Rapportage

Code: 15215
25 januari 2017

Windpark Waardpolder – Wieringerwaard

Indicatief ontwerp fundering

abt

Velp

Delft

Düsseldorf

Antwerpen

Projectgegevens

Project	Windpark Waardpolder – Wieringerwaard
Onderdeel	Indicatief ontwerp fundaties
Code	15215
Datum	25 januari 2017
Samengesteld door	ing. R. Hageman / ing. F.M.M. Oostendorp
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Eindverantwoording	ABT bv Arnhemsestraatweg 358 Velp Postbus 82 6800 AB Arnhem

Date	Version	Description
25-01-2017	A	Final

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Paraaf:			
Datum:	25-01-2017	25-01-2017	25-01-2017

Inhoudsopgave

1. Projectgegevens

1.1. *Inleiding*

In opdracht van Windpark Waardpolder is door ABT bv te Velp een indicatief ontwerp gemaakt voor de fundering van zes windturbines in de Wieringerwaard. Een definitieve turbinekeuze is nog niet gemaakt als uitgangspunt zijn de belastingen en torenverankering van een Vestas V126-3.6MW genomen, conform bijlage A.

De windturbine wordt geplaatst op een rond betonnen hybride gewapend funderingsblok:

Turbine	Cirkel fundering [m]	Dikte aan rand [m]	Dikte naast sokkel [m]	Hoogte sokkel[m]	Dikte t.p.v. sokkel [m]
WT-1 t/m WT-6	16,5	1,6	2,5	0,593	3,393

Tabel 1: type turbine en fundering

Turbine	Palen	Schoorstand
WT-1 t/m WT-6	34 Vibro palen 456/506 mm	8:1

Tabel 2: type turbine en palen

De aansluiting van de mast aan de fundering zal geschieden door het instorten van voorgespannen ankers. De verankering van de mast is bepaald door de fabrikant. Ten behoeve van dit indicatieve ontwerp zijn voor de verankering de volgende documenten gebruikt:
– Tekening nr.: 0057-882 Rev 0.0, d.d.: 2016-03-07.

De verankering bestaat uit 184 stuks ankerbouten M48-8.8 welke geplaatst worden in twee concentrische cirkels van elk 92 bouten met een gemiddelde cirkeldiameter van 4000 mm. De bouten zijn voorgespannen met een initiële voorspankracht van 628 kN per bout.

1.2. *Algemene ontwerpuitgangspunten*

Gevolgklasse: CC2
Betrouwbaarheidsklasse: RC2
Geotechnische categorie: 2
Ontwerplevensduur: 20 jaar

Fundament
Betonsterkteklasse: C30/37 (56 daagse kubusdruksterkte i.v.m. massabeton)
Grout: C90/105 [MPa]
Milieuklasse: XF3/XC4
Wapening: B500B
Dekking: 40 mm ($c_{min,dur}$ = 30 mm; Δc_{dev} = 10 mm)
Scheurwijdte: <0,3 mm

Palen
Milieuklasse: XA2

1.3. *Grondonderzoek*

Ter plaatse van locatie WT1 is door Bodem Belang bv onder projectreferentie 03 1002679 d.d. 24 november 2016 een grondonderzoek uitgevoerd bestaande uit 5 sonderingen. Op basis van deze sonderingen zijn de druk- en trekdraagvermogen berekeningen uitgevoerd voor deze locatie. De sonderingen zijn ter informatie in bijlage B gepresenteerd.

Definitieve grondonderzoeken zijn voor WT 2 t/m 6 in dit stadium nog niet uitgevoerd. Uit het archief van ABT zijn de grondonderzoeken van het oude windpark Waardpolder beschikbaar. Deze zullen worden gebruikt om de haalbaarheid van het indicatieve ontwerp aan te tonen. De resultaten van het grondonderzoek zijn gepresenteerd in de rapportage onder referentie: Opdrachtnummer: U-0881 d.d. 22-01-1996 (zie bijlage C).

1.4. *Randvoorwaarden*

Ten aanzien van het ontwerp zijn de volgende randvoorwaarden aangehouden:

- Alle berekeningen worden conform de volgende richtlijnen / normen uitgevoerd:
  - Eurocode 0 Basis of structural design.
  - Eurocode 1, 1-1 Loads and Deformations.
  - Eurocode 2, 1-1 Design of concrete structures.
  - Eurocode 7, 1 Geotechnical design of structures, general rules.

- De rotatieveerstijfheid van de fundering, dient minimaal te bedragen:
  - K_{rot} = 49 GNm/rad
  - K_{hor} = 23 MN/m

Verticale stijfheid dient gecontroleerd te worden in combinatie met de horizontale stijfheid

- Er zal geen rekening worden gehouden met zijdelingse belastingen op de palen en de rest van de fundering ten gevolge van eventuele (toekomstige) bovenbelasting naast de fundering.

1.5. *Belastingen*

In onderstaande tabellen is een samenvatting van de aan te houden belastingen weergegeven conform de belastingspecificatie van Vestas (zie ook bijlage A). De rekenwaarden van de belastingen zijn bepaald door Vestas door gebruik te maken van de partiële veiligheidsfactoren conform de IEC 61400-1 norm voor windturbines. Onderscheid wordt gemaakt tussen de volgende belastingen:

Tabel 3: resulterende extreme belasting voor UGT verificaties (REL)

REL	Vestas	γ	Rekenwaarden
F hor	1216 kN	1,1	1080 kN
F vert	5210 kN	0,9 / 1,1	4995 / 7493 kN*
M	125200 kNm	1,1	149175 kNm

* gunstig en ongunstig werkende belasting.

Tabel 4: extreme belastingen tijdens normaal gebruik voor BGT verificaties (ELNO)

ELNO	Vestas	γ	Rekenwaarden
F hor	692 kN	1.0	892 kN
F vert	5388 kN	1.0	5445 kN
M	73 kNm	1.0	100625 kNm

Overige belastingfactoren:

Voor permanente belastingen van de fundering zijn de volgende partiële veiligheidsfactoren toegepast conform NEN-EN 1990:

	NEN-EN 1990
Permanente belasting gunstig werkend	0,9
Permanente belasting ongunstig werkend	1,2

Tabel 5: belastingfactoren

Grondwater

Voor het funderingsontwerp is rekening gehouden met een opwaartse belasting door 1,0 m grondwater boven onderkant fundering ter plaatsen van de paalkop.

2. Ontwerp fundering

2.1. *Ontwerpberekening*

In deze paragraaf is een ontwerpberekening toegevoegd ten behoeve van vaststelling van de geometrie en overall gedrag (paalbelastingen, stijfheidsgedrag) van het fundament. In dit stadium zijn er nog geen constructieve berekeningen van het fundament uitgevoerd. Op basis van ervaring kan worden gesteld dat er met de gegeven geometrie en belastingen een haalbaar en goed te wapenen fundament is.

Geometrische gegevens

funderingsplaat gegevens

Diameter funderingsplaat	16,50	m
Dikte funderingsplaat rand	1,60	m
Dikte funderingsplaat mdden	2,50	m
Aantal funderingspalen	34	st
Optimale schoorstand dynamische situatie:	14,1	: 1
Optimale schoorstand quasi-statische situatie:	13,7	: 1
Gekozen schoorstand:	8	: 1
v.m. beton	25	kN/m3
Oppervlak funderingsplaat:	214	m2
Volume beton fundering:	453	m3
Eigen gewicht fundering: (repr.)	11325	kN
Eigen gewicht ballast: (repr.)	0	kN
Afstand palen - middelpunt fundering:	7,750	m
kortste afstand hart paal tot rand fundering	500	mm
I palen =	1021,1	m4/m2
Maat grondwaterstand t.o.v. bovenkant sokkel:	0,7	m
Volume beton onder grondwater:	434	m3

Belastingfactoren

Veiligheidsklasse:	2
Referentieperiode: [jaar]	22
factor momentane belastingwaarde (NEN 6702 art. 8,6,1,2)	0
reductiefactor conform NEN 6702 art. 5.5.2	0,91
Permanente belasting, gunstig werkend:	0,90
Permanente belasting, ongunstig werkend:	1,20
Permanente belasting, alleen perm. bel.:	1,35
Veranderlijke belasting:	1,30
"Gereduceerde belastingfactor" Veranderlijke belasting:	1,18

paalgegevens

d paal =	456	mm
L gem =	23,00	m
E =	20000	N/mm2

sokkel/ballast gegevens

D sokkel =	5,85	m
h sokkel =	0,59	m
% ballast	100%	bk=ok sokkel
v.m. ballast =	0,00	kN/m3

Representatieve belastingen

Dynamische belastingen (Normaal bedrijf)

	mastvoet:	paalfund.: (excl. gw.)	paalfund.: (incl. gw.)	
F hor =	692	692	692	kN
F vert =	5388	16713	12378	kN
M fund =	73588	73998	73998	kNm

Quasi-statische belastingen (Extreem storm)

	mastvoet:	paalfund.: (excl. gw.)	paalfund.: (incl. gw.)	
F hor =	1216	1216	1216	kN
F vert =	5210	16535	12200	kN
M fund =	125200	125921	125921	kNm

Paalbelastingen [kN]

	representatieve waarden		*rekenwaarden*	
	excl. grondwater	incl. grondwater	excl. grondwater	incl. grondwater
Dynamische paalbelastingen				
1) alleen verticale belasting:	492	364	664	491
2) maximale drukbelasting:	1053	926	1253	1100
3) maximale trekbelasting:	-70	-198	-221	-336
Quasi-statische paalbelastingen				
1) alleen verticale belasting:	486	359	657	484
2) maximale drukbelasting:	1442	1315	1713	1560
3) maximale trekbelasting:	-469	-597	-691	-806

Algemene gegevens palen

schachtafmeting:	0,456	**m**
puntafmeting:	0,506	**m**
	rond	
	grondverdringend	
negatieve kleef:	10	**kN per m1 paalomtrek**
Fr,rep,punt	2.500	**kN**
Fr,rep,schacht	1.000	kN
h kleef	10,0	m
Paallengte	23,0	**m**
F druk,stat,d	2.800	**kN**
F druk,dyn,d	1.740	**kN**
F druk,dyn,rep	2.175	**kN**
γ - =	1,25	materiaalfactor druk
red + =	70%	reductie% trek
red schacht	50%	**reductie% dyn. schacht**
red punt	67%	**reductie% dyn. punt**

Berekening dyn. Veerstijfheid palen

	maximum	minimum
Optr. dynamische repr. belasting [kN]:	1053	-70
25% Optr. belasting incl. neg. kleef [kN]:	267	-18
Aandeel punt berekend [kN]:	159	0
Aandeel schacht berekend [kN]:	108	-18
Optredende mobilisatie grond [mm]:	0,14	-0,03
Optr. elastische vervorming [mm] (factor 1,5):	1,14	-0,06
Optredende totale vervorming [mm]:	1,29	-0,09
Cyclische veerconstante paal [kN/mm]:	166	148

Samendrukbare laag onder paalpunt:		
Spreidingsoppervlak =	5,50	[m2]
Dikte samendrukbare laag h =	0,00	[m]
Samendrukkingsconstante C =	30	[-]
Oorspronkelijke grondspanning =	240	[kN/m2]

Maximaal vervormingsverschil cyclische belasting:	6,81	mm
Repr. dynamisch moment:	73998	kNm
Afstand uiterste palen:	15500	mm
Rekenwaarde rotatieveerstijfheid palen (factor 1,0):	168357	MNm/rad
Rekenwaarde rotatieveerstijfheid palen (factor 1,3):	129505	MNm/rad

Berekening dyn. veerstijfheid ronde funderingsplaat

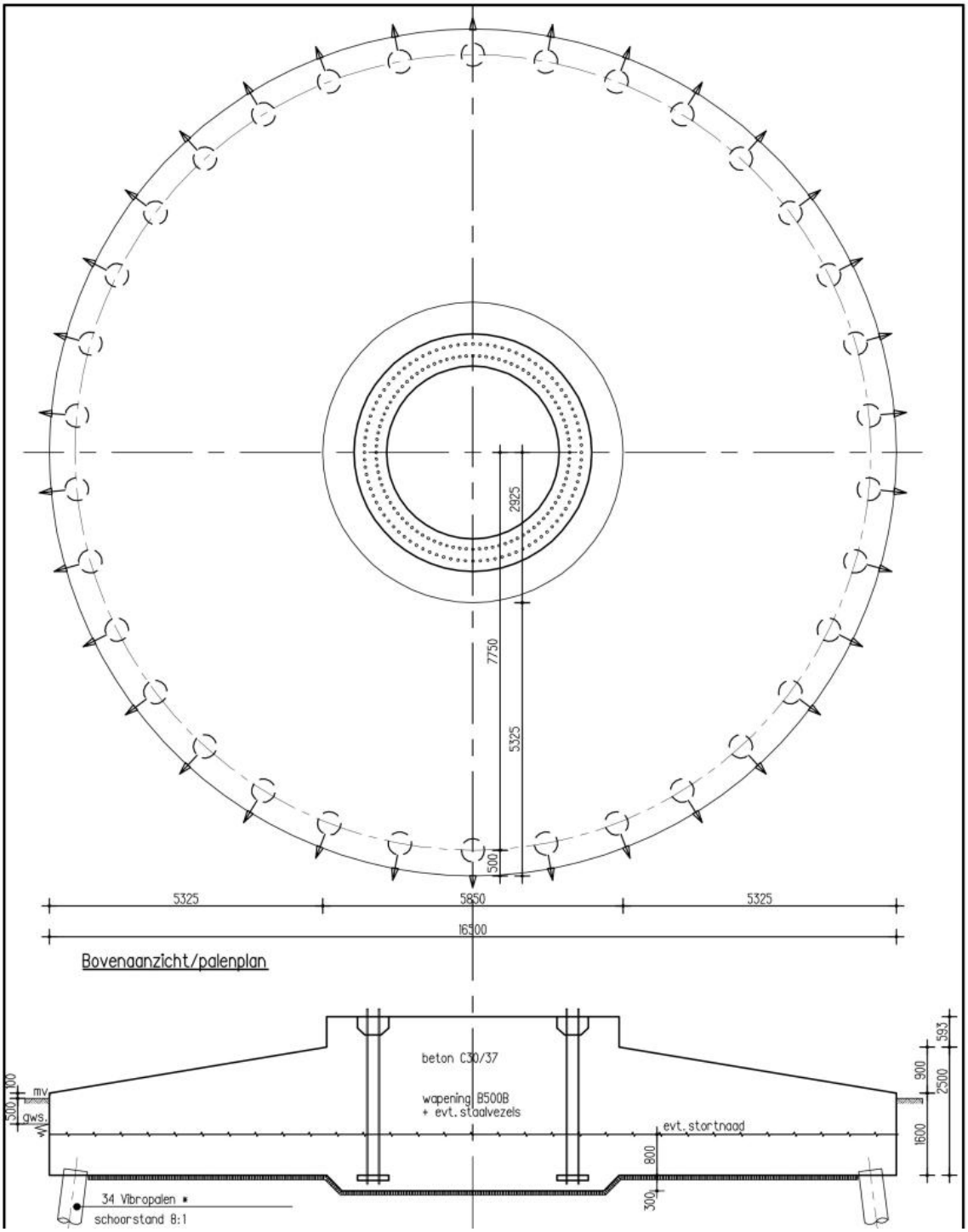
E (t=0)	31000	N/mm2
dikte plaat (eq)	2050	mm
diameter mastvoet	5000	mm
afstand palen	15500	mm

dyn. factor E	2,0	
Rekenwaarde rotatieveerstijfheid plaat (factor 1,0):	613070	MNm/rad
Rekenwaarde rotatieveerstijfheid plaat (factor 1,3):	471592	MNm/rad

Toetsing rotatieveerstijfheid fundament [MNm/rad]

	C rot,palen,max	C rot,palen,min	C rot,plaat	C rot,totaal.max	C rot,totaal,min	
t = 0:	168.357	129.505	613.070	132.085	106.919	voldoet
t = t:			471.592	124.066	101.604	voldoet

2.2. *Lay-out fundament*



3. Geotechnische berekeningen

3.1. *Algemeen*

Gezien het bodemprofiel wordt er gekozen voor een paalfundering. In deze berekening wordt een fundering op Vibro palen verder uitgewerkt.

De in hoofdstuk 2 berekende paalbelastingen en aangehouden paalafmetingen bedragen:

Tabel 6: turbine en paalbelastingen

Turbine	Maximale paalbelasting (ULS)		Palen
WT1 t/m WT6	1640 kN (druk)	670 kN (trek)	34 Vibro's ∅456/506 mm

De volgende paalpuntniveaus zijn gekozen.

Tabel 7: paalpuntniveaus

Turbine	Sondering	Paalpuntniveau [m t.o.v. NAP]
WT1	S1 t/m S3*	-23,0
WT2	DKM3**	-24,0
WT3	DKM7**	-22,0
WT4	DKM10**	-25,0***
WT5	DKM14**	-26,0***
WT6	DKM16**	-26,0***

*grondonderzoek Bodem Belang d.d. 2016 (Bijlage B)
**grondonderzoek Fugro d.d. 1996 (Bijlage C)
***sonderingen zijn t.b.v. drukdraagvermogen berekening niet tot voldoende diepte uitgevoerd. Op basis van de beschikbare sonderingen welke tot een dieper niveau zijn berekend is een conservatieve aanname gedaan van een conusweerstand van 5 MPa.

Het ontwerp van de fundering heeft plaatsgevonden conform de Eurocode 7-1. De constructie is hierbij in het algemeen als een stijf bouwwerk beschouwd.
De constructie moet worden ingedeeld in Geotechnische Categorie 2, gezien de aard van de constructie, de eventuele invloedsfactoren vanuit de omgeving alsmede de aangetroffen bodemgesteldheid.

In de volgende paragrafen worden de uitgangspunten voor de geotechnische berekening besproken en worden de resultaten van de berekening weergegeven. Voor de complete berekening wordt verwezen naar bijlage D.

3.2. *Drukpalen*

Voor op druk belaste palen worden achtereenvolgens de uiterste grenstoestanden 1A en 1B getoetst, alsmede de bruikbaarheidsgrenstoestand 2:
– uiterste grenstoestand 1A: bezwijkmechanisme in de grond;
– uiterste grenstoestand 1B: vervormingen zodanig dat voor de bouwconstructie niet meer wordt voldaan aan de eis van veiligheid;
– bruikbaarheidsgrenstoestand 2: vervormingen zodanig dat verlies aan bruikbaarheid van de bouwconstructie ontstaat alsmede schade, hoge onderhoudskosten e.d.

3.3. *Ontgravingseffect*

In verband met de benodigde ontgravingen moet rekening worden gehouden met een reductie van de gemeten sondeerwaarden. Op basis van Eurocode 7-1 artikel 7.6.3.2 (k) wordt de volgende berekeningsmethode gehanteerd:

Fase 1: ontgraving tot maximaal NAP -3,15 m (na heiwerk palen)

$$q_{c;z;corr} = \sqrt{\frac{\sigma'_{v;z}}{\sigma'_{v;z;i}}} q_{c;z}$$

Hierin is:

$q_{c;z;corr}$ = gecorrigeerde conusweerstand
$\sigma'_{v;z}$ = verticale korrelspanning na ontgraving
$\sigma'_{v;z;i}$ = verticale korrelspanning voor ontgraving
$q_{c;z}$ = conusweerstand voor ontgraving

3.3.1. *Uiterste grenstoestand 1A*

De maximale draagkracht van de paalpunt is berekend met de 4D/8D-methode van Koppejan. Voor de berekening van de draagkracht van de paalpunt geldt een paalklassefactor α_p van 0,7. Voorts zijn de waarden van de vormfactoren β en s gelijk aan 1,0 te stellen.
De maximale schachtwrijvingskracht is bepaald aan de hand van een percentage van de gemiddelde conusweerstand. De aan te houden paalklassefactor α_s bedraagt 0,014. Uitgangspunt is hierbij dat de hulpbuis terugheiend uit de grond wordt verwijderd.

Bij de bepaling van de rekenwaarde van de maximale draagkracht, ter plaatse van locatie WT1, is op basis van het bovenstaande een $\xi 3$ en $\xi 4$ -waarde van 1,18 (stijf bouwwerk en 3 sonderingen) gehanteerd. Voor de locaties WT2 t/m WT6 is een ξ_3 en ξ_4 -waarde van 1,26 (stijf bouwwerk en 1 sondering) gehanteerd

Bij de toetsing van grenstoestand 1A wordt in het rekenprogramma reeds rekening gehouden met het ontstaan van negatieve kleef langs de paalschacht, waarbij voor wat betreft de draagkracht impliciet grenstoestand 1B wordt getoetst.
Negatieve kleef kan ontstaan omdat de grond rondom de paal gedeeltelijk nog aan zettingen onderhevig kan zijn als gevolg van terreinophogingen en fluctuaties van de grondwaterstand. De negatieve kleef is berekend op een maximale waarde van 159 kN per m^1 paalomtrek.

3.3.2. *Maatgevende grenstoestand*

Concluderend kan worden gesteld dat in het onderhavige geval de maximaal realiseerbare draagkracht bepalend is voor het funderingsontwerp, dat wil zeggen: uiterste grenstoestand 1A, rekening houdend met het optreden van negatieve kleef.

Tabel 8: draagkracht op druk

Turbine	Sondering	Drukbelasting	Draagvermogen druk
WT1	S1 t/m S3	1640 kN	2089 kN
WT2	DKM3	1640 kN	1780 kN
WT3	DKM7	1640 kN	2205 kN
WT4	DKM10	1640 kN	1721 kN
WT5	DKM14	1640 kN	1783 kN
WT6	DKM16	1640 kN	1649 kN

3.4. *Trekpalen*

De rekenwaarde van de trekbelasting op de funderingspalen bedraagt 670 kN.
De trekpalen dienen te worden gedimensioneerd op basis van een drietal criteria:
- Opneembaarheid van de trekkracht door de paalschacht, te waarborgen door voldoende doorgaande paalwapening.
- Waarborging van evenwicht door mobilisatie van wrijving tussen grond en paalschacht, het zogenaamde schuifcriterium.

– Waarborging van evenwicht door mobilisatie van grondgewicht tussen de palen, het zogenaamde kluitcriterium.

Voor de berekeningen zijn de Eurocode 7-1 artikel 7.6.3.3 opgestelde rekenregels gehanteerd, gebaseerd op de zogenaamde qc-methode. Voor de paalklassefactor is een waarde van α_t= 0,012 aangehouden. In deze berekeningsmethode is het kluitcriterium impliciet verwerkt.
De factor voor het opspaneffect bij grondverdringende palen f_1 is zekerheidshalve op 1,0 gesteld.
De stramienafstand is dusdanig dat een reductie van de paaltrekkracht in rekening moet worden gebracht in verband met een verminderde korrelspanning ten gevolge van de afgifte van schuifkrachten in de hogere zandlagen (groepswerking).

Voor het bepalen van de rekenwaarde van de trekkracht is een materiaalfactor van $\gamma_{m;trek}$= 1,35 en een variatiecoëfficiënt van $\gamma_{m:var:qc}$= 1,25 gehanteerd.

De waarde van $\gamma_{m:var:qc}$ volgens de norm heeft betrekking op een belastingsituatie waarbij gedurende de levensduur een groot aantal belastingwisselingen kan optreden. In dit geval hebben we te maken met een quasi statische extreme belastingsituatie welke slechts één tot enkele keren gedurende de levensduur zou kunnen optreden. Er is desondanks een (geringere) extra veiligheid ingebouwd door toepassing van een $\gamma_{m:var:qc}$ van 1,25. De normaal bedrijfssituatie (ELNO) (welke een groot aantal keren optreed gedurende de levensduur) resulteert in een aanzienlijk lagere trekbelasting of zelfs enkel druk op de palen.

Tabel 9: draagkracht op trek

Turbine	Sondering	Trekbelasting	Draagvermogen trek
WT1	S1 t/m S3	670 kN	2089 kN
WT2	DKM3	670 kN	1780 kN
WT3	DKM7	670 kN	2205 kN
WT4	DKM10	670 kN	1721 kN
WT5	DKM14	670 kN	1783 kN
WT6	DKM16	670 kN	1649 kN

Bijlage A: specificaties windturbine

CLASS T05

DOCUMENT:
[0057-6792] VER 00

DESCRIPTION:
Foundation loads

Foundation loads

V126-3.45/3.6 MW, Mk3a/b, IEC2B/IEC2A, 117 m

50 Hz, GS

Version History

VERSION:	DATE:	CHANGE:
00	2016.02.17	New document

Table of Contents

1. Introduction

This document presents the foundation loads from the load spectrum of the following Mk3 turbines:

- V126 3.45MW IEC2B Mk3a
- V126 3.45MW IEC2A Mk3b
- V126 3.6MW IEC2A Mk3b

The natural frequency of the tower must be within the frequency interval [0.171 Hz; 0.188 Hz]

The loads are simulated in accordance with IEC61400-1 Edition 3, ref. [1]. Additional tower & foundation interface requirements can be found in ref [3] and the tower used for calculating the loads can be found in ref [2].

Reference	Description	Doc No.
[1]	IEC61400-1 Edition 3	
[2]	Tower drawing	0057-6926
[3]	Additional Tower & Foundation Interface Requirements	0001-3891

Table 1-1 Reference to documents.

2. Extreme loads

Foundation loads components at the instant of extreme resulting bending moment are given in beneath table. Own weight moment contribution due to tower out of vertical (0.008 m/m) is included with PLF 1.10 in below resultant moments.

Loads are given at height: 0.20m

Extreme resulting tower bottom moment according to ref [1] incl. own weight moment contribution due to 8mm/m tower out of vertical and second order effects. *unfavorable loads: PLF = 1.1, favorable loads: PLF = 0.9.

Mbt1: Resulting bending moment. SQRT(Mxt1^2 + Myt1^2) (also M_{res})
FndFr: Resulting shear force. SQRT(Fxt1^2 + Fyt1^2) (also F_{res})

Characteristic Extreme							
Lead	LC/Family	PLF	Type	Mbt1	Mzt1	FndFr	Fzt1
Sensor	[-]	[-]	[-]	[kNm]	[kNm]	[kN]	[kN]
Mbt1	62E50b04500(fam225)	1.10	Abs	**125200**	2463	1216	-5210
Mzt1	22VOGHWO200(fam118)	1.10	Abs	19270	**-7783**	159.1	-5205
FndFr	62E50b07500(fam227)	1.10	Abs	123200	1920	**1228**	-5247
Fzt1	1320etm04(fam40)	1.35	Abs	39110	2889	369.8	**-5444**

Table 2-1 Characteristic Extreme (excl. PLF). Load cases sorted with PLF.

Characteristic Extreme							
Lead	LC/Family	PLF	Type	Mbt1	Mzt1	FndFr	Fzt1
Sensor	[-]	[-]	[-]	[kNm]	[kNm]	[kN]	[kN]
Mbt1	62E50b04500(fam225)	1.10	Abs	**125200**	2463	1216	-5210
Mzt1	22VOGHWO200(fam118)	1.10	Abs	19270	**-7783**	159.1	-5205
FndFr	62E50b07500(fam227)	1.10	Abs	123200	1920	**1228**	-5247
Fzt1	1320etm04(fam40)	1.35	Abs	39110	2889	369.8	**-5444**

Table 2-2 Characteristic Extreme (excl. PLF). Load cases sorted without PLF.

Characteristic Extreme							
Lead	LC/Family	PLF	Type	Mbt1	Mzt1	FndFr	Fzt1
Sensor	[-]	[-]	[-]	[kNm]	[kNm]	[kN]	[kN]
Mbt1	62E50b04500(fam225)	1.10	Abs	**125200**	2463	1216	-5210
Mzt1	22VOGHWO200(fam118)	1.10	Abs	19270	**-7783**	159.1	-5205
FndFr	62E50b07500(fam227)	1.10	Abs	123200	1920	**1228**	-5247
Fzt1	22VOGHWO200(fam119)	1.10	Abs	36680	1945	339.8	**-5433**

Table 2-3 Characteristic Extreme (excl. PLF). Only load cases with PLF = 1.10.

Characteristic Extreme							
Lead	LC/Family	PLF	Type	Mbt1	Mzt1	FndFr	Fzt1
Sensor	[-]	[-]	[-]	[kNm]	[kNm]	[kN]	[kN]
Mbt1	32PREogVout21(fam181)	1.35	Abs	**100600**	116.9	859.4	-5310
Mzt1	21RPY10HWO1b00(fam83)	1.35	Abs	28800	**-6896**	286	-5186
FndFr	61E50a00800(fam209)	1.35	Abs	83380	-1079	**891.7**	-5031
Fzt1	1320etm04(fam40)	1.35	Abs	39110	2889	369.8	**-5444**

Table 2-4 Characteristic Extreme (excl. PLF). Only load cases with PLF = 1.35.

3. Production loads

The production loads are calculated for the main sensors of the foundation. The following loads are calculated.

Char. load Characteristic Extreme (excl. PLF, Load cases sorted without PLF). Only load cases with PLF = 1.35 and 1.50 are included in the evaluation.

Prob.: 1e-2 Load level with an exceedance probability of 1e-2

Prob.: 1e-4 Load level with an exceedance probability of 1e-4

Production loads				
		Char. load	Prob.:1e-2	Prob.:1e-4
M_{res}	[kNm]	100624.2	66340.26	73587.5
M_z	[kNm]	-6895.5	-2913.98	-4515.98
F_{res}	[kN]	891.72	570.1	692.03
F_z	[kN]	-5444.36	-5359.08	-5387.78

Table 3-1 Service Limit State (SLS) loads, in accordance with DiBt 2012.

4. Fatigue loads

For the foundation, the mean loads have to be considered. The mean loads must be combined with either the equivalent loads or the fatigue load spectrum.

Loads are given at height: 0.20m

The equivalent loads given may be used only if the material property can be characterized by an S/N-curve with the same slope as given for the equivalent loads.

Equivalent and Mean Fatigue Foundation Loads				
		Mean load	Range m = 4	Range m = 7
Fy	[kN]	283.77	576	497.26
Mx	[kNm]	-33650.8	31260.4	33920.73
Mz	[kNm]	-367.7	6530.84	6074.4

Table 4-1 Fatigue loads for N=1E7 cycles.

5. Stiffness of foundation

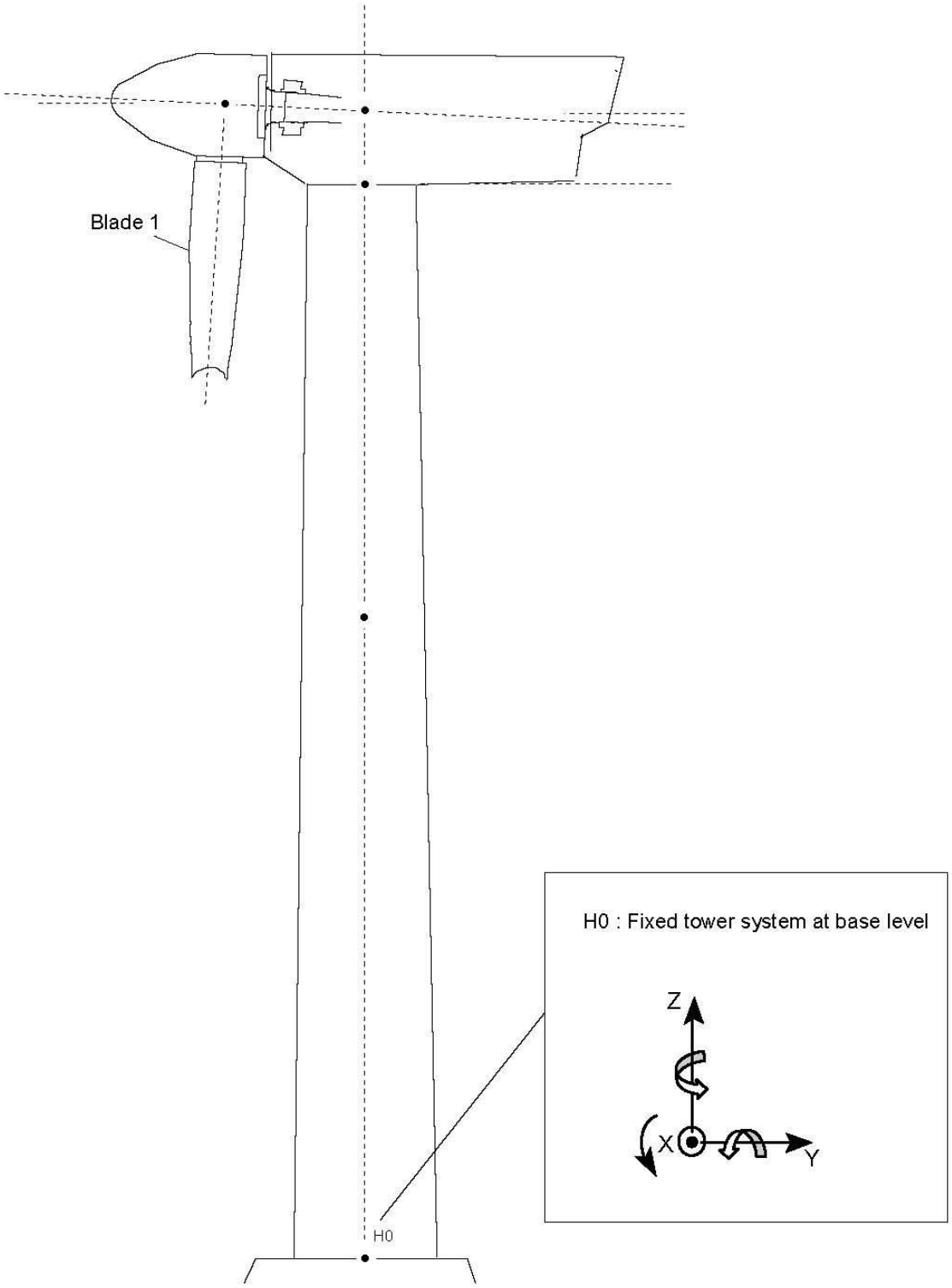
The nominal spring stiffness used for the load calculations is 500 GNm/rad resulting in a nominal tower frequency of 0.180 Hz. The spring stiffness of the foundation must be at least $C_{\varphi,dyn} \geq 41$ GNm/rad for the loads to be valid. Concurrent values for rotational- and lateral stiffness of the foundation are given in Table 5-1.

Concurrent values for rotational- and lateral stiffness										
Rotational stiffness	[GNm/rad]	41	49	72	107	157	231	340	443	500
Lateral stiffness	[MN/m]	2500.0	23.0	8.6	6.0	6.0	6.0	6.0	6.0	6.0

Table 5-1 Minimum lateral stiffness.

The natural frequency of the tower must be within the frequency interval [0.171 Hz; 0.188 Hz]

Appendix A. Co-ordinate systems



Foundation design must be verified for the most critical rainflow count and markov matrices.

Appendix B. Mk3a V126 3.45MW IEC2B HH117 Rain flow count

This appendix contains the rain flow spectrum for the shear force, the bending moment and the torsional moment in the bottom of the tower.

Foundation Fatigue Load Spectrum					
Tower shear, bottom F_y [kN]		Tower bending, bottom M_x [kNm]		Tower torsion, bottom M_z [kNm]	
Range	Frequency	Range	Frequency	Range	Frequency
1.140E+003	5.208E+000	1.178E+005	6.958E+000	9.413E+003	9.511E+002
1.094E+003	1.567E+001	1.131E+005	8.709E+000	9.036E+003	6.221E+003
1.049E+003	3.500E+000	1.084E+005	5.250E+000	8.660E+003	2.382E+004
1.003E+003	6.129E+001	1.037E+005	2.792E+001	8.283E+003	5.094E+004
9.577E+002	9.946E+001	9.897E+004	8.908E+001	7.907E+003	9.546E+004
9.121E+002	5.400E+001	9.426E+004	8.208E+001	7.530E+003	1.741E+005
8.665E+002	1.178E+003	8.955E+004	8.908E+001	7.154E+003	2.373E+005
8.209E+002	1.206E+002	8.484E+004	2.036E+002	6.777E+003	4.101E+005
7.753E+002	9.854E+003	8.012E+004	1.188E+002	6.401E+003	4.955E+005
7.297E+002	3.461E+004	7.541E+004	2.282E+002	6.024E+003	4.756E+005
6.841E+002	1.014E+005	7.070E+004	2.773E+002	5.648E+003	8.500E+005
6.384E+002	1.703E+005	6.598E+004	1.172E+003	5.271E+003	1.116E+006
5.928E+002	3.315E+005	6.127E+004	2.233E+003	4.895E+003	1.558E+006
5.472E+002	7.399E+005	5.656E+004	9.434E+003	4.518E+003	2.194E+006
5.016E+002	1.269E+006	5.184E+004	4.387E+004	4.142E+003	3.514E+006
4.560E+002	2.509E+006	4.713E+004	1.667E+005	3.765E+003	5.605E+006
4.104E+002	5.147E+006	4.242E+004	3.953E+005	3.389E+003	9.075E+006
3.648E+002	9.441E+006	3.770E+004	7.822E+005	3.012E+003	1.366E+007
3.192E+002	1.784E+007	3.299E+004	1.359E+006	2.636E+003	2.144E+007
2.736E+002	2.891E+007	2.828E+004	2.387E+006	2.259E+003	3.110E+007
2.280E+002	4.798E+007	2.357E+004	4.593E+006	1.883E+003	4.304E+007
1.824E+002	7.452E+007	1.885E+004	8.054E+006	1.506E+003	5.796E+007
1.368E+002	1.183E+008	1.414E+004	2.208E+007	1.130E+003	7.008E+007
9.121E+001	1.840E+008	9.426E+003	9.965E+007	7.530E+002	8.349E+007
4.560E+001	4.310E+008	4.713E+003	4.129E+008	3.765E+002	2.006E+008

Table B-1 Rainflow counting spectra

Appendix C. Mk3a V126 3.45MW IEC2B HH117 Markov matrices

This appendix contains the Markov Matrices for the shear force, the bending moment and the torsional moment in the bottom of the tower.

Markov Matrices								
Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
6.667E+002	2.280E+001	1.904E+003	5.819E+004	0.000E+000	3.500E+000	3.180E+003	1.883E+002	2.061E+003
6.667E+002	0.000E+000	6.366E+003	5.552E+004	0.000E+000	3.500E+000	3.180E+003	0.000E+000	1.007E+003
6.403E+002	6.841E+001	9.561E+003	4.752E+004	0.000E+000	3.500E+000	2.744E+003	7.530E+002	1.917E+004
6.403E+002	4.560E+001	1.667E-001	4.219E+004	0.000E+000	3.500E+000	2.744E+003	3.765E+002	6.366E+003
6.403E+002	2.280E+001	6.441E+003	3.952E+004	0.000E+000	7.000E+000	2.744E+003	1.883E+002	2.241E+003
6.403E+002	0.000E+000	4.474E+004	3.686E+004	2.357E+003	3.500E+000	2.744E+003	0.000E+000	3.573E+004
6.140E+002	4.560E+001	1.281E+004	3.686E+004	0.000E+000	8.417E+001	2.527E+003	2.071E+003	9.561E+003
6.140E+002	2.280E+001	4.786E+004	3.419E+004	2.357E+003	7.000E+000	2.527E+003	7.530E+002	3.808E+003
6.140E+002	0.000E+000	2.541E+005	3.419E+004	0.000E+000	1.042E+001	2.527E+003	5.648E+002	1.667E-001
5.877E+002	2.280E+002	6.366E+003	3.152E+004	2.357E+003	3.500E+000	2.527E+003	3.765E+002	1.917E+004
5.877E+002	1.824E+002	9.561E+003	3.152E+004	0.000E+000	2.800E+001	2.527E+003	1.883E+002	4.176E+004
5.877E+002	1.368E+002	1.838E+002	2.885E+004	4.713E+003	1.392E+001	2.527E+003	0.000E+000	7.208E+004
5.877E+002	1.140E+002	1.667E-001	2.885E+004	2.357E+003	1.050E+001	2.309E+003	1.883E+003	6.366E+003
5.877E+002	9.121E+001	1.511E+004	2.885E+004	0.000E+000	1.750E+001	2.309E+003	1.694E+003	9.561E+003
5.877E+002	6.841E+001	6.366E+003	2.619E+004	7.070E+003	3.500E+000	2.309E+003	1.506E+003	1.029E+003
5.877E+002	4.560E+001	1.046E+005	2.619E+004	4.713E+003	3.500E+000	2.309E+003	1.130E+003	3.500E+000
5.877E+002	2.280E+001	1.675E+005	2.619E+004	2.357E+003	9.117E+001	2.309E+003	9.413E+002	9.561E+003
5.877E+002	0.000E+000	8.276E+005	2.619E+004	0.000E+000	3.492E+001	2.309E+003	7.530E+002	2.354E+004
5.614E+002	2.964E+002	9.561E+003	2.352E+004	7.070E+003	3.500E+000	2.309E+003	5.648E+002	2.549E+004
5.614E+002	2.508E+002	6.366E+003	2.352E+004	2.357E+003	4.183E+001	2.309E+003	3.765E+002	3.906E+004
5.614E+002	2.280E+002	1.593E+004	2.352E+004	0.000E+000	4.550E+001	2.309E+003	1.883E+002	6.346E+004
5.614E+002	2.052E+002	2.538E+004	2.085E+004	4.713E+003	2.433E+001	2.309E+003	0.000E+000	1.388E+005
5.614E+002	1.824E+002	1.281E+004	2.085E+004	2.357E+003	2.100E+001	2.091E+003	2.259E+003	3.183E+003
5.614E+002	1.596E+002	5.538E+004	2.085E+004	0.000E+000	3.289E+002	2.091E+003	2.071E+003	1.904E+003
5.614E+002	1.368E+002	4.302E+004	1.819E+004	8.012E+004	1.750E+000	2.091E+003	1.694E+003	2.467E+004
5.614E+002	1.140E+002	7.495E+004	1.819E+004	5.184E+004	1.750E+000	2.091E+003	1.318E+003	1.974E+004
5.614E+002	9.121E+001	1.241E+005	1.819E+004	9.426E+003	3.500E+000	2.091E+003	1.130E+003	1.325E+004
5.614E+002	6.841E+001	5.978E+004	1.819E+004	4.713E+003	2.442E+001	2.091E+003	9.413E+002	2.237E+004
5.614E+002	4.560E+001	2.319E+005	1.819E+004	2.357E+003	4.192E+001	2.091E+003	7.530E+002	2.866E+004
5.614E+002	2.280E+001	8.880E+005	1.819E+004	0.000E+000	4.620E+002	2.091E+003	5.648E+002	8.237E+004
5.614E+002	0.000E+000	2.724E+006	1.552E+004	6.363E+004	1.750E+000	2.091E+003	3.765E+002	9.360E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
5.350E+002	4.332E+002	1.281E+004	1.552E+004	5.420E+004	1.750E+000	2.091E+003	1.883E+002	1.647E+005
5.350E+002	4.104E+002	1.281E+004	1.552E+004	4.713E+003	1.042E+001	2.091E+003	0.000E+000	1.836E+005
5.350E+002	3.420E+002	9.561E+003	1.552E+004	2.357E+003	3.442E+002	1.874E+003	3.389E+003	3.808E+003
5.350E+002	3.192E+002	1.917E+000	1.552E+004	0.000E+000	8.017E+002	1.874E+003	3.012E+003	1.904E+003
5.350E+002	2.964E+002	1.913E+004	1.285E+004	6.363E+004	1.750E+000	1.874E+003	2.447E+003	3.198E+004
5.350E+002	2.736E+002	1.912E+004	1.285E+004	5.656E+004	1.750E+000	1.874E+003	2.259E+003	3.216E+004
5.350E+002	2.508E+002	4.510E+004	1.285E+004	5.420E+004	3.500E+000	1.874E+003	2.071E+003	7.617E+003
5.350E+002	2.280E+002	1.375E+005	1.285E+004	5.184E+004	1.750E+000	1.874E+003	1.883E+003	3.260E+004
5.350E+002	2.052E+002	1.965E+005	1.285E+004	4.949E+004	5.250E+000	1.874E+003	1.694E+003	1.162E+004
5.350E+002	1.824E+002	2.570E+005	1.285E+004	4.713E+004	1.750E+000	1.874E+003	1.506E+003	2.356E+004
5.350E+002	1.596E+002	3.820E+005	1.285E+004	4.477E+004	1.750E+000	1.874E+003	1.318E+003	7.175E+004
5.350E+002	1.368E+002	5.596E+005	1.285E+004	3.770E+004	1.750E+000	1.874E+003	1.130E+003	8.530E+004
5.350E+002	1.140E+002	5.212E+005	1.285E+004	3.299E+004	1.750E+000	1.874E+003	9.413E+002	6.219E+004
5.350E+002	9.121E+001	5.721E+005	1.285E+004	7.070E+003	1.042E+001	1.874E+003	7.530E+002	3.792E+004
5.350E+002	6.841E+001	9.250E+005	1.285E+004	4.713E+003	1.570E+002	1.874E+003	5.648E+002	7.941E+004
5.350E+002	4.560E+001	1.122E+006	1.285E+004	2.357E+003	5.110E+002	1.874E+003	3.765E+002	9.801E+004
5.350E+002	2.280E+001	3.351E+006	1.285E+004	0.000E+000	7.700E+003	1.874E+003	1.883E+002	3.898E+005
5.350E+002	0.000E+000	7.099E+006	1.019E+004	5.420E+004	1.750E+000	1.874E+003	0.000E+000	3.254E+005
5.087E+002	5.244E+002	4.780E+003	1.019E+004	5.184E+004	1.750E+000	1.656E+003	3.577E+003	3.500E+000
5.087E+002	5.016E+002	6.403E+003	1.019E+004	4.949E+004	7.000E+000	1.656E+003	3.012E+003	1.912E+004
5.087E+002	4.788E+002	2.237E+004	1.019E+004	4.713E+004	3.500E+000	1.656E+003	2.824E+003	2.330E+004
5.087E+002	4.560E+002	1.281E+004	1.019E+004	4.477E+004	3.500E+000	1.656E+003	2.636E+003	1.892E+004
5.087E+002	4.332E+002	2.238E+004	1.019E+004	4.242E+004	5.250E+000	1.656E+003	2.447E+003	1.936E+004
5.087E+002	4.104E+002	2.237E+004	1.019E+004	4.006E+004	1.750E+000	1.656E+003	2.259E+003	1.868E+004
5.087E+002	3.876E+002	2.549E+004	1.019E+004	3.770E+004	1.050E+001	1.656E+003	2.071E+003	1.300E+005
5.087E+002	3.648E+002	6.079E+004	1.019E+004	3.535E+004	3.500E+000	1.656E+003	1.883E+003	8.784E+004
5.087E+002	3.420E+002	7.022E+004	1.019E+004	3.299E+004	3.500E+000	1.656E+003	1.694E+003	8.164E+004
5.087E+002	3.192E+002	1.087E+005	1.019E+004	3.063E+004	7.000E+000	1.656E+003	1.506E+003	8.727E+004
5.087E+002	2.964E+002	2.156E+005	1.019E+004	2.828E+004	7.000E+000	1.656E+003	1.318E+003	9.942E+004
5.087E+002	2.736E+002	3.108E+005	1.019E+004	2.592E+004	8.750E+000	1.656E+003	1.130E+003	7.334E+004
5.087E+002	2.508E+002	5.138E+005	1.019E+004	2.357E+004	5.250E+000	1.656E+003	9.413E+002	9.908E+004
5.087E+002	2.280E+002	6.514E+005	1.019E+004	1.650E+004	3.500E+000	1.656E+003	7.530E+002	1.270E+005
5.087E+002	2.052E+002	1.035E+006	1.019E+004	9.426E+003	3.500E+000	1.656E+003	5.648E+002	1.881E+005
5.087E+002	1.824E+002	1.375E+006	1.019E+004	7.070E+003	7.850E+001	1.656E+003	3.765E+002	2.880E+005
5.087E+002	1.596E+002	1.704E+006	1.019E+004	4.713E+003	2.532E+002	1.656E+003	1.883E+002	6.063E+005

Markov Matrices								
Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
5.087E+002	1.368E+002	2.146E+006	1.019E+004	2.357E+003	1.436E+004	1.656E+003	0.000E+000	1.021E+006
5.087E+002	1.140E+002	2.696E+006	1.019E+004	0.000E+000	1.295E+005	1.438E+003	3.765E+003	4.115E+003
5.087E+002	9.121E+001	3.085E+006	7.519E+003	4.713E+004	5.250E+000	1.438E+003	3.389E+003	1.374E+004
5.087E+002	6.841E+001	3.270E+006	7.519E+003	4.242E+004	5.250E+000	1.438E+003	3.200E+003	2.058E+003
5.087E+002	4.560E+001	4.065E+006	7.519E+003	4.006E+004	5.250E+000	1.438E+003	3.012E+003	3.441E+004
5.087E+002	2.280E+001	9.126E+006	7.519E+003	3.770E+004	1.050E+001	1.438E+003	2.824E+003	1.593E+004
5.087E+002	0.000E+000	1.658E+007	7.519E+003	3.535E+004	8.750E+000	1.438E+003	2.636E+003	8.365E+004
4.824E+002	6.384E+002	4.780E+003	7.519E+003	3.299E+004	4.625E+001	1.438E+003	2.447E+003	8.263E+004
4.824E+002	5.472E+002	9.561E+003	7.519E+003	3.063E+004	1.127E+002	1.438E+003	2.259E+003	8.665E+004
4.824E+002	5.244E+002	6.403E+003	7.519E+003	2.828E+004	2.779E+002	1.438E+003	2.071E+003	1.279E+005
4.824E+002	5.016E+002	6.403E+003	7.519E+003	2.592E+004	1.654E+002	1.438E+003	1.883E+003	1.152E+005
4.824E+002	4.788E+002	3.517E+004	7.519E+003	2.357E+004	2.218E+002	1.438E+003	1.694E+003	2.161E+005
4.824E+002	4.560E+002	4.159E+004	7.519E+003	2.121E+004	2.012E+002	1.438E+003	1.506E+003	1.543E+005
4.824E+002	4.332E+002	3.518E+004	7.519E+003	1.885E+004	4.143E+002	1.438E+003	1.318E+003	2.036E+005
4.824E+002	4.104E+002	9.418E+004	7.519E+003	1.650E+004	1.283E+002	1.438E+003	1.130E+003	2.093E+005
4.824E+002	3.876E+002	1.423E+005	7.519E+003	1.414E+004	2.800E+001	1.438E+003	9.413E+002	2.103E+005
4.824E+002	3.648E+002	2.049E+005	7.519E+003	1.178E+004	3.419E+003	1.438E+003	7.530E+002	2.569E+005
4.824E+002	3.420E+002	3.379E+005	7.519E+003	9.426E+003	1.813E+001	1.438E+003	5.648E+002	1.981E+005
4.824E+002	3.192E+002	7.199E+005	7.519E+003	7.070E+003	1.050E+001	1.438E+003	3.765E+002	3.119E+005
4.824E+002	2.964E+002	9.182E+005	7.519E+003	4.713E+003	6.752E+003	1.438E+003	1.883E+002	1.116E+006
4.824E+002	2.736E+002	9.560E+005	7.519E+003	2.357E+003	3.333E+004	1.438E+003	0.000E+000	1.381E+006
4.824E+002	2.508E+002	1.580E+006	7.519E+003	0.000E+000	3.571E+005	1.221E+003	4.518E+003	3.333E-001
4.824E+002	2.280E+002	2.157E+006	4.852E+003	6.363E+004	3.333E+001	1.221E+003	4.330E+003	3.808E+003
4.824E+002	2.052E+002	2.603E+006	4.852E+003	5.420E+004	3.333E+001	1.221E+003	4.142E+003	2.561E+004
4.824E+002	1.824E+002	3.327E+006	4.852E+003	4.477E+004	3.500E+000	1.221E+003	3.953E+003	9.183E+001
4.824E+002	1.596E+002	4.508E+006	4.852E+003	4.242E+004	1.750E+000	1.221E+003	3.765E+003	1.342E+004
4.824E+002	1.368E+002	6.033E+006	4.852E+003	4.006E+004	8.750E+000	1.221E+003	3.577E+003	8.423E+003
4.824E+002	1.140E+002	6.880E+006	4.852E+003	3.770E+004	7.000E+000	1.221E+003	3.389E+003	1.381E+004
4.824E+002	9.121E+001	7.493E+006	4.852E+003	3.535E+004	1.519E+002	1.221E+003	3.200E+003	6.371E+004
4.824E+002	6.841E+001	8.257E+006	4.852E+003	3.299E+004	4.817E+001	1.221E+003	3.012E+003	2.329E+004
4.824E+002	4.560E+001	8.539E+006	4.852E+003	3.063E+004	7.358E+001	1.221E+003	2.824E+003	3.896E+004
4.824E+002	2.280E+001	1.793E+007	4.852E+003	2.828E+004	1.225E+001	1.221E+003	2.636E+003	7.092E+004
4.824E+002	0.000E+000	2.856E+007	4.852E+003	2.592E+004	1.575E+001	1.221E+003	2.447E+003	1.379E+005
4.561E+002	6.156E+002	3.183E+003	4.852E+003	2.357E+004	6.200E+001	1.221E+003	2.259E+003	1.325E+005
4.561E+002	5.928E+002	1.281E+004	4.852E+003	2.121E+004	3.491E+002	1.221E+003	2.071E+003	1.832E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
4.561E+002	5.700E+002	6.403E+003	4.852E+003	1.885E+004	8.558E+002	1.221E+003	1.883E+003	2.126E+005
4.561E+002	5.472E+002	1.277E+004	4.852E+003	1.650E+004	5.043E+002	1.221E+003	1.694E+003	2.774E+005
4.561E+002	5.244E+002	1.437E+004	4.852E+003	1.414E+004	3.790E+003	1.221E+003	1.506E+003	4.214E+005
4.561E+002	5.016E+002	1.483E+004	4.852E+003	1.178E+004	1.007E+004	1.221E+003	1.318E+003	2.518E+005
4.561E+002	4.788E+002	5.901E+004	4.852E+003	9.426E+003	7.300E+003	1.221E+003	1.130E+003	2.165E+005
4.561E+002	4.560E+002	8.635E+004	4.852E+003	7.070E+003	3.311E+003	1.221E+003	9.413E+002	4.472E+005
4.561E+002	4.332E+002	1.242E+005	4.852E+003	4.713E+003	2.574E+004	1.221E+003	7.530E+002	3.704E+005
4.561E+002	4.104E+002	2.311E+005	4.852E+003	2.357E+003	7.097E+004	1.221E+003	5.648E+002	4.751E+005
4.561E+002	3.876E+002	3.558E+005	4.852E+003	0.000E+000	5.392E+005	1.221E+003	3.765E+002	7.245E+005
4.561E+002	3.648E+002	4.973E+005	2.185E+003	4.949E+004	1.750E+000	1.221E+003	1.883E+002	1.605E+006
4.561E+002	3.420E+002	8.850E+005	2.185E+003	4.477E+004	3.333E+001	1.221E+003	0.000E+000	2.410E+006
4.561E+002	3.192E+002	1.030E+006	2.185E+003	4.006E+004	5.250E+000	1.003E+003	4.895E+003	2.058E+003
4.561E+002	2.964E+002	1.496E+006	2.185E+003	3.770E+004	6.992E+001	1.003E+003	4.706E+003	1.750E+000
4.561E+002	2.736E+002	2.016E+006	2.185E+003	3.535E+004	6.658E+001	1.003E+003	4.330E+003	1.281E+004
4.561E+002	2.508E+002	2.693E+006	2.185E+003	3.299E+004	6.308E+001	1.003E+003	4.142E+003	7.504E+003
4.561E+002	2.280E+002	3.481E+006	2.185E+003	3.063E+004	6.750E+001	1.003E+003	3.953E+003	4.190E+003
4.561E+002	2.052E+002	4.800E+006	2.185E+003	2.828E+004	8.750E+000	1.003E+003	3.765E+003	2.929E+004
4.561E+002	1.824E+002	5.752E+006	2.185E+003	2.592E+004	5.250E+000	1.003E+003	3.577E+003	2.685E+004
4.561E+002	1.596E+002	7.234E+006	2.185E+003	2.357E+004	1.105E+002	1.003E+003	3.389E+003	4.180E+004
4.561E+002	1.368E+002	9.253E+006	2.185E+003	2.121E+004	3.475E+003	1.003E+003	3.200E+003	3.846E+004
4.561E+002	1.140E+002	9.561E+006	2.185E+003	1.885E+004	3.990E+003	1.003E+003	3.012E+003	9.750E+004
4.561E+002	9.121E+001	1.101E+007	2.185E+003	1.650E+004	1.686E+003	1.003E+003	2.824E+003	1.104E+005
4.561E+002	6.841E+001	1.050E+007	2.185E+003	1.414E+004	3.237E+003	1.003E+003	2.636E+003	1.331E+005
4.561E+002	4.560E+001	1.180E+007	2.185E+003	1.178E+004	4.390E+003	1.003E+003	2.447E+003	1.749E+005
4.561E+002	2.280E+001	2.362E+007	2.185E+003	9.426E+003	6.201E+003	1.003E+003	2.259E+003	2.452E+005
4.561E+002	0.000E+000	3.498E+007	2.185E+003	7.070E+003	2.005E+004	1.003E+003	2.071E+003	3.170E+005
4.297E+002	7.068E+002	4.780E+003	2.185E+003	4.713E+003	3.030E+005	1.003E+003	1.883E+003	3.167E+005
4.297E+002	6.612E+002	3.183E+003	2.185E+003	2.357E+003	1.640E+006	1.003E+003	1.694E+003	3.747E+005
4.297E+002	6.156E+002	4.780E+003	2.185E+003	0.000E+000	2.057E+007	1.003E+003	1.506E+003	5.226E+005
4.297E+002	5.928E+002	2.868E+004	-4.818E+002	1.178E+005	1.750E+000	1.003E+003	1.318E+003	4.725E+005
4.297E+002	5.700E+002	6.371E+003	-4.818E+002	4.006E+004	6.225E+001	1.003E+003	1.130E+003	6.562E+005
4.297E+002	5.472E+002	1.912E+004	-4.818E+002	3.535E+004	1.750E+000	1.003E+003	9.413E+002	4.577E+005
4.297E+002	5.244E+002	3.353E+004	-4.818E+002	3.299E+004	1.600E+001	1.003E+003	7.530E+002	4.835E+005
4.297E+002	5.016E+002	6.860E+004	-4.818E+002	3.063E+004	4.750E+000	1.003E+003	5.648E+002	7.859E+005
4.297E+002	4.788E+002	9.367E+004	-4.818E+002	2.828E+004	6.250E+000	1.003E+003	3.765E+002	1.244E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
4.297E+002	4.560E+002	1.075E+005	-4.818E+002	2.592E+004	6.667E+003	1.003E+003	1.883E+002	3.011E+006
4.297E+002	4.332E+002	2.310E+005	-4.818E+002	2.357E+004	6.667E+001	1.003E+003	0.000E+000	4.499E+006
4.297E+002	4.104E+002	2.292E+005	-4.818E+002	2.121E+004	3.508E+001	7.851E+002	5.836E+003	1.750E+000
4.297E+002	3.876E+002	3.848E+005	-4.818E+002	1.885E+004	9.493E+002	7.851E+002	5.648E+003	1.750E+000
4.297E+002	3.648E+002	4.762E+005	-4.818E+002	1.650E+004	6.908E+003	7.851E+002	5.271E+003	4.780E+003
4.297E+002	3.420E+002	8.517E+005	-4.818E+002	1.414E+004	6.099E+003	7.851E+002	4.895E+003	2.241E+003
4.297E+002	3.192E+002	1.156E+006	-4.818E+002	1.178E+004	6.872E+002	7.851E+002	4.518E+003	1.837E+002
4.297E+002	2.964E+002	1.629E+006	-4.818E+002	9.426E+003	1.839E+004	7.851E+002	4.330E+003	5.866E+003
4.297E+002	2.736E+002	1.847E+006	-4.818E+002	7.070E+003	4.058E+004	7.851E+002	4.142E+003	1.147E+004
4.297E+002	2.508E+002	2.614E+006	-4.818E+002	4.713E+003	2.401E+005	7.851E+002	3.953E+003	3.536E+004
4.297E+002	2.280E+002	2.963E+006	-4.818E+002	2.357E+003	5.965E+005	7.851E+002	3.765E+003	3.586E+004
4.297E+002	2.052E+002	4.692E+006	-4.818E+002	0.000E+000	3.274E+006	7.851E+002	3.577E+003	4.382E+004
4.297E+002	1.824E+002	5.195E+006	-3.149E+003	7.777E+004	1.750E+000	7.851E+002	3.389E+003	5.059E+004
4.297E+002	1.596E+002	6.174E+006	-3.149E+003	5.420E+004	3.333E+001	7.851E+002	3.200E+003	8.458E+004
4.297E+002	1.368E+002	7.513E+006	-3.149E+003	4.949E+004	3.333E+001	7.851E+002	3.012E+003	1.061E+005
4.297E+002	1.140E+002	8.422E+006	-3.149E+003	4.242E+004	3.750E+001	7.851E+002	2.824E+003	2.065E+005
4.297E+002	9.121E+001	9.626E+006	-3.149E+003	4.006E+004	3.750E+001	7.851E+002	2.636E+003	1.424E+005
4.297E+002	6.841E+001	9.762E+006	-3.149E+003	3.770E+004	1.313E+001	7.851E+002	2.447E+003	2.386E+005
4.297E+002	4.560E+001	1.086E+007	-3.149E+003	3.535E+004	4.583E+001	7.851E+002	2.259E+003	3.651E+005
4.297E+002	2.280E+001	2.265E+007	-3.149E+003	3.299E+004	1.927E+002	7.851E+002	2.071E+003	4.763E+005
4.297E+002	0.000E+000	3.511E+007	-3.149E+003	3.063E+004	8.750E+000	7.851E+002	1.883E+003	5.664E+005
4.034E+002	7.297E+002	3.183E+003	-3.149E+003	2.828E+004	6.734E+003	7.851E+002	1.694E+003	7.382E+005
4.034E+002	7.068E+002	3.183E+003	-3.149E+003	2.592E+004	4.725E+001	7.851E+002	1.506E+003	7.813E+005
4.034E+002	6.841E+002	8.270E+003	-3.149E+003	2.357E+004	1.313E+002	7.851E+002	1.318E+003	9.745E+005
4.034E+002	6.612E+002	4.780E+003	-3.149E+003	2.121E+004	5.888E+003	7.851E+002	1.130E+003	9.252E+005
4.034E+002	6.384E+002	7.963E+003	-3.149E+003	1.885E+004	2.573E+003	7.851E+002	9.413E+002	1.229E+006
4.034E+002	6.156E+002	1.752E+004	-3.149E+003	1.650E+004	2.474E+002	7.851E+002	7.530E+002	1.372E+006
4.034E+002	5.928E+002	1.293E+004	-3.149E+003	1.414E+004	5.760E+002	7.851E+002	5.648E+002	1.296E+006
4.034E+002	5.700E+002	2.256E+004	-3.149E+003	1.178E+004	4.196E+003	7.851E+002	3.765E+002	1.975E+006
4.034E+002	5.472E+002	6.852E+004	-3.149E+003	9.426E+003	2.091E+004	7.851E+002	1.883E+002	4.854E+006
4.034E+002	5.244E+002	8.943E+004	-3.149E+003	7.070E+003	1.477E+004	7.851E+002	0.000E+000	7.870E+006
4.034E+002	5.016E+002	7.232E+004	-3.149E+003	4.713E+003	3.238E+005	5.675E+002	8.095E+003	1.029E+003
4.034E+002	4.788E+002	1.070E+005	-3.149E+003	2.357E+003	1.535E+006	5.675E+002	5.648E+003	1.121E+003
4.034E+002	4.560E+002	1.205E+005	-3.149E+003	0.000E+000	6.634E+006	5.675E+002	5.459E+003	1.231E+003
4.034E+002	4.332E+002	1.596E+005	-5.816E+003	1.084E+005	1.750E+000	5.675E+002	5.271E+003	2.505E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
4.034E+002	4.104E+002	2.515E+005	-5.816E+003	4.949E+004	3.750E+001	5.675E+002	4.895E+003	1.223E+004
4.034E+002	3.876E+002	3.696E+005	-5.816E+003	4.713E+004	3.396E+001	5.675E+002	4.706E+003	1.277E+004
4.034E+002	3.648E+002	4.359E+005	-5.816E+003	4.006E+004	5.000E+000	5.675E+002	4.518E+003	7.925E+003
4.034E+002	3.420E+002	5.235E+005	-5.816E+003	3.770E+004	1.046E+002	5.675E+002	4.330E+003	3.472E+004
4.034E+002	3.192E+002	7.425E+005	-5.816E+003	3.535E+004	1.855E+002	5.675E+002	4.142E+003	6.920E+004
4.034E+002	2.964E+002	9.437E+005	-5.816E+003	3.299E+004	2.575E+002	5.675E+002	3.953E+003	2.381E+004
4.034E+002	2.736E+002	1.211E+006	-5.816E+003	3.063E+004	5.834E+002	5.675E+002	3.765E+003	6.018E+004
4.034E+002	2.508E+002	1.823E+006	-5.816E+003	2.828E+004	7.331E+002	5.675E+002	3.577E+003	9.339E+004
4.034E+002	2.280E+002	2.180E+006	-5.816E+003	2.592E+004	9.706E+002	5.675E+002	3.389E+003	1.177E+005
4.034E+002	2.052E+002	2.479E+006	-5.816E+003	2.357E+004	6.580E+002	5.675E+002	3.200E+003	5.716E+004
4.034E+002	1.824E+002	3.309E+006	-5.816E+003	2.121E+004	1.148E+004	5.675E+002	3.012E+003	1.123E+005
4.034E+002	1.596E+002	4.066E+006	-5.816E+003	1.885E+004	2.253E+004	5.675E+002	2.824E+003	2.660E+005
4.034E+002	1.368E+002	4.878E+006	-5.816E+003	1.650E+004	5.592E+003	5.675E+002	2.636E+003	2.546E+005
4.034E+002	1.140E+002	6.270E+006	-5.816E+003	1.414E+004	1.475E+004	5.675E+002	2.447E+003	3.899E+005
4.034E+002	9.121E+001	6.795E+006	-5.816E+003	1.178E+004	8.303E+003	5.675E+002	2.259E+003	4.125E+005
4.034E+002	6.841E+001	7.229E+006	-5.816E+003	9.426E+003	2.156E+004	5.675E+002	2.071E+003	5.865E+005
4.034E+002	4.560E+001	8.640E+006	-5.816E+003	7.070E+003	6.708E+004	5.675E+002	1.883E+003	6.302E+005
4.034E+002	2.280E+001	1.732E+007	-5.816E+003	4.713E+003	1.068E+006	5.675E+002	1.694E+003	9.848E+005
4.034E+002	0.000E+000	3.047E+007	-5.816E+003	2.357E+003	3.855E+006	5.675E+002	1.506E+003	1.411E+006
3.771E+002	7.753E+002	4.780E+003	-5.816E+003	0.000E+000	1.601E+007	5.675E+002	1.318E+003	1.620E+006
3.771E+002	7.068E+002	4.780E+003	-8.483E+003	1.013E+005	1.750E+000	5.675E+002	1.130E+003	1.547E+006
3.771E+002	6.841E+002	7.394E+003	-8.483E+003	8.248E+004	1.750E+000	5.675E+002	9.413E+002	1.911E+006
3.771E+002	6.612E+002	1.368E+004	-8.483E+003	5.420E+004	6.250E-001	5.675E+002	7.530E+002	1.958E+006
3.771E+002	6.384E+002	2.865E+004	-8.483E+003	5.184E+004	6.575E+000	5.675E+002	5.648E+002	2.146E+006
3.771E+002	6.156E+002	1.464E+004	-8.483E+003	4.949E+004	6.250E-001	5.675E+002	3.765E+002	2.945E+006
3.771E+002	5.928E+002	1.972E+004	-8.483E+003	4.713E+004	4.375E+000	5.675E+002	1.883E+002	6.888E+006
3.771E+002	5.700E+002	4.082E+004	-8.483E+003	4.477E+004	2.157E+001	5.675E+002	0.000E+000	1.208E+007
3.771E+002	5.472E+002	3.180E+004	-8.483E+003	4.242E+004	1.467E+002	3.498E+002	6.401E+003	5.035E+002
3.771E+002	5.244E+002	2.673E+004	-8.483E+003	4.006E+004	4.250E+001	3.498E+002	6.024E+003	2.238E+002
3.771E+002	5.016E+002	1.163E+005	-8.483E+003	3.770E+004	2.081E+002	3.498E+002	5.836E+003	5.078E+002
3.771E+002	4.788E+002	9.022E+004	-8.483E+003	3.535E+004	2.523E+002	3.498E+002	5.648E+003	1.031E+003
3.771E+002	4.560E+002	8.377E+004	-8.483E+003	3.299E+004	5.019E+002	3.498E+002	5.459E+003	1.062E+004
3.771E+002	4.332E+002	1.489E+005	-8.483E+003	3.063E+004	2.529E+002	3.498E+002	5.271E+003	1.129E+004
3.771E+002	4.104E+002	2.624E+005	-8.483E+003	2.828E+004	5.092E+002	3.498E+002	5.083E+003	1.350E+004
3.771E+002	3.876E+002	2.874E+005	-8.483E+003	2.592E+004	1.282E+003	3.498E+002	4.895E+003	1.895E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.771E+002	3.648E+002	4.891E+005	-8.483E+003	2.357E+004	9.243E+002	3.498E+002	4.706E+003	4.281E+004
3.771E+002	3.420E+002	6.249E+005	-8.483E+003	2.121E+004	1.312E+003	3.498E+002	4.518E+003	1.188E+004
3.771E+002	3.192E+002	7.085E+005	-8.483E+003	1.885E+004	2.048E+003	3.498E+002	4.330E+003	2.711E+004
3.771E+002	2.964E+002	1.104E+006	-8.483E+003	1.650E+004	2.448E+003	3.498E+002	4.142E+003	8.481E+004
3.771E+002	2.736E+002	1.323E+006	-8.483E+003	1.414E+004	1.289E+004	3.498E+002	3.953E+003	4.155E+004
3.771E+002	2.508E+002	1.514E+006	-8.483E+003	1.178E+004	4.909E+004	3.498E+002	3.765E+003	7.729E+004
3.771E+002	2.280E+002	2.121E+006	-8.483E+003	9.426E+003	5.328E+004	3.498E+002	3.577E+003	1.511E+005
3.771E+002	2.052E+002	2.363E+006	-8.483E+003	7.070E+003	6.102E+004	3.498E+002	3.389E+003	1.367E+005
3.771E+002	1.824E+002	3.078E+006	-8.483E+003	4.713E+003	1.212E+006	3.498E+002	3.200E+003	2.419E+005
3.771E+002	1.596E+002	3.457E+006	-8.483E+003	2.357E+003	5.275E+006	3.498E+002	3.012E+003	2.812E+005
3.771E+002	1.368E+002	4.236E+006	-8.483E+003	0.000E+000	2.132E+007	3.498E+002	2.824E+003	3.855E+005
3.771E+002	1.140E+002	5.150E+006	-1.115E+004	1.155E+005	5.208E+000	3.498E+002	2.636E+003	4.397E+005
3.771E+002	9.121E+001	6.226E+006	-1.115E+004	1.108E+005	8.709E+000	3.498E+002	2.447E+003	5.588E+005
3.771E+002	6.841E+001	6.843E+006	-1.115E+004	1.060E+005	1.750E+000	3.498E+002	2.259E+003	8.614E+005
3.771E+002	4.560E+001	7.701E+006	-1.115E+004	1.013E+005	1.750E+000	3.498E+002	2.071E+003	1.008E+006
3.771E+002	2.280E+001	1.540E+007	-1.115E+004	9.426E+004	1.750E+000	3.498E+002	1.883E+003	1.154E+006
3.771E+002	0.000E+000	2.667E+007	-1.115E+004	8.012E+004	1.750E+000	3.498E+002	1.694E+003	1.563E+006
3.507E+002	7.753E+002	1.904E+003	-1.115E+004	7.777E+004	1.750E+000	3.498E+002	1.506E+003	2.079E+006
3.507E+002	7.297E+002	1.029E+003	-1.115E+004	5.891E+004	3.750E+001	3.498E+002	1.318E+003	2.174E+006
3.507E+002	7.068E+002	6.776E+003	-1.115E+004	5.420E+004	4.075E+000	3.498E+002	1.130E+003	2.572E+006
3.507E+002	6.841E+002	2.360E+004	-1.115E+004	5.184E+004	5.542E+001	3.498E+002	9.413E+002	3.247E+006
3.507E+002	6.612E+002	1.423E+004	-1.115E+004	4.949E+004	1.375E+001	3.498E+002	7.530E+002	3.234E+006
3.507E+002	6.384E+002	1.644E+004	-1.115E+004	4.713E+004	1.452E+002	3.498E+002	5.648E+002	3.428E+006
3.507E+002	6.156E+002	2.088E+004	-1.115E+004	4.477E+004	9.809E+001	3.498E+002	3.765E+002	5.000E+006
3.507E+002	5.928E+002	4.659E+004	-1.115E+004	4.242E+004	7.825E+000	3.498E+002	1.883E+002	9.995E+006
3.507E+002	5.700E+002	2.393E+004	-1.115E+004	4.006E+004	1.810E+002	3.498E+002	0.000E+000	1.770E+007
3.507E+002	5.472E+002	6.092E+004	-1.115E+004	3.770E+004	2.567E+002	1.321E+002	9.036E+003	1.029E+003
3.507E+002	5.244E+002	1.006E+005	-1.115E+004	3.535E+004	4.295E+002	1.321E+002	8.660E+003	1.810E+002
3.507E+002	5.016E+002	7.866E+004	-1.115E+004	3.299E+004	4.873E+002	1.321E+002	8.472E+003	5.000E+000
3.507E+002	4.788E+002	1.221E+005	-1.115E+004	3.063E+004	6.014E+002	1.321E+002	7.907E+003	1.029E+003
3.507E+002	4.560E+002	1.821E+005	-1.115E+004	2.828E+004	1.491E+003	1.321E+002	7.719E+003	1.007E+003
3.507E+002	4.332E+002	1.872E+005	-1.115E+004	2.592E+004	9.020E+002	1.321E+002	7.530E+003	3.436E+003
3.507E+002	4.104E+002	3.847E+005	-1.115E+004	2.357E+004	1.179E+003	1.321E+002	7.342E+003	5.035E+002
3.507E+002	3.876E+002	4.363E+005	-1.115E+004	2.121E+004	1.672E+003	1.321E+002	6.965E+003	1.119E+003
3.507E+002	3.648E+002	4.982E+005	-1.115E+004	1.885E+004	2.132E+004	1.321E+002	6.777E+003	1.904E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.507E+002	3.420E+002	6.538E+005	-1.115E+004	1.650E+004	4.035E+004	1.321E+002	6.589E+003	5.953E+002
3.507E+002	3.192E+002	8.689E+005	-1.115E+004	1.414E+004	1.592E+004	1.321E+002	6.401E+003	7.394E+003
3.507E+002	2.964E+002	1.109E+006	-1.115E+004	1.178E+004	1.932E+004	1.321E+002	6.213E+003	4.780E+003
3.507E+002	2.736E+002	1.372E+006	-1.115E+004	9.426E+003	4.188E+004	1.321E+002	5.836E+003	2.058E+003
3.507E+002	2.508E+002	1.753E+006	-1.115E+004	7.070E+003	1.595E+005	1.321E+002	5.648E+003	7.553E+003
3.507E+002	2.280E+002	2.031E+006	-1.115E+004	4.713E+003	1.636E+006	1.321E+002	5.459E+003	1.314E+004
3.507E+002	2.052E+002	2.602E+006	-1.115E+004	2.357E+003	7.233E+006	1.321E+002	5.271E+003	1.362E+004
3.507E+002	1.824E+002	2.919E+006	-1.115E+004	0.000E+000	2.873E+007	1.321E+002	5.083E+003	3.978E+004
3.507E+002	1.596E+002	4.100E+006	-1.382E+004	1.060E+005	1.750E+000	1.321E+002	4.895E+003	2.494E+004
3.507E+002	1.368E+002	4.652E+006	-1.382E+004	1.037E+005	3.500E+000	1.321E+002	4.706E+003	1.641E+004
3.507E+002	1.140E+002	6.033E+006	-1.382E+004	1.013E+005	3.500E+000	1.321E+002	4.518E+003	8.353E+004
3.507E+002	9.121E+001	6.175E+006	-1.382E+004	9.897E+004	3.858E+001	1.321E+002	4.330E+003	6.827E+004
3.507E+002	6.841E+001	7.855E+006	-1.382E+004	9.662E+004	1.750E+000	1.321E+002	4.142E+003	1.209E+005
3.507E+002	4.560E+001	8.496E+006	-1.382E+004	9.191E+004	5.208E+000	1.321E+002	3.953E+003	1.689E+005
3.507E+002	2.280E+001	1.457E+007	-1.382E+004	8.955E+004	1.750E+000	1.321E+002	3.765E+003	1.705E+005
3.507E+002	0.000E+000	2.486E+007	-1.382E+004	8.719E+004	1.750E+000	1.321E+002	3.577E+003	1.877E+005
3.244E+002	7.525E+002	1.029E+003	-1.382E+004	8.484E+004	3.500E+000	1.321E+002	3.389E+003	2.303E+005
3.244E+002	7.297E+002	9.183E+001	-1.382E+004	8.012E+004	3.500E+000	1.321E+002	3.200E+003	3.219E+005
3.244E+002	7.068E+002	9.521E+003	-1.382E+004	7.305E+004	1.750E+000	1.321E+002	3.012E+003	3.670E+005
3.244E+002	6.841E+002	7.801E+003	-1.382E+004	6.127E+004	4.158E+001	1.321E+002	2.824E+003	4.995E+005
3.244E+002	6.612E+002	2.933E+003	-1.382E+004	5.891E+004	5.117E+000	1.321E+002	2.636E+003	6.533E+005
3.244E+002	6.384E+002	3.808E+003	-1.382E+004	5.656E+004	2.500E+001	1.321E+002	2.447E+003	8.000E+005
3.244E+002	6.156E+002	2.114E+004	-1.382E+004	5.420E+004	6.575E+000	1.321E+002	2.259E+003	1.029E+006
3.244E+002	5.928E+002	3.333E+004	-1.382E+004	5.184E+004	3.708E+001	1.321E+002	2.071E+003	1.192E+006
3.244E+002	5.700E+002	4.103E+004	-1.382E+004	4.949E+004	7.711E+001	1.321E+002	1.883E+003	1.461E+006
3.244E+002	5.472E+002	5.811E+004	-1.382E+004	4.713E+004	1.305E+002	1.321E+002	1.694E+003	2.136E+006
3.244E+002	5.244E+002	7.249E+004	-1.382E+004	4.477E+004	1.437E+002	1.321E+002	1.506E+003	2.609E+006
3.244E+002	5.016E+002	8.266E+004	-1.382E+004	4.242E+004	4.188E+002	1.321E+002	1.318E+003	3.023E+006
3.244E+002	4.788E+002	1.035E+005	-1.382E+004	4.006E+004	6.704E+002	1.321E+002	1.130E+003	3.873E+006
3.244E+002	4.560E+002	2.098E+005	-1.382E+004	3.770E+004	9.887E+002	1.321E+002	9.413E+002	4.268E+006
3.244E+002	4.332E+002	1.952E+005	-1.382E+004	3.535E+004	8.904E+002	1.321E+002	7.530E+002	4.508E+006
3.244E+002	4.104E+002	3.207E+005	-1.382E+004	3.299E+004	1.489E+003	1.321E+002	5.648E+002	5.069E+006
3.244E+002	3.876E+002	3.995E+005	-1.382E+004	3.063E+004	2.039E+003	1.321E+002	3.765E+002	6.714E+006
3.244E+002	3.648E+002	4.632E+005	-1.382E+004	2.828E+004	2.895E+003	1.321E+002	1.883E+002	1.477E+007
3.244E+002	3.420E+002	5.894E+005	-1.382E+004	2.592E+004	2.102E+003	1.321E+002	0.000E+000	2.472E+007

