UNI	kN/m	GY	-0.380	-	-	-	-
44	UNI	kN/m	GY	-1.000	-	-	-	-
45	UNI	kN/m	GY	-1.000	-	-	-	-
48	UNI	kN/m	GY	-2.000	-	-	-	-
49	UNI	kN/m	GY	-2.000	-	-	-	-
50	UNI	kN/m	GY	-0.190	-	-	-	-
55	UNI	kN/m	GY	-0.380	-	-	-	-
56	UNI	kN/m	GY	-0.190	-	-	-	-
58	UNI	kN/m	GY	-0.380	-	-	-	-
59	UNI	kN/m	GY	-1.000	-	-	-	-
61	UNI	kN/m	GY	-2.000	-	-	-	-
62	UNI	kN/m	GY	-1.000	-	-	-	-
64	UNI	kN/m	GY	-2.000	-	-	-	-
65	UNI	kN/m	GY	-1.000	-	-	-	-

6 WIND X1 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	-0.060	-	-	-	-
15	UNI	kN/m	Y	-0.030	-	-	-	-
25	UNI	kN/m	GX	0.990	-	-	-	-
26	UNI	kN/m	GZ	0.700	-	-	-	-
	UNI	kN/m	GX	0.500	-	-	-	-
27	UNI	kN/m	GZ	1.390	-	-	-	-
28	UNI	kN/m	GZ	1.110	-	-	-	-
44	UNI	kN/m	Y	0.470	-	-	-	-
45	UNI	kN/m	Y	0.470	-	-	-	-
48	UNI	kN/m	Y	0.930	-	-	-	-
49	UNI	kN/m	Y	0.930	-	-	-	-
59	UNI	kN/m	Y	0.470	-	-	-	-
61	UNI	kN/m	Y	0.930	-	-	-	-
62	UNI	kN/m	Y	0.960	-	-	-	-
64	UNI	kN/m	Y	1.920	-	-	-	-
65	UNI	kN/m	Y	0.470	-	-	-	-

7 WIND X2 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	-0.060	-	-	-	-
8	UNI	kN/m	Y	-0.810	-	-	-	-
15	UNI	kN/m	Y	-0.030	-	-	-	-
16	UNI	kN/m	Y	-1.620	-	-	-	-
25	UNI	kN/m	GX	0.990	-	-	-	-
26	UNI	kN/m	GZ	0.700	-	-	-	-
	UNI	kN/m	GX	0.500	-	-	-	-
27	UNI	kN/m	GZ	1.390	-	-	-	-
28	UNI	kN/m	GZ	1.110	-	-	-	-
44	UNI	kN/m	Y	0.470	-	-	-	-
45	UNI	kN/m	Y	0.470	-	-	-	-
48	UNI	kN/m	Y	0.930	-	-	-	-
49	UNI	kN/m	Y	0.930	-	-	-	-
50	UNI	kN/m	Y	-0.810	-	-	-	-
55	UNI	kN/m	Y	-1.620	-	-	-	-
56	UNI	kN/m	Y	-0.700	-	-	-	-
58	UNI	kN/m	Y	-1.390	-	-	-	-
59	UNI	kN/m	Y	0.470	-	-	-	-
61	UNI	kN/m	Y	0.930	-	-	-	-
62	UNI	kN/m	Y	0.960	-	-	-	-
64	UNI	kN/m	Y	1.920	-	-	-	-
65	UNI	kN/m	Y	0.470	-	-	-	-

8 WIND X3 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	-0.990	-	-	-	-
15	UNI	kN/m	Y	-0.500	-	-	-	-
25	UNI	kN/m	GX	0.990	-	-	-	-
26	UNI	kN/m	GZ	0.700	-	-	-	-
	UNI	kN/m	GX	0.500	-	-	-	-
27	UNI	kN/m	GZ	1.390	-	-	-	-
28	UNI	kN/m	GZ	1.110	-	-	-	-

9 WIND X4 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	-0.990	-	-	-	-
8	UNI	kN/m	Y	-0.810	-	-	-	-
15	UNI	kN/m	Y	-0.500	-	-	-	-
16	UNI	kN/m	Y	-1.620	-	-	-	-
25	UNI	kN/m	GX	0.990	-	-	-	-
26	UNI	kN/m	GZ	0.700	-	-	-	-
	UNI	kN/m	GX	0.500	-	-	-	-
27	UNI	kN/m	GZ	1.390	-	-	-	-
28	UNI	kN/m	GZ	1.110	-	-	-	-
50	UNI	kN/m	Y	-0.810	-	-	-	-
55	UNI	kN/m	Y	-1.620	-	-	-	-
56	UNI	kN/m	Y	-0.700	-	-	-	-
58	UNI	kN/m	Y	-1.390	-	-	-	-

10 WIND -X1 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	3.200	-	-	-	-
8	UNI	kN/m	Y	0.240	-	-	-	-
15	UNI	kN/m	Y	1.680	-	-	-	-
16	UNI	kN/m	Y	0.470	-	-	-	-
25	UNI	kN/m	GX	-1.580	-	-	-	-
26	UNI	kN/m	GZ	1.110	-	-	-	-
	UNI	kN/m	GX	-0.790	-	-	-	-
27	UNI	kN/m	GZ	1.390	-	-	-	-
28	UNI	kN/m	GZ	0.700	-	-	-	-
44	UNI	kN/m	Y	0.890	-	-	-	-
45	UNI	kN/m	Y	0.320	-	-	-	-
48	UNI	kN/m	Y	1.620	-	-	-	-
49	UNI	kN/m	Y	0.630	-	-	-	-
50	UNI	kN/m	Y	0.240	-	-	-	-
55	UNI	kN/m	Y	0.470	-	-	-	-
56	UNI	kN/m	Y	0.350	-	-	-	-
58	UNI	kN/m	Y	0.700	-	-	-	-
59	UNI	kN/m	Y	0.320	-	-	-	-
61	UNI	kN/m	Y	0.630	-	-	-	-
62	UNI	kN/m	Y	0.320	-	-	-	-
64	UNI	kN/m	Y	0.630	-	-	-	-
65	UNI	kN/m	Y	0.320	-	-	-	-

11 WIND -X2 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	0.720	-	-	-	-
8	UNI	kN/m	Y	0.240	-	-	-	-
15	UNI	kN/m	Y	0.360	-	-	-	-
16	UNI	kN/m	Y	0.470	-	-	-	-
25	UNI	kN/m	GX	-1.580	-	-	-	-
26	UNI	kN/m	GZ	1.110	-	-	-	-
	UNI	kN/m	GX	-0.790	-	-	-	-
27	UNI	kN/m	GZ	1.390	-	-	-	-
28	UNI	kN/m	GZ	0.700	-	-	-	-
44	UNI	kN/m	Y	-0.430	-	-	-	-
45	UNI	kN/m	Y	-0.320	-	-	-	-
48	UNI	kN/m	Y	-0.860	-	-	-	-
49	UNI	kN/m	Y	-0.630	-	-	-	-
50	UNI	kN/m	Y	0.240	-	-	-	-
55	UNI	kN/m	Y	0.470	-	-	-	-
56	UNI	kN/m	Y	0.350	-	-	-	-
58	UNI	kN/m	Y	0.700	-	-	-	-
59	UNI	kN/m	Y	-0.320	-	-	-	-
61	UNI	kN/m	Y	-0.630	-	-	-	-
62	UNI	kN/m	Y	-0.320	-	-	-	-
64	UNI	kN/m	Y	-0.630	-	-	-	-
65	UNI	kN/m	Y	-0.320	-	-	-	-

12 WIND -X3 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	3.200	-	-	-	-
15	UNI	kN/m	Y	1.680	-	-	-	-
25	UNI	kN/m	GX	-1.580	-	-	-	-
26	UNI	kN/m	GZ	1.110	-	-	-	-
	UNI	kN/m	GX	-0.790	-	-	-	-
27	UNI	kN/m	GZ	1.390	-	-	-	-
28	UNI	kN/m	GZ	0.700	-	-	-	-
44	UNI	kN/m	Y	0.890	-	-	-	-
45	UNI	kN/m	Y	0.320	-	-	-	-
48	UNI	kN/m	Y	1.620	-	-	-	-
49	UNI	kN/m	Y	0.630	-	-	-	-
59	UNI	kN/m	Y	0.320	-	-	-	-
61	UNI	kN/m	Y	0.630	-	-	-	-
62	UNI	kN/m	Y	0.320	-	-	-	-
64	UNI	kN/m	Y	0.630	-	-	-	-
65	UNI	kN/m	Y	0.320	-	-	-	-

13 WIND -X4 : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	0.720	-	-	-	-
15	UNI	kN/m	Y	0.360	-	-	-	-
25	UNI	kN/m	GX	-1.580	-	-	-	-
26	UNI	kN/m	GZ	1.110	-	-	-	-
	UNI	kN/m	GX	-0.790	-	-	-	-
27	UNI	kN/m	GZ	1.390	-	-	-	-
28	UNI	kN/m	GZ	0.700	-	-	-	-
44	UNI	kN/m	Y	-0.430	-	-	-	-
45	UNI	kN/m	Y	-0.320	-	-	-	-
48	UNI	kN/m	Y	-0.860	-	-	-	-
49	UNI	kN/m	Y	-0.630	-	-	-	-
59	UNI	kN/m	Y	-0.320	-	-	-	-
61	UNI	kN/m	Y	-0.630	-	-	-	-
62	UNI	kN/m	Y	-0.320	-	-	-	-
64	UNI	kN/m	Y	-0.630	-	-	-	-
65	UNI	kN/m	Y	-0.320	-	-	-	-