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.244E+002	3.192E+002	8.983E+005	-1.382E+004	2.357E+004	1.672E+004	-8.560E+001	8.660E+003	5.035E+002
3.244E+002	2.964E+002	1.132E+006	-1.382E+004	2.121E+004	1.068E+004	-8.560E+001	8.472E+003	2.058E+003
3.244E+002	2.736E+002	1.229E+006	-1.382E+004	1.885E+004	2.544E+004	-8.560E+001	8.095E+003	6.869E+003
3.244E+002	2.508E+002	1.586E+006	-1.382E+004	1.650E+004	1.729E+004	-8.560E+001	7.719E+003	4.302E+003
3.244E+002	2.280E+002	1.954E+006	-1.382E+004	1.414E+004	4.286E+004	-8.560E+001	7.530E+003	4.780E+003
3.244E+002	2.052E+002	2.351E+006	-1.382E+004	1.178E+004	2.950E+004	-8.560E+001	7.342E+003	1.219E+004
3.244E+002	1.824E+002	3.074E+006	-1.382E+004	9.426E+003	2.697E+004	-8.560E+001	7.154E+003	6.206E+003
3.244E+002	1.596E+002	3.142E+006	-1.382E+004	7.070E+003	9.989E+004	-8.560E+001	6.965E+003	1.277E+004
3.244E+002	1.368E+002	4.585E+006	-1.382E+004	4.713E+003	1.401E+006	-8.560E+001	6.777E+003	7.143E+003
3.244E+002	1.140E+002	5.810E+006	-1.382E+004	2.357E+003	6.108E+006	-8.560E+001	6.589E+003	2.016E+004
3.244E+002	9.121E+001	7.015E+006	-1.382E+004	0.000E+000	2.197E+007	-8.560E+001	6.401E+003	1.285E+004
3.244E+002	6.841E+001	7.554E+006	-1.648E+004	1.037E+005	1.750E+000	-8.560E+001	6.213E+003	1.210E+004
3.244E+002	4.560E+001	8.705E+006	-1.648E+004	1.013E+005	1.392E+001	-8.560E+001	6.024E+003	9.322E+003
3.244E+002	2.280E+001	1.248E+007	-1.648E+004	9.897E+004	1.046E+001	-8.560E+001	5.836E+003	1.084E+004
3.244E+002	0.000E+000	2.381E+007	-1.648E+004	9.662E+004	6.958E+000	-8.560E+001	5.648E+003	1.842E+004
2.981E+002	8.665E+002	1.029E+003	-1.648E+004	9.426E+004	4.204E+001	-8.560E+001	5.459E+003	7.433E+004
2.981E+002	7.753E+002	1.029E+003	-1.648E+004	9.191E+004	1.750E+000	-8.560E+001	5.271E+003	2.844E+004
2.981E+002	7.297E+002	1.029E+003	-1.648E+004	8.955E+004	1.392E+001	-8.560E+001	5.083E+003	4.481E+004
2.981E+002	7.068E+002	9.183E+001	-1.648E+004	8.719E+004	1.750E+000	-8.560E+001	4.895E+003	8.371E+004
2.981E+002	6.841E+002	2.149E+003	-1.648E+004	8.484E+004	1.750E+000	-8.560E+001	4.706E+003	8.155E+004
2.981E+002	6.612E+002	1.127E+004	-1.648E+004	8.248E+004	1.750E+000	-8.560E+001	4.518E+003	8.437E+004
2.981E+002	6.384E+002	8.859E+003	-1.648E+004	7.541E+004	1.750E+000	-8.560E+001	4.330E+003	9.351E+004
2.981E+002	6.156E+002	1.237E+004	-1.648E+004	7.070E+004	1.750E+000	-8.560E+001	4.142E+003	1.398E+005
2.981E+002	5.928E+002	1.375E+004	-1.648E+004	5.891E+004	4.075E+000	-8.560E+001	3.953E+003	1.300E+005
2.981E+002	5.700E+002	7.820E+003	-1.648E+004	5.420E+004	4.408E+001	-8.560E+001	3.765E+003	2.168E+005
2.981E+002	5.472E+002	3.080E+004	-1.648E+004	5.184E+004	6.232E+001	-8.560E+001	3.577E+003	2.809E+005
2.981E+002	5.244E+002	4.932E+004	-1.648E+004	4.949E+004	8.350E+001	-8.560E+001	3.389E+003	4.092E+005
2.981E+002	5.016E+002	4.000E+004	-1.648E+004	4.713E+004	3.435E+002	-8.560E+001	3.200E+003	4.595E+005
2.981E+002	4.788E+002	5.881E+004	-1.648E+004	4.477E+004	4.070E+002	-8.560E+001	3.012E+003	4.592E+005
2.981E+002	4.560E+002	1.237E+005	-1.648E+004	4.242E+004	5.196E+002	-8.560E+001	2.824E+003	6.229E+005
2.981E+002	4.332E+002	1.786E+005	-1.648E+004	4.006E+004	9.644E+002	-8.560E+001	2.636E+003	8.901E+005
2.981E+002	4.104E+002	2.079E+005	-1.648E+004	3.770E+004	1.071E+003	-8.560E+001	2.447E+003	1.028E+006
2.981E+002	3.876E+002	2.527E+005	-1.648E+004	3.535E+004	2.302E+003	-8.560E+001	2.259E+003	1.109E+006
2.981E+002	3.648E+002	3.475E+005	-1.648E+004	3.299E+004	3.783E+003	-8.560E+001	2.071E+003	1.680E+006
2.981E+002	3.420E+002	5.591E+005	-1.648E+004	3.063E+004	3.337E+003	-8.560E+001	1.883E+003	1.810E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.981E+002	3.192E+002	6.404E+005	-1.648E+004	2.828E+004	4.096E+003	-8.560E+001	1.694E+003	2.305E+006
2.981E+002	2.964E+002	7.864E+005	-1.648E+004	2.592E+004	6.698E+003	-8.560E+001	1.506E+003	2.551E+006
2.981E+002	2.736E+002	9.940E+005	-1.648E+004	2.357E+004	6.857E+003	-8.560E+001	1.318E+003	3.898E+006
2.981E+002	2.508E+002	1.087E+006	-1.648E+004	2.121E+004	7.936E+003	-8.560E+001	1.130E+003	4.243E+006
2.981E+002	2.280E+002	1.567E+006	-1.648E+004	1.885E+004	8.965E+003	-8.560E+001	9.413E+002	4.910E+006
2.981E+002	2.052E+002	1.873E+006	-1.648E+004	1.650E+004	2.258E+004	-8.560E+001	7.530E+002	4.617E+006
2.981E+002	1.824E+002	2.522E+006	-1.648E+004	1.414E+004	1.727E+004	-8.560E+001	5.648E+002	5.595E+006
2.981E+002	1.596E+002	2.774E+006	-1.648E+004	1.178E+004	1.628E+004	-8.560E+001	3.765E+002	7.861E+006
2.981E+002	1.368E+002	3.893E+006	-1.648E+004	9.426E+003	1.874E+004	-8.560E+001	1.883E+002	1.572E+007
2.981E+002	1.140E+002	5.406E+006	-1.648E+004	7.070E+003	1.274E+005	-8.560E+001	0.000E+000	6.030E+007
2.981E+002	9.121E+001	6.880E+006	-1.648E+004	4.713E+003	1.446E+006	-3.033E+002	8.848E+003	1.029E+003
2.981E+002	6.841E+001	8.739E+006	-1.648E+004	2.357E+003	5.851E+006	-3.033E+002	8.283E+003	6.991E+003
2.981E+002	4.560E+001	9.980E+006	-1.648E+004	0.000E+000	1.764E+007	-3.033E+002	8.095E+003	1.002E+004
2.981E+002	2.280E+001	1.227E+007	-1.915E+004	1.013E+005	1.750E+000	-3.033E+002	7.907E+003	5.809E+003
2.981E+002	0.000E+000	2.412E+007	-1.915E+004	9.897E+004	1.046E+001	-3.033E+002	7.719E+003	8.720E+003
2.718E+002	7.525E+002	1.029E+003	-1.915E+004	9.662E+004	1.567E+001	-3.033E+002	7.530E+003	6.843E+003
2.718E+002	6.841E+002	1.031E+003	-1.915E+004	9.426E+004	3.500E+000	-3.033E+002	7.342E+003	1.009E+004
2.718E+002	6.612E+002	1.007E+003	-1.915E+004	9.191E+004	1.750E+000	-3.033E+002	7.154E+003	1.006E+004
2.718E+002	6.384E+002	1.031E+003	-1.915E+004	8.955E+004	1.046E+001	-3.033E+002	6.965E+003	1.452E+004
2.718E+002	6.156E+002	1.570E+003	-1.915E+004	8.719E+004	6.958E+000	-3.033E+002	6.777E+003	2.897E+004
2.718E+002	5.928E+002	4.755E+003	-1.915E+004	8.484E+004	3.508E+001	-3.033E+002	6.589E+003	7.464E+004
2.718E+002	5.700E+002	5.828E+003	-1.915E+004	5.891E+004	5.000E+001	-3.033E+002	6.401E+003	2.564E+004
2.718E+002	5.472E+002	2.441E+004	-1.915E+004	5.656E+004	9.050E+001	-3.033E+002	6.213E+003	3.339E+004
2.718E+002	5.244E+002	1.006E+004	-1.915E+004	5.420E+004	9.258E+001	-3.033E+002	6.024E+003	1.115E+004
2.718E+002	5.016E+002	2.556E+004	-1.915E+004	5.184E+004	3.418E+002	-3.033E+002	5.836E+003	4.595E+004
2.718E+002	4.788E+002	3.671E+004	-1.915E+004	4.949E+004	2.225E+002	-3.033E+002	5.648E+003	3.508E+004
2.718E+002	4.560E+002	6.720E+004	-1.915E+004	4.713E+004	3.260E+002	-3.033E+002	5.459E+003	3.867E+004
2.718E+002	4.332E+002	9.219E+004	-1.915E+004	4.477E+004	5.860E+002	-3.033E+002	5.271E+003	9.327E+004
2.718E+002	4.104E+002	1.100E+005	-1.915E+004	4.242E+004	5.858E+002	-3.033E+002	5.083E+003	3.889E+004
2.718E+002	3.876E+002	1.978E+005	-1.915E+004	4.006E+004	9.832E+002	-3.033E+002	4.895E+003	8.756E+004
2.718E+002	3.648E+002	2.587E+005	-1.915E+004	3.770E+004	1.919E+003	-3.033E+002	4.706E+003	1.114E+005
2.718E+002	3.420E+002	2.765E+005	-1.915E+004	3.535E+004	2.090E+003	-3.033E+002	4.518E+003	1.696E+005
2.718E+002	3.192E+002	4.123E+005	-1.915E+004	3.299E+004	4.934E+003	-3.033E+002	4.330E+003	1.238E+005
2.718E+002	2.964E+002	5.301E+005	-1.915E+004	3.063E+004	6.496E+003	-3.033E+002	4.142E+003	2.097E+005
2.718E+002	2.736E+002	6.043E+005	-1.915E+004	2.828E+004	7.539E+003	-3.033E+002	3.953E+003	2.768E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.718E+002	2.508E+002	7.496E+005	-1.915E+004	2.592E+004	9.762E+003	-3.033E+002	3.765E+003	3.145E+005
2.718E+002	2.280E+002	8.692E+005	-1.915E+004	2.357E+004	9.860E+003	-3.033E+002	3.577E+003	3.260E+005
2.718E+002	2.052E+002	1.083E+006	-1.915E+004	2.121E+004	1.642E+004	-3.033E+002	3.389E+003	4.055E+005
2.718E+002	1.824E+002	1.272E+006	-1.915E+004	1.885E+004	1.335E+004	-3.033E+002	3.200E+003	6.399E+005
2.718E+002	1.596E+002	1.857E+006	-1.915E+004	1.650E+004	1.553E+004	-3.033E+002	3.012E+003	5.711E+005
2.718E+002	1.368E+002	2.716E+006	-1.915E+004	1.414E+004	2.446E+004	-3.033E+002	2.824E+003	8.243E+005
2.718E+002	1.140E+002	4.205E+006	-1.915E+004	1.178E+004	1.521E+004	-3.033E+002	2.636E+003	9.247E+005
2.718E+002	9.121E+001	5.547E+006	-1.915E+004	9.426E+003	1.853E+004	-3.033E+002	2.447E+003	1.159E+006
2.718E+002	6.841E+001	7.546E+006	-1.915E+004	7.070E+003	1.226E+005	-3.033E+002	2.259E+003	1.281E+006
2.718E+002	4.560E+001	9.712E+006	-1.915E+004	4.713E+003	1.172E+006	-3.033E+002	2.071E+003	1.589E+006
2.718E+002	2.280E+001	1.233E+007	-1.915E+004	2.357E+003	6.689E+006	-3.033E+002	1.883E+003	1.759E+006
2.718E+002	0.000E+000	2.179E+007	-1.915E+004	0.000E+000	1.609E+007	-3.033E+002	1.694E+003	2.444E+006
2.454E+002	8.665E+002	3.750E+001	-2.182E+004	9.897E+004	5.208E+000	-3.033E+002	1.506E+003	2.936E+006
2.454E+002	8.209E+002	7.500E+001	-2.182E+004	9.426E+004	1.750E+000	-3.033E+002	1.318E+003	2.993E+006
2.454E+002	7.753E+002	3.925E+001	-2.182E+004	9.191E+004	1.738E+001	-3.033E+002	1.130E+003	3.570E+006
2.454E+002	7.297E+002	7.500E+001	-2.182E+004	8.955E+004	4.033E+001	-3.033E+002	9.413E+002	3.953E+006
2.454E+002	6.841E+002	9.050E+001	-2.182E+004	8.719E+004	1.042E+001	-3.033E+002	7.530E+002	4.710E+006
2.454E+002	6.384E+002	5.940E+002	-2.182E+004	8.484E+004	3.854E+001	-3.033E+002	5.648E+002	4.787E+006
2.454E+002	6.156E+002	1.007E+003	-2.182E+004	8.248E+004	6.958E+000	-3.033E+002	3.765E+002	7.162E+006
2.454E+002	5.928E+002	1.455E+003	-2.182E+004	8.012E+004	7.083E+001	-3.033E+002	1.883E+002	1.440E+007
2.454E+002	5.700E+002	1.678E+003	-2.182E+004	6.363E+004	1.500E+001	-3.033E+002	0.000E+000	2.329E+007
2.454E+002	5.472E+002	3.901E+003	-2.182E+004	5.891E+004	3.750E+001	-5.210E+002	9.413E+003	2.238E+002
2.454E+002	5.244E+002	5.485E+003	-2.182E+004	5.656E+004	3.542E+000	-5.210E+002	9.225E+003	7.273E+002
2.454E+002	5.016E+002	8.133E+003	-2.182E+004	5.184E+004	9.050E+001	-5.210E+002	9.036E+003	1.007E+003
2.454E+002	4.788E+002	9.469E+003	-2.182E+004	4.949E+004	1.210E+002	-5.210E+002	8.660E+003	2.933E+003
2.454E+002	4.560E+002	1.674E+004	-2.182E+004	4.713E+004	6.104E+001	-5.210E+002	8.472E+003	3.183E+003
2.454E+002	4.332E+002	4.040E+004	-2.182E+004	4.477E+004	4.515E+002	-5.210E+002	8.283E+003	7.273E+002
2.454E+002	4.104E+002	4.524E+004	-2.182E+004	4.242E+004	9.611E+002	-5.210E+002	8.095E+003	8.153E+003
2.454E+002	3.876E+002	6.142E+004	-2.182E+004	4.006E+004	4.048E+002	-5.210E+002	7.907E+003	1.749E+004
2.454E+002	3.648E+002	1.001E+005	-2.182E+004	3.770E+004	2.783E+003	-5.210E+002	7.719E+003	1.692E+004
2.454E+002	3.420E+002	1.166E+005	-2.182E+004	3.535E+004	2.281E+003	-5.210E+002	7.530E+003	4.310E+004
2.454E+002	3.192E+002	2.041E+005	-2.182E+004	3.299E+004	4.630E+003	-5.210E+002	7.342E+003	3.457E+004
2.454E+002	2.964E+002	2.218E+005	-2.182E+004	3.063E+004	5.700E+003	-5.210E+002	7.154E+003	2.984E+004
2.454E+002	2.736E+002	2.621E+005	-2.182E+004	2.828E+004	1.048E+004	-5.210E+002	6.965E+003	5.318E+004
2.454E+002	2.508E+002	3.848E+005	-2.182E+004	2.592E+004	1.507E+004	-5.210E+002	6.777E+003	6.383E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.454E+002	2.280E+002	4.423E+005	-2.182E+004	2.357E+004	1.556E+004	-5.210E+002	6.589E+003	4.016E+004
2.454E+002	2.052E+002	5.385E+005	-2.182E+004	2.121E+004	1.442E+004	-5.210E+002	6.401E+003	5.688E+004
2.454E+002	1.824E+002	6.906E+005	-2.182E+004	1.885E+004	1.507E+004	-5.210E+002	6.213E+003	6.426E+004
2.454E+002	1.596E+002	8.252E+005	-2.182E+004	1.650E+004	2.192E+004	-5.210E+002	6.024E+003	2.854E+004
2.454E+002	1.368E+002	1.460E+006	-2.182E+004	1.414E+004	1.352E+004	-5.210E+002	5.836E+003	4.582E+004
2.454E+002	1.140E+002	2.073E+006	-2.182E+004	1.178E+004	2.245E+004	-5.210E+002	5.648E+003	8.532E+004
2.454E+002	9.121E+001	3.649E+006	-2.182E+004	9.426E+003	9.591E+004	-5.210E+002	5.459E+003	7.839E+004
2.454E+002	6.841E+001	6.444E+006	-2.182E+004	7.070E+003	3.023E+005	-5.210E+002	5.271E+003	9.869E+004
2.454E+002	4.560E+001	8.770E+006	-2.182E+004	4.713E+003	1.900E+006	-5.210E+002	5.083E+003	4.868E+004
2.454E+002	2.280E+001	1.138E+007	-2.182E+004	2.357E+003	8.197E+006	-5.210E+002	4.895E+003	1.175E+005
2.454E+002	0.000E+000	2.007E+007	-2.182E+004	0.000E+000	1.614E+007	-5.210E+002	4.706E+003	1.406E+005
2.191E+002	1.072E+003	5.208E+000	-2.448E+004	9.426E+004	5.208E+000	-5.210E+002	4.518E+003	1.438E+005
2.191E+002	9.577E+002	6.958E+000	-2.448E+004	9.191E+004	1.750E+000	-5.210E+002	4.330E+003	1.485E+005
2.191E+002	9.349E+002	1.750E+000	-2.448E+004	8.955E+004	1.750E+000	-5.210E+002	4.142E+003	1.461E+005
2.191E+002	9.121E+002	5.208E+000	-2.448E+004	8.012E+004	3.750E+001	-5.210E+002	3.953E+003	2.890E+005
2.191E+002	8.893E+002	1.750E+000	-2.448E+004	7.541E+004	3.925E+001	-5.210E+002	3.765E+003	3.001E+005
2.191E+002	8.665E+002	3.333E+001	-2.448E+004	7.305E+004	1.750E+000	-5.210E+002	3.577E+003	3.724E+005
2.191E+002	8.437E+002	1.750E+000	-2.448E+004	5.420E+004	9.050E+001	-5.210E+002	3.389E+003	4.442E+005
2.191E+002	7.753E+002	3.333E+001	-2.448E+004	4.949E+004	6.714E+002	-5.210E+002	3.200E+003	5.716E+005
2.191E+002	7.297E+002	1.750E+000	-2.448E+004	4.713E+004	4.476E+002	-5.210E+002	3.012E+003	5.747E+005
2.191E+002	7.068E+002	1.250E+001	-2.448E+004	4.477E+004	1.541E+003	-5.210E+002	2.824E+003	8.592E+005
2.191E+002	6.841E+002	1.750E+000	-2.448E+004	4.242E+004	2.134E+003	-5.210E+002	2.636E+003	9.846E+005
2.191E+002	6.384E+002	1.042E+000	-2.448E+004	4.006E+004	2.900E+003	-5.210E+002	2.447E+003	1.206E+006
2.191E+002	6.156E+002	1.313E+001	-2.448E+004	3.770E+004	3.184E+003	-5.210E+002	2.259E+003	1.403E+006
2.191E+002	5.928E+002	8.030E+002	-2.448E+004	3.535E+004	6.755E+003	-5.210E+002	2.071E+003	1.768E+006
2.191E+002	5.700E+002	5.117E+000	-2.448E+004	3.299E+004	8.365E+003	-5.210E+002	1.883E+003	1.904E+006
2.191E+002	5.472E+002	1.678E+003	-2.448E+004	3.063E+004	1.842E+004	-5.210E+002	1.694E+003	2.289E+006
2.191E+002	5.244E+002	1.828E+003	-2.448E+004	2.828E+004	1.431E+004	-5.210E+002	1.506E+003	2.560E+006
2.191E+002	5.016E+002	2.949E+003	-2.448E+004	2.592E+004	2.423E+004	-5.210E+002	1.318E+003	3.185E+006
2.191E+002	4.788E+002	4.970E+003	-2.448E+004	2.357E+004	2.649E+004	-5.210E+002	1.130E+003	3.419E+006
2.191E+002	4.560E+002	8.024E+003	-2.448E+004	2.121E+004	3.168E+004	-5.210E+002	9.413E+002	3.780E+006
2.191E+002	4.332E+002	1.351E+004	-2.448E+004	1.885E+004	5.284E+004	-5.210E+002	7.530E+002	4.125E+006
2.191E+002	4.104E+002	1.546E+004	-2.448E+004	1.650E+004	5.834E+004	-5.210E+002	5.648E+002	4.349E+006
2.191E+002	3.876E+002	2.377E+004	-2.448E+004	1.414E+004	6.330E+004	-5.210E+002	3.765E+002	6.502E+006
2.191E+002	3.648E+002	2.795E+004	-2.448E+004	1.178E+004	7.957E+004	-5.210E+002	1.883E+002	1.223E+007

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.191E+002	3.420E+002	4.194E+004	-2.448E+004	9.426E+003	2.079E+005	-5.210E+002	0.000E+000	1.805E+007
2.191E+002	3.192E+002	8.099E+004	-2.448E+004	7.070E+003	4.024E+005	-7.387E+002	9.036E+003	5.940E+002
2.191E+002	2.964E+002	7.057E+004	-2.448E+004	4.713E+003	2.174E+006	-7.387E+002	8.848E+003	2.058E+003
2.191E+002	2.736E+002	9.323E+004	-2.448E+004	2.357E+003	8.049E+006	-7.387E+002	8.660E+003	1.904E+003
2.191E+002	2.508E+002	1.596E+005	-2.448E+004	0.000E+000	1.530E+007	-7.387E+002	8.472E+003	3.660E+003
2.191E+002	2.280E+002	1.806E+005	-2.715E+004	8.484E+004	7.500E+001	-7.387E+002	8.283E+003	3.023E+003
2.191E+002	2.052E+002	2.668E+005	-2.715E+004	8.248E+004	3.925E+001	-7.387E+002	8.095E+003	6.445E+003
2.191E+002	1.824E+002	3.679E+005	-2.715E+004	4.949E+004	9.050E+001	-7.387E+002	7.907E+003	3.409E+003
2.191E+002	1.596E+002	3.872E+005	-2.715E+004	4.713E+004	1.399E+003	-7.387E+002	7.719E+003	3.227E+003
2.191E+002	1.368E+002	6.239E+005	-2.715E+004	4.477E+004	1.846E+003	-7.387E+002	7.530E+003	8.679E+003
2.191E+002	1.140E+002	9.655E+005	-2.715E+004	4.242E+004	1.343E+003	-7.387E+002	7.342E+003	1.656E+004
2.191E+002	9.121E+001	1.746E+006	-2.715E+004	4.006E+004	3.306E+003	-7.387E+002	7.154E+003	3.268E+004
2.191E+002	6.841E+001	4.675E+006	-2.715E+004	3.770E+004	2.402E+003	-7.387E+002	6.965E+003	2.875E+004
2.191E+002	4.560E+001	7.054E+006	-2.715E+004	3.535E+004	7.675E+003	-7.387E+002	6.777E+003	3.066E+004
2.191E+002	2.280E+001	1.091E+007	-2.715E+004	3.299E+004	2.671E+004	-7.387E+002	6.589E+003	5.390E+004
2.191E+002	0.000E+000	1.643E+007	-2.715E+004	3.063E+004	2.907E+004	-7.387E+002	6.401E+003	6.144E+004
1.928E+002	1.003E+003	6.958E+000	-2.715E+004	2.828E+004	1.573E+004	-7.387E+002	6.213E+003	8.482E+004
1.928E+002	9.805E+002	3.508E+001	-2.715E+004	2.592E+004	3.488E+004	-7.387E+002	6.024E+003	4.034E+004
1.928E+002	9.577E+002	6.958E+000	-2.715E+004	2.357E+004	3.838E+004	-7.387E+002	5.836E+003	5.772E+004
1.928E+002	9.349E+002	1.042E+001	-2.715E+004	2.121E+004	6.650E+004	-7.387E+002	5.648E+003	6.530E+004
1.928E+002	9.121E+002	6.958E+000	-2.715E+004	1.885E+004	6.150E+004	-7.387E+002	5.459E+003	7.236E+004
1.928E+002	8.893E+002	1.046E+001	-2.715E+004	1.650E+004	7.975E+004	-7.387E+002	5.271E+003	8.451E+004
1.928E+002	8.665E+002	8.709E+000	-2.715E+004	1.414E+004	9.194E+004	-7.387E+002	5.083E+003	1.014E+005
1.928E+002	8.437E+002	4.900E+001	-2.715E+004	1.178E+004	1.698E+005	-7.387E+002	4.895E+003	8.172E+004
1.928E+002	8.209E+002	3.500E+000	-2.715E+004	9.426E+003	3.625E+005	-7.387E+002	4.706E+003	1.396E+005
1.928E+002	7.981E+002	3.508E+001	-2.715E+004	7.070E+003	9.397E+005	-7.387E+002	4.518E+003	1.526E+005
1.928E+002	6.384E+002	1.029E+003	-2.715E+004	4.713E+003	2.865E+006	-7.387E+002	4.330E+003	1.470E+005
1.928E+002	6.156E+002	1.042E+000	-2.715E+004	2.357E+003	9.175E+006	-7.387E+002	4.142E+003	2.141E+005
1.928E+002	5.700E+002	2.216E+002	-2.715E+004	0.000E+000	1.445E+007	-7.387E+002	3.953E+003	2.179E+005
1.928E+002	5.472E+002	1.279E+002	-2.982E+004	7.070E+004	9.183E+001	-7.387E+002	3.765E+003	3.565E+005
1.928E+002	5.244E+002	2.822E+003	-2.982E+004	6.598E+004	9.183E+001	-7.387E+002	3.577E+003	3.595E+005
1.928E+002	5.016E+002	1.130E+003	-2.982E+004	5.656E+004	2.238E+002	-7.387E+002	3.389E+003	5.334E+005
1.928E+002	4.788E+002	1.164E+003	-2.982E+004	5.420E+004	5.035E+002	-7.387E+002	3.200E+003	5.737E+005
1.928E+002	4.560E+002	1.955E+003	-2.982E+004	5.184E+004	2.500E+000	-7.387E+002	3.012E+003	6.424E+005
1.928E+002	4.332E+002	2.057E+003	-2.982E+004	4.949E+004	5.035E+002	-7.387E+002	2.824E+003	7.965E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.928E+002	4.104E+002	5.796E+003	-2.982E+004	4.713E+004	9.511E+002	-7.387E+002	2.636E+003	1.074E+006
1.928E+002	3.876E+002	9.184E+003	-2.982E+004	4.477E+004	2.791E+003	-7.387E+002	2.447E+003	1.143E+006
1.928E+002	3.648E+002	1.443E+004	-2.982E+004	4.242E+004	4.759E+003	-7.387E+002	2.259E+003	1.209E+006
1.928E+002	3.420E+002	1.055E+004	-2.982E+004	4.006E+004	2.568E+003	-7.387E+002	2.071E+003	1.564E+006
1.928E+002	3.192E+002	1.936E+004	-2.982E+004	3.770E+004	1.847E+004	-7.387E+002	1.883E+003	2.082E+006
1.928E+002	2.964E+002	3.204E+004	-2.982E+004	3.535E+004	1.646E+004	-7.387E+002	1.694E+003	1.875E+006
1.928E+002	2.736E+002	4.456E+004	-2.982E+004	3.299E+004	3.295E+004	-7.387E+002	1.506E+003	2.548E+006
1.928E+002	2.508E+002	5.101E+004	-2.982E+004	3.063E+004	5.751E+004	-7.387E+002	1.318E+003	2.431E+006
1.928E+002	2.280E+002	6.720E+004	-2.982E+004	2.828E+004	4.104E+004	-7.387E+002	1.130E+003	2.647E+006
1.928E+002	2.052E+002	1.142E+005	-2.982E+004	2.592E+004	7.118E+004	-7.387E+002	9.413E+002	2.782E+006
1.928E+002	1.824E+002	1.201E+005	-2.982E+004	2.357E+004	9.231E+004	-7.387E+002	7.530E+002	2.602E+006
1.928E+002	1.596E+002	1.895E+005	-2.982E+004	2.121E+004	1.348E+005	-7.387E+002	5.648E+002	3.732E+006
1.928E+002	1.368E+002	2.917E+005	-2.982E+004	1.885E+004	1.027E+005	-7.387E+002	3.765E+002	5.301E+006
1.928E+002	1.140E+002	4.857E+005	-2.982E+004	1.650E+004	1.208E+005	-7.387E+002	1.883E+002	1.045E+007
1.928E+002	9.121E+001	1.481E+006	-2.982E+004	1.414E+004	1.928E+005	-7.387E+002	0.000E+000	1.396E+007
1.928E+002	6.841E+001	4.211E+006	-2.982E+004	1.178E+004	3.874E+005	-9.564E+002	8.848E+003	5.035E+002
1.928E+002	4.560E+001	8.138E+006	-2.982E+004	9.426E+003	7.448E+005	-9.564E+002	8.660E+003	2.204E+003
1.928E+002	2.280E+001	1.323E+007	-2.982E+004	7.070E+003	1.637E+006	-9.564E+002	8.472E+003	2.933E+003
1.928E+002	0.000E+000	1.629E+007	-2.982E+004	4.713E+003	4.669E+006	-9.564E+002	8.283E+003	3.534E+003
1.665E+002	1.026E+003	1.750E+000	-2.982E+004	2.357E+003	1.311E+007	-9.564E+002	8.095E+003	1.479E+003
1.665E+002	1.003E+003	1.750E+000	-2.982E+004	0.000E+000	1.709E+007	-9.564E+002	7.907E+003	2.505E+003
1.665E+002	9.805E+002	1.750E+000	-3.248E+004	7.305E+004	9.183E+001	-9.564E+002	7.719E+003	1.465E+004
1.665E+002	9.577E+002	1.563E+001	-3.248E+004	6.834E+004	1.837E+002	-9.564E+002	7.530E+003	3.583E+003
1.665E+002	9.349E+002	1.217E+001	-3.248E+004	4.949E+004	1.231E+003	-9.564E+002	7.342E+003	2.365E+004
1.665E+002	9.121E+002	7.000E+000	-3.248E+004	4.713E+004	1.511E+003	-9.564E+002	7.154E+003	1.035E+004
1.665E+002	8.893E+002	6.958E+000	-3.248E+004	4.477E+004	2.539E+003	-9.564E+002	6.965E+003	1.299E+004
1.665E+002	8.665E+002	3.500E+000	-3.248E+004	4.242E+004	6.567E+003	-9.564E+002	6.777E+003	2.725E+004
1.665E+002	8.437E+002	1.750E+000	-3.248E+004	4.006E+004	4.553E+003	-9.564E+002	6.589E+003	3.151E+004
1.665E+002	7.981E+002	1.750E+000	-3.248E+004	3.770E+004	1.534E+004	-9.564E+002	6.401E+003	5.816E+004
1.665E+002	7.525E+002	1.750E+000	-3.248E+004	3.535E+004	1.771E+004	-9.564E+002	6.213E+003	2.065E+004
1.665E+002	7.068E+002	5.000E+001	-3.248E+004	3.299E+004	2.738E+004	-9.564E+002	6.024E+003	7.137E+004
1.665E+002	6.384E+002	4.075E+000	-3.248E+004	3.063E+004	4.181E+004	-9.564E+002	5.836E+003	8.040E+004
1.665E+002	6.156E+002	6.159E+000	-3.248E+004	2.828E+004	9.023E+004	-9.564E+002	5.648E+003	1.482E+005
1.665E+002	5.928E+002	6.250E-001	-3.248E+004	2.592E+004	8.865E+004	-9.564E+002	5.459E+003	9.216E+004
1.665E+002	5.700E+002	8.659E+000	-3.248E+004	2.357E+004	1.440E+005	-9.564E+002	5.271E+003	1.097E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.665E+002	5.472E+002	1.907E+001	-3.248E+004	2.121E+004	1.821E+005	-9.564E+002	5.083E+003	8.798E+004
1.665E+002	5.244E+002	1.090E+002	-3.248E+004	1.885E+004	1.727E+005	-9.564E+002	4.895E+003	8.149E+004
1.665E+002	5.016E+002	2.313E+002	-3.248E+004	1.650E+004	1.939E+005	-9.564E+002	4.706E+003	1.161E+005
1.665E+002	4.788E+002	8.762E+002	-3.248E+004	1.414E+004	3.048E+005	-9.564E+002	4.518E+003	9.830E+004
1.665E+002	4.560E+002	1.806E+003	-3.248E+004	1.178E+004	5.720E+005	-9.564E+002	4.330E+003	1.299E+005
1.665E+002	4.332E+002	6.141E+002	-3.248E+004	9.426E+003	1.156E+006	-9.564E+002	4.142E+003	1.493E+005
1.665E+002	4.104E+002	4.277E+003	-3.248E+004	7.070E+003	2.902E+006	-9.564E+002	3.953E+003	2.522E+005
1.665E+002	3.876E+002	1.955E+003	-3.248E+004	4.713E+003	7.453E+006	-9.564E+002	3.765E+003	2.547E+005
1.665E+002	3.648E+002	3.466E+003	-3.248E+004	2.357E+003	1.567E+007	-9.564E+002	3.577E+003	3.092E+005
1.665E+002	3.420E+002	7.471E+003	-3.248E+004	0.000E+000	1.749E+007	-9.564E+002	3.389E+003	4.467E+005
1.665E+002	3.192E+002	9.040E+003	-3.515E+004	7.305E+004	9.183E+001	-9.564E+002	3.200E+003	5.079E+005
1.665E+002	2.964E+002	1.257E+004	-3.515E+004	5.656E+004	1.029E+003	-9.564E+002	3.012E+003	5.093E+005
1.665E+002	2.736E+002	1.041E+004	-3.515E+004	5.420E+004	5.035E+002	-9.564E+002	2.824E+003	7.007E+005
1.665E+002	2.508E+002	2.206E+004	-3.515E+004	5.184E+004	2.561E+003	-9.564E+002	2.636E+003	9.041E+005
1.665E+002	2.280E+002	2.843E+004	-3.515E+004	4.713E+004	1.532E+003	-9.564E+002	2.447E+003	9.659E+005
1.665E+002	2.052E+002	3.771E+004	-3.515E+004	4.477E+004	4.115E+003	-9.564E+002	2.259E+003	1.377E+006
1.665E+002	1.824E+002	5.794E+004	-3.515E+004	4.242E+004	5.647E+003	-9.564E+002	2.071E+003	1.601E+006
1.665E+002	1.596E+002	8.587E+004	-3.515E+004	4.006E+004	2.058E+004	-9.564E+002	1.883E+003	1.785E+006
1.665E+002	1.368E+002	1.099E+005	-3.515E+004	3.770E+004	1.666E+004	-9.564E+002	1.694E+003	1.761E+006
1.665E+002	1.140E+002	1.762E+005	-3.515E+004	3.535E+004	3.155E+004	-9.564E+002	1.506E+003	2.131E+006
1.665E+002	9.121E+001	7.116E+005	-3.515E+004	3.299E+004	5.045E+004	-9.564E+002	1.318E+003	2.171E+006
1.665E+002	6.841E+001	2.943E+006	-3.515E+004	3.063E+004	3.903E+004	-9.564E+002	1.130E+003	2.238E+006
1.665E+002	4.560E+001	7.393E+006	-3.515E+004	2.828E+004	6.542E+004	-9.564E+002	9.413E+002	2.090E+006
1.665E+002	2.280E+001	1.326E+007	-3.515E+004	2.592E+004	1.354E+005	-9.564E+002	7.530E+002	2.455E+006
1.665E+002	0.000E+000	1.275E+007	-3.515E+004	2.357E+004	1.324E+005	-9.564E+002	5.648E+002	2.835E+006
1.401E+002	1.140E+003	5.208E+000	-3.515E+004	2.121E+004	1.843E+005	-9.564E+002	3.765E+002	4.356E+006
1.401E+002	1.003E+003	1.750E+000	-3.515E+004	1.885E+004	2.279E+005	-9.564E+002	1.883E+002	8.302E+006
1.401E+002	9.805E+002	8.750E+000	-3.515E+004	1.650E+004	3.159E+005	-9.564E+002	0.000E+000	1.143E+007
1.401E+002	9.577E+002	3.683E+001	-3.515E+004	1.414E+004	4.165E+005	-1.174E+003	8.660E+003	3.436E+003
1.401E+002	9.349E+002	1.750E+000	-3.515E+004	1.178E+004	9.388E+005	-1.174E+003	8.472E+003	8.178E+002
1.401E+002	9.121E+002	6.958E+000	-3.515E+004	9.426E+003	1.937E+006	-1.174E+003	8.283E+003	9.050E+001
1.401E+002	8.665E+002	5.208E+000	-3.515E+004	7.070E+003	3.839E+006	-1.174E+003	8.095E+003	7.273E+002
1.401E+002	8.437E+002	1.750E+000	-3.515E+004	4.713E+003	8.780E+006	-1.174E+003	7.907E+003	2.060E+003
1.401E+002	8.209E+002	3.500E+000	-3.515E+004	2.357E+003	1.748E+007	-1.174E+003	7.719E+003	1.186E+004
1.401E+002	7.981E+002	1.750E+000	-3.515E+004	0.000E+000	1.824E+007	-1.174E+003	7.530E+003	1.254E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.401E+002	7.753E+002	3.500E+000	-3.782E+004	6.363E+004	1.029E+003	-1.174E+003	7.342E+003	4.277E+003
1.401E+002	6.612E+002	3.500E+000	-3.782E+004	6.127E+004	1.029E+003	-1.174E+003	7.154E+003	3.548E+003
1.401E+002	6.384E+002	3.750E+001	-3.782E+004	5.420E+004	1.029E+003	-1.174E+003	6.965E+003	1.768E+004
1.401E+002	5.928E+002	6.250E-001	-3.782E+004	5.184E+004	1.029E+003	-1.174E+003	6.777E+003	5.746E+003
1.401E+002	5.700E+002	5.117E+000	-3.782E+004	4.949E+004	3.086E+003	-1.174E+003	6.589E+003	1.899E+004
1.401E+002	5.472E+002	1.813E+001	-3.782E+004	4.713E+004	9.674E+003	-1.174E+003	6.401E+003	9.757E+003
1.401E+002	5.244E+002	6.577E+001	-3.782E+004	4.477E+004	1.657E+004	-1.174E+003	6.213E+003	1.759E+004
1.401E+002	5.016E+002	6.285E+001	-3.782E+004	4.242E+004	1.744E+004	-1.174E+003	6.024E+003	1.216E+004
1.401E+002	4.788E+002	1.952E+001	-3.782E+004	4.006E+004	1.055E+004	-1.174E+003	5.836E+003	3.439E+004
1.401E+002	4.560E+002	2.352E+002	-3.782E+004	3.770E+004	2.737E+004	-1.174E+003	5.648E+003	4.525E+004
1.401E+002	4.332E+002	3.859E+002	-3.782E+004	3.535E+004	5.686E+004	-1.174E+003	5.459E+003	3.477E+004
1.401E+002	4.104E+002	5.301E+002	-3.782E+004	3.299E+004	5.947E+004	-1.174E+003	5.271E+003	5.678E+004
1.401E+002	3.876E+002	4.711E+002	-3.782E+004	3.063E+004	8.264E+004	-1.174E+003	5.083E+003	1.072E+005
1.401E+002	3.648E+002	9.374E+002	-3.782E+004	2.828E+004	8.204E+004	-1.174E+003	4.895E+003	1.184E+005
1.401E+002	3.420E+002	1.914E+003	-3.782E+004	2.592E+004	1.433E+005	-1.174E+003	4.706E+003	7.697E+004
1.401E+002	3.192E+002	3.394E+003	-3.782E+004	2.357E+004	2.142E+005	-1.174E+003	4.518E+003	7.193E+004
1.401E+002	2.964E+002	2.647E+003	-3.782E+004	2.121E+004	2.577E+005	-1.174E+003	4.330E+003	1.374E+005
1.401E+002	2.736E+002	5.610E+003	-3.782E+004	1.885E+004	3.659E+005	-1.174E+003	4.142E+003	1.414E+005
1.401E+002	2.508E+002	8.279E+003	-3.782E+004	1.650E+004	3.907E+005	-1.174E+003	3.953E+003	1.544E+005
1.401E+002	2.280E+002	1.531E+004	-3.782E+004	1.414E+004	5.449E+005	-1.174E+003	3.765E+003	1.924E+005
1.401E+002	2.052E+002	1.359E+004	-3.782E+004	1.178E+004	1.035E+006	-1.174E+003	3.577E+003	2.971E+005
1.401E+002	1.824E+002	3.308E+004	-3.782E+004	9.426E+003	2.390E+006	-1.174E+003	3.389E+003	3.984E+005
1.401E+002	1.596E+002	5.129E+004	-3.782E+004	7.070E+003	4.694E+006	-1.174E+003	3.200E+003	4.671E+005
1.401E+002	1.368E+002	4.481E+004	-3.782E+004	4.713E+003	8.865E+006	-1.174E+003	3.012E+003	5.192E+005
1.401E+002	1.140E+002	1.082E+005	-3.782E+004	2.357E+003	1.513E+007	-1.174E+003	2.824E+003	6.586E+005
1.401E+002	9.121E+001	4.439E+005	-3.782E+004	0.000E+000	1.698E+007	-1.174E+003	2.636E+003	8.235E+005
1.401E+002	6.841E+001	2.326E+006	-4.049E+004	5.891E+004	1.029E+003	-1.174E+003	2.447E+003	9.664E+005
1.401E+002	4.560E+001	5.868E+006	-4.049E+004	5.184E+004	1.904E+003	-1.174E+003	2.259E+003	1.005E+006
1.401E+002	2.280E+001	1.415E+007	-4.049E+004	4.949E+004	2.933E+003	-1.174E+003	2.071E+003	1.391E+006
1.401E+002	0.000E+000	1.741E+007	-4.049E+004	4.713E+004	7.617E+003	-1.174E+003	1.883E+003	1.525E+006
1.138E+002	1.094E+003	6.958E+000	-4.049E+004	4.477E+004	1.348E+004	-1.174E+003	1.694E+003	1.554E+006
1.138E+002	1.072E+003	1.750E+000	-4.049E+004	4.242E+004	2.058E+003	-1.174E+003	1.506E+003	1.858E+006
1.138E+002	1.049E+003	1.750E+000	-4.049E+004	4.006E+004	1.779E+004	-1.174E+003	1.318E+003	1.732E+006
1.138E+002	9.805E+002	1.750E+000	-4.049E+004	3.770E+004	1.348E+004	-1.174E+003	1.130E+003	1.803E+006
1.138E+002	9.577E+002	3.500E+000	-4.049E+004	3.535E+004	4.032E+004	-1.174E+003	9.413E+002	1.750E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.138E+002	9.121E+002	1.750E+000	-4.049E+004	3.299E+004	4.541E+004	-1.174E+003	7.530E+002	2.043E+006
1.138E+002	8.893E+002	6.958E+000	-4.049E+004	3.063E+004	5.418E+004	-1.174E+003	5.648E+002	2.391E+006
1.138E+002	8.665E+002	5.208E+000	-4.049E+004	2.828E+004	1.139E+005	-1.174E+003	3.765E+002	3.467E+006
1.138E+002	8.437E+002	1.750E+000	-4.049E+004	2.592E+004	1.354E+005	-1.174E+003	1.883E+002	7.186E+006
1.138E+002	7.525E+002	1.750E+000	-4.049E+004	2.357E+004	2.072E+005	-1.174E+003	0.000E+000	9.491E+006
1.138E+002	7.068E+002	1.750E+000	-4.049E+004	2.121E+004	2.820E+005	-1.392E+003	8.660E+003	3.542E+000
1.138E+002	5.244E+002	5.742E+000	-4.049E+004	1.885E+004	2.886E+005	-1.392E+003	8.095E+003	3.143E+002
1.138E+002	5.016E+002	3.750E+000	-4.049E+004	1.650E+004	3.867E+005	-1.392E+003	7.907E+003	3.143E+002
1.138E+002	4.788E+002	4.375E+000	-4.049E+004	1.414E+004	7.393E+005	-1.392E+003	7.719E+003	9.050E+001
1.138E+002	4.560E+002	2.500E+000	-4.049E+004	1.178E+004	1.127E+006	-1.392E+003	7.530E+003	5.035E+002
1.138E+002	4.332E+002	7.604E+001	-4.049E+004	9.426E+003	2.485E+006	-1.392E+003	7.154E+003	2.105E+002
1.138E+002	4.104E+002	5.539E+002	-4.049E+004	7.070E+003	5.140E+006	-1.392E+003	6.965E+003	9.750E+001
1.138E+002	3.876E+002	8.271E+001	-4.049E+004	4.713E+003	9.336E+006	-1.392E+003	6.777E+003	1.435E+003
1.138E+002	3.648E+002	4.772E+002	-4.049E+004	2.357E+003	1.621E+007	-1.392E+003	6.589E+003	2.129E+003
1.138E+002	3.420E+002	5.190E+002	-4.049E+004	0.000E+000	1.819E+007	-1.392E+003	6.401E+003	7.593E+003
1.138E+002	3.192E+002	5.100E+002	-4.315E+004	5.656E+004	1.904E+003	-1.392E+003	6.213E+003	1.346E+004
1.138E+002	2.964E+002	1.042E+003	-4.315E+004	5.420E+004	3.808E+003	-1.392E+003	6.024E+003	1.624E+004
1.138E+002	2.736E+002	1.337E+003	-4.315E+004	4.713E+004	8.895E+003	-1.392E+003	5.836E+003	4.358E+003
1.138E+002	2.508E+002	2.853E+003	-4.315E+004	4.477E+004	8.270E+003	-1.392E+003	5.648E+003	7.161E+003
1.138E+002	2.280E+002	9.693E+003	-4.315E+004	4.242E+004	1.392E+004	-1.392E+003	5.459E+003	8.440E+003
1.138E+002	2.052E+002	2.255E+004	-4.315E+004	4.006E+004	2.035E+004	-1.392E+003	5.271E+003	3.626E+004
1.138E+002	1.824E+002	3.785E+004	-4.315E+004	3.770E+004	3.492E+004	-1.392E+003	5.083E+003	6.198E+004
1.138E+002	1.596E+002	4.638E+004	-4.315E+004	3.535E+004	4.834E+004	-1.392E+003	4.895E+003	3.819E+004
1.138E+002	1.368E+002	7.539E+004	-4.315E+004	3.299E+004	4.678E+004	-1.392E+003	4.706E+003	6.327E+004
1.138E+002	1.140E+002	7.652E+004	-4.315E+004	3.063E+004	7.806E+004	-1.392E+003	4.518E+003	9.536E+004
1.138E+002	9.121E+001	2.583E+005	-4.315E+004	2.828E+004	1.103E+005	-1.392E+003	4.330E+003	1.982E+005
1.138E+002	6.841E+001	1.985E+006	-4.315E+004	2.592E+004	1.215E+005	-1.392E+003	4.142E+003	1.394E+005
1.138E+002	4.560E+001	7.345E+006	-4.315E+004	2.357E+004	1.943E+005	-1.392E+003	3.953E+003	1.026E+005
1.138E+002	2.280E+001	2.033E+007	-4.315E+004	2.121E+004	2.490E+005	-1.392E+003	3.765E+003	2.587E+005
1.138E+002	0.000E+000	2.752E+007	-4.315E+004	1.885E+004	2.949E+005	-1.392E+003	3.577E+003	2.822E+005
8.747E+001	1.003E+003	1.750E+000	-4.315E+004	1.650E+004	3.432E+005	-1.392E+003	3.389E+003	2.014E+005
8.747E+001	9.805E+002	1.750E+000	-4.315E+004	1.414E+004	5.549E+005	-1.392E+003	3.200E+003	3.759E+005
8.747E+001	9.577E+002	1.750E+000	-4.315E+004	1.178E+004	1.095E+006	-1.392E+003	3.012E+003	4.241E+005
8.747E+001	9.349E+002	1.750E+000	-4.315E+004	9.426E+003	2.528E+006	-1.392E+003	2.824E+003	5.983E+005
8.747E+001	7.525E+002	1.750E+000	-4.315E+004	7.070E+003	5.021E+006	-1.392E+003	2.636E+003	7.127E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
8.747E+001	5.244E+002	3.750E+001	-4.315E+004	4.713E+003	9.224E+006	-1.392E+003	2.447E+003	1.003E+006
8.747E+001	4.560E+002	1.250E+000	-4.315E+004	2.357E+003	1.514E+007	-1.392E+003	2.259E+003	1.097E+006
8.747E+001	4.332E+002	1.104E+001	-4.315E+004	0.000E+000	1.864E+007	-1.392E+003	2.071E+003	9.943E+005
8.747E+001	4.104E+002	4.646E+001	-4.582E+004	4.949E+004	1.433E+004	-1.392E+003	1.883E+003	1.504E+006
8.747E+001	3.876E+002	5.063E+001	-4.582E+004	4.713E+004	3.611E+004	-1.392E+003	1.694E+003	1.243E+006
8.747E+001	3.648E+002	5.313E+001	-4.582E+004	4.477E+004	1.273E+004	-1.392E+003	1.506E+003	1.498E+006
8.747E+001	3.420E+002	3.661E+002	-4.582E+004	4.242E+004	6.565E+004	-1.392E+003	1.318E+003	1.437E+006
8.747E+001	3.192E+002	7.307E+002	-4.582E+004	4.006E+004	4.375E+004	-1.392E+003	1.130E+003	1.495E+006
8.747E+001	2.964E+002	3.875E+002	-4.582E+004	3.770E+004	4.320E+004	-1.392E+003	9.413E+002	1.554E+006
8.747E+001	2.736E+002	8.600E+002	-4.582E+004	3.535E+004	1.050E+005	-1.392E+003	7.530E+002	1.879E+006
8.747E+001	2.508E+002	4.956E+002	-4.582E+004	3.299E+004	5.090E+004	-1.392E+003	5.648E+002	2.153E+006
8.747E+001	2.280E+002	1.230E+003	-4.582E+004	3.063E+004	4.077E+004	-1.392E+003	3.765E+002	3.426E+006
8.747E+001	2.052E+002	2.245E+003	-4.582E+004	2.828E+004	8.246E+004	-1.392E+003	1.883E+002	6.244E+006
8.747E+001	1.824E+002	2.755E+003	-4.582E+004	2.592E+004	1.185E+005	-1.392E+003	0.000E+000	7.085E+006
8.747E+001	1.596E+002	1.864E+004	-4.582E+004	2.357E+004	9.943E+004	-1.609E+003	9.036E+003	1.042E+000
8.747E+001	1.368E+002	4.363E+004	-4.582E+004	2.121E+004	2.140E+005	-1.609E+003	8.472E+003	1.042E+000
8.747E+001	1.140E+002	9.952E+004	-4.582E+004	1.885E+004	2.547E+005	-1.609E+003	8.095E+003	1.532E+003
8.747E+001	9.121E+001	2.703E+005	-4.582E+004	1.650E+004	2.480E+005	-1.609E+003	7.907E+003	6.000E+001
8.747E+001	6.841E+001	2.024E+006	-4.582E+004	1.414E+004	5.106E+005	-1.609E+003	7.719E+003	1.964E+003
8.747E+001	4.560E+001	6.677E+006	-4.582E+004	1.178E+004	1.156E+006	-1.609E+003	7.530E+003	3.333E+001
8.747E+001	2.280E+001	1.858E+007	-4.582E+004	9.426E+003	2.084E+006	-1.609E+003	6.965E+003	1.262E+003
8.747E+001	0.000E+000	2.567E+007	-4.582E+004	7.070E+003	4.670E+006	-1.609E+003	6.777E+003	5.000E+000
6.114E+001	7.068E+002	1.750E+000	-4.582E+004	4.713E+003	8.169E+006	-1.609E+003	6.401E+003	3.336E+002
6.114E+001	4.788E+002	3.750E+001	-4.582E+004	2.357E+003	1.332E+007	-1.609E+003	6.213E+003	2.626E+003
6.114E+001	4.560E+002	6.667E+001	-4.582E+004	0.000E+000	1.836E+007	-1.609E+003	6.024E+003	3.187E+003
6.114E+001	4.104E+002	1.500E+001	-4.849E+004	5.184E+004	7.963E+003	-1.609E+003	5.836E+003	6.969E+002
6.114E+001	3.876E+002	5.000E+001	-4.849E+004	4.949E+004	6.366E+003	-1.609E+003	5.648E+003	6.926E+003
6.114E+001	3.648E+002	1.813E+001	-4.849E+004	4.713E+004	3.183E+003	-1.609E+003	5.459E+003	2.053E+003
6.114E+001	3.420E+002	2.125E+001	-4.849E+004	4.477E+004	1.433E+004	-1.609E+003	5.271E+003	1.180E+004
6.114E+001	3.192E+002	1.231E+002	-4.849E+004	4.242E+004	5.335E+004	-1.609E+003	5.083E+003	1.849E+004
6.114E+001	2.964E+002	4.333E+001	-4.849E+004	4.006E+004	5.812E+004	-1.609E+003	4.895E+003	2.535E+004
6.114E+001	2.736E+002	7.646E+001	-4.849E+004	3.770E+004	5.907E+004	-1.609E+003	4.706E+003	4.181E+004
6.114E+001	2.508E+002	3.248E+002	-4.849E+004	3.535E+004	6.764E+004	-1.609E+003	4.518E+003	2.733E+004
6.114E+001	2.280E+002	2.310E+002	-4.849E+004	3.299E+004	7.845E+004	-1.609E+003	4.330E+003	6.180E+004
6.114E+001	2.052E+002	5.091E+002	-4.849E+004	3.063E+004	9.222E+004	-1.609E+003	4.142E+003	8.636E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
6.114E+001	1.824E+002	2.114E+004	-4.849E+004	2.828E+004	6.176E+004	-1.609E+003	3.953E+003	1.133E+005
6.114E+001	1.596E+002	9.431E+003	-4.849E+004	2.592E+004	1.165E+005	-1.609E+003	3.765E+003	1.172E+005
6.114E+001	1.368E+002	1.646E+004	-4.849E+004	2.357E+004	1.488E+005	-1.609E+003	3.577E+003	1.605E+005
6.114E+001	1.140E+002	2.240E+004	-4.849E+004	2.121E+004	2.329E+005	-1.609E+003	3.389E+003	2.557E+005
6.114E+001	9.121E+001	1.390E+005	-4.849E+004	1.885E+004	1.635E+005	-1.609E+003	3.200E+003	2.400E+005
6.114E+001	6.841E+001	1.135E+006	-4.849E+004	1.650E+004	2.855E+005	-1.609E+003	3.012E+003	3.701E+005
6.114E+001	4.560E+001	4.380E+006	-4.849E+004	1.414E+004	3.725E+005	-1.609E+003	2.824E+003	5.202E+005
6.114E+001	2.280E+001	1.246E+007	-4.849E+004	1.178E+004	9.627E+005	-1.609E+003	2.636E+003	4.983E+005
6.114E+001	0.000E+000	1.714E+007	-4.849E+004	9.426E+003	2.103E+006	-1.609E+003	2.447E+003	7.602E+005
3.482E+001	5.016E+002	6.667E+001	-4.849E+004	7.070E+003	5.288E+006	-1.609E+003	2.259E+003	7.533E+005
3.482E+001	4.104E+002	5.250E+000	-4.849E+004	4.713E+003	8.606E+006	-1.609E+003	2.071E+003	9.036E+005
3.482E+001	3.876E+002	6.729E+001	-4.849E+004	2.357E+003	1.354E+007	-1.609E+003	1.883E+003	1.100E+006
3.482E+001	3.648E+002	3.067E+001	-4.849E+004	0.000E+000	2.036E+007	-1.609E+003	1.694E+003	1.202E+006
3.482E+001	3.192E+002	3.633E+001	-5.115E+004	4.477E+004	1.434E+004	-1.609E+003	1.506E+003	9.659E+005
3.482E+001	2.964E+002	1.150E+001	-5.115E+004	4.242E+004	1.752E+004	-1.609E+003	1.318E+003	1.124E+006
3.482E+001	2.736E+002	6.701E+003	-5.115E+004	4.006E+004	1.434E+004	-1.609E+003	1.130E+003	1.024E+006
3.482E+001	2.508E+002	3.358E+003	-5.115E+004	3.770E+004	3.786E+004	-1.609E+003	9.413E+002	1.226E+006
3.482E+001	2.280E+002	3.508E+001	-5.115E+004	3.535E+004	6.851E+004	-1.609E+003	7.530E+002	1.287E+006
3.482E+001	2.052E+002	1.707E+002	-5.115E+004	3.299E+004	1.075E+005	-1.609E+003	5.648E+002	1.454E+006
3.482E+001	1.824E+002	5.984E+003	-5.115E+004	3.063E+004	9.575E+004	-1.609E+003	3.765E+002	2.629E+006
3.482E+001	1.596E+002	4.478E+003	-5.115E+004	2.828E+004	1.085E+005	-1.609E+003	1.883E+002	4.565E+006
3.482E+001	1.368E+002	3.442E+003	-5.115E+004	2.592E+004	1.540E+005	-1.609E+003	0.000E+000	6.408E+006
3.482E+001	1.140E+002	4.767E+003	-5.115E+004	2.357E+004	2.498E+005	-1.827E+003	7.907E+003	3.333E+001
3.482E+001	9.121E+001	3.950E+004	-5.115E+004	2.121E+004	1.147E+005	-1.827E+003	7.719E+003	1.250E+001
3.482E+001	6.841E+001	2.438E+005	-5.115E+004	1.885E+004	2.653E+005	-1.827E+003	7.530E+003	9.050E+001
3.482E+001	4.560E+001	1.271E+006	-5.115E+004	1.650E+004	3.895E+005	-1.827E+003	7.154E+003	9.050E+001
3.482E+001	2.280E+001	4.040E+006	-5.115E+004	1.414E+004	5.933E+005	-1.827E+003	6.965E+003	1.906E+003
3.482E+001	0.000E+000	8.349E+006	-5.115E+004	1.178E+004	1.391E+006	-1.827E+003	6.777E+003	3.449E+002
8.490E+000	1.072E+003	1.750E+000	-5.115E+004	9.426E+003	3.384E+006	-1.827E+003	6.589E+003	5.035E+002
8.490E+000	4.788E+002	3.508E+001	-5.115E+004	7.070E+003	7.731E+006	-1.827E+003	6.213E+003	9.865E+001
8.490E+000	4.560E+002	1.750E+000	-5.115E+004	4.713E+003	1.249E+007	-1.827E+003	6.024E+003	4.700E+000
8.490E+000	4.332E+002	1.750E+000	-5.115E+004	2.357E+003	1.858E+007	-1.827E+003	5.836E+003	4.148E+001
8.490E+000	4.104E+002	1.425E+001	-5.115E+004	0.000E+000	2.660E+007	-1.827E+003	5.648E+003	4.598E+002
8.490E+000	3.876E+002	5.250E+000	-5.382E+004	4.477E+004	8.334E-002	-1.827E+003	5.459E+003	2.163E+001
8.490E+000	3.648E+002	3.508E+001	-5.382E+004	3.770E+004	9.561E+003	-1.827E+003	5.271E+003	6.827E+002

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
8.490E+000	3.420E+002	3.500E+000	-5.382E+004	3.535E+004	1.290E+004	-1.827E+003	5.083E+003	3.723E+002
8.490E+000	3.192E+002	3.858E+001	-5.382E+004	3.299E+004	5.707E+004	-1.827E+003	4.895E+003	2.545E+003
8.490E+000	2.964E+002	7.100E+001	-5.382E+004	3.063E+004	7.996E+004	-1.827E+003	4.706E+003	8.812E+003
8.490E+000	2.736E+002	7.717E+001	-5.382E+004	2.828E+004	1.022E+005	-1.827E+003	4.518E+003	2.742E+003
8.490E+000	2.508E+002	3.395E+003	-5.382E+004	2.592E+004	1.822E+005	-1.827E+003	4.330E+003	4.329E+004
8.490E+000	2.280E+002	1.050E+001	-5.382E+004	2.357E+004	2.268E+005	-1.827E+003	4.142E+003	3.621E+004
8.490E+000	2.052E+002	3.456E+003	-5.382E+004	2.121E+004	3.155E+005	-1.827E+003	3.953E+003	7.314E+004
8.490E+000	1.824E+002	4.334E+003	-5.382E+004	1.885E+004	5.792E+005	-1.827E+003	3.765E+003	9.783E+004
8.490E+000	1.596E+002	1.873E+003	-5.382E+004	1.650E+004	9.945E+005	-1.827E+003	3.577E+003	1.128E+005
8.490E+000	1.368E+002	1.012E+004	-5.382E+004	1.414E+004	1.487E+006	-1.827E+003	3.389E+003	1.381E+005
8.490E+000	1.140E+002	5.120E+003	-5.382E+004	1.178E+004	2.332E+006	-1.827E+003	3.200E+003	2.577E+005
8.490E+000	9.121E+001	1.856E+004	-5.382E+004	9.426E+003	4.828E+006	-1.827E+003	3.012E+003	3.003E+005
8.490E+000	6.841E+001	7.223E+004	-5.382E+004	7.070E+003	9.126E+006	-1.827E+003	2.824E+003	3.749E+005
8.490E+000	4.560E+001	4.649E+005	-5.382E+004	4.713E+003	1.699E+007	-1.827E+003	2.636E+003	5.311E+005
8.490E+000	2.280E+001	2.372E+006	-5.382E+004	2.357E+003	2.446E+007	-1.827E+003	2.447E+003	4.932E+005
8.490E+000	0.000E+000	7.554E+007	-5.382E+004	0.000E+000	3.403E+007	-1.827E+003	2.259E+003	6.327E+005
-1.784E+001	4.332E+002	1.750E+000	-5.649E+004	3.770E+004	4.780E+003	-1.827E+003	2.071E+003	5.809E+005
-1.784E+001	4.104E+002	8.750E+000	-5.649E+004	3.535E+004	8.334E-002	-1.827E+003	1.883E+003	7.563E+005
-1.784E+001	3.876E+002	2.275E+001	-5.649E+004	3.299E+004	6.403E+003	-1.827E+003	1.694E+003	7.970E+005
-1.784E+001	3.648E+002	7.000E+000	-5.649E+004	3.063E+004	1.599E+004	-1.827E+003	1.506E+003	9.616E+005
-1.784E+001	3.420E+002	1.179E+002	-5.649E+004	2.828E+004	3.202E+004	-1.827E+003	1.318E+003	9.350E+005
-1.784E+001	3.192E+002	1.093E+002	-5.649E+004	2.592E+004	4.486E+004	-1.827E+003	1.130E+003	8.123E+005
-1.784E+001	2.964E+002	1.358E+002	-5.649E+004	2.357E+004	1.088E+005	-1.827E+003	9.413E+002	1.035E+006
-1.784E+001	2.736E+002	1.323E+002	-5.649E+004	2.121E+004	2.384E+005	-1.827E+003	7.530E+002	7.663E+005
-1.784E+001	2.508E+002	2.275E+001	-5.649E+004	1.885E+004	2.831E+005	-1.827E+003	5.648E+002	1.310E+006
-1.784E+001	2.280E+002	7.358E+001	-5.649E+004	1.650E+004	5.573E+005	-1.827E+003	3.765E+002	1.929E+006
-1.784E+001	2.052E+002	6.483E+001	-5.649E+004	1.414E+004	9.224E+005	-1.827E+003	1.883E+002	3.894E+006
-1.784E+001	1.824E+002	6.728E+002	-5.649E+004	1.178E+004	1.808E+006	-1.827E+003	0.000E+000	4.511E+006
-1.784E+001	1.596E+002	1.562E+003	-5.649E+004	9.426E+003	4.025E+006	-2.045E+003	6.965E+003	6.575E+000
-1.784E+001	1.368E+002	1.188E+003	-5.649E+004	7.070E+003	8.163E+006	-2.045E+003	6.777E+003	6.000E+001
-1.784E+001	1.140E+002	8.916E+002	-5.649E+004	4.713E+003	1.601E+007	-2.045E+003	6.589E+003	6.667E+001
-1.784E+001	9.121E+001	5.074E+003	-5.649E+004	2.357E+003	2.216E+007	-2.045E+003	6.401E+003	1.212E+003
-1.784E+001	6.841E+001	8.021E+003	-5.649E+004	0.000E+000	3.135E+007	-2.045E+003	6.213E+003	4.075E+000
-1.784E+001	4.560E+001	6.975E+004	-5.915E+004	2.828E+004	4.780E+003	-2.045E+003	6.024E+003	2.263E+002
-1.784E+001	2.280E+001	2.887E+005	-5.915E+004	2.592E+004	1.290E+004	-2.045E+003	5.648E+003	1.954E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-1.784E+001	0.000E+000	3.816E+006	-5.915E+004	2.357E+004	2.562E+004	-2.045E+003	5.459E+003	1.565E+001
-4.416E+001	6.384E+002	3.333E+001	-5.915E+004	2.121E+004	5.443E+004	-2.045E+003	5.271E+003	2.363E+002
-4.416E+001	5.700E+002	3.500E+000	-5.915E+004	1.885E+004	4.158E+004	-2.045E+003	5.083E+003	1.848E+002
-4.416E+001	5.472E+002	3.508E+001	-5.915E+004	1.650E+004	2.479E+005	-2.045E+003	4.895E+003	2.220E+003
-4.416E+001	5.244E+002	1.750E+000	-5.915E+004	1.414E+004	4.451E+005	-2.045E+003	4.706E+003	4.280E+003
-4.416E+001	5.016E+002	1.750E+000	-5.915E+004	1.178E+004	1.040E+006	-2.045E+003	4.518E+003	1.047E+002
-4.416E+001	4.788E+002	1.750E+000	-5.915E+004	9.426E+003	2.142E+006	-2.045E+003	4.330E+003	4.682E+002
-4.416E+001	4.560E+002	1.750E+000	-5.915E+004	7.070E+003	4.898E+006	-2.045E+003	4.142E+003	4.220E+003
-4.416E+001	4.332E+002	5.250E+000	-5.915E+004	4.713E+003	9.327E+006	-2.045E+003	3.953E+003	2.456E+004
-4.416E+001	4.104E+002	1.225E+001	-5.915E+004	2.357E+003	1.424E+007	-2.045E+003	3.765E+003	2.417E+004
-4.416E+001	3.876E+002	1.575E+001	-5.915E+004	0.000E+000	2.133E+007	-2.045E+003	3.577E+003	3.874E+004
-4.416E+001	3.648E+002	7.000E+000	-6.182E+004	1.885E+004	1.281E+004	-2.045E+003	3.389E+003	1.190E+005
-4.416E+001	3.420E+002	1.400E+001	-6.182E+004	1.650E+004	2.238E+004	-2.045E+003	3.200E+003	1.337E+005
-4.416E+001	3.192E+002	4.450E+001	-6.182E+004	1.414E+004	1.006E+005	-2.045E+003	3.012E+003	1.476E+005
-4.416E+001	2.964E+002	4.625E+001	-6.182E+004	1.178E+004	2.852E+005	-2.045E+003	2.824E+003	3.010E+005
-4.416E+001	2.736E+002	1.023E+002	-6.182E+004	9.426E+003	6.956E+005	-2.045E+003	2.636E+003	3.687E+005
-4.416E+001	2.508E+002	2.918E+002	-6.182E+004	7.070E+003	2.258E+006	-2.045E+003	2.447E+003	2.805E+005
-4.416E+001	2.280E+002	2.048E+002	-6.182E+004	4.713E+003	4.202E+006	-2.045E+003	2.259E+003	5.695E+005
-4.416E+001	2.052E+002	3.531E+002	-6.182E+004	2.357E+003	6.567E+006	-2.045E+003	2.071E+003	5.304E+005
-4.416E+001	1.824E+002	5.463E+002	-6.182E+004	0.000E+000	9.074E+006	-2.045E+003	1.883E+003	5.296E+005
-4.416E+001	1.596E+002	3.074E+002	-6.449E+004	1.178E+004	2.237E+004	-2.045E+003	1.694E+003	5.799E+005
-4.416E+001	1.368E+002	3.639E+003	-6.449E+004	9.426E+003	1.007E+005	-2.045E+003	1.506E+003	7.369E+005
-4.416E+001	1.140E+002	1.361E+004	-6.449E+004	7.070E+003	3.861E+005	-2.045E+003	1.318E+003	6.047E+005
-4.416E+001	9.121E+001	3.772E+003	-6.449E+004	4.713E+003	9.834E+005	-2.045E+003	1.130E+003	7.474E+005
-4.416E+001	6.841E+001	7.572E+003	-6.449E+004	2.357E+003	1.593E+006	-2.045E+003	9.413E+002	8.740E+005
-4.416E+001	4.560E+001	4.116E+004	-6.449E+004	0.000E+000	2.834E+006	-2.045E+003	7.530E+002	6.846E+005
-4.416E+001	2.280E+001	2.795E+005	-6.715E+004	1.178E+004	1.750E+000	-2.045E+003	5.648E+002	1.023E+006
-4.416E+001	0.000E+000	5.482E+005	-6.715E+004	7.070E+003	1.292E+004	-2.045E+003	3.765E+002	1.708E+006
-7.049E+001	5.472E+002	3.500E+000	-6.715E+004	4.713E+003	1.788E+005	-2.045E+003	1.883E+002	2.510E+006
-7.049E+001	5.016E+002	5.250E+000	-6.715E+004	2.357E+003	2.358E+005	-2.045E+003	0.000E+000	3.184E+006
-7.049E+001	4.788E+002	3.500E+000	-6.715E+004	0.000E+000	6.494E+005	-2.262E+003	7.907E+003	2.500E+000
-7.049E+001	4.560E+002	1.750E+000	-6.982E+004	7.070E+003	2.229E+004	-2.262E+003	7.719E+003	1.042E+000
-7.049E+001	4.332E+002	7.000E+000	-6.982E+004	4.713E+003	1.281E+004	-2.262E+003	6.777E+003	9.333E+001
-7.049E+001	4.104E+002	1.750E+000	-6.982E+004	2.357E+003	2.549E+004	-2.262E+003	6.213E+003	6.250E-001
-7.049E+001	3.876E+002	5.250E+000	-6.982E+004	0.000E+000	4.469E+004	-2.262E+003	5.836E+003	4.075E+000

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-7.049E+001	3.648E+002	1.750E+000	-7.249E+004	2.357E+003	1.667E-001	-2.262E+003	5.648E+003	1.500E+001
-7.049E+001	3.420E+002	7.000E+000	-7.249E+004	0.000E+000	2.237E+004	-2.262E+003	5.459E+003	2.083E+000
-7.049E+001	3.192E+002	5.250E+000				-2.262E+003	5.271E+003	1.200E+002
-7.049E+001	2.964E+002	1.050E+001				-2.262E+003	4.895E+003	2.062E+003
-7.049E+001	2.736E+002	8.725E+001				-2.262E+003	4.706E+003	1.378E+001
-7.049E+001	2.508E+002	7.850E+001				-2.262E+003	4.518E+003	3.881E+003
-7.049E+001	2.280E+002	4.100E+001				-2.262E+003	4.330E+003	3.962E+003
-7.049E+001	2.052E+002	7.675E+001				-2.262E+003	4.142E+003	1.023E+003
-7.049E+001	1.824E+002	1.042E+001				-2.262E+003	3.953E+003	1.301E+004
-7.049E+001	1.596E+002	1.050E+001				-2.262E+003	3.765E+003	6.538E+003
-7.049E+001	1.368E+002	1.569E+002				-2.262E+003	3.577E+003	1.867E+004
-7.049E+001	1.140E+002	2.682E+002				-2.262E+003	3.389E+003	4.503E+003
-7.049E+001	9.121E+001	2.119E+002				-2.262E+003	3.200E+003	4.557E+004
-7.049E+001	6.841E+001	5.637E+002				-2.262E+003	3.012E+003	5.886E+004
-7.049E+001	4.560E+001	1.306E+003				-2.262E+003	2.824E+003	1.231E+005
-7.049E+001	2.280E+001	8.862E+004				-2.262E+003	2.636E+003	1.772E+005
-7.049E+001	0.000E+000	1.611E+005				-2.262E+003	2.447E+003	1.879E+005
-9.682E+001	6.156E+002	1.750E+000				-2.262E+003	2.259E+003	2.301E+005
-9.682E+001	5.472E+002	3.500E+000				-2.262E+003	2.071E+003	3.531E+005
-9.682E+001	5.244E+002	1.750E+000				-2.262E+003	1.883E+003	4.087E+005
-9.682E+001	5.016E+002	1.750E+000				-2.262E+003	1.694E+003	3.948E+005
-9.682E+001	4.788E+002	3.500E+000				-2.262E+003	1.506E+003	3.594E+005
-9.682E+001	4.560E+002	1.750E+000				-2.262E+003	1.318E+003	5.112E+005
-9.682E+001	4.332E+002	1.750E+000				-2.262E+003	1.130E+003	5.503E+005
-9.682E+001	4.104E+002	5.250E+000				-2.262E+003	9.413E+002	4.760E+005
-9.682E+001	3.420E+002	1.750E+000				-2.262E+003	7.530E+002	3.107E+005
-9.682E+001	3.192E+002	3.500E+000				-2.262E+003	5.648E+002	7.591E+005
-9.682E+001	2.964E+002	1.750E+000				-2.262E+003	3.765E+002	1.239E+006
-9.682E+001	2.280E+002	1.042E+001				-2.262E+003	1.883E+002	1.982E+006
-9.682E+001	1.596E+002	2.442E+001				-2.262E+003	0.000E+000	2.466E+006
-9.682E+001	1.368E+002	8.892E+001				-2.480E+003	6.589E+003	2.500E+000
-9.682E+001	1.140E+002	8.900E+001				-2.480E+003	6.024E+003	2.500E+000
-9.682E+001	9.121E+001	2.941E+002				-2.480E+003	5.836E+003	5.625E+000
-9.682E+001	6.841E+001	3.768E+002				-2.480E+003	5.648E+003	2.083E+000
-9.682E+001	4.560E+001	3.031E+002				-2.480E+003	5.459E+003	4.250E+000

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-9.682E+001	2.280E+001	7.263E+002				-2.480E+003	5.083E+003	1.025E+002
-9.682E+001	0.000E+000	1.088E+004				-2.480E+003	4.330E+003	4.075E+000
-1.231E+002	7.753E+002	1.750E+000				-2.480E+003	4.142E+003	2.063E+003
-1.231E+002	6.384E+002	1.750E+000				-2.480E+003	3.953E+003	3.908E+003
-1.231E+002	5.928E+002	1.750E+000				-2.480E+003	3.765E+003	2.462E+003
-1.231E+002	5.700E+002	3.500E+000				-2.480E+003	3.577E+003	2.585E+003
-1.231E+002	5.244E+002	3.500E+000				-2.480E+003	3.389E+003	9.430E+003
-1.231E+002	5.016E+002	1.750E+000				-2.480E+003	3.200E+003	8.780E+003
-1.231E+002	2.508E+002	1.042E+001				-2.480E+003	3.012E+003	6.602E+004
-1.231E+002	1.824E+002	3.500E+000				-2.480E+003	2.824E+003	3.451E+004
-1.231E+002	1.596E+002	7.000E+000				-2.480E+003	2.636E+003	3.687E+004
-1.231E+002	1.368E+002	1.400E+001				-2.480E+003	2.447E+003	4.350E+004
-1.231E+002	1.140E+002	1.742E+001				-2.480E+003	2.259E+003	7.696E+004
-1.231E+002	9.121E+001	2.468E+002				-2.480E+003	2.071E+003	7.756E+004
-1.231E+002	6.841E+001	4.542E+001				-2.480E+003	1.883E+003	1.486E+005
-1.231E+002	4.560E+001	1.402E+002				-2.480E+003	1.694E+003	1.159E+005
-1.231E+002	2.280E+001	4.890E+002				-2.480E+003	1.506E+003	3.023E+005
-1.231E+002	0.000E+000	3.419E+003				-2.480E+003	1.318E+003	2.153E+005
-1.495E+002	5.700E+002	1.750E+000				-2.480E+003	1.130E+003	2.905E+005
-1.495E+002	3.420E+002	3.500E+000				-2.480E+003	9.413E+002	2.338E+005
-1.495E+002	2.508E+002	1.042E+001				-2.480E+003	7.530E+002	3.197E+005
-1.495E+002	2.052E+002	1.392E+001				-2.480E+003	5.648E+002	3.429E+005
-1.495E+002	1.824E+002	7.000E+000				-2.480E+003	3.765E+002	7.090E+005
-1.495E+002	1.596E+002	1.392E+001				-2.480E+003	1.883E+002	1.257E+006
-1.495E+002	1.368E+002	2.092E+001				-2.480E+003	0.000E+000	1.565E+006
-1.495E+002	9.121E+001	3.142E+001				-2.698E+003	6.965E+003	2.500E+000
-1.495E+002	6.841E+001	5.600E+001				-2.698E+003	6.024E+003	4.075E+000
-1.495E+002	4.560E+001	1.332E+002				-2.698E+003	5.836E+003	1.250E+001
-1.495E+002	2.280E+001	8.753E+002				-2.698E+003	4.706E+003	1.250E+000
-1.495E+002	0.000E+000	2.664E+003				-2.698E+003	4.142E+003	1.250E+000
-1.758E+002	2.280E+002	3.500E+000				-2.698E+003	3.765E+003	2.500E+000
-1.758E+002	1.368E+002	1.742E+001				-2.698E+003	3.577E+003	6.667E+001
-1.758E+002	1.140E+002	7.000E+000				-2.698E+003	3.389E+003	2.579E+002
-1.758E+002	9.121E+001	7.000E+000				-2.698E+003	3.200E+003	8.859E+003
-1.758E+002	6.841E+001	3.142E+001				-2.698E+003	3.012E+003	5.042E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-1.758E+002	4.560E+001	2.450E+001				-2.698E+003	2.824E+003	2.027E+003
-1.758E+002	2.280E+001	2.032E+002				-2.698E+003	2.636E+003	2.044E+004
-1.758E+002	0.000E+000	4.917E+002				-2.698E+003	2.447E+003	2.172E+004
-2.021E+002	2.508E+002	3.500E+000				-2.698E+003	2.259E+003	2.453E+004
-2.021E+002	1.824E+002	7.000E+000				-2.698E+003	2.071E+003	4.679E+004
-2.021E+002	1.368E+002	1.392E+001				-2.698E+003	1.883E+003	6.147E+004
-2.021E+002	1.140E+002	7.017E+001				-2.698E+003	1.694E+003	8.460E+004
-2.021E+002	9.121E+001	3.142E+001				-2.698E+003	1.506E+003	1.295E+005
-2.021E+002	6.841E+001	7.717E+001				-2.698E+003	1.318E+003	1.264E+005
-2.021E+002	4.560E+001	2.800E+001				-2.698E+003	1.130E+003	1.329E+005
-2.021E+002	2.280E+001	1.331E+002				-2.698E+003	9.413E+002	1.450E+005
-2.021E+002	0.000E+000	9.100E+001				-2.698E+003	7.530E+002	2.690E+005
-2.285E+002	1.824E+002	3.500E+000				-2.698E+003	5.648E+002	2.710E+005
-2.285E+002	1.368E+002	3.500E+000				-2.698E+003	3.765E+002	5.416E+005
-2.285E+002	1.140E+002	3.500E+000				-2.698E+003	1.883E+002	7.231E+005
-2.285E+002	6.841E+001	7.000E+000				-2.698E+003	0.000E+000	1.133E+006
-2.285E+002	4.560E+001	3.500E+000				-2.916E+003	6.213E+003	1.750E+000
-2.285E+002	2.280E+001	1.086E+002				-2.916E+003	6.024E+003	3.508E+001
-2.285E+002	0.000E+000	1.012E+002				-2.916E+003	5.836E+003	3.333E+001
-2.548E+002	1.824E+002	3.500E+000				-2.916E+003	3.953E+003	6.250E-001
-2.548E+002	1.596E+002	7.000E+000				-2.916E+003	3.012E+003	2.686E+003
-2.548E+002	1.140E+002	1.042E+001				-2.916E+003	2.824E+003	6.842E+001
-2.548E+002	9.121E+001	3.500E+000				-2.916E+003	2.636E+003	1.250E+000
-2.548E+002	6.841E+001	3.500E+000				-2.916E+003	2.447E+003	5.905E+002
-2.548E+002	4.560E+001	1.750E+001				-2.916E+003	2.259E+003	6.392E+003
-2.548E+002	2.280E+001	4.192E+001				-2.916E+003	2.071E+003	8.525E+003
-2.548E+002	0.000E+000	3.500E+001				-2.916E+003	1.883E+003	1.990E+004
-2.811E+002	9.121E+001	1.392E+001				-2.916E+003	1.694E+003	4.912E+003
-2.811E+002	6.841E+001	6.667E+001				-2.916E+003	1.506E+003	3.420E+004
-2.811E+002	4.560E+001	3.500E+000				-2.916E+003	1.318E+003	1.618E+004
-2.811E+002	2.280E+001	2.792E+001				-2.916E+003	1.130E+003	5.508E+004
-2.811E+002	0.000E+000	5.942E+001				-2.916E+003	9.413E+002	5.830E+004
-3.074E+002	9.121E+001	3.500E+000				-2.916E+003	7.530E+002	9.858E+004
-3.074E+002	4.560E+001	7.000E+000				-2.916E+003	5.648E+002	5.596E+004
-3.074E+002	2.280E+001	1.400E+001				-2.916E+003	3.765E+002	2.616E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-3.074E+002	0.000E+000	1.400E+001				-2.916E+003	1.883E+002	5.014E+005
-3.338E+002	9.121E+001	3.500E+000				-2.916E+003	0.000E+000	5.533E+005
-3.338E+002	4.560E+001	3.500E+000				-3.133E+003	4.706E+003	3.333E+001
-3.338E+002	0.000E+000	1.050E+001				-3.133E+003	3.765E+003	1.015E+003
-3.601E+002	4.560E+001	3.500E+000				-3.133E+003	3.389E+003	1.810E+002
-3.601E+002	2.280E+001	7.000E+000				-3.133E+003	3.200E+003	5.143E+002
-4.654E+002	9.121E+001	3.500E+000				-3.133E+003	2.824E+003	1.250E+000
-4.654E+002	0.000E+000	3.500E+000				-3.133E+003	2.636E+003	4.558E+002
-4.917E+002	2.280E+001	3.500E+000				-3.133E+003	2.447E+003	6.476E+002
-4.917E+002	0.000E+000	3.500E+000				-3.133E+003	2.259E+003	5.758E+002
						-3.133E+003	2.071E+003	3.959E+003
						-3.133E+003	1.883E+003	4.606E+002
						-3.133E+003	1.694E+003	5.116E+002
						-3.133E+003	1.506E+003	6.387E+002
						-3.133E+003	1.318E+003	1.166E+003
						-3.133E+003	1.130E+003	4.590E+003
						-3.133E+003	9.413E+002	1.704E+004
						-3.133E+003	7.530E+002	3.936E+003
						-3.133E+003	5.648E+002	4.193E+004
						-3.133E+003	3.765E+002	1.183E+005
						-3.133E+003	1.883E+002	2.531E+005
						-3.133E+003	0.000E+000	3.790E+005
						-3.351E+003	3.200E+003	5.000E+000
						-3.351E+003	3.012E+003	7.167E+001
						-3.351E+003	2.824E+003	1.810E+002
						-3.351E+003	2.636E+003	3.500E+000
						-3.351E+003	2.259E+003	6.667E+001
						-3.351E+003	2.071E+003	6.547E+003
						-3.351E+003	1.694E+003	1.000E+002
						-3.351E+003	1.506E+003	4.476E+002
						-3.351E+003	1.318E+003	9.375E+001
						-3.351E+003	1.130E+003	2.572E+003
						-3.351E+003	9.413E+002	1.490E+004
						-3.351E+003	7.530E+002	1.339E+004
						-3.351E+003	5.648E+002	1.067E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
						-3.351E+003	3.765E+002	2.424E+004
						-3.351E+003	1.883E+002	8.631E+004
						-3.351E+003	0.000E+000	1.695E+005
						-3.569E+003	3.577E+003	1.200E+002
						-3.569E+003	2.447E+003	6.667E+001
						-3.569E+003	2.071E+003	2.239E+003
						-3.569E+003	1.506E+003	6.366E+003
						-3.569E+003	1.318E+003	1.007E+003
						-3.569E+003	9.413E+002	7.375E+003
						-3.569E+003	7.530E+002	2.977E+002
						-3.569E+003	5.648E+002	1.468E+003
						-3.569E+003	3.765E+002	7.539E+003
						-3.569E+003	1.883E+002	2.777E+004
						-3.569E+003	0.000E+000	5.485E+004
						-3.786E+003	1.694E+003	1.810E+002
						-3.786E+003	1.318E+003	4.476E+002
						-3.786E+003	9.413E+002	4.256E+003
						-3.786E+003	7.530E+002	1.810E+002
						-3.786E+003	5.648E+002	4.476E+002
						-3.786E+003	1.883E+002	2.133E+004
						-3.786E+003	0.000E+000	1.667E+004
						-4.004E+003	9.413E+002	1.250E+000
						-4.004E+003	7.530E+002	3.500E+000
						-4.004E+003	5.648E+002	6.368E+002
						-4.004E+003	3.765E+002	8.952E+002
						-4.004E+003	1.883E+002	3.435E+003
						-4.004E+003	0.000E+000	6.603E+003
						-4.222E+003	1.130E+003	1.810E+002
						-4.222E+003	5.648E+002	4.476E+002
						-4.222E+003	3.765E+002	1.810E+002
						-4.222E+003	1.883E+002	1.942E+002
						-4.222E+003	0.000E+000	7.380E+002
						-4.439E+003	1.883E+002	4.538E+002
						-4.439E+003	0.000E+000	3.500E+000
						-4.657E+003	1.883E+002	4.476E+002

Markov Matrices								
Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
						-4.875E+003	1.883E+002	8.151E+000
						-4.875E+003	0.000E+000	2.058E+003
						-5.092E+003	0.000E+000	2.477E+002

Appendix D. Mk3b V126 3.45MW IEC2A HH117 Rain flow count

This appendix contains the rain flow spectrum for the shear force, the bending moment and the torsional moment in the bottom of the tower.

Foundation Fatigue Load Spectrum					
Tower shear, bottom F_y [kN]		Tower bending, bottom M_x [kNm]		Tower torsion, bottom M_z [kNm]	
Range	Frequency	Range	Frequency	Range	Frequency
1.103E+003	1.750E+000	1.184E+005	1.750E+000	1.116E+004	9.458E+002
1.058E+003	1.750E+000	1.136E+005	1.750E+000	1.072E+004	1.004E+003
1.014E+003	1.221E+001	1.089E+005	3.500E+000	1.027E+004	2.713E+003
9.703E+002	1.392E+001	1.042E+005	1.221E+001	9.822E+003	5.612E+003
9.262E+002	2.267E+001	9.944E+004	3.479E+001	9.375E+003	1.302E+004
8.821E+002	3.542E+001	9.470E+004	2.088E+001	8.929E+003	2.441E+004
8.380E+002	5.996E+002	8.997E+004	4.000E+001	8.482E+003	5.463E+004
7.938E+002	5.734E+003	8.524E+004	1.347E+002	8.036E+003	8.219E+004
7.497E+002	9.147E+003	8.050E+004	2.010E+002	7.590E+003	2.658E+005
7.056E+002	2.093E+004	7.576E+004	8.413E+001	7.143E+003	4.071E+005
6.615E+002	4.945E+004	7.103E+004	6.039E+003	6.697E+003	6.802E+005
6.174E+002	9.989E+004	6.629E+004	4.899E+003	6.250E+003	8.132E+005
5.733E+002	2.119E+005	6.156E+004	4.007E+003	5.804E+003	1.103E+006
5.292E+002	3.646E+005	5.682E+004	2.947E+004	5.357E+003	1.765E+006
4.851E+002	7.885E+005	5.209E+004	5.531E+004	4.911E+003	2.216E+006
4.410E+002	1.329E+006	4.735E+004	1.959E+005	4.464E+003	3.957E+006
3.969E+002	2.477E+006	4.262E+004	3.693E+005	4.018E+003	6.233E+006
3.528E+002	4.110E+006	3.788E+004	7.198E+005	3.572E+003	1.055E+007
3.087E+002	7.858E+006	3.315E+004	1.172E+006	3.125E+003	1.686E+007
2.646E+002	1.621E+007	2.841E+004	1.999E+006	2.679E+003	2.659E+007
2.205E+002	3.416E+007	2.368E+004	3.784E+006	2.232E+003	4.076E+007

Foundation Fatigue Load Spectrum					
1.764E+002	7.236E+007	1.894E+004	6.399E+006	1.786E+003	5.593E+007
1.323E+002	1.389E+008	1.421E+004	1.391E+007	1.339E+003	6.757E+007
8.821E+001	2.226E+008	9.470E+003	6.714E+007	8.929E+002	8.002E+007
4.410E+001	4.523E+008	4.735E+003	4.421E+008	4.464E+002	1.970E+008

Table B-1 Rainflow counting spectra

Appendix E. Mk3b V126 3.45MW IEC2A HH117 Markov matrices

This appendix contains the Markov Matrices for the shear force, the bending moment and the torsional moment in the bottom of the tower.

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
6.189E+002	0.000E+000	1.017E+003	5.106E+004	0.000E+000	3.500E+000	3.808E+003	0.000E+000	1.810E+002
5.945E+002	1.764E+002	3.808E+003	4.858E+004	0.000E+000	3.500E+000	3.284E+003	2.232E+002	1.200E+002
5.945E+002	2.205E+001	1.057E+004	4.362E+004	0.000E+000	1.050E+001	3.284E+003	0.000E+000	1.860E+002
5.945E+002	0.000E+000	7.524E+004	4.114E+004	0.000E+000	3.500E+000	3.023E+003	4.464E+002	7.617E+003
5.701E+002	8.821E+001	6.366E+003	3.866E+004	0.000E+000	3.500E+000	3.023E+003	2.232E+002	1.738E+004
5.701E+002	6.615E+001	1.667E-001	3.618E+004	0.000E+000	3.500E+000	3.023E+003	0.000E+000	1.418E+004
5.701E+002	4.410E+001	6.366E+003	3.369E+004	2.368E+003	1.042E+001	2.761E+003	1.339E+003	9.050E+001
5.701E+002	2.205E+001	3.938E+004	3.369E+004	0.000E+000	3.842E+001	2.761E+003	4.464E+002	1.299E+004
5.701E+002	0.000E+000	1.570E+005	3.121E+004	0.000E+000	2.442E+001	2.761E+003	2.232E+002	2.448E+004
5.456E+002	2.205E+002	3.815E+003	2.873E+004	2.368E+003	1.042E+001	2.761E+003	0.000E+000	7.222E+004
5.456E+002	1.985E+002	4.511E+002	2.873E+004	0.000E+000	4.542E+001	2.499E+003	2.009E+003	3.500E+000
5.456E+002	1.764E+002	3.814E+003	2.625E+004	2.368E+003	1.392E+001	2.499E+003	1.116E+003	3.500E+000
5.456E+002	1.544E+002	6.817E+003	2.625E+004	0.000E+000	2.100E+001	2.499E+003	8.929E+002	1.837E+002
5.456E+002	1.323E+002	9.561E+003	2.377E+004	2.368E+003	1.050E+001	2.499E+003	6.697E+002	1.284E+004
5.456E+002	1.103E+002	1.680E+004	2.377E+004	0.000E+000	6.642E+001	2.499E+003	4.464E+002	4.816E+004
5.456E+002	8.821E+001	1.593E+004	2.129E+004	2.368E+003	1.050E+001	2.499E+003	2.232E+002	9.473E+004
5.456E+002	6.615E+001	3.505E+004	2.129E+004	0.000E+000	1.553E+002	2.499E+003	0.000E+000	8.693E+004
5.456E+002	4.410E+001	4.997E+004	1.881E+004	5.446E+004	1.750E+000	2.238E+003	1.786E+003	7.373E+003
5.456E+002	2.205E+001	3.051E+005	1.881E+004	7.103E+003	7.000E+000	2.238E+003	1.563E+003	9.564E+003
5.456E+002	0.000E+000	7.695E+005	1.881E+004	4.735E+003	7.000E+000	2.238E+003	1.339E+003	3.977E+004
5.212E+002	3.087E+002	3.808E+003	1.881E+004	2.368E+003	4.542E+001	2.238E+003	1.116E+003	2.756E+004
5.212E+002	2.426E+002	1.580E+004	1.881E+004	0.000E+000	5.878E+002	2.238E+003	8.929E+002	2.549E+004
5.212E+002	2.205E+002	7.388E+003	1.632E+004	7.103E+004	1.750E+000	2.238E+003	6.697E+002	7.962E+004
5.212E+002	1.985E+002	2.362E+004	1.632E+004	5.682E+004	1.750E+000	2.238E+003	4.464E+002	7.265E+004
5.212E+002	1.764E+002	2.880E+004	1.632E+004	4.972E+004	1.750E+000	2.238E+003	2.232E+002	2.328E+005
5.212E+002	1.544E+002	5.314E+004	1.632E+004	7.103E+003	6.000E+000	2.238E+003	0.000E+000	3.393E+005
5.212E+002	1.323E+002	3.923E+004	1.632E+004	4.735E+003	8.500E+000	1.976E+003	2.679E+003	1.511E+004
5.212E+002	1.103E+002	1.543E+005	1.632E+004	2.368E+003	5.650E+001	1.976E+003	2.455E+003	2.235E+004
5.212E+002	8.821E+001	1.889E+005	1.632E+004	0.000E+000	6.848E+002	1.976E+003	2.232E+003	1.511E+004
5.212E+002	6.615E+001	3.045E+005	1.384E+004	7.813E+004	1.750E+000	1.976E+003	2.009E+003	2.773E+004
5.212E+002	4.410E+001	3.574E+005	1.384E+004	7.576E+004	1.750E+000	1.976E+003	1.786E+003	4.840E+004

Markov Matrices								
Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
5.212E+002	2.205E+001	1.384E+006	1.384E+004	6.156E+004	1.750E+000	1.976E+003	1.563E+003	6.919E+004
5.212E+002	0.000E+000	3.550E+006	1.384E+004	5.682E+004	1.750E+000	1.976E+003	1.339E+003	9.967E+004
4.968E+002	4.190E+002	4.476E+002	1.384E+004	5.209E+004	1.750E+000	1.976E+003	1.116E+003	6.707E+004
4.968E+002	3.749E+002	1.904E+003	1.384E+004	7.103E+003	3.500E+000	1.976E+003	8.929E+002	5.681E+004
4.968E+002	3.308E+002	6.366E+003	1.384E+004	4.735E+003	1.613E+001	1.976E+003	6.697E+002	7.529E+004
4.968E+002	2.867E+002	8.946E+003	1.384E+004	2.368E+003	2.451E+002	1.976E+003	4.464E+002	2.229E+005
4.968E+002	2.646E+002	1.320E+004	1.384E+004	0.000E+000	7.910E+002	1.976E+003	2.232E+002	3.958E+005
4.968E+002	2.426E+002	2.161E+004	1.136E+004	6.629E+004	1.750E+000	1.976E+003	0.000E+000	7.934E+005
4.968E+002	2.205E+002	5.423E+004	1.136E+004	4.735E+004	1.750E+000	1.714E+003	5.134E+003	4.476E+002
4.968E+002	1.985E+002	5.930E+004	1.136E+004	4.025E+004	1.750E+000	1.714E+003	4.688E+003	1.007E+003
4.968E+002	1.764E+002	2.028E+005	1.136E+004	3.551E+004	1.750E+000	1.714E+003	3.348E+003	2.058E+003
4.968E+002	1.544E+002	3.467E+005	1.136E+004	3.315E+004	1.750E+000	1.714E+003	3.125E+003	2.758E+004
4.968E+002	1.323E+002	5.821E+005	1.136E+004	3.078E+004	3.500E+000	1.714E+003	2.902E+003	2.395E+004
4.968E+002	1.103E+002	1.016E+006	1.136E+004	2.841E+004	3.500E+000	1.714E+003	2.679E+003	1.274E+004
4.968E+002	8.821E+001	1.344E+006	1.136E+004	1.421E+004	3.500E+000	1.714E+003	2.455E+003	9.818E+004
4.968E+002	6.615E+001	1.384E+006	1.136E+004	1.184E+004	3.500E+000	1.714E+003	2.232E+003	1.858E+005
4.968E+002	4.410E+001	1.836E+006	1.136E+004	7.103E+003	4.750E+000	1.714E+003	2.009E+003	1.408E+005
4.968E+002	2.205E+001	5.084E+006	1.136E+004	4.735E+003	1.958E+001	1.714E+003	1.786E+003	1.632E+005
4.968E+002	0.000E+000	1.030E+007	1.136E+004	2.368E+003	1.923E+002	1.714E+003	1.563E+003	1.744E+005
4.723E+002	4.410E+002	6.403E+003	1.136E+004	0.000E+000	8.885E+004	1.714E+003	1.339E+003	2.046E+005
4.723E+002	3.969E+002	8.423E+003	8.880E+003	5.209E+004	1.750E+000	1.714E+003	1.116E+003	1.462E+005
4.723E+002	3.308E+002	6.403E+003	8.880E+003	4.972E+004	1.750E+000	1.714E+003	8.929E+002	1.871E+005
4.723E+002	3.087E+002	2.767E+004	8.880E+003	4.735E+004	3.500E+000	1.714E+003	6.697E+002	1.686E+005
4.723E+002	2.867E+002	3.839E+004	8.880E+003	4.499E+004	3.500E+000	1.714E+003	4.464E+002	4.615E+005
4.723E+002	2.646E+002	8.462E+004	8.880E+003	4.262E+004	1.750E+000	1.714E+003	2.232E+002	9.513E+005
4.723E+002	2.426E+002	1.031E+005	8.880E+003	3.788E+004	3.500E+000	1.714E+003	0.000E+000	1.484E+006
4.723E+002	2.205E+002	4.294E+005	8.880E+003	3.551E+004	7.000E+000	1.453E+003	5.134E+003	3.500E+000
4.723E+002	1.985E+002	6.010E+005	8.880E+003	3.078E+004	5.250E+000	1.453E+003	4.911E+003	4.476E+002
4.723E+002	1.764E+002	1.022E+006	8.880E+003	2.841E+004	4.450E+001	1.453E+003	4.688E+003	3.065E+003
4.723E+002	1.544E+002	1.931E+006	8.880E+003	2.604E+004	1.178E+002	1.453E+003	4.018E+003	3.500E+000
4.723E+002	1.323E+002	2.884E+006	8.880E+003	2.368E+004	7.167E+001	1.453E+003	3.795E+003	1.487E+004
4.723E+002	1.103E+002	3.843E+006	8.880E+003	2.131E+004	8.750E+000	1.453E+003	3.572E+003	2.235E+004
4.723E+002	8.821E+001	4.752E+006	8.880E+003	1.894E+004	8.750E+000	1.453E+003	3.348E+003	3.704E+004
4.723E+002	6.615E+001	5.189E+006	8.880E+003	1.657E+004	1.050E+001	1.453E+003	3.125E+003	5.664E+004
4.723E+002	4.410E+001	5.717E+006	8.880E+003	1.421E+004	7.000E+000	1.453E+003	2.902E+003	9.917E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
4.723E+002	2.205E+001	1.388E+007	8.880E+003	1.184E+004	3.500E+000	1.453E+003	2.679E+003	1.490E+005
4.723E+002	0.000E+000	2.193E+007	8.880E+003	9.470E+003	7.000E+000	1.453E+003	2.455E+003	1.107E+005
4.479E+002	4.851E+002	1.029E+003	8.880E+003	7.103E+003	1.400E+001	1.453E+003	2.232E+003	1.563E+005
4.479E+002	4.190E+002	6.403E+003	8.880E+003	4.735E+003	6.886E+003	1.453E+003	2.009E+003	2.649E+005
4.479E+002	3.969E+002	6.405E+003	8.880E+003	2.368E+003	2.058E+004	1.453E+003	1.786E+003	2.581E+005
4.479E+002	3.749E+002	2.391E+004	8.880E+003	0.000E+000	1.328E+005	1.453E+003	1.563E+003	2.578E+005
4.479E+002	3.528E+002	3.563E+004	6.399E+003	4.735E+004	3.500E+000	1.453E+003	1.339E+003	2.866E+005
4.479E+002	3.308E+002	9.896E+004	6.399E+003	4.499E+004	1.750E+000	1.453E+003	1.116E+003	3.341E+005
4.479E+002	3.087E+002	1.462E+005	6.399E+003	4.025E+004	8.750E+000	1.453E+003	8.929E+002	3.178E+005
4.479E+002	2.867E+002	2.358E+005	6.399E+003	3.788E+004	1.225E+001	1.453E+003	6.697E+002	4.697E+005
4.479E+002	2.646E+002	4.523E+005	6.399E+003	3.551E+004	1.050E+001	1.453E+003	4.464E+002	7.215E+005
4.479E+002	2.426E+002	8.294E+005	6.399E+003	3.315E+004	1.400E+001	1.453E+003	2.232E+002	1.682E+006
4.479E+002	2.205E+002	1.189E+006	6.399E+003	3.078E+004	4.800E+001	1.453E+003	0.000E+000	2.776E+006
4.479E+002	1.985E+002	2.052E+006	6.399E+003	2.841E+004	1.451E+002	1.191E+003	6.250E+003	1.750E+000
4.479E+002	1.764E+002	3.249E+006	6.399E+003	2.604E+004	1.025E+002	1.191E+003	6.027E+003	1.750E+000
4.479E+002	1.544E+002	4.907E+006	6.399E+003	2.368E+004	1.928E+002	1.191E+003	5.357E+003	1.750E+000
4.479E+002	1.323E+002	6.962E+006	6.399E+003	2.131E+004	1.467E+002	1.191E+003	4.688E+003	8.002E+003
4.479E+002	1.103E+002	9.249E+006	6.399E+003	1.894E+004	6.475E+002	1.191E+003	4.464E+003	4.258E+003
4.479E+002	8.821E+001	1.077E+007	6.399E+003	1.657E+004	3.685E+002	1.191E+003	4.241E+003	7.734E+003
4.479E+002	6.615E+001	1.237E+007	6.399E+003	1.421E+004	1.925E+001	1.191E+003	4.018E+003	1.007E+003
4.479E+002	4.410E+001	1.256E+007	6.399E+003	1.184E+004	1.688E+004	1.191E+003	3.795E+003	2.705E+004
4.479E+002	2.205E+001	2.425E+007	6.399E+003	9.470E+003	3.356E+003	1.191E+003	3.572E+003	1.900E+004
4.479E+002	0.000E+000	3.669E+007	6.399E+003	7.103E+003	2.925E+001	1.191E+003	3.348E+003	8.768E+004
4.235E+002	5.292E+002	1.904E+003	6.399E+003	4.735E+003	9.850E+003	1.191E+003	3.125E+003	1.017E+005
4.235E+002	4.631E+002	7.556E+003	6.399E+003	2.368E+003	7.207E+004	1.191E+003	2.902E+003	1.595E+005
4.235E+002	4.410E+002	5.787E+003	6.399E+003	0.000E+000	3.842E+005	1.191E+003	2.679E+003	1.701E+005
4.235E+002	4.190E+002	2.551E+004	3.918E+003	4.262E+004	1.750E+000	1.191E+003	2.455E+003	2.028E+005
4.235E+002	3.969E+002	7.456E+004	3.918E+003	4.025E+004	4.275E+001	1.191E+003	2.232E+003	3.014E+005
4.235E+002	3.749E+002	8.168E+004	3.918E+003	3.788E+004	1.400E+001	1.191E+003	2.009E+003	4.117E+005
4.235E+002	3.528E+002	1.661E+005	3.918E+003	3.551E+004	4.450E+001	1.191E+003	1.786E+003	4.515E+005
4.235E+002	3.308E+002	3.383E+005	3.918E+003	3.315E+004	1.076E+002	1.191E+003	1.563E+003	5.476E+005
4.235E+002	3.087E+002	4.510E+005	3.918E+003	3.078E+004	6.308E+001	1.191E+003	1.339E+003	6.485E+005
4.235E+002	2.867E+002	7.573E+005	3.918E+003	2.841E+004	1.925E+001	1.191E+003	1.116E+003	5.599E+005
4.235E+002	2.646E+002	1.202E+006	3.918E+003	2.604E+004	4.033E+001	1.191E+003	8.929E+002	5.777E+005
4.235E+002	2.426E+002	1.736E+006	3.918E+003	2.368E+004	3.500E+000	1.191E+003	6.697E+002	6.199E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
4.235E+002	2.205E+002	2.635E+006	3.918E+003	2.131E+004	5.692E+001	1.191E+003	4.464E+002	1.239E+006
4.235E+002	1.985E+002	3.805E+006	3.918E+003	1.894E+004	3.342E+002	1.191E+003	2.232E+002	2.880E+006
4.235E+002	1.764E+002	5.976E+006	3.918E+003	1.657E+004	8.296E+002	1.191E+003	0.000E+000	4.927E+006
4.235E+002	1.544E+002	7.832E+006	3.918E+003	1.421E+004	8.570E+002	9.293E+002	7.590E+003	1.042E+000
4.235E+002	1.323E+002	1.104E+007	3.918E+003	1.184E+004	3.200E+003	9.293E+002	6.250E+003	2.238E+002
4.235E+002	1.103E+002	1.238E+007	3.918E+003	9.470E+003	1.114E+004	9.293E+002	6.027E+003	4.780E+003
4.235E+002	8.821E+001	1.486E+007	3.918E+003	7.103E+003	3.269E+004	9.293E+002	5.804E+003	4.476E+002
4.235E+002	6.615E+001	1.610E+007	3.918E+003	4.735E+003	1.487E+004	9.293E+002	5.134E+003	1.281E+004
4.235E+002	4.410E+001	1.638E+007	3.918E+003	2.368E+003	6.474E+004	9.293E+002	4.911E+003	2.178E+003
4.235E+002	2.205E+001	3.167E+007	3.918E+003	0.000E+000	6.362E+005	9.293E+002	4.688E+003	1.281E+004
4.235E+002	0.000E+000	4.559E+007	1.436E+003	5.446E+004	3.500E+000	9.293E+002	4.464E+003	1.787E+004
3.990E+002	5.954E+002	6.366E+003	1.436E+003	4.499E+004	5.250E+000	9.293E+002	4.241E+003	6.567E+003
3.990E+002	5.733E+002	1.277E+004	1.436E+003	4.262E+004	3.500E+000	9.293E+002	4.018E+003	8.097E+004
3.990E+002	5.513E+002	3.183E+003	1.436E+003	4.025E+004	3.500E+000	9.293E+002	3.795E+003	5.128E+004
3.990E+002	5.292E+002	3.183E+003	1.436E+003	3.788E+004	3.500E+000	9.293E+002	3.572E+003	1.494E+005
3.990E+002	4.851E+002	2.689E+004	1.436E+003	3.551E+004	7.167E+001	9.293E+002	3.348E+003	9.720E+004
3.990E+002	4.631E+002	5.894E+004	1.436E+003	3.315E+004	7.183E+001	9.293E+002	3.125E+003	1.758E+005
3.990E+002	4.410E+002	6.474E+004	1.436E+003	3.078E+004	4.117E+001	9.293E+002	2.902E+003	1.955E+005
3.990E+002	4.190E+002	7.795E+004	1.436E+003	2.841E+004	4.250E+000	9.293E+002	2.679E+003	3.604E+005
3.990E+002	3.969E+002	1.123E+005	1.436E+003	2.604E+004	8.750E+000	9.293E+002	2.455E+003	5.180E+005
3.990E+002	3.749E+002	2.581E+005	1.436E+003	2.368E+004	2.275E+001	9.293E+002	2.232E+003	6.419E+005
3.990E+002	3.528E+002	3.020E+005	1.436E+003	2.131E+004	3.465E+003	9.293E+002	2.009E+003	7.766E+005
3.990E+002	3.308E+002	2.761E+005	1.436E+003	1.894E+004	2.458E+002	9.293E+002	1.786E+003	9.631E+005
3.990E+002	3.087E+002	3.265E+005	1.436E+003	1.657E+004	7.851E+003	9.293E+002	1.563E+003	1.020E+006
3.990E+002	2.867E+002	5.882E+005	1.436E+003	1.421E+004	5.021E+003	9.293E+002	1.339E+003	1.117E+006
3.990E+002	2.646E+002	9.351E+005	1.436E+003	1.184E+004	4.233E+003	9.293E+002	1.116E+003	9.859E+005
3.990E+002	2.426E+002	1.203E+006	1.436E+003	9.470E+003	5.728E+003	9.293E+002	8.929E+002	1.219E+006
3.990E+002	2.205E+002	1.890E+006	1.436E+003	7.103E+003	3.005E+004	9.293E+002	6.697E+002	1.489E+006
3.990E+002	1.985E+002	3.163E+006	1.436E+003	4.735E+003	2.393E+005	9.293E+002	4.464E+002	2.256E+006
3.990E+002	1.764E+002	4.689E+006	1.436E+003	2.368E+003	1.515E+006	9.293E+002	2.232E+002	4.631E+006
3.990E+002	1.544E+002	6.408E+006	1.436E+003	0.000E+000	2.420E+007	9.293E+002	0.000E+000	8.482E+006
3.990E+002	1.323E+002	9.450E+006	-1.045E+003	4.735E+004	3.333E+001	6.676E+002	6.920E+003	6.286E+002
3.990E+002	1.103E+002	1.105E+007	-1.045E+003	4.499E+004	3.125E+000	6.676E+002	6.697E+003	1.810E+002
3.990E+002	8.821E+001	1.334E+007	-1.045E+003	4.262E+004	3.333E+001	6.676E+002	6.473E+003	4.476E+002
3.990E+002	6.615E+001	1.262E+007	-1.045E+003	4.025E+004	7.500E+000	6.676E+002	6.027E+003	3.086E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.990E+002	4.410E+001	1.474E+007	-1.045E+003	3.788E+004	3.067E+001	6.676E+002	5.804E+003	4.476E+002
3.990E+002	2.205E+001	2.906E+007	-1.045E+003	3.551E+004	1.500E+001	6.676E+002	5.581E+003	2.597E+003
3.990E+002	0.000E+000	4.299E+007	-1.045E+003	3.315E+004	3.125E+000	6.676E+002	5.357E+003	4.476E+002
3.746E+002	7.497E+002	5.035E+002	-1.045E+003	3.078E+004	1.750E+000	6.676E+002	5.134E+003	2.138E+004
3.746E+002	7.056E+002	1.029E+003	-1.045E+003	2.604E+004	6.670E+003	6.676E+002	4.911E+003	9.613E+003
3.746E+002	6.615E+002	1.029E+003	-1.045E+003	2.368E+004	1.437E+003	6.676E+002	4.688E+003	4.448E+004
3.746E+002	6.174E+002	1.904E+003	-1.045E+003	2.131E+004	1.059E+003	6.676E+002	4.464E+003	4.785E+004
3.746E+002	5.954E+002	2.058E+003	-1.045E+003	1.894E+004	6.745E+003	6.676E+002	4.241E+003	3.839E+004
3.746E+002	5.733E+002	1.336E+004	-1.045E+003	1.657E+004	3.530E+003	6.676E+002	4.018E+003	4.800E+004
3.746E+002	5.513E+002	9.399E+003	-1.045E+003	1.421E+004	1.765E+003	6.676E+002	3.795E+003	1.488E+005
3.746E+002	5.292E+002	1.595E+004	-1.045E+003	1.184E+004	9.051E+003	6.676E+002	3.572E+003	1.060E+005
3.746E+002	5.072E+002	2.769E+004	-1.045E+003	9.470E+003	1.736E+004	6.676E+002	3.348E+003	1.447E+005
3.746E+002	4.851E+002	2.753E+004	-1.045E+003	7.103E+003	5.998E+004	6.676E+002	3.125E+003	2.624E+005
3.746E+002	4.631E+002	7.489E+004	-1.045E+003	4.735E+003	3.126E+005	6.676E+002	2.902E+003	3.107E+005
3.746E+002	4.410E+002	9.036E+004	-1.045E+003	2.368E+003	6.599E+005	6.676E+002	2.679E+003	3.964E+005
3.746E+002	4.190E+002	1.025E+005	-1.045E+003	0.000E+000	3.359E+006	6.676E+002	2.455E+003	5.816E+005
3.746E+002	3.969E+002	1.316E+005	-3.526E+003	1.065E+005	1.750E+000	6.676E+002	2.232E+003	9.703E+005
3.746E+002	3.749E+002	1.600E+005	-3.526E+003	5.682E+004	6.250E-001	6.676E+002	2.009E+003	1.066E+006
3.746E+002	3.528E+002	1.836E+005	-3.526E+003	4.735E+004	1.313E+001	6.676E+002	1.786E+003	1.448E+006
3.746E+002	3.308E+002	2.166E+005	-3.526E+003	4.262E+004	1.250E+000	6.676E+002	1.563E+003	1.772E+006
3.746E+002	3.087E+002	3.414E+005	-3.526E+003	4.025E+004	9.150E+001	6.676E+002	1.339E+003	1.979E+006
3.746E+002	2.867E+002	4.804E+005	-3.526E+003	3.788E+004	5.625E+000	6.676E+002	1.116E+003	1.959E+006
3.746E+002	2.646E+002	6.552E+005	-3.526E+003	3.551E+004	4.063E+001	6.676E+002	8.929E+002	2.055E+006
3.746E+002	2.426E+002	9.325E+005	-3.526E+003	3.315E+004	1.681E+002	6.676E+002	6.697E+002	2.311E+006
3.746E+002	2.205E+002	1.491E+006	-3.526E+003	3.078E+004	3.463E+003	6.676E+002	4.464E+002	3.315E+006
3.746E+002	1.985E+002	1.814E+006	-3.526E+003	2.841E+004	3.383E+003	6.676E+002	2.232E+002	7.429E+006
3.746E+002	1.764E+002	3.002E+006	-3.526E+003	2.604E+004	1.194E+002	6.676E+002	0.000E+000	1.410E+007
3.746E+002	1.544E+002	3.969E+006	-3.526E+003	2.368E+004	1.221E+003	4.059E+002	8.482E+003	2.238E+002
3.746E+002	1.323E+002	6.417E+006	-3.526E+003	2.131E+004	3.485E+003	4.059E+002	7.813E+003	5.035E+002
3.746E+002	1.103E+002	8.013E+006	-3.526E+003	1.894E+004	4.475E+002	4.059E+002	7.590E+003	1.029E+003
3.746E+002	8.821E+001	8.947E+006	-3.526E+003	1.657E+004	4.917E+002	4.059E+002	6.920E+003	4.167E+000
3.746E+002	6.615E+001	9.264E+006	-3.526E+003	1.421E+004	4.168E+003	4.059E+002	6.697E+003	2.185E+002
3.746E+002	4.410E+001	1.080E+007	-3.526E+003	1.184E+004	7.158E+003	4.059E+002	6.473E+003	3.038E+003
3.746E+002	2.205E+001	2.057E+007	-3.526E+003	9.470E+003	1.688E+004	4.059E+002	6.250E+003	5.348E+003
3.746E+002	0.000E+000	3.603E+007	-3.526E+003	7.103E+003	9.982E+004	4.059E+002	6.027E+003	6.106E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.502E+002	7.938E+002	5.035E+002	-3.526E+003	4.735E+003	6.329E+005	4.059E+002	5.804E+003	4.547E+003
3.502E+002	7.497E+002	2.238E+002	-3.526E+003	2.368E+003	1.784E+006	4.059E+002	5.581E+003	2.373E+004
3.502E+002	7.277E+002	4.476E+002	-3.526E+003	0.000E+000	8.319E+006	4.059E+002	5.357E+003	1.587E+004
3.502E+002	6.836E+002	2.281E+003	-6.008E+003	1.184E+005	1.750E+000	4.059E+002	5.134E+003	3.767E+004
3.502E+002	6.615E+002	3.808E+003	-6.008E+003	1.113E+005	1.750E+000	4.059E+002	4.911E+003	6.006E+003
3.502E+002	6.395E+002	5.866E+003	-6.008E+003	1.018E+005	3.500E+000	4.059E+002	4.688E+003	1.645E+004
3.502E+002	6.174E+002	6.369E+003	-6.008E+003	9.707E+004	1.750E+000	4.059E+002	4.464E+003	5.700E+004
3.502E+002	5.954E+002	1.111E+004	-6.008E+003	7.340E+004	1.750E+000	4.059E+002	4.241E+003	1.036E+005
3.502E+002	5.733E+002	1.205E+004	-6.008E+003	5.682E+004	6.250E-001	4.059E+002	4.018E+003	1.361E+005
3.502E+002	5.513E+002	1.572E+004	-6.008E+003	5.446E+004	3.333E+001	4.059E+002	3.795E+003	1.631E+005
3.502E+002	5.292E+002	2.372E+004	-6.008E+003	5.209E+004	6.250E-001	4.059E+002	3.572E+003	3.703E+005
3.502E+002	5.072E+002	3.564E+004	-6.008E+003	4.972E+004	1.250E+001	4.059E+002	3.348E+003	3.310E+005
3.502E+002	4.851E+002	5.911E+004	-6.008E+003	4.735E+004	2.500E+000	4.059E+002	3.125E+003	4.303E+005
3.502E+002	4.631E+002	7.432E+004	-6.008E+003	4.499E+004	1.250E+000	4.059E+002	2.902E+003	4.917E+005
3.502E+002	4.410E+002	6.683E+004	-6.008E+003	4.262E+004	2.281E+002	4.059E+002	2.679E+003	7.215E+005
3.502E+002	4.190E+002	1.023E+005	-6.008E+003	4.025E+004	1.406E+002	4.059E+002	2.455E+003	9.700E+005
3.502E+002	3.969E+002	1.650E+005	-6.008E+003	3.788E+004	4.038E+002	4.059E+002	2.232E+003	1.433E+006
3.502E+002	3.749E+002	1.633E+005	-6.008E+003	3.551E+004	1.888E+002	4.059E+002	2.009E+003	1.650E+006
3.502E+002	3.528E+002	1.910E+005	-6.008E+003	3.315E+004	1.975E+002	4.059E+002	1.786E+003	2.055E+006
3.502E+002	3.308E+002	2.794E+005	-6.008E+003	3.078E+004	3.081E+002	4.059E+002	1.563E+003	2.800E+006
3.502E+002	3.087E+002	4.505E+005	-6.008E+003	2.841E+004	3.881E+002	4.059E+002	1.339E+003	3.125E+006
3.502E+002	2.867E+002	5.650E+005	-6.008E+003	2.604E+004	8.600E+002	4.059E+002	1.116E+003	3.212E+006
3.502E+002	2.646E+002	8.205E+005	-6.008E+003	2.368E+004	1.230E+003	4.059E+002	8.929E+002	3.768E+006
3.502E+002	2.426E+002	1.062E+006	-6.008E+003	2.131E+004	4.696E+003	4.059E+002	6.697E+002	3.612E+006
3.502E+002	2.205E+002	1.481E+006	-6.008E+003	1.894E+004	5.691E+003	4.059E+002	4.464E+002	5.606E+006
3.502E+002	1.985E+002	2.121E+006	-6.008E+003	1.657E+004	1.302E+004	4.059E+002	2.232E+002	1.185E+007
3.502E+002	1.764E+002	3.027E+006	-6.008E+003	1.421E+004	6.636E+003	4.059E+002	0.000E+000	2.050E+007
3.502E+002	1.544E+002	4.039E+006	-6.008E+003	1.184E+004	2.156E+004	1.443E+002	1.004E+004	9.050E+001
3.502E+002	1.323E+002	5.577E+006	-6.008E+003	9.470E+003	2.803E+004	1.443E+002	9.599E+003	1.343E+003
3.502E+002	1.103E+002	7.295E+006	-6.008E+003	7.103E+003	1.452E+005	1.443E+002	9.375E+003	1.231E+003
3.502E+002	8.821E+001	7.397E+006	-6.008E+003	4.735E+003	1.331E+006	1.443E+002	9.152E+003	9.050E+001
3.502E+002	6.615E+001	8.728E+006	-6.008E+003	2.368E+003	3.921E+006	1.443E+002	8.706E+003	7.273E+002
3.502E+002	4.410E+001	9.017E+006	-6.008E+003	0.000E+000	1.584E+007	1.443E+002	8.482E+003	9.300E+001
3.502E+002	2.205E+001	1.666E+007	-8.489E+003	1.065E+005	1.750E+000	1.443E+002	8.259E+003	1.031E+003
3.502E+002	0.000E+000	2.871E+007	-8.489E+003	9.707E+004	1.750E+000	1.443E+002	8.036E+003	9.050E+001

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.257E+002	8.159E+002	2.238E+002	-8.489E+003	8.050E+004	1.750E+000	1.443E+002	7.813E+003	3.098E+003
3.257E+002	7.718E+002	1.029E+003	-8.489E+003	7.813E+004	1.750E+000	1.443E+002	7.590E+003	6.838E+003
3.257E+002	7.056E+002	9.050E+001	-8.489E+003	5.682E+004	1.250E+000	1.443E+002	7.366E+003	6.714E+002
3.257E+002	6.836E+002	1.207E+003	-8.489E+003	5.446E+004	6.250E-001	1.443E+002	7.143E+003	1.761E+003
3.257E+002	6.615E+002	1.533E+003	-8.489E+003	5.209E+004	6.250E-001	1.443E+002	6.920E+003	3.696E+003
3.257E+002	6.395E+002	1.216E+004	-8.489E+003	4.972E+004	8.033E+001	1.443E+002	6.697E+003	2.365E+003
3.257E+002	6.174E+002	4.343E+003	-8.489E+003	4.735E+004	5.086E+001	1.443E+002	6.473E+003	1.092E+004
3.257E+002	5.954E+002	6.835E+003	-8.489E+003	4.499E+004	1.281E+002	1.443E+002	6.250E+003	4.515E+003
3.257E+002	5.733E+002	1.098E+004	-8.489E+003	4.262E+004	1.265E+002	1.443E+002	6.027E+003	4.842E+004
3.257E+002	5.513E+002	3.405E+004	-8.489E+003	4.025E+004	3.188E+001	1.443E+002	5.804E+003	4.983E+004
3.257E+002	5.292E+002	3.372E+004	-8.489E+003	3.788E+004	2.100E+002	1.443E+002	5.581E+003	6.350E+004
3.257E+002	5.072E+002	4.680E+004	-8.489E+003	3.551E+004	1.347E+002	1.443E+002	5.357E+003	8.163E+004
3.257E+002	4.851E+002	5.721E+004	-8.489E+003	3.315E+004	4.029E+002	1.443E+002	5.134E+003	4.558E+004
3.257E+002	4.631E+002	8.226E+004	-8.489E+003	3.078E+004	3.063E+002	1.443E+002	4.911E+003	6.264E+004
3.257E+002	4.410E+002	9.931E+004	-8.489E+003	2.841E+004	9.425E+002	1.443E+002	4.688E+003	1.123E+005
3.257E+002	4.190E+002	1.457E+005	-8.489E+003	2.604E+004	9.173E+002	1.443E+002	4.464E+003	1.756E+005
3.257E+002	3.969E+002	1.555E+005	-8.489E+003	2.368E+004	1.284E+003	1.443E+002	4.241E+003	1.451E+005
3.257E+002	3.749E+002	2.939E+005	-8.489E+003	2.131E+004	1.435E+003	1.443E+002	4.018E+003	2.408E+005
3.257E+002	3.528E+002	3.089E+005	-8.489E+003	1.894E+004	1.814E+004	1.443E+002	3.795E+003	2.301E+005
3.257E+002	3.308E+002	3.316E+005	-8.489E+003	1.657E+004	7.945E+003	1.443E+002	3.572E+003	3.818E+005
3.257E+002	3.087E+002	4.876E+005	-8.489E+003	1.421E+004	2.875E+004	1.443E+002	3.348E+003	5.385E+005
3.257E+002	2.867E+002	6.443E+005	-8.489E+003	1.184E+004	1.845E+004	1.443E+002	3.125E+003	5.949E+005
3.257E+002	2.646E+002	8.173E+005	-8.489E+003	9.470E+003	6.604E+004	1.443E+002	2.902E+003	8.727E+005
3.257E+002	2.426E+002	1.237E+006	-8.489E+003	7.103E+003	2.241E+005	1.443E+002	2.679E+003	1.170E+006
3.257E+002	2.205E+002	1.664E+006	-8.489E+003	4.735E+003	1.373E+006	1.443E+002	2.455E+003	1.392E+006
3.257E+002	1.985E+002	2.155E+006	-8.489E+003	2.368E+003	3.891E+006	1.443E+002	2.232E+003	1.757E+006
3.257E+002	1.764E+002	3.008E+006	-8.489E+003	0.000E+000	1.714E+007	1.443E+002	2.009E+003	2.249E+006
3.257E+002	1.544E+002	3.817E+006	-1.097E+004	1.042E+005	1.750E+000	1.443E+002	1.786E+003	2.859E+006
3.257E+002	1.323E+002	5.617E+006	-1.097E+004	1.018E+005	1.750E+000	1.443E+002	1.563E+003	3.302E+006
3.257E+002	1.103E+002	6.222E+006	-1.097E+004	9.707E+004	5.208E+000	1.443E+002	1.339E+003	4.314E+006
3.257E+002	8.821E+001	7.561E+006	-1.097E+004	9.234E+004	5.208E+000	1.443E+002	1.116E+003	4.547E+006
3.257E+002	6.615E+001	8.442E+006	-1.097E+004	7.340E+004	1.750E+000	1.443E+002	8.929E+002	5.278E+006
3.257E+002	4.410E+001	8.744E+006	-1.097E+004	7.103E+004	6.250E-001	1.443E+002	6.697E+002	5.842E+006
3.257E+002	2.205E+001	1.397E+007	-1.097E+004	6.156E+004	1.500E+001	1.443E+002	4.464E+002	7.911E+006
3.257E+002	0.000E+000	2.459E+007	-1.097E+004	5.919E+004	4.021E+001	1.443E+002	2.232E+002	1.613E+007

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.013E+002	7.718E+002	3.808E+003	-1.097E+004	5.682E+004	3.333E+001	1.443E+002	0.000E+000	2.950E+007
3.013E+002	7.497E+002	4.476E+002	-1.097E+004	5.446E+004	5.098E+001	-1.174E+002	9.822E+003	1.119E+003
3.013E+002	7.277E+002	1.041E+003	-1.097E+004	5.209E+004	5.940E+001	-1.174E+002	9.375E+003	2.248E+002
3.013E+002	7.056E+002	2.015E+003	-1.097E+004	4.972E+004	6.380E+001	-1.174E+002	9.152E+003	5.035E+002
3.013E+002	6.836E+002	4.218E+003	-1.097E+004	4.735E+004	4.178E+001	-1.174E+002	8.929E+003	1.810E+002
3.013E+002	6.615E+002	4.469E+003	-1.097E+004	4.499E+004	2.013E+002	-1.174E+002	8.706E+003	9.050E+001
3.013E+002	6.395E+002	8.049E+003	-1.097E+004	4.262E+004	9.713E+001	-1.174E+002	8.482E+003	4.809E+002
3.013E+002	6.174E+002	1.469E+004	-1.097E+004	4.025E+004	4.202E+002	-1.174E+002	8.259E+003	3.854E+003
3.013E+002	5.954E+002	1.496E+004	-1.097E+004	3.788E+004	2.814E+002	-1.174E+002	8.036E+003	6.556E+003
3.013E+002	5.733E+002	2.061E+004	-1.097E+004	3.551E+004	4.947E+002	-1.174E+002	7.813E+003	4.027E+003
3.013E+002	5.513E+002	2.083E+004	-1.097E+004	3.315E+004	6.127E+002	-1.174E+002	7.590E+003	4.973E+003
3.013E+002	5.292E+002	3.058E+004	-1.097E+004	3.078E+004	7.446E+002	-1.174E+002	7.366E+003	2.294E+004
3.013E+002	5.072E+002	5.096E+004	-1.097E+004	2.841E+004	9.723E+002	-1.174E+002	7.143E+003	2.150E+004
3.013E+002	4.851E+002	8.654E+004	-1.097E+004	2.604E+004	1.102E+003	-1.174E+002	6.920E+003	3.256E+004
3.013E+002	4.631E+002	9.851E+004	-1.097E+004	2.368E+004	1.966E+003	-1.174E+002	6.697E+003	5.013E+004
3.013E+002	4.410E+002	1.069E+005	-1.097E+004	2.131E+004	2.083E+004	-1.174E+002	6.473E+003	6.777E+004
3.013E+002	4.190E+002	1.788E+005	-1.097E+004	1.894E+004	8.315E+003	-1.174E+002	6.250E+003	3.332E+004
3.013E+002	3.969E+002	2.223E+005	-1.097E+004	1.657E+004	1.478E+004	-1.174E+002	6.027E+003	4.037E+004
3.013E+002	3.749E+002	2.207E+005	-1.097E+004	1.421E+004	1.893E+004	-1.174E+002	5.804E+003	6.290E+004
3.013E+002	3.528E+002	3.033E+005	-1.097E+004	1.184E+004	8.660E+003	-1.174E+002	5.581E+003	8.650E+004
3.013E+002	3.308E+002	3.506E+005	-1.097E+004	9.470E+003	5.153E+004	-1.174E+002	5.357E+003	1.201E+005
3.013E+002	3.087E+002	4.832E+005	-1.097E+004	7.103E+003	3.621E+005	-1.174E+002	5.134E+003	1.387E+005
3.013E+002	2.867E+002	5.558E+005	-1.097E+004	4.735E+003	1.900E+006	-1.174E+002	4.911E+003	1.660E+005
3.013E+002	2.646E+002	7.627E+005	-1.097E+004	2.368E+003	5.123E+006	-1.174E+002	4.688E+003	1.671E+005
3.013E+002	2.426E+002	1.057E+006	-1.097E+004	0.000E+000	2.136E+007	-1.174E+002	4.464E+003	2.533E+005
3.013E+002	2.205E+002	1.508E+006	-1.345E+004	1.018E+005	5.208E+000	-1.174E+002	4.241E+003	3.582E+005
3.013E+002	1.985E+002	1.682E+006	-1.345E+004	9.944E+004	1.042E+001	-1.174E+002	4.018E+003	4.568E+005
3.013E+002	1.764E+002	2.544E+006	-1.345E+004	9.707E+004	6.958E+000	-1.174E+002	3.795E+003	4.932E+005
3.013E+002	1.544E+002	3.494E+006	-1.345E+004	9.470E+004	3.500E+000	-1.174E+002	3.572E+003	5.214E+005
3.013E+002	1.323E+002	5.052E+006	-1.345E+004	8.997E+004	1.046E+001	-1.174E+002	3.348E+003	7.919E+005
3.013E+002	1.103E+002	5.935E+006	-1.345E+004	8.524E+004	5.208E+000	-1.174E+002	3.125E+003	9.406E+005
3.013E+002	8.821E+001	7.709E+006	-1.345E+004	8.050E+004	3.500E+000	-1.174E+002	2.902E+003	1.097E+006
3.013E+002	6.615E+001	8.320E+006	-1.345E+004	7.813E+004	1.750E+000	-1.174E+002	2.679E+003	1.320E+006
3.013E+002	4.410E+001	8.554E+006	-1.345E+004	7.103E+004	2.500E+000	-1.174E+002	2.455E+003	1.741E+006
3.013E+002	2.205E+001	1.228E+007	-1.345E+004	6.629E+004	1.042E+000	-1.174E+002	2.232E+003	1.827E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.013E+002	0.000E+000	2.247E+007	-1.345E+004	6.393E+004	6.250E-001	-1.174E+002	2.009E+003	2.422E+006
2.769E+002	8.159E+002	2.238E+002	-1.345E+004	6.156E+004	4.075E+000	-1.174E+002	1.786E+003	2.876E+006
2.769E+002	7.938E+002	1.750E+000	-1.345E+004	5.919E+004	1.086E+001	-1.174E+002	1.563E+003	3.535E+006
2.769E+002	7.718E+002	2.500E+000	-1.345E+004	5.682E+004	3.875E+001	-1.174E+002	1.339E+003	4.334E+006
2.769E+002	7.497E+002	9.050E+001	-1.345E+004	5.446E+004	3.521E+001	-1.174E+002	1.116E+003	5.469E+006
2.769E+002	7.277E+002	4.198E+003	-1.345E+004	5.209E+004	4.806E+001	-1.174E+002	8.929E+002	5.635E+006
2.769E+002	7.056E+002	1.906E+003	-1.345E+004	4.972E+004	6.741E+001	-1.174E+002	6.697E+002	6.192E+006
2.769E+002	6.836E+002	3.736E+003	-1.345E+004	4.735E+004	2.053E+002	-1.174E+002	4.464E+002	8.125E+006
2.769E+002	6.615E+002	2.594E+003	-1.345E+004	4.499E+004	2.205E+002	-1.174E+002	2.232E+002	1.846E+007
2.769E+002	6.395E+002	5.315E+003	-1.345E+004	4.262E+004	5.031E+002	-1.174E+002	0.000E+000	6.589E+007
2.769E+002	6.174E+002	1.079E+004	-1.345E+004	4.025E+004	5.393E+002	-3.791E+002	1.094E+004	9.050E+001
2.769E+002	5.954E+002	1.136E+004	-1.345E+004	3.788E+004	7.660E+002	-3.791E+002	1.004E+004	2.238E+002
2.769E+002	5.733E+002	2.117E+004	-1.345E+004	3.551E+004	1.061E+003	-3.791E+002	9.822E+003	1.042E+003
2.769E+002	5.513E+002	2.042E+004	-1.345E+004	3.315E+004	1.536E+003	-3.791E+002	9.599E+003	8.178E+002
2.769E+002	5.292E+002	2.761E+004	-1.345E+004	3.078E+004	1.376E+003	-3.791E+002	9.375E+003	1.210E+003
2.769E+002	5.072E+002	4.182E+004	-1.345E+004	2.841E+004	2.162E+003	-3.791E+002	9.152E+003	1.238E+002
2.769E+002	4.851E+002	3.525E+004	-1.345E+004	2.604E+004	8.487E+003	-3.791E+002	8.929E+003	1.286E+003
2.769E+002	4.631E+002	4.355E+004	-1.345E+004	2.368E+004	8.248E+003	-3.791E+002	8.706E+003	8.407E+003
2.769E+002	4.410E+002	6.816E+004	-1.345E+004	2.131E+004	1.505E+004	-3.791E+002	8.482E+003	3.344E+003
2.769E+002	4.190E+002	9.490E+004	-1.345E+004	1.894E+004	2.182E+004	-3.791E+002	8.259E+003	1.121E+004
2.769E+002	3.969E+002	8.464E+004	-1.345E+004	1.657E+004	3.479E+004	-3.791E+002	8.036E+003	8.950E+003
2.769E+002	3.749E+002	1.467E+005	-1.345E+004	1.421E+004	3.419E+004	-3.791E+002	7.813E+003	3.802E+003
2.769E+002	3.528E+002	2.046E+005	-1.345E+004	1.184E+004	2.411E+004	-3.791E+002	7.590E+003	2.408E+004
2.769E+002	3.308E+002	2.242E+005	-1.345E+004	9.470E+003	2.364E+004	-3.791E+002	7.366E+003	5.139E+004
2.769E+002	3.087E+002	3.027E+005	-1.345E+004	7.103E+003	1.630E+005	-3.791E+002	7.143E+003	7.754E+004
2.769E+002	2.867E+002	4.046E+005	-1.345E+004	4.735E+003	1.996E+006	-3.791E+002	6.920E+003	4.675E+004
2.769E+002	2.646E+002	4.746E+005	-1.345E+004	2.368E+003	5.622E+006	-3.791E+002	6.697E+003	9.832E+004
2.769E+002	2.426E+002	6.660E+005	-1.345E+004	0.000E+000	2.074E+007	-3.791E+002	6.473E+003	1.499E+005
2.769E+002	2.205E+002	8.606E+005	-1.593E+004	9.944E+004	1.750E+000	-3.791E+002	6.250E+003	1.054E+005
2.769E+002	1.985E+002	1.251E+006	-1.593E+004	9.470E+004	5.208E+000	-3.791E+002	6.027E+003	7.202E+004
2.769E+002	1.764E+002	1.749E+006	-1.593E+004	9.234E+004	1.750E+000	-3.791E+002	5.804E+003	1.020E+005
2.769E+002	1.544E+002	2.675E+006	-1.593E+004	8.997E+004	1.042E+001	-3.791E+002	5.581E+003	1.126E+005
2.769E+002	1.323E+002	3.530E+006	-1.593E+004	8.760E+004	3.500E+000	-3.791E+002	5.357E+003	1.923E+005
2.769E+002	1.103E+002	4.997E+006	-1.593E+004	8.524E+004	6.958E+000	-3.791E+002	5.134E+003	1.497E+005
2.769E+002	8.821E+001	6.024E+006	-1.593E+004	8.050E+004	1.396E+001	-3.791E+002	4.911E+003	2.201E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.769E+002	6.615E+001	7.533E+006	-1.593E+004	7.813E+004	1.750E+000	-3.791E+002	4.688E+003	2.073E+005
2.769E+002	4.410E+001	8.097E+006	-1.593E+004	7.103E+004	1.250E+001	-3.791E+002	4.464E+003	3.687E+005
2.769E+002	2.205E+001	1.140E+007	-1.593E+004	6.866E+004	1.042E+000	-3.791E+002	4.241E+003	3.842E+005
2.769E+002	0.000E+000	1.978E+007	-1.593E+004	6.629E+004	4.386E+001	-3.791E+002	4.018E+003	4.275E+005
2.524E+002	7.718E+002	2.624E+002	-1.593E+004	6.393E+004	6.575E+000	-3.791E+002	3.795E+003	5.441E+005
2.524E+002	7.497E+002	2.238E+002	-1.593E+004	6.156E+004	6.250E-001	-3.791E+002	3.572E+003	7.450E+005
2.524E+002	7.277E+002	9.225E+001	-1.593E+004	5.919E+004	3.938E+001	-3.791E+002	3.348E+003	9.030E+005
2.524E+002	7.056E+002	2.322E+002	-1.593E+004	5.682E+004	8.982E+001	-3.791E+002	3.125E+003	1.171E+006
2.524E+002	6.836E+002	2.896E+003	-1.593E+004	5.446E+004	4.660E+001	-3.791E+002	2.902E+003	1.250E+006
2.524E+002	6.615E+002	1.719E+003	-1.593E+004	5.209E+004	2.209E+002	-3.791E+002	2.679E+003	1.631E+006
2.524E+002	6.395E+002	1.717E+003	-1.593E+004	4.972E+004	2.262E+002	-3.791E+002	2.455E+003	1.645E+006
2.524E+002	6.174E+002	3.232E+003	-1.593E+004	4.735E+004	3.004E+002	-3.791E+002	2.232E+003	2.361E+006
2.524E+002	5.954E+002	3.330E+003	-1.593E+004	4.499E+004	3.235E+002	-3.791E+002	2.009E+003	2.603E+006
2.524E+002	5.733E+002	5.965E+003	-1.593E+004	4.262E+004	4.581E+002	-3.791E+002	1.786E+003	3.110E+006
2.524E+002	5.513E+002	6.236E+003	-1.593E+004	4.025E+004	5.609E+002	-3.791E+002	1.563E+003	3.925E+006
2.524E+002	5.292E+002	8.568E+003	-1.593E+004	3.788E+004	5.918E+002	-3.791E+002	1.339E+003	3.863E+006
2.524E+002	5.072E+002	6.512E+003	-1.593E+004	3.551E+004	9.115E+002	-3.791E+002	1.116E+003	4.507E+006
2.524E+002	4.851E+002	2.048E+004	-1.593E+004	3.315E+004	1.031E+003	-3.791E+002	8.929E+002	4.938E+006
2.524E+002	4.631E+002	1.930E+004	-1.593E+004	3.078E+004	1.235E+003	-3.791E+002	6.697E+002	5.466E+006
2.524E+002	4.410E+002	2.358E+004	-1.593E+004	2.841E+004	9.299E+002	-3.791E+002	4.464E+002	7.664E+006
2.524E+002	4.190E+002	3.599E+004	-1.593E+004	2.604E+004	8.113E+003	-3.791E+002	2.232E+002	1.614E+007
2.524E+002	3.969E+002	5.703E+004	-1.593E+004	2.368E+004	8.358E+003	-3.791E+002	0.000E+000	2.547E+007
2.524E+002	3.749E+002	5.892E+004	-1.593E+004	2.131E+004	1.721E+003	-6.408E+002	1.094E+004	6.714E+002
2.524E+002	3.528E+002	7.954E+004	-1.593E+004	1.894E+004	8.951E+003	-6.408E+002	1.072E+004	9.050E+001
2.524E+002	3.308E+002	1.005E+005	-1.593E+004	1.657E+004	1.587E+004	-6.408E+002	1.027E+004	2.238E+002
2.524E+002	3.087E+002	1.380E+005	-1.593E+004	1.421E+004	3.294E+003	-6.408E+002	1.004E+004	7.273E+002
2.524E+002	2.867E+002	1.959E+005	-1.593E+004	1.184E+004	2.245E+004	-6.408E+002	9.822E+003	6.286E+002
2.524E+002	2.646E+002	2.568E+005	-1.593E+004	9.470E+003	1.065E+004	-6.408E+002	9.375E+003	1.009E+003
2.524E+002	2.426E+002	3.776E+005	-1.593E+004	7.103E+003	2.214E+005	-6.408E+002	9.152E+003	9.521E+002
2.524E+002	2.205E+002	4.826E+005	-1.593E+004	4.735E+003	1.952E+006	-6.408E+002	8.929E+003	2.238E+002
2.524E+002	1.985E+002	6.469E+005	-1.593E+004	2.368E+003	5.281E+006	-6.408E+002	8.706E+003	4.435E+003
2.524E+002	1.764E+002	9.873E+005	-1.593E+004	0.000E+000	1.625E+007	-6.408E+002	8.482E+003	5.471E+003
2.524E+002	1.544E+002	1.512E+006	-1.842E+004	9.707E+004	5.208E+000	-6.408E+002	8.259E+003	9.446E+003
2.524E+002	1.323E+002	2.230E+006	-1.842E+004	9.234E+004	5.208E+000	-6.408E+002	8.036E+003	5.348E+003
2.524E+002	1.103E+002	3.111E+006	-1.842E+004	8.997E+004	1.042E+001	-6.408E+002	7.813E+003	2.716E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.524E+002	8.821E+001	5.060E+006	-1.842E+004	8.524E+004	2.613E+001	-6.408E+002	7.590E+003	4.196E+004
2.524E+002	6.615E+001	5.887E+006	-1.842E+004	8.287E+004	1.571E+001	-6.408E+002	7.366E+003	6.586E+004
2.524E+002	4.410E+001	8.061E+006	-1.842E+004	8.050E+004	1.750E+000	-6.408E+002	7.143E+003	6.799E+004
2.524E+002	2.205E+001	9.605E+006	-1.842E+004	7.576E+004	1.042E+000	-6.408E+002	6.920E+003	9.159E+004
2.524E+002	0.000E+000	1.739E+007	-1.842E+004	7.103E+004	4.250E+000	-6.408E+002	6.697E+003	1.119E+005
2.280E+002	8.159E+002	3.333E+001	-1.842E+004	6.866E+004	2.708E+000	-6.408E+002	6.473E+003	1.025E+005
2.280E+002	7.938E+002	1.667E+000	-1.842E+004	6.629E+004	2.500E+000	-6.408E+002	6.250E+003	9.106E+004
2.280E+002	7.718E+002	3.750E+001	-1.842E+004	6.393E+004	7.083E+001	-6.408E+002	6.027E+003	1.402E+005
2.280E+002	7.497E+002	4.542E+000	-1.842E+004	6.156E+004	1.135E+002	-6.408E+002	5.804E+003	1.345E+005
2.280E+002	7.277E+002	1.795E+003	-1.842E+004	5.919E+004	3.845E+001	-6.408E+002	5.581E+003	1.151E+005
2.280E+002	7.056E+002	1.326E+002	-1.842E+004	5.682E+004	1.350E+002	-6.408E+002	5.357E+003	1.356E+005
2.280E+002	6.836E+002	8.616E+002	-1.842E+004	5.446E+004	1.385E+002	-6.408E+002	5.134E+003	2.315E+005
2.280E+002	6.615E+002	4.154E+002	-1.842E+004	5.209E+004	1.497E+002	-6.408E+002	4.911E+003	2.720E+005
2.280E+002	6.395E+002	4.809E+002	-1.842E+004	4.972E+004	1.621E+002	-6.408E+002	4.688E+003	1.647E+005
2.280E+002	6.174E+002	1.752E+002	-1.842E+004	4.735E+004	6.793E+002	-6.408E+002	4.464E+003	2.752E+005
2.280E+002	5.954E+002	1.261E+003	-1.842E+004	4.499E+004	2.720E+002	-6.408E+002	4.241E+003	3.719E+005
2.280E+002	5.733E+002	1.075E+003	-1.842E+004	4.262E+004	5.634E+002	-6.408E+002	4.018E+003	4.153E+005
2.280E+002	5.513E+002	2.155E+003	-1.842E+004	4.025E+004	4.090E+002	-6.408E+002	3.795E+003	5.933E+005
2.280E+002	5.292E+002	1.543E+003	-1.842E+004	3.788E+004	4.539E+002	-6.408E+002	3.572E+003	5.144E+005
2.280E+002	5.072E+002	4.679E+003	-1.842E+004	3.551E+004	6.799E+002	-6.408E+002	3.348E+003	9.376E+005
2.280E+002	4.851E+002	5.776E+003	-1.842E+004	3.315E+004	6.584E+002	-6.408E+002	3.125E+003	1.166E+006
2.280E+002	4.631E+002	2.846E+003	-1.842E+004	3.078E+004	2.104E+003	-6.408E+002	2.902E+003	1.091E+006
2.280E+002	4.410E+002	6.323E+003	-1.842E+004	2.841E+004	1.391E+003	-6.408E+002	2.679E+003	1.474E+006
2.280E+002	4.190E+002	9.198E+003	-1.842E+004	2.604E+004	2.158E+003	-6.408E+002	2.455E+003	1.887E+006
2.280E+002	3.969E+002	7.779E+003	-1.842E+004	2.368E+004	3.311E+003	-6.408E+002	2.232E+003	2.002E+006
2.280E+002	3.749E+002	1.542E+004	-1.842E+004	2.131E+004	9.392E+003	-6.408E+002	2.009E+003	2.845E+006
2.280E+002	3.528E+002	3.676E+004	-1.842E+004	1.894E+004	2.738E+003	-6.408E+002	1.786E+003	2.981E+006
2.280E+002	3.308E+002	2.963E+004	-1.842E+004	1.657E+004	1.013E+004	-6.408E+002	1.563E+003	4.056E+006
2.280E+002	3.087E+002	4.081E+004	-1.842E+004	1.421E+004	6.525E+003	-6.408E+002	1.339E+003	3.593E+006
2.280E+002	2.867E+002	8.786E+004	-1.842E+004	1.184E+004	7.014E+003	-6.408E+002	1.116E+003	3.613E+006
2.280E+002	2.646E+002	1.094E+005	-1.842E+004	9.470E+003	5.077E+004	-6.408E+002	8.929E+002	4.345E+006
2.280E+002	2.426E+002	1.482E+005	-1.842E+004	7.103E+003	2.028E+005	-6.408E+002	6.697E+002	4.528E+006
2.280E+002	2.205E+002	2.127E+005	-1.842E+004	4.735E+003	1.795E+006	-6.408E+002	4.464E+002	6.405E+006
2.280E+002	1.985E+002	3.257E+005	-1.842E+004	2.368E+003	7.705E+006	-6.408E+002	2.232E+002	1.375E+007
2.280E+002	1.764E+002	4.206E+005	-1.842E+004	0.000E+000	1.638E+007	-6.408E+002	0.000E+000	1.969E+007