14 WIND Z : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	-0.590	-	-	-	-
8	UNI	kN/m	Y	0.560	-	-	-	-
15	UNI	kN/m	Y	-0.020	-	-	-	-
16	UNI	kN/m	Y	1.390	-	-	-	-
25	UNI	kN/m	GX	1.850	-	-	-	-
26	UNI	kN/m	GZ	0.370	-	-	-	-
	UNI	kN/m	GX	0.580	-	-	-	-
27	UNI	kN/m	GZ	0.740	-	-	-	-
28	UNI	kN/m	GZ	0.370	-	-	-	-
44	UNI	kN/m	Y	0.560	-	-	-	-
45	UNI	kN/m	Y	0.560	-	-	-	-
48	UNI	kN/m	Y	1.260	-	-	-	-
49	UNI	kN/m	Y	1.260	-	-	-	-
50	UNI	kN/m	Y	0.560	-	-	-	-
55	UNI	kN/m	Y	1.390	-	-	-	-
56	UNI	kN/m	Y	0.560	-	-	-	-
58	UNI	kN/m	Y	1.390	-	-	-	-
59	UNI	kN/m	Y	0.560	-	-	-	-
61	UNI	kN/m	Y	1.260	-	-	-	-
62	UNI	kN/m	Y	0.560	-	-	-	-
64	UNI	kN/m	Y	1.260	-	-	-	-
65	UNI	kN/m	Y	0.560	-	-	-	-

15 WIND -Z : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	-0.590	-	-	-	-
8	UNI	kN/m	Y	1.110	-	-	-	-
15	UNI	kN/m	Y	-0.240	-	-	-	-
16	UNI	kN/m	Y	1.390	-	-	-	-
25	UNI	kN/m	GX	1.850	-	-	-	-
26	UNI	kN/m	GZ	-0.600	-	-	-	-
	UNI	kN/m	GX	1.210	-	-	-	-
27	UNI	kN/m	GZ	-1.180	-	-	-	-
28	UNI	kN/m	GZ	-0.600	-	-	-	-
44	UNI	kN/m	Y	0.970	-	-	-	-
45	UNI	kN/m	Y	1.010	-	-	-	-
48	UNI	kN/m	Y	1.260	-	-	-	-
49	UNI	kN/m	Y	1.260	-	-	-	-
50	UNI	kN/m	Y	1.110	-	-	-	-
55	UNI	kN/m	Y	1.390	-	-	-	-
56	UNI	kN/m	Y	1.110	-	-	-	-
58	UNI	kN/m	Y	1.390	-	-	-	-
59	UNI	kN/m	Y	0.970	-	-	-	-
61	UNI	kN/m	Y	1.260	-	-	-	-
62	UNI	kN/m	Y	1.010	-	-	-	-
64	UNI	kN/m	Y	1.260	-	-	-	-
65	UNI	kN/m	Y	1.010	-	-	-	-

16 OVERDRUK WIND X : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	1.670	-	-	-	-
8	UNI	kN/m	Y	0.840	-	-	-	-
15	UNI	kN/m	Y	0.840	-	-	-	-
16	UNI	kN/m	Y	1.670	-	-	-	-
25	UNI	kN/m	GX	1.670	-	-	-	-
26	UNI	kN/m	GZ	0.630	-	-	-	-
	UNI	kN/m	GX	0.840	-	-	-	-
27	UNI	kN/m	GZ	1.250	-	-	-	-
28	UNI	kN/m	GZ	0.630	-	-	-	-
44	UNI	kN/m	Y	0.840	-	-	-	-
45	UNI	kN/m	Y	0.840	-	-	-	-
48	UNI	kN/m	Y	1.670	-	-	-	-
49	UNI	kN/m	Y	1.670	-	-	-	-
50	UNI	kN/m	Y	0.840	-	-	-	-
55	UNI	kN/m	Y	1.670	-	-	-	-
56	UNI	kN/m	Y	0.840	-	-	-	-
58	UNI	kN/m	Y	1.670	-	-	-	-
59	UNI	kN/m	Y	0.840	-	-	-	-
61	UNI	kN/m	Y	1.670	-	-	-	-
62	UNI	kN/m	Y	0.840	-	-	-	-
64	UNI	kN/m	Y	1.670	-	-	-	-
65	UNI	kN/m	Y	0.840	-	-	-	-

17 ONDERDRUK WIND -X : Beam Loads

Beam	Type		Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI	kN/m	Y	-1.040	-	-	-	-
8	UNI	kN/m	Y	-0.520	-	-	-	-
15	UNI	kN/m	Y	-0.520	-	-	-	-
16	UNI	kN/m	Y	-1.040	-	-	-	-
25	UNI	kN/m	GX	-1.040	-	-	-	-
26	UNI	kN/m	GZ	-0.390	-	-	-	-
	UNI	kN/m	GX	-0.520	-	-	-	-
27	UNI	kN/m	GZ	-0.780	-	-	-	-
28	UNI	kN/m	GZ	-0.390	-	-	-	-
44	UNI	kN/m	Y	-0.520	-	-	-	-
45	UNI	kN/m	Y	-0.520	-	-	-	-
48	UNI	kN/m	Y	-1.040	-	-	-	-
49	UNI	kN/m	Y	-1.040	-	-	-	-
50	UNI	kN/m	Y	-0.520	-	-	-	-
55	UNI	kN/m	Y	-1.040	-	-	-	-
56	UNI	kN/m	Y	-0.520	-	-	-	-
58	UNI	kN/m	Y	-1.040	-	-	-	-
59	UNI	kN/m	Y	-0.520	-	-	-	-
61	UNI	kN/m	Y	-1.040	-	-	-	-
62	UNI	kN/m	Y	-0.520	-	-	-	-
64	UNI	kN/m	Y	-1.040	-	-	-	-
65	UNI	kN/m	Y	-0.520	-	-	-	-

18 ONDERDRUK WIND Z : Beam Loads

Beam	Type	Direction	Fa	Da (m)	Fb	Db	Ecc. (m)
5	UNI kN/m	Y	-1.830	-	-	-	-
8	UNI kN/m	Y	-0.910	-	-	-	-
15	UNI kN/m	Y	-0.910	-	-	-	-
16	UNI kN/m	Y	-1.830	-	-	-	-
25	UNI kN/m	GX	-1.830	-	-	-	-
26	UNI kN/m	GZ	-0.690	-	-	-	-
	UNI kN/m	GX	-0.910	-	-	-	-
27	UNI kN/m	GZ	-1.370	-	-	-	-
28	UNI kN/m	GZ	-0.690	-	-	-	-
44	UNI kN/m	Y	-0.910	-	-	-	-
45	UNI kN/m	Y	-0.910	-	-	-	-
48	UNI kN/m	Y	-1.830	-	-	-	-
49	UNI kN/m	Y	-1.830	-	-	-	-
50	UNI kN/m	Y	-0.910	-	-	-	-
55	UNI kN/m	Y	-1.830	-	-	-	-
56	UNI kN/m	Y	-0.910	-	-	-	-
58	UNI kN/m	Y	-1.830	-	-	-	-
59	UNI kN/m	Y	-0.910	-	-	-	-
61	UNI kN/m	Y	-1.830	-	-	-	-
62	UNI kN/m	Y	-0.910	-	-	-	-
64	UNI kN/m	Y	-1.830	-	-	-	-
65	UNI kN/m	Y	-0.910	-	-	-	-

20 UGT1 : Repeat Loads

Ref	Name	Factor
1	EG	1.220
2	BB DAK + WAND	1.220

21 UGT2 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
3	SNEEUW1	1.350

22 UGT3 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
4	SNEEUW2	1.350

23 UGT4 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
5	SNEEUW3	1.350

24 UGT5 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
6	WIND X1	1.350
16	OVERDRUK WIND X	1.350

25 UGT6 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
7	WIND X2	1.350
16	OVERDRUK WIND X	1.350

26 UGT7 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
8	WIND X3	1.350
16	OVERDRUK WIND X	1.350

27 UGT8 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
9	WIND X4	1.350
16	OVERDRUK WIND X	1.350

28 UGT9 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
10	WIND -X1	1.350
17	ONDERDRUK WIND -X	1.350

29 UGT10 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
11	WIND -X2	1.350
17	ONDERDRUK WIND -X	1.350

30 UGT11 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
12	WIND -X3	1.350
17	ONDERDRUK WIND -X	1.350

31 UGT12 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
13	WIND -X4	1.350
17	ONDERDRUK WIND -X	1.350

32 UGT13 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
14	WIND Z	1.350
18	ONDERDRUK WIND Z	1.350

33 UGT14 : Repeat Loads

Ref	Name	Factor
1	EG	1.080
2	BB DAK + WAND	1.080
15	WIND -Z	1.350
18	ONDERDRUK WIND Z	1.350

34 UGT15 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
6	WIND X1	1.350
16	OVERDRUK WIND X	1.350

35 UGT16 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
7	WIND X2	1.350
16	OVERDRUK WIND X	1.350

36 UGT17 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
8	WIND X3	1.350
16	OVERDRUK WIND X	1.350

37 UGT18 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
9	WIND X4	1.350
16	OVERDRUK WIND X	1.350

38 UGT19 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
10	WIND -X1	1.350
17	ONDERDRUK WIND -X	1.350

39 UGT20 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
11	WIND -X2	1.350
17	ONDERDRUK WIND -X	1.350

40 UGT21 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
12	WIND -X3	1.350
17	ONDERDRUK WIND -X	1.350

41 UGT22 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
13	WIND -X4	1.350
17	ONDERDRUK WIND -X	1.350

42 UGT23 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
14	WIND Z	1.350
18	ONDERDRUK WIND Z	1.350

43 UGT24 : Repeat Loads

Ref	Name	Factor
1	EG	0.900
2	BB DAK + WAND	0.900
15	WIND -Z	1.350
18	ONDERDRUK WIND Z	1.350