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.280E+002	1.544E+002	5.544E+005	-2.090E+004	9.707E+004	1.750E+000	-9.024E+002	1.072E+004	4.476E+002
2.280E+002	1.323E+002	9.846E+005	-2.090E+004	8.760E+004	5.208E+000	-9.024E+002	1.004E+004	9.050E+001
2.280E+002	1.103E+002	1.611E+006	-2.090E+004	8.524E+004	1.750E+000	-9.024E+002	9.822E+003	9.050E+001
2.280E+002	8.821E+001	2.795E+006	-2.090E+004	8.287E+004	7.367E+001	-9.024E+002	9.599E+003	4.476E+002
2.280E+002	6.615E+001	4.436E+006	-2.090E+004	8.050E+004	3.508E+001	-9.024E+002	9.375E+003	2.070E+003
2.280E+002	4.410E+001	6.158E+006	-2.090E+004	7.813E+004	1.325E+001	-9.024E+002	9.152E+003	4.156E+003
2.280E+002	2.205E+001	8.333E+006	-2.090E+004	6.866E+004	6.250E+001	-9.024E+002	8.929E+003	1.456E+003
2.280E+002	0.000E+000	1.496E+007	-2.090E+004	6.629E+004	3.438E+001	-9.024E+002	8.706E+003	3.132E+003
2.036E+002	9.262E+002	1.750E+000	-2.090E+004	6.393E+004	2.332E+002	-9.024E+002	8.482E+003	2.937E+003
2.036E+002	8.380E+002	1.750E+000	-2.090E+004	6.156E+004	7.083E+000	-9.024E+002	8.259E+003	4.396E+003
2.036E+002	8.159E+002	3.500E+000	-2.090E+004	5.919E+004	4.000E+001	-9.024E+002	8.036E+003	2.863E+003
2.036E+002	7.938E+002	1.946E+001	-2.090E+004	5.682E+004	3.058E+002	-9.024E+002	7.813E+003	1.170E+004
2.036E+002	7.718E+002	2.792E+000	-2.090E+004	5.446E+004	1.569E+002	-9.024E+002	7.590E+003	1.232E+004
2.036E+002	7.497E+002	4.542E+000	-2.090E+004	5.209E+004	1.138E+002	-9.024E+002	7.366E+003	2.007E+004
2.036E+002	7.277E+002	4.175E+001	-2.090E+004	4.972E+004	5.293E+002	-9.024E+002	7.143E+003	1.539E+004
2.036E+002	7.056E+002	3.438E+001	-2.090E+004	4.735E+004	1.867E+002	-9.024E+002	6.920E+003	2.713E+004
2.036E+002	6.836E+002	2.696E+002	-2.090E+004	4.499E+004	3.575E+002	-9.024E+002	6.697E+003	1.973E+004
2.036E+002	6.615E+002	7.178E+001	-2.090E+004	4.262E+004	5.932E+002	-9.024E+002	6.473E+003	3.811E+004
2.036E+002	6.395E+002	2.017E+002	-2.090E+004	4.025E+004	8.180E+002	-9.024E+002	6.250E+003	9.633E+004
2.036E+002	6.174E+002	3.775E+002	-2.090E+004	3.788E+004	1.379E+003	-9.024E+002	6.027E+003	9.852E+004
2.036E+002	5.954E+002	4.090E+002	-2.090E+004	3.551E+004	1.190E+003	-9.024E+002	5.804E+003	9.273E+004
2.036E+002	5.733E+002	2.526E+002	-2.090E+004	3.315E+004	1.632E+003	-9.024E+002	5.581E+003	1.122E+005
2.036E+002	5.513E+002	1.080E+003	-2.090E+004	3.078E+004	8.224E+002	-9.024E+002	5.357E+003	1.446E+005
2.036E+002	5.292E+002	8.933E+002	-2.090E+004	2.841E+004	3.005E+003	-9.024E+002	5.134E+003	1.851E+005
2.036E+002	5.072E+002	3.014E+002	-2.090E+004	2.604E+004	2.820E+003	-9.024E+002	4.911E+003	1.511E+005
2.036E+002	4.851E+002	7.556E+002	-2.090E+004	2.368E+004	3.502E+003	-9.024E+002	4.688E+003	1.473E+005
2.036E+002	4.631E+002	3.592E+003	-2.090E+004	2.131E+004	3.890E+003	-9.024E+002	4.464E+003	1.902E+005
2.036E+002	4.410E+002	1.840E+003	-2.090E+004	1.894E+004	4.563E+003	-9.024E+002	4.241E+003	2.954E+005
2.036E+002	4.190E+002	3.981E+003	-2.090E+004	1.657E+004	3.532E+003	-9.024E+002	4.018E+003	3.223E+005
2.036E+002	3.969E+002	5.027E+003	-2.090E+004	1.421E+004	6.266E+003	-9.024E+002	3.795E+003	4.734E+005
2.036E+002	3.749E+002	8.933E+003	-2.090E+004	1.184E+004	2.479E+004	-9.024E+002	3.572E+003	5.036E+005
2.036E+002	3.528E+002	7.351E+003	-2.090E+004	9.470E+003	5.906E+004	-9.024E+002	3.348E+003	6.969E+005
2.036E+002	3.308E+002	1.284E+004	-2.090E+004	7.103E+003	2.797E+005	-9.024E+002	3.125E+003	7.159E+005
2.036E+002	3.087E+002	2.101E+004	-2.090E+004	4.735E+003	2.112E+006	-9.024E+002	2.902E+003	1.127E+006
2.036E+002	2.867E+002	3.011E+004	-2.090E+004	2.368E+003	7.865E+006	-9.024E+002	2.679E+003	1.338E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.036E+002	2.646E+002	4.731E+004	-2.090E+004	0.000E+000	1.378E+007	-9.024E+002	2.455E+003	1.470E+006
2.036E+002	2.426E+002	6.481E+004	-2.338E+004	8.287E+004	5.250E+000	-9.024E+002	2.232E+003	1.995E+006
2.036E+002	2.205E+002	1.273E+005	-2.338E+004	8.050E+004	4.621E+001	-9.024E+002	2.009E+003	2.230E+006
2.036E+002	1.985E+002	1.272E+005	-2.338E+004	7.340E+004	7.083E+001	-9.024E+002	1.786E+003	2.329E+006
2.036E+002	1.764E+002	1.756E+005	-2.338E+004	7.103E+004	1.750E+000	-9.024E+002	1.563E+003	2.416E+006
2.036E+002	1.544E+002	2.551E+005	-2.338E+004	6.866E+004	3.750E+001	-9.024E+002	1.339E+003	2.740E+006
2.036E+002	1.323E+002	5.668E+005	-2.338E+004	6.629E+004	3.438E+001	-9.024E+002	1.116E+003	2.590E+006
2.036E+002	1.103E+002	8.923E+005	-2.338E+004	6.393E+004	6.667E+001	-9.024E+002	8.929E+002	2.684E+006
2.036E+002	8.821E+001	2.667E+006	-2.338E+004	6.156E+004	1.788E+002	-9.024E+002	6.697E+002	3.118E+006
2.036E+002	6.615E+001	4.615E+006	-2.338E+004	5.919E+004	1.810E+002	-9.024E+002	4.464E+002	5.021E+006
2.036E+002	4.410E+001	7.041E+006	-2.338E+004	5.682E+004	1.946E+002	-9.024E+002	2.232E+002	1.120E+007
2.036E+002	2.205E+001	1.029E+007	-2.338E+004	5.446E+004	7.113E+002	-9.024E+002	0.000E+000	1.516E+007
2.036E+002	0.000E+000	1.416E+007	-2.338E+004	5.209E+004	4.310E+002	-1.164E+003	1.094E+004	9.050E+001
1.791E+002	9.262E+002	6.958E+000	-2.338E+004	4.972E+004	8.166E+002	-1.164E+003	1.072E+004	9.050E+001
1.791E+002	8.600E+002	1.750E+000	-2.338E+004	4.735E+004	6.820E+002	-1.164E+003	1.049E+004	9.050E+001
1.791E+002	8.380E+002	7.708E+000	-2.338E+004	4.499E+004	9.784E+002	-1.164E+003	1.027E+004	7.273E+002
1.791E+002	8.159E+002	4.204E+001	-2.338E+004	4.262E+004	1.611E+003	-1.164E+003	1.004E+004	5.035E+002
1.791E+002	7.938E+002	9.792E+000	-2.338E+004	4.025E+004	1.588E+003	-1.164E+003	9.822E+003	6.000E+001
1.791E+002	7.718E+002	4.033E+001	-2.338E+004	3.788E+004	2.293E+003	-1.164E+003	9.599E+003	6.000E+001
1.791E+002	7.497E+002	1.475E+001	-2.338E+004	3.551E+004	3.687E+003	-1.164E+003	9.375E+003	3.333E+001
1.791E+002	7.277E+002	3.500E+000	-2.338E+004	3.315E+004	2.742E+003	-1.164E+003	9.152E+003	2.905E+002
1.791E+002	7.056E+002	5.825E+000	-2.338E+004	3.078E+004	4.031E+003	-1.164E+003	8.929E+003	3.518E+002
1.791E+002	6.836E+002	3.542E+000	-2.338E+004	2.841E+004	1.299E+004	-1.164E+003	8.706E+003	3.059E+003
1.791E+002	6.615E+002	2.500E+000	-2.338E+004	2.604E+004	1.346E+004	-1.164E+003	8.482E+003	7.708E+003
1.791E+002	6.395E+002	9.075E+000	-2.338E+004	2.368E+004	5.805E+003	-1.164E+003	8.259E+003	2.711E+003
1.791E+002	6.174E+002	2.330E+002	-2.338E+004	2.131E+004	6.232E+003	-1.164E+003	8.036E+003	6.349E+002
1.791E+002	5.954E+002	1.943E+001	-2.338E+004	1.894E+004	2.058E+004	-1.164E+003	7.813E+003	5.801E+003
1.791E+002	5.733E+002	1.803E+002	-2.338E+004	1.657E+004	7.846E+003	-1.164E+003	7.590E+003	3.766E+003
1.791E+002	5.513E+002	2.607E+002	-2.338E+004	1.421E+004	2.231E+004	-1.164E+003	7.366E+003	8.519E+003
1.791E+002	5.292E+002	9.531E+001	-2.338E+004	1.184E+004	3.190E+004	-1.164E+003	7.143E+003	9.397E+003
1.791E+002	5.072E+002	1.395E+003	-2.338E+004	9.470E+003	1.194E+005	-1.164E+003	6.920E+003	8.032E+003
1.791E+002	4.851E+002	1.135E+003	-2.338E+004	7.103E+003	4.692E+005	-1.164E+003	6.697E+003	9.937E+003
1.791E+002	4.631E+002	4.054E+002	-2.338E+004	4.735E+003	2.409E+006	-1.164E+003	6.473E+003	5.306E+003
1.791E+002	4.410E+002	8.214E+002	-2.338E+004	2.368E+003	8.152E+006	-1.164E+003	6.250E+003	8.256E+003
1.791E+002	4.190E+002	1.190E+003	-2.338E+004	0.000E+000	1.391E+007	-1.164E+003	6.027E+003	3.827E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.791E+002	3.969E+002	1.431E+003	-2.586E+004	7.813E+004	7.675E+001	-1.164E+003	5.804E+003	3.990E+004
1.791E+002	3.749E+002	3.530E+003	-2.586E+004	7.576E+004	1.750E+000	-1.164E+003	5.581E+003	6.544E+004
1.791E+002	3.528E+002	3.008E+003	-2.586E+004	7.340E+004	1.750E+000	-1.164E+003	5.357E+003	3.284E+004
1.791E+002	3.308E+002	7.961E+003	-2.586E+004	7.103E+004	3.750E+001	-1.164E+003	5.134E+003	1.465E+005
1.791E+002	3.087E+002	7.689E+003	-2.586E+004	6.866E+004	3.438E+001	-1.164E+003	4.911E+003	1.073E+005
1.791E+002	2.867E+002	1.772E+004	-2.586E+004	6.629E+004	6.250E-001	-1.164E+003	4.688E+003	1.394E+005
1.791E+002	2.646E+002	2.089E+004	-2.586E+004	6.393E+004	1.810E+002	-1.164E+003	4.464E+003	2.414E+005
1.791E+002	2.426E+002	3.657E+004	-2.586E+004	6.156E+004	9.050E+001	-1.164E+003	4.241E+003	2.514E+005
1.791E+002	2.205E+002	5.499E+004	-2.586E+004	5.919E+004	3.743E+002	-1.164E+003	4.018E+003	2.497E+005
1.791E+002	1.985E+002	6.149E+004	-2.586E+004	5.682E+004	5.858E+002	-1.164E+003	3.795E+003	3.542E+005
1.791E+002	1.764E+002	7.938E+004	-2.586E+004	5.446E+004	6.848E+002	-1.164E+003	3.572E+003	4.716E+005
1.791E+002	1.544E+002	8.536E+004	-2.586E+004	5.209E+004	6.837E+002	-1.164E+003	3.348E+003	5.689E+005
1.791E+002	1.323E+002	3.232E+005	-2.586E+004	4.972E+004	9.970E+002	-1.164E+003	3.125E+003	7.233E+005
1.791E+002	1.103E+002	6.570E+005	-2.586E+004	4.735E+004	9.103E+002	-1.164E+003	2.902E+003	7.444E+005
1.791E+002	8.821E+001	2.219E+006	-2.586E+004	4.499E+004	2.463E+003	-1.164E+003	2.679E+003	1.240E+006
1.791E+002	6.615E+001	4.216E+006	-2.586E+004	4.262E+004	2.132E+003	-1.164E+003	2.455E+003	1.416E+006
1.791E+002	4.410E+001	7.022E+006	-2.586E+004	4.025E+004	3.084E+003	-1.164E+003	2.232E+003	1.549E+006
1.791E+002	2.205E+001	1.085E+007	-2.586E+004	3.788E+004	6.012E+003	-1.164E+003	2.009E+003	1.822E+006
1.791E+002	0.000E+000	1.300E+007	-2.586E+004	3.551E+004	4.400E+003	-1.164E+003	1.786E+003	1.864E+006
1.547E+002	9.041E+002	1.750E+000	-2.586E+004	3.315E+004	1.380E+004	-1.164E+003	1.563E+003	2.158E+006
1.547E+002	8.821E+002	1.563E+001	-2.586E+004	3.078E+004	6.131E+003	-1.164E+003	1.339E+003	2.241E+006
1.547E+002	8.600E+002	1.217E+001	-2.586E+004	2.841E+004	1.715E+004	-1.164E+003	1.116E+003	2.097E+006
1.547E+002	8.380E+002	1.842E+001	-2.586E+004	2.604E+004	1.276E+004	-1.164E+003	8.929E+002	2.058E+006
1.547E+002	8.159E+002	1.913E+001	-2.586E+004	2.368E+004	1.833E+004	-1.164E+003	6.697E+002	2.570E+006
1.547E+002	7.938E+002	9.792E+000	-2.586E+004	2.131E+004	2.009E+004	-1.164E+003	4.464E+002	3.787E+006
1.547E+002	7.718E+002	1.750E+000	-2.586E+004	1.894E+004	3.335E+004	-1.164E+003	2.232E+002	8.701E+006
1.547E+002	7.497E+002	2.375E+000	-2.586E+004	1.657E+004	4.697E+004	-1.164E+003	0.000E+000	1.216E+007
1.547E+002	7.056E+002	1.250E+000	-2.586E+004	1.421E+004	3.731E+004	-1.426E+003	1.049E+004	2.248E+002
1.547E+002	6.836E+002	2.500E+000	-2.586E+004	1.184E+004	8.285E+004	-1.426E+003	1.004E+004	9.050E+001
1.547E+002	6.174E+002	8.776E+000	-2.586E+004	9.470E+003	1.945E+005	-1.426E+003	9.375E+003	2.715E+002
1.547E+002	5.954E+002	3.803E+001	-2.586E+004	7.103E+003	7.624E+005	-1.426E+003	9.152E+003	2.238E+002
1.547E+002	5.733E+002	1.142E+002	-2.586E+004	4.735E+003	2.348E+006	-1.426E+003	8.929E+003	3.915E+002
1.547E+002	5.513E+002	5.035E+001	-2.586E+004	2.368E+003	7.109E+006	-1.426E+003	8.706E+003	1.935E+002
1.547E+002	5.292E+002	3.175E+002	-2.586E+004	0.000E+000	1.201E+007	-1.426E+003	8.482E+003	1.066E+003
1.547E+002	5.072E+002	2.462E+002	-2.834E+004	7.813E+004	1.750E+000	-1.426E+003	8.259E+003	6.540E+002

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.547E+002	4.851E+002	6.091E+001	-2.834E+004	7.576E+004	1.750E+000	-1.426E+003	8.036E+003	5.035E+002
1.547E+002	4.631E+002	1.394E+002	-2.834E+004	7.340E+004	1.750E+000	-1.426E+003	7.813E+003	1.011E+003
1.547E+002	4.410E+002	6.409E+002	-2.834E+004	6.866E+004	9.183E+001	-1.426E+003	7.590E+003	2.592E+002
1.547E+002	4.190E+002	9.291E+002	-2.834E+004	6.629E+004	2.238E+002	-1.426E+003	7.366E+003	5.482E+002
1.547E+002	3.969E+002	3.060E+003	-2.834E+004	6.393E+004	1.029E+003	-1.426E+003	7.143E+003	5.513E+002
1.547E+002	3.749E+002	1.539E+003	-2.834E+004	6.156E+004	3.156E+002	-1.426E+003	6.920E+003	1.557E+003
1.547E+002	3.528E+002	1.821E+003	-2.834E+004	5.919E+004	7.524E+002	-1.426E+003	6.697E+003	1.768E+003
1.547E+002	3.308E+002	1.954E+003	-2.834E+004	5.682E+004	2.715E+002	-1.426E+003	6.473E+003	4.829E+003
1.547E+002	3.087E+002	4.170E+003	-2.834E+004	5.446E+004	4.486E+002	-1.426E+003	6.250E+003	1.741E+003
1.547E+002	2.867E+002	4.265E+003	-2.834E+004	5.209E+004	7.858E+002	-1.426E+003	6.027E+003	7.448E+003
1.547E+002	2.646E+002	1.325E+004	-2.834E+004	4.972E+004	1.429E+003	-1.426E+003	5.804E+003	9.856E+003
1.547E+002	2.426E+002	1.338E+004	-2.834E+004	4.735E+004	1.653E+003	-1.426E+003	5.581E+003	1.764E+004
1.547E+002	2.205E+002	2.799E+004	-2.834E+004	4.499E+004	4.192E+003	-1.426E+003	5.357E+003	1.186E+004
1.547E+002	1.985E+002	1.975E+004	-2.834E+004	4.262E+004	6.065E+003	-1.426E+003	5.134E+003	3.822E+004
1.547E+002	1.764E+002	4.167E+004	-2.834E+004	4.025E+004	5.129E+003	-1.426E+003	4.911E+003	6.749E+004
1.547E+002	1.544E+002	4.034E+004	-2.834E+004	3.788E+004	1.597E+004	-1.426E+003	4.688E+003	6.667E+004
1.547E+002	1.323E+002	7.539E+004	-2.834E+004	3.551E+004	2.676E+004	-1.426E+003	4.464E+003	1.184E+005
1.547E+002	1.103E+002	3.693E+005	-2.834E+004	3.315E+004	3.417E+004	-1.426E+003	4.241E+003	1.257E+005
1.547E+002	8.821E+001	1.465E+006	-2.834E+004	3.078E+004	2.418E+004	-1.426E+003	4.018E+003	1.634E+005
1.547E+002	6.615E+001	3.848E+006	-2.834E+004	2.841E+004	4.223E+004	-1.426E+003	3.795E+003	2.183E+005
1.547E+002	4.410E+001	7.989E+006	-2.834E+004	2.604E+004	2.398E+004	-1.426E+003	3.572E+003	3.222E+005
1.547E+002	2.205E+001	1.276E+007	-2.834E+004	2.368E+004	6.967E+004	-1.426E+003	3.348E+003	4.028E+005
1.547E+002	0.000E+000	1.472E+007	-2.834E+004	2.131E+004	6.750E+004	-1.426E+003	3.125E+003	6.567E+005
1.303E+002	9.923E+002	5.208E+000	-2.834E+004	1.894E+004	5.476E+004	-1.426E+003	2.902E+003	7.923E+005
1.303E+002	9.703E+002	5.208E+000	-2.834E+004	1.657E+004	5.979E+004	-1.426E+003	2.679E+003	9.298E+005
1.303E+002	9.262E+002	1.750E+000	-2.834E+004	1.421E+004	4.735E+004	-1.426E+003	2.455E+003	1.104E+006
1.303E+002	9.041E+002	1.750E+000	-2.834E+004	1.184E+004	1.387E+005	-1.426E+003	2.232E+003	1.126E+006
1.303E+002	8.600E+002	1.750E+000	-2.834E+004	9.470E+003	3.922E+005	-1.426E+003	2.009E+003	1.410E+006
1.303E+002	8.380E+002	1.738E+001	-2.834E+004	7.103E+003	1.287E+006	-1.426E+003	1.786E+003	1.512E+006
1.303E+002	8.159E+002	8.709E+000	-2.834E+004	4.735E+003	4.250E+006	-1.426E+003	1.563E+003	1.429E+006
1.303E+002	7.497E+002	3.500E+000	-2.834E+004	2.368E+003	9.651E+006	-1.426E+003	1.339E+003	1.701E+006
1.303E+002	7.277E+002	1.750E+000	-2.834E+004	0.000E+000	1.336E+007	-1.426E+003	1.116E+003	1.671E+006
1.303E+002	6.395E+002	2.792E+000	-3.082E+004	6.866E+004	1.212E+003	-1.426E+003	8.929E+002	1.709E+006
1.303E+002	6.174E+002	1.417E+001	-3.082E+004	6.629E+004	9.183E+001	-1.426E+003	6.697E+002	2.173E+006
1.303E+002	5.954E+002	8.151E+000	-3.082E+004	6.393E+004	5.953E+002	-1.426E+003	4.464E+002	3.050E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.303E+002	5.733E+002	6.250E-001	-3.082E+004	5.919E+004	8.524E+002	-1.426E+003	2.232E+002	6.434E+006
1.303E+002	5.513E+002	1.042E+000	-3.082E+004	5.682E+004	1.601E+003	-1.426E+003	0.000E+000	9.346E+006
1.303E+002	5.292E+002	4.479E+001	-3.082E+004	5.446E+004	1.993E+003	-1.687E+003	9.375E+003	9.050E+001
1.303E+002	5.072E+002	2.223E+002	-3.082E+004	5.209E+004	3.258E+003	-1.687E+003	9.152E+003	3.143E+002
1.303E+002	4.851E+002	7.958E+001	-3.082E+004	4.972E+004	2.968E+003	-1.687E+003	8.929E+003	3.315E+002
1.303E+002	4.631E+002	1.697E+002	-3.082E+004	4.735E+004	8.194E+003	-1.687E+003	8.706E+003	4.000E+001
1.303E+002	4.410E+002	3.311E+002	-3.082E+004	4.499E+004	1.468E+004	-1.687E+003	8.259E+003	2.500E+000
1.303E+002	4.190E+002	4.264E+002	-3.082E+004	4.262E+004	9.907E+003	-1.687E+003	8.036E+003	6.667E+001
1.303E+002	3.969E+002	7.859E+002	-3.082E+004	4.025E+004	1.808E+004	-1.687E+003	7.813E+003	7.074E+001
1.303E+002	3.749E+002	1.498E+003	-3.082E+004	3.788E+004	2.648E+004	-1.687E+003	7.590E+003	4.075E+000
1.303E+002	3.528E+002	1.021E+003	-3.082E+004	3.551E+004	4.425E+004	-1.687E+003	7.366E+003	5.398E+002
1.303E+002	3.308E+002	1.618E+003	-3.082E+004	3.315E+004	3.899E+004	-1.687E+003	7.143E+003	4.868E+001
1.303E+002	3.087E+002	1.019E+003	-3.082E+004	3.078E+004	4.376E+004	-1.687E+003	6.920E+003	1.289E+002
1.303E+002	2.867E+002	2.354E+003	-3.082E+004	2.841E+004	6.966E+004	-1.687E+003	6.697E+003	1.111E+003
1.303E+002	2.646E+002	1.048E+004	-3.082E+004	2.604E+004	6.491E+004	-1.687E+003	6.473E+003	5.799E+002
1.303E+002	2.426E+002	5.221E+003	-3.082E+004	2.368E+004	9.713E+004	-1.687E+003	6.250E+003	5.468E+003
1.303E+002	2.205E+002	2.659E+004	-3.082E+004	2.131E+004	9.493E+004	-1.687E+003	6.027E+003	9.070E+002
1.303E+002	1.985E+002	2.677E+004	-3.082E+004	1.894E+004	1.034E+005	-1.687E+003	5.804E+003	3.915E+003
1.303E+002	1.764E+002	2.846E+004	-3.082E+004	1.657E+004	1.081E+005	-1.687E+003	5.581E+003	6.469E+002
1.303E+002	1.544E+002	3.418E+004	-3.082E+004	1.421E+004	2.194E+005	-1.687E+003	5.357E+003	1.054E+004
1.303E+002	1.323E+002	5.609E+004	-3.082E+004	1.184E+004	2.887E+005	-1.687E+003	5.134E+003	7.695E+003
1.303E+002	1.103E+002	2.305E+005	-3.082E+004	9.470E+003	8.129E+005	-1.687E+003	4.911E+003	5.447E+003
1.303E+002	8.821E+001	8.781E+005	-3.082E+004	7.103E+003	2.381E+006	-1.687E+003	4.688E+003	3.414E+004
1.303E+002	6.615E+001	2.916E+006	-3.082E+004	4.735E+003	6.387E+006	-1.687E+003	4.464E+003	3.017E+004
1.303E+002	4.410E+001	5.861E+006	-3.082E+004	2.368E+003	1.398E+007	-1.687E+003	4.241E+003	5.285E+004
1.303E+002	2.205E+001	1.440E+007	-3.082E+004	0.000E+000	1.562E+007	-1.687E+003	4.018E+003	1.179E+005
1.303E+002	0.000E+000	1.638E+007	-3.330E+004	6.866E+004	5.035E+002	-1.687E+003	3.795E+003	1.589E+005
1.058E+002	1.014E+003	1.750E+000	-3.330E+004	6.629E+004	1.029E+003	-1.687E+003	3.572E+003	2.599E+005
1.058E+002	9.482E+002	5.208E+000	-3.330E+004	6.393E+004	1.029E+003	-1.687E+003	3.348E+003	3.295E+005
1.058E+002	9.262E+002	1.750E+000	-3.330E+004	5.919E+004	2.238E+002	-1.687E+003	3.125E+003	3.524E+005
1.058E+002	9.041E+002	5.208E+000	-3.330E+004	5.682E+004	6.714E+002	-1.687E+003	2.902E+003	4.759E+005
1.058E+002	8.821E+002	2.375E+000	-3.330E+004	5.446E+004	9.511E+002	-1.687E+003	2.679E+003	6.616E+005
1.058E+002	7.938E+002	1.750E+000	-3.330E+004	5.209E+004	1.456E+003	-1.687E+003	2.455E+003	6.493E+005
1.058E+002	7.497E+002	1.750E+000	-3.330E+004	4.972E+004	7.003E+003	-1.687E+003	2.232E+003	1.077E+006
1.058E+002	6.836E+002	1.750E+000	-3.330E+004	4.735E+004	3.637E+003	-1.687E+003	2.009E+003	1.088E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.058E+002	6.615E+002	6.250E-001	-3.330E+004	4.499E+004	7.842E+003	-1.687E+003	1.786E+003	1.273E+006
1.058E+002	6.395E+002	1.042E+000	-3.330E+004	4.262E+004	1.537E+004	-1.687E+003	1.563E+003	1.250E+006
1.058E+002	6.174E+002	6.250E-001	-3.330E+004	4.025E+004	2.632E+004	-1.687E+003	1.339E+003	1.037E+006
1.058E+002	5.954E+002	6.250E-001	-3.330E+004	3.788E+004	2.319E+004	-1.687E+003	1.116E+003	1.115E+006
1.058E+002	5.733E+002	4.075E+000	-3.330E+004	3.551E+004	3.766E+004	-1.687E+003	8.929E+002	1.009E+006
1.058E+002	5.513E+002	6.250E-001	-3.330E+004	3.315E+004	8.995E+004	-1.687E+003	6.697E+002	1.483E+006
1.058E+002	5.292E+002	2.083E+000	-3.330E+004	3.078E+004	7.971E+004	-1.687E+003	4.464E+002	2.362E+006
1.058E+002	5.072E+002	4.792E+001	-3.330E+004	2.841E+004	9.418E+004	-1.687E+003	2.232E+002	5.165E+006
1.058E+002	4.851E+002	1.253E+001	-3.330E+004	2.604E+004	1.572E+005	-1.687E+003	0.000E+000	6.676E+006
1.058E+002	4.631E+002	6.375E+001	-3.330E+004	2.368E+004	1.839E+005	-1.949E+003	1.094E+004	3.333E+001
1.058E+002	4.410E+002	3.479E+001	-3.330E+004	2.131E+004	1.958E+005	-1.949E+003	1.027E+004	1.042E+000
1.058E+002	4.190E+002	3.246E+002	-3.330E+004	1.894E+004	1.842E+005	-1.949E+003	1.004E+004	1.042E+000
1.058E+002	3.969E+002	1.685E+002	-3.330E+004	1.657E+004	2.957E+005	-1.949E+003	9.599E+003	2.500E+000
1.058E+002	3.749E+002	4.929E+002	-3.330E+004	1.421E+004	3.039E+005	-1.949E+003	9.375E+003	2.238E+002
1.058E+002	3.528E+002	7.672E+002	-3.330E+004	1.184E+004	4.807E+005	-1.949E+003	8.706E+003	2.500E+000
1.058E+002	3.308E+002	9.589E+002	-3.330E+004	9.470E+003	1.121E+006	-1.949E+003	7.590E+003	3.542E+000
1.058E+002	3.087E+002	4.519E+002	-3.330E+004	7.103E+003	3.203E+006	-1.949E+003	7.143E+003	2.963E+002
1.058E+002	2.867E+002	1.601E+003	-3.330E+004	4.735E+003	8.175E+006	-1.949E+003	6.920E+003	4.517E+002
1.058E+002	2.646E+002	2.140E+003	-3.330E+004	2.368E+003	1.600E+007	-1.949E+003	6.697E+003	1.066E+003
1.058E+002	2.426E+002	8.067E+003	-3.330E+004	0.000E+000	1.703E+007	-1.949E+003	6.473E+003	6.250E-001
1.058E+002	2.205E+002	8.760E+003	-3.578E+004	6.866E+004	4.032E+003	-1.949E+003	6.250E+003	4.963E+001
1.058E+002	1.985E+002	4.036E+004	-3.578E+004	6.393E+004	2.238E+002	-1.949E+003	6.027E+003	1.179E+002
1.058E+002	1.764E+002	2.372E+004	-3.578E+004	5.919E+004	5.035E+002	-1.949E+003	5.804E+003	5.190E+002
1.058E+002	1.544E+002	5.508E+004	-3.578E+004	5.682E+004	1.756E+003	-1.949E+003	5.581E+003	2.172E+002
1.058E+002	1.323E+002	5.218E+004	-3.578E+004	5.446E+004	2.238E+002	-1.949E+003	5.357E+003	1.203E+003
1.058E+002	1.103E+002	1.122E+005	-3.578E+004	5.209E+004	5.494E+003	-1.949E+003	5.134E+003	1.672E+003
1.058E+002	8.821E+001	5.532E+005	-3.578E+004	4.972E+004	2.238E+002	-1.949E+003	4.911E+003	3.608E+003
1.058E+002	6.615E+001	2.765E+006	-3.578E+004	4.735E+004	9.706E+003	-1.949E+003	4.688E+003	9.601E+003
1.058E+002	4.410E+001	6.367E+006	-3.578E+004	4.499E+004	2.169E+004	-1.949E+003	4.464E+003	1.106E+004
1.058E+002	2.205E+001	1.745E+007	-3.578E+004	4.262E+004	1.913E+004	-1.949E+003	4.241E+003	1.361E+004
1.058E+002	0.000E+000	2.056E+007	-3.578E+004	4.025E+004	1.743E+004	-1.949E+003	4.018E+003	4.191E+004
8.141E+001	1.103E+003	1.750E+000	-3.578E+004	3.788E+004	2.820E+004	-1.949E+003	3.795E+003	4.275E+004
8.141E+001	1.036E+003	1.750E+000	-3.578E+004	3.551E+004	5.877E+004	-1.949E+003	3.572E+003	4.294E+004
8.141E+001	9.923E+002	1.750E+000	-3.578E+004	3.315E+004	6.117E+004	-1.949E+003	3.348E+003	1.833E+005
8.141E+001	9.703E+002	1.750E+000	-3.578E+004	3.078E+004	9.187E+004	-1.949E+003	3.125E+003	1.677E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
8.141E+001	9.262E+002	1.750E+000	-3.578E+004	2.841E+004	1.269E+005	-1.949E+003	2.902E+003	3.205E+005
8.141E+001	8.821E+002	1.750E+000	-3.578E+004	2.604E+004	1.336E+005	-1.949E+003	2.679E+003	2.911E+005
8.141E+001	7.938E+002	1.750E+000	-3.578E+004	2.368E+004	1.929E+005	-1.949E+003	2.455E+003	4.009E+005
8.141E+001	7.277E+002	1.750E+000	-3.578E+004	2.131E+004	2.950E+005	-1.949E+003	2.232E+003	5.736E+005
8.141E+001	6.615E+002	2.375E+000	-3.578E+004	1.894E+004	2.773E+005	-1.949E+003	2.009E+003	6.907E+005
8.141E+001	5.733E+002	6.250E-001	-3.578E+004	1.657E+004	2.998E+005	-1.949E+003	1.786E+003	7.508E+005
8.141E+001	5.513E+002	1.250E+001	-3.578E+004	1.421E+004	4.246E+005	-1.949E+003	1.563E+003	7.856E+005
8.141E+001	5.292E+002	3.396E+001	-3.578E+004	1.184E+004	5.107E+005	-1.949E+003	1.339E+003	7.702E+005
8.141E+001	5.072E+002	2.500E+000	-3.578E+004	9.470E+003	1.286E+006	-1.949E+003	1.116E+003	7.904E+005
8.141E+001	4.851E+002	3.125E+000	-3.578E+004	7.103E+003	3.699E+006	-1.949E+003	8.929E+002	8.380E+005
8.141E+001	4.631E+002	1.688E+001	-3.578E+004	4.735E+003	9.053E+006	-1.949E+003	6.697E+002	1.022E+006
8.141E+001	4.410E+002	2.500E+000	-3.578E+004	2.368E+003	1.674E+007	-1.949E+003	4.464E+002	1.614E+006
8.141E+001	4.190E+002	5.521E+001	-3.578E+004	0.000E+000	1.845E+007	-1.949E+003	2.232E+002	3.850E+006
8.141E+001	3.969E+002	1.315E+002	-3.827E+004	6.156E+004	2.238E+002	-1.949E+003	0.000E+000	4.638E+006
8.141E+001	3.749E+002	1.975E+002	-3.827E+004	5.682E+004	2.632E+003	-2.211E+003	9.822E+003	6.250E-001
8.141E+001	3.528E+002	2.981E+002	-3.827E+004	5.446E+004	7.398E+003	-2.211E+003	7.590E+003	1.250E+001
8.141E+001	3.308E+002	3.173E+002	-3.827E+004	5.209E+004	4.991E+003	-2.211E+003	7.143E+003	6.000E+001
8.141E+001	3.087E+002	8.149E+002	-3.827E+004	4.972E+004	7.770E+003	-2.211E+003	6.697E+003	2.521E+001
8.141E+001	2.867E+002	8.101E+002	-3.827E+004	4.735E+004	1.804E+004	-2.211E+003	6.473E+003	3.333E+000
8.141E+001	2.646E+002	9.296E+002	-3.827E+004	4.499E+004	1.370E+004	-2.211E+003	6.250E+003	1.042E+000
8.141E+001	2.426E+002	2.358E+003	-3.827E+004	4.262E+004	1.389E+004	-2.211E+003	6.027E+003	1.255E+003
8.141E+001	2.205E+002	1.690E+003	-3.827E+004	4.025E+004	2.884E+004	-2.211E+003	5.804E+003	6.250E-001
8.141E+001	1.985E+002	1.536E+004	-3.827E+004	3.788E+004	3.242E+004	-2.211E+003	5.581E+003	1.438E+002
8.141E+001	1.764E+002	1.308E+004	-3.827E+004	3.551E+004	5.019E+004	-2.211E+003	5.357E+003	1.875E+000
8.141E+001	1.544E+002	3.387E+004	-3.827E+004	3.315E+004	2.901E+004	-2.211E+003	5.134E+003	1.055E+003
8.141E+001	1.323E+002	3.859E+004	-3.827E+004	3.078E+004	9.150E+004	-2.211E+003	4.911E+003	6.619E+002
8.141E+001	1.103E+002	1.335E+005	-3.827E+004	2.841E+004	9.545E+004	-2.211E+003	4.688E+003	5.580E+003
8.141E+001	8.821E+001	5.633E+005	-3.827E+004	2.604E+004	1.202E+005	-2.211E+003	4.464E+003	3.147E+003
8.141E+001	6.615E+001	2.120E+006	-3.827E+004	2.368E+004	1.949E+005	-2.211E+003	4.241E+003	4.346E+003
8.141E+001	4.410E+001	4.826E+006	-3.827E+004	2.131E+004	1.829E+005	-2.211E+003	4.018E+003	5.023E+003
8.141E+001	2.205E+001	1.420E+007	-3.827E+004	1.894E+004	2.561E+005	-2.211E+003	3.795E+003	4.975E+003
8.141E+001	0.000E+000	1.840E+007	-3.827E+004	1.657E+004	2.757E+005	-2.211E+003	3.572E+003	1.764E+004
5.698E+001	9.923E+002	3.500E+000	-3.827E+004	1.421E+004	4.343E+005	-2.211E+003	3.348E+003	1.685E+004
5.698E+001	9.482E+002	1.750E+000	-3.827E+004	1.184E+004	7.073E+005	-2.211E+003	3.125E+003	6.929E+004
5.698E+001	5.733E+002	1.042E+001	-3.827E+004	9.470E+003	1.580E+006	-2.211E+003	2.902E+003	1.396E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
5.698E+001	5.513E+002	6.250E-001	-3.827E+004	7.103E+003	4.326E+006	-2.211E+003	2.679E+003	1.231E+005
5.698E+001	5.072E+002	1.750E+000	-3.827E+004	4.735E+003	9.618E+006	-2.211E+003	2.455E+003	2.307E+005
5.698E+001	4.631E+002	4.250E+000	-3.827E+004	2.368E+003	1.684E+007	-2.211E+003	2.232E+003	3.570E+005
5.698E+001	4.410E+002	6.250E-001	-3.827E+004	0.000E+000	1.822E+007	-2.211E+003	2.009E+003	3.935E+005
5.698E+001	3.969E+002	5.250E+001	-4.075E+004	5.446E+004	2.561E+003	-2.211E+003	1.786E+003	5.012E+005
5.698E+001	3.749E+002	1.750E+001	-4.075E+004	4.972E+004	5.713E+003	-2.211E+003	1.563E+003	5.676E+005
5.698E+001	3.528E+002	5.688E+001	-4.075E+004	4.735E+004	3.311E+004	-2.211E+003	1.339E+003	6.077E+005
5.698E+001	3.308E+002	5.625E+000	-4.075E+004	4.499E+004	1.789E+004	-2.211E+003	1.116E+003	4.587E+005
5.698E+001	3.087E+002	9.458E+000	-4.075E+004	4.262E+004	2.353E+004	-2.211E+003	8.929E+002	4.587E+005
5.698E+001	2.867E+002	3.363E+003	-4.075E+004	4.025E+004	4.554E+004	-2.211E+003	6.697E+002	5.537E+005
5.698E+001	2.646E+002	2.641E+002	-4.075E+004	3.788E+004	2.862E+004	-2.211E+003	4.464E+002	1.020E+006
5.698E+001	2.426E+002	1.088E+002	-4.075E+004	3.551E+004	5.160E+004	-2.211E+003	2.232E+002	2.375E+006
5.698E+001	2.205E+002	2.398E+003	-4.075E+004	3.315E+004	1.985E+004	-2.211E+003	0.000E+000	3.208E+006
5.698E+001	1.985E+002	5.533E+002	-4.075E+004	3.078E+004	2.354E+004	-2.472E+003	1.116E+004	6.000E+001
5.698E+001	1.764E+002	4.468E+003	-4.075E+004	2.841E+004	8.473E+004	-2.472E+003	1.027E+004	3.333E+001
5.698E+001	1.544E+002	5.391E+003	-4.075E+004	2.604E+004	9.100E+004	-2.472E+003	8.706E+003	1.030E+002
5.698E+001	1.323E+002	9.579E+003	-4.075E+004	2.368E+004	1.286E+005	-2.472E+003	8.259E+003	3.542E+000
5.698E+001	1.103E+002	4.811E+004	-4.075E+004	2.131E+004	1.746E+005	-2.472E+003	7.813E+003	2.500E+000
5.698E+001	8.821E+001	3.700E+005	-4.075E+004	1.894E+004	2.975E+005	-2.472E+003	6.920E+003	2.500E+000
5.698E+001	6.615E+001	1.376E+006	-4.075E+004	1.657E+004	2.866E+005	-2.472E+003	6.697E+003	4.000E+001
5.698E+001	4.410E+001	3.907E+006	-4.075E+004	1.421E+004	2.931E+005	-2.472E+003	6.473E+003	3.508E+001
5.698E+001	2.205E+001	1.092E+007	-4.075E+004	1.184E+004	5.632E+005	-2.472E+003	6.027E+003	1.813E+001
5.698E+001	0.000E+000	1.557E+007	-4.075E+004	9.470E+003	1.446E+006	-2.472E+003	5.581E+003	1.008E+003
3.254E+001	7.277E+002	6.250E-001	-4.075E+004	7.103E+003	3.971E+006	-2.472E+003	5.134E+003	3.837E+002
3.254E+001	5.513E+002	6.250E-001	-4.075E+004	4.735E+003	9.530E+006	-2.472E+003	4.911E+003	3.333E+000
3.254E+001	5.072E+002	3.583E+001	-4.075E+004	2.368E+003	1.679E+007	-2.472E+003	4.688E+003	8.102E+002
3.254E+001	4.631E+002	3.646E+001	-4.075E+004	0.000E+000	1.974E+007	-2.472E+003	4.464E+003	1.287E+003
3.254E+001	4.410E+002	3.333E+001	-4.323E+004	5.446E+004	5.713E+003	-2.472E+003	4.241E+003	1.848E+003
3.254E+001	4.190E+002	1.000E+001	-4.323E+004	4.972E+004	6.366E+003	-2.472E+003	4.018E+003	5.976E+002
3.254E+001	3.528E+002	7.804E+001	-4.323E+004	4.735E+004	1.115E+004	-2.472E+003	3.795E+003	2.871E+003
3.254E+001	2.867E+002	7.333E+000	-4.323E+004	4.499E+004	6.366E+003	-2.472E+003	3.572E+003	4.216E+003
3.254E+001	2.646E+002	3.376E+003	-4.323E+004	4.262E+004	3.652E+004	-2.472E+003	3.348E+003	1.385E+004
3.254E+001	2.426E+002	3.372E+003	-4.323E+004	4.025E+004	3.661E+004	-2.472E+003	3.125E+003	2.476E+004
3.254E+001	2.205E+002	1.592E+001	-4.323E+004	3.788E+004	5.967E+004	-2.472E+003	2.902E+003	1.266E+004
3.254E+001	1.985E+002	4.421E+003	-4.323E+004	3.551E+004	7.650E+004	-2.472E+003	2.679E+003	5.682E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.254E+001	1.764E+002	6.514E+003	-4.323E+004	3.315E+004	9.035E+004	-2.472E+003	2.455E+003	6.862E+004
3.254E+001	1.544E+002	2.645E+003	-4.323E+004	3.078E+004	9.394E+004	-2.472E+003	2.232E+003	1.310E+005
3.254E+001	1.323E+002	4.867E+003	-4.323E+004	2.841E+004	4.701E+004	-2.472E+003	2.009E+003	1.251E+005
3.254E+001	1.103E+002	2.247E+004	-4.323E+004	2.604E+004	9.974E+004	-2.472E+003	1.786E+003	1.256E+005
3.254E+001	8.821E+001	6.693E+004	-4.323E+004	2.368E+004	1.622E+005	-2.472E+003	1.563E+003	1.573E+005
3.254E+001	6.615E+001	3.639E+005	-4.323E+004	2.131E+004	1.551E+005	-2.472E+003	1.339E+003	2.677E+005
3.254E+001	4.410E+001	1.265E+006	-4.323E+004	1.894E+004	1.530E+005	-2.472E+003	1.116E+003	1.807E+005
3.254E+001	2.205E+001	4.164E+006	-4.323E+004	1.657E+004	3.399E+005	-2.472E+003	8.929E+002	2.765E+005
3.254E+001	0.000E+000	8.231E+006	-4.323E+004	1.421E+004	2.809E+005	-2.472E+003	6.697E+002	3.771E+005
8.111E+000	5.954E+002	1.750E+000	-4.323E+004	1.184E+004	4.792E+005	-2.472E+003	4.464E+002	5.906E+005
8.111E+000	5.292E+002	3.500E+000	-4.323E+004	9.470E+003	1.138E+006	-2.472E+003	2.232E+002	1.320E+006
8.111E+000	5.072E+002	1.750E+000	-4.323E+004	7.103E+003	3.295E+006	-2.472E+003	0.000E+000	1.946E+006
8.111E+000	4.410E+002	3.500E+000	-4.323E+004	4.735E+003	8.686E+006	-2.734E+003	1.049E+004	6.000E+001
8.111E+000	4.190E+002	5.250E+000	-4.323E+004	2.368E+003	1.617E+007	-2.734E+003	6.920E+003	1.750E+000
8.111E+000	3.969E+002	7.000E+000	-4.323E+004	0.000E+000	2.251E+007	-2.734E+003	6.697E+003	1.250E+001
8.111E+000	3.749E+002	1.050E+001	-4.571E+004	4.972E+004	3.183E+003	-2.734E+003	6.250E+003	3.333E+001
8.111E+000	3.528E+002	8.750E+000	-4.571E+004	4.735E+004	7.963E+003	-2.734E+003	5.804E+003	3.583E+001
8.111E+000	3.308E+002	7.217E+001	-4.571E+004	4.499E+004	3.183E+003	-2.734E+003	5.134E+003	2.500E+000
8.111E+000	3.087E+002	6.992E+001	-4.571E+004	4.262E+004	1.591E+004	-2.734E+003	4.688E+003	5.000E+000
8.111E+000	2.867E+002	7.008E+001	-4.571E+004	4.025E+004	1.595E+004	-2.734E+003	4.464E+003	1.923E+002
8.111E+000	2.646E+002	1.225E+001	-4.571E+004	3.788E+004	3.772E+004	-2.734E+003	4.241E+003	6.667E+001
8.111E+000	2.426E+002	3.422E+003	-4.571E+004	3.551E+004	2.988E+004	-2.734E+003	4.018E+003	1.095E+003
8.111E+000	2.205E+002	3.386E+003	-4.571E+004	3.315E+004	4.799E+004	-2.734E+003	3.795E+003	6.137E+002
8.111E+000	1.985E+002	7.658E+001	-4.571E+004	3.078E+004	9.747E+004	-2.734E+003	3.572E+003	8.550E+002
8.111E+000	1.764E+002	5.681E+003	-4.571E+004	2.841E+004	1.053E+005	-2.734E+003	3.348E+003	7.071E+003
8.111E+000	1.544E+002	5.809E+003	-4.571E+004	2.604E+004	5.062E+004	-2.734E+003	3.125E+003	4.280E+003
8.111E+000	1.323E+002	5.933E+003	-4.571E+004	2.368E+004	1.040E+005	-2.734E+003	2.902E+003	1.126E+004
8.111E+000	1.103E+002	4.866E+003	-4.571E+004	2.131E+004	1.687E+005	-2.734E+003	2.679E+003	5.400E+003
8.111E+000	8.821E+001	1.121E+004	-4.571E+004	1.894E+004	1.170E+005	-2.734E+003	2.455E+003	7.817E+003
8.111E+000	6.615E+001	9.761E+004	-4.571E+004	1.657E+004	1.615E+005	-2.734E+003	2.232E+003	2.257E+004
8.111E+000	4.410E+001	4.301E+005	-4.571E+004	1.421E+004	2.739E+005	-2.734E+003	2.009E+003	4.727E+004
8.111E+000	2.205E+001	2.198E+006	-4.571E+004	1.184E+004	4.963E+005	-2.734E+003	1.786E+003	4.906E+004
8.111E+000	0.000E+000	6.682E+007	-4.571E+004	9.470E+003	1.330E+006	-2.734E+003	1.563E+003	3.758E+004
-1.632E+001	4.851E+002	1.750E+000	-4.571E+004	7.103E+003	3.772E+006	-2.734E+003	1.339E+003	1.290E+005
-1.632E+001	4.631E+002	3.500E+000	-4.571E+004	4.735E+003	1.047E+007	-2.734E+003	1.116E+003	7.334E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-1.632E+001	4.410E+002	5.250E+000	-4.571E+004	2.368E+003	1.974E+007	-2.734E+003	8.929E+002	1.558E+005
-1.632E+001	4.190E+002	1.575E+001	-4.571E+004	0.000E+000	2.657E+007	-2.734E+003	6.697E+002	1.621E+005
-1.632E+001	3.969E+002	7.750E+000	-4.819E+004	4.499E+004	4.780E+003	-2.734E+003	4.464E+002	3.004E+005
-1.632E+001	3.749E+002	4.975E+001	-4.819E+004	4.262E+004	1.623E+004	-2.734E+003	2.232E+002	7.798E+005
-1.632E+001	3.528E+002	8.750E+000	-4.819E+004	4.025E+004	4.780E+003	-2.734E+003	0.000E+000	1.105E+006
-1.632E+001	3.308E+002	5.675E+001	-4.819E+004	3.788E+004	9.561E+003	-2.996E+003	6.473E+003	1.750E+000
-1.632E+001	3.087E+002	4.708E+001	-4.819E+004	3.551E+004	4.264E+004	-2.996E+003	5.581E+003	6.667E+001
-1.632E+001	2.867E+002	1.041E+002	-4.819E+004	3.315E+004	4.089E+004	-2.996E+003	5.134E+003	2.500E+000
-1.632E+001	2.646E+002	1.008E+002	-4.819E+004	3.078E+004	8.151E+004	-2.996E+003	4.688E+003	8.096E+002
-1.632E+001	2.426E+002	1.700E+001	-4.819E+004	2.841E+004	1.462E+005	-2.996E+003	4.241E+003	5.208E+001
-1.632E+001	2.205E+002	6.025E+001	-4.819E+004	2.604E+004	1.404E+005	-2.996E+003	4.018E+003	1.440E+001
-1.632E+001	1.985E+002	1.208E+002	-4.819E+004	2.368E+004	1.823E+005	-2.996E+003	3.795E+003	3.670E+002
-1.632E+001	1.764E+002	4.473E+002	-4.819E+004	2.131E+004	2.203E+005	-2.996E+003	3.572E+003	6.349E+002
-1.632E+001	1.544E+002	1.144E+003	-4.819E+004	1.894E+004	2.978E+005	-2.996E+003	3.348E+003	1.188E+003
-1.632E+001	1.323E+002	1.567E+003	-4.819E+004	1.657E+004	4.524E+005	-2.996E+003	3.125E+003	5.214E+002
-1.632E+001	1.103E+002	3.466E+003	-4.819E+004	1.421E+004	6.831E+005	-2.996E+003	2.902E+003	4.726E+002
-1.632E+001	8.821E+001	1.577E+004	-4.819E+004	1.184E+004	1.077E+006	-2.996E+003	2.679E+003	2.675E+002
-1.632E+001	6.615E+001	3.551E+004	-4.819E+004	9.470E+003	2.098E+006	-2.996E+003	2.455E+003	3.799E+003
-1.632E+001	4.410E+001	9.723E+004	-4.819E+004	7.103E+003	5.234E+006	-2.996E+003	2.232E+003	2.106E+003
-1.632E+001	2.205E+001	2.424E+005	-4.819E+004	4.735E+003	1.411E+007	-2.996E+003	2.009E+003	9.084E+003
-1.632E+001	0.000E+000	3.348E+006	-4.819E+004	2.368E+003	2.780E+007	-2.996E+003	1.786E+003	4.497E+003
-4.075E+001	4.851E+002	1.750E+000	-4.819E+004	0.000E+000	3.978E+007	-2.996E+003	1.563E+003	2.379E+004
-4.075E+001	4.631E+002	1.750E+000	-5.067E+004	3.788E+004	4.780E+003	-2.996E+003	1.339E+003	1.200E+003
-4.075E+001	4.410E+002	1.750E+000	-5.067E+004	3.551E+004	9.548E+003	-2.996E+003	1.116E+003	2.925E+004
-4.075E+001	4.190E+002	1.050E+001	-5.067E+004	3.315E+004	1.118E+004	-2.996E+003	8.929E+002	2.295E+004
-4.075E+001	3.969E+002	1.050E+001	-5.067E+004	3.078E+004	1.787E+004	-2.996E+003	6.697E+002	7.015E+004
-4.075E+001	3.749E+002	3.500E+000	-5.067E+004	2.841E+004	8.274E+004	-2.996E+003	4.464E+002	1.196E+005
-4.075E+001	3.528E+002	1.225E+001	-5.067E+004	2.604E+004	8.315E+004	-2.996E+003	2.232E+002	3.405E+005
-4.075E+001	3.308E+002	1.400E+001	-5.067E+004	2.368E+004	2.845E+005	-2.996E+003	0.000E+000	6.220E+005
-4.075E+001	3.087E+002	7.000E+000	-5.067E+004	2.131E+004	3.770E+005	-3.257E+003	7.143E+003	1.250E+001
-4.075E+001	2.867E+002	5.500E+001	-5.067E+004	1.894E+004	5.629E+005	-3.257E+003	4.241E+003	1.917E+002
-4.075E+001	2.646E+002	8.900E+001	-5.067E+004	1.657E+004	9.501E+005	-3.257E+003	3.795E+003	7.486E+002
-4.075E+001	2.426E+002	1.758E+002	-5.067E+004	1.421E+004	9.987E+005	-3.257E+003	3.572E+003	3.748E+002
-4.075E+001	2.205E+002	2.674E+002	-5.067E+004	1.184E+004	2.190E+006	-3.257E+003	3.348E+003	2.083E+000
-4.075E+001	1.985E+002	1.896E+002	-5.067E+004	9.470E+003	3.427E+006	-3.257E+003	3.125E+003	1.333E+002

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-4.075E+001	1.764E+002	5.238E+002	-5.067E+004	7.103E+003	6.339E+006	-3.257E+003	2.902E+003	2.620E+002
-4.075E+001	1.544E+002	5.031E+002	-5.067E+004	4.735E+003	1.815E+007	-3.257E+003	2.679E+003	8.153E+002
-4.075E+001	1.323E+002	3.484E+003	-5.067E+004	2.368E+003	3.492E+007	-3.257E+003	2.455E+003	1.527E+003
-4.075E+001	1.103E+002	1.358E+004	-5.067E+004	0.000E+000	4.905E+007	-3.257E+003	2.232E+003	3.243E+002
-4.075E+001	8.821E+001	3.743E+003	-5.315E+004	3.315E+004	6.403E+003	-3.257E+003	2.009E+003	4.526E+002
-4.075E+001	6.615E+001	2.126E+004	-5.315E+004	3.078E+004	1.281E+004	-3.257E+003	1.786E+003	4.087E+002
-4.075E+001	4.410E+001	4.984E+004	-5.315E+004	2.841E+004	1.277E+004	-3.257E+003	1.563E+003	1.020E+003
-4.075E+001	2.205E+001	2.669E+005	-5.315E+004	2.604E+004	2.560E+004	-3.257E+003	1.339E+003	7.800E+003
-4.075E+001	0.000E+000	5.901E+005	-5.315E+004	2.368E+004	2.074E+004	-3.257E+003	1.116E+003	1.814E+004
-6.519E+001	5.513E+002	1.750E+000	-5.315E+004	2.131E+004	5.949E+004	-3.257E+003	8.929E+002	1.800E+003
-6.519E+001	5.072E+002	3.500E+000	-5.315E+004	1.894E+004	9.152E+004	-3.257E+003	6.697E+002	4.780E+003
-6.519E+001	4.631E+002	3.500E+000	-5.315E+004	1.657E+004	3.711E+005	-3.257E+003	4.464E+002	3.662E+004
-6.519E+001	4.410E+002	1.750E+000	-5.315E+004	1.421E+004	5.072E+005	-3.257E+003	2.232E+002	9.776E+004
-6.519E+001	3.969E+002	1.750E+000	-5.315E+004	1.184E+004	1.483E+006	-3.257E+003	0.000E+000	3.269E+005
-6.519E+001	3.749E+002	3.500E+000	-5.315E+004	9.470E+003	2.061E+006	-3.519E+003	7.366E+003	6.250E-001
-6.519E+001	3.308E+002	8.750E+000	-5.315E+004	7.103E+003	5.306E+006	-3.519E+003	4.464E+003	3.010E+002
-6.519E+001	3.087E+002	1.000E+001	-5.315E+004	4.735E+003	1.428E+007	-3.519E+003	4.018E+003	4.476E+002
-6.519E+001	2.867E+002	1.050E+001	-5.315E+004	2.368E+003	2.798E+007	-3.519E+003	3.572E+003	1.368E+002
-6.519E+001	2.646E+002	4.450E+001	-5.315E+004	0.000E+000	4.062E+007	-3.519E+003	3.348E+003	4.476E+002
-6.519E+001	2.426E+002	8.450E+001	-5.563E+004	2.368E+004	6.405E+003	-3.519E+003	2.902E+003	6.327E+003
-6.519E+001	2.205E+002	8.025E+001	-5.563E+004	2.131E+004	1.925E+004	-3.519E+003	2.679E+003	7.167E+001
-6.519E+001	1.985E+002	1.917E+001	-5.563E+004	1.894E+004	3.206E+004	-3.519E+003	2.455E+003	7.500E+001
-6.519E+001	1.764E+002	8.200E+001	-5.563E+004	1.657E+004	5.771E+004	-3.519E+003	2.232E+003	2.477E+002
-6.519E+001	1.544E+002	9.250E+001	-5.563E+004	1.421E+004	1.951E+005	-3.519E+003	2.009E+003	1.024E+003
-6.519E+001	1.323E+002	2.163E+001	-5.563E+004	1.184E+004	2.842E+005	-3.519E+003	1.786E+003	9.982E+001
-6.519E+001	1.103E+002	5.592E+001	-5.563E+004	9.470E+003	7.520E+005	-3.519E+003	1.563E+003	6.286E+002
-6.519E+001	8.821E+001	2.020E+002	-5.563E+004	7.103E+003	2.262E+006	-3.519E+003	1.339E+003	1.810E+002
-6.519E+001	6.615E+001	4.354E+002	-5.563E+004	4.735E+003	7.235E+006	-3.519E+003	1.116E+003	3.149E+003
-6.519E+001	4.410E+001	2.047E+004	-5.563E+004	2.368E+003	1.669E+007	-3.519E+003	8.929E+002	1.312E+003
-6.519E+001	2.205E+001	8.682E+004	-5.563E+004	0.000E+000	2.540E+007	-3.519E+003	6.697E+002	2.630E+003
-6.519E+001	0.000E+000	1.866E+005	-5.812E+004	1.657E+004	1.281E+004	-3.519E+003	4.464E+002	1.114E+004
-8.962E+001	7.497E+002	1.750E+000	-5.812E+004	1.421E+004	3.068E+004	-3.519E+003	2.232E+002	4.280E+004
-8.962E+001	7.056E+002	1.750E+000	-5.812E+004	1.184E+004	6.143E+004	-3.519E+003	0.000E+000	1.261E+005
-8.962E+001	6.615E+002	1.750E+000	-5.812E+004	9.470E+003	1.446E+005	-3.781E+003	4.911E+003	5.000E+000
-8.962E+001	5.072E+002	1.750E+000	-5.812E+004	7.103E+003	6.614E+005	-3.781E+003	4.241E+003	5.000E+000

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-8.962E+001	3.969E+002	1.750E+000	-5.812E+004	4.735E+003	2.816E+006	-3.781E+003	4.018E+003	1.007E+003
-8.962E+001	3.749E+002	1.750E+000	-5.812E+004	2.368E+003	6.292E+006	-3.781E+003	3.572E+003	6.250E-001
-8.962E+001	3.308E+002	7.000E+000	-5.812E+004	0.000E+000	1.022E+007	-3.781E+003	3.348E+003	5.000E+000
-8.962E+001	3.087E+002	1.750E+000	-6.060E+004	9.470E+003	3.810E+003	-3.781E+003	2.902E+003	1.012E+003
-8.962E+001	2.867E+002	1.750E+000	-6.060E+004	7.103E+003	8.768E+004	-3.781E+003	2.679E+003	2.059E+003
-8.962E+001	1.985E+002	7.000E+000	-6.060E+004	4.735E+003	5.246E+005	-3.781E+003	2.455E+003	8.096E+002
-8.962E+001	1.764E+002	1.042E+001	-6.060E+004	2.368E+003	1.514E+006	-3.781E+003	2.232E+003	4.497E+002
-8.962E+001	1.544E+002	1.400E+001	-6.060E+004	0.000E+000	2.611E+006	-3.781E+003	1.786E+003	6.394E+003
-8.962E+001	1.323E+002	3.550E+001	-6.308E+004	1.421E+004	1.750E+000	-3.781E+003	1.563E+003	1.460E+003
-8.962E+001	1.103E+002	1.305E+002	-6.308E+004	9.470E+003	5.208E+000	-3.781E+003	1.339E+003	6.371E+003
-8.962E+001	8.821E+001	6.283E+001	-6.308E+004	7.103E+003	1.276E+004	-3.781E+003	8.929E+002	2.110E+002
-8.962E+001	6.615E+001	2.040E+002	-6.308E+004	4.735E+003	9.370E+004	-3.781E+003	6.697E+002	1.439E+003
-8.962E+001	4.410E+001	3.884E+002	-6.308E+004	2.368E+003	3.040E+005	-3.781E+003	4.464E+002	1.118E+004
-8.962E+001	2.205E+001	1.408E+004	-6.308E+004	0.000E+000	3.927E+005	-3.781E+003	2.232E+002	9.524E+003
-8.962E+001	0.000E+000	3.153E+004	-6.556E+004	7.103E+003	3.500E+000	-3.781E+003	0.000E+000	3.038E+004
-1.140E+002	6.395E+002	1.750E+000	-6.556E+004	4.735E+003	6.366E+003	-4.042E+003	3.795E+003	1.810E+002
-1.140E+002	5.954E+002	1.750E+000	-6.556E+004	2.368E+003	4.786E+004	-4.042E+003	3.572E+003	1.810E+002
-1.140E+002	5.733E+002	1.750E+000	-6.556E+004	0.000E+000	7.698E+004	-4.042E+003	3.125E+003	1.810E+002
-1.140E+002	3.969E+002	1.750E+000	-6.804E+004	4.735E+003	3.808E+003	-4.042E+003	2.902E+003	6.667E+001
-1.140E+002	2.646E+002	1.250E+000	-6.804E+004	2.368E+003	3.809E+003	-4.042E+003	2.009E+003	5.000E+000
-1.140E+002	1.985E+002	8.500E+000	-6.804E+004	0.000E+000	1.593E+004	-4.042E+003	1.116E+003	6.667E+001
-1.140E+002	1.764E+002	3.500E+000				-4.042E+003	6.697E+002	4.643E+002
-1.140E+002	1.544E+002	1.400E+001				-4.042E+003	4.464E+002	8.671E+003
-1.140E+002	1.323E+002	7.000E+000				-4.042E+003	2.232E+002	2.039E+004
-1.140E+002	1.103E+002	2.100E+001				-4.042E+003	0.000E+000	9.694E+003
-1.140E+002	8.821E+001	2.800E+001				-4.304E+003	1.786E+003	2.058E+003
-1.140E+002	6.615E+001	1.121E+002				-4.304E+003	1.339E+003	4.482E+002
-1.140E+002	4.410E+001	1.198E+002				-4.304E+003	8.929E+002	6.299E+002
-1.140E+002	2.205E+001	7.398E+002				-4.304E+003	6.697E+002	6.667E+001
-1.140E+002	0.000E+000	3.884E+003				-4.304E+003	4.464E+002	3.641E+002
-1.385E+002	5.954E+002	1.750E+000				-4.304E+003	2.232E+002	8.230E+002
-1.385E+002	5.733E+002	1.750E+000				-4.304E+003	0.000E+000	6.974E+003
-1.385E+002	5.072E+002	1.750E+000				-4.566E+003	2.679E+003	1.810E+002
-1.385E+002	4.631E+002	1.750E+000				-4.566E+003	1.116E+003	4.476E+002
-1.385E+002	2.426E+002	7.000E+000				-4.566E+003	6.697E+002	4.476E+002

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-1.385E+002	1.764E+002	3.500E+000				-4.566E+003	4.464E+002	1.526E+003
-1.385E+002	1.544E+002	3.500E+000				-4.566E+003	2.232E+002	8.096E+002
-1.385E+002	1.323E+002	7.000E+000				-4.566E+003	0.000E+000	5.574E+002
-1.385E+002	1.103E+002	2.100E+001				-4.828E+003	4.464E+002	4.476E+002
-1.385E+002	8.821E+001	2.100E+001				-4.828E+003	0.000E+000	2.637E+003
-1.385E+002	6.615E+001	1.226E+002				-5.089E+003	0.000E+000	4.393E+002
-1.385E+002	4.410E+001	1.279E+002				-5.351E+003	0.000E+000	1.246E+002
-1.385E+002	2.205E+001	3.628E+002				-5.613E+003	4.464E+002	6.667E+001
-1.385E+002	0.000E+000	2.775E+003				-5.613E+003	2.232E+002	6.336E+002
-1.629E+002	1.764E+002	1.042E+001				-5.613E+003	0.000E+000	5.000E+000
-1.629E+002	1.103E+002	3.500E+000						
-1.629E+002	8.821E+001	1.400E+001						
-1.629E+002	6.615E+001	3.842E+001						
-1.629E+002	4.410E+001	4.883E+001						
-1.629E+002	2.205E+001	1.400E+002						
-1.629E+002	0.000E+000	5.744E+002						
-1.873E+002	1.544E+002	3.500E+000						
-1.873E+002	1.103E+002	7.000E+000						
-1.873E+002	8.821E+001	1.042E+001						
-1.873E+002	6.615E+001	3.483E+001						
-1.873E+002	4.410E+001	2.442E+001						
-1.873E+002	2.205E+001	4.900E+001						
-1.873E+002	0.000E+000	1.800E+002						
-2.118E+002	8.821E+001	1.050E+001						
-2.118E+002	6.615E+001	1.042E+001						
-2.118E+002	4.410E+001	1.742E+001						
-2.118E+002	2.205E+001	5.242E+001						
-2.118E+002	0.000E+000	5.592E+001						
-2.362E+002	1.323E+002	3.500E+000						
-2.362E+002	1.103E+002	1.042E+001						
-2.362E+002	6.615E+001	1.050E+001						
-2.362E+002	4.410E+001	1.400E+001						
-2.362E+002	2.205E+001	2.100E+001						
-2.362E+002	0.000E+000	3.500E+001						
-2.606E+002	1.323E+002	1.392E+001						

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-2.606E+002	6.615E+001	2.442E+001						
-2.606E+002	2.205E+001	3.483E+001						
-2.606E+002	0.000E+000	4.542E+001						
-2.851E+002	8.821E+001	3.500E+000						
-2.851E+002	6.615E+001	3.500E+000						
-2.851E+002	2.205E+001	3.500E+000						
-2.851E+002	0.000E+000	1.742E+001						
-3.095E+002	6.615E+001	3.500E+000						
-3.095E+002	4.410E+001	7.000E+000						
-3.095E+002	2.205E+001	7.000E+000						
-3.095E+002	0.000E+000	3.500E+000						
-3.339E+002	4.410E+001	7.000E+000						
-3.339E+002	2.205E+001	3.500E+000						
-3.339E+002	0.000E+000	1.400E+001						
-3.584E+002	0.000E+000	7.000E+000						
-3.828E+002	4.410E+001	7.000E+000						
-3.828E+002	2.205E+001	3.500E+000						
-3.828E+002	0.000E+000	3.500E+000						
-4.072E+002	0.000E+000	1.400E+001						
-4.317E+002	2.205E+001	3.500E+000						

Appendix F. Mk3b V126 3.6MW IEC2A HH117 Rain flow count

This appendix contains the rain flow spectrum for the shear force, the bending moment and the torsional moment in the bottom of the tower.