120 BGT1 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000

121 BGT2 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
3	SNEEUW1	1.000

122 BGT3 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
4	SNEEUW2	1.000

123 BGT4 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
5	SNEEUW3	1.000

124 BGT5 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
6	WIND X1	1.000
16	OVERDRUK WIND X	1.000

125 BGT6 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
7	WIND X2	1.000
16	OVERDRUK WIND X	1.000

126 BGT7 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
8	WIND X3	1.000
16	OVERDRUK WIND X	1.000

127 BGT8 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
9	WIND X4	1.000
16	OVERDRUK WIND X	1.000

128 BGT9 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
10	WIND -X1	1.000
17	ONDERDRUK WIND -X	1.000

129 BGT10 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
11	WIND -X2	1.000
17	ONDERDRUK WIND -X	1.000

130 BGT11 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
12	WIND -X3	1.000
17	ONDERDRUK WIND -X	1.000

131 BGT12 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
13	WIND -X4	1.000
17	ONDERDRUK WIND -X	1.000

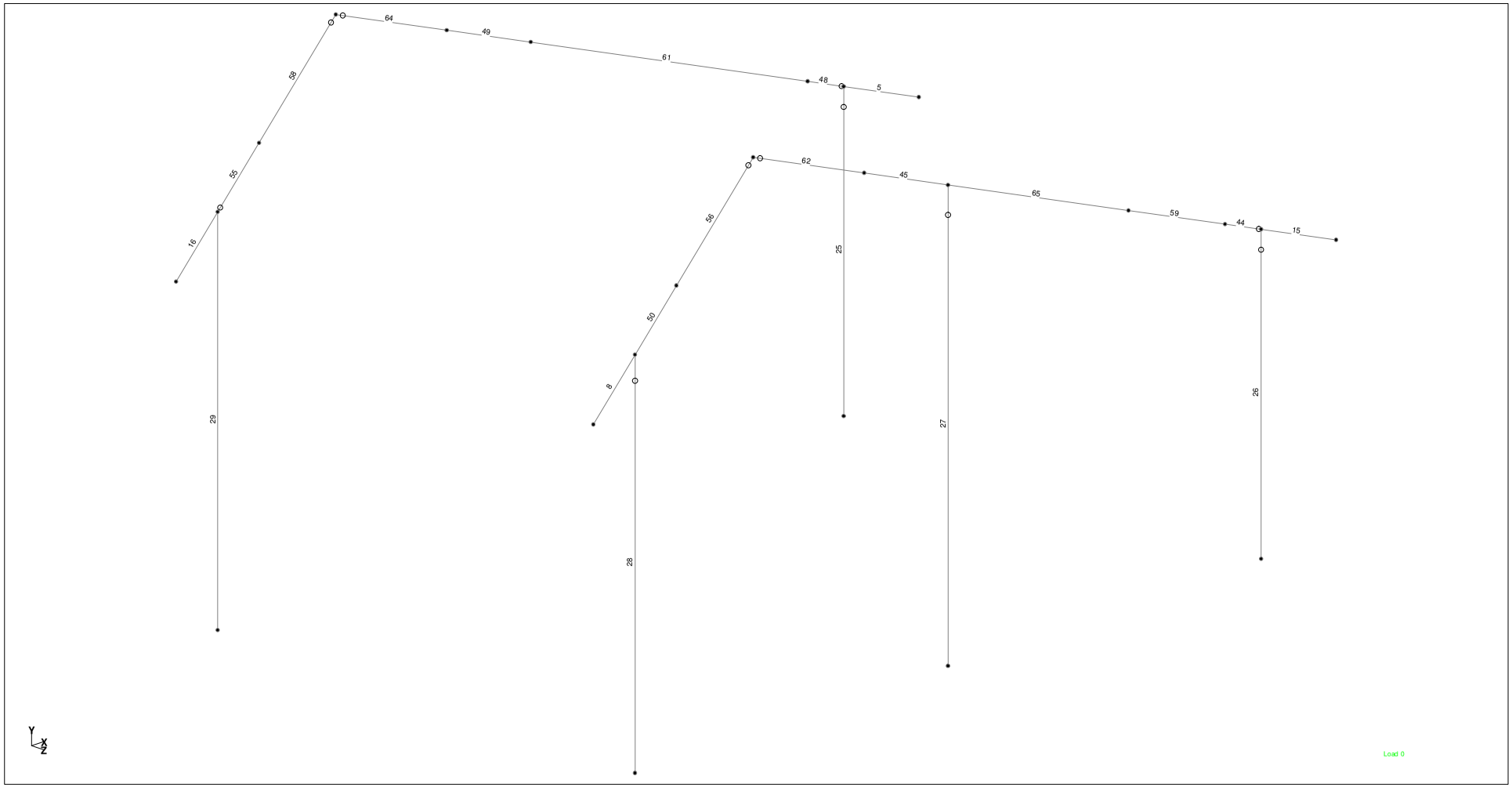
132 BGT13 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
14	WIND Z	1.000
18	ONDERDRUK WIND Z	1.000

133 BGT14 : Repeat Loads

Ref	Name	Factor
1	EG	1.000
2	BB DAK + WAND	1.000
15	WIND -Z	1.000
18	ONDERDRUK WIND Z	1.000

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **13**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



staafnummers tbv staafcontroles

Steel Design (Track 2) Beam 5 Check 1

```
 ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
 MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                          FX           MY              MZ       LOCATION
 ========================================================================

       5 ST   KK70X3      (DUTCH SECTIONS)
                           PASS     EC-6.2.9.1         0.458        32

                        0.47 T          0.00          -2.12        0.96
 ========================================================================
   MATERIAL DATA
      Grade of steel           =  S 235
      Modulus of elasticity    =  205 kN/mm2
      Design Strength  (py)    =  235  N/mm2

   SECTION PROPERTIES (units - cm)
      Member Length =     95.78
      Gross Area =    7.88          Net Area =    7.88

                                     z-axis          y-axis
      Moment of inertia          :     58.460          58.460
      Plastic modulus            :     19.684          19.684
      Elastic modulus            :     16.703          16.703
      Shear Area                 :      3.940           3.940
      Radius of gyration         :      2.724           2.724
      Effective Length           :     95.776          95.776

   DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
      Section Class              :   CLASS 1
      Squash Load                :    185.18
      Axial force/Squash load    :     0.003
      GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                     z-axis          y-axis
      Slenderness ratio (KL/r) :       35.2            35.2
      Compression Capacity     :      177.7           177.7
      Tension Capacity         :      185.2           185.2
      Moment Capacity          :        4.6             4.6
      Reduced Moment Capacity  :        4.6             4.6
      Shear Capacity           :       53.5            53.5

   BUCKLING CALCULATIONS (units - kN,m)
      Lateral Torsional Buckling Moment       MB =    4.6
      co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 0.958

   CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
    CLAUSE        RATIO  LOAD     FX       VY      VZ       MZ      MY
   EC-6.2.3 (T)   0.007    21    -1.4      3.7     0.0     -1.8     0.0
   EC-6.2.9.1     0.458    32    -0.5      4.4     0.0     -2.1     0.0
   EC-6.2.5       0.317    12     0.0     -3.1     0.0      1.5     0.0
   EC-6.2.6-(Y)   0.083    32    -0.5      4.4     0.0     -2.1     0.0
   EC-6.3.2 LTB   0.317    12     0.0     -3.1     0.0      1.5     0.0
    Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 8 Check 1

```
 ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
 MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                          FX           MY              MZ       LOCATION
 ========================================================================

       8 ST   IPE160      (DUTCH SECTIONS)
                           PASS     EC-6.2.9.1         0.011        30

                        0.43 T          0.00          -0.33        0.71
 ========================================================================
   MATERIAL DATA
      Grade of steel           =  S 235
      Modulus of elasticity    =  205 kN/mm2
      Design Strength  (py)    =  235  N/mm2

   SECTION PROPERTIES (units - cm)
      Member Length =     70.71
      Gross Area =   20.10          Net Area =   20.10

                                     z-axis          y-axis
      Moment of inertia          :     869.000          68.000
      Plastic modulus            :     124.000          26.000
      Elastic modulus            :     108.625          16.585
      Shear Area                 :       8.090           9.666
      Radius of gyration         :       6.575           1.839
      Effective Length           :      70.711          70.711

   DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
      Section Class              :   CLASS 1
      Squash Load                :    472.35
      Axial force/Squash load    :     0.001
      GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                     z-axis          y-axis
      Slenderness ratio (KL/r) :        10.8            38.4
      Compression Capacity     :       472.4           435.7
      Tension Capacity         :       472.4           472.4
      Moment Capacity          :        29.1             6.1
      Reduced Moment Capacity  :        29.1             6.1
      Shear Capacity           :       109.8           131.1

   BUCKLING CALCULATIONS (units - kN,m)
      Lateral Torsional Buckling Moment       MB =   28.9
      co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 0.707

   CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
    CLAUSE        RATIO  LOAD     FX       VY       VZ       MZ       MY
   EC-6.2.3 (T)   0.001    21    -0.7      0.7      0.0     -0.2      0.0
   EC-6.2.9.1     0.011    30    -0.4      0.9      0.0     -0.3      0.0
   EC-6.2.5       0.010    15     0.0     -0.8      0.0      0.3      0.0
   EC-6.2.6-(Y)   0.007    30    -0.4      0.9      0.0     -0.3      0.0
   EC-6.3.2 LTB   0.011    30    -0.4      0.9      0.0     -0.3      0.0
    Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 15 Check 1

```
ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                         FX           MY              MZ       LOCATION
=========================================================================

     15 ST   KK70X3      (DUTCH SECTIONS)
                          PASS     EC-6.2.9.1         0.225        33

                       0.25 T          0.00          -1.04        0.96
=========================================================================
  MATERIAL DATA
     Grade of steel           =  S 235
     Modulus of elasticity    =  205 kN/mm2
     Design Strength  (py)    =  235  N/mm2

  SECTION PROPERTIES (units - cm)
     Member Length =     95.78
     Gross Area =    7.88          Net Area =    7.88

                                    z-axis          y-axis
     Moment of inertia          :     58.460          58.460
     Plastic modulus            :     19.684          19.684
     Elastic modulus            :     16.703          16.703
     Shear Area                 :      3.940           3.940
     Radius of gyration         :      2.724           2.724
     Effective Length           :     95.776          95.776

  DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
     Section Class              :   CLASS 1
     Squash Load                :    185.18
     Axial force/Squash load    :     0.001
     GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                    z-axis          y-axis
     Slenderness ratio (KL/r) :       35.2            35.2
     Compression Capacity     :      177.7           177.7
     Tension Capacity         :      185.2           185.2
     Moment Capacity          :        4.6             4.6
     Reduced Moment Capacity  :        4.6             4.6
     Shear Capacity           :       53.5            53.5

  BUCKLING CALCULATIONS (units - kN,m)
     Lateral Torsional Buckling Moment       MB =    4.6
     co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 0.958

  CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
   CLAUSE        RATIO  LOAD     FX       VY      VZ       MZ      MY
  EC-6.2.3 (T)   0.004    21    -0.7      1.9     0.0     -0.9     0.0
  EC-6.2.9.1     0.225    33    -0.2      2.2     0.0     -1.0     0.0
  EC-6.2.5       0.167    10     0.0     -1.6     0.0      0.8     0.0
  EC-6.2.6-(Y)   0.041    33    -0.2      2.2     0.0     -1.0     0.0
  EC-6.3.2 LTB   0.167    10     0.0     -1.6     0.0      0.8     0.0
   Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 16 Check 1

```
 ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
 MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                          FX           MY              MZ       LOCATION
 ========================================================================

      16 ST   IPE160      (DUTCH SECTIONS)
                           PASS     EC-6.3.2 LTB       0.022        30

                        0.77 T          0.00          -0.62        0.71
 ========================================================================
   MATERIAL DATA
      Grade of steel           =  S 235
      Modulus of elasticity    =  205 kN/mm2
      Design Strength  (py)    =  235  N/mm2

   SECTION PROPERTIES (units - cm)
      Member Length =     70.71
      Gross Area =   20.10          Net Area =   20.10

                                     z-axis          y-axis
      Moment of inertia          :     869.000          68.000
      Plastic modulus            :     124.000          26.000
      Elastic modulus            :     108.625          16.585
      Shear Area                 :       8.090           9.666
      Radius of gyration         :       6.575           1.839
      Effective Length           :      70.711          70.711

   DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
      Section Class              :   CLASS 1
      Squash Load                :    472.35
      Axial force/Squash load    :     0.002
      GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                     z-axis          y-axis
      Slenderness ratio (KL/r) :        10.8            38.4
      Compression Capacity     :       472.4           435.7
      Tension Capacity         :       472.4           472.4
      Moment Capacity          :        29.1             6.1
      Reduced Moment Capacity  :        29.1             6.1
      Shear Capacity           :       109.8           131.1

   BUCKLING CALCULATIONS (units - kN,m)
      Lateral Torsional Buckling Moment       MB =   28.9
      co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 0.707

   CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
    CLAUSE        RATIO  LOAD     FX       VY      VZ       MZ      MY
   EC-6.2.3 (T)   0.003    21    -1.3      1.3     0.0     -0.5     0.0
   EC-6.2.9.1     0.021    30    -0.8      1.8     0.0     -0.6     0.0
   EC-6.2.5       0.016    18     0.0      1.3     0.0     -0.5     0.0
   EC-6.2.6-(Y)   0.013    30    -0.8      1.8     0.0     -0.6     0.0
   EC-6.3.2 LTB   0.022    30    -0.8      1.8     0.0     -0.6     0.0
    Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 25 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
25	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.789	21
		21.14 C	0.00	-11.82	2.97

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 297.00
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	779.000	289.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.045
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	118.5	157.1
Compression Capacity	232.6	134.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 17.8
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.890

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.025	35	-11.9	-7.6	0.0	6.8	0.0
EC-6.3.1.1	0.177	21	23.9	-4.0	0.0	0.0	0.0
EC-6.2.9.1	0.406	21	21.1	4.0	0.0	-11.8	0.0
EC-6.3.3-661	0.517	21	21.1	4.0	0.0	-11.8	0.0
EC-6.3.3-662	0.789	21	21.1	4.0	0.0	-11.8	0.0
EC-6.2.5	0.091	127	0.1	0.2	0.0	2.6	0.0
EC-6.2.6-(Y)	0.067	31	19.1	8.7	0.0	-10.3	0.0
EC-6.3.2 LTB	0.662	21	21.1	4.0	0.0	-11.8	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 26 Check 1

```
ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                         FX           MY              MZ       LOCATION
=========================================================================

     26 ST   IPE160      (DUTCH SECTIONS)
                          PASS     EC-6.3.3-662       0.412        27

                       0.38 C          1.98           1.75        1.49
=========================================================================
  MATERIAL DATA
     Grade of steel           =  S 235
     Modulus of elasticity    =  205 kN/mm2
     Design Strength  (py)    =  235  N/mm2

  SECTION PROPERTIES (units - cm)
     Member Length =    297.00
     Gross Area =   20.10          Net Area =   20.10

                                    z-axis          y-axis
     Moment of inertia          :     869.000          68.000
     Plastic modulus            :     124.000          26.000
     Elastic modulus            :     108.625          16.585
     Shear Area                 :       8.090           9.666
     Radius of gyration         :       6.575           1.839
     Effective Length           :     297.000         297.000

  DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
     Section Class              :   CLASS 1
     Squash Load                :    472.35
     Axial force/Squash load    :     0.001
     GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                    z-axis          y-axis
     Slenderness ratio (KL/r) :        45.2           161.5
     Compression Capacity     :       439.3           128.8
     Tension Capacity         :       472.4           472.4
     Moment Capacity          :        29.1             6.1
     Reduced Moment Capacity  :        29.1             6.1
     Shear Capacity           :       109.8           131.1

  BUCKLING CALCULATIONS (units - kN,m)
     Lateral Torsional Buckling Moment       MB =   17.6
     co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.970

  CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
   CLAUSE        RATIO  LOAD     FX       VY       VZ       MZ       MY
  EC-6.2.3 (T)   0.007    34    -3.3     -2.9      2.7      0.8      0.0
  EC-6.3.1.1     0.109    32    14.0      0.4     -0.6      0.0      0.0
  EC-6.2.9.1     0.328    25    -1.2      0.1      0.0      1.8      2.0
  EC-6.3.3-661   0.280    27     0.4      0.2      0.0      1.8      2.0
  EC-6.3.3-662   0.412    27     0.4      0.2      0.0      1.8      2.0
  EC-6.2.5       0.243    36     0.0     -1.1      1.3      1.3      1.5
  EC-6.2.6-(Z)   0.024    24    -0.1     -2.4      2.7      0.0      0.0
  EC-6.2.6-(Y)   0.024    30     2.6      3.1      1.4     -1.5      0.0
  EC-6.3.2 LTB   0.102    25    -1.2      0.1      0.0      1.8      2.0
   Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 27 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.882	25
		19.38 C	0.00	8.37	2.17

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 433.49
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	433.489	433.489

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.041
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	65.9	235.7
Compression Capacity	400.0	65.5
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 13.7
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 4.335

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.004	10	-2.0	-3.0	0.0	0.0	0.0
EC-6.3.1.1	0.326	25	21.4	-7.7	0.0	0.0	0.0
EC-6.2.9.1	0.287	24	15.0	0.0	0.0	8.4	0.0
EC-6.3.3-661	0.644	25	19.4	0.0	0.0	8.4	0.0
EC-6.3.3-662	0.882	25	19.4	0.0	0.0	8.4	0.0
EC-6.2.6-(Y)	0.059	24	17.0	-7.7	0.0	0.0	0.0
EC-6.3.2 LTB	0.612	24	15.0	0.0	0.0	8.4	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 28 Check 1

```
 ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
 MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/      LOADING/
                          FX           MY              MZ        LOCATION
 ========================================================================

      28 ST   IPE160      (DUTCH SECTIONS)
                           PASS     EC-6.3.3-662       0.338         33

                       11.59 C          0.00          -3.09         1.88
 ========================================================================
   MATERIAL DATA
      Grade of steel           =  S 235
      Modulus of elasticity    =  205 kN/mm2
      Design Strength  (py)    =  235  N/mm2

   SECTION PROPERTIES (units - cm)
      Member Length =    377.00
      Gross Area =   20.10          Net Area =   20.10

                                     z-axis          y-axis
      Moment of inertia          :     869.000          68.000
      Plastic modulus            :     124.000          26.000
      Elastic modulus            :     108.625          16.585
      Shear Area                 :       8.090           9.666
      Radius of gyration         :       6.575           1.839
      Effective Length           :     377.000         377.000

   DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
      Section Class              :   CLASS 1
      Squash Load                :    472.35
      Axial force/Squash load    :     0.025
      GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                     z-axis          y-axis
      Slenderness ratio (KL/r) :        57.3           205.0
      Compression Capacity     :       418.5            84.6
      Tension Capacity         :       472.4           472.4
      Moment Capacity          :        29.1             6.1
      Reduced Moment Capacity  :        29.1             6.1
      Shear Capacity           :       109.8           131.1

   BUCKLING CALCULATIONS (units - kN,m)
      Lateral Torsional Buckling Moment       MB =   15.1
      co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 3.770

   CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
    CLAUSE        RATIO  LOAD     FX       VY       VZ       MZ       MY
   EC-6.2.3 (T)   0.004    16    -1.9     -1.2      0.0      0.0      0.0
   EC-6.3.1.1     0.282    29    23.9     -0.8      0.0      0.0      0.0
   EC-6.2.9.1     0.143    24     0.6      0.0      0.0      4.2      0.0
   EC-6.3.3-661   0.272    27     3.2      0.0      0.0      4.2      0.0
   EC-6.3.3-662   0.338    33    11.6      0.0      0.0     -3.1      0.0
   EC-6.2.5       0.107    24     0.1      2.2      0.0      3.1      0.0
   EC-6.2.6-(Y)   0.034    24     1.6     -4.4      0.0      0.0      0.0
   EC-6.3.2 LTB   0.277    24     0.6      0.0      0.0      4.2      0.0
    Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 29 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
29	ST HE180A	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.127	21
		8.32 C	0.00	-7.43	3.77

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 377.00
- Gross Area = 45.30 Net Area = 45.30

	z-axis	y-axis
Moment of inertia	2510.000	925.000
Plastic modulus	325.000	156.000
Elastic modulus	293.567	102.778
Shear Area	22.799	14.520
Radius of gyration	7.444	4.519
Effective Length	859.000	366.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 1064.55
- Axial force/Squash load : 0.008
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	115.4	81.0
Compression Capacity	492.5	663.2
Tension Capacity	1064.6	1064.6
Moment Capacity	76.4	36.7
Reduced Moment Capacity	76.4	36.7
Shear Capacity	309.3	197.0

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 65.0
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 3.660

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.006	16	-6.8	1.1	0.0	0.0	0.0
EC-6.3.1.1	0.020	21	9.8	-2.0	0.0	0.0	0.0
EC-6.2.9.1	0.107	35	-3.8	-2.2	0.0	8.2	0.0
EC-6.3.3-661	0.086	21	8.3	2.0	0.0	-7.4	0.0
EC-6.3.3-662	0.127	21	8.3	2.0	0.0	-7.4	0.0
EC-6.2.5	0.053	125	0.0	-1.1	0.0	4.1	0.0
EC-6.2.6-(Y)	0.011	35	-2.6	2.2	0.0	0.0	0.0
EC-6.3.2 LTB	0.126	35	-3.8	-2.2	0.0	8.2	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 44 Check 1

```
 ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
 MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                          FX           MY              MZ       LOCATION
 ========================================================================

      44 ST   IPE160      (DUTCH SECTIONS)
                           PASS     EC-6.3.3-662       0.095        21

                        1.74 C          0.00           1.91        0.00
 ========================================================================
   MATERIAL DATA
      Grade of steel           =  S 235
      Modulus of elasticity    =  205 kN/mm2
      Design Strength  (py)    =  235  N/mm2

   SECTION PROPERTIES (units - cm)
      Member Length =     46.00
      Gross Area =   20.10          Net Area =   20.10

                                     z-axis          y-axis
      Moment of inertia          :      869.000          68.000
      Plastic modulus            :      124.000          26.000
      Elastic modulus            :      108.625          16.585
      Shear Area                 :        8.090           9.666
      Radius of gyration         :        6.575           1.839
      Effective Length           :      399.000         200.000

   DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
      Section Class              :   CLASS 1
      Squash Load                :    472.35
      Axial force/Squash load    :     0.004
      GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                     z-axis          y-axis
      Slenderness ratio (KL/r) :         60.7           108.7
      Compression Capacity     :        411.7           236.9
      Tension Capacity         :        472.4           472.4
      Moment Capacity          :         29.1             6.1
      Reduced Moment Capacity  :         29.1             6.1
      Shear Capacity           :        109.8           131.1

   BUCKLING CALCULATIONS (units - kN,m)
      Lateral Torsional Buckling Moment       MB =   21.7
      co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

   CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
    CLAUSE        RATIO  LOAD     FX       VY       VZ       MZ       MY
   EC-6.2.3 (T)   0.009    34    -4.4     -1.8      0.0     -0.5      0.0
   EC-6.3.1.1     0.028    33     6.6      1.4      0.0      0.4      0.0
   EC-6.2.9.1     0.066    21     1.7      3.8      0.0      1.9      0.0
   EC-6.3.3-661   0.062    21     1.7      3.8      0.0      1.9      0.0
   EC-6.3.3-662   0.095    21     1.7      3.8      0.0      1.9      0.0
   EC-6.2.6-(Y)   0.031    29     4.6      4.0      0.0      1.3      0.0
   EC-6.3.2 LTB   0.088    21     1.7      3.8      0.0      1.9      0.0
    Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 45 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
45	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.181	21
		6.02 C	0.02	3.36	0.00

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 107.00
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	249.000	200.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.013
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	37.9	108.7
Compression Capacity	449.6	236.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 21.7
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.3.1.1	0.036	25	8.5	-2.1	0.0	-1.6	0.0
EC-6.2.9.1	0.115	21	6.0	4.6	0.0	3.4	0.0
EC-6.3.3-661	0.091	21	6.0	4.6	0.0	3.4	0.0
EC-6.3.3-662	0.181	21	6.0	4.6	0.0	3.4	0.0
EC-6.2.6-(Y)	0.035	21	6.0	4.6	0.0	3.4	0.0
EC-6.3.2 LTB	0.155	21	6.0	4.6	0.0	3.4	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 48 Check 1

```
 ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
 MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                          FX           MY              MZ       LOCATION
 ========================================================================

      48 ST   IPE160      (DUTCH SECTIONS)
                           PASS     EC-6.3.3-662       0.662        21

                        9.47 C          0.00          13.60        0.00
 ========================================================================
   MATERIAL DATA
      Grade of steel           =  S 235
      Modulus of elasticity    =  205 kN/mm2
      Design Strength  (py)    =  235  N/mm2

   SECTION PROPERTIES (units - cm)
      Member Length =     46.00
      Gross Area =   20.10          Net Area =   20.10

                                     z-axis          y-axis
      Moment of inertia          :     869.000          68.000
      Plastic modulus            :     124.000          26.000
      Elastic modulus            :     108.625          16.585
      Shear Area                 :       8.090           9.666
      Radius of gyration         :       6.575           1.839
      Effective Length           :    1081.000         200.000

   DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
      Section Class              :   CLASS 1
      Squash Load                :    472.35
      Axial force/Squash load    :     0.020
      GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                     z-axis          y-axis
      Slenderness ratio (KL/r) :       164.4           108.7
      Compression Capacity     :       134.2           236.9
      Tension Capacity         :       472.4           472.4
      Moment Capacity          :        29.1             6.1
      Reduced Moment Capacity  :        29.1             6.1
      Shear Capacity           :       109.8           131.1

   BUCKLING CALCULATIONS (units - kN,m)
      Lateral Torsional Buckling Moment       MB =   21.7
      co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

   CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
    CLAUSE        RATIO  LOAD     FX       VY      VZ       MZ      MY
   EC-6.2.3 (T)   0.025    35   -12.0     -7.3     0.0     -4.3     0.0
   EC-6.3.1.1     0.105    31    14.1     12.9     0.0     11.1     0.0
   EC-6.2.9.1     0.467    21     9.5     14.4     0.0     13.6     0.0
   EC-6.3.3-661   0.608    21     9.5     14.4     0.0     13.6     0.0
   EC-6.3.3-662   0.662    21     9.5     14.4     0.0     13.6     0.0
   EC-6.2.5       0.079    10     0.1     -2.7     0.0     -2.3     0.0
   EC-6.2.6-(Y)   0.110    21     9.5     14.4     0.0     13.6     0.0
   EC-6.3.2 LTB   0.626    21     9.5     14.4     0.0     13.6     0.0
    Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 49 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
49	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-661	0.600	21
		10.42 C	0.00	-12.12	0.00

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 107.00
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	1081.000	200.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.022
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	164.4	108.7
Compression Capacity	134.2	236.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 21.7
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.006	36	-3.0	1.4	0.0	0.8	0.0
EC-6.3.1.1	0.090	31	12.0	-2.8	0.0	-10.2	0.0
EC-6.2.9.1	0.416	21	10.4	-2.3	0.0	-12.1	0.0
EC-6.3.3-661	0.600	21	10.4	-2.3	0.0	-12.1	0.0
EC-6.3.3-662	0.598	21	10.4	-2.3	0.0	-12.1	0.0
EC-6.2.5	0.071	12	0.1	0.2	0.0	2.1	0.0
EC-6.2.6-(Y)	0.053	29	11.0	6.9	0.0	4.9	0.0
EC-6.3.2 LTB	0.558	21	10.4	-2.3	0.0	-12.1	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 50 Check 1

```
 ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
 MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                          FX           MY              MZ       LOCATION
 ========================================================================

      50 ST   IPE160      (DUTCH SECTIONS)
                           PASS     EC-6.3.3-662       0.109        39

                       14.02 C          0.00          -1.10        0.70
 ========================================================================
   MATERIAL DATA
      Grade of steel           =  S 235
      Modulus of elasticity    =  205 kN/mm2
      Design Strength  (py)    =  235  N/mm2

   SECTION PROPERTIES (units - cm)
      Member Length =     70.00
      Gross Area =   20.10          Net Area =   20.10

                                     z-axis          y-axis
      Moment of inertia          :     869.000          68.000
      Plastic modulus            :     124.000          26.000
      Elastic modulus            :     108.625          16.585
      Shear Area                 :       8.090           9.666
      Radius of gyration         :       6.575           1.839
      Effective Length           :     200.000         200.000

   DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
      Section Class              :   CLASS 1
      Squash Load                :    472.35
      Axial force/Squash load    :     0.030
      GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                     z-axis          y-axis
      Slenderness ratio (KL/r) :        30.4           108.7
      Compression Capacity     :       459.0           236.9
      Tension Capacity         :       472.4           472.4
      Moment Capacity          :        29.1             6.1
      Reduced Moment Capacity  :        29.1             6.1
      Shear Capacity           :       109.8           131.1

   BUCKLING CALCULATIONS (units - kN,m)
      Lateral Torsional Buckling Moment       MB =   21.7
      co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

   CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
    CLAUSE        RATIO  LOAD     FX       VY       VZ       MZ       MY
   EC-6.2.3 (T)   0.003    34    -1.5     -0.1      0.0      0.1      0.0
   EC-6.3.1.1     0.062    29    14.8     -0.7      0.0      0.2      0.0
   EC-6.2.9.1     0.038    39    14.0      1.6      0.0     -1.1      0.0
   EC-6.3.3-661   0.063    39    14.0      1.6      0.0     -1.1      0.0
   EC-6.3.3-662   0.109    39    14.0      1.6      0.0     -1.1      0.0
   EC-6.2.5       0.005   126     0.0      0.4      0.0     -0.2      0.0
   EC-6.2.6-(Y)   0.014    21     9.1      1.9      0.0      0.2      0.0
   EC-6.3.2 LTB   0.051    39    14.0      1.6      0.0     -1.1      0.0
    Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 55 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
55	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.434	21
		17.78 C	0.00	7.89	0.00

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 70.00
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	305.000	200.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.038
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	46.4	108.7
Compression Capacity	437.5	236.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 21.7
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.016	34	-7.4	2.0	0.0	4.8	0.0
EC-6.3.1.1	0.075	31	17.8	0.6	0.0	4.5	0.0
EC-6.2.9.1	0.274	35	-5.2	-2.0	0.0	-8.0	0.0
EC-6.3.3-661	0.375	21	17.8	2.8	0.0	7.9	0.0
EC-6.3.3-662	0.434	21	17.8	2.8	0.0	7.9	0.0
EC-6.2.5	0.050	27	0.0	0.6	0.0	-1.4	0.0
EC-6.2.6-(Y)	0.022	34	-6.8	-2.9	0.0	-6.5	0.0
EC-6.3.2 LTB	0.367	35	-5.2	-2.0	0.0	-8.0	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 56 Check 1