Foundation Fatigue Load Spectrum					
Tower shear, bottom F_y [kN]		Tower bending, bottom M_x [kNm]		Tower torsion, bottom M_z [kNm]	
Range	Frequency	Range	Frequency	Range	Frequency
1.093E+003	1.750E+000	1.149E+005	3.500E+000	1.167E+004	4.476E+002
1.049E+003	1.750E+000	1.103E+005	1.750E+000	1.121E+004	6.914E+002
1.006E+003	2.258E+001	1.057E+005	1.563E+001	1.074E+004	8.083E+002
9.619E+002	4.867E+001	1.012E+005	4.171E+001	1.027E+004	3.530E+003
9.181E+002	5.050E+001	9.655E+004	6.783E+001	9.805E+003	5.046E+003
8.744E+002	1.856E+003	9.196E+004	7.171E+001	9.338E+003	2.241E+004
8.307E+002	1.426E+003	8.736E+004	7.179E+001	8.871E+003	3.028E+004
7.870E+002	8.060E+003	8.276E+004	1.252E+002	8.404E+003	7.834E+004
7.433E+002	1.646E+004	7.816E+004	1.383E+002	7.937E+003	1.316E+005
6.995E+002	3.953E+004	7.356E+004	2.898E+002	7.471E+003	3.685E+005
6.558E+002	6.801E+004	6.897E+004	1.612E+003	7.004E+003	5.264E+005
6.121E+002	1.253E+005	6.437E+004	5.911E+003	6.537E+003	7.195E+005
5.684E+002	3.157E+005	5.977E+004	1.558E+004	6.070E+003	1.118E+006
5.246E+002	4.678E+005	5.517E+004	4.332E+004	5.603E+003	1.435E+006
4.809E+002	1.126E+006	5.057E+004	9.315E+004	5.136E+003	2.261E+006
4.372E+002	1.751E+006	4.598E+004	2.108E+005	4.669E+003	3.378E+006
3.935E+002	3.165E+006	4.138E+004	4.896E+005	4.202E+003	5.965E+006
3.498E+002	5.485E+006	3.678E+004	9.380E+005	3.735E+003	9.493E+006
3.060E+002	1.021E+007	3.218E+004	1.420E+006	3.268E+003	1.605E+007
2.623E+002	1.892E+007	2.759E+004	2.320E+006	2.801E+003	2.540E+007
2.186E+002	3.905E+007	2.299E+004	4.173E+006	2.335E+003	3.944E+007
1.749E+002	7.786E+007	1.839E+004	7.055E+006	1.868E+003	5.644E+007
1.312E+002	1.405E+008	1.379E+004	1.613E+007	1.401E+003	7.016E+007
8.744E+001	2.131E+008	9.196E+003	7.862E+007	9.338E+002	8.157E+007
4.372E+001	4.352E+008	4.598E+003	4.411E+008	4.669E+002	1.994E+008

Table B-1 Rainflow counting spectra

Appendix G. Mk3b V126 3.6MW IEC2A HH117 Markov matrices

This appendix contains the Markov Matrices for the shear force, the bending moment and the torsional moment in the bottom of the tower.

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
6.809E+002	0.000E+000	6.366E+003	4.835E+004	0.000E+000	3.500E+000	4.282E+003	0.000E+000	1.810E+002
6.281E+002	2.186E+001	1.007E+003	4.064E+004	2.299E+003	1.042E+001	3.743E+003	0.000E+000	4.476E+002
6.281E+002	0.000E+000	1.398E+004	4.064E+004	0.000E+000	1.392E+001	3.204E+003	0.000E+000	2.420E+003
6.016E+002	2.186E+001	7.373E+003	3.807E+004	2.299E+003	3.500E+000	2.935E+003	4.669E+002	8.383E+003
6.016E+002	0.000E+000	7.554E+004	3.807E+004	0.000E+000	1.042E+001	2.935E+003	2.335E+002	2.731E+004
5.752E+002	2.405E+002	3.808E+003	3.550E+004	0.000E+000	3.500E+000	2.935E+003	0.000E+000	1.135E+003
5.752E+002	1.749E+002	2.058E+003	3.293E+004	2.299E+003	3.125E+001	2.665E+003	4.669E+002	2.606E+004
5.752E+002	1.093E+002	6.366E+003	3.293E+004	0.000E+000	2.092E+001	2.665E+003	2.335E+002	4.084E+004
5.752E+002	8.744E+001	6.366E+003	3.036E+004	6.897E+003	3.500E+000	2.665E+003	0.000E+000	7.702E+004
5.752E+002	6.558E+001	1.910E+004	3.036E+004	4.598E+003	3.500E+000	2.396E+003	1.167E+003	3.500E+000
5.752E+002	4.372E+001	1.292E+004	3.036E+004	2.299E+003	7.000E+000	2.396E+003	9.338E+002	6.432E+003
5.752E+002	2.186E+001	8.682E+004	3.036E+004	0.000E+000	2.092E+001	2.396E+003	7.004E+002	1.001E+004
5.752E+002	0.000E+000	3.026E+005	2.779E+004	2.299E+003	3.500E+000	2.396E+003	4.669E+002	8.919E+004
5.488E+002	3.279E+002	3.808E+003	2.779E+004	0.000E+000	4.892E+001	2.396E+003	2.335E+002	1.163E+005
5.488E+002	3.060E+002	6.366E+003	2.522E+004	2.299E+003	2.092E+001	2.396E+003	0.000E+000	2.244E+005
5.488E+002	2.186E+002	1.904E+003	2.522E+004	0.000E+000	4.883E+001	2.127E+003	3.035E+003	1.904E+003
5.488E+002	1.967E+002	1.224E+004	2.265E+004	4.598E+003	3.500E+000	2.127E+003	2.568E+003	1.511E+004
5.488E+002	1.749E+002	3.500E+000	2.265E+004	2.299E+003	1.400E+001	2.127E+003	2.335E+003	1.281E+004
5.488E+002	1.530E+002	3.769E+004	2.265E+004	0.000E+000	2.660E+002	2.127E+003	2.101E+003	1.716E+004
5.488E+002	1.312E+002	3.333E-001	2.008E+004	4.598E+003	3.500E+000	2.127E+003	1.868E+003	9.561E+003
5.488E+002	1.093E+002	3.947E+004	2.008E+004	2.299E+003	3.275E+001	2.127E+003	1.634E+003	5.262E+004
5.488E+002	8.744E+001	4.203E+004	2.008E+004	0.000E+000	4.920E+002	2.127E+003	1.401E+003	2.994E+004
5.488E+002	6.558E+001	5.842E+004	1.751E+004	4.598E+003	1.258E+001	2.127E+003	1.167E+003	5.565E+004
5.488E+002	4.372E+001	3.827E+004	1.751E+004	2.299E+003	3.625E+001	2.127E+003	9.338E+002	6.145E+004
5.488E+002	2.186E+001	3.486E+005	1.751E+004	0.000E+000	8.853E+002	2.127E+003	7.004E+002	1.155E+005
5.488E+002	0.000E+000	1.002E+006	1.493E+004	8.276E+004	1.750E+000	2.127E+003	4.669E+002	8.186E+004
5.224E+002	2.623E+002	4.476E+002	1.493E+004	8.046E+004	1.750E+000	2.127E+003	2.335E+002	1.992E+005
5.224E+002	2.405E+002	2.111E+004	1.493E+004	5.517E+004	1.750E+000	2.127E+003	0.000E+000	7.195E+005
5.224E+002	2.186E+002	1.027E+004	1.493E+004	4.368E+004	1.750E+000	1.857E+003	3.969E+003	2.058E+003
5.224E+002	1.967E+002	2.299E+004	1.493E+004	6.897E+003	5.000E+000	1.857E+003	3.502E+003	2.061E+003
5.224E+002	1.749E+002	2.968E+004	1.493E+004	4.598E+003	1.050E+001	1.857E+003	3.035E+003	9.548E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
5.224E+002	1.530E+002	1.029E+005	1.493E+004	2.299E+003	6.450E+001	1.857E+003	2.801E+003	2.248E+004
5.224E+002	1.312E+002	1.929E+005	1.493E+004	0.000E+000	1.003E+003	1.857E+003	2.568E+003	2.561E+004
5.224E+002	1.093E+002	1.964E+005	1.236E+004	5.287E+004	1.750E+000	1.857E+003	2.335E+003	1.005E+005
5.224E+002	8.744E+001	1.937E+005	1.236E+004	5.057E+004	1.750E+000	1.857E+003	2.101E+003	8.066E+004
5.224E+002	6.558E+001	2.706E+005	1.236E+004	4.828E+004	1.750E+000	1.857E+003	1.868E+003	9.449E+004
5.224E+002	4.372E+001	3.771E+005	1.236E+004	4.598E+004	1.750E+000	1.857E+003	1.634E+003	7.859E+004
5.224E+002	2.186E+001	1.522E+006	1.236E+004	4.368E+004	1.750E+000	1.857E+003	1.401E+003	9.780E+004
5.224E+002	0.000E+000	3.443E+006	1.236E+004	4.138E+004	1.750E+000	1.857E+003	1.167E+003	1.196E+005
4.960E+002	3.498E+002	2.059E+003	1.236E+004	3.448E+004	1.750E+000	1.857E+003	9.338E+002	1.193E+005
4.960E+002	3.279E+002	1.750E+000	1.236E+004	2.988E+004	3.500E+000	1.857E+003	7.004E+002	1.693E+005
4.960E+002	3.060E+002	1.546E+004	1.236E+004	6.897E+003	1.250E+000	1.857E+003	4.669E+002	2.769E+005
4.960E+002	2.842E+002	7.850E+001	1.236E+004	4.598E+003	1.050E+001	1.857E+003	2.335E+002	6.280E+005
4.960E+002	2.623E+002	2.935E+004	1.236E+004	2.299E+003	2.159E+002	1.857E+003	0.000E+000	1.144E+006
4.960E+002	2.405E+002	7.644E+004	1.236E+004	0.000E+000	1.486E+004	1.588E+003	5.136E+003	1.750E+000
4.960E+002	2.186E+002	9.847E+004	9.793E+003	5.057E+004	1.750E+000	1.588E+003	3.735E+003	9.561E+003
4.960E+002	1.967E+002	1.552E+005	9.793E+003	4.828E+004	3.500E+000	1.588E+003	3.502E+003	1.011E+003
4.960E+002	1.749E+002	3.164E+005	9.793E+003	4.598E+004	3.500E+000	1.588E+003	3.268E+003	2.058E+003
4.960E+002	1.530E+002	5.846E+005	9.793E+003	4.368E+004	3.500E+000	1.588E+003	3.035E+003	5.028E+004
4.960E+002	1.312E+002	7.410E+005	9.793E+003	4.138E+004	5.250E+000	1.588E+003	2.801E+003	9.444E+004
4.960E+002	1.093E+002	1.267E+006	9.793E+003	3.908E+004	1.750E+000	1.588E+003	2.568E+003	1.358E+005
4.960E+002	8.744E+001	1.201E+006	9.793E+003	3.678E+004	3.500E+000	1.588E+003	2.335E+003	1.601E+005
4.960E+002	6.558E+001	1.448E+006	9.793E+003	3.448E+004	5.250E+000	1.588E+003	2.101E+003	1.252E+005
4.960E+002	4.372E+001	1.841E+006	9.793E+003	3.218E+004	3.500E+000	1.588E+003	1.868E+003	2.851E+005
4.960E+002	2.186E+001	5.462E+006	9.793E+003	2.988E+004	7.000E+000	1.588E+003	1.634E+003	2.377E+005
4.960E+002	0.000E+000	1.115E+007	9.793E+003	2.759E+004	1.178E+002	1.588E+003	1.401E+003	2.087E+005
4.696E+002	4.372E+002	2.238E+002	9.793E+003	2.529E+004	7.000E+000	1.588E+003	1.167E+003	2.742E+005
4.696E+002	4.153E+002	2.058E+003	9.793E+003	2.299E+004	5.250E+000	1.588E+003	9.338E+002	2.105E+005
4.696E+002	3.935E+002	2.059E+003	9.793E+003	1.379E+004	3.500E+000	1.588E+003	7.004E+002	3.872E+005
4.696E+002	3.716E+002	9.561E+003	9.793E+003	1.149E+004	3.500E+000	1.588E+003	4.669E+002	5.884E+005
4.696E+002	3.498E+002	2.624E+004	9.793E+003	9.196E+003	7.000E+000	1.588E+003	2.335E+002	1.393E+006
4.696E+002	3.279E+002	2.504E+004	9.793E+003	6.897E+003	7.000E+000	1.588E+003	0.000E+000	2.211E+006
4.696E+002	3.060E+002	7.137E+004	9.793E+003	4.598E+003	2.077E+002	1.318E+003	6.070E+003	3.500E+000
4.696E+002	2.842E+002	1.543E+005	9.793E+003	2.299E+003	2.059E+004	1.318E+003	5.603E+003	4.476E+002
4.696E+002	2.623E+002	1.623E+005	9.793E+003	0.000E+000	1.232E+005	1.318E+003	4.669E+003	9.616E+003
4.696E+002	2.405E+002	3.239E+005	7.223E+003	5.747E+004	3.500E+000	1.318E+003	4.436E+003	1.011E+003

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
4.696E+002	2.186E+002	5.705E+005	7.223E+003	4.828E+004	1.750E+000	1.318E+003	4.202E+003	1.718E+004
4.696E+002	1.967E+002	1.130E+006	7.223E+003	4.598E+004	1.750E+000	1.318E+003	3.969E+003	2.118E+004
4.696E+002	1.749E+002	1.720E+006	7.223E+003	4.368E+004	3.500E+000	1.318E+003	3.735E+003	2.343E+004
4.696E+002	1.530E+002	2.686E+006	7.223E+003	4.138E+004	1.575E+001	1.318E+003	3.502E+003	2.611E+004
4.696E+002	1.312E+002	3.792E+006	7.223E+003	3.908E+004	1.050E+001	1.318E+003	3.268E+003	1.008E+005
4.696E+002	1.093E+002	4.778E+006	7.223E+003	3.678E+004	1.750E+000	1.318E+003	3.035E+003	1.259E+005
4.696E+002	8.744E+001	5.519E+006	7.223E+003	3.448E+004	5.250E+000	1.318E+003	2.801E+003	1.567E+005
4.696E+002	6.558E+001	6.206E+006	7.223E+003	3.218E+004	4.800E+001	1.318E+003	2.568E+003	2.128E+005
4.696E+002	4.372E+001	6.229E+006	7.223E+003	2.988E+004	6.308E+001	1.318E+003	2.335E+003	1.756E+005
4.696E+002	2.186E+001	1.483E+007	7.223E+003	2.759E+004	3.219E+002	1.318E+003	2.101E+003	2.726E+005
4.696E+002	0.000E+000	2.387E+007	7.223E+003	2.529E+004	1.041E+002	1.318E+003	1.868E+003	3.059E+005
4.432E+002	5.465E+002	1.904E+003	7.223E+003	2.299E+004	2.968E+002	1.318E+003	1.634E+003	3.959E+005
4.432E+002	5.028E+002	3.183E+003	7.223E+003	2.069E+004	2.574E+002	1.318E+003	1.401E+003	6.066E+005
4.432E+002	4.809E+002	6.403E+003	7.223E+003	1.839E+004	9.075E+001	1.318E+003	1.167E+003	5.267E+005
4.432E+002	4.591E+002	1.115E+004	7.223E+003	1.609E+004	7.000E+000	1.318E+003	9.338E+002	4.493E+005
4.432E+002	4.372E+002	1.228E+004	7.223E+003	1.379E+004	1.575E+001	1.318E+003	7.004E+002	5.585E+005
4.432E+002	4.153E+002	3.992E+004	7.223E+003	1.149E+004	3.340E+003	1.318E+003	4.669E+002	9.412E+005
4.432E+002	3.935E+002	4.304E+004	7.223E+003	9.196E+003	1.400E+001	1.318E+003	2.335E+002	2.268E+006
4.432E+002	3.716E+002	1.170E+005	7.223E+003	6.897E+003	2.913E+003	1.318E+003	0.000E+000	3.593E+006
4.432E+002	3.498E+002	1.347E+005	7.223E+003	4.598E+003	1.410E+002	1.049E+003	6.537E+003	1.042E+000
4.432E+002	3.279E+002	2.719E+005	7.223E+003	2.299E+003	7.860E+004	1.049E+003	5.369E+003	4.780E+003
4.432E+002	3.060E+002	4.340E+005	7.223E+003	0.000E+000	3.845E+005	1.049E+003	4.903E+003	2.507E+003
4.432E+002	2.842E+002	5.618E+005	4.652E+003	5.977E+004	1.750E+000	1.049E+003	4.669E+003	1.867E+004
4.432E+002	2.623E+002	9.775E+005	4.652E+003	4.828E+004	1.750E+000	1.049E+003	4.436E+003	8.844E+003
4.432E+002	2.405E+002	1.610E+006	4.652E+003	4.368E+004	5.250E+000	1.049E+003	4.202E+003	6.230E+003
4.432E+002	2.186E+002	2.210E+006	4.652E+003	4.138E+004	3.500E+000	1.049E+003	3.969E+003	2.462E+004
4.432E+002	1.967E+002	3.444E+006	4.652E+003	3.908E+004	5.250E+000	1.049E+003	3.735E+003	3.519E+004
4.432E+002	1.749E+002	4.851E+006	4.652E+003	3.678E+004	8.025E+001	1.049E+003	3.502E+003	1.194E+005
4.432E+002	1.530E+002	6.930E+006	4.652E+003	3.448E+004	7.008E+001	1.049E+003	3.268E+003	1.146E+005
4.432E+002	1.312E+002	9.390E+006	4.652E+003	3.218E+004	7.183E+001	1.049E+003	3.035E+003	2.208E+005
4.432E+002	1.093E+002	1.122E+007	4.652E+003	2.988E+004	3.592E+001	1.049E+003	2.801E+003	2.281E+005
4.432E+002	8.744E+001	1.244E+007	4.652E+003	2.759E+004	1.050E+001	1.049E+003	2.568E+003	2.407E+005
4.432E+002	6.558E+001	1.232E+007	4.652E+003	2.529E+004	9.992E+001	1.049E+003	2.335E+003	5.540E+005
4.432E+002	4.372E+001	1.335E+007	4.652E+003	2.299E+004	1.861E+002	1.049E+003	2.101E+003	4.146E+005
4.432E+002	2.186E+001	2.751E+007	4.652E+003	2.069E+004	8.512E+002	1.049E+003	1.868E+003	9.070E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
4.432E+002	0.000E+000	3.916E+007	4.652E+003	1.839E+004	7.807E+002	1.049E+003	1.634E+003	9.083E+005
4.168E+002	6.121E+002	6.366E+003	4.652E+003	1.609E+004	1.729E+002	1.049E+003	1.401E+003	8.610E+005
4.168E+002	5.902E+002	3.183E+003	4.652E+003	1.379E+004	3.553E+003	1.049E+003	1.167E+003	1.046E+006
4.168E+002	5.684E+002	9.548E+003	4.652E+003	1.149E+004	1.298E+004	1.049E+003	9.338E+002	7.891E+005
4.168E+002	4.809E+002	4.026E+004	4.652E+003	9.196E+003	7.870E+003	1.049E+003	7.004E+002	8.281E+005
4.168E+002	4.591E+002	4.401E+004	4.652E+003	6.897E+003	1.982E+004	1.049E+003	4.669E+002	1.810E+006
4.168E+002	4.372E+002	9.283E+004	4.652E+003	4.598E+003	1.881E+004	1.049E+003	2.335E+002	4.296E+006
4.168E+002	4.153E+002	7.988E+004	4.652E+003	2.299E+003	7.598E+004	1.049E+003	0.000E+000	6.440E+006
4.168E+002	3.935E+002	1.933E+005	4.652E+003	0.000E+000	4.231E+005	7.795E+002	9.105E+003	5.035E+002
4.168E+002	3.716E+002	3.378E+005	2.082E+003	5.057E+004	1.750E+000	7.795E+002	8.638E+003	5.035E+002
4.168E+002	3.498E+002	3.743E+005	2.082E+003	4.368E+004	1.750E+000	7.795E+002	7.237E+003	1.210E+003
4.168E+002	3.279E+002	7.358E+005	2.082E+003	4.138E+004	1.750E+000	7.795E+002	6.537E+003	1.750E+000
4.168E+002	3.060E+002	9.427E+005	2.082E+003	3.908E+004	1.039E+002	7.795E+002	6.303E+003	5.035E+002
4.168E+002	2.842E+002	1.328E+006	2.082E+003	3.678E+004	3.417E+001	7.795E+002	6.070E+003	1.007E+003
4.168E+002	2.623E+002	1.476E+006	2.082E+003	3.448E+004	5.250E+000	7.795E+002	5.603E+003	9.683E+001
4.168E+002	2.405E+002	2.481E+006	2.082E+003	3.218E+004	4.117E+001	7.795E+002	5.369E+003	2.421E+003
4.168E+002	2.186E+002	3.404E+006	2.082E+003	2.988E+004	1.018E+002	7.795E+002	5.136E+003	1.917E+004
4.168E+002	1.967E+002	5.234E+006	2.082E+003	2.759E+004	5.250E+000	7.795E+002	4.903E+003	2.599E+003
4.168E+002	1.749E+002	6.867E+006	2.082E+003	2.529E+004	1.750E+001	7.795E+002	4.669E+003	7.642E+004
4.168E+002	1.530E+002	9.775E+006	2.082E+003	2.299E+004	1.400E+001	7.795E+002	4.436E+003	3.922E+004
4.168E+002	1.312E+002	1.231E+007	2.082E+003	2.069E+004	2.618E+002	7.795E+002	4.202E+003	6.808E+004
4.168E+002	1.093E+002	1.489E+007	2.082E+003	1.839E+004	5.674E+003	7.795E+002	3.969E+003	6.818E+004
4.168E+002	8.744E+001	1.541E+007	2.082E+003	1.609E+004	4.416E+003	7.795E+002	3.735E+003	6.999E+004
4.168E+002	6.558E+001	1.584E+007	2.082E+003	1.379E+004	4.972E+003	7.795E+002	3.502E+003	6.892E+004
4.168E+002	4.372E+001	1.792E+007	2.082E+003	1.149E+004	7.088E+003	7.795E+002	3.268E+003	1.815E+005
4.168E+002	2.186E+001	3.269E+007	2.082E+003	9.196E+003	7.515E+003	7.795E+002	3.035E+003	2.970E+005
4.168E+002	0.000E+000	4.767E+007	2.082E+003	6.897E+003	4.373E+004	7.795E+002	2.801E+003	2.914E+005
3.903E+002	8.088E+002	5.035E+002	2.082E+003	4.598E+003	3.189E+005	7.795E+002	2.568E+003	5.726E+005
3.903E+002	7.433E+002	1.029E+003	2.082E+003	2.299E+003	1.436E+006	7.795E+002	2.335E+003	7.759E+005
3.903E+002	6.777E+002	1.029E+003	2.082E+003	0.000E+000	1.971E+007	7.795E+002	2.101E+003	9.944E+005
3.903E+002	6.558E+002	3.183E+003	-4.891E+002	1.149E+005	1.750E+000	7.795E+002	1.868E+003	1.131E+006
3.903E+002	6.340E+002	3.183E+003	-4.891E+002	1.126E+005	1.750E+000	7.795E+002	1.634E+003	1.342E+006
3.903E+002	6.121E+002	6.991E+003	-4.891E+002	5.057E+004	3.333E+001	7.795E+002	1.401E+003	1.457E+006
3.903E+002	5.902E+002	3.183E+003	-4.891E+002	4.828E+004	3.333E+001	7.795E+002	1.167E+003	1.915E+006
3.903E+002	5.684E+002	9.548E+003	-4.891E+002	4.368E+004	1.750E+000	7.795E+002	9.338E+002	1.778E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.903E+002	5.465E+002	2.232E+004	-4.891E+002	4.138E+004	3.129E+001	7.795E+002	7.004E+002	1.989E+006
3.903E+002	5.246E+002	4.669E+004	-4.891E+002	3.908E+004	1.750E+000	7.795E+002	4.669E+002	2.732E+006
3.903E+002	5.028E+002	4.444E+004	-4.891E+002	3.678E+004	3.500E+000	7.795E+002	2.335E+002	6.416E+006
3.903E+002	4.809E+002	3.406E+004	-4.891E+002	3.448E+004	3.242E+001	7.795E+002	0.000E+000	1.199E+007
3.903E+002	4.591E+002	1.134E+005	-4.891E+002	3.218E+004	3.192E+001	5.100E+002	8.404E+003	3.333E+001
3.903E+002	4.372E+002	9.523E+004	-4.891E+002	2.988E+004	3.500E+000	5.100E+002	7.704E+003	1.042E+000
3.903E+002	4.153E+002	1.525E+005	-4.891E+002	2.759E+004	3.375E+003	5.100E+002	7.471E+003	5.000E+000
3.903E+002	3.935E+002	2.042E+005	-4.891E+002	2.529E+004	7.717E+001	5.100E+002	6.770E+003	8.524E+002
3.903E+002	3.716E+002	1.956E+005	-4.891E+002	2.299E+004	4.625E+001	5.100E+002	6.303E+003	1.810E+002
3.903E+002	3.498E+002	3.503E+005	-4.891E+002	2.069E+004	4.263E+003	5.100E+002	6.070E+003	1.188E+003
3.903E+002	3.279E+002	4.456E+005	-4.891E+002	1.839E+004	1.019E+004	5.100E+002	5.836E+003	9.636E+003
3.903E+002	3.060E+002	5.251E+005	-4.891E+002	1.609E+004	2.602E+003	5.100E+002	5.603E+003	1.046E+004
3.903E+002	2.842E+002	8.232E+005	-4.891E+002	1.379E+004	2.313E+003	5.100E+002	5.369E+003	1.282E+004
3.903E+002	2.623E+002	1.181E+006	-4.891E+002	1.149E+004	8.402E+003	5.100E+002	5.136E+003	3.127E+004
3.903E+002	2.405E+002	1.597E+006	-4.891E+002	9.196E+003	2.143E+004	5.100E+002	4.903E+003	2.950E+004
3.903E+002	2.186E+002	2.471E+006	-4.891E+002	6.897E+003	5.655E+004	5.100E+002	4.669E+003	2.565E+004
3.903E+002	1.967E+002	3.349E+006	-4.891E+002	4.598E+003	3.212E+005	5.100E+002	4.436E+003	6.366E+004
3.903E+002	1.749E+002	5.048E+006	-4.891E+002	2.299E+003	5.349E+005	5.100E+002	4.202E+003	5.762E+004
3.903E+002	1.530E+002	6.990E+006	-4.891E+002	0.000E+000	3.021E+006	5.100E+002	3.969E+003	1.667E+005
3.903E+002	1.312E+002	9.602E+006	-3.060E+003	4.828E+004	6.250E-001	5.100E+002	3.735E+003	1.729E+005
3.903E+002	1.093E+002	1.103E+007	-3.060E+003	4.368E+004	3.813E+001	5.100E+002	3.502E+003	2.689E+005
3.903E+002	8.744E+001	1.216E+007	-3.060E+003	4.138E+004	1.375E+001	5.100E+002	3.268E+003	3.390E+005
3.903E+002	6.558E+001	1.242E+007	-3.060E+003	3.908E+004	6.250E+000	5.100E+002	3.035E+003	4.957E+005
3.903E+002	4.372E+001	1.371E+007	-3.060E+003	3.678E+004	1.875E+001	5.100E+002	2.801E+003	5.663E+005
3.903E+002	2.186E+001	2.783E+007	-3.060E+003	3.448E+004	2.500E+000	5.100E+002	2.568E+003	7.760E+005
3.903E+002	0.000E+000	4.259E+007	-3.060E+003	3.218E+004	1.875E+000	5.100E+002	2.335E+003	1.031E+006
3.639E+002	8.526E+002	5.035E+002	-3.060E+003	2.988E+004	6.684E+003	5.100E+002	2.101E+003	1.435E+006
3.639E+002	7.433E+002	1.029E+003	-3.060E+003	2.759E+004	8.875E+001	5.100E+002	1.868E+003	1.614E+006
3.639E+002	6.995E+002	3.808E+003	-3.060E+003	2.529E+004	3.523E+003	5.100E+002	1.634E+003	1.937E+006
3.639E+002	6.777E+002	5.866E+003	-3.060E+003	2.299E+004	6.136E+003	5.100E+002	1.401E+003	2.250E+006
3.639E+002	6.558E+002	2.058E+003	-3.060E+003	2.069E+004	3.618E+003	5.100E+002	1.167E+003	3.234E+006
3.639E+002	6.340E+002	1.904E+003	-3.060E+003	1.839E+004	5.035E+002	5.100E+002	9.338E+002	3.268E+006
3.639E+002	6.121E+002	2.911E+003	-3.060E+003	1.609E+004	3.827E+002	5.100E+002	7.004E+002	3.372E+006
3.639E+002	5.902E+002	1.244E+004	-3.060E+003	1.379E+004	5.763E+003	5.100E+002	4.669E+002	4.537E+006
3.639E+002	5.684E+002	3.256E+004	-3.060E+003	1.149E+004	6.804E+003	5.100E+002	2.335E+002	1.062E+007

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.639E+002	5.465E+002	4.246E+004	-3.060E+003	9.196E+003	1.525E+004	5.100E+002	0.000E+000	1.783E+007
3.639E+002	5.246E+002	3.984E+004	-3.060E+003	6.897E+003	8.626E+004	2.406E+002	1.004E+004	2.238E+002
3.639E+002	5.028E+002	4.186E+004	-3.060E+003	4.598E+003	5.979E+005	2.406E+002	9.338E+003	9.050E+001
3.639E+002	4.809E+002	6.898E+004	-3.060E+003	2.299E+003	1.468E+006	2.406E+002	8.871E+003	5.035E+002
3.639E+002	4.591E+002	1.324E+005	-3.060E+003	0.000E+000	7.242E+006	2.406E+002	8.638E+003	9.050E+001
3.639E+002	4.372E+002	1.175E+005	-5.630E+003	5.977E+004	3.333E+001	2.406E+002	7.937E+003	9.050E+001
3.639E+002	4.153E+002	1.560E+005	-5.630E+003	5.057E+004	1.375E+001	2.406E+002	7.471E+003	4.476E+002
3.639E+002	3.935E+002	1.654E+005	-5.630E+003	4.828E+004	3.458E+001	2.406E+002	7.237E+003	4.048E+002
3.639E+002	3.716E+002	3.052E+005	-5.630E+003	4.598E+004	1.875E+000	2.406E+002	7.004E+003	5.111E+003
3.639E+002	3.498E+002	3.122E+005	-5.630E+003	4.368E+004	3.521E+001	2.406E+002	6.770E+003	4.072E+003
3.639E+002	3.279E+002	3.973E+005	-5.630E+003	4.138E+004	7.521E+001	2.406E+002	6.537E+003	4.763E+003
3.639E+002	3.060E+002	5.465E+005	-5.630E+003	3.908E+004	1.540E+002	2.406E+002	6.303E+003	4.526E+002
3.639E+002	2.842E+002	7.025E+005	-5.630E+003	3.678E+004	8.375E+001	2.406E+002	6.070E+003	5.536E+003
3.639E+002	2.623E+002	8.934E+005	-5.630E+003	3.448E+004	2.738E+002	2.406E+002	5.836E+003	1.656E+004
3.639E+002	2.405E+002	1.320E+006	-5.630E+003	3.218E+004	6.600E+002	2.406E+002	5.603E+003	4.909E+004
3.639E+002	2.186E+002	1.853E+006	-5.630E+003	2.988E+004	3.538E+002	2.406E+002	5.369E+003	5.633E+004
3.639E+002	1.967E+002	2.633E+006	-5.630E+003	2.759E+004	5.525E+002	2.406E+002	5.136E+003	2.361E+004
3.639E+002	1.749E+002	3.306E+006	-5.630E+003	2.529E+004	4.497E+003	2.406E+002	4.903E+003	5.049E+004
3.639E+002	1.530E+002	5.374E+006	-5.630E+003	2.299E+004	1.106E+004	2.406E+002	4.669E+003	1.280E+005
3.639E+002	1.312E+002	6.492E+006	-5.630E+003	2.069E+004	4.593E+003	2.406E+002	4.436E+003	9.422E+004
3.639E+002	1.093E+002	8.046E+006	-5.630E+003	1.839E+004	8.524E+003	2.406E+002	4.202E+003	1.641E+005
3.639E+002	8.744E+001	8.634E+006	-5.630E+003	1.609E+004	7.298E+003	2.406E+002	3.969E+003	2.273E+005
3.639E+002	6.558E+001	9.438E+006	-5.630E+003	1.379E+004	6.525E+003	2.406E+002	3.735E+003	2.776E+005
3.639E+002	4.372E+001	1.015E+007	-5.630E+003	1.149E+004	1.401E+004	2.406E+002	3.502E+003	4.596E+005
3.639E+002	2.186E+001	2.029E+007	-5.630E+003	9.196E+003	3.689E+004	2.406E+002	3.268E+003	3.858E+005
3.639E+002	0.000E+000	3.202E+007	-5.630E+003	6.897E+003	1.963E+005	2.406E+002	3.035E+003	6.513E+005
3.375E+002	8.744E+002	1.029E+003	-5.630E+003	4.598E+003	1.398E+006	2.406E+002	2.801E+003	8.641E+005
3.375E+002	8.088E+002	5.035E+002	-5.630E+003	2.299E+003	3.622E+006	2.406E+002	2.568E+003	1.188E+006
3.375E+002	7.870E+002	5.035E+002	-5.630E+003	0.000E+000	1.557E+007	2.406E+002	2.335E+003	1.673E+006
3.375E+002	7.651E+002	3.065E+003	-8.201E+003	1.057E+005	5.208E+000	2.406E+002	2.101E+003	1.900E+006
3.375E+002	7.214E+002	1.476E+003	-8.201E+003	1.012E+005	1.042E+001	2.406E+002	1.868E+003	2.990E+006
3.375E+002	6.995E+002	3.288E+003	-8.201E+003	9.196E+004	1.750E+000	2.406E+002	1.634E+003	3.618E+006
3.375E+002	6.777E+002	4.969E+003	-8.201E+003	8.506E+004	1.750E+000	2.406E+002	1.401E+003	3.810E+006
3.375E+002	6.558E+002	9.127E+003	-8.201E+003	5.517E+004	4.075E+000	2.406E+002	1.167E+003	4.649E+006
3.375E+002	6.340E+002	1.270E+004	-8.201E+003	5.287E+004	3.458E+001	2.406E+002	9.338E+002	4.855E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.375E+002	6.121E+002	8.755E+003	-8.201E+003	5.057E+004	4.878E+001	2.406E+002	7.004E+002	5.354E+006
3.375E+002	5.902E+002	1.137E+004	-8.201E+003	4.828E+004	3.803E+001	2.406E+002	4.669E+002	6.806E+006
3.375E+002	5.684E+002	1.693E+004	-8.201E+003	4.598E+004	6.575E+000	2.406E+002	2.335E+002	1.429E+007
3.375E+002	5.465E+002	3.483E+004	-8.201E+003	4.368E+004	1.681E+002	2.406E+002	0.000E+000	2.728E+007
3.375E+002	5.246E+002	3.497E+004	-8.201E+003	4.138E+004	9.500E+001	-2.883E+001	1.074E+004	5.035E+002
3.375E+002	5.028E+002	4.207E+004	-8.201E+003	3.908E+004	1.750E+002	-2.883E+001	9.805E+003	5.035E+002
3.375E+002	4.809E+002	1.053E+005	-8.201E+003	3.678E+004	2.248E+002	-2.883E+001	9.572E+003	4.048E+002
3.375E+002	4.591E+002	1.500E+005	-8.201E+003	3.448E+004	3.736E+002	-2.883E+001	9.105E+003	3.333E+001
3.375E+002	4.372E+002	1.948E+005	-8.201E+003	3.218E+004	2.844E+002	-2.883E+001	8.638E+003	2.729E+003
3.375E+002	4.153E+002	1.783E+005	-8.201E+003	2.988E+004	2.914E+002	-2.883E+001	8.404E+003	5.271E+003
3.375E+002	3.935E+002	2.374E+005	-8.201E+003	2.759E+004	5.965E+002	-2.883E+001	8.171E+003	3.474E+003
3.375E+002	3.716E+002	2.932E+005	-8.201E+003	2.529E+004	1.070E+003	-2.883E+001	7.937E+003	4.529E+003
3.375E+002	3.498E+002	3.450E+005	-8.201E+003	2.299E+004	1.576E+003	-2.883E+001	7.704E+003	1.272E+004
3.375E+002	3.279E+002	3.952E+005	-8.201E+003	2.069E+004	5.620E+003	-2.883E+001	7.471E+003	1.822E+004
3.375E+002	3.060E+002	5.846E+005	-8.201E+003	1.839E+004	8.645E+003	-2.883E+001	7.237E+003	7.886E+003
3.375E+002	2.842E+002	7.930E+005	-8.201E+003	1.609E+004	1.796E+004	-2.883E+001	7.004E+003	2.461E+004
3.375E+002	2.623E+002	9.880E+005	-8.201E+003	1.379E+004	1.456E+004	-2.883E+001	6.770E+003	2.567E+004
3.375E+002	2.405E+002	1.358E+006	-8.201E+003	1.149E+004	1.913E+004	-2.883E+001	6.537E+003	3.773E+004
3.375E+002	2.186E+002	1.755E+006	-8.201E+003	9.196E+003	6.503E+004	-2.883E+001	6.303E+003	3.888E+004
3.375E+002	1.967E+002	2.538E+006	-8.201E+003	6.897E+003	2.287E+005	-2.883E+001	6.070E+003	6.913E+004
3.375E+002	1.749E+002	3.109E+006	-8.201E+003	4.598E+003	1.432E+006	-2.883E+001	5.836E+003	6.946E+004
3.375E+002	1.530E+002	4.233E+006	-8.201E+003	2.299E+003	4.158E+006	-2.883E+001	5.603E+003	7.857E+004
3.375E+002	1.312E+002	5.928E+006	-8.201E+003	0.000E+000	1.779E+007	-2.883E+001	5.369E+003	9.816E+004
3.375E+002	1.093E+002	7.078E+006	-1.077E+004	1.080E+005	1.750E+000	-2.883E+001	5.136E+003	1.208E+005
3.375E+002	8.744E+001	8.011E+006	-1.077E+004	1.034E+005	1.042E+001	-2.883E+001	4.903E+003	1.749E+005
3.375E+002	6.558E+001	9.152E+006	-1.077E+004	1.012E+005	5.208E+000	-2.883E+001	4.669E+003	2.004E+005
3.375E+002	4.372E+001	8.837E+006	-1.077E+004	9.885E+004	1.750E+000	-2.883E+001	4.436E+003	2.496E+005
3.375E+002	2.186E+001	1.502E+007	-1.077E+004	9.655E+004	5.208E+000	-2.883E+001	4.202E+003	2.498E+005
3.375E+002	0.000E+000	2.590E+007	-1.077E+004	9.425E+004	1.392E+001	-2.883E+001	3.969E+003	5.024E+005
3.111E+002	7.870E+002	2.058E+003	-1.077E+004	8.966E+004	1.750E+000	-2.883E+001	3.735E+003	5.196E+005
3.111E+002	7.651E+002	2.838E+002	-1.077E+004	8.506E+004	1.750E+000	-2.883E+001	3.502E+003	6.730E+005
3.111E+002	7.433E+002	1.127E+003	-1.077E+004	6.207E+004	1.250E+000	-2.883E+001	3.268E+003	8.796E+005
3.111E+002	7.214E+002	3.267E+003	-1.077E+004	5.977E+004	6.250E-001	-2.883E+001	3.035E+003	9.854E+005
3.111E+002	6.995E+002	2.049E+003	-1.077E+004	5.747E+004	6.250E-001	-2.883E+001	2.801E+003	1.240E+006
3.111E+002	6.777E+002	5.470E+003	-1.077E+004	5.517E+004	4.148E+001	-2.883E+001	2.568E+003	1.574E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
3.111E+002	6.558E+002	5.493E+003	-1.077E+004	5.287E+004	4.708E+001	-2.883E+001	2.335E+003	1.902E+006
3.111E+002	6.340E+002	6.767E+003	-1.077E+004	5.057E+004	1.141E+002	-2.883E+001	2.101E+003	2.054E+006
3.111E+002	6.121E+002	2.221E+004	-1.077E+004	4.828E+004	5.496E+001	-2.883E+001	1.868E+003	3.058E+006
3.111E+002	5.902E+002	1.590E+004	-1.077E+004	4.598E+004	4.273E+001	-2.883E+001	1.634E+003	3.658E+006
3.111E+002	5.684E+002	3.254E+004	-1.077E+004	4.368E+004	8.648E+001	-2.883E+001	1.401E+003	4.792E+006
3.111E+002	5.465E+002	3.637E+004	-1.077E+004	4.138E+004	1.042E+002	-2.883E+001	1.167E+003	5.315E+006
3.111E+002	5.246E+002	5.373E+004	-1.077E+004	3.908E+004	4.477E+002	-2.883E+001	9.338E+002	5.840E+006
3.111E+002	5.028E+002	6.831E+004	-1.077E+004	3.678E+004	3.301E+002	-2.883E+001	7.004E+002	6.125E+006
3.111E+002	4.809E+002	9.314E+004	-1.077E+004	3.448E+004	2.907E+002	-2.883E+001	4.669E+002	9.009E+006
3.111E+002	4.591E+002	1.358E+005	-1.077E+004	3.218E+004	7.970E+002	-2.883E+001	2.335E+002	1.992E+007
3.111E+002	4.372E+002	1.358E+005	-1.077E+004	2.988E+004	8.135E+002	-2.883E+001	0.000E+000	6.853E+007
3.111E+002	4.153E+002	1.873E+005	-1.077E+004	2.759E+004	1.296E+003	-2.983E+002	1.097E+004	2.238E+002
3.111E+002	3.935E+002	2.260E+005	-1.077E+004	2.529E+004	9.502E+002	-2.983E+002	1.050E+004	9.050E+001
3.111E+002	3.716E+002	2.769E+005	-1.077E+004	2.299E+004	8.076E+003	-2.983E+002	1.027E+004	5.035E+002
3.111E+002	3.498E+002	3.981E+005	-1.077E+004	2.069E+004	1.411E+004	-2.983E+002	1.004E+004	7.273E+002
3.111E+002	3.279E+002	4.031E+005	-1.077E+004	1.839E+004	2.072E+004	-2.983E+002	9.805E+003	9.511E+002
3.111E+002	3.060E+002	5.402E+005	-1.077E+004	1.609E+004	1.540E+004	-2.983E+002	9.572E+003	9.050E+001
3.111E+002	2.842E+002	6.908E+005	-1.077E+004	1.379E+004	1.833E+004	-2.983E+002	9.338E+003	1.029E+003
3.111E+002	2.623E+002	8.254E+005	-1.077E+004	1.149E+004	8.501E+003	-2.983E+002	9.105E+003	4.878E+003
3.111E+002	2.405E+002	1.110E+006	-1.077E+004	9.196E+003	5.117E+004	-2.983E+002	8.871E+003	2.598E+003
3.111E+002	2.186E+002	1.638E+006	-1.077E+004	6.897E+003	3.916E+005	-2.983E+002	8.638E+003	2.260E+003
3.111E+002	1.967E+002	2.052E+006	-1.077E+004	4.598E+003	2.038E+006	-2.983E+002	8.404E+003	1.437E+004
3.111E+002	1.749E+002	2.779E+006	-1.077E+004	2.299E+003	5.269E+006	-2.983E+002	8.171E+003	1.904E+003
3.111E+002	1.530E+002	3.609E+006	-1.077E+004	0.000E+000	2.174E+007	-2.983E+002	7.937E+003	1.706E+004
3.111E+002	1.312E+002	5.015E+006	-1.334E+004	9.885E+004	1.392E+001	-2.983E+002	7.704E+003	1.117E+004
3.111E+002	1.093E+002	6.350E+006	-1.334E+004	9.655E+004	6.958E+000	-2.983E+002	7.471E+003	5.363E+004
3.111E+002	8.744E+001	7.679E+006	-1.334E+004	9.425E+004	1.392E+001	-2.983E+002	7.237E+003	7.339E+004
3.111E+002	6.558E+001	7.942E+006	-1.334E+004	9.196E+004	5.208E+000	-2.983E+002	7.004E+003	5.006E+004
3.111E+002	4.372E+001	8.379E+006	-1.334E+004	8.966E+004	6.958E+000	-2.983E+002	6.770E+003	9.087E+004
3.111E+002	2.186E+001	1.247E+007	-1.334E+004	8.736E+004	5.250E+000	-2.983E+002	6.537E+003	9.561E+004
3.111E+002	0.000E+000	2.286E+007	-1.334E+004	8.276E+004	1.750E+000	-2.983E+002	6.303E+003	4.924E+004
2.847E+002	8.526E+002	2.238E+002	-1.334E+004	7.816E+004	1.750E+000	-2.983E+002	6.070E+003	6.196E+004
2.847E+002	7.870E+002	5.201E+002	-1.334E+004	6.897E+004	3.750E+001	-2.983E+002	5.836E+003	1.068E+005
2.847E+002	7.651E+002	1.007E+003	-1.334E+004	6.437E+004	1.042E+000	-2.983E+002	5.603E+003	1.167E+005
2.847E+002	7.433E+002	1.247E+003	-1.334E+004	6.207E+004	2.943E+001	-2.983E+002	5.369E+003	1.904E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.847E+002	7.214E+002	5.217E+003	-1.334E+004	5.977E+004	1.410E+001	-2.983E+002	5.136E+003	1.902E+005
2.847E+002	6.995E+002	4.570E+003	-1.334E+004	5.747E+004	4.556E+001	-2.983E+002	4.903E+003	2.369E+005
2.847E+002	6.777E+002	5.136E+003	-1.334E+004	5.517E+004	2.038E+001	-2.983E+002	4.669E+003	2.159E+005
2.847E+002	6.558E+002	4.287E+003	-1.334E+004	5.287E+004	9.966E+001	-2.983E+002	4.436E+003	3.441E+005
2.847E+002	6.340E+002	1.142E+004	-1.334E+004	5.057E+004	1.818E+001	-2.983E+002	4.202E+003	3.964E+005
2.847E+002	6.121E+002	9.864E+003	-1.334E+004	4.828E+004	1.240E+002	-2.983E+002	3.969E+003	5.502E+005
2.847E+002	5.902E+002	1.211E+004	-1.334E+004	4.598E+004	2.889E+002	-2.983E+002	3.735E+003	5.858E+005
2.847E+002	5.684E+002	2.216E+004	-1.334E+004	4.368E+004	2.674E+002	-2.983E+002	3.502E+003	7.343E+005
2.847E+002	5.465E+002	2.942E+004	-1.334E+004	4.138E+004	4.799E+002	-2.983E+002	3.268E+003	8.888E+005
2.847E+002	5.246E+002	3.327E+004	-1.334E+004	3.908E+004	5.310E+002	-2.983E+002	3.035E+003	1.313E+006
2.847E+002	5.028E+002	2.547E+004	-1.334E+004	3.678E+004	9.937E+002	-2.983E+002	2.801E+003	1.445E+006
2.847E+002	4.809E+002	5.568E+004	-1.334E+004	3.448E+004	1.078E+003	-2.983E+002	2.568E+003	1.801E+006
2.847E+002	4.591E+002	6.908E+004	-1.334E+004	3.218E+004	1.961E+003	-2.983E+002	2.335E+003	2.208E+006
2.847E+002	4.372E+002	8.665E+004	-1.334E+004	2.988E+004	2.050E+003	-2.983E+002	2.101E+003	2.424E+006
2.847E+002	4.153E+002	1.160E+005	-1.334E+004	2.759E+004	7.998E+003	-2.983E+002	1.868E+003	3.184E+006
2.847E+002	3.935E+002	1.324E+005	-1.334E+004	2.529E+004	1.873E+003	-2.983E+002	1.634E+003	3.868E+006
2.847E+002	3.716E+002	2.061E+005	-1.334E+004	2.299E+004	1.580E+004	-2.983E+002	1.401E+003	4.225E+006
2.847E+002	3.498E+002	2.175E+005	-1.334E+004	2.069E+004	1.499E+004	-2.983E+002	1.167E+003	4.871E+006
2.847E+002	3.279E+002	2.655E+005	-1.334E+004	1.839E+004	2.150E+004	-2.983E+002	9.338E+002	6.051E+006
2.847E+002	3.060E+002	3.482E+005	-1.334E+004	1.609E+004	3.993E+004	-2.983E+002	7.004E+002	5.987E+006
2.847E+002	2.842E+002	4.384E+005	-1.334E+004	1.379E+004	9.192E+003	-2.983E+002	4.669E+002	8.151E+006
2.847E+002	2.623E+002	5.416E+005	-1.334E+004	1.149E+004	3.523E+004	-2.983E+002	2.335E+002	1.778E+007
2.847E+002	2.405E+002	7.392E+005	-1.334E+004	9.196E+003	1.549E+004	-2.983E+002	0.000E+000	2.651E+007
2.847E+002	2.186E+002	8.790E+005	-1.334E+004	6.897E+003	1.883E+005	-5.677E+002	1.027E+004	9.050E+001
2.847E+002	1.967E+002	1.176E+006	-1.334E+004	4.598E+003	2.197E+006	-5.677E+002	1.004E+004	1.810E+002
2.847E+002	1.749E+002	2.050E+006	-1.334E+004	2.299E+003	5.985E+006	-5.677E+002	9.805E+003	1.029E+003
2.847E+002	1.530E+002	2.576E+006	-1.334E+004	0.000E+000	2.116E+007	-5.677E+002	9.572E+003	7.273E+002
2.847E+002	1.312E+002	4.264E+006	-1.591E+004	9.885E+004	5.208E+000	-5.677E+002	9.338E+003	9.868E+002
2.847E+002	1.093E+002	5.298E+006	-1.591E+004	9.655E+004	1.750E+000	-5.677E+002	9.105E+003	7.273E+002
2.847E+002	8.744E+001	6.900E+006	-1.591E+004	9.425E+004	2.258E+001	-5.677E+002	8.871E+003	3.749E+003
2.847E+002	6.558E+001	8.121E+006	-1.591E+004	9.196E+004	3.500E+000	-5.677E+002	8.638E+003	5.667E+003
2.847E+002	4.372E+001	8.487E+006	-1.591E+004	8.966E+004	7.000E+000	-5.677E+002	8.404E+003	1.058E+004
2.847E+002	2.186E+001	1.099E+007	-1.591E+004	8.736E+004	8.750E+000	-5.677E+002	8.171E+003	1.476E+004
2.847E+002	0.000E+000	2.112E+007	-1.591E+004	8.506E+004	1.750E+000	-5.677E+002	7.937E+003	2.102E+004
2.583E+002	8.088E+002	3.143E+002	-1.591E+004	8.276E+004	1.750E+000	-5.677E+002	7.704E+003	2.610E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.583E+002	7.870E+002	7.500E+001	-1.591E+004	7.586E+004	6.250E-001	-5.677E+002	7.471E+003	7.595E+004
2.583E+002	7.651E+002	2.238E+002	-1.591E+004	7.127E+004	2.708E+000	-5.677E+002	7.237E+003	5.937E+004
2.583E+002	7.433E+002	1.750E+000	-1.591E+004	6.897E+004	6.575E+000	-5.677E+002	7.004E+003	1.118E+005
2.583E+002	7.214E+002	1.254E+003	-1.591E+004	6.667E+004	1.250E+000	-5.677E+002	6.770E+003	6.481E+004
2.583E+002	6.995E+002	1.816E+002	-1.591E+004	6.437E+004	1.067E+002	-5.677E+002	6.537E+003	1.259E+005
2.583E+002	6.777E+002	1.312E+003	-1.591E+004	6.207E+004	3.583E+001	-5.677E+002	6.303E+003	1.316E+005
2.583E+002	6.558E+002	1.659E+003	-1.591E+004	5.977E+004	9.241E+001	-5.677E+002	6.070E+003	1.806E+005
2.583E+002	6.340E+002	3.902E+003	-1.591E+004	5.747E+004	6.416E+001	-5.677E+002	5.836E+003	1.442E+005
2.583E+002	6.121E+002	4.132E+003	-1.591E+004	5.517E+004	2.032E+001	-5.677E+002	5.603E+003	9.835E+004
2.583E+002	5.902E+002	2.599E+003	-1.591E+004	5.287E+004	1.143E+002	-5.677E+002	5.369E+003	1.321E+005
2.583E+002	5.684E+002	1.032E+004	-1.591E+004	5.057E+004	1.945E+002	-5.677E+002	5.136E+003	2.044E+005
2.583E+002	5.465E+002	8.323E+003	-1.591E+004	4.828E+004	3.683E+002	-5.677E+002	4.903E+003	2.216E+005
2.583E+002	5.246E+002	9.607E+003	-1.591E+004	4.598E+004	2.982E+002	-5.677E+002	4.669E+003	3.502E+005
2.583E+002	5.028E+002	1.471E+004	-1.591E+004	4.368E+004	7.709E+002	-5.677E+002	4.436E+003	2.650E+005
2.583E+002	4.809E+002	2.670E+004	-1.591E+004	4.138E+004	6.684E+002	-5.677E+002	4.202E+003	4.559E+005
2.583E+002	4.591E+002	2.519E+004	-1.591E+004	3.908E+004	1.012E+003	-5.677E+002	3.969E+003	5.597E+005
2.583E+002	4.372E+002	2.970E+004	-1.591E+004	3.678E+004	1.083E+003	-5.677E+002	3.735E+003	6.903E+005
2.583E+002	4.153E+002	3.485E+004	-1.591E+004	3.448E+004	1.100E+003	-5.677E+002	3.502E+003	8.962E+005
2.583E+002	3.935E+002	6.956E+004	-1.591E+004	3.218E+004	1.191E+003	-5.677E+002	3.268E+003	1.086E+006
2.583E+002	3.716E+002	8.396E+004	-1.591E+004	2.988E+004	1.777E+003	-5.677E+002	3.035E+003	1.153E+006
2.583E+002	3.498E+002	1.031E+005	-1.591E+004	2.759E+004	7.741E+003	-5.677E+002	2.801E+003	1.439E+006
2.583E+002	3.279E+002	1.192E+005	-1.591E+004	2.529E+004	2.382E+003	-5.677E+002	2.568E+003	1.739E+006
2.583E+002	3.060E+002	1.756E+005	-1.591E+004	2.299E+004	8.875E+003	-5.677E+002	2.335E+003	2.100E+006
2.583E+002	2.842E+002	2.358E+005	-1.591E+004	2.069E+004	1.841E+003	-5.677E+002	2.101E+003	2.754E+006
2.583E+002	2.623E+002	2.212E+005	-1.591E+004	1.839E+004	9.354E+003	-5.677E+002	1.868E+003	3.062E+006
2.583E+002	2.405E+002	4.048E+005	-1.591E+004	1.609E+004	1.617E+004	-5.677E+002	1.634E+003	3.729E+006
2.583E+002	2.186E+002	6.094E+005	-1.591E+004	1.379E+004	1.530E+004	-5.677E+002	1.401E+003	3.613E+006
2.583E+002	1.967E+002	6.737E+005	-1.591E+004	1.149E+004	1.669E+004	-5.677E+002	1.167E+003	4.199E+006
2.583E+002	1.749E+002	1.087E+006	-1.591E+004	9.196E+003	3.955E+004	-5.677E+002	9.338E+002	4.751E+006
2.583E+002	1.530E+002	1.803E+006	-1.591E+004	6.897E+003	2.995E+005	-5.677E+002	7.004E+002	5.087E+006
2.583E+002	1.312E+002	2.534E+006	-1.591E+004	4.598E+003	2.018E+006	-5.677E+002	4.669E+002	7.378E+006
2.583E+002	1.093E+002	3.496E+006	-1.591E+004	2.299E+003	5.708E+006	-5.677E+002	2.335E+002	1.457E+007
2.583E+002	8.744E+001	5.027E+006	-1.591E+004	0.000E+000	1.626E+007	-5.677E+002	0.000E+000	2.334E+007
2.583E+002	6.558E+001	6.627E+006	-1.848E+004	9.885E+004	5.208E+000	-8.371E+002	1.167E+004	2.238E+002
2.583E+002	4.372E+001	7.810E+006	-1.848E+004	9.655E+004	1.750E+000	-8.371E+002	1.121E+004	2.238E+002

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.583E+002	2.186E+001	9.800E+006	-1.848E+004	9.196E+004	1.750E+000	-8.371E+002	1.074E+004	9.050E+001
2.583E+002	0.000E+000	1.746E+007	-1.848E+004	8.966E+004	3.508E+001	-8.371E+002	1.027E+004	1.042E+000
2.319E+002	8.744E+002	1.750E+000	-1.848E+004	8.736E+004	1.750E+000	-8.371E+002	1.004E+004	2.238E+002
2.319E+002	8.526E+002	1.425E+001	-1.848E+004	8.506E+004	4.379E+001	-8.371E+002	9.805E+003	4.476E+002
2.319E+002	8.307E+002	1.042E+000	-1.848E+004	8.276E+004	3.508E+001	-8.371E+002	9.572E+003	1.810E+002
2.319E+002	7.870E+002	3.417E+000	-1.848E+004	8.046E+004	1.750E+000	-8.371E+002	9.338E+003	3.091E+003
2.319E+002	7.651E+002	2.655E+002	-1.848E+004	7.586E+004	1.354E+001	-8.371E+002	9.105E+003	9.394E+003
2.319E+002	7.433E+002	9.050E+001	-1.848E+004	7.127E+004	6.250E-001	-8.371E+002	8.871E+003	1.996E+003
2.319E+002	7.214E+002	4.086E+002	-1.848E+004	6.897E+004	1.750E+000	-8.371E+002	8.638E+003	2.362E+003
2.319E+002	6.995E+002	7.083E+001	-1.848E+004	6.667E+004	3.333E+001	-8.371E+002	8.404E+003	3.530E+003
2.319E+002	6.777E+002	1.522E+003	-1.848E+004	6.437E+004	8.325E+000	-8.371E+002	8.171E+003	1.776E+004
2.319E+002	6.558E+002	2.502E+002	-1.848E+004	6.207E+004	1.063E+002	-8.371E+002	7.937E+003	1.819E+004
2.319E+002	6.340E+002	1.365E+003	-1.848E+004	5.977E+004	2.020E+002	-8.371E+002	7.704E+003	1.191E+004
2.319E+002	6.121E+002	1.459E+003	-1.848E+004	5.747E+004	1.316E+002	-8.371E+002	7.471E+003	2.359E+004
2.319E+002	5.902E+002	6.237E+002	-1.848E+004	5.517E+004	7.428E+001	-8.371E+002	7.237E+003	3.630E+004
2.319E+002	5.684E+002	2.707E+003	-1.848E+004	5.287E+004	2.128E+002	-8.371E+002	7.004E+003	5.299E+004
2.319E+002	5.465E+002	2.170E+003	-1.848E+004	5.057E+004	1.984E+002	-8.371E+002	6.770E+003	4.922E+004
2.319E+002	5.246E+002	2.818E+003	-1.848E+004	4.828E+004	3.267E+002	-8.371E+002	6.537E+003	6.883E+004
2.319E+002	5.028E+002	3.723E+003	-1.848E+004	4.598E+004	2.980E+002	-8.371E+002	6.303E+003	8.275E+004
2.319E+002	4.809E+002	4.273E+003	-1.848E+004	4.368E+004	3.815E+002	-8.371E+002	6.070E+003	1.467E+005
2.319E+002	4.591E+002	4.977E+003	-1.848E+004	4.138E+004	3.526E+002	-8.371E+002	5.836E+003	1.307E+005
2.319E+002	4.372E+002	6.656E+003	-1.848E+004	3.908E+004	5.294E+002	-8.371E+002	5.603E+003	1.275E+005
2.319E+002	4.153E+002	1.592E+004	-1.848E+004	3.678E+004	6.036E+002	-8.371E+002	5.369E+003	2.398E+005
2.319E+002	3.935E+002	1.732E+004	-1.848E+004	3.448E+004	1.526E+003	-8.371E+002	5.136E+003	2.378E+005
2.319E+002	3.716E+002	1.782E+004	-1.848E+004	3.218E+004	1.158E+003	-8.371E+002	4.903E+003	2.352E+005
2.319E+002	3.498E+002	4.063E+004	-1.848E+004	2.988E+004	1.901E+003	-8.371E+002	4.669E+003	1.966E+005
2.319E+002	3.279E+002	5.521E+004	-1.848E+004	2.759E+004	2.018E+003	-8.371E+002	4.436E+003	2.990E+005
2.319E+002	3.060E+002	8.903E+004	-1.848E+004	2.529E+004	2.047E+003	-8.371E+002	4.202E+003	3.617E+005
2.319E+002	2.842E+002	8.927E+004	-1.848E+004	2.299E+004	2.671E+003	-8.371E+002	3.969E+003	4.775E+005
2.319E+002	2.623E+002	1.442E+005	-1.848E+004	2.069E+004	9.643E+003	-8.371E+002	3.735E+003	4.863E+005
2.319E+002	2.405E+002	1.763E+005	-1.848E+004	1.839E+004	3.470E+003	-8.371E+002	3.502E+003	6.916E+005
2.319E+002	2.186E+002	2.532E+005	-1.848E+004	1.609E+004	9.936E+003	-8.371E+002	3.268E+003	8.170E+005
2.319E+002	1.967E+002	3.585E+005	-1.848E+004	1.379E+004	5.849E+003	-8.371E+002	3.035E+003	1.185E+006
2.319E+002	1.749E+002	4.309E+005	-1.848E+004	1.149E+004	8.799E+003	-8.371E+002	2.801E+003	1.294E+006
2.319E+002	1.530E+002	6.703E+005	-1.848E+004	9.196E+003	6.031E+004	-8.371E+002	2.568E+003	1.616E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.319E+002	1.312E+002	1.138E+006	-1.848E+004	6.897E+003	3.186E+005	-8.371E+002	2.335E+003	2.132E+006
2.319E+002	1.093E+002	1.657E+006	-1.848E+004	4.598E+003	2.037E+006	-8.371E+002	2.101E+003	2.448E+006
2.319E+002	8.744E+001	2.760E+006	-1.848E+004	2.299E+003	8.363E+006	-8.371E+002	1.868E+003	2.515E+006
2.319E+002	6.558E+001	4.754E+006	-1.848E+004	0.000E+000	1.615E+007	-8.371E+002	1.634E+003	3.080E+006
2.319E+002	4.372E+001	6.465E+006	-2.105E+004	9.425E+004	1.750E+000	-8.371E+002	1.401E+003	3.153E+006
2.319E+002	2.186E+001	9.177E+006	-2.105E+004	9.196E+004	6.958E+000	-8.371E+002	1.167E+003	3.343E+006
2.319E+002	0.000E+000	1.536E+007	-2.105E+004	8.966E+004	1.750E+000	-8.371E+002	9.338E+002	3.026E+006
2.054E+002	8.963E+002	1.750E+000	-2.105E+004	8.736E+004	3.500E+000	-8.371E+002	7.004E+002	3.464E+006
2.054E+002	8.744E+002	3.508E+001	-2.105E+004	8.276E+004	3.500E+000	-8.371E+002	4.669E+002	5.551E+006
2.054E+002	8.088E+002	6.292E+000	-2.105E+004	8.046E+004	3.333E+001	-8.371E+002	2.335E+002	1.185E+007
2.054E+002	7.870E+002	2.375E+000	-2.105E+004	7.816E+004	4.208E+001	-8.371E+002	0.000E+000	1.733E+007
2.054E+002	7.651E+002	1.750E+000	-2.105E+004	7.356E+004	1.750E+000	-1.107E+003	1.074E+004	9.050E+001
2.054E+002	7.433E+002	6.292E+000	-2.105E+004	7.127E+004	1.750E+000	-1.107E+003	1.027E+004	2.238E+002
2.054E+002	7.214E+002	2.606E+002	-2.105E+004	6.667E+004	2.083E+000	-1.107E+003	1.004E+004	1.238E+002
2.054E+002	6.995E+002	6.667E+001	-2.105E+004	6.437E+004	6.917E+001	-1.107E+003	9.805E+003	1.042E+000
2.054E+002	6.777E+002	1.810E+002	-2.105E+004	6.207E+004	1.277E+002	-1.107E+003	9.572E+003	2.238E+002
2.054E+002	6.558E+002	3.333E+001	-2.105E+004	5.977E+004	1.800E+002	-1.107E+003	9.105E+003	1.077E+003
2.054E+002	6.340E+002	4.308E+002	-2.105E+004	5.747E+004	1.716E+002	-1.107E+003	8.871E+003	2.954E+003
2.054E+002	6.121E+002	1.346E+002	-2.105E+004	5.517E+004	1.563E+002	-1.107E+003	8.638E+003	4.228E+003
2.054E+002	5.902E+002	5.763E+002	-2.105E+004	5.287E+004	9.404E+001	-1.107E+003	8.404E+003	2.509E+003
2.054E+002	5.684E+002	4.751E+002	-2.105E+004	5.057E+004	2.023E+002	-1.107E+003	8.171E+003	7.079E+002
2.054E+002	5.465E+002	4.572E+002	-2.105E+004	4.828E+004	6.729E+001	-1.107E+003	7.937E+003	1.853E+003
2.054E+002	5.246E+002	6.322E+002	-2.105E+004	4.598E+004	6.716E+002	-1.107E+003	7.704E+003	1.621E+003
2.054E+002	5.028E+002	9.137E+002	-2.105E+004	4.368E+004	6.620E+002	-1.107E+003	7.471E+003	5.950E+003
2.054E+002	4.809E+002	1.630E+003	-2.105E+004	4.138E+004	7.288E+002	-1.107E+003	7.237E+003	9.755E+003
2.054E+002	4.591E+002	1.297E+003	-2.105E+004	3.908E+004	1.361E+003	-1.107E+003	7.004E+003	7.300E+003
2.054E+002	4.372E+002	5.051E+003	-2.105E+004	3.678E+004	5.568E+002	-1.107E+003	6.770E+003	1.717E+004
2.054E+002	4.153E+002	4.535E+003	-2.105E+004	3.448E+004	3.232E+003	-1.107E+003	6.537E+003	1.420E+004
2.054E+002	3.935E+002	8.904E+003	-2.105E+004	3.218E+004	2.170E+003	-1.107E+003	6.303E+003	4.974E+004
2.054E+002	3.716E+002	8.084E+003	-2.105E+004	2.988E+004	3.036E+003	-1.107E+003	6.070E+003	6.857E+004
2.054E+002	3.498E+002	2.126E+004	-2.105E+004	2.759E+004	2.792E+003	-1.107E+003	5.836E+003	8.040E+004
2.054E+002	3.279E+002	1.438E+004	-2.105E+004	2.529E+004	3.263E+003	-1.107E+003	5.603E+003	5.280E+004
2.054E+002	3.060E+002	2.602E+004	-2.105E+004	2.299E+004	2.832E+003	-1.107E+003	5.369E+003	9.837E+004
2.054E+002	2.842E+002	3.680E+004	-2.105E+004	2.069E+004	4.027E+003	-1.107E+003	5.136E+003	1.050E+005
2.054E+002	2.623E+002	5.019E+004	-2.105E+004	1.839E+004	4.809E+003	-1.107E+003	4.903E+003	1.782E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.054E+002	2.405E+002	7.656E+004	-2.105E+004	1.609E+004	5.044E+003	-1.107E+003	4.669E+003	2.117E+005
2.054E+002	2.186E+002	1.124E+005	-2.105E+004	1.379E+004	8.231E+003	-1.107E+003	4.436E+003	1.636E+005
2.054E+002	1.967E+002	1.401E+005	-2.105E+004	1.149E+004	3.941E+004	-1.107E+003	4.202E+003	2.844E+005
2.054E+002	1.749E+002	1.495E+005	-2.105E+004	9.196E+003	8.572E+004	-1.107E+003	3.969E+003	3.447E+005
2.054E+002	1.530E+002	2.853E+005	-2.105E+004	6.897E+003	3.845E+005	-1.107E+003	3.735E+003	5.542E+005
2.054E+002	1.312E+002	5.294E+005	-2.105E+004	4.598E+003	2.284E+006	-1.107E+003	3.502E+003	5.349E+005
2.054E+002	1.093E+002	1.048E+006	-2.105E+004	2.299E+003	7.812E+006	-1.107E+003	3.268E+003	6.857E+005
2.054E+002	8.744E+001	2.636E+006	-2.105E+004	0.000E+000	1.383E+007	-1.107E+003	3.035E+003	9.290E+005
2.054E+002	6.558E+001	4.830E+006	-2.363E+004	8.736E+004	1.750E+000	-1.107E+003	2.801E+003	1.213E+006
2.054E+002	4.372E+001	7.270E+006	-2.363E+004	8.506E+004	1.750E+000	-1.107E+003	2.568E+003	1.414E+006
2.054E+002	2.186E+001	1.050E+007	-2.363E+004	8.276E+004	3.500E+000	-1.107E+003	2.335E+003	1.848E+006
2.054E+002	0.000E+000	1.502E+007	-2.363E+004	8.046E+004	3.500E+000	-1.107E+003	2.101E+003	1.950E+006
1.790E+002	9.619E+002	5.208E+000	-2.363E+004	7.816E+004	1.750E+000	-1.107E+003	1.868E+003	2.294E+006
1.790E+002	9.181E+002	3.500E+000	-2.363E+004	7.586E+004	3.925E+001	-1.107E+003	1.634E+003	2.212E+006
1.790E+002	8.744E+002	1.750E+000	-2.363E+004	7.356E+004	9.750E+001	-1.107E+003	1.401E+003	2.386E+006
1.790E+002	8.526E+002	1.221E+001	-2.363E+004	6.897E+004	1.042E+000	-1.107E+003	1.167E+003	2.561E+006
1.790E+002	8.307E+002	1.221E+001	-2.363E+004	6.667E+004	7.438E+001	-1.107E+003	9.338E+002	2.429E+006
1.790E+002	8.088E+002	7.017E+001	-2.363E+004	6.437E+004	2.113E+002	-1.107E+003	7.004E+002	2.793E+006
1.790E+002	7.870E+002	3.500E+000	-2.363E+004	6.207E+004	1.835E+002	-1.107E+003	4.669E+002	4.434E+006
1.790E+002	7.651E+002	3.758E+001	-2.363E+004	5.977E+004	2.715E+002	-1.107E+003	2.335E+002	8.916E+006
1.790E+002	7.433E+002	3.813E+001	-2.363E+004	5.747E+004	6.525E+002	-1.107E+003	0.000E+000	1.340E+007
1.790E+002	7.214E+002	2.792E+000	-2.363E+004	5.517E+004	3.413E+002	-1.376E+003	1.121E+004	9.050E+001
1.790E+002	6.995E+002	5.000E+000	-2.363E+004	5.287E+004	6.998E+002	-1.376E+003	1.027E+004	1.042E+000
1.790E+002	6.777E+002	2.500E+000	-2.363E+004	5.057E+004	1.139E+003	-1.376E+003	1.004E+004	1.007E+003
1.790E+002	6.558E+002	9.475E+001	-2.363E+004	4.828E+004	1.691E+003	-1.376E+003	9.805E+003	9.050E+001
1.790E+002	6.340E+002	7.908E+001	-2.363E+004	4.598E+004	1.345E+003	-1.376E+003	9.572E+003	9.050E+001
1.790E+002	6.121E+002	9.181E+001	-2.363E+004	4.368E+004	8.268E+002	-1.376E+003	9.105E+003	3.438E+002
1.790E+002	5.902E+002	2.566E+002	-2.363E+004	4.138E+004	1.323E+003	-1.376E+003	8.638E+003	2.849E+002
1.790E+002	5.684E+002	8.767E+001	-2.363E+004	3.908E+004	8.922E+002	-1.376E+003	8.404E+003	6.191E+002
1.790E+002	5.465E+002	2.774E+002	-2.363E+004	3.678E+004	2.116E+003	-1.376E+003	8.171E+003	2.252E+003
1.790E+002	5.246E+002	2.848E+002	-2.363E+004	3.448E+004	2.721E+003	-1.376E+003	7.937E+003	3.156E+003
1.790E+002	5.028E+002	8.106E+002	-2.363E+004	3.218E+004	3.538E+003	-1.376E+003	7.704E+003	1.357E+003
1.790E+002	4.809E+002	4.676E+002	-2.363E+004	2.988E+004	4.018E+003	-1.376E+003	7.471E+003	1.211E+003
1.790E+002	4.591E+002	7.053E+002	-2.363E+004	2.759E+004	1.213E+004	-1.376E+003	7.237E+003	7.972E+002
1.790E+002	4.372E+002	1.405E+003	-2.363E+004	2.529E+004	5.473E+003	-1.376E+003	7.004E+003	1.075E+004

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.790E+002	4.153E+002	1.884E+003	-2.363E+004	2.299E+004	7.517E+003	-1.376E+003	6.770E+003	5.321E+003
1.790E+002	3.935E+002	2.863E+003	-2.363E+004	2.069E+004	4.576E+003	-1.376E+003	6.537E+003	1.025E+004
1.790E+002	3.716E+002	3.624E+003	-2.363E+004	1.839E+004	3.106E+004	-1.376E+003	6.303E+003	2.526E+003
1.790E+002	3.498E+002	6.679E+003	-2.363E+004	1.609E+004	9.342E+003	-1.376E+003	6.070E+003	9.705E+003
1.790E+002	3.279E+002	8.052E+003	-2.363E+004	1.379E+004	3.154E+004	-1.376E+003	5.836E+003	1.002E+004
1.790E+002	3.060E+002	1.973E+004	-2.363E+004	1.149E+004	8.423E+004	-1.376E+003	5.603E+003	2.058E+004
1.790E+002	2.842E+002	1.391E+004	-2.363E+004	9.196E+003	1.083E+005	-1.376E+003	5.369E+003	2.478E+004
1.790E+002	2.623E+002	1.987E+004	-2.363E+004	6.897E+003	4.606E+005	-1.376E+003	5.136E+003	6.353E+004
1.790E+002	2.405E+002	3.427E+004	-2.363E+004	4.598E+003	2.369E+006	-1.376E+003	4.903E+003	6.090E+004
1.790E+002	2.186E+002	4.518E+004	-2.363E+004	2.299E+003	8.307E+006	-1.376E+003	4.669E+003	1.101E+005
1.790E+002	1.967E+002	5.131E+004	-2.363E+004	0.000E+000	1.377E+007	-1.376E+003	4.436E+003	1.788E+005
1.790E+002	1.749E+002	6.946E+004	-2.620E+004	8.046E+004	3.750E+001	-1.376E+003	4.202E+003	2.129E+005
1.790E+002	1.530E+002	1.083E+005	-2.620E+004	7.586E+004	1.750E+000	-1.376E+003	3.969E+003	3.334E+005
1.790E+002	1.312E+002	2.149E+005	-2.620E+004	7.127E+004	1.750E+000	-1.376E+003	3.735E+003	3.554E+005
1.790E+002	1.093E+002	7.038E+005	-2.620E+004	6.897E+004	2.584E+002	-1.376E+003	3.502E+003	4.120E+005
1.790E+002	8.744E+001	2.207E+006	-2.620E+004	6.667E+004	1.042E+000	-1.376E+003	3.268E+003	5.987E+005
1.790E+002	6.558E+001	4.734E+006	-2.620E+004	6.437E+004	9.050E+001	-1.376E+003	3.035E+003	6.803E+005
1.790E+002	4.372E+001	7.748E+006	-2.620E+004	6.207E+004	2.238E+002	-1.376E+003	2.801E+003	7.781E+005
1.790E+002	2.186E+001	1.130E+007	-2.620E+004	5.977E+004	2.238E+002	-1.376E+003	2.568E+003	1.136E+006
1.790E+002	0.000E+000	1.315E+007	-2.620E+004	5.747E+004	1.905E+002	-1.376E+003	2.335E+003	1.338E+006
1.526E+002	9.400E+002	3.500E+000	-2.620E+004	5.517E+004	4.620E+002	-1.376E+003	2.101E+003	1.743E+006
1.526E+002	9.181E+002	5.208E+000	-2.620E+004	5.287E+004	7.097E+002	-1.376E+003	1.868E+003	1.765E+006
1.526E+002	8.963E+002	8.709E+000	-2.620E+004	5.057E+004	9.524E+002	-1.376E+003	1.634E+003	1.883E+006
1.526E+002	8.744E+002	1.217E+001	-2.620E+004	4.828E+004	1.108E+003	-1.376E+003	1.401E+003	1.900E+006
1.526E+002	8.526E+002	1.750E+000	-2.620E+004	4.598E+004	1.611E+003	-1.376E+003	1.167E+003	1.936E+006
1.526E+002	8.307E+002	1.750E+000	-2.620E+004	4.368E+004	3.115E+003	-1.376E+003	9.338E+002	2.156E+006
1.526E+002	8.088E+002	2.375E+000	-2.620E+004	4.138E+004	2.282E+003	-1.376E+003	7.004E+002	2.156E+006
1.526E+002	7.870E+002	1.750E+000	-2.620E+004	3.908E+004	4.887E+003	-1.376E+003	4.669E+002	3.528E+006
1.526E+002	7.651E+002	2.083E+000	-2.620E+004	3.678E+004	1.271E+004	-1.376E+003	2.335E+002	7.572E+006
1.526E+002	6.995E+002	4.075E+000	-2.620E+004	3.448E+004	1.630E+004	-1.376E+003	0.000E+000	1.027E+007
1.526E+002	6.777E+002	1.667E+000	-2.620E+004	3.218E+004	8.106E+003	-1.645E+003	1.144E+004	2.238E+002
1.526E+002	6.558E+002	2.315E+001	-2.620E+004	2.988E+004	1.252E+004	-1.645E+003	9.805E+003	3.020E+002
1.526E+002	6.340E+002	5.053E+001	-2.620E+004	2.759E+004	2.766E+004	-1.645E+003	9.572E+003	1.042E+000
1.526E+002	6.121E+002	1.244E+002	-2.620E+004	2.529E+004	2.176E+004	-1.645E+003	9.105E+003	7.250E+001
1.526E+002	5.902E+002	1.315E+001	-2.620E+004	2.299E+004	2.142E+004	-1.645E+003	8.871E+003	9.050E+001

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.526E+002	5.684E+002	1.015E+002	-2.620E+004	2.069E+004	1.992E+004	-1.645E+003	8.404E+003	1.810E+002
1.526E+002	5.465E+002	4.935E+001	-2.620E+004	1.839E+004	3.098E+004	-1.645E+003	8.171E+003	2.988E+002
1.526E+002	5.246E+002	7.596E+001	-2.620E+004	1.609E+004	5.629E+004	-1.645E+003	7.937E+003	7.731E+002
1.526E+002	5.028E+002	1.053E+002	-2.620E+004	1.379E+004	2.640E+004	-1.645E+003	7.704E+003	1.042E+000
1.526E+002	4.809E+002	3.919E+002	-2.620E+004	1.149E+004	7.351E+004	-1.645E+003	7.471E+003	8.659E+000
1.526E+002	4.591E+002	3.237E+002	-2.620E+004	9.196E+003	2.090E+005	-1.645E+003	7.237E+003	9.845E+001
1.526E+002	4.372E+002	6.513E+002	-2.620E+004	6.897E+003	8.506E+005	-1.645E+003	7.004E+003	3.139E+003
1.526E+002	4.153E+002	8.365E+002	-2.620E+004	4.598E+003	2.372E+006	-1.645E+003	6.770E+003	1.251E+003
1.526E+002	3.935E+002	3.602E+003	-2.620E+004	2.299E+003	7.025E+006	-1.645E+003	6.537E+003	2.439E+003
1.526E+002	3.716E+002	9.987E+002	-2.620E+004	0.000E+000	1.216E+007	-1.645E+003	6.303E+003	1.075E+003
1.526E+002	3.498E+002	5.212E+003	-2.877E+004	7.586E+004	3.750E+001	-1.645E+003	6.070E+003	9.242E+002
1.526E+002	3.279E+002	2.955E+003	-2.877E+004	7.127E+004	1.837E+002	-1.645E+003	5.836E+003	3.427E+003
1.526E+002	3.060E+002	5.551E+003	-2.877E+004	6.897E+004	9.183E+001	-1.645E+003	5.603E+003	4.581E+003
1.526E+002	2.842E+002	6.257E+003	-2.877E+004	6.667E+004	6.000E+001	-1.645E+003	5.369E+003	1.044E+004
1.526E+002	2.623E+002	1.683E+004	-2.877E+004	6.437E+004	1.823E+002	-1.645E+003	5.136E+003	2.116E+004
1.526E+002	2.405E+002	1.477E+004	-2.877E+004	6.207E+004	2.238E+002	-1.645E+003	4.903E+003	2.907E+004
1.526E+002	2.186E+002	1.950E+004	-2.877E+004	5.977E+004	9.050E+001	-1.645E+003	4.669E+003	2.296E+004
1.526E+002	1.967E+002	2.309E+004	-2.877E+004	5.747E+004	1.905E+002	-1.645E+003	4.436E+003	7.633E+004
1.526E+002	1.749E+002	3.925E+004	-2.877E+004	5.517E+004	4.054E+002	-1.645E+003	4.202E+003	1.059E+005
1.526E+002	1.530E+002	2.790E+004	-2.877E+004	5.287E+004	4.476E+002	-1.645E+003	3.969E+003	2.038E+005
1.526E+002	1.312E+002	9.558E+004	-2.877E+004	5.057E+004	6.876E+002	-1.645E+003	3.735E+003	1.789E+005
1.526E+002	1.093E+002	4.742E+005	-2.877E+004	4.828E+004	2.765E+003	-1.645E+003	3.502E+003	3.801E+005
1.526E+002	8.744E+001	1.541E+006	-2.877E+004	4.598E+004	3.720E+003	-1.645E+003	3.268E+003	4.292E+005
1.526E+002	6.558E+001	4.614E+006	-2.877E+004	4.368E+004	3.116E+003	-1.645E+003	3.035E+003	6.242E+005
1.526E+002	4.372E+001	8.299E+006	-2.877E+004	4.138E+004	1.716E+004	-1.645E+003	2.801E+003	8.164E+005
1.526E+002	2.186E+001	1.351E+007	-2.877E+004	3.908E+004	2.270E+004	-1.645E+003	2.568E+003	8.915E+005
1.526E+002	0.000E+000	1.517E+007	-2.877E+004	3.678E+004	9.456E+003	-1.645E+003	2.335E+003	1.024E+006
1.262E+002	9.619E+002	1.563E+001	-2.877E+004	3.448E+004	2.832E+004	-1.645E+003	2.101E+003	1.203E+006
1.262E+002	9.400E+002	1.750E+000	-2.877E+004	3.218E+004	3.167E+004	-1.645E+003	1.868E+003	1.380E+006
1.262E+002	9.181E+002	1.567E+001	-2.877E+004	2.988E+004	2.380E+004	-1.645E+003	1.634E+003	1.247E+006
1.262E+002	8.963E+002	6.958E+000	-2.877E+004	2.759E+004	2.668E+004	-1.645E+003	1.401E+003	1.326E+006
1.262E+002	8.744E+002	6.958E+000	-2.877E+004	2.529E+004	3.130E+004	-1.645E+003	1.167E+003	1.308E+006
1.262E+002	8.526E+002	3.500E+000	-2.877E+004	2.299E+004	6.531E+004	-1.645E+003	9.338E+002	1.265E+006
1.262E+002	8.307E+002	5.250E+000	-2.877E+004	2.069E+004	4.723E+004	-1.645E+003	7.004E+002	1.640E+006
1.262E+002	8.088E+002	3.500E+000	-2.877E+004	1.839E+004	4.115E+004	-1.645E+003	4.669E+002	2.791E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
1.262E+002	7.870E+002	1.750E+000	-2.877E+004	1.609E+004	5.519E+004	-1.645E+003	2.335E+002	5.606E+006
1.262E+002	7.651E+002	1.750E+000	-2.877E+004	1.379E+004	5.960E+004	-1.645E+003	0.000E+000	7.412E+006
1.262E+002	7.214E+002	2.375E+000	-2.877E+004	1.149E+004	1.959E+005	-1.915E+003	9.805E+003	2.500E+000
1.262E+002	6.558E+002	4.075E+000	-2.877E+004	9.196E+003	4.583E+005	-1.915E+003	9.338E+003	9.050E+001
1.262E+002	6.340E+002	6.250E-001	-2.877E+004	6.897E+003	1.317E+006	-1.915E+003	8.638E+003	3.396E+001
1.262E+002	6.121E+002	5.325E+000	-2.877E+004	4.598E+003	4.780E+006	-1.915E+003	8.171E+003	9.050E+001
1.262E+002	5.902E+002	2.708E+000	-2.877E+004	2.299E+003	1.013E+007	-1.915E+003	7.704E+003	1.667E+001
1.262E+002	5.684E+002	3.803E+001	-2.877E+004	0.000E+000	1.260E+007	-1.915E+003	7.471E+003	9.550E+001
1.262E+002	5.465E+002	4.211E+001	-3.134E+004	6.897E+004	9.183E+001	-1.915E+003	7.237E+003	4.075E+000
1.262E+002	5.246E+002	8.704E+001	-3.134E+004	6.667E+004	4.476E+002	-1.915E+003	7.004E+003	1.029E+003
1.262E+002	5.028E+002	2.422E+001	-3.134E+004	6.437E+004	2.238E+002	-1.915E+003	6.770E+003	6.408E+001
1.262E+002	4.809E+002	1.394E+002	-3.134E+004	6.207E+004	2.238E+002	-1.915E+003	6.537E+003	2.492E+002
1.262E+002	4.591E+002	2.475E+001	-3.134E+004	5.977E+004	7.273E+002	-1.915E+003	6.303E+003	6.016E+002
1.262E+002	4.372E+002	1.348E+003	-3.134E+004	5.517E+004	1.232E+003	-1.915E+003	6.070E+003	4.501E+002
1.262E+002	4.153E+002	3.041E+002	-3.134E+004	5.287E+004	2.715E+002	-1.915E+003	5.836E+003	1.155E+002
1.262E+002	3.935E+002	4.205E+002	-3.134E+004	5.057E+004	2.271E+003	-1.915E+003	5.603E+003	2.838E+003
1.262E+002	3.716E+002	1.374E+003	-3.134E+004	4.828E+004	4.330E+003	-1.915E+003	5.369E+003	1.368E+003
1.262E+002	3.498E+002	1.201E+003	-3.134E+004	4.598E+004	2.111E+003	-1.915E+003	5.136E+003	3.852E+003
1.262E+002	3.279E+002	1.858E+003	-3.134E+004	4.368E+004	1.114E+004	-1.915E+003	4.903E+003	1.224E+004
1.262E+002	3.060E+002	1.065E+003	-3.134E+004	4.138E+004	1.267E+004	-1.915E+003	4.669E+003	1.934E+003
1.262E+002	2.842E+002	1.508E+003	-3.134E+004	3.908E+004	1.152E+004	-1.915E+003	4.436E+003	7.651E+003
1.262E+002	2.623E+002	1.079E+004	-3.134E+004	3.678E+004	3.793E+004	-1.915E+003	4.202E+003	2.238E+004
1.262E+002	2.405E+002	1.053E+004	-3.134E+004	3.448E+004	2.854E+004	-1.915E+003	3.969E+003	3.558E+004
1.262E+002	2.186E+002	2.528E+004	-3.134E+004	3.218E+004	3.387E+004	-1.915E+003	3.735E+003	9.723E+004
1.262E+002	1.967E+002	2.664E+004	-3.134E+004	2.988E+004	3.439E+004	-1.915E+003	3.502E+003	9.331E+004
1.262E+002	1.749E+002	4.496E+004	-3.134E+004	2.759E+004	5.334E+004	-1.915E+003	3.268E+003	2.584E+005
1.262E+002	1.530E+002	4.853E+004	-3.134E+004	2.529E+004	7.062E+004	-1.915E+003	3.035E+003	3.833E+005
1.262E+002	1.312E+002	5.859E+004	-3.134E+004	2.299E+004	6.928E+004	-1.915E+003	2.801E+003	4.511E+005
1.262E+002	1.093E+002	1.452E+005	-3.134E+004	2.069E+004	5.907E+004	-1.915E+003	2.568E+003	5.614E+005
1.262E+002	8.744E+001	8.807E+005	-3.134E+004	1.839E+004	9.615E+004	-1.915E+003	2.335E+003	5.493E+005
1.262E+002	6.558E+001	3.318E+006	-3.134E+004	1.609E+004	1.244E+005	-1.915E+003	2.101E+003	7.995E+005
1.262E+002	4.372E+001	6.851E+006	-3.134E+004	1.379E+004	1.777E+005	-1.915E+003	1.868E+003	8.379E+005
1.262E+002	2.186E+001	1.644E+007	-3.134E+004	1.149E+004	3.000E+005	-1.915E+003	1.634E+003	1.025E+006
1.262E+002	0.000E+000	1.878E+007	-3.134E+004	9.196E+003	8.136E+005	-1.915E+003	1.401E+003	1.014E+006
9.979E+001	1.006E+003	1.750E+000	-3.134E+004	6.897E+003	2.458E+006	-1.915E+003	1.167E+003	1.062E+006

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
9.979E+001	9.837E+002	1.563E+001	-3.134E+004	4.598E+003	6.474E+006	-1.915E+003	9.338E+002	7.957E+005
9.979E+001	9.619E+002	1.217E+001	-3.134E+004	2.299E+003	1.314E+007	-1.915E+003	7.004E+002	1.020E+006
9.979E+001	9.181E+002	6.958E+000	-3.134E+004	0.000E+000	1.455E+007	-1.915E+003	4.669E+002	1.637E+006
9.979E+001	8.744E+002	8.709E+000	-3.391E+004	6.437E+004	4.476E+002	-1.915E+003	2.335E+002	4.152E+006
9.979E+001	8.526E+002	1.750E+000	-3.391E+004	6.207E+004	5.035E+002	-1.915E+003	0.000E+000	5.701E+006
9.979E+001	8.088E+002	1.750E+000	-3.391E+004	5.977E+004	9.511E+002	-2.184E+003	1.097E+004	3.333E+001
9.979E+001	7.870E+002	1.750E+000	-3.391E+004	5.747E+004	1.455E+003	-2.184E+003	1.074E+004	3.333E+001
9.979E+001	6.121E+002	6.250E-001	-3.391E+004	5.517E+004	6.714E+002	-2.184E+003	1.004E+004	2.238E+002
9.979E+001	5.684E+002	6.250E-001	-3.391E+004	5.287E+004	3.211E+003	-2.184E+003	9.338E+003	2.500E+000
9.979E+001	5.465E+002	3.803E+001	-3.391E+004	5.057E+004	6.568E+003	-2.184E+003	9.105E+003	2.500E+000
9.979E+001	5.246E+002	5.833E+000	-3.391E+004	4.828E+004	5.619E+003	-2.184E+003	7.471E+003	5.000E+000
9.979E+001	5.028E+002	7.961E+001	-3.391E+004	4.598E+004	7.351E+003	-2.184E+003	7.004E+003	5.000E+000
9.979E+001	4.809E+002	1.250E+000	-3.391E+004	4.368E+004	1.376E+004	-2.184E+003	6.770E+003	2.288E+002
9.979E+001	4.591E+002	1.065E+001	-3.391E+004	4.138E+004	1.844E+004	-2.184E+003	6.537E+003	5.117E+000
9.979E+001	4.372E+002	2.393E+002	-3.391E+004	3.908E+004	3.458E+004	-2.184E+003	6.303E+003	1.905E+003
9.979E+001	4.153E+002	9.773E+001	-3.391E+004	3.678E+004	2.768E+004	-2.184E+003	6.070E+003	1.835E+002
9.979E+001	3.935E+002	2.211E+002	-3.391E+004	3.448E+004	6.191E+004	-2.184E+003	5.836E+003	6.250E-001
9.979E+001	3.716E+002	4.510E+002	-3.391E+004	3.218E+004	6.039E+004	-2.184E+003	5.603E+003	1.455E+003
9.979E+001	3.498E+002	4.783E+002	-3.391E+004	2.988E+004	7.355E+004	-2.184E+003	5.369E+003	3.500E+001
9.979E+001	3.279E+002	8.775E+002	-3.391E+004	2.759E+004	1.225E+005	-2.184E+003	5.136E+003	4.572E+002
9.979E+001	3.060E+002	7.584E+002	-3.391E+004	2.529E+004	1.441E+005	-2.184E+003	4.903E+003	4.630E+003
9.979E+001	2.842E+002	1.366E+003	-3.391E+004	2.299E+004	1.357E+005	-2.184E+003	4.669E+003	4.240E+003
9.979E+001	2.623E+002	1.744E+003	-3.391E+004	2.069E+004	1.657E+005	-2.184E+003	4.436E+003	1.066E+004
9.979E+001	2.405E+002	1.012E+004	-3.391E+004	1.839E+004	1.696E+005	-2.184E+003	4.202E+003	2.029E+003
9.979E+001	2.186E+002	1.100E+004	-3.391E+004	1.609E+004	2.296E+005	-2.184E+003	3.969E+003	2.732E+004
9.979E+001	1.967E+002	3.358E+004	-3.391E+004	1.379E+004	3.395E+005	-2.184E+003	3.735E+003	1.349E+004
9.979E+001	1.749E+002	2.540E+004	-3.391E+004	1.149E+004	5.232E+005	-2.184E+003	3.502E+003	5.067E+004
9.979E+001	1.530E+002	2.810E+004	-3.391E+004	9.196E+003	1.260E+006	-2.184E+003	3.268E+003	6.193E+004
9.979E+001	1.312E+002	4.108E+004	-3.391E+004	6.897E+003	3.394E+006	-2.184E+003	3.035E+003	7.139E+004
9.979E+001	1.093E+002	1.694E+005	-3.391E+004	4.598E+003	8.125E+006	-2.184E+003	2.801E+003	1.975E+005
9.979E+001	8.744E+001	7.464E+005	-3.391E+004	2.299E+003	1.590E+007	-2.184E+003	2.568E+003	2.651E+005
9.979E+001	6.558E+001	2.968E+006	-3.391E+004	0.000E+000	1.623E+007	-2.184E+003	2.335E+003	4.346E+005
9.979E+001	4.372E+001	6.630E+006	-3.648E+004	6.437E+004	5.035E+002	-2.184E+003	2.101E+003	4.512E+005
9.979E+001	2.186E+001	1.858E+007	-3.648E+004	5.977E+004	4.476E+002	-2.184E+003	1.868E+003	5.122E+005
9.979E+001	0.000E+000	2.077E+007	-3.648E+004	5.747E+004	3.086E+003	-2.184E+003	1.634E+003	6.195E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
7.338E+001	9.837E+002	5.208E+000	-3.648E+004	5.517E+004	2.128E+003	-2.184E+003	1.401E+003	5.819E+005
7.338E+001	9.619E+002	1.042E+001	-3.648E+004	5.287E+004	4.072E+003	-2.184E+003	1.167E+003	6.368E+005
7.338E+001	8.963E+002	1.750E+000	-3.648E+004	5.057E+004	5.772E+003	-2.184E+003	9.338E+002	5.987E+005
7.338E+001	5.902E+002	3.333E+001	-3.648E+004	4.828E+004	8.427E+003	-2.184E+003	7.004E+002	7.331E+005
7.338E+001	5.465E+002	1.250E+001	-3.648E+004	4.598E+004	1.648E+004	-2.184E+003	4.669E+002	1.257E+006
7.338E+001	5.246E+002	6.250E-001	-3.648E+004	4.368E+004	1.195E+004	-2.184E+003	2.335E+002	2.530E+006
7.338E+001	5.028E+002	6.250E-001	-3.648E+004	4.138E+004	3.250E+004	-2.184E+003	0.000E+000	3.837E+006
7.338E+001	4.809E+002	1.654E+001	-3.648E+004	3.908E+004	1.937E+004	-2.454E+003	1.121E+004	6.000E+001
7.338E+001	4.591E+002	3.958E+001	-3.648E+004	3.678E+004	4.557E+004	-2.454E+003	1.097E+004	6.000E+001
7.338E+001	4.372E+002	3.458E+001	-3.648E+004	3.448E+004	7.848E+004	-2.454E+003	9.105E+003	9.050E+001
7.338E+001	4.153E+002	5.208E+000	-3.648E+004	3.218E+004	7.812E+004	-2.454E+003	8.638E+003	2.263E+002
7.338E+001	3.935E+002	8.238E+001	-3.648E+004	2.988E+004	1.083E+005	-2.454E+003	8.404E+003	1.042E+000
7.338E+001	3.716E+002	5.190E+001	-3.648E+004	2.759E+004	1.397E+005	-2.454E+003	7.004E+003	2.500E+000
7.338E+001	3.498E+002	1.811E+002	-3.648E+004	2.529E+004	1.827E+005	-2.454E+003	6.770E+003	3.750E+001
7.338E+001	3.279E+002	6.750E+001	-3.648E+004	2.299E+004	2.315E+005	-2.454E+003	6.537E+003	5.000E+001
7.338E+001	3.060E+002	2.102E+002	-3.648E+004	2.069E+004	2.807E+005	-2.454E+003	6.303E+003	3.125E+000
7.338E+001	2.842E+002	3.490E+002	-3.648E+004	1.839E+004	2.494E+005	-2.454E+003	6.070E+003	4.476E+002
7.338E+001	2.623E+002	5.214E+002	-3.648E+004	1.609E+004	3.361E+005	-2.454E+003	5.836E+003	1.250E+001
7.338E+001	2.405E+002	2.565E+002	-3.648E+004	1.379E+004	4.053E+005	-2.454E+003	5.603E+003	6.667E+001
7.338E+001	2.186E+002	1.233E+003	-3.648E+004	1.149E+004	7.341E+005	-2.454E+003	5.369E+003	1.750E+000
7.338E+001	1.967E+002	9.291E+003	-3.648E+004	9.196E+003	1.502E+006	-2.454E+003	5.136E+003	4.075E+000
7.338E+001	1.749E+002	1.229E+004	-3.648E+004	6.897E+003	4.164E+006	-2.454E+003	4.903E+003	1.065E+001
7.338E+001	1.530E+002	2.326E+004	-3.648E+004	4.598E+003	8.863E+006	-2.454E+003	4.669E+003	5.955E+002
7.338E+001	1.312E+002	3.019E+004	-3.648E+004	2.299E+003	1.640E+007	-2.454E+003	4.436E+003	4.148E+001
7.338E+001	1.093E+002	1.209E+005	-3.648E+004	0.000E+000	1.637E+007	-2.454E+003	4.202E+003	4.388E+003
7.338E+001	8.744E+001	4.730E+005	-3.905E+004	6.897E+004	5.035E+002	-2.454E+003	3.969E+003	7.243E+003
7.338E+001	6.558E+001	2.107E+006	-3.905E+004	6.207E+004	1.904E+003	-2.454E+003	3.735E+003	3.151E+003
7.338E+001	4.372E+001	4.811E+006	-3.905E+004	5.977E+004	1.511E+003	-2.454E+003	3.502E+003	3.661E+003
7.338E+001	2.186E+001	1.468E+007	-3.905E+004	5.747E+004	2.933E+003	-2.454E+003	3.268E+003	2.418E+004
7.338E+001	0.000E+000	1.929E+007	-3.905E+004	5.517E+004	1.904E+003	-2.454E+003	3.035E+003	1.114E+004
4.696E+001	1.027E+003	1.750E+000	-3.905E+004	5.287E+004	2.561E+003	-2.454E+003	2.801E+003	4.157E+004
4.696E+001	6.121E+002	6.250E-001	-3.905E+004	5.057E+004	8.427E+003	-2.454E+003	2.568E+003	7.324E+004
4.696E+001	5.028E+002	6.667E+001	-3.905E+004	4.828E+004	9.302E+003	-2.454E+003	2.335E+003	1.258E+005
4.696E+001	4.809E+002	6.250E-001	-3.905E+004	4.598E+004	1.086E+004	-2.454E+003	2.101E+003	1.592E+005
4.696E+001	4.591E+002	5.063E+001	-3.905E+004	4.368E+004	1.399E+004	-2.454E+003	1.868E+003	1.911E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
4.696E+001	4.372E+002	4.750E+000	-3.905E+004	4.138E+004	3.084E+004	-2.454E+003	1.634E+003	2.315E+005
4.696E+001	4.153E+002	4.646E+001	-3.905E+004	3.908E+004	5.944E+004	-2.454E+003	1.401E+003	2.394E+005
4.696E+001	3.935E+002	7.500E+000	-3.905E+004	3.678E+004	2.964E+004	-2.454E+003	1.167E+003	2.369E+005
4.696E+001	3.716E+002	3.000E+001	-3.905E+004	3.448E+004	8.712E+004	-2.454E+003	9.338E+002	3.086E+005
4.696E+001	3.498E+002	6.250E+000	-3.905E+004	3.218E+004	5.537E+004	-2.454E+003	7.004E+002	4.913E+005
4.696E+001	3.279E+002	3.813E+001	-3.905E+004	2.988E+004	8.729E+004	-2.454E+003	4.669E+002	7.760E+005
4.696E+001	3.060E+002	9.225E+001	-3.905E+004	2.759E+004	1.146E+005	-2.454E+003	2.335E+002	1.525E+006
4.696E+001	2.842E+002	3.447E+003	-3.905E+004	2.529E+004	1.757E+005	-2.454E+003	0.000E+000	2.379E+006
4.696E+001	2.623E+002	3.360E+003	-3.905E+004	2.299E+004	1.722E+005	-2.723E+003	7.004E+003	6.250E-001
4.696E+001	2.405E+002	3.633E+003	-3.905E+004	2.069E+004	1.849E+005	-2.723E+003	6.770E+003	1.250E+001
4.696E+001	2.186E+002	3.803E+003	-3.905E+004	1.839E+004	2.161E+005	-2.723E+003	6.537E+003	1.750E+000
4.696E+001	1.967E+002	5.022E+003	-3.905E+004	1.609E+004	3.070E+005	-2.723E+003	6.070E+003	6.250E-001
4.696E+001	1.749E+002	4.161E+003	-3.905E+004	1.379E+004	4.259E+005	-2.723E+003	5.836E+003	5.000E+000
4.696E+001	1.530E+002	6.052E+003	-3.905E+004	1.149E+004	8.650E+005	-2.723E+003	5.136E+003	2.083E+000
4.696E+001	1.312E+002	1.004E+004	-3.905E+004	9.196E+003	1.947E+006	-2.723E+003	4.903E+003	1.081E+003
4.696E+001	1.093E+002	5.749E+004	-3.905E+004	6.897E+003	4.155E+006	-2.723E+003	4.669E+003	1.281E+003
4.696E+001	8.744E+001	2.205E+005	-3.905E+004	4.598E+003	9.808E+006	-2.723E+003	4.436E+003	6.377E+002
4.696E+001	6.558E+001	8.432E+005	-3.905E+004	2.299E+003	1.617E+007	-2.723E+003	4.202E+003	1.194E+003
4.696E+001	4.372E+001	2.813E+006	-3.905E+004	0.000E+000	1.723E+007	-2.723E+003	3.969E+003	4.297E+002
4.696E+001	2.186E+001	8.472E+006	-4.162E+004	6.207E+004	5.035E+002	-2.723E+003	3.735E+003	7.449E+002
4.696E+001	0.000E+000	1.378E+007	-4.162E+004	5.747E+004	1.904E+003	-2.723E+003	3.502E+003	1.644E+003
2.055E+001	1.093E+003	1.750E+000	-4.162E+004	5.517E+004	5.713E+003	-2.723E+003	3.268E+003	1.835E+003
2.055E+001	5.028E+002	3.508E+001	-4.162E+004	5.287E+004	4.837E+003	-2.723E+003	3.035E+003	3.179E+003
2.055E+001	4.809E+002	4.250E+000	-4.162E+004	5.057E+004	9.299E+003	-2.723E+003	2.801E+003	2.138E+003
2.055E+001	3.935E+002	7.750E+000	-4.162E+004	4.828E+004	1.904E+003	-2.723E+003	2.568E+003	1.176E+004
2.055E+001	3.716E+002	6.575E+001	-4.162E+004	4.598E+004	9.924E+003	-2.723E+003	2.335E+003	3.769E+004
2.055E+001	3.498E+002	8.750E+000	-4.162E+004	4.368E+004	1.810E+004	-2.723E+003	2.101E+003	6.841E+003
2.055E+001	3.279E+002	1.225E+001	-4.162E+004	4.138E+004	1.436E+004	-2.723E+003	1.868E+003	4.640E+004
2.055E+001	3.060E+002	7.275E+001	-4.162E+004	3.908E+004	3.218E+004	-2.723E+003	1.634E+003	8.921E+004
2.055E+001	2.842E+002	9.083E+000	-4.162E+004	3.678E+004	2.796E+004	-2.723E+003	1.401E+003	7.475E+004
2.055E+001	2.623E+002	3.785E+003	-4.162E+004	3.448E+004	4.394E+004	-2.723E+003	1.167E+003	1.752E+005
2.055E+001	2.405E+002	3.456E+003	-4.162E+004	3.218E+004	3.447E+004	-2.723E+003	9.338E+002	1.079E+005
2.055E+001	2.186E+002	1.989E+002	-4.162E+004	2.988E+004	8.257E+004	-2.723E+003	7.004E+002	2.637E+005
2.055E+001	1.967E+002	5.072E+003	-4.162E+004	2.759E+004	8.742E+004	-2.723E+003	4.669E+002	3.535E+005
2.055E+001	1.749E+002	8.433E+003	-4.162E+004	2.529E+004	1.046E+005	-2.723E+003	2.335E+002	9.679E+005

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
2.055E+001	1.530E+002	9.376E+003	-4.162E+004	2.299E+004	1.706E+005	-2.723E+003	0.000E+000	1.331E+006
2.055E+001	1.312E+002	4.433E+003	-4.162E+004	2.069E+004	2.061E+005	-2.993E+003	7.237E+003	3.333E+001
2.055E+001	1.093E+002	1.081E+004	-4.162E+004	1.839E+004	2.380E+005	-2.993E+003	6.770E+003	3.333E+001
2.055E+001	8.744E+001	4.527E+004	-4.162E+004	1.609E+004	3.542E+005	-2.993E+003	6.303E+003	1.750E+000
2.055E+001	6.558E+001	1.980E+005	-4.162E+004	1.379E+004	3.919E+005	-2.993E+003	4.669E+003	1.042E+000
2.055E+001	4.372E+001	7.144E+005	-4.162E+004	1.149E+004	8.030E+005	-2.993E+003	4.436E+003	2.477E+002
2.055E+001	2.186E+001	2.229E+006	-4.162E+004	9.196E+003	1.534E+006	-2.993E+003	4.202E+003	4.476E+002
2.055E+001	0.000E+000	8.314E+006	-4.162E+004	6.897E+003	4.529E+006	-2.993E+003	3.969E+003	5.451E+002
-5.863E+000	6.340E+002	1.750E+000	-4.162E+004	4.598E+003	9.590E+006	-2.993E+003	3.735E+003	1.031E+003
-5.863E+000	5.684E+002	1.750E+000	-4.162E+004	2.299E+003	1.682E+007	-2.993E+003	3.502E+003	5.773E+002
-5.863E+000	5.465E+002	6.250E-001	-4.162E+004	0.000E+000	1.980E+007	-2.993E+003	3.268E+003	1.774E+003
-5.863E+000	4.809E+002	3.500E+000	-4.419E+004	5.517E+004	6.366E+003	-2.993E+003	3.035E+003	1.167E+003
-5.863E+000	4.153E+002	1.750E+000	-4.419E+004	5.287E+004	6.366E+003	-2.993E+003	2.801E+003	6.792E+001
-5.863E+000	3.935E+002	1.400E+001	-4.419E+004	5.057E+004	3.183E+003	-2.993E+003	2.568E+003	2.260E+003
-5.863E+000	3.716E+002	1.050E+001	-4.419E+004	4.828E+004	1.145E+004	-2.993E+003	2.335E+003	2.487E+003
-5.863E+000	3.498E+002	1.050E+002	-4.419E+004	4.598E+004	3.183E+003	-2.993E+003	2.101E+003	2.076E+004
-5.863E+000	3.279E+002	1.092E+002	-4.419E+004	4.368E+004	4.232E+004	-2.993E+003	1.868E+003	7.301E+003
-5.863E+000	3.060E+002	4.033E+001	-4.419E+004	4.138E+004	3.461E+004	-2.993E+003	1.634E+003	2.096E+004
-5.863E+000	2.842E+002	7.358E+001	-4.419E+004	3.908E+004	6.250E+004	-2.993E+003	1.401E+003	1.837E+004
-5.863E+000	2.623E+002	2.050E+001	-4.419E+004	3.678E+004	9.248E+004	-2.993E+003	1.167E+003	1.675E+004
-5.863E+000	2.405E+002	5.608E+001	-4.419E+004	3.448E+004	1.105E+005	-2.993E+003	9.338E+002	2.975E+004
-5.863E+000	2.186E+002	1.050E+002	-4.419E+004	3.218E+004	1.332E+005	-2.993E+003	7.004E+002	8.012E+004
-5.863E+000	1.967E+002	2.353E+002	-4.419E+004	2.988E+004	7.191E+004	-2.993E+003	4.669E+002	1.338E+005
-5.863E+000	1.749E+002	9.004E+002	-4.419E+004	2.759E+004	6.437E+004	-2.993E+003	2.335E+002	4.285E+005
-5.863E+000	1.530E+002	3.292E+003	-4.419E+004	2.529E+004	1.267E+005	-2.993E+003	0.000E+000	7.130E+005
-5.863E+000	1.312E+002	7.571E+003	-4.419E+004	2.299E+004	1.853E+005	-3.262E+003	7.471E+003	2.500E+000
-5.863E+000	1.093E+002	7.780E+003	-4.419E+004	2.069E+004	1.443E+005	-3.262E+003	7.237E+003	1.810E+002
-5.863E+000	8.744E+001	8.211E+003	-4.419E+004	1.839E+004	2.802E+005	-3.262E+003	4.903E+003	4.476E+002
-5.863E+000	6.558E+001	6.454E+004	-4.419E+004	1.609E+004	3.002E+005	-3.262E+003	4.436E+003	4.476E+002
-5.863E+000	4.372E+001	3.069E+005	-4.419E+004	1.379E+004	3.774E+005	-3.262E+003	4.202E+003	2.083E+000
-5.863E+000	2.186E+001	1.885E+006	-4.419E+004	1.149E+004	7.346E+005	-3.262E+003	3.969E+003	1.074E+003
-5.863E+000	0.000E+000	5.986E+007	-4.419E+004	9.196E+003	1.676E+006	-3.262E+003	3.735E+003	1.923E+002
-3.228E+001	5.902E+002	1.750E+000	-4.419E+004	6.897E+003	4.376E+006	-3.262E+003	3.268E+003	4.489E+002
-3.228E+001	5.684E+002	1.750E+000	-4.419E+004	4.598E+003	1.044E+007	-3.262E+003	3.035E+003	6.357E+002
-3.228E+001	5.028E+002	3.500E+000	-4.419E+004	2.299E+003	1.771E+007	-3.262E+003	2.801E+003	3.985E+002

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-3.228E+001	4.809E+002	1.750E+000	-4.419E+004	0.000E+000	2.281E+007	-3.262E+003	2.568E+003	1.082E+003
-3.228E+001	4.591E+002	3.500E+000	-4.676E+004	5.057E+004	3.183E+003	-3.262E+003	2.335E+003	6.147E+002
-3.228E+001	4.372E+002	1.050E+001	-4.676E+004	4.828E+004	3.183E+003	-3.262E+003	2.101E+003	1.192E+003
-3.228E+001	4.153E+002	1.225E+001	-4.676E+004	4.598E+004	9.548E+003	-3.262E+003	1.868E+003	2.389E+003
-3.228E+001	3.935E+002	1.400E+001	-4.676E+004	4.368E+004	9.548E+003	-3.262E+003	1.634E+003	2.865E+003
-3.228E+001	3.716E+002	8.750E+000	-4.676E+004	4.138E+004	2.868E+004	-3.262E+003	1.401E+003	1.181E+003
-3.228E+001	3.498E+002	1.050E+001	-4.676E+004	3.908E+004	2.388E+004	-3.262E+003	1.167E+003	1.424E+004
-3.228E+001	3.279E+002	8.750E+000	-4.676E+004	3.678E+004	3.539E+004	-3.262E+003	9.338E+002	7.684E+003
-3.228E+001	3.060E+002	1.023E+002	-4.676E+004	3.448E+004	6.724E+004	-3.262E+003	7.004E+002	1.369E+004
-3.228E+001	2.842E+002	7.167E+001	-4.676E+004	3.218E+004	7.798E+004	-3.262E+003	4.669E+002	4.421E+004
-3.228E+001	2.623E+002	1.314E+002	-4.676E+004	2.988E+004	8.652E+004	-3.262E+003	2.335E+002	1.994E+005
-3.228E+001	2.405E+002	2.422E+002	-4.676E+004	2.759E+004	1.398E+005	-3.262E+003	0.000E+000	2.487E+005
-3.228E+001	2.186E+002	3.851E+002	-4.676E+004	2.529E+004	8.062E+004	-3.531E+003	4.669E+003	1.200E+002
-3.228E+001	1.967E+002	9.667E+002	-4.676E+004	2.299E+004	1.731E+005	-3.531E+003	4.436E+003	1.200E+002
-3.228E+001	1.749E+002	4.971E+002	-4.676E+004	2.069E+004	2.890E+005	-3.531E+003	3.735E+003	1.200E+002
-3.228E+001	1.530E+002	6.308E+002	-4.676E+004	1.839E+004	1.959E+005	-3.531E+003	3.268E+003	7.017E+001
-3.228E+001	1.312E+002	5.166E+002	-4.676E+004	1.609E+004	3.795E+005	-3.531E+003	3.035E+003	4.526E+002
-3.228E+001	1.093E+002	1.362E+004	-4.676E+004	1.379E+004	4.435E+005	-3.531E+003	2.801E+003	3.991E+003
-3.228E+001	8.744E+001	7.023E+003	-4.676E+004	1.149E+004	8.921E+005	-3.531E+003	2.568E+003	5.474E+002
-3.228E+001	6.558E+001	1.707E+004	-4.676E+004	9.196E+003	2.175E+006	-3.531E+003	2.335E+003	1.810E+002
-3.228E+001	4.372E+001	8.156E+004	-4.676E+004	6.897E+003	5.742E+006	-3.531E+003	2.101E+003	3.022E+003
-3.228E+001	2.186E+001	2.611E+005	-4.676E+004	4.598E+003	1.457E+007	-3.531E+003	1.868E+003	6.501E+003
-3.228E+001	0.000E+000	7.879E+005	-4.676E+004	2.299E+003	2.461E+007	-3.531E+003	1.634E+003	5.000E+000
-5.869E+001	5.246E+002	1.750E+000	-4.676E+004	0.000E+000	3.400E+007	-3.531E+003	1.401E+003	6.819E+003
-5.869E+001	5.028E+002	3.500E+000	-4.933E+004	4.598E+004	9.548E+003	-3.531E+003	1.167E+003	9.621E+003
-5.869E+001	4.809E+002	1.750E+000	-4.933E+004	4.368E+004	3.183E+003	-3.531E+003	9.338E+002	9.920E+003
-5.869E+001	4.591E+002	1.050E+001	-4.933E+004	4.138E+004	1.904E+003	-3.531E+003	7.004E+002	1.485E+004
-5.869E+001	4.372E+002	3.500E+000	-4.933E+004	3.908E+004	1.274E+004	-3.531E+003	4.669E+002	1.524E+004
-5.869E+001	4.153E+002	1.750E+000	-4.933E+004	3.678E+004	3.535E+004	-3.531E+003	2.335E+002	5.061E+004
-5.869E+001	3.935E+002	7.000E+000	-4.933E+004	3.448E+004	4.466E+004	-3.531E+003	0.000E+000	1.134E+005
-5.869E+001	3.716E+002	5.250E+000	-4.933E+004	3.218E+004	8.129E+004	-3.801E+003	5.603E+003	2.500E+000
-5.869E+001	3.498E+002	3.500E+000	-4.933E+004	2.988E+004	1.616E+005	-3.801E+003	3.268E+003	6.667E+001
-5.869E+001	3.279E+002	5.250E+000	-4.933E+004	2.759E+004	1.536E+005	-3.801E+003	3.035E+003	6.667E+001
-5.869E+001	3.060E+002	1.050E+001	-4.933E+004	2.529E+004	1.586E+005	-3.801E+003	2.801E+003	2.083E+000
-5.869E+001	2.842E+002	1.400E+001	-4.933E+004	2.299E+004	3.072E+005	-3.801E+003	2.335E+003	5.000E+000

Markov Matrices

Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-5.869E+001	2.623E+002	1.859E+002	-4.933E+004	2.069E+004	4.500E+005	-3.801E+003	1.868E+003	9.050E+001
-5.869E+001	2.405E+002	1.670E+002	-4.933E+004	1.839E+004	4.555E+005	-3.801E+003	1.634E+003	1.810E+002
-5.869E+001	2.186E+002	1.050E+001	-4.933E+004	1.609E+004	8.760E+005	-3.801E+003	1.167E+003	8.151E+000
-5.869E+001	1.967E+002	1.400E+001	-4.933E+004	1.379E+004	1.125E+006	-3.801E+003	9.338E+002	2.625E+001
-5.869E+001	1.749E+002	1.525E+001	-4.933E+004	1.149E+004	1.955E+006	-3.801E+003	7.004E+002	7.808E+002
-5.869E+001	1.530E+002	1.207E+002	-4.933E+004	9.196E+003	3.557E+006	-3.801E+003	4.669E+002	1.960E+003
-5.869E+001	1.312E+002	3.392E+003	-4.933E+004	6.897E+003	8.124E+006	-3.801E+003	2.335E+002	1.099E+004
-5.869E+001	1.093E+002	2.976E+002	-4.933E+004	4.598E+003	1.912E+007	-3.801E+003	0.000E+000	2.013E+004
-5.869E+001	8.744E+001	4.229E+002	-4.933E+004	2.299E+003	3.246E+007	-4.070E+003	3.735E+003	5.000E+000
-5.869E+001	6.558E+001	1.388E+004	-4.933E+004	0.000E+000	4.495E+007	-4.070E+003	3.268E+003	1.810E+002
-5.869E+001	4.372E+001	3.450E+004	-5.190E+004	4.138E+004	3.183E+003	-4.070E+003	2.568E+003	1.810E+002
-5.869E+001	2.186E+001	1.370E+005	-5.190E+004	3.678E+004	8.334E-002	-4.070E+003	2.335E+003	1.008E+003
-5.869E+001	0.000E+000	3.007E+005	-5.190E+004	3.218E+004	2.077E+004	-4.070E+003	1.868E+003	1.007E+003
-8.510E+001	7.433E+002	1.750E+000	-5.190E+004	2.988E+004	1.913E+004	-4.070E+003	1.634E+003	1.831E+002
-8.510E+001	5.684E+002	1.750E+000	-5.190E+004	2.759E+004	4.590E+004	-4.070E+003	1.401E+003	6.286E+002
-8.510E+001	5.465E+002	5.250E+000	-5.190E+004	2.529E+004	1.773E+005	-4.070E+003	1.167E+003	4.075E+000
-8.510E+001	5.246E+002	1.750E+000	-5.190E+004	2.299E+004	2.072E+005	-4.070E+003	9.338E+002	1.333E+002
-8.510E+001	5.028E+002	1.750E+000	-5.190E+004	2.069E+004	3.867E+005	-4.070E+003	7.004E+002	1.823E+002
-8.510E+001	4.809E+002	3.500E+000	-5.190E+004	1.839E+004	5.181E+005	-4.070E+003	4.669E+002	3.717E+003
-8.510E+001	4.591E+002	3.500E+000	-5.190E+004	1.609E+004	9.451E+005	-4.070E+003	2.335E+002	1.636E+003
-8.510E+001	4.153E+002	3.500E+000	-5.190E+004	1.379E+004	1.254E+006	-4.070E+003	0.000E+000	2.771E+004
-8.510E+001	3.716E+002	1.750E+000	-5.190E+004	1.149E+004	2.130E+006	-4.340E+003	4.202E+003	5.000E+000
-8.510E+001	3.498E+002	3.500E+000	-5.190E+004	9.196E+003	3.937E+006	-4.340E+003	2.335E+003	4.476E+002
-8.510E+001	3.279E+002	3.500E+000	-5.190E+004	6.897E+003	7.815E+006	-4.340E+003	2.101E+003	1.810E+002
-8.510E+001	3.060E+002	1.750E+000	-5.190E+004	4.598E+003	1.895E+007	-4.340E+003	1.868E+003	2.058E+003
-8.510E+001	2.842E+002	8.750E+000	-5.190E+004	2.299E+003	3.307E+007	-4.340E+003	1.634E+003	4.476E+002
-8.510E+001	2.405E+002	1.750E+000	-5.190E+004	0.000E+000	4.404E+007	-4.340E+003	1.401E+003	5.625E+000
-8.510E+001	1.967E+002	3.500E+000	-5.447E+004	2.988E+004	6.403E+003	-4.340E+003	1.167E+003	6.667E+001
-8.510E+001	1.749E+002	3.500E+000	-5.447E+004	2.759E+004	6.403E+003	-4.340E+003	7.004E+002	5.143E+002
-8.510E+001	1.530E+002	4.025E+001	-5.447E+004	2.529E+004	1.750E+000	-4.340E+003	2.335E+002	3.181E+002
-8.510E+001	1.312E+002	1.800E+001	-5.447E+004	2.299E+004	1.290E+004	-4.340E+003	0.000E+000	8.828E+003
-8.510E+001	1.093E+002	1.089E+002	-5.447E+004	2.069E+004	5.439E+004	-4.609E+003	3.502E+003	5.000E+000
-8.510E+001	8.744E+001	4.225E+001	-5.447E+004	1.839E+004	8.503E+004	-4.609E+003	2.801E+003	1.810E+002
-8.510E+001	6.558E+001	1.548E+002	-5.447E+004	1.609E+004	1.791E+005	-4.609E+003	1.634E+003	4.476E+002
-8.510E+001	4.372E+001	5.901E+002	-5.447E+004	1.379E+004	3.959E+005	-4.609E+003	2.335E+002	6.669E+002

Markov Matrices

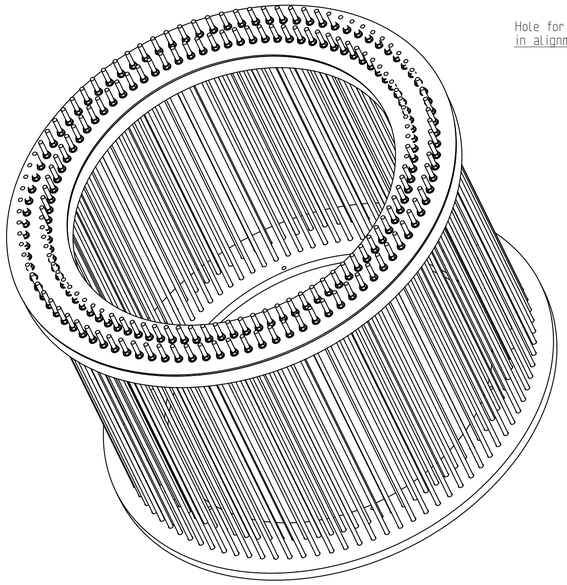
Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-8.510E+001	2.186E+001	1.465E+004	-5.447E+004	1.149E+004	7.721E+005	-4.609E+003	0.000E+000	1.205E+003
-8.510E+001	0.000E+000	3.188E+004	-5.447E+004	9.196E+003	1.729E+006	-4.879E+003	9.338E+002	1.810E+002
-1.115E+002	5.465E+002	1.750E+000	-5.447E+004	6.897E+003	4.993E+006	-4.879E+003	2.335E+002	5.193E+002
-1.115E+002	4.153E+002	1.750E+000	-5.447E+004	4.598E+003	1.183E+007	-4.879E+003	0.000E+000	1.250E+002
-1.115E+002	3.716E+002	1.750E+000	-5.447E+004	2.299E+003	2.197E+007	-5.148E+003	1.634E+003	1.810E+002
-1.115E+002	3.498E+002	1.750E+000	-5.447E+004	0.000E+000	3.106E+007	-5.148E+003	4.669E+002	3.010E+002
-1.115E+002	1.749E+002	8.500E+000	-5.704E+004	2.988E+004	3.183E+003	-5.148E+003	0.000E+000	9.321E+002
-1.115E+002	1.530E+002	7.000E+000	-5.704E+004	2.069E+004	3.950E+001	-5.417E+003	4.669E+002	6.667E+001
-1.115E+002	1.312E+002	1.875E+001	-5.704E+004	1.839E+004	3.206E+004	-5.417E+003	2.335E+002	1.250E+000
-1.115E+002	1.093E+002	1.215E+002	-5.704E+004	1.609E+004	5.035E+004	-5.417E+003	0.000E+000	2.477E+002
-1.115E+002	8.744E+001	4.667E+001	-5.704E+004	1.379E+004	4.842E+004	-5.687E+003	2.335E+002	1.810E+002
-1.115E+002	6.558E+001	3.625E+001	-5.704E+004	1.149E+004	2.678E+005	-5.687E+003	0.000E+000	1.250E+000
-1.115E+002	4.372E+001	2.009E+002	-5.704E+004	9.196E+003	5.071E+005			
-1.115E+002	2.186E+001	7.440E+002	-5.704E+004	6.897E+003	1.764E+006			
-1.115E+002	0.000E+000	4.115E+003	-5.704E+004	4.598E+003	5.322E+006			
-1.379E+002	7.870E+002	1.750E+000	-5.704E+004	2.299E+003	1.005E+007			
-1.379E+002	2.623E+002	3.500E+000	-5.704E+004	0.000E+000	1.414E+007			
-1.379E+002	1.530E+002	5.583E+000	-5.961E+004	1.149E+004	1.917E+004			
-1.379E+002	1.093E+002	1.400E+001	-5.961E+004	9.196E+003	9.106E+004			
-1.379E+002	8.744E+001	3.500E+001	-5.961E+004	6.897E+003	2.798E+005			
-1.379E+002	6.558E+001	5.017E+001	-5.961E+004	4.598E+003	1.408E+006			
-1.379E+002	4.372E+001	2.008E+002	-5.961E+004	2.299E+003	2.820E+006			
-1.379E+002	2.186E+001	6.242E+002	-5.961E+004	0.000E+000	4.541E+006			
-1.379E+002	0.000E+000	3.157E+003	-6.218E+004	1.149E+004	1.750E+000			
-1.643E+002	1.530E+002	3.500E+000	-6.218E+004	9.196E+003	1.667E-001			
-1.643E+002	1.312E+002	3.500E+000	-6.218E+004	6.897E+003	4.147E+004			
-1.643E+002	1.093E+002	1.400E+001	-6.218E+004	4.598E+003	3.429E+005			
-1.643E+002	8.744E+001	1.400E+001	-6.218E+004	2.299E+003	7.070E+005			
-1.643E+002	6.558E+001	2.800E+001	-6.218E+004	0.000E+000	1.177E+006			
-1.643E+002	4.372E+001	1.121E+002	-6.475E+004	1.149E+004	3.808E+003			
-1.643E+002	2.186E+001	6.100E+002	-6.475E+004	9.196E+003	8.270E+003			
-1.643E+002	0.000E+000	1.960E+003	-6.475E+004	6.897E+003	9.561E+003			
-1.908E+002	1.749E+002	3.500E+000	-6.475E+004	4.598E+003	3.655E+004			
-1.908E+002	1.312E+002	1.050E+001	-6.475E+004	2.299E+003	1.596E+005			
-1.908E+002	1.093E+002	1.050E+001	-6.475E+004	0.000E+000	2.514E+005			

Markov Matrices

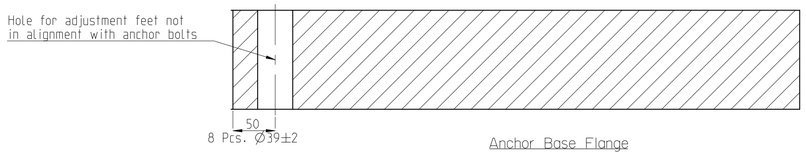
Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-1.908E+002	8.744E+001	1.392E+001	-6.733E+004	6.897E+003	1.017E+004			
-1.908E+002	6.558E+001	2.442E+001	-6.733E+004	4.598E+003	6.366E+003			
-1.908E+002	4.372E+001	4.550E+001	-6.733E+004	2.299E+003	2.866E+004			
-1.908E+002	2.186E+001	9.767E+001	-6.733E+004	0.000E+000	3.565E+004			
-1.908E+002	0.000E+000	2.430E+002	-6.990E+004	0.000E+000	6.366E+003			
-2.172E+002	2.186E+002	3.500E+000	-7.247E+004	0.000E+000	6.366E+003			
-2.172E+002	1.530E+002	7.000E+000						
-2.172E+002	1.093E+002	3.500E+000						
-2.172E+002	8.744E+001	2.083E+001						
-2.172E+002	6.558E+001	7.000E+000						
-2.172E+002	4.372E+001	1.750E+001						
-2.172E+002	2.186E+001	1.156E+002						
-2.172E+002	0.000E+000	1.750E+002						
-2.436E+002	1.749E+002	1.042E+001						
-2.436E+002	1.312E+002	1.042E+001						
-2.436E+002	8.744E+001	1.392E+001						
-2.436E+002	6.558E+001	3.500E+000						
-2.436E+002	4.372E+001	3.500E+000						
-2.436E+002	2.186E+001	1.400E+001						
-2.436E+002	0.000E+000	6.983E+001						
-2.700E+002	1.093E+002	1.392E+001						
-2.700E+002	8.744E+001	3.500E+000						
-2.700E+002	6.558E+001	1.042E+001						
-2.700E+002	4.372E+001	7.000E+000						
-2.700E+002	2.186E+001	1.392E+001						
-2.700E+002	0.000E+000	3.483E+001						
-2.964E+002	1.093E+002	3.500E+000						
-2.964E+002	4.372E+001	1.392E+001						
-2.964E+002	2.186E+001	2.433E+001						
-2.964E+002	0.000E+000	3.833E+001						
-3.228E+002	1.093E+002	1.042E+001						
-3.228E+002	2.186E+001	1.392E+001						
-3.492E+002	6.558E+001	3.500E+000						
-3.492E+002	4.372E+001	1.042E+001						
-3.492E+002	0.000E+000	7.000E+000						

Markov Matrices

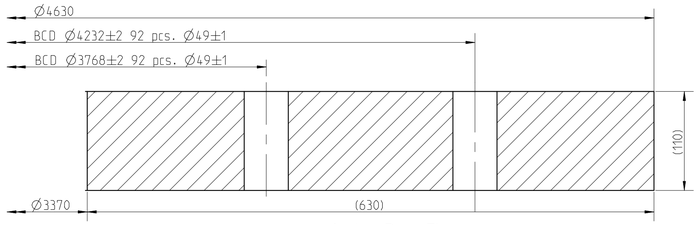
Tower shear, bottom F_y [kN]			Tower bending, bottom M_x [kNm]			Tower torsion, bottom M_z [kNm]		
Level	Range	Cycles	Level	Range	Cycles	Level	Range	Cycles
-3.756E+002	0.000E+000	1.042E+001						
-4.021E+002	6.558E+001	3.500E+000						
-4.021E+002	4.372E+001	3.500E+000						
-4.021E+002	2.186E+001	7.000E+000						



Isometric view



Anchor Base Flange



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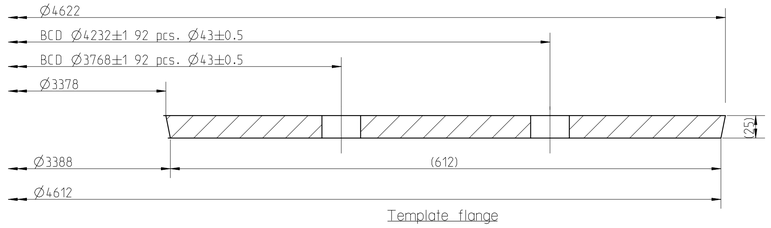
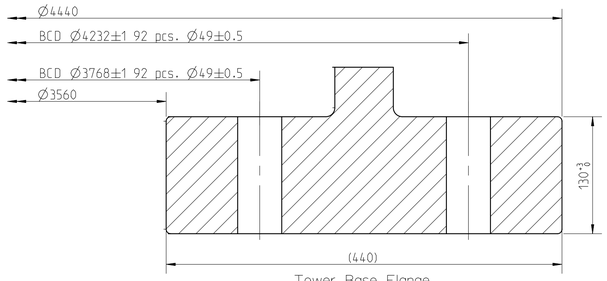
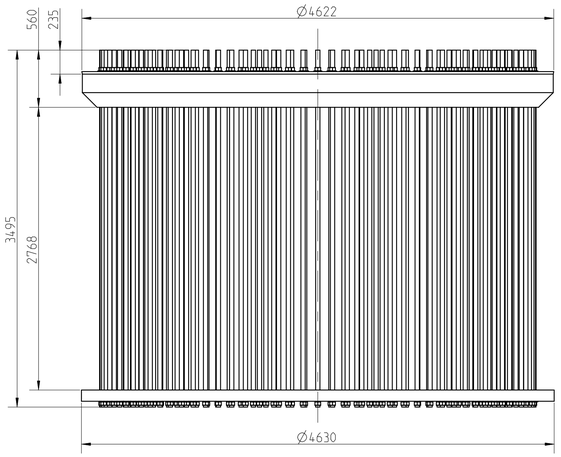


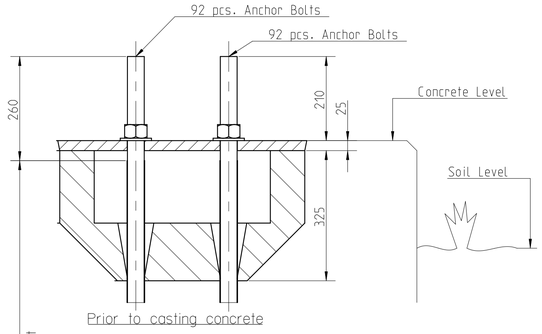
Template flange



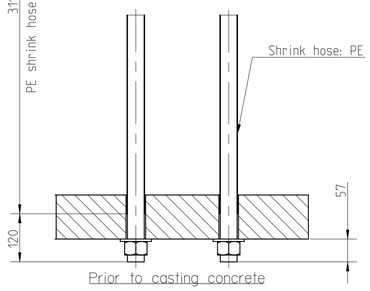
Tower Base Flange
for information only!



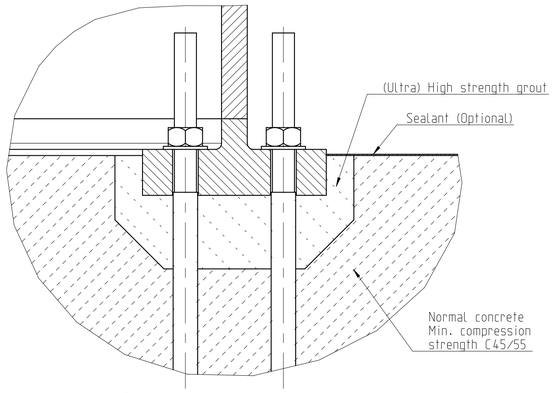
Profile view



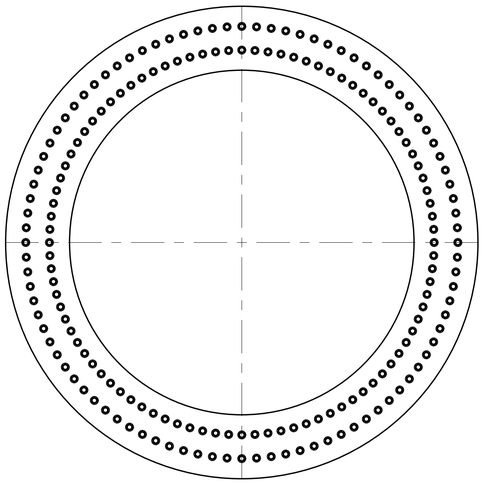
Prior to casting concrete



Prior to casting concrete

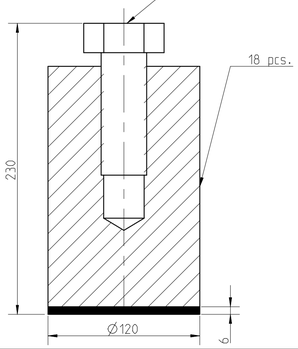


General view regarding concrete

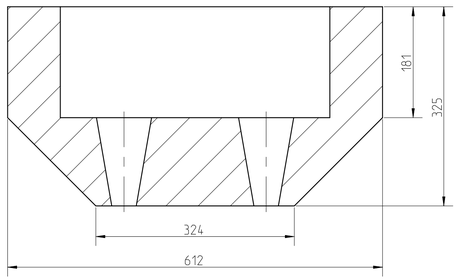


Plan view

Adjustment feet:
pcs. 18



Foam:



Note:
Anchors: M42 Grade 10.9 ISO 898-1 and DASt guideline 021 / 3.1 EN 10204
Nuts: Grade 10 TZN EN 14399-4
Washers: Grade 10 TZN EN 14399-6
Shrink hose: PE

Anchor Base Flange: S355J0 EN 10025-2/3.1 EN 10204
Other steel parts: S235JR EN 10025-2

Thermal cutting:
Anchor Base Flange EN/ISO 9013-331. Holes are to be drilled.

Surface treatment:
Upper thread: Tectyl 846 or equivalent.

Platform 3MW	Post-tension ratio %	Post-tension force [kN]	Min strength at post-tensioning. [MPa]	Grout grade [MPa]	Elongation (mm) Min.	Max.
V126 3.45/3.60MW HH117 Mk3 IEC2a/IEC2b	56	628	68	C90/105	7.4	8.5

Item no.	Mass (kg)	Certificate	Format	Status	Revised by	Created date	Created by
0057-8822	0	-	A1	Approved	-	2016-03-07	SAGRA

Material / Specification	Scale	Change no.	PDM ver.	Reviewed date	Reviewed by
- -	1:30	407450	0.3	14.03.2016	NIMUL

Proj. / Pro/E — Item description: ANCH E. V126 3.45/3.60MW H117M

Vestas. vestas.com

Metric Dimensions shown in mm unless otherwise specified	Replaces / Copy of	Drawing no.	Ver.	Sheet
	-	0057-8822	0	1 of 1

Bijlage B: grondonderzoeken WTG1

Bodem Belang BV
Korfwaterweg 27
1755 LC Petten
Tel: 0224 531 274
info@bodembelang.nl
www.bodembelang.nl

Sondeerrapport conform NEN 5140
Locatie: Windpark Windpark
Projectnummer: 03 1002679

Opdrachtgever:	WP Energiek BV Waardpolderhoofdweg 22 1766ec Wieringerwaard
Opdrachtnemer/ Rapporteur:	Bodem Belang BV Korfwaterweg 27 1755 LC Petten
Auteur:	Dhr J. v. Trigt
Datum:	donderdag 24 november 2016
Controle	D.J. Schermer

Bodem Belang BV
Korfwaterweg 27
1755 LC Petten
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info@bodembelang.nl
www.bodembelang.nl

Inhoudsopgave **Pagina**

Bodem Belang BV
Korfwaterweg 27
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www.bodembelang.nl

1. Inleiding en doel

In opdracht van WP Energiek BV heeft Bodem Belang BV sonderingen uitgevoerd conform NEN 5140 op de locatie Windpark Windpark.

De aanleiding van het onderzoek is nieuwbouw.

Bodem Belang BV
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www.bodembelang.nl

Bijlage 1.1- Tabel 1 Waterpassing

Beschrijving	X Coordinaat	Y Coordinaat	Hoogte t.o.v. NAP
Kruin wegdek	121305.908	537773.677	-1.562 meters
Sondering01	121365.107	537776.304	-1.511 meters
Sondering02	121369.937	537761.769	-1.556 meters
Sondering03	121349.936	537767.257	-1.582 meters
Sondering04	121328.234	537771.142	-1.674 meters
Sondering05	121319.601	537772.630	-1.668 meters
Waterpeil	121295.169	537775.558	-3.343 meters

* De hoogtebepaling d.m.v. DGPS dient enkel om de grondopbouw te koppelen aan een vast punt en is niet geschikt voor andere doeleinden dan dit onderzoek

Uitleg verband conus/kleef en grondsoort

Door het registreren van de plaatselijke wrijving is het mogelijk een indicatieve classificatie te geven van de grondsoort, dit door middel van het wrijvingsgetal. Het wrijvingsgetal heeft voor iedere grondsoort een andere waarde(zie tabel) en word bepaald door middel van de onderstaande formule.

Plaatselijke wrijvingsweerstand / Conusweerstand = wrijvingsgetal (%)

Als indicatie gelden voor de gladde elektronische conus de navolgende relaties.

Wrijvingsgetal in %	Grondsoort
0.3 - 1.2	Zand, grof tot fijn
1.5 - 2.0	Silthoudend zand, kleihoudend zand
2.5 - 5.0	Klei
5.5 - 7.5	Kleihoudend veen
8.0 >	Veen

De hierboven genoemde wrijvingsgetallen geven over het algemeen een goed beeld van de bodemopbouw onder de grondwaterstand. Boven de grondwaterstand kunnen grote afwijkingen ten opzichte van genoemde waarden voorkomen. Tussen de verschillende grondsoorten komen overgansvormen voor zodat de aangegeven grenzen niet als hard zijn te beschouwen.