```
 ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
 MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                          FX           MY              MZ       LOCATION
 ========================================================================

      56 ST   IPE160      (DUTCH SECTIONS)
                           PASS     EC-6.3.3-662       0.228        39

                       13.36 C          0.00          -3.77        1.30
 ========================================================================
   MATERIAL DATA
      Grade of steel           =  S 235
      Modulus of elasticity    =  205 kN/mm2
      Design Strength  (py)    =  235  N/mm2

   SECTION PROPERTIES (units - cm)
      Member Length =    130.09
      Gross Area =   20.10          Net Area =   20.10

                                     z-axis          y-axis
      Moment of inertia          :     869.000          68.000
      Plastic modulus            :     124.000          26.000
      Elastic modulus            :     108.625          16.585
      Shear Area                 :       8.090           9.666
      Radius of gyration         :       6.575           1.839
      Effective Length           :     200.000         200.000

   DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
      Section Class              :   CLASS 1
      Squash Load                :    472.35
      Axial force/Squash load    :     0.028
      GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                     z-axis          y-axis
      Slenderness ratio (KL/r) :         30.4            108.7
      Compression Capacity     :        459.0            236.9
      Tension Capacity         :        472.4            472.4
      Moment Capacity          :         29.1              6.1
      Reduced Moment Capacity  :         29.1              6.1
      Shear Capacity           :        109.8            131.1

   BUCKLING CALCULATIONS (units - kN,m)
      Lateral Torsional Buckling Moment       MB =   21.7
      co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

   CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
    CLAUSE        RATIO  LOAD     FX       VY       VZ       MZ       MY
   EC-6.2.3 (T)   0.004    24    -2.1     -1.0      0.0      1.0      0.0
   EC-6.3.1.1     0.061    29    14.3     -1.4      0.0      1.0      0.0
   EC-6.2.9.1     0.129    39    13.4      2.5      0.0     -3.8      0.0
   EC-6.3.3-661   0.148    39    13.4      2.5      0.0     -3.8      0.0
   EC-6.3.3-662   0.228    39    13.4      2.5      0.0     -3.8      0.0
   EC-6.2.5       0.025   127     0.0      0.2      0.0     -0.7      0.0
   EC-6.2.6-(Y)   0.021    41    12.3      2.7      0.0     -3.3      0.0
   EC-6.3.2 LTB   0.174    39    13.4      2.5      0.0     -3.8      0.0
    Torsion and deflections have not been considered in the design.
```

Steel Design (Track 2) Beam 58 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
58	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.458	29
		15.57 C	0.00	-8.62	1.30

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 130.09
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	305.000	200.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.033
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	46.4	108.7
Compression Capacity	437.5	236.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 21.7
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.018	34	-8.6	0.2	0.0	3.4	0.0
EC-6.3.1.1	0.072	31	17.1	-1.1	0.0	4.7	0.0
EC-6.2.9.1	0.296	29	15.6	3.9	0.0	-8.6	0.0
EC-6.3.3-661	0.355	29	15.6	3.9	0.0	-8.6	0.0
EC-6.3.3-662	0.458	29	15.6	3.9	0.0	-8.6	0.0
EC-6.2.5	0.030	127	0.0	0.2	0.0	-0.9	0.0
EC-6.2.6-(Y)	0.034	41	14.8	4.4	0.0	-8.0	0.0
EC-6.3.2 LTB	0.397	29	15.6	3.9	0.0	-8.6	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 59 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
59	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.138	29
		4.15 C	-0.01	2.60	1.23

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 123.00
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	399.000	200.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.009
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	60.7	108.7
Compression Capacity	411.7	236.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 21.7
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.010	24	-4.7	0.3	0.0	-0.9	0.0
EC-6.3.1.1	0.027	33	6.5	1.1	0.0	-0.2	0.0
EC-6.2.9.1	0.089	29	4.2	-0.7	0.0	2.6	0.0
EC-6.3.3-661	0.102	29	4.2	-0.7	0.0	2.6	0.0
EC-6.3.3-662	0.138	29	4.2	-0.7	0.0	2.6	0.0
EC-6.2.5	0.003	1	0.0	0.0	0.0	0.1	0.0
EC-6.2.6-(Y)	0.023	29	4.5	3.1	0.0	-0.3	0.0
EC-6.3.2 LTB	0.120	29	4.2	-0.7	0.0	2.6	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 61 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
61	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.586	21
		4.11 C	0.00	-12.39	3.24

MATERIAL DATA

Grade of steel = S 235
Modulus of elasticity = 205 kN/mm2
Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)

Member Length = 353.07
Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	1081.000	200.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005

Section Class : CLASS 1
Squash Load : 472.35
Axial force/Squash load : 0.009
GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	164.4	108.7
Compression Capacity	134.2	236.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)

Lateral Torsional Buckling Moment MB = 21.7
co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.029	35	-13.6	-1.0	0.0	-6.9	0.0
EC-6.3.1.1	0.103	31	13.9	11.0	0.0	5.6	0.0
EC-6.2.9.1	0.425	21	4.1	-0.3	0.0	-12.4	0.0
EC-6.3.3-661	0.542	29	12.1	0.0	0.0	-10.8	0.0
EC-6.3.3-662	0.586	21	4.1	-0.3	0.0	-12.4	0.0
EC-6.2.5	0.067	10	0.1	0.0	0.0	2.0	0.0
EC-6.2.6-(Y)	0.096	21	8.8	12.6	0.0	7.4	0.0
EC-6.3.2 LTB	0.570	21	4.1	-0.3	0.0	-12.4	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 62 Check 1

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ALL UNITS ARE - KN   METE (UNLESS OTHERWISE NOTED)
MEMBER     TABLE       RESULT/   CRITICAL COND/     RATIO/     LOADING/
                         FX           MY              MZ       LOCATION
=========================================================================

     62 ST   IPE160      (DUTCH SECTIONS)
                          PASS     EC-6.3.3-662       0.192        39

                       4.67 C          0.00          -3.77        1.42
=========================================================================
  MATERIAL DATA
     Grade of steel           =  S 235
     Modulus of elasticity    =  205 kN/mm2
     Design Strength  (py)    =  235  N/mm2

  SECTION PROPERTIES (units - cm)
     Member Length =    141.50
     Gross Area =   20.10          Net Area =   20.10

                                    z-axis          y-axis
     Moment of inertia          :     869.000          68.000
     Plastic modulus            :     124.000          26.000
     Elastic modulus            :     108.625          16.585
     Shear Area                 :       8.090           9.666
     Radius of gyration         :       6.575           1.839
     Effective Length           :     249.000         200.000

  DESIGN DATA (units - kN,m)   EUROCODE NO.3 /2005
     Section Class              :   CLASS 1
     Squash Load                :    472.35
     Axial force/Squash load    :     0.010
     GM0 :  1.00          GM1 :  1.00          GM2 :  1.25

                                    z-axis          y-axis
     Slenderness ratio (KL/r) :        37.9          108.7
     Compression Capacity     :       449.6          236.9
     Tension Capacity         :       472.4          472.4
     Moment Capacity          :        29.1            6.1
     Reduced Moment Capacity  :        29.1            6.1
     Shear Capacity           :       109.8          131.1

  BUCKLING CALCULATIONS (units - kN,m)
     Lateral Torsional Buckling Moment       MB =   21.7
     co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

  CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):
   CLAUSE        RATIO  LOAD     FX       VY       VZ       MZ       MY
  EC-6.3.1.1     0.034    25     8.2     -1.1      0.0      0.2      0.0
  EC-6.2.9.1     0.129    39     4.7      3.5      0.0     -3.8      0.0
  EC-6.3.3-661   0.110    39     4.7      3.5      0.0     -3.8      0.0
  EC-6.3.3-662   0.192    39     4.7      3.5      0.0     -3.8      0.0
  EC-6.2.6-(Y)   0.026    39     4.7      3.5      0.0     -3.8      0.0
  EC-6.3.2 LTB   0.174    39     4.7      3.5      0.0     -3.8      0.0
   Torsion and deflections have not been considered in the design.
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Steel Design (Track 2) Beam 64 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
64	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.3-662	0.429	29
		10.22 C	0.00	-8.62	1.42

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 141.50
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	1081.000	200.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.022
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	164.4	108.7
Compression Capacity	134.2	236.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 21.7
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.008	26	-3.6	-2.2	0.0	2.3	0.0
EC-6.3.1.1	0.085	31	11.5	-6.8	0.0	-5.1	0.0
EC-6.2.9.1	0.296	29	10.2	12.2	0.0	-8.6	0.0
EC-6.3.3-661	0.245	29	10.2	12.2	0.0	-8.6	0.0
EC-6.3.3-662	0.429	29	10.2	12.2	0.0	-8.6	0.0
EC-6.2.5	0.050	12	0.1	0.9	0.0	1.5	0.0
EC-6.2.6-(Y)	0.093	23	6.6	12.2	0.0	-5.9	0.0
EC-6.3.2 LTB	0.397	29	10.2	12.2	0.0	-8.6	0.0

Torsion and deflections have not been considered in the design.

Steel Design (Track 2) Beam 65 Check 1

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
65	ST IPE160	(DUTCH SECTIONS) PASS	EC-6.3.2 LTB	0.155	21
	1.28 T	-0.02	-3.36	2.30	

MATERIAL DATA
- Grade of steel = S 235
- Modulus of elasticity = 205 kN/mm2
- Design Strength (py) = 235 N/mm2

SECTION PROPERTIES (units - cm)
- Member Length = 230.07
- Gross Area = 20.10 Net Area = 20.10

	z-axis	y-axis
Moment of inertia	869.000	68.000
Plastic modulus	124.000	26.000
Elastic modulus	108.625	16.585
Shear Area	8.090	9.666
Radius of gyration	6.575	1.839
Effective Length	399.000	200.000

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005
- Section Class : CLASS 1
- Squash Load : 472.35
- Axial force/Squash load : 0.003
- GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r)	60.7	108.7