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Bijlage 1.2- Tabel 2 Sonderingen

Ten behoeve van: **nieuwbouw**

Datum: **2016-11-24**

De volgende sonderingen zijn verricht:

Referentiepunt	**Diepte t.o.v. M.V. in M**	**Geplaatst**	**Opmerking(en)**
Sondering 01	30.180	2016-11-07 12:51:00	
Sondering 02	30.200	2016-11-07 11:54:00	
Sondering 03	30.140	2016-11-07 11:06:00	
Sondering 04	31.010	2016-11-07 10:19:00	
Sondering 05	30.450	2016-11-07 09:35:00	

Bodem Belang BV
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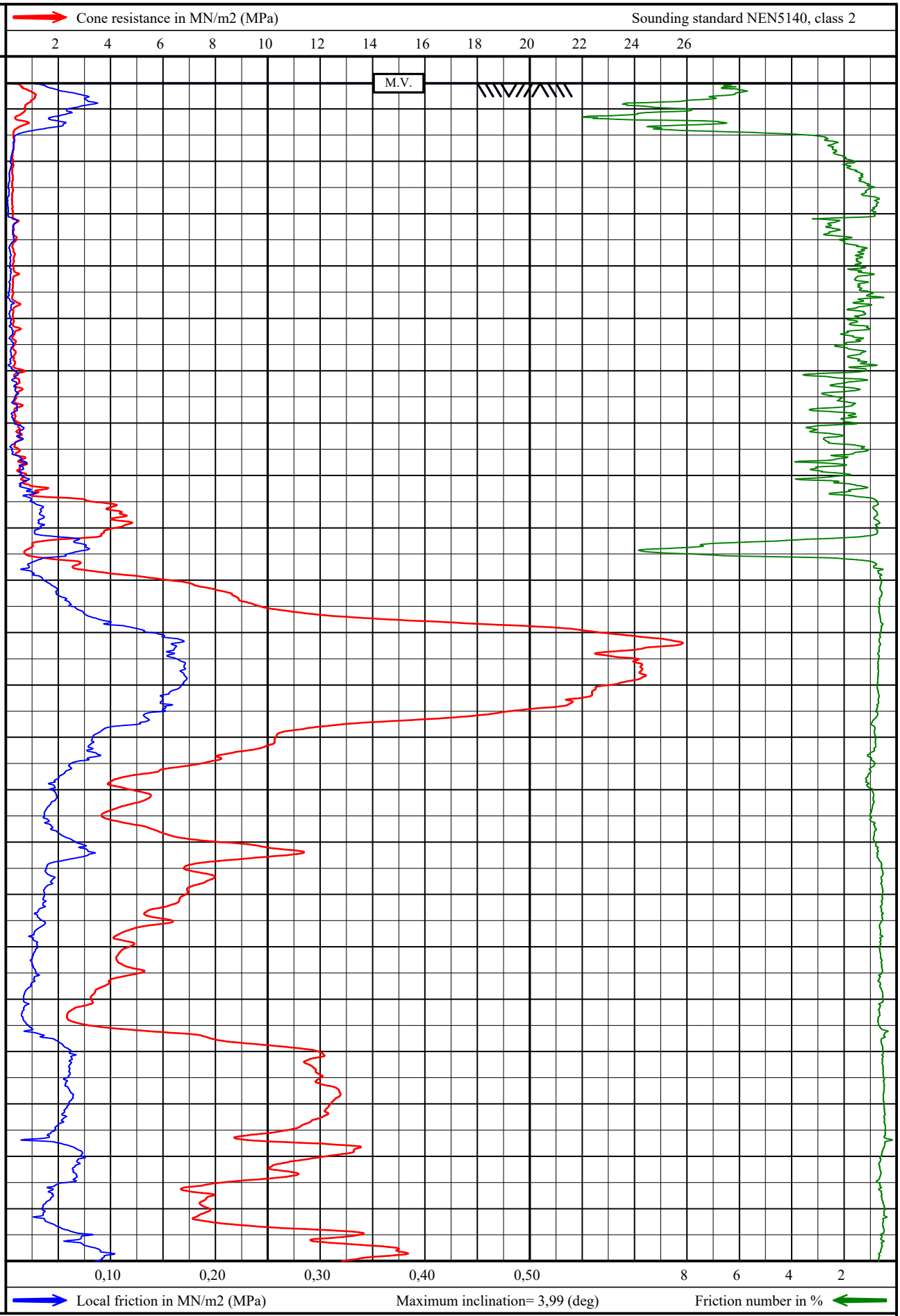
Sondeerlocatie

nr.: **1**

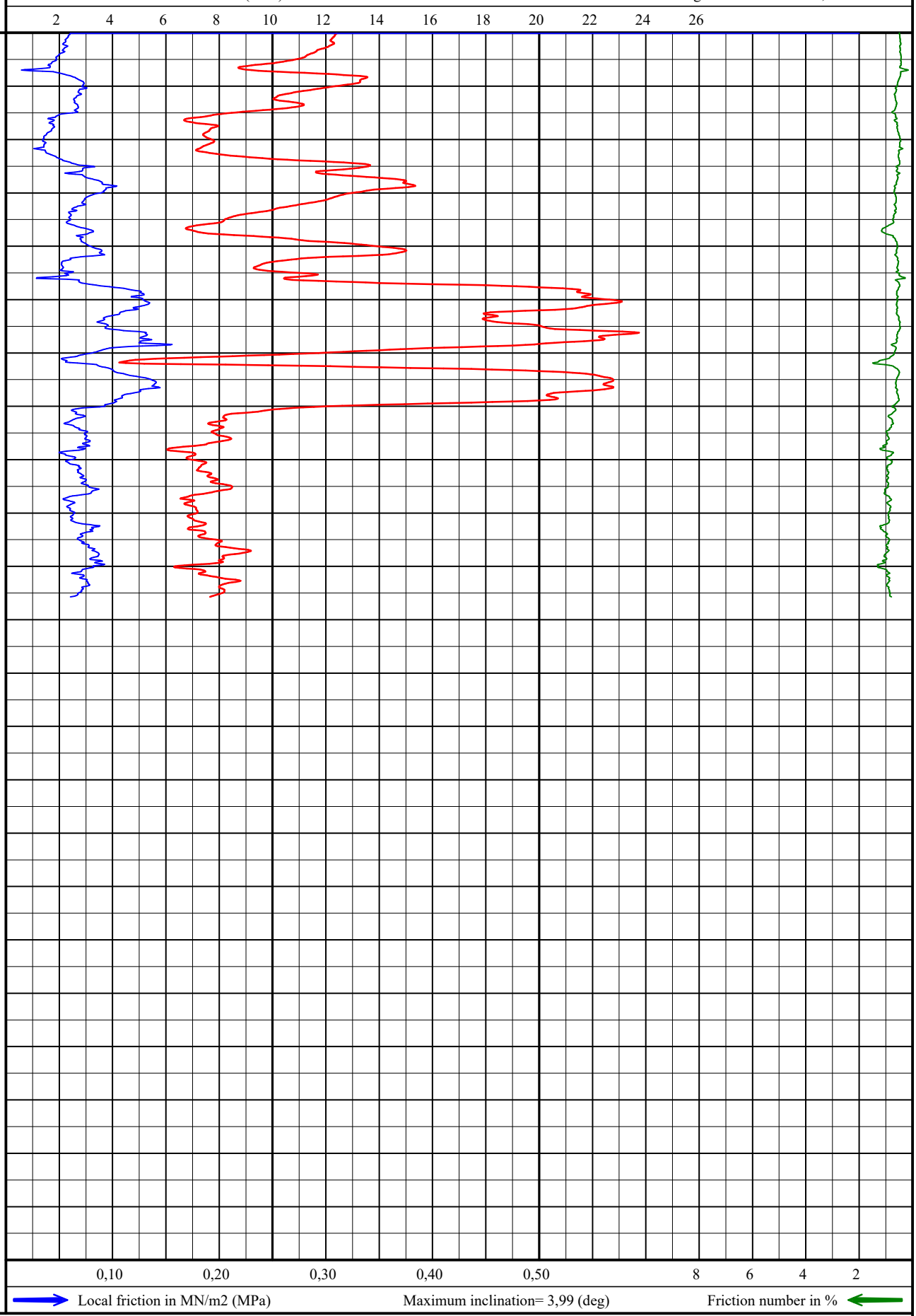


Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121365.107 / 537776.304 (X / Y)

Windmolen	gl : NAP -1,51 m	Project number: **031002679**
Waardpolder	exec. : 07-11-2016 12:51	Sounding number **1**
	drawn: 24-11-2016	

nr.: **1**

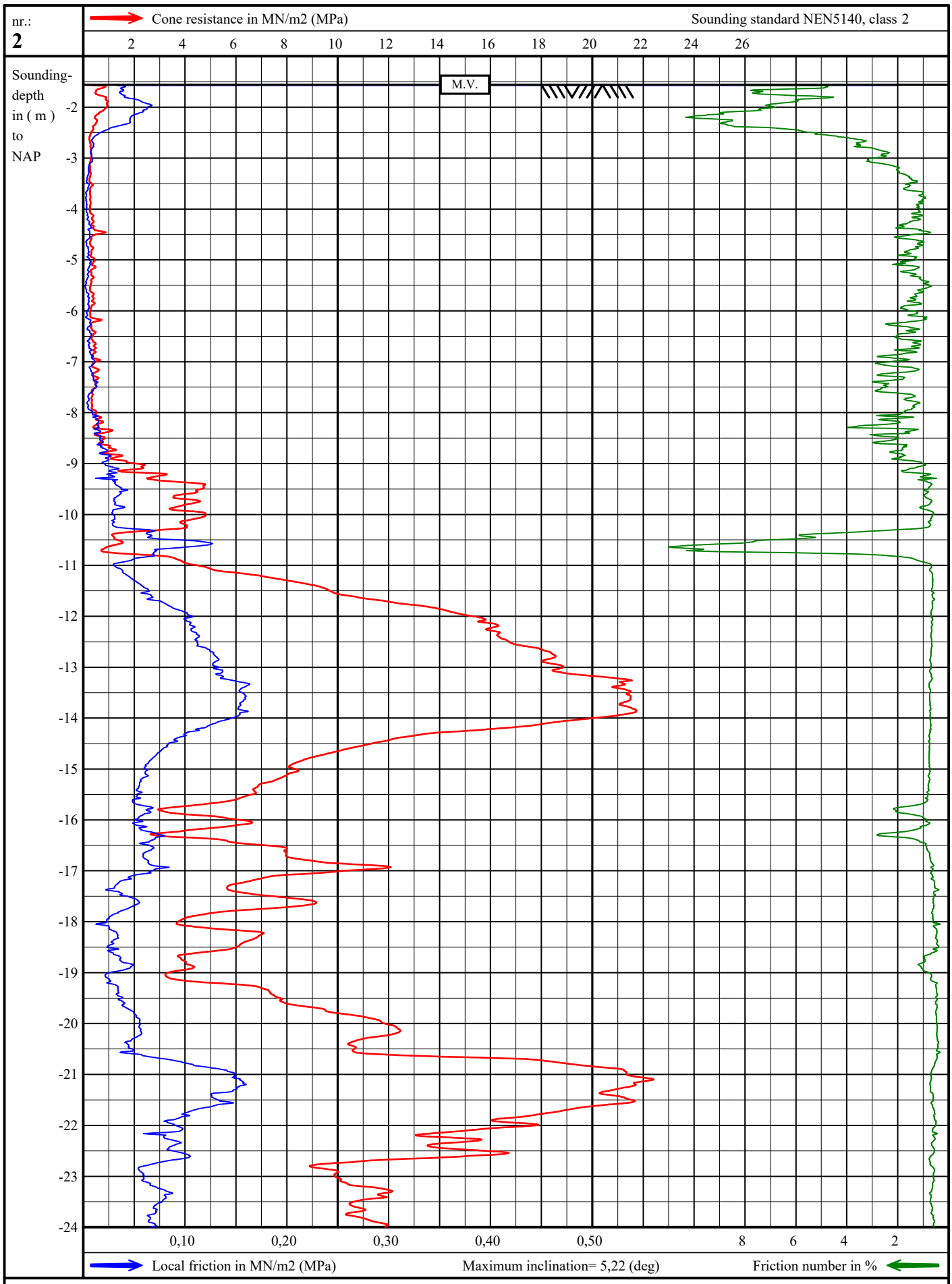
Cone resistance in MN/m2 (MPa) — Sounding standard NEN5140, class 2



Local friction in MN/m2 (MPa) — Maximum inclination= 3,99 (deg) — Friction number in %

Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121365.107 / 537776.304 (X / Y)

Windmolen	gl : NAP -1,51 m	Project number: **031002679**
Waardpolder	exec. : 07-11-2016 12:51	Sounding number **1**
	drawn: 24-11-2016	

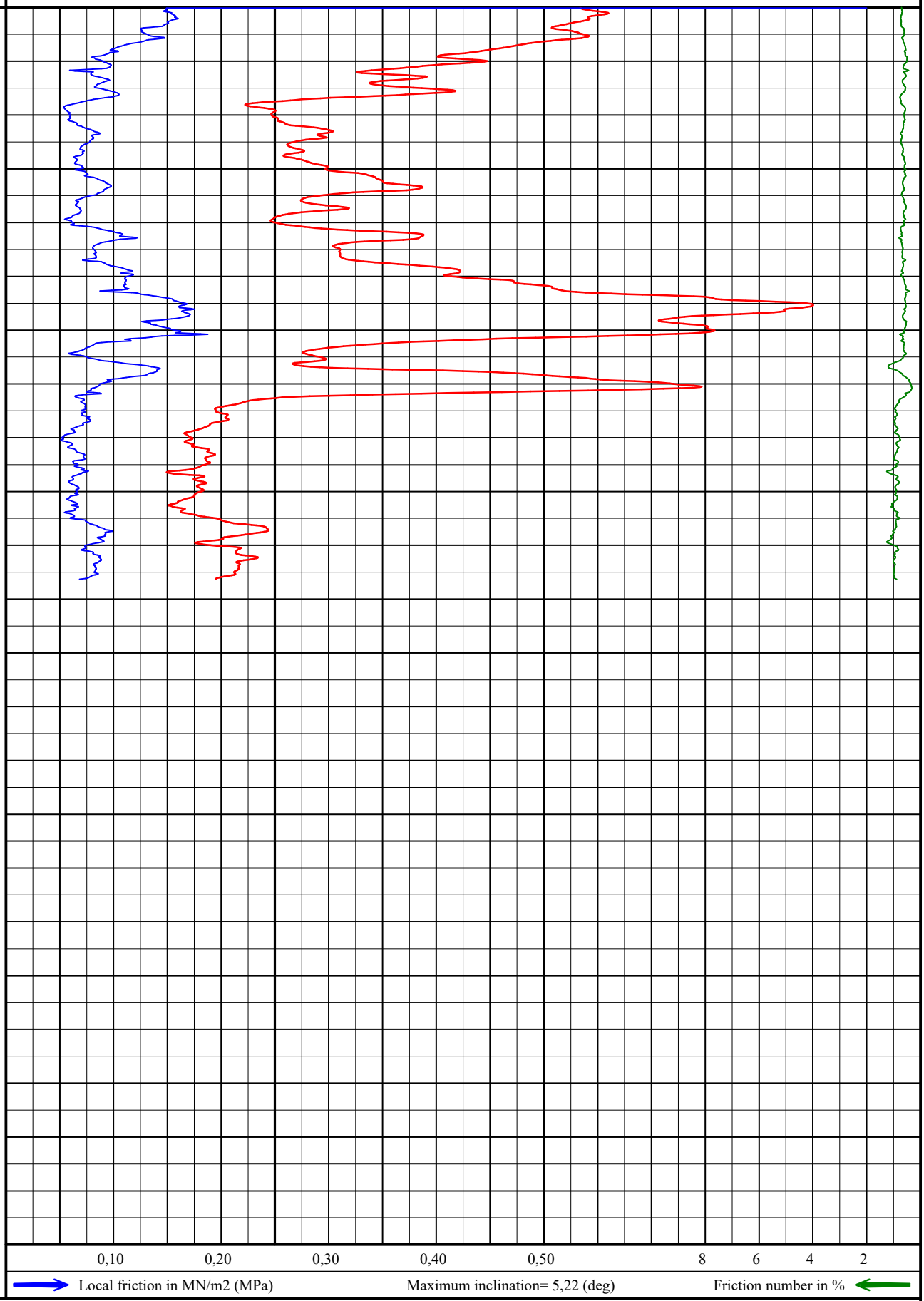


Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121369.937 / 537761.769 (X / Y)

Windmolen	gl : NAP -1,56 m	Project number: **031002679**
Waardpolder	exec. : 07-11-2016 11:54	Sounding number **2**
	drawn: 24-11-2016	

nr.: **2**

Cone resistance in MN/m2 (MPa) — Sounding standard NEN5140, class 2

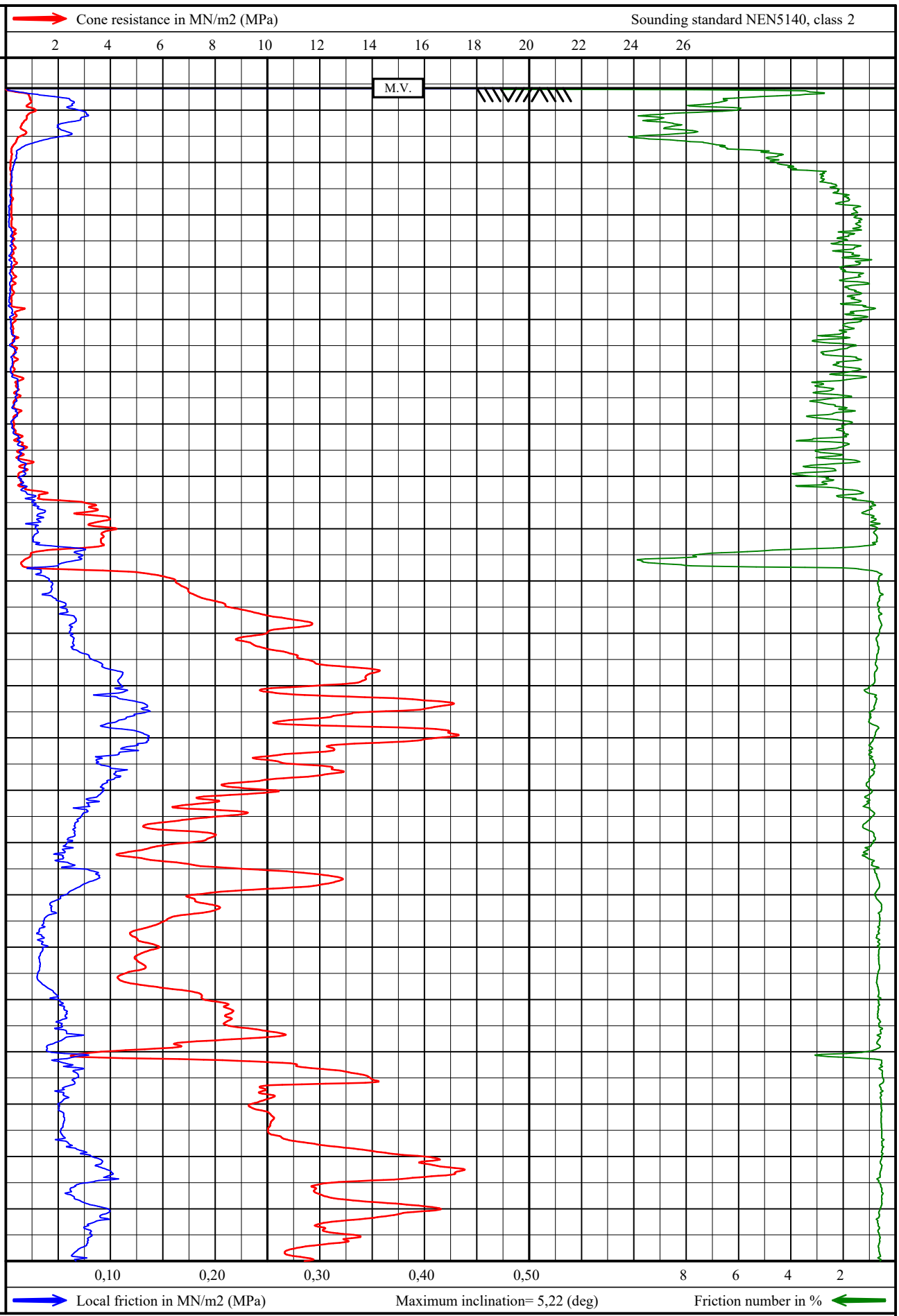


Local friction in MN/m2 (MPa) — Maximum inclination= 5,22 (deg) — Friction number in %

Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121369.937 / 537761.769 (X / Y)

Windmolen	gl : NAP -1,56 m	Project number: **031002679**
	exec. : 07-11-2016 11:54	Sounding number
Waardpolder	drawn: 24-11-2016	**2**

nr.: **3**

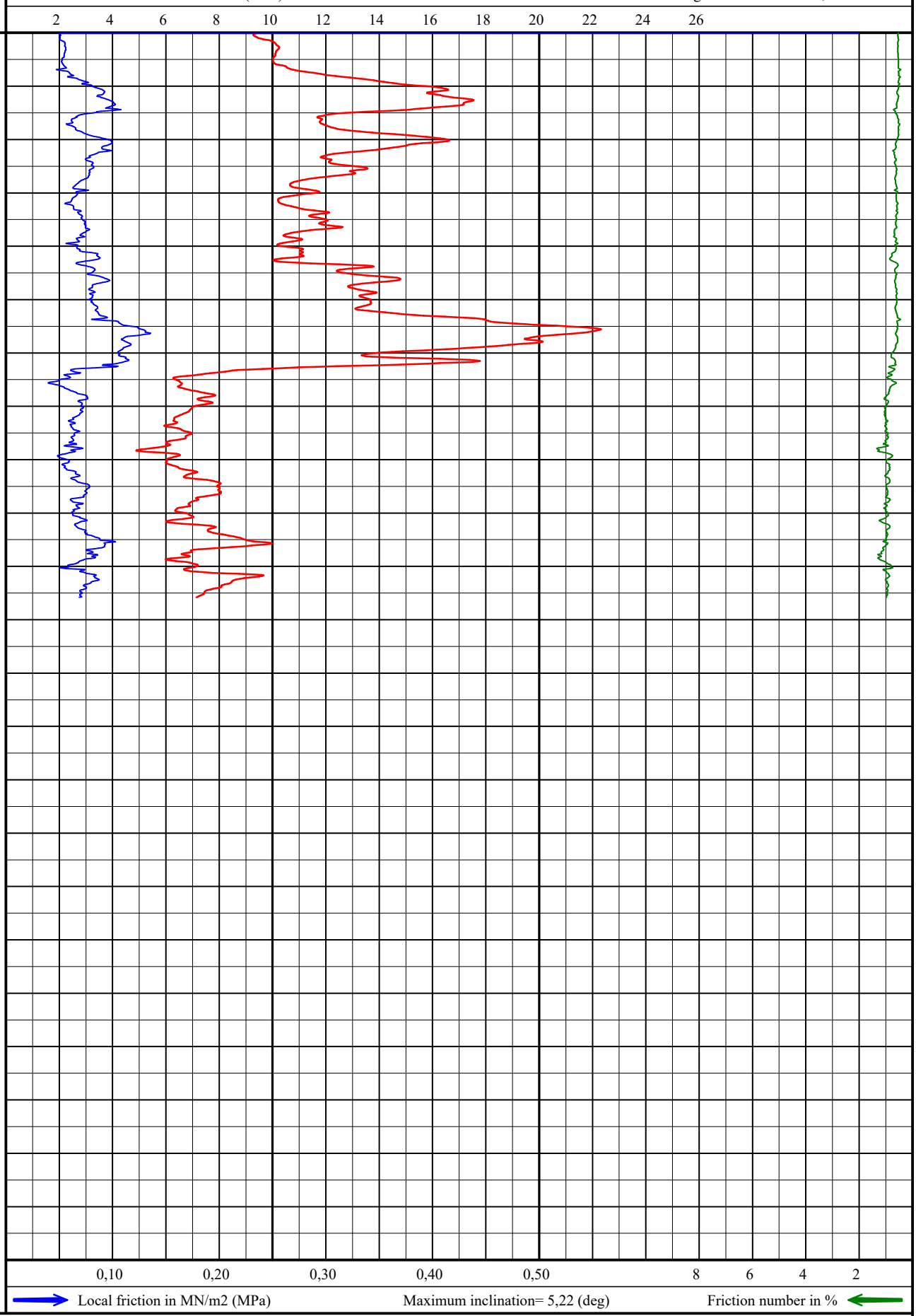


Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121349.936 / 537767.257 (X / Y)

Windmolen	gl : NAP -1,58 m	Project number: **031002679**
Waardpolder	exec. : 07-11-2016 11:06	Sounding number **3**
	drawn: 24-11-2016	

nr.: **3**

Cone resistance in MN/m2 (MPa) — Sounding standard NEN5140, class 2

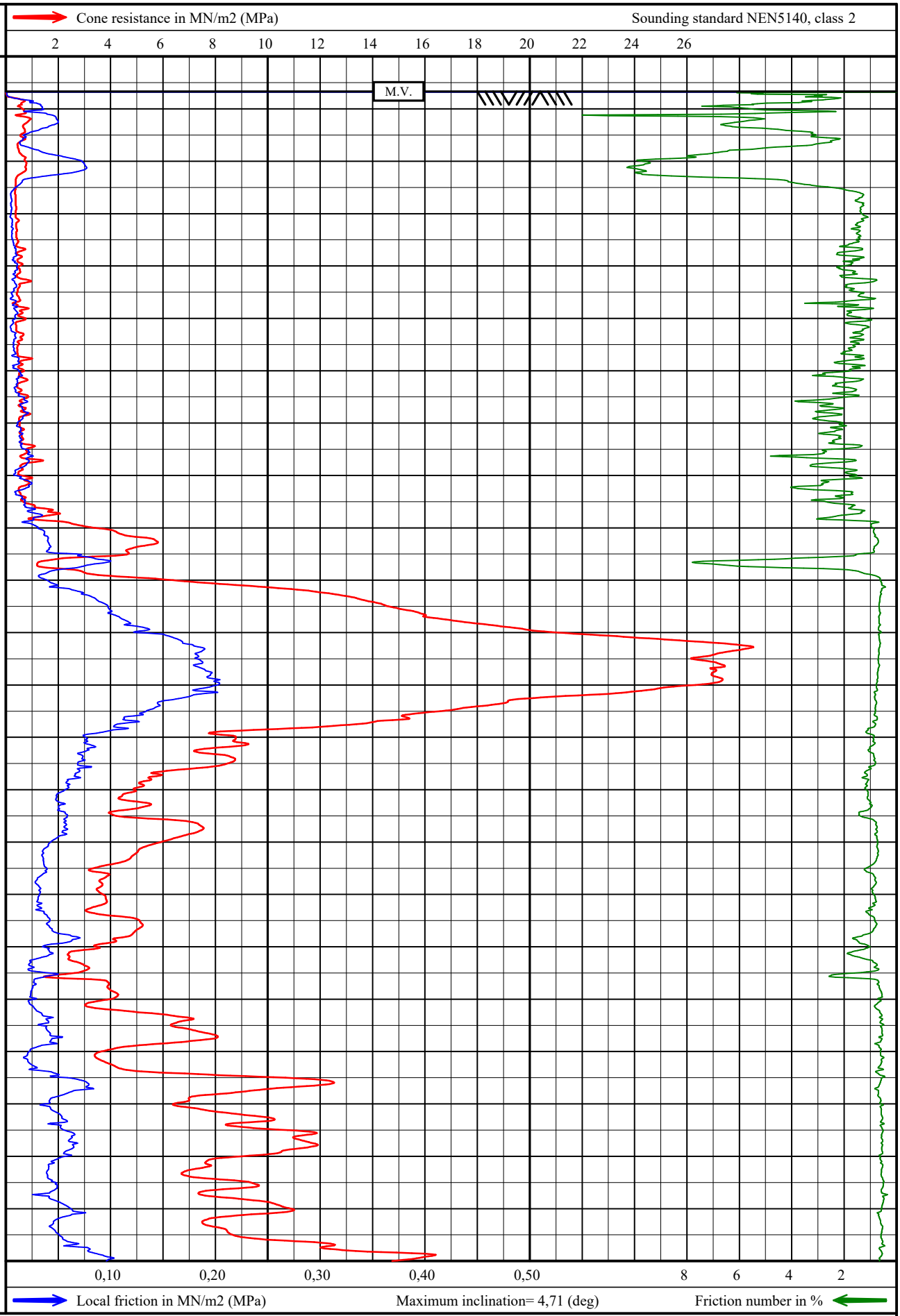


Local friction in MN/m2 (MPa) — Maximum inclination= 5,22 (deg) — Friction number in %

Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121349.936 / 537767.257 (X / Y)

Windmolen	gl : NAP -1,58 m	Project number: **031002679**
	exec. : 07-11-2016 11:06	Sounding number
Waardpolder	drawn: 24-11-2016	**3**

nr.: **4**

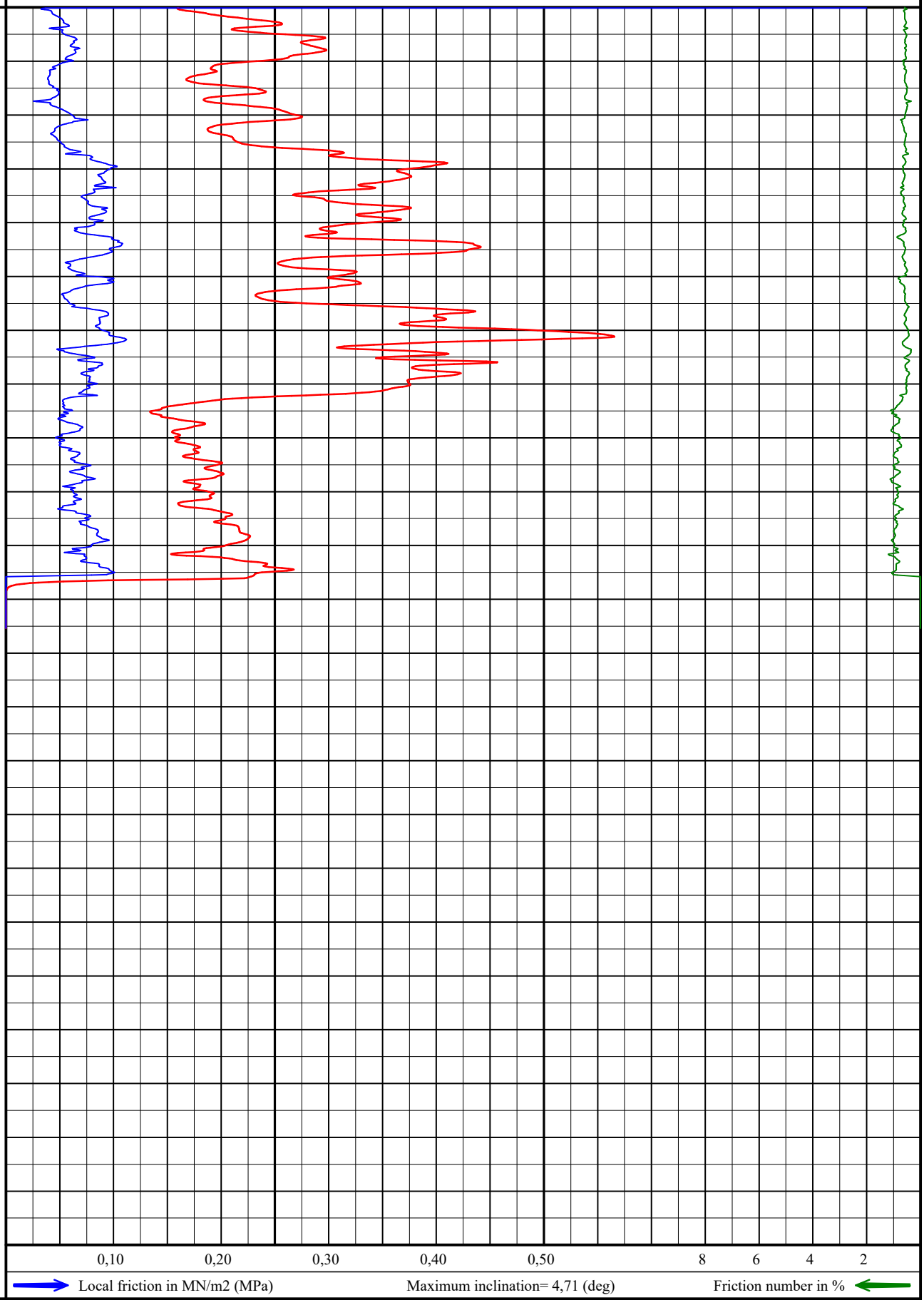


Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121328.234 / 537771.142 (X / Y)

Windmolen	gl : NAP -1,67 m	Project number: **031002679**
Waardpolder	exec. : 07-11-2016 10:19	Sounding number **4**
	drawn: 24-11-2016	

nr.: **4**

Cone resistance in MN/m2 (MPa) — Sounding standard NEN5140, class 2



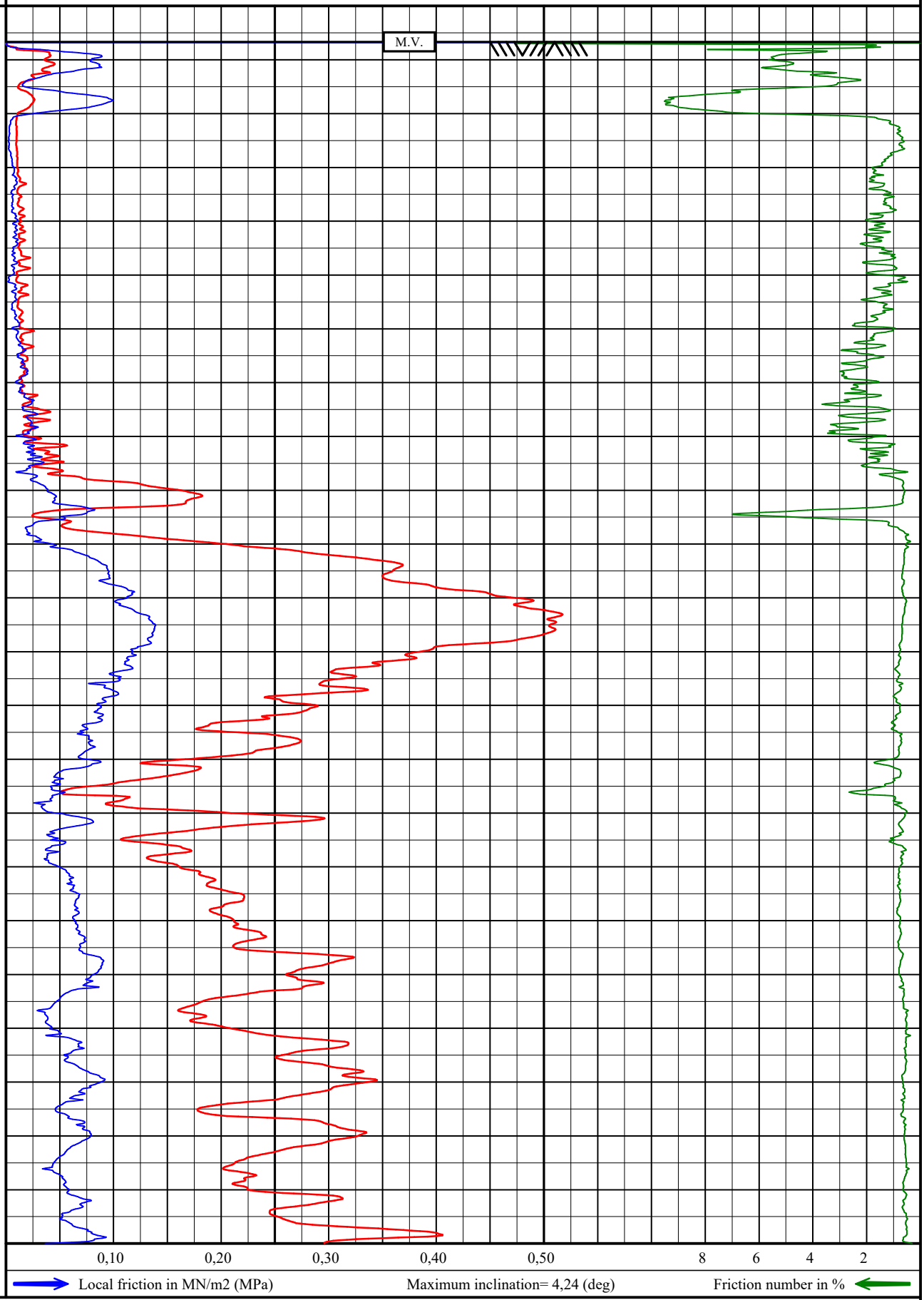
Local friction in MN/m2 (MPa) — Maximum inclination= 4,71 (deg) — Friction number in %

Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121328.234 / 537771.142 (X / Y)

Windmolen	gl : NAP -1,67 m	Project number: **031002679**
Waardpolder	exec. : 07-11-2016 10:19	Sounding number **4**
	drawn: 24-11-2016	

nr.: **5**

Cone resistance in MN/m2 (MPa) — Sounding standard NEN5140, class 2



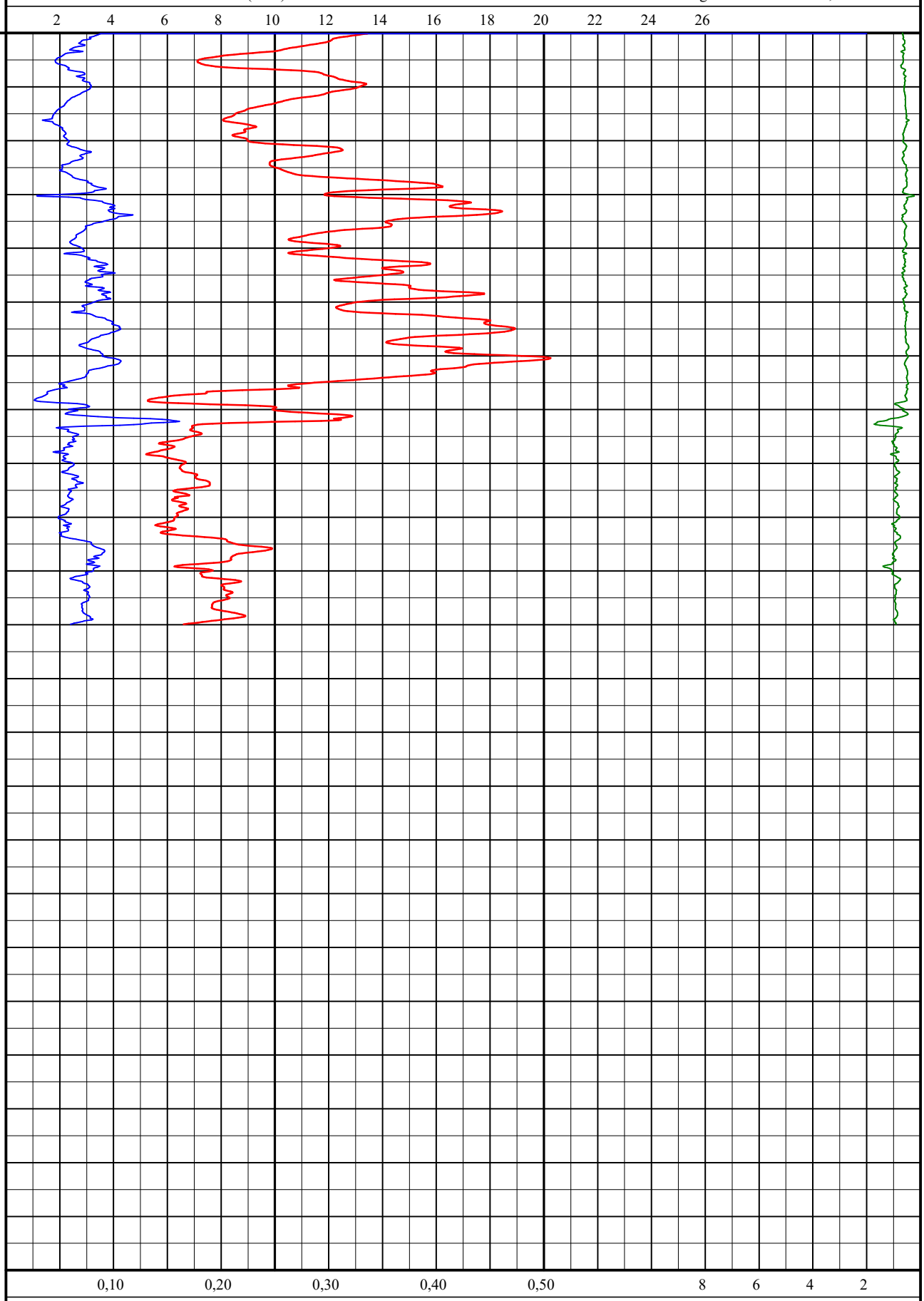
Local friction in MN/m2 (MPa) — Maximum inclination= 4,24 (deg) — Friction number in %

Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121319.601 / 537772.630 (X / Y)

Windmolen	gl : NAP -1,67 m	Project number: **031002679**
Waardpolder	exec. : 07-11-2016 09:35	Sounding number **5**
	drawn: 24-11-2016	

nr.: **5**

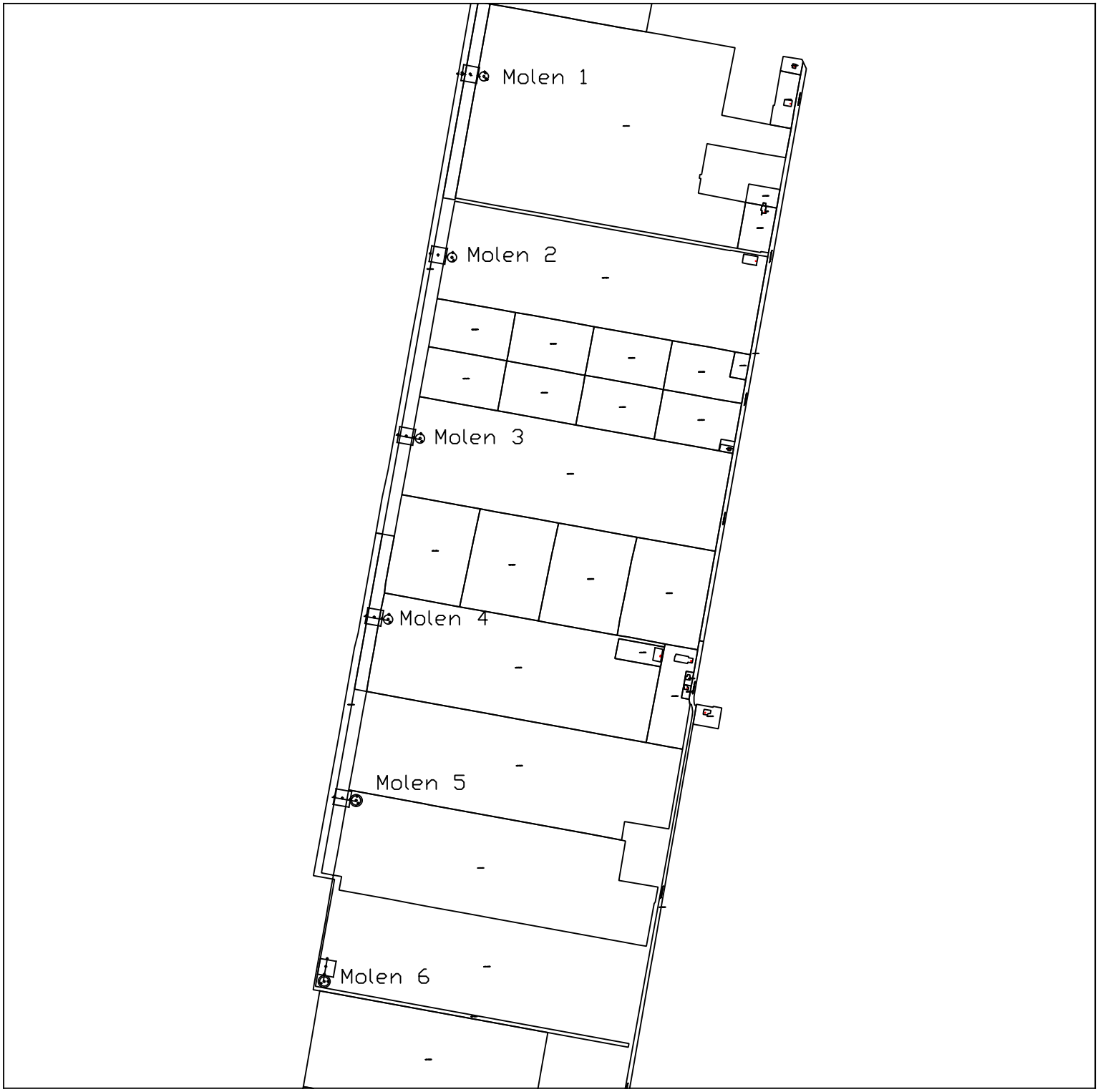
Cone resistance in MN/m2 (MPa) — Sounding standard NEN5140, class 2



Local friction in MN/m2 (MPa) — Maximum inclination= 4,24 (deg) — Friction number in %

Cone-ID: S10-CFI.625 A-mantle: 15000 mm^2 A-cone: 1000 mm^2 Location: 121319.601 / 537772.630 (X / Y)

Windmolen	gl : NAP -1,67 m	Project number: **031002679**
Waardpolder	exec. : 07-11-2016 09:35	Sounding number **5**
	drawn: 24-11-2016	



Locatie: Waardpolder

Te: **Wieringerwaard**

Projectnummer: 031002679

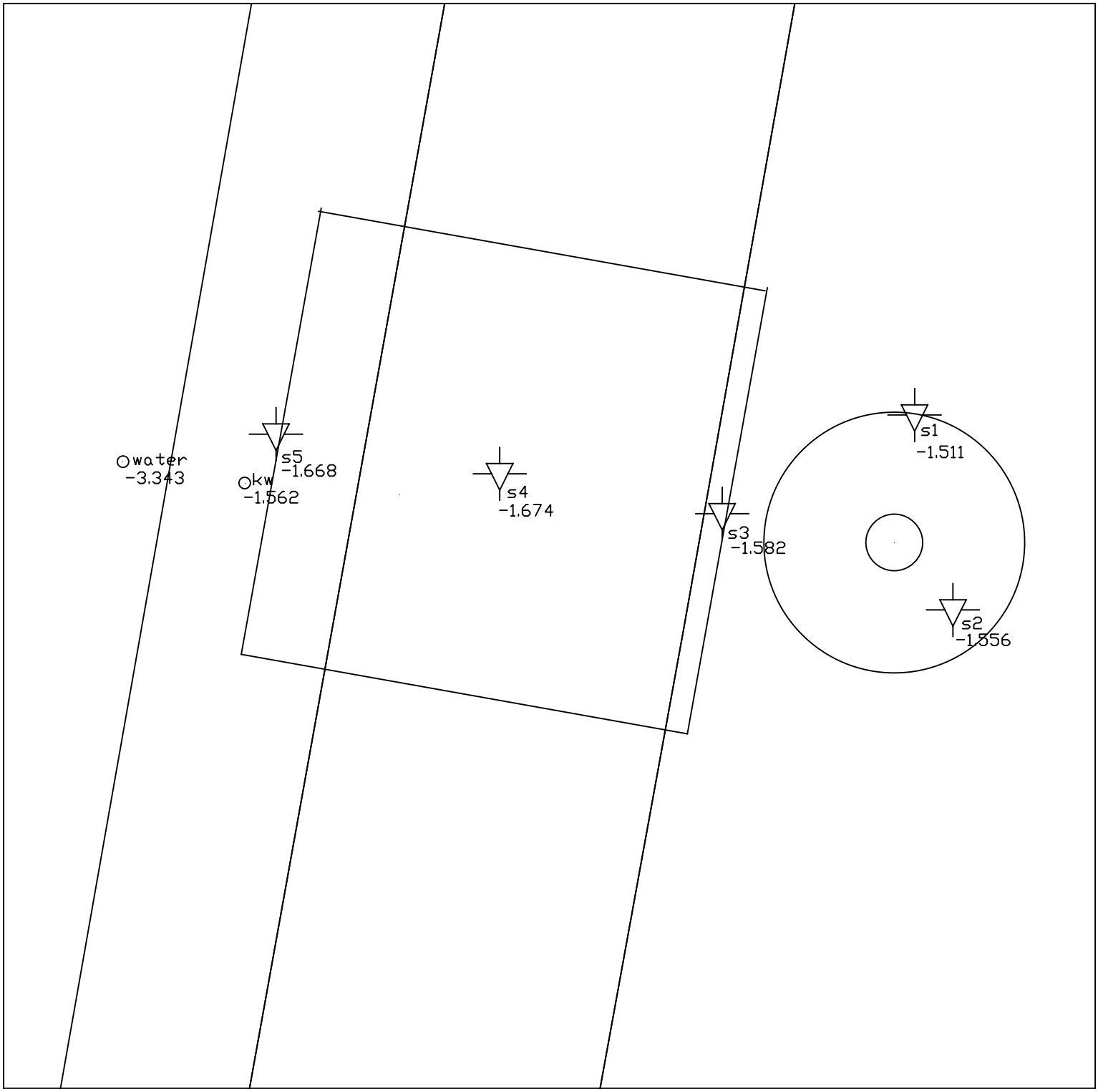
Opdrachtgever: **WP Energiek BV**

Legenda

= Sondering

= Vast punt

N



Locatie: Waardpolder

Te: **Wieringerwaard**

Projectnummer: 031002679

Opdrachtgever: **WP Energiek BV**

Legenda

= Sondering

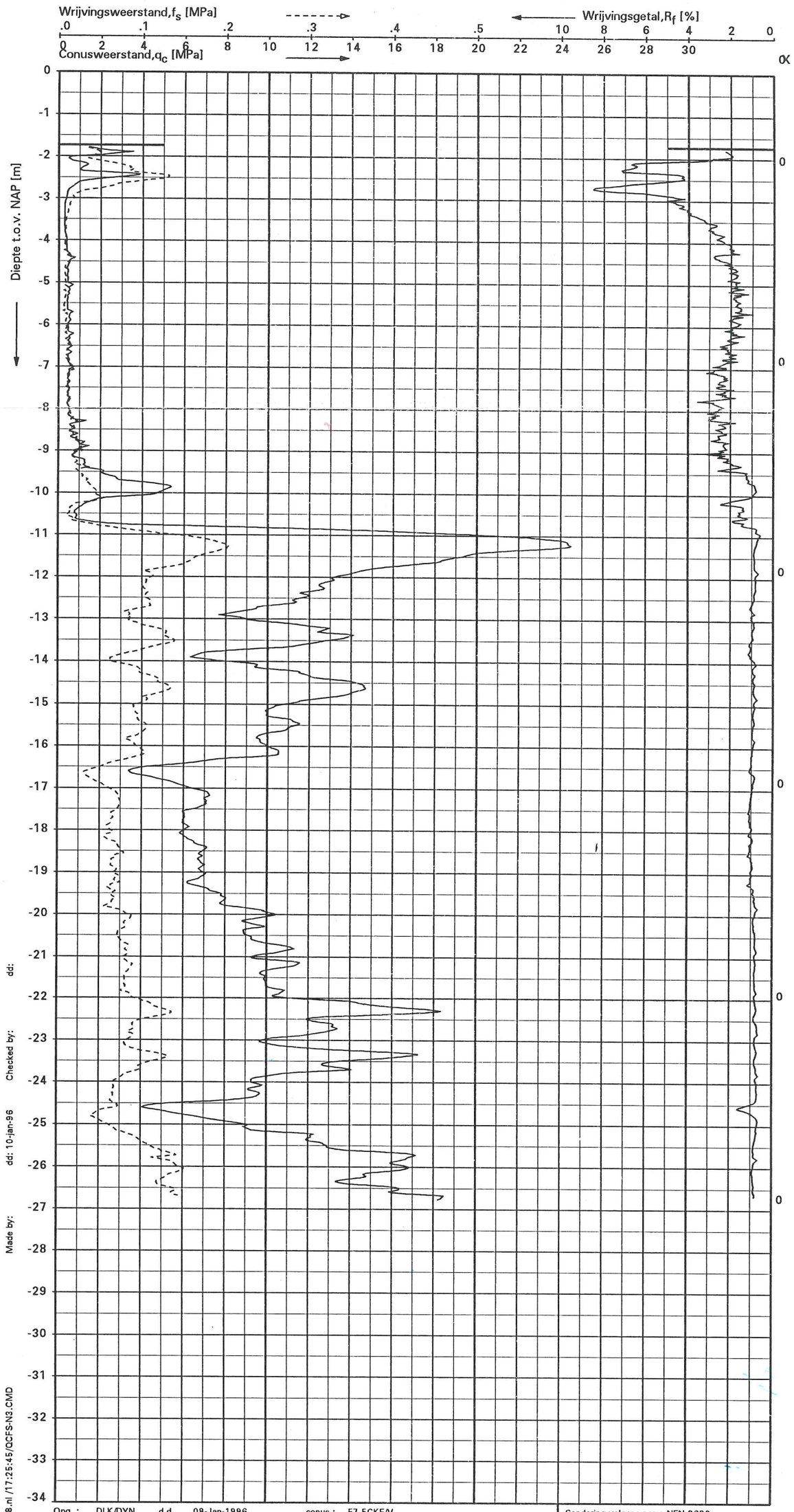
= Vast punt

N

Bijlage C: indicatieve grondonderzoeken WTG2 t/m WTG6

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



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Get. : HUN d.d. 10-jan-96 MV = NAP -1.73 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
ϝ: afwijking van de vertikaal

UNIPLOT 01.08.nl /17:25:45/QCFS-N3.CMD

Made by: dd: 10-jan-96 Checked by: dd:

SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 1

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

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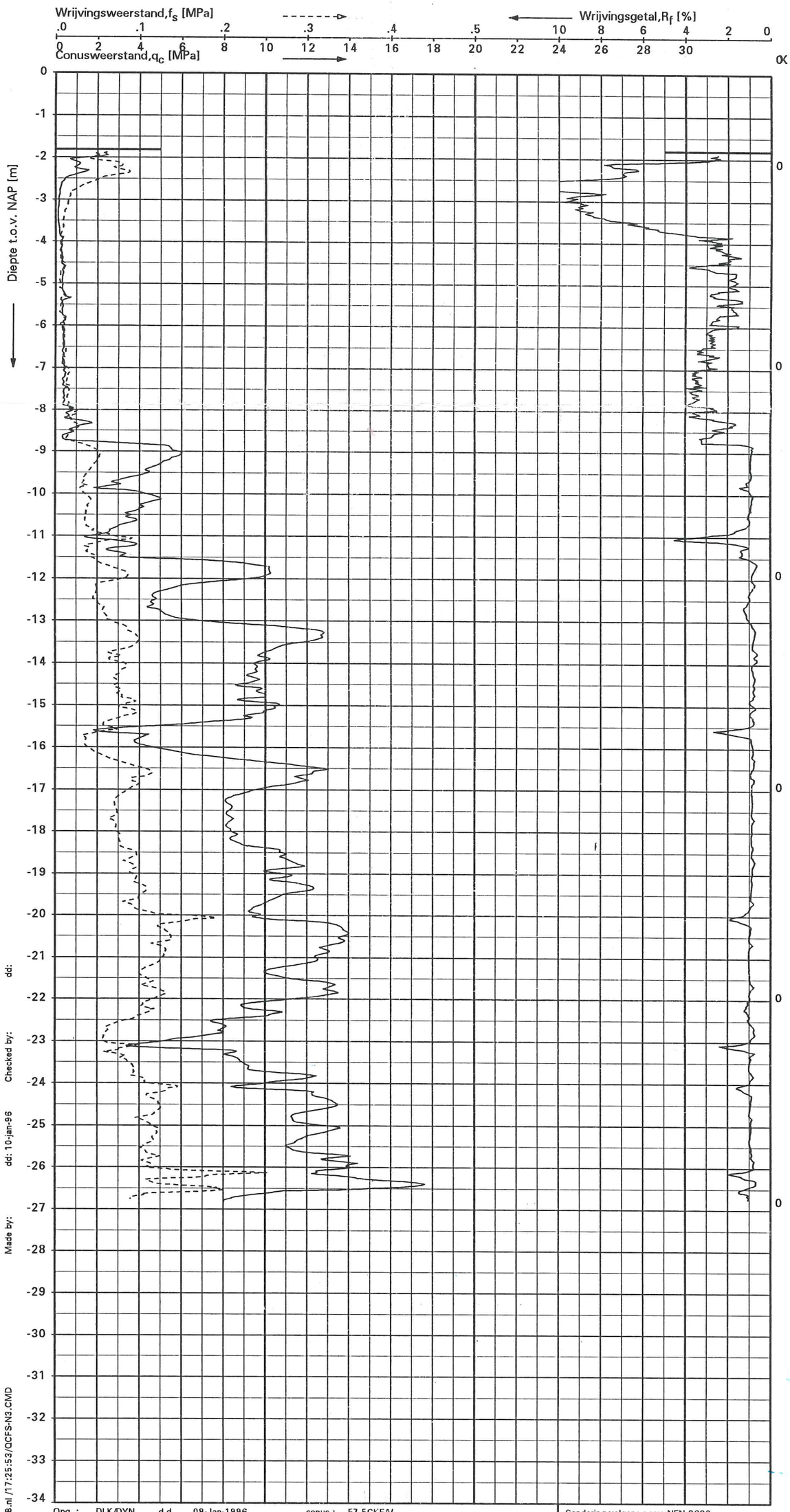

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Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.81 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
ØC afwijking van de vertikaal

SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 2

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

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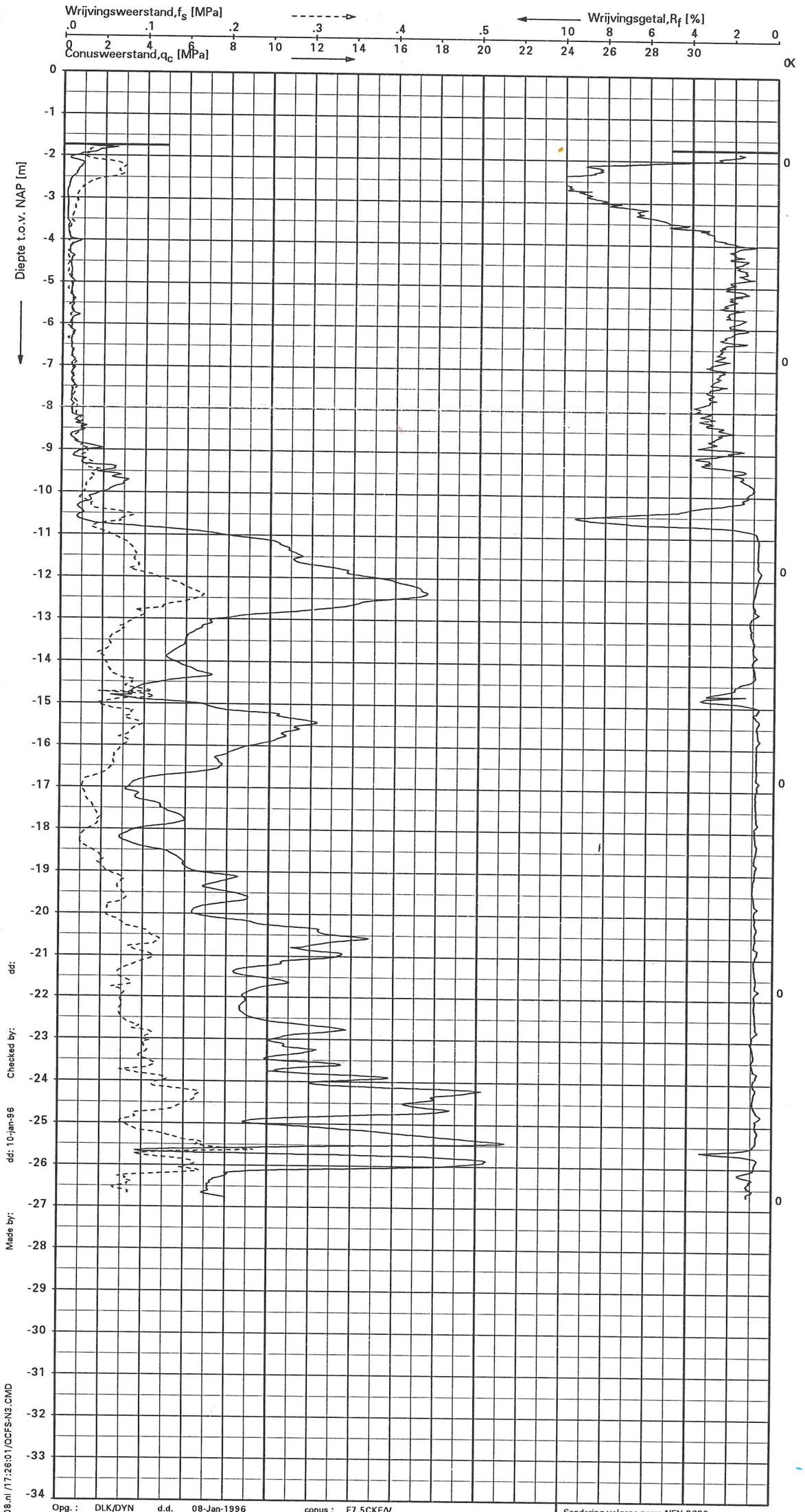

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Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.74 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
ØK: afwijking van de vertikaal

SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 3

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

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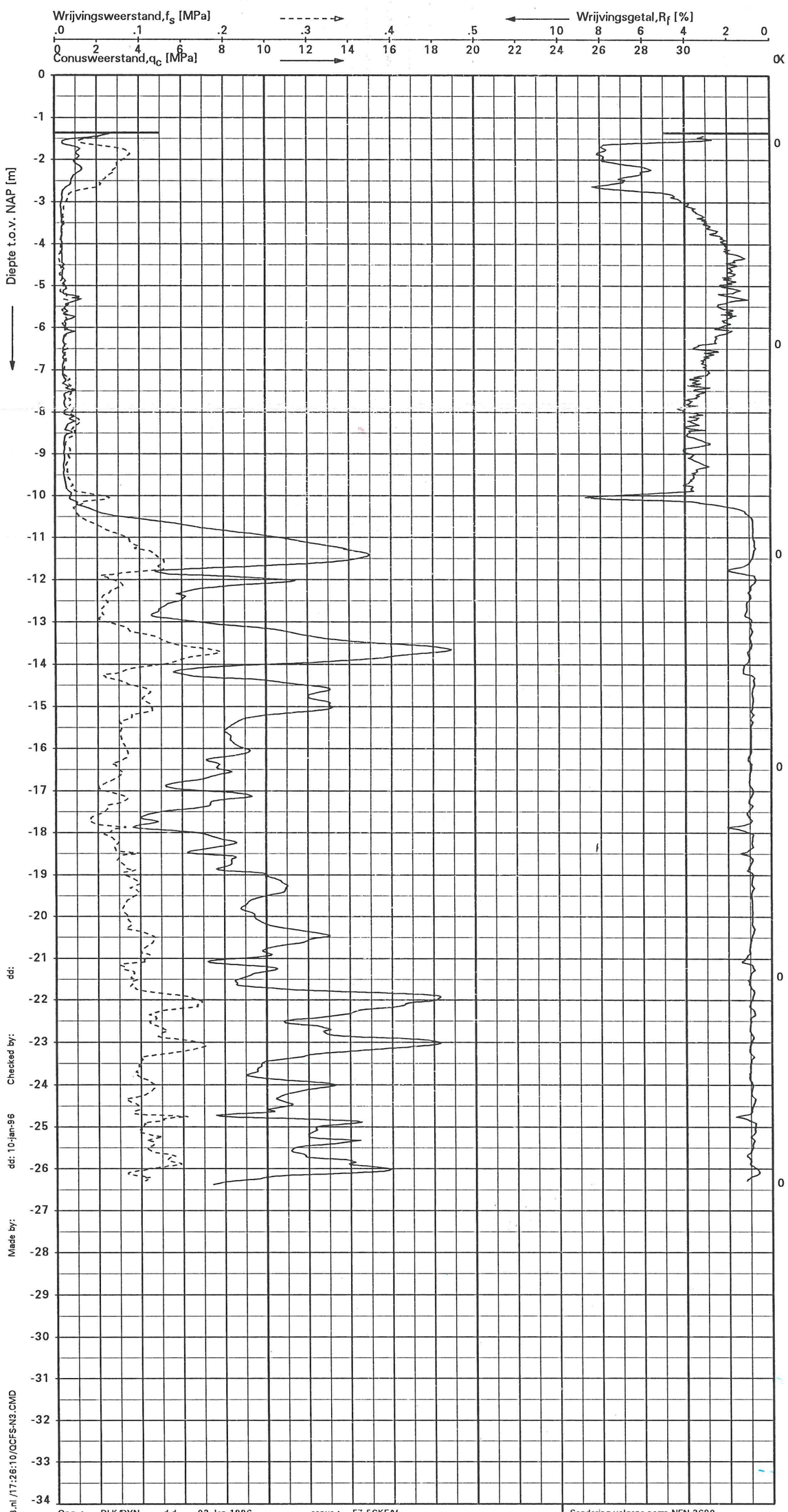

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Get. :	HUN	d.d.	10-jan-96	MV = NAP -1.36	m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
ØC afwijking van de vertikaal

SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 4

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

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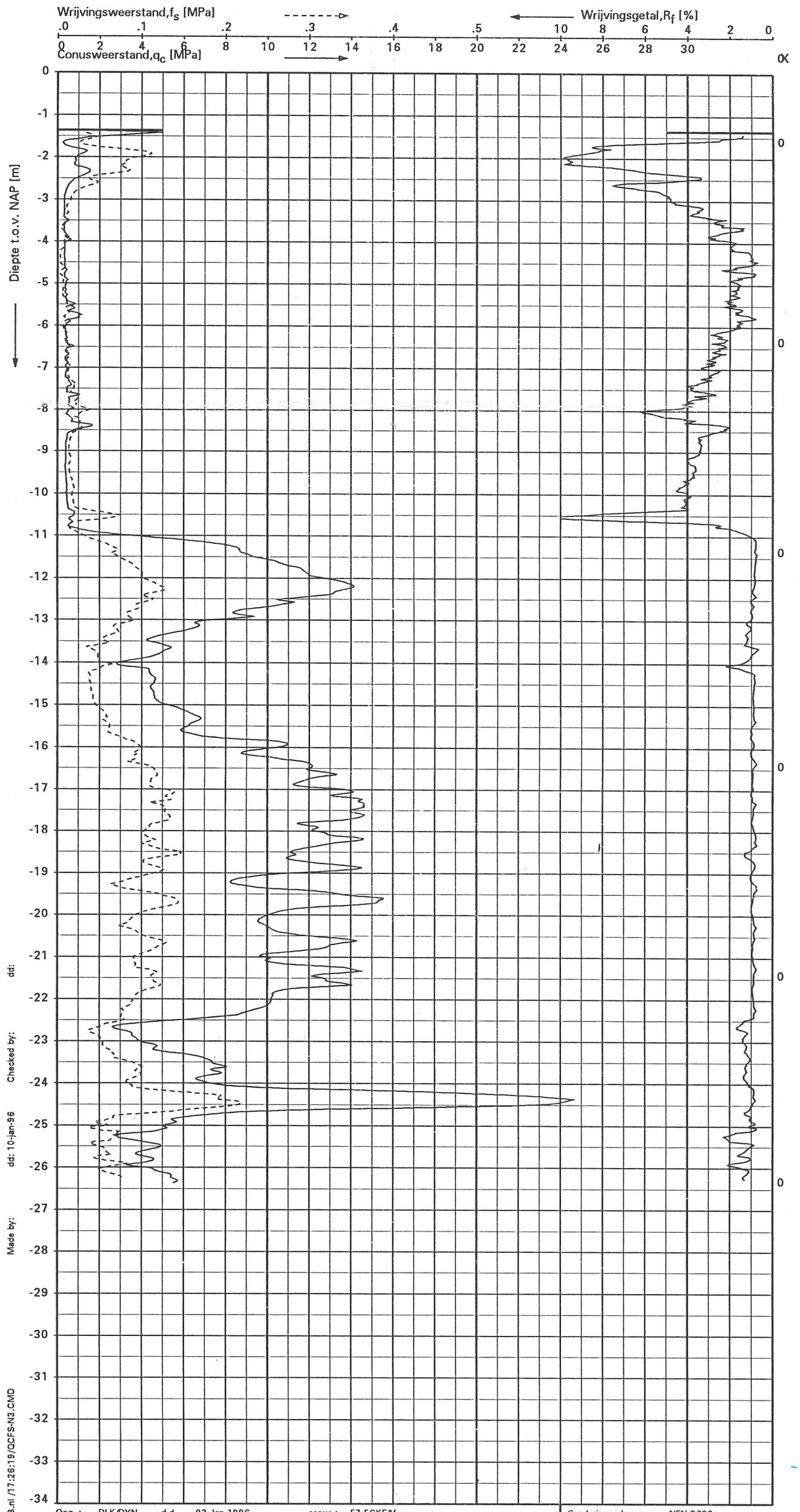

Opg. : DLK/DYN d.d. 03-Jan-1996 conus : F7.5CKE/V
Get. : HUN d.d. 10-jan-96 MV = NAP -1.36 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
0K: afwijking van de vertikaal

Made by: dd: 10-jan-96 Checked by: dd:

UNIPLOT 01.08.nl /17:26:19/QCFS-N3.CMD

SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 5

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

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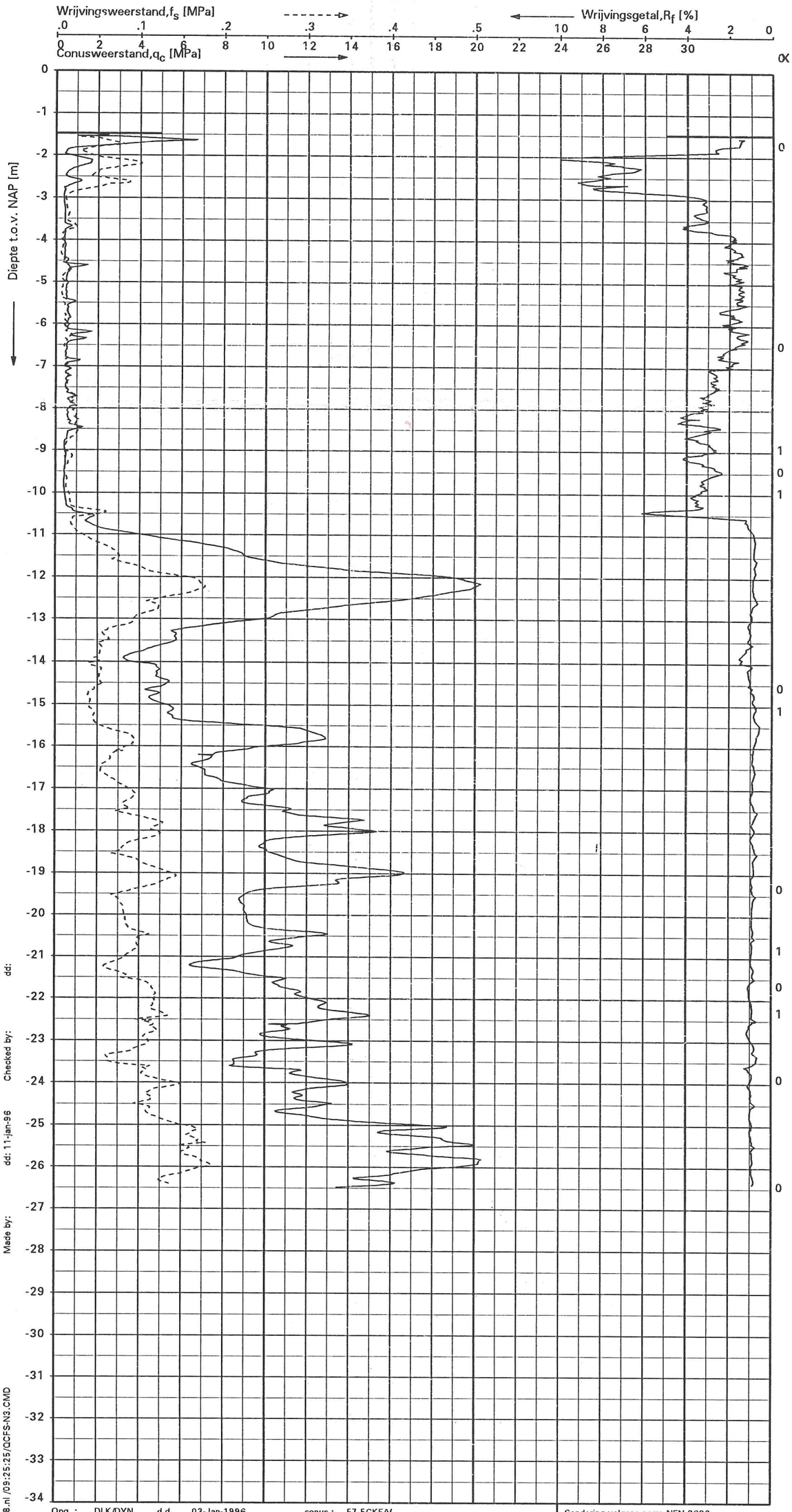

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Get. :	HUN	d.d.	11-jan-96	MV = NAP -1.48	m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
0α afwijking van de vertikaal

SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 6

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

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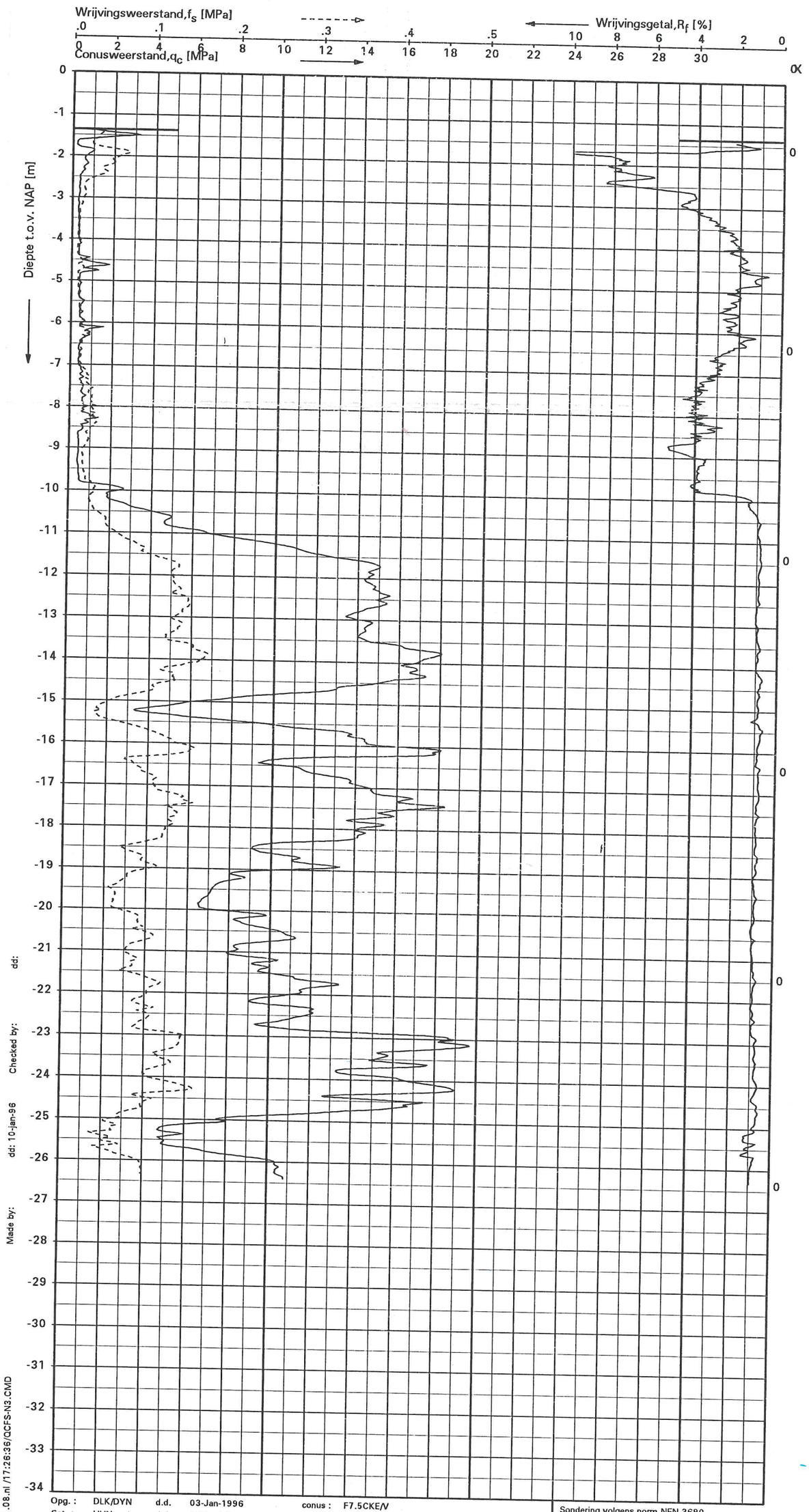

Made by: dd: 10-jan-96 Checked by: dd:

UNIPLOT 01.08.nl /17:26:36/QCFS-N3.CMD

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Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.36 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
℄: afwijking van de vertikaal