Compression Capacity	411.7	236.9
Tension Capacity	472.4	472.4
Moment Capacity	29.1	6.1
Reduced Moment Capacity	29.1	6.1
Shear Capacity	109.8	131.1

BUCKLING CALCULATIONS (units - kN,m)
- Lateral Torsional Buckling Moment MB = 21.7
- co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 2.000

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.011	24	-5.4	-1.9	0.0	1.0	0.0
EC-6.3.1.1	0.026	33	6.1	0.2	0.0	-1.0	0.0
EC-6.2.9.1	0.115	21	-1.3	4.5	0.0	-3.4	0.0
EC-6.3.3-661	0.117	39	4.1	0.0	0.0	-2.7	0.0
EC-6.3.3-662	0.143	29	4.0	-0.1	0.0	-2.7	0.0
EC-6.2.5	0.046	23	0.0	-0.9	0.0	-1.3	0.0
EC-6.2.6-(Y)	0.034	21	-1.3	4.5	0.0	-3.4	0.0
EC-6.3.2 LTB	0.155	21	-1.3	4.5	0.0	-3.4	0.0

Torsion and deflections have not been considered in the design.

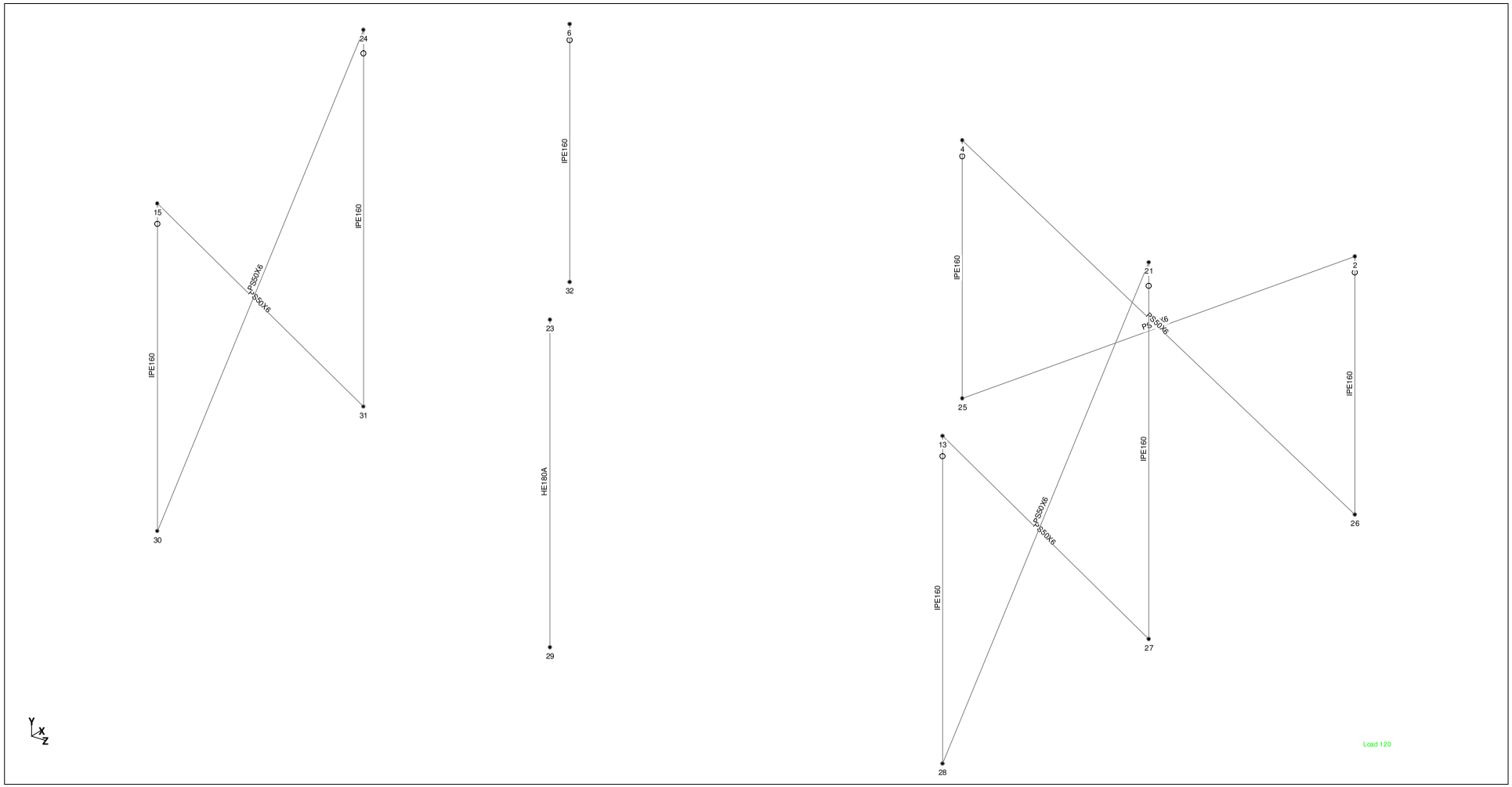
Beam Maximum Forces by Section Property

Section		Axial	Shear		Torsion	Bending	
		Max Fx (kN)	Max Fy (kN)	Max Fz (kN)	Max Mx (kNm)	Max My (kNm)	Max Mz (kNm)
IPE160	Max +ve	23.86	7.72	0.00	0.00	0.00	8.37
	Max -ve	-1.98	-7.72	-0.00	-0.00	-0.00	-8.09
PS50X6	Max +ve	0.04	0.06	0.00	0.00	0.00	0.00
	Max -ve	-21.90	-0.06	0.00	0.00	0.00	0.00
IPE160	Max +ve	14.77	4.58	2.67	0.00	1.98	3.77
	Max -ve	-5.37	-4.51	-2.67	-0.00	-1.98	-2.72
HE180A	Max +ve	9.77	2.17	0.00	0.00	0.00	7.43
	Max -ve	-6.84	-1.97	-0.00	-0.00	-0.00	-8.19
IPE160	Max +ve	23.86	14.40	0.02	0.00	0.05	13.60
	Max -ve	-13.60	-12.21	-0.02	-0.00	-0.05	-12.39
L50X5	Max +ve	0.03	0.13	0.00	0.00	0.00	0.00
	Max -ve	-22.15	-0.13	0.00	0.00	0.00	0.00
KK70X3	Max +ve	22.26	0.19	0.00	0.00	0.00	0.00
	Max -ve	-7.71	-0.19	0.00	0.00	0.00	0.00
KK70X3	Max +ve	0.00	3.06	0.00	0.00	0.00	2.12
	Max -ve	-1.36	-4.42	-0.00	-0.00	-0.00	-1.47

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (cm^2)	Iz (cm^4)	Iy (cm^4)	Ix (cm^4)
1	PS50X6	PS50X6	0.303	1.000	0.303	EC-6.2.3 (T)	29	3.000	6.250	0.090	0.333
2	PS50X6	PS50X6	0.433	1.000	0.433	EC-6.2.3 (T)	35	3.000	6.250	0.090	0.333
3	PS50X6	PS50X6	0.303	1.000	0.303	EC-6.2.3 (T)	29	3.000	6.250	0.090	0.333
4	KK70X3	KK70X3	0.517	1.000	0.517	EC-6.3.1.1	21	7.880	58.460	58.460	91.920
5	KK70X3	KK70X3	0.458	1.000	0.458	EC-6.2.9.1	32	7.880	58.460	58.460	91.920
6	IPE160	IPE160	0.011	1.000	0.011	EC-6.2.9.1	30	20.100	869.000	68.000	3.600
7	KK70X3	KK70X3	0.517	1.000	0.517	EC-6.3.1.1	21	7.880	58.460	58.460	91.920
8	IPE160	IPE160	0.011	1.000	0.011	EC-6.2.9.1	30	20.100	869.000	68.000	3.600
9	KK70X3	KK70X3	0.225	1.000	0.225	EC-6.2.9.1	32	7.880	58.460	58.460	91.920
10	PS50X6	PS50X6	0.433	1.000	0.433	EC-6.2.3 (T)	35	3.000	6.250	0.090	0.333
11	PS50X6	PS50X6	0.232	1.000	0.232	EC-6.2.3 (T)	33	3.000	6.250	0.090	0.333
12	PS50X6	PS50X6	0.689	1.000	0.689	EC-6.3.1.1	28	3.000	6.250	0.090	0.333
15	KK70X3	KK70X3	0.225	1.000	0.225	EC-6.2.9.1	33	7.880	58.460	58.460	91.920
16	IPE160	IPE160	0.022	1.000	0.022	EC-6.3.2 LTB	30	20.100	869.000	68.000	3.600
21	KK70X3	KK70X3	0.248	1.000	0.248	EC-6.3.1.1	32	7.880	58.460	58.460	91.920
22	KK70X3	KK70X3	0.247	1.000	0.247	EC-6.3.1.1	32	7.880	58.460	58.460	91.920
23	KK70X3	KK70X3	0.173	1.000	0.173	EC-6.3.1.1	33	7.880	58.460	58.460	91.920
24	KK70X3	KK70X3	0.173	1.000	0.173	EC-6.3.1.1	32	7.880	58.460	58.460	91.920
25	IPE160	IPE160	0.789	1.000	0.789	EC-6.3.3-662	21	20.100	869.000	68.000	3.600
26	IPE160	IPE160	0.412	1.000	0.412	EC-6.3.3-662	27	20.100	869.000	68.000	3.600
27	IPE160	IPE160	0.882	1.000	0.882	EC-6.3.3-662	25	20.100	869.000	68.000	3.600
28	IPE160	IPE160	0.338	1.000	0.338	EC-6.3.3-662	33	20.100	869.000	68.000	3.600
29	HE180A	HE180A	0.127	1.000	0.127	EC-6.3.3-662	21	45.300	2.51E+3	925.000	14.800
30	IPE160	IPE160	0.338	1.000	0.338	EC-6.3.3-662	32	20.100	869.000	68.000	3.600
31	IPE160	IPE160	0.882	1.000	0.882	EC-6.3.3-662	25	20.100	869.000	68.000	3.600
32	IPE160	IPE160	0.409	1.000	0.409	EC-6.3.3-662	27	20.100	869.000	68.000	3.600
35	L50X5	L50X5	0.128	1.000	0.128	EC-6.2.3 (T)	33	4.800	4.516	17.986	0.400
36	L50X5	L50X5	0.274	1.000	0.274	EC-6.2.3 (T)	29	4.800	4.516	17.986	0.400
37	L50X5	L50X5	0.274	1.000	0.274	EC-6.2.3 (T)	29	4.800	4.516	17.986	0.400
38	L50X5	L50X5	0.210	1.000	0.210	EC-6.2.3 (T)	25	4.800	4.516	17.986	0.400
42	L50X5	L50X5	0.128	1.000	0.128	EC-6.2.3 (T)	32	4.800	4.516	17.986	0.400
43	L50X5	L50X5	0.210	1.000	0.210	EC-6.2.3 (T)	25	4.800	4.516	17.986	0.400
44	IPE160	IPE160	0.095	1.000	0.095	EC-6.3.3-662	21	20.100	869.000	68.000	3.600
45	IPE160	IPE160	0.181	1.000	0.181	EC-6.3.3-662	21	20.100	869.000	68.000	3.600
46	IPE160	IPE160	0.095	1.000	0.095	EC-6.3.3-662	21	20.100	869.000	68.000	3.600
47	IPE160	IPE160	0.181	1.000	0.181	EC-6.3.3-662	21	20.100	869.000	68.000	3.600
48	IPE160	IPE160	0.662	1.000	0.662	EC-6.3.3-662	21	20.100	869.000	68.000	3.600
49	IPE160	IPE160	0.600	1.000	0.600	EC-6.3.3-661	21	20.100	869.000	68.000	3.600
50	IPE160	IPE160	0.109	1.000	0.109	EC-6.3.3-662	39	20.100	869.000	68.000	3.600
51	IPE160	IPE160	0.109	1.000	0.109	EC-6.3.3-662	39	20.100	869.000	68.000	3.600
55	IPE160	IPE160	0.434	1.000	0.434	EC-6.3.3-662	21	20.100	869.000	68.000	3.600
56	IPE160	IPE160	0.228	1.000	0.228	EC-6.3.3-662	39	20.100	869.000	68.000	3.600
57	IPE160	IPE160	0.228	1.000	0.228	EC-6.3.3-662	39	20.100	869.000	68.000	3.600
58	IPE160	IPE160	0.458	1.000	0.458	EC-6.3.3-662	29	20.100	869.000	68.000	3.600
59	IPE160	IPE160	0.138	1.000	0.138	EC-6.3.3-662	29	20.100	869.000	68.000	3.600
60	IPE160	IPE160	0.138	1.000	0.138	EC-6.3.3-662	29	20.100	869.000	68.000	3.600
61	IPE160	IPE160	0.586	1.000	0.586	EC-6.3.3-662	21	20.100	869.000	68.000	3.600
62	IPE160	IPE160	0.192	1.000	0.192	EC-6.3.3-662	39	20.100	869.000	68.000	3.600
63	IPE160	IPE160	0.192	1.000	0.192	EC-6.3.3-662	39	20.100	869.000	68.000	3.600
64	IPE160	IPE160	0.429	1.000	0.429	EC-6.3.3-662	29	20.100	869.000	68.000	3.600
65	IPE160	IPE160	0.155	1.000	0.155	EC-6.3.2 LTB	21	20.100	869.000	68.000	3.600
66	IPE160	IPE160	0.155	1.000	0.155	EC-6.3.2 LTB	21	20.100	869.000	68.000	3.600
67	KK70X3	KK70X3	0.076	1.000	0.076	EC-6.3.1.1	32	7.880	58.460	58.460	91.920
68	KK70X3	KK70X3	0.076	1.000	0.076	EC-6.3.1.1	33	7.880	58.460	58.460	91.920

Software licensed to Engineering	**KLOEZE bv** ENGINEERING	Job No **9111-011**	Sheet No **37**	Rev
		Part Staalconstructie		
Job Title Nieuwbouw schuur		Ref		
		By AdJ	Date 07-Jul-15	Chd PC
Client Fam. Venekamp / van Lingen		File 9111-011.std	Date/Time 08-Jul-2015 14:01	



knoopnummers tbv reacties

Verklaring reactiekrachten :

De in de lijst aangegeven krachten zij de minimale (-ve) en de maximale (+ve) **reactiekrachten**
in de richtingen (+) of tegengesteld (-) aan de richtingen van de pijlen zoals in het UDS icoon te zien links onder op sheet 37
Op deze pagina staan tevens de knoopnummers voor de reacties vermeld.
De maatgevende belastingcombinatie staat eronder.
Belastingcombinaties zie blz 8 ,deel 10.2 nummerieke computerinvoer

Ontwerpuitgangspunten : 15 jr; CC1; EXC1

nr. 9111-011 dd : 08-07-15

Node	Env	Horizontal Fx kN	Vertical Fy kN	Horizontal Fz kN	**INFORMATIEF (representatief EG + BB) BGT1 Horizontal Fx kN**	**Vertical Fy kN**
25	+ve	3.20	23.93	0.00	**0.00**	**10.17**
		38 UGT19	21 UGT2	20 UGT1	**-**	**120 BGT1**
25	-ve	-4.67	-9.86	-10.03	**-1.47**	**0.00**
		26 UGT7	35 UGT16	32 UGT13	**120 BGT1**	**-**
26	+ve	2.36	14.07	12.62	**0.00**	**5.08**
		39 UGT20	32 UGT13	33 UGT14	**-**	**120 BGT1**
26	-ve	-2.55	-1.21	-2.35	**-0.13**	**0.00**
		25 UGT6	34 UGT15	27 UGT8	**120 BGT1**	**-**
27	+ve	10.76	21.43	7.46	**2.14**	**7.93**
		29 UGT10	25 UGT6	33 UGT14	**120 BGT1**	**120 BGT1**
27	-ve	-0.00	-2.33	-7.72	**0.00**	**0.00**
		34 UGT15	39 UGT20	24 UGT5	**-**	**-**
28	+ve	0.00	23.93	3.28	**0.00**	**6.51**
		-	29 UGT10	33 UGT14	**-**	**120 BGT1**
28	-ve	-14.30	-13.66	-4.43	**-1.67**	**0.00**
		35 UGT16	35 UGT16	24 UGT5	**120 BGT1**	**-**
29	+ve	1.97	9.77	0.00	**0.79**	**5.94**
		21 UGT2	21 UGT2	33 UGT14	**120 BGT1**	**120 BGT1**
29	-ve	-2.17	-5.41	-0.00	**0.00**	**0.00**
		35 UGT16	34 UGT15	32 UGT13	**-**	**-**
30	+ve	0.00	23.93	4.43	**0.00**	**6.51**
		-	29 UGT10	24 UGT5	**-**	**120 BGT1**
30	-ve	-14.30	-13.66	-3.28	**-1.67**	**0.00**
		35 UGT16	35 UGT16	32 UGT13	**120 BGT1**	**-**
31	+ve	10.76	21.43	7.72	**2.14**	**7.93**
		29 UGT10	25 UGT6	26 UGT7	**120 BGT1**	**120 BGT1**
31	-ve	-0.00	-2.33	-7.46	**0.00**	**0.00**
		25 UGT6	39 UGT20	32 UGT13	**-**	**-**
32	+ve	2.36	9.31	2.67	**0.00**	**4.95**
		39 UGT20	31 UGT12	25 UGT6	**-**	**120 BGT1**
32	-ve	-2.55	-1.33	-2.59	**-0.13**	**0.00**
		25 UGT6	34 UGT15	32 UGT13	**120 BGT1**	**-**