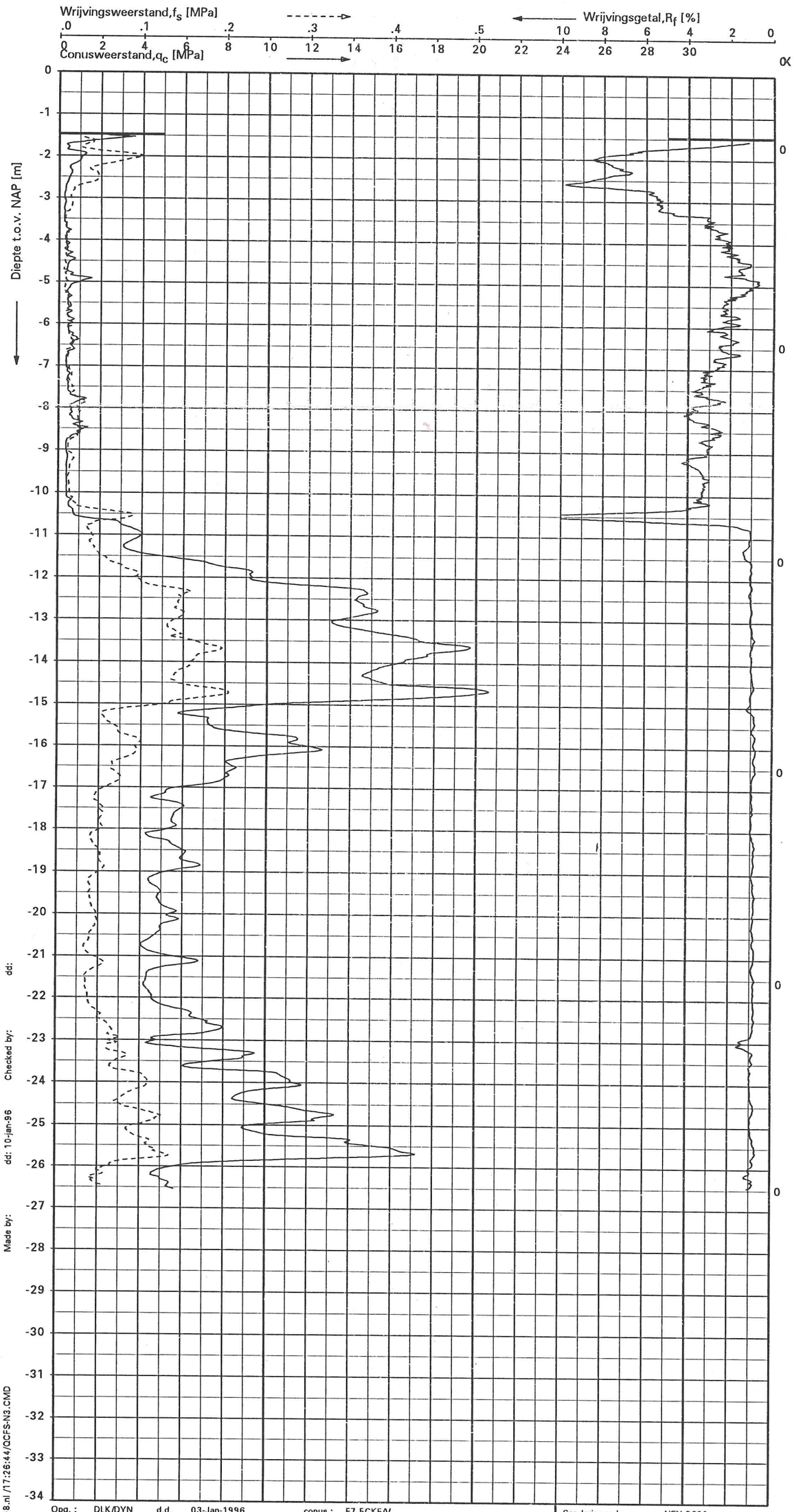
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 7

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Made by: dd: 10-jan-96 Checked by: dd:

UNIPLOT 01.08.nl /17:26:44/OCFS-N3.CMD

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Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.47 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
OK afwijking van de vertikaal

SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 8

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

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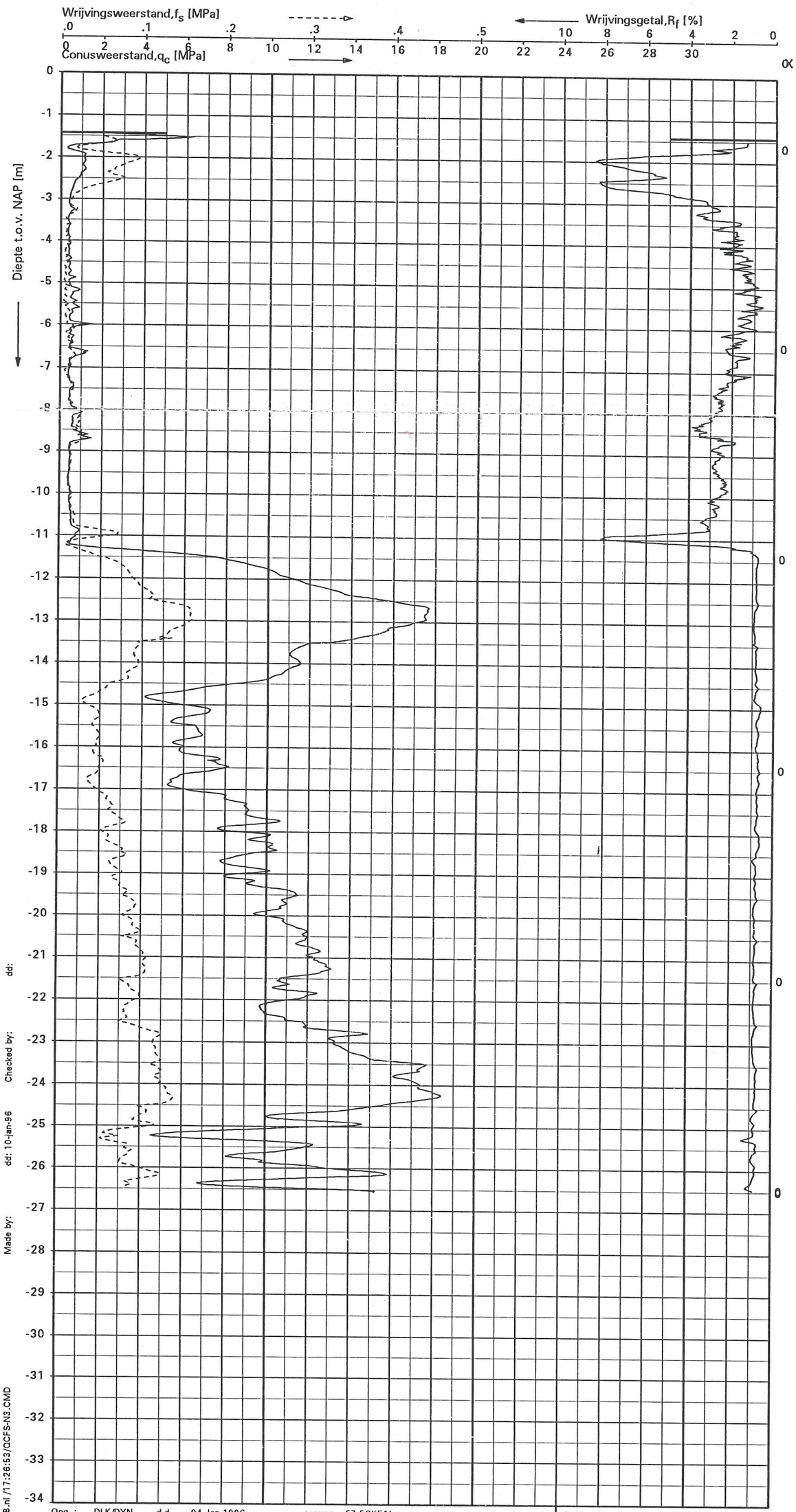


Made by: dd: 10-jan-96 Checked by: dd:

UNIPLOT 01.08.nl /17:26:53/QCFS-N3.CMD

Opg. :	DLK/DYN	d.d.	04-Jan-1996	conus :	F7.5CKE/V
Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.43 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
α: afwijking van de vertikaal

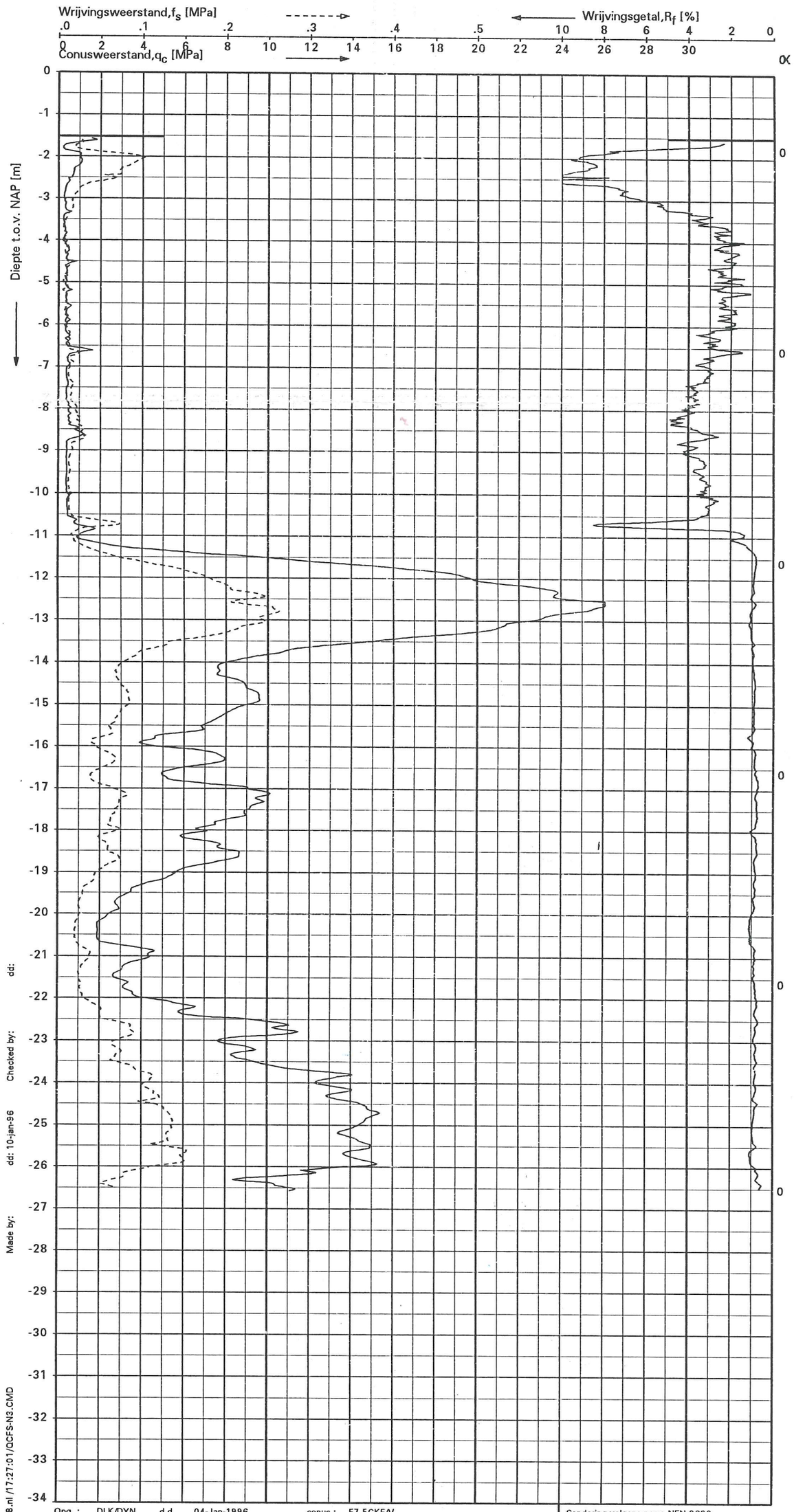
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 9

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Made by: dd: 10-jan-96 Checked by: dd:

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Opg. :	DLK/DYN	d.d.	04-Jan-1996	conus :	F7.5CKE/V
Get. :	HUN	d.d.	10-jan-96	MV = NAP -1.52	m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
OK: afwijking van de vertikaal

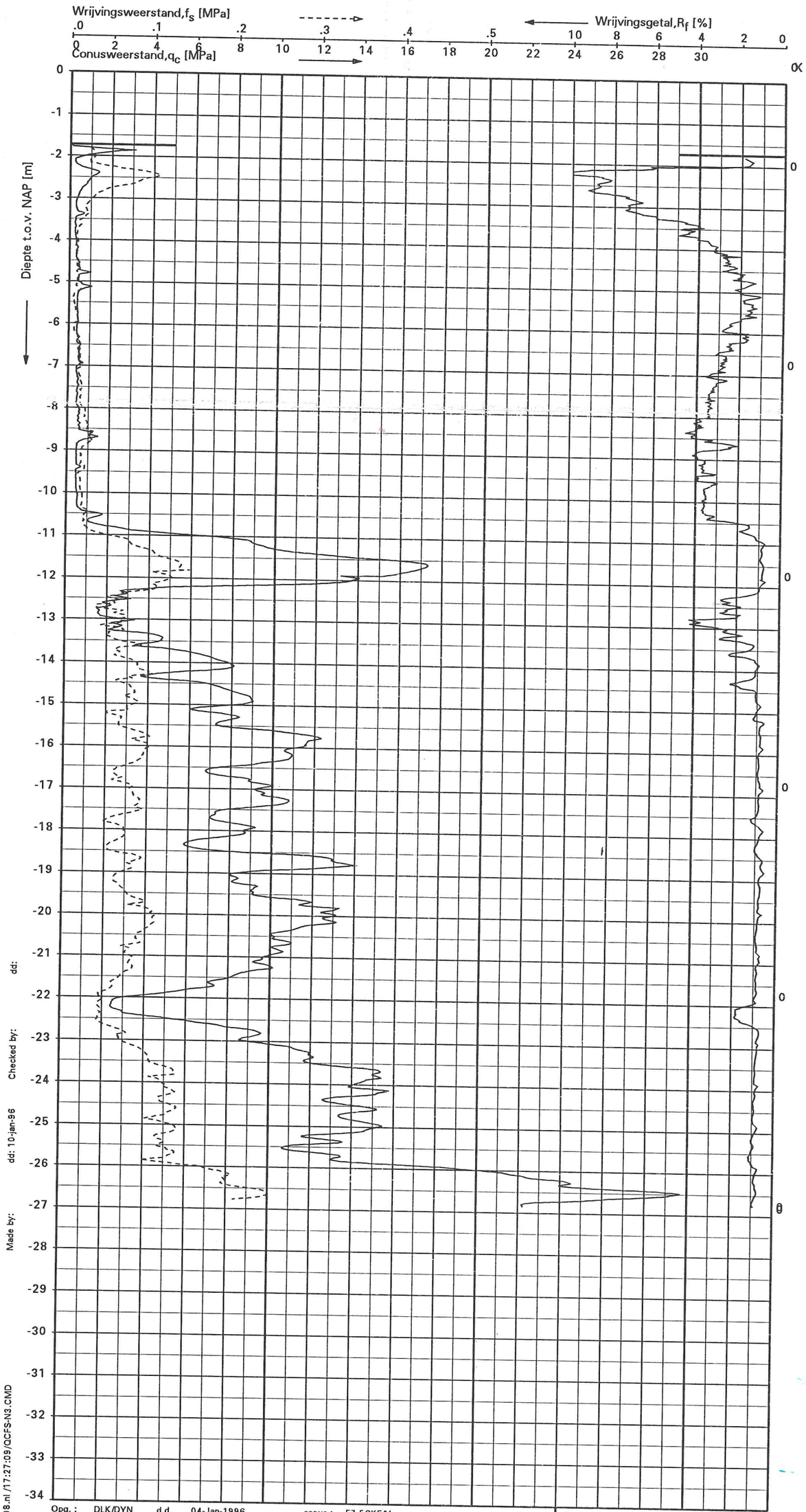
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 10

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



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Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.72 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
α: afwijking van de vertikaal

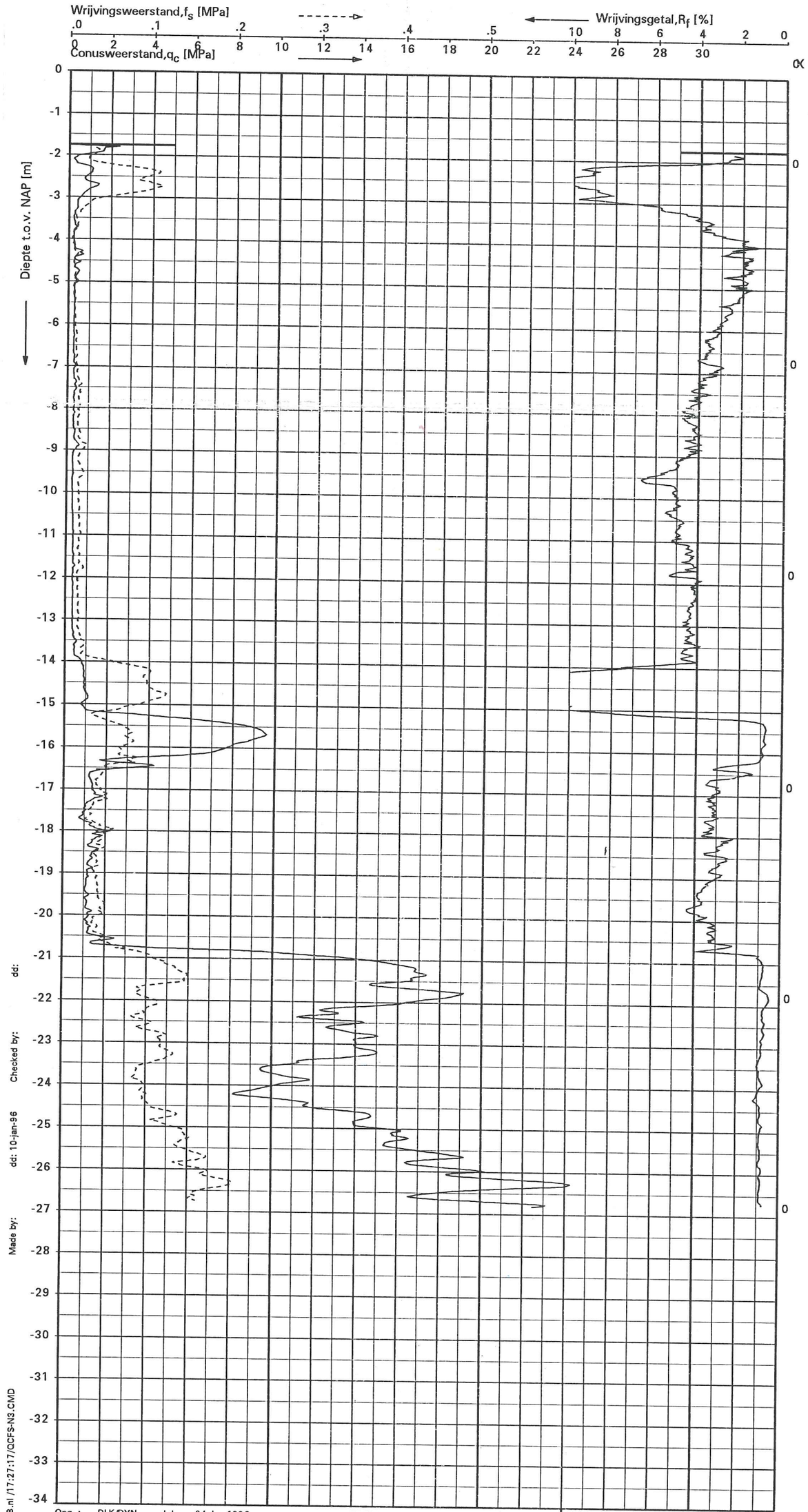
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 11

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Opg.: DLK/DYN d.d. 04-Jan-1996 conus: F7.5CKE/V
Get.: HUN d.d. 10-jan-96 MV = NAP -1.75 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
α: afwijking van de vertikaal

Made by: Checked by: dd: dd: 10-jan-96

UNIPLOT 01.08.nl /17:27:17/QCFS-N3.CMD

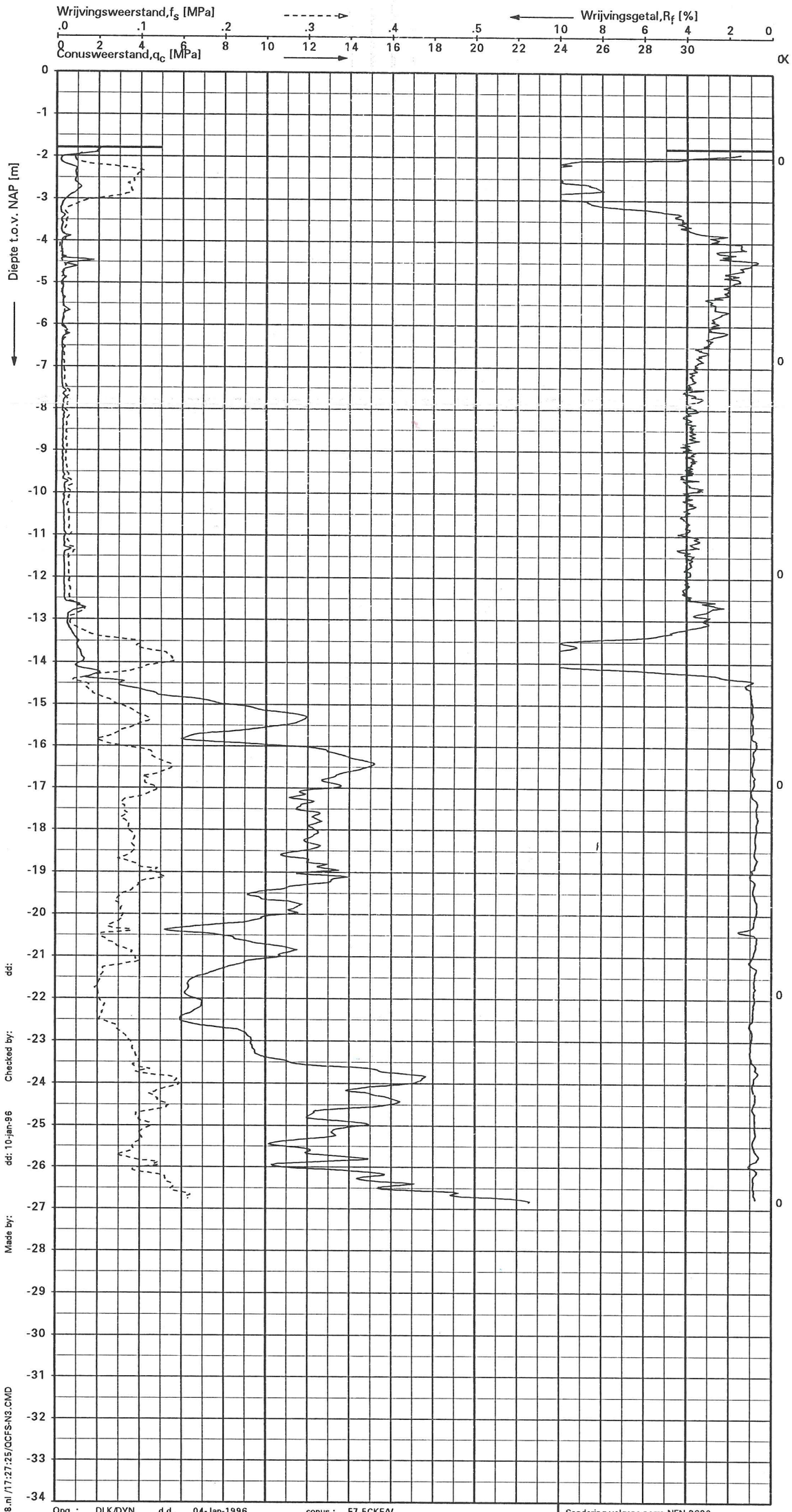
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 12

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Made by: dd: 10-jan-96 Checked by: dd:

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Opg. :	DLK/DYN	d.d.	04-Jan-1996	conus :	F7.5CKE/V
Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.79 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
ØK: afwijking van de vertikaal

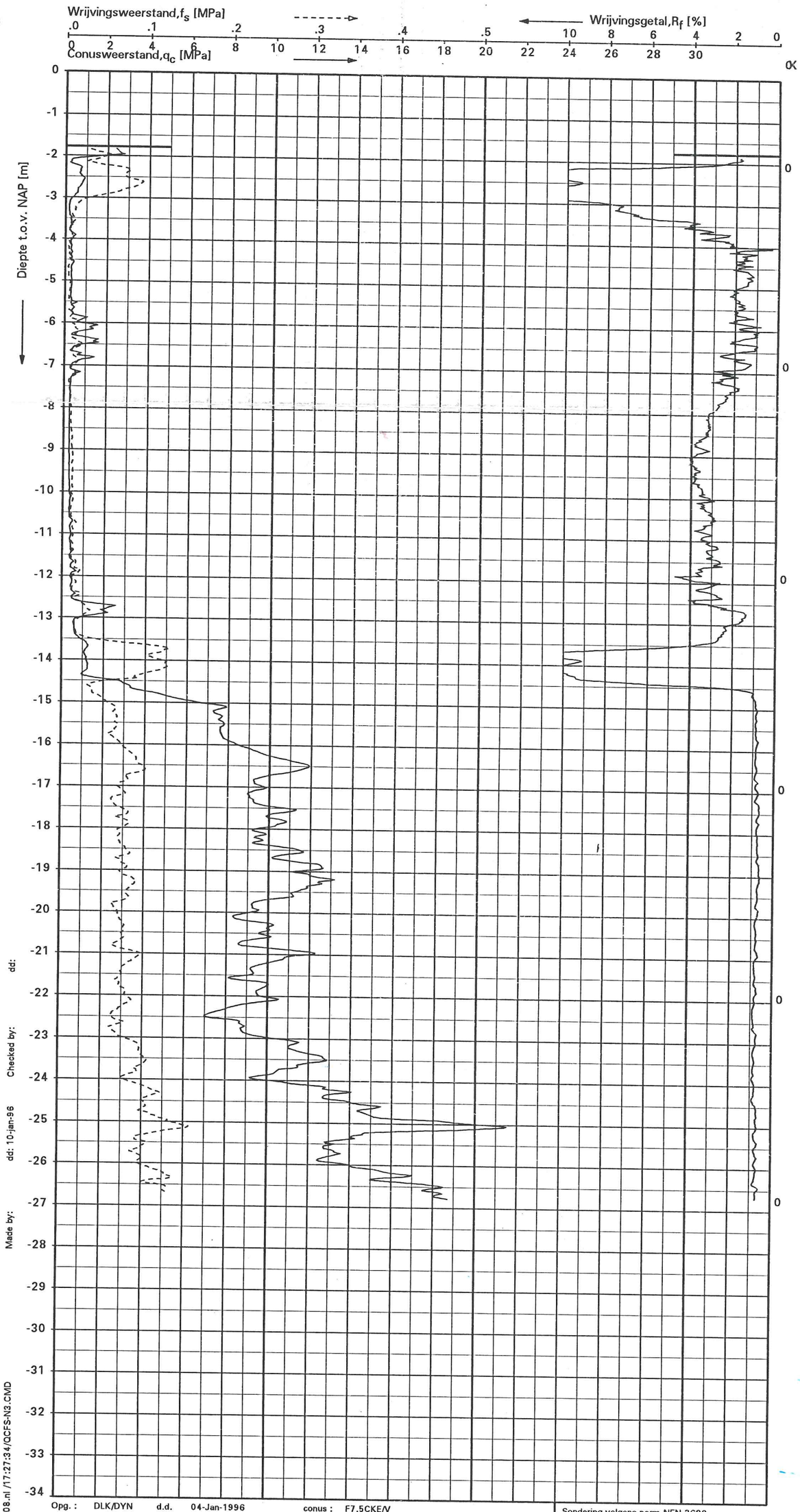
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 13

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



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Get. : HUN d.d. 10-jan-96 MV = NAP -1.77 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
0K afwijking van de vertikaal

Made by: dd: 10-jan-96 Checked by: dd:

UNIPLOT 01.08.nl /17:27:34/QCFS-N3.CMD

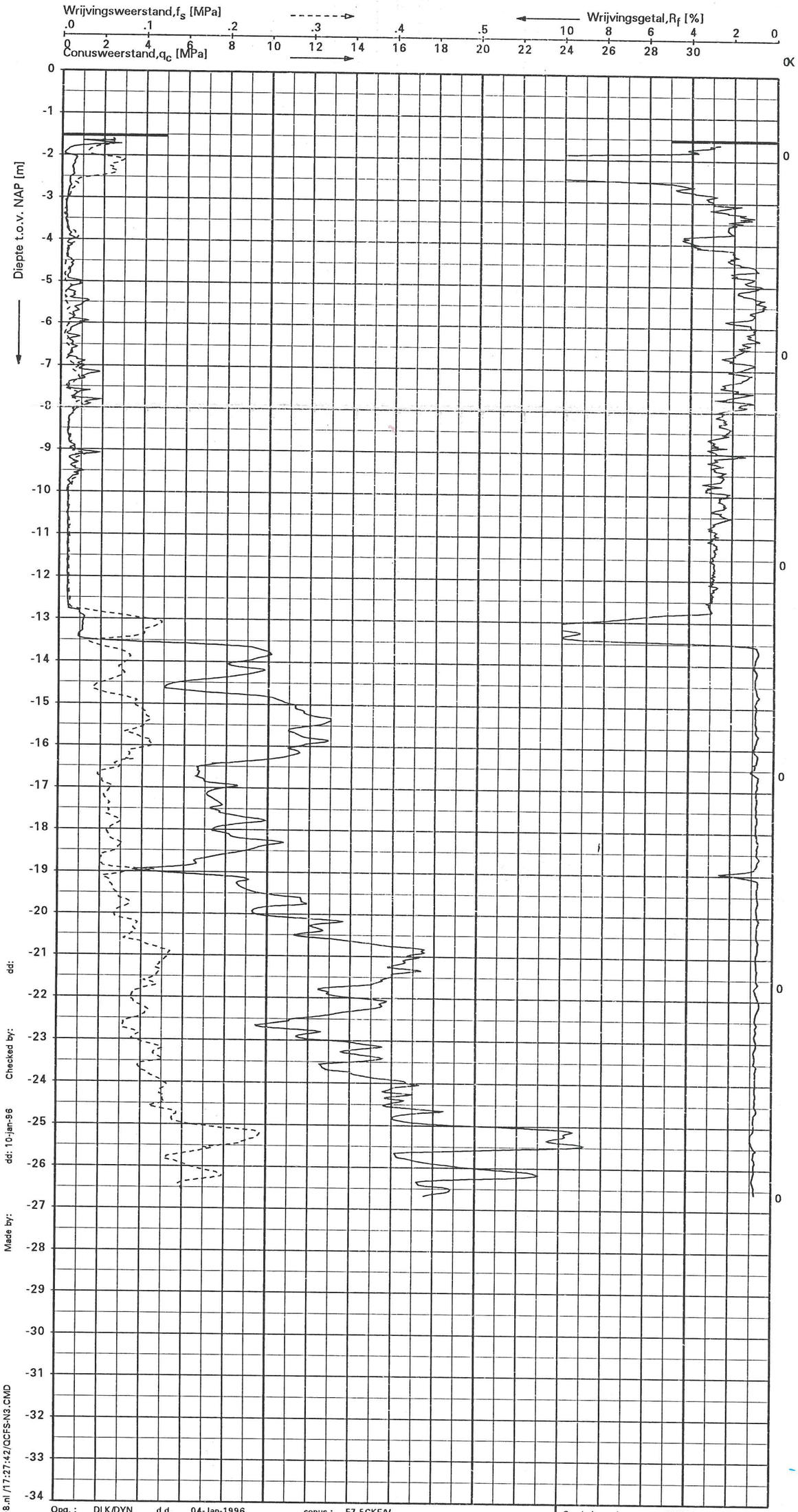
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 14

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Made by: dd: 10-jan-96 Checked by: dd:

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Opg. :	DLK/DYN	d.d.	04-Jan-1996	conus :	F7.5CKE/V
Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.54 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
0K: afwijking van de vertikaal

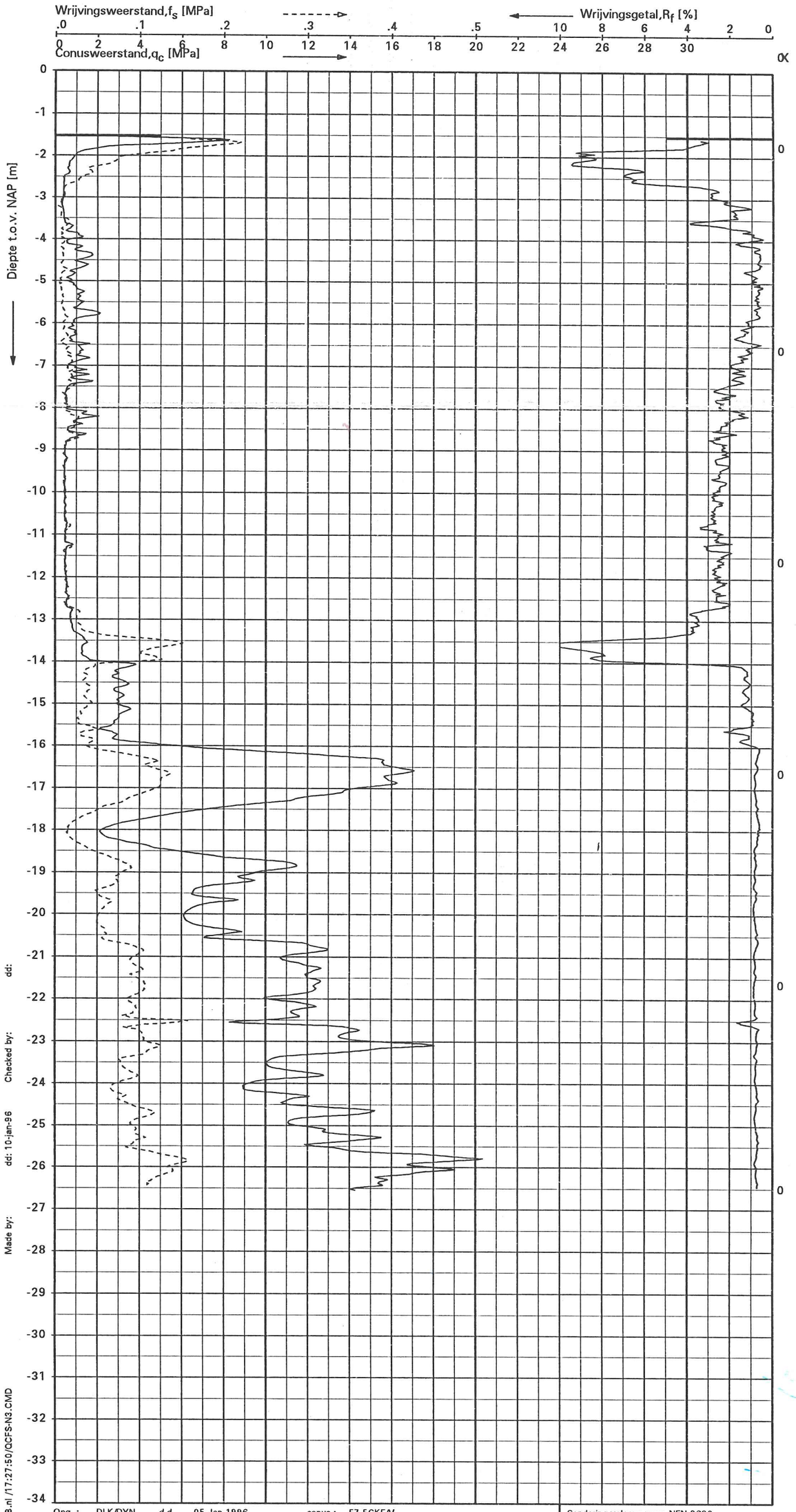
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 15

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Made by: dd: 10-jan-96 Checked by: dd:

UNIPLOT 01.08.nl /17:27:50/QCFS-N3.CMD

Opg. :	DLK/DYN	d.d.	05-Jan-1996	conus :	F7.5CKE/V
Get. :	HUN	d.d.	10-jan-96	MV = NAP -1.53	m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
ØK: afwijking van de vertikaal

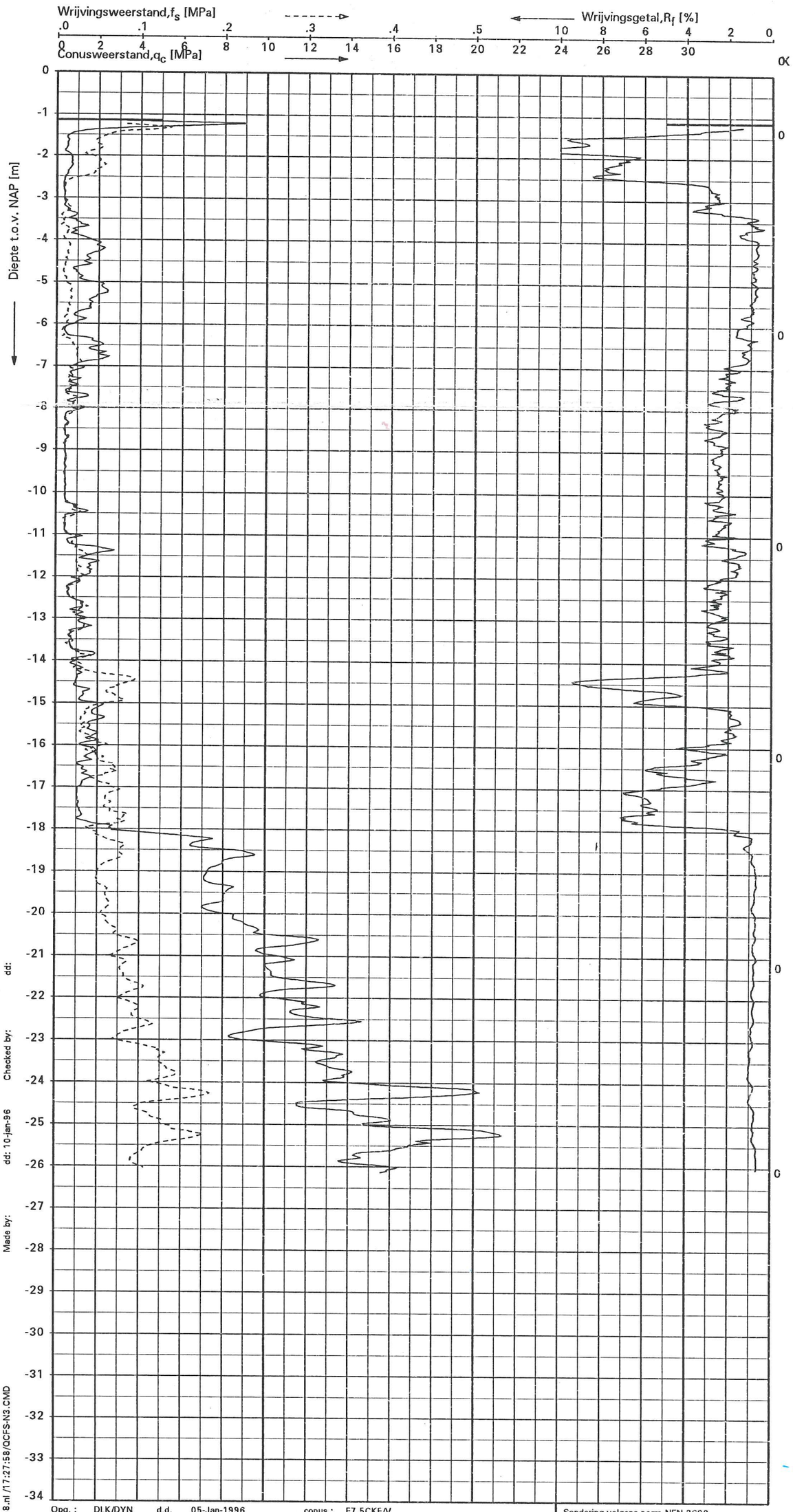
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 16

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Made by: dd: 10-jan-96 Checked by: dd:

UNIPLOT 01.08.nl /17:27:58/QCFS-N3.CMD

Opg. :	DLK/DYN	d.d.	05-Jan-1996	conus :	F7.5CKE/V
Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.14 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
OK: afwijking van de vertikaal

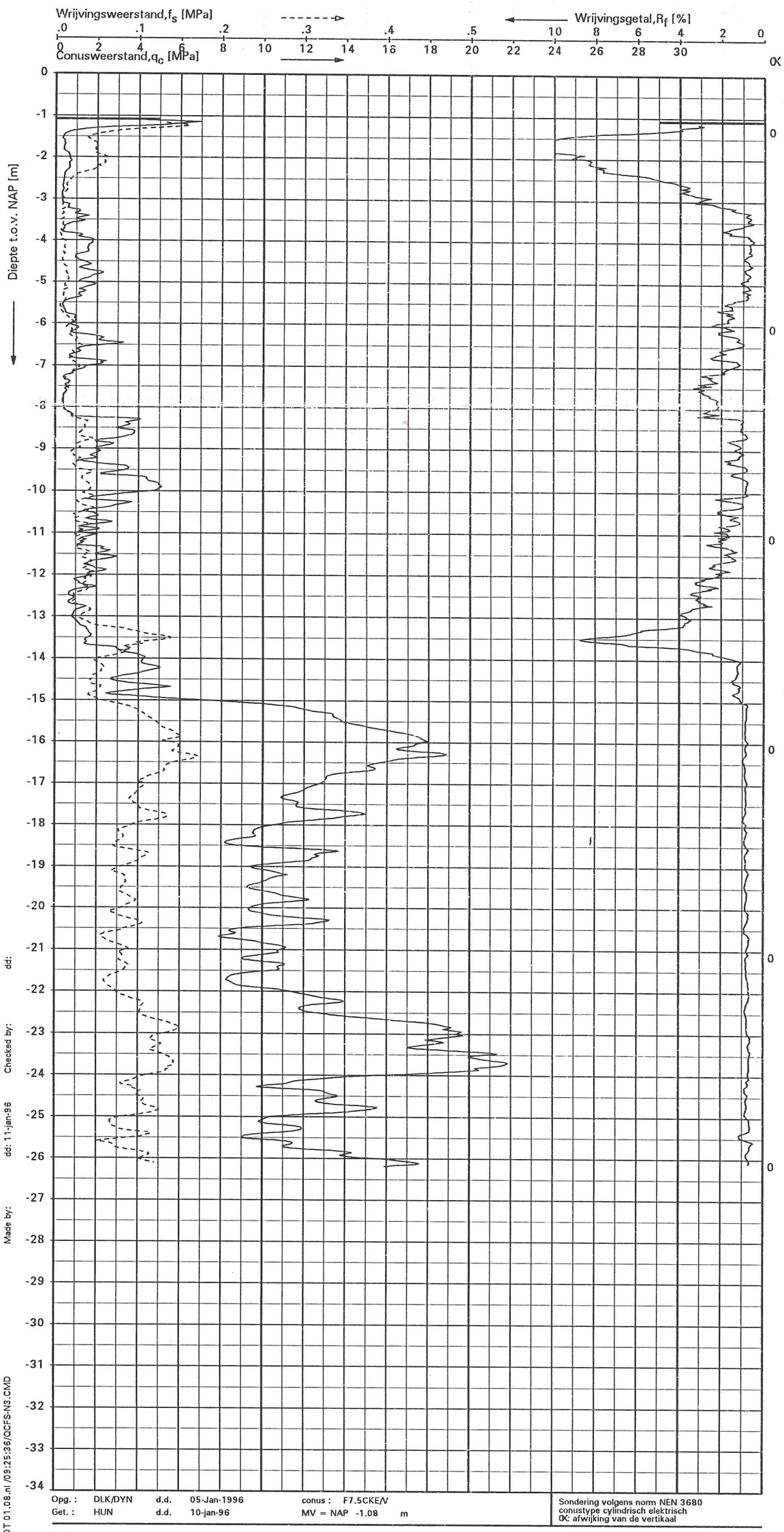
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 17

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Opg. :	DLK/DYN	d.d.	05-Jan-1996	conus :	F7.5CKE/V
Get. :	HUN	d.d.	10-jan-96	MV = NAP	-1.08 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
0K: afwijking van de vertikaal

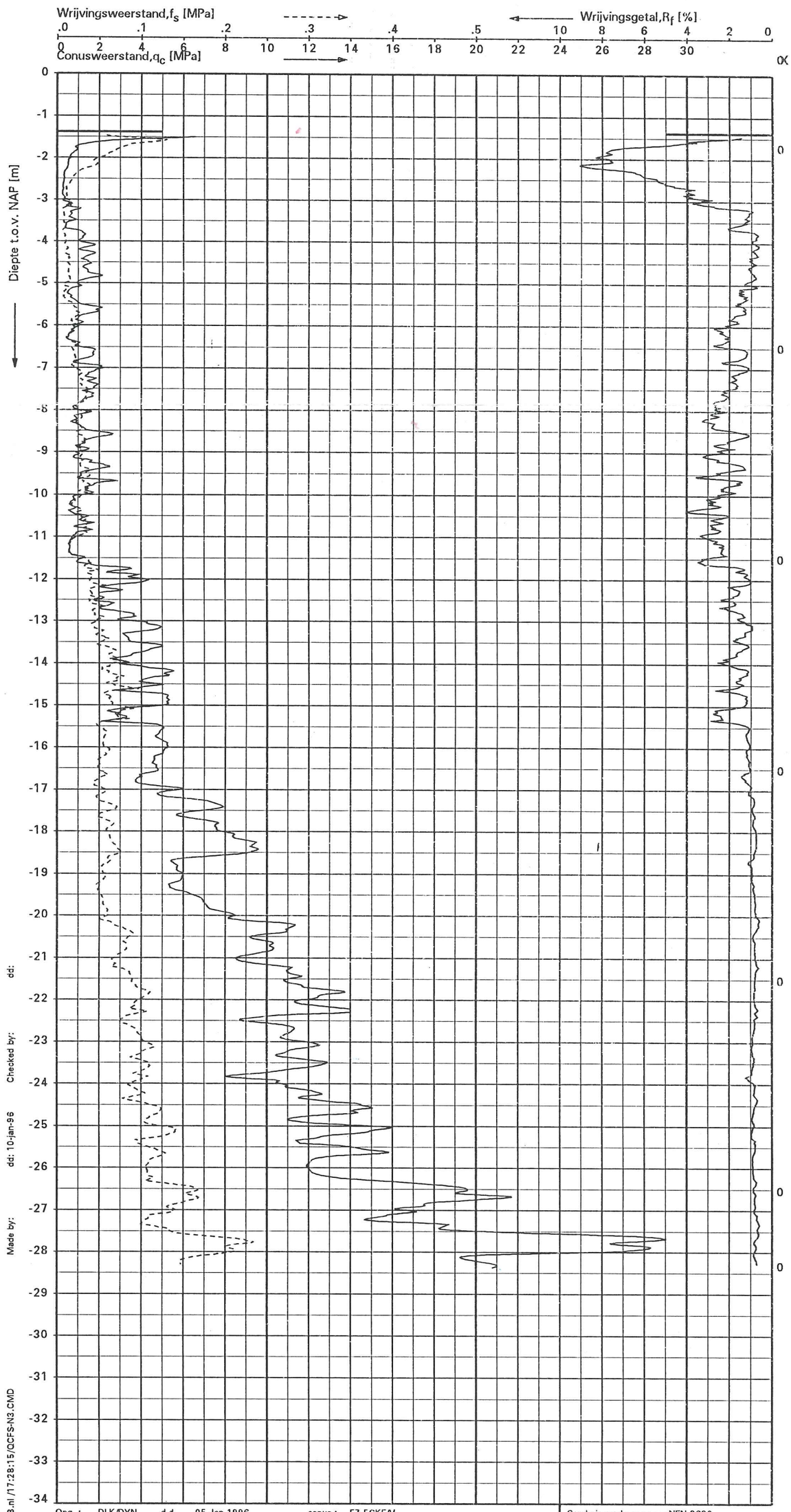
SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 18

KOMO Procescertificaat
voor Elektrisch sonderen
Certificaatnr.: K2519/94

FUGRO



Opg. : DLK/DYN d.d. 05-Jan-1996 conus : F7.5CKE/V
Get. : HUN d.d. 10-jan-96 MV = NAP -1.38 m

Sondering volgens norm NEN 3680
conustype cylindrisch elektrisch
0K afwijking van de vertikaal

SONDERING MET PLAATSELIJKE KLEEFMETING

WINDTURBINEPARK WAARDPOLDER GEM. ANNA PAULOWNA

Opdr. U-0881
Sond. DKM 19

Bijlage D: geotechnische berekeningen

Rapport voor D-Foundations 16.1

Ontwerp en Verificatie volgens Eurocode 7 van Strook- en Paalfunderingen
Ontwikkeld door Deltares

Bedrijfsnaam:	ABT bv
Datum van rapport:	24-1-2017
Tijd van rapport:	13:55:27
Datum van berekening:	24-1-2017
Tijd van berekening:	09:02:00
Bestandsnaam:	P:\..\DFoundation\170123_15215_BER_WTG-1-druk_CT_V001_CON
Projectbeschrijving:	Windpark Waardpolder te Wieringerwaard Vibro rond 456/506 mm D-Foundations 170123_15215_BER_WTG-1-druk_CT_V001_CON

1 Inhoudsopgave

2 Invoergegevens

2.1 Algemene Invoergegevens

Model	Bearing Piles (EC7-NL)

2.2 Rapportage Gegevens

Geotechnisch adviseur :	
Constructeur bovenbouw :	
Opdrachtgever :	
Titel 1 :	Windpark Waardpolder te Wieringerwaard
Titel 2 :	Vibro rond 456/506 mm
Titel 3 :	D-Foundations 170123_15215_BER_WTG-1-druk_CT_V001_CON
Nummer project :	15215
Locatie project :	

2.3 Toepassingsgebied Model Bearing Piles

De toetsingen uitgevoerd door het model BEARING PILES van D-FOUNDATIONS hebben betrekking op paalfunderingen waarop statische of quasi-statische belastingen werken die drukkrachten in de palen veroorzaken met dien verstande dat de berekening van de paalkrachten en de vervormingen is gebaseerd op sonderingen. Eventuele rijzing van (trek-)palen en mogelijke horizontale verplaatsingen van palen zijn niet in deze toetsingen opgenomen.

2.4 Bovenbouw

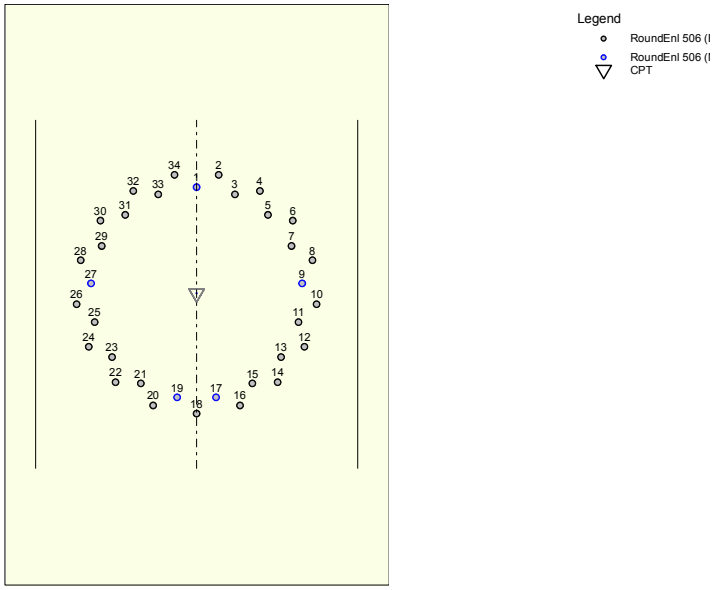
Stijfheidskarakteristiek :	Stijf

2.5 Funderingsplan

Aantal palen :	34
Aantal samenwerkende palen* :	34

* : 0 = niet ingevoerd, 1 = slappe bovenbouw, >1 = stijve bovenbouw

2.5.1 Overzicht Funderingsplan



Paal nr/naam	X-coor-dinaat [m]	Y-coor-dinaat [m]	Fc;d (STR/GEO) [kN]	Fc;d (BGT) [kN]	P0 [kN/m2]	Paalkop-niveau [m R.N.]
1: 1	0,00	7,75	0,00	0,00	0,00	-3,15
2: 2	1,62	8,65	0,00	0,00	0,00	-3,15
3: 3	2,80	7,23	0,00	0,00	0,00	-3,15
4: 4	4,63	7,48	0,00	0,00	0,00	-3,15
5: 5	5,22	5,73	0,00	0,00	0,00	-3,15
6: 6	7,03	5,31	0,00	0,00	0,00	-3,15
7: 7	6,94	3,45	0,00	0,00	0,00	-3,15
8: 8	8,47	2,41	0,00	0,00	0,00	-3,15
9: 9	7,72	0,72	0,00	0,00	0,00	-3,15
10: 10	8,77	-0,81	0,00	0,00	0,00	-3,15
11: 11	7,45	-2,12	0,00	0,00	0,00	-3,15
12: 12	7,88	-3,92	0,00	0,00	0,00	-3,15
13: 13	6,18	-4,67	0,00	0,00	0,00	-3,15
14: 14	5,93	-6,51	0,00	0,00	0,00	-3,15
15: 15	4,08	-6,59	0,00	0,00	0,00	-3,15
16: 16	3,18	-8,21	0,00	0,00	0,00	-3,15
17: 17	1,42	-7,62	0,00	0,00	0,00	-3,15
18: 18	0,00	-8,80	0,00	0,00	0,00	-3,15
19: 19	-1,42	-7,62	0,00	0,00	0,00	-3,15
20: 20	-3,18	-8,21	0,00	0,00	0,00	-3,15
21: 21	-4,08	-6,59	0,00	0,00	0,00	-3,15
22: 22	-5,93	-6,51	0,00	0,00	0,00	-3,15
23: 23	-6,18	-4,67	0,00	0,00	0,00	-3,15
24: 24	-7,88	-3,92	0,00	0,00	0,00	-3,15
25: 25	-7,45	-2,12	0,00	0,00	0,00	-3,15
26: 26	-8,77	-0,81	0,00	0,00	0,00	-3,15
27: 27	-7,72	0,72	0,00	0,00	0,00	-3,15
28: 28	-8,47	2,41	0,00	0,00	0,00	-3,15
29: 29	-6,94	3,45	0,00	0,00	0,00	-3,15
30: 30	-7,03	5,31	0,00	0,00	0,00	-3,15
31: 31	-5,22	5,73	0,00	0,00	0,00	-3,15
32: 32	-4,63	7,48	0,00	0,00	0,00	-3,15
33: 33	-2,80	7,23	0,00	0,00	0,00	-3,15
34: 34	-1,62	8,65	0,00	0,00	0,00	-3,15

3 Bearing Piles (EC7-NL): Resultaten van de optie Voorontwerp-Draagkracht bij vaste PPN

3.1 Rekenparameters

3.1.1 Factoren Paal

gamma;b (NEN-EN 9997-1:2012, bijlage A.6 A.7 A.8, Grenstoestand STR/GEO) :	1,20
gamma;b (NEN-EN 9997-1:2012, bijlage A.6 A.7 A.8, de Bruikbaarheidsgrenstoestand) :	1,00
gamma;s (NEN-EN 9997-1:2012, bijlage A.6 A.7 A.8, Grenstoestand STR/GEO) :	1,20
gamma;s (NEN-EN 9997-1:2012, bijlage A.6 A.7 A.8, de Bruikbaarheidsgrenstoestand) :	1,00
ksi3 (naar eigen opgave) :	1,18
ksi4 (naar eigen opgave) :	0,94

Nota Bene: De ontgraving(-en) is niet meegenomen in de berekening!

3.1.2 Paaltype : RoundEnl 506

Paaltype : Eigen paaltype (trillend)

Paaltype voor bepaling uitvoeringsfactor alpha_s in zand/grind:
Vibropaal, geheid

Paaltype voor bepaling uitvoeringsfactor alpha_s in klei/leem/veen:
alpha_s klei/leem/veen volgens tabel 7f, NEN-EN paragraaf 7.6.2.3
NEN-EN 9997-1 (i)
Hierbij is de alpha_s afhankelijk van de grondsoort en relatieve diepte.

Paaltype voor bepaling paalklasse factor alpha_p :
Vibropaal, geheid

Paaltype voor gebruik in last-/zakkingsdiagrammen :	1
Materiaaltype paal :	Beton
Gladheidsbehandeling voor paal :	Geen gladheidsbehandeling
Paalvorm :	Ronde paal met verzwaarde punt
beta (Paalvoetvormfactor; figuur 7i, NEN-EN 1997 1:2005 par. 7.6.2.3(g): NEN-EN 9997-1) :	1,00
s (NEN-EN 1997 1:2005 par. 7.6.2.3(h), NEN-EN 9997-1 : factor voor invloed vorm dwarsdoorsnede paalvoet) :	1,00

Paalafmetingen :

Diameter punt [m] :	0,506
Diameter schacht [m] :	0,456
Effectieve hoogte paalvoet [m] :	0,010

Sondering	Alpha_s Zand/ Grind	Alpha_s Klei/Leem Veen	Alpha_p
1	0,0140	0,0224	0,7000
2	0,0140	0,0172	0,7000
3	0,0140	0,0118	0,7000

3.2 Overzicht bij paaltype : RoundEnl 506

Sondering	PPN [m R.N.]	Maaiveld [m R.N.]	Rb;cal;max [kN]	Rs;cal;max [kN]	Rc;cal;max [kN]	Rc;d [kN]	F;nk;rep [kN]	Fnk;d [kN]
1	-23.00	-1,51	970	2183	3153	2227	138	138

Sondering	PPN [m R.N.]	Maaiveld [m R.N.]	Rb;cal;max [kN]	Rs;cal;max [kN]	Rc;cal;max [kN]	Rc;d [kN]	F;nk;rep [kN]	Fnk;d [kN]
2	-23.00	-1,56	1337	2501	3838	2711	133	133
3	-23.00	-1,58	1317	2254	3571	2522	126	126

3.3 Samenvatting Rekenwaarde Draagkracht in kN

Sondering	Maaiveld [m R.N.]	PPN [m R.N.]	RoundEnl 506 Rc;net;d [kN]
1	-1,51	-23,00	2089,00
2	-1,56	-23,00	2578,00
3	-1,58	-23,00	2396,00

Einde Rapport

Rapport voor D-Foundations 16.1

Ontwerp en Verificatie volgens Eurocode 7 van Strook- en Paalfunderingen
Ontwikkeld door Deltares

Bedrijfsnaam:	ABT bv
Datum van rapport:	24-1-2017
Tijd van rapport:	13:57:43
Datum van berekening:	24-1-2017
Tijd van berekening:	08:53:20
Bestandsnaam:	P:\..\DFoundation\170123_15215_BER_WTG-1-trek_CT_V001_CON
Projectbeschrijving:	Windpark Waardpolder te Wieringerwaard Vibro rond 456/506 mm D-Foundations 170123_15215_BER_WTG-1-trek_CT_V001_CON

1 Inhoudsopgave

2 Invoergegevens

2.1 Algemene Invoergegevens

Model	Tension Piles (EC7-NL)

2.2 Rapportage Gegevens

Geotechnisch adviseur :	
Constructeur bovenbouw :	
Opdrachtgever :	
Titel 1 :	Windpark Waardpolder te Wieringerwaard
Titel 2 :	Vibro rond 456/506 mm
Titel 3 :	D-Foundations 170123_15215_BER_WTG-1-trek_CT_V001_CON
Nummer project :	15215
Locatie project :	

2.3 Toepassingsgebied Model Tension Piles (NEN-EN)

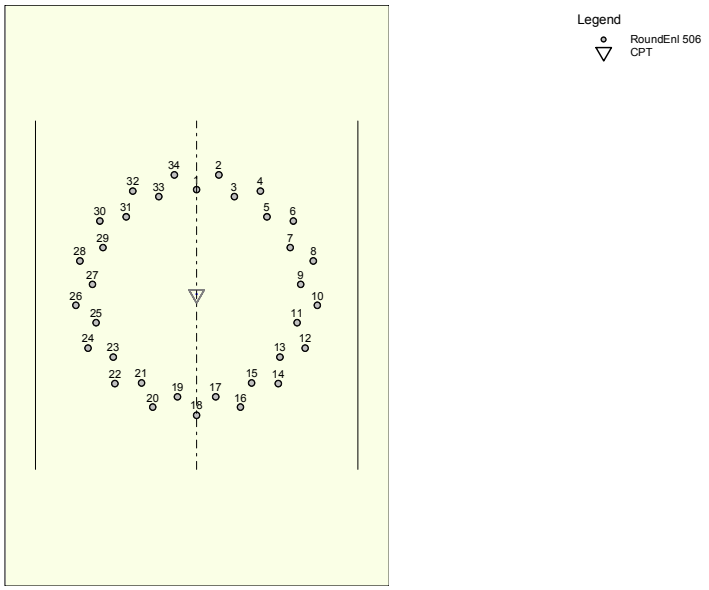
De berekeningen uitgevoerd door het model TENSION PILES (NEN-EN) van D-FOUNDATIONS hebben betrekking op paalfunderingen waarop statische of quasi-statische belastingen werken die trekkrachten in de palen veroorzaken met dien verstande dat de berekening van de paalkrachten is gebaseerd op sonderingen. De paalkrachten zijn gebaseerd op de NEN-EN 9997-1:2012, hoofdstuk 7.Ook paal- en veiligheidsfactoren zijn gebaseerd op NEN-EN 9997-1:2012. Met horizontale verplaatsingen van de palen wordt geen rekening gehouden. Verticale verplaatsingen worden niet berekend. De geldigheid van de NEN-EN 9997-1:2012 is beperkt tot palen met een lengte tussen de 7 en 50 m en een minimale lengte/diameter verhouding van 13.5.

2.4 Funderingsplan

Aantal palen :	34
Aantal samenwerkende palen* :	34

* : 0 = niet ingevoerd, 1 = slappe bovenbouw, >1 = stijve bovenbouw

2.4.1 Overzicht Funderingsplan

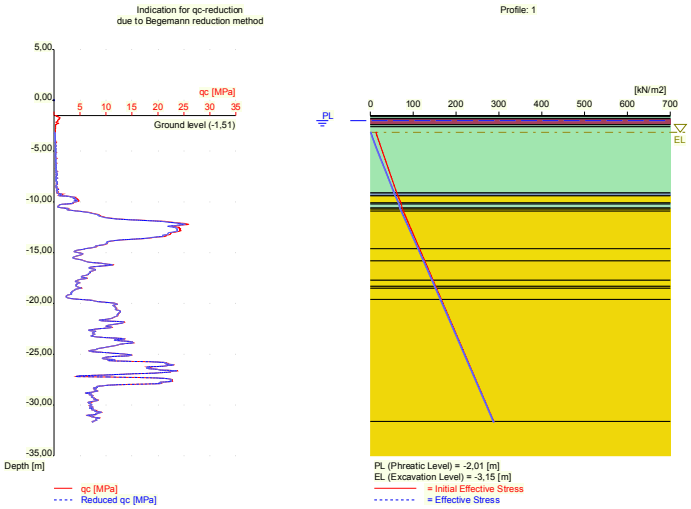


Paal nr./code	X-coor-dinaat [m]	Y-coor-dinaat [m]	Maximale belasting [kN]	Minimale belasting [kN]	Paalkop-niveau [m R.N.]	Gebruik wissel. belasting	Factor Gamma;var
1: 1	0,00	7,75	0,00	0,00	-3,15	Niet	nvt
2: 2	1,65	8,84	0,00	0,00	-3,15	Niet	nvt
3: 3	2,80	7,23	0,00	0,00	-3,15	Niet	nvt
4: 4	4,73	7,64	0,00	0,00	-3,15	Niet	nvt
5: 5	5,22	5,73	0,00	0,00	-3,15	Niet	nvt
6: 6	7,17	5,42	0,00	0,00	-3,15	Niet	nvt
7: 7	6,94	3,45	0,00	0,00	-3,15	Niet	nvt
8: 8	8,65	2,46	0,00	0,00	-3,15	Niet	nvt
9: 9	7,72	0,72	0,00	0,00	-3,15	Niet	nvt
10: 10	8,95	-0,83	0,00	0,00	-3,15	Niet	nvt
11: 11	7,45	-2,12	0,00	0,00	-3,15	Niet	nvt
12: 12	8,05	-4,01	0,00	0,00	-3,15	Niet	nvt
13: 13	6,18	-4,67	0,00	0,00	-3,15	Niet	nvt
14: 14	6,06	-6,64	0,00	0,00	-3,15	Niet	nvt
15: 15	4,08	-6,59	0,00	0,00	-3,15	Niet	nvt
16: 16	3,25	-8,38	0,00	0,00	-3,15	Niet	nvt
17: 17	1,42	-7,62	0,00	0,00	-3,15	Niet	nvt
18: 18	0,00	-8,99	0,00	0,00	-3,15	Niet	nvt
19: 19	-1,42	-7,62	0,00	0,00	-3,15	Niet	nvt
20: 20	-3,25	-8,38	0,00	0,00	-3,15	Niet	nvt
21: 21	-4,08	-6,59	0,00	0,00	-3,15	Niet	nvt
22: 22	-6,06	-6,64	0,00	0,00	-3,15	Niet	nvt
23: 23	-6,18	-4,67	0,00	0,00	-3,15	Niet	nvt
24: 24	-8,05	-4,01	0,00	0,00	-3,15	Niet	nvt
25: 25	-7,45	-2,12	0,00	0,00	-3,15	Niet	nvt
26: 26	-8,95	-0,83	0,00	0,00	-3,15	Niet	nvt
27: 27	-7,72	0,72	0,00	0,00	-3,15	Niet	nvt
28: 28	-8,65	2,46	0,00	0,00	-3,15	Niet	nvt
29: 29	-6,94	3,45	0,00	0,00	-3,15	Niet	nvt
30: 30	-7,17	5,42	0,00	0,00	-3,15	Niet	nvt
31: 31	-5,22	5,73	0,00	0,00	-3,15	Niet	nvt
32: 32	-4,73	7,64	0,00	0,00	-3,15	Niet	nvt
33: 33	-2,80	7,23	0,00	0,00	-3,15	Niet	nvt
34: 34	-1,65	8,84	0,00	0,00	-3,15	Niet	nvt

N.B. : trekbelastingen zijn positief, drukbelastingen zijn negatief
N.B. 2 : Zie OPGEGEVEN PARAMETERS voor gamma;var

2.5 Ontgravingsgegevens

Niveau ontgraving in [m. t.o.v. referentie niveau] :	-3,15
Reductie model :	Begemann
Afstand van randpaal tot grens ontgraving [m] :	3,00


Indication for qc-reduction
due to Begemann reduction method
qc [MPa]
5 10 15 20 25 30 35
Ground level (-1,51)
5,00
0,00
-5,00
-10,00
-15,00
-20,00
-25,00
-30,00
-35,00
Depth [m]
qc [MPa]
Reduced qc [MPa]
Profile: 1
[kN/m2]
0 100 200 300 400 500 600 700
PL
EL
PL (Phreatic Level) = -2,01 [m]
EL (Excavation Level) = -3,15 [m]
= Initial Effective Stress
= Effective Stress

3 Tension Piles (EC7-NL): Draagkracht bij vaste PPN's.

3.1 Rekenparameters

3.1.1 Factoren Paal

ksi3 (naar eigen opgave) :	1,18
ksi4 (naar eigen opgave) :	0,94
Opgegeven gamma;var [-]	1,250
Opgegeven gamma;st [-]	1,350
gamma;gamma factor volgens NEN-EN 9997-1:2012 bijlage A.3 tabel A2 [-]	
Boven het ontgravingsniveau	1,0
Beneden het ontgravingsniveau	1,1

3.1.2 Paaltype : RoundEnl 506

Paaltype voor uitvoeringsfactor (alpha;t) zand/grind/leem :	Eigen paaltype (trillend)
Uitvoeringsfactor zand/grind/leem [-] :	0,0120
Paaltype voor uitvoeringsfactor (alpha;t) klei :	Eigen paaltype
Uitvoeringsfactor klei [-] :	0,0120
Materiaaltype paal :	Beton
Paalvorm :	Ronde paal met verzwaarde punt
Paalafmetingen :	
Diameter punt [m] :	0,506
Diameter schacht [m] :	0,456
Effectieve hoogte paalvoet [m] :	0,010

3.2 Resultaten voor alle sonderingen

3.2.1 Overzicht bij paaltype : RoundEnl 506

3.2.1.1 Paalgroep 1

Aantal palen in deze paalgroep : 1
Paalnamen in deze paalgroep
1

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	749,14	686,12	686,12	Ksi3

3.2.1.2 Paalgroep 2

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
2
34

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	810,72	731,11	731,11	Ksi3

3.2.1.3 Paalgroep 3

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
3
33

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	741,91	681,32	681,32	Ksi3

3.2.1.4 Paalgroep 4

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
4
32

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	812,32	732,51	732,51	Ksi3

3.2.1.5 Paalgroep 5

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
5
31

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	743,46	682,54	682,54	Ksi3

3.2.1.6 Paalgroep 6

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
6
30

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	812,08	732,33	732,33	Ksi3

3.2.1.7 Paalgroep 7

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
7
29

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	746,78	684,94	684,94	Ksi3

3.2.1.8 Paalgroep 8

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
8
28

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	813,66	733,16	733,16	Ksi3

3.2.1.9 Paalgroep 9

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
9
27

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	744,27	683,06	683,06	Ksi3

3.2.1.10 Paalgroep 10

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
10
26

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	813,74	733,66	733,66	Ksi3

3.2.1.11 Paalgroep 11

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
11
25

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	745,66	684,44	684,44	Ksi3

3.2.1.12 Paalgroep 12

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
12
24

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	815,52	735,18	735,18	Ksi3

3.2.1.13 Paalgroep 13

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
13
23

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	743,75	682,76	682,76	Ksi3

3.2.1.14 Paalgroep 14

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
14
22

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	812,55	732,41	732,41	Ksi3

3.2.1.15 Paalgroep 15

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
15
21

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	746,70	684,70	684,70	Ksi3

3.2.1.16 Paalgroep 16

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
16
20

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	810,43	730,95	730,95	Ksi3

3.2.1.17 Paalgroep 17

Aantal palen in deze paalgroep : 2
Paalnamen in deze paalgroep
17
19

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	742,59	681,92	681,92	Ksi3

3.2.1.18 Paalgroep 18

Aantal palen in deze paalgroep : 1
Paalnamen in deze paalgroep
18

PPN [m R.N.]	Rt;d min [kN]	Rt;d gem [kN]	Rt;d [kN]	Gebruikte Ksi [-]
-23,00	814,16	733,46	733,46	Ksi3

Einde Rapport

postbus 82 6800 AB, Arnhem tel. 026 - 36 83 111
postbus 458 2600 AL, Delft tel. 015 - 27 03 611
www.abt.eu info@abt.eu

BEREKENING TOELAATBARE PAALBELASTING VOLGENS NEN 9997-1 **BIJLAGE -**

ALGEMEEN

Werkcode	**15215**
Project	**WP Waardpolder**
	Bouwaanvraag
Onderdeel	
Datum	24-1-2017
Adviseur	HGN

PAALGEGEVENS

Paaltype	**Vibro**	Paalafmetingen	
Rond/vierkant	rond	Schachtdiameter	0,456 m
Open/dichte punt	dicht	Voetdiameter	0,506 m
		Schachtomtrek	1,43 m
		Voetoppervlak	0,201 m²

BEREKENINGSFACTOREN

ξ_3	1,26
ξ_4	1,26
γ_t (materiaalfactor)	1,20
α_p (paalklasse)	0,7
b (voetvorm)	1,0
s (voetverhouding)	1,0
α_s (schachtwrijving)	0,014
Red.factor as (grof zand)	1,00
OCR-waarde	1
Red.factor ontgraving (schacht)	1,00
Red.factor ontgraving (punt)	1,00
$\gamma_{f;nk}$ (belastingfactor negatieve kleef)	1,0

NEGATIEVE KLEEF

Rekenwaarde negatieve kleef per paal $F_{nk;d}$ 228 kN

REKENWAARDE PAALBELASTING

$F_{c;d}$ (DRUK) 1640 kN

BEREKENING PAALDRAAGVERMOGEN

NEN 9777-1 artikel:		7.6.2.3 (10c)		7.6.2.3 (10i)	7.6.2.3 (10c)	7.6.2.3 (10c)		7.6.2.3 (5)	7.6.2.3 (3)	TOELAATBARE BELASTING $F_{c;d}$		Voldoet aan grens-
Sonde-ring nr.	Basisnivo in m t.o.v. NAP	$q_{b;max}$ punt [MPa]	$q_{b;max}$ punt;red [MPa]	$q_{s;max}$ schacht [MPa]	ΔL [m]	$R_{b;cal;max}$ punt [kN]	$R_{s;cal;max}$ schacht [kN]	$R_{c;cal}$ totaal [kN]	$R_{c;d}$ reken [kN]	TREK [kN]	DRUK [kN]	toestand GEO
DKM3	-24,00	4,59	4,59	0,113	13,00	924	2112	3036	2008	n.v.t.	1780	ja
DKM7	-22,00	5,97	5,97	0,144	12,00	1200	2479	3679	2433		2205	ja
DKM10	-25,00	3,76	3,76	0,109	14,00	757	2190	2947	1949		1721	ja
DKM14	-26,00	3,94	3,94	0,137	11,50	792	2249	3041	2011		1783	ja
DKM16	-26,00	3,94	3,94	0,119	12,00	792	2046	2837	1877		1649	ja

gemiddelde $R_{c;cal}$	3108 kN	gemiddelde $R_{c;cal}/\xi_3$	2467 kN	$R_{c;d}$	1877 kN		
kleinste $R_{c;cal}$	2837 kN	kleinste $R_{c;cal}/\xi_4$	2252 kN			$R_{c;d}$ - $F_{nk;d}$	1649 kN

abt

postbus 82 6800 AB, Arnhem tel. 026 - 36 83 111
postbus 458 2600 AL, Delft tel. 015 - 27 03 611

Project :	WP Waardpolder, WT2	Werkcode :	15215
Onderwerp :	Bouwaanvraag	Referentie :	hgn
sondering:	DKM 3	Printdatum :	24-jan-17
Bestandsnaam :	P:\152\15215\02_Berekeningen ABT\DFoundation\[170124_15215_BER_WTG-2-trek_CT_V001_DEF.xlsx]abt-layout	Printtijd :	13:59:49
Versienummer :	F 01-04-12	Adviesgroep :	CT

modelnr.

Invoerparameters

paaltype :	Vibro		$F_{t;max;d:}$	640	kN (trek >0)	GWS:	-2,2	m tov NAP
paalvorm (r/v):	r	-	$F_{t;max;rep}$:	474,1	kN (trek >0)	ontgravingsniveau:	-3,3	m tov NAP
schachtafm.:	0,456	m	$F_{t;min;rep}$:	-1225	kN (druk <0)	paalpuntniveau	-24,0	m tov NAP
paalomtrek :	1,43	m	α_t :	0,012	-			
paalopp.:	0,16	m^2	ξ_3 :	1,26	-	controle sonderingen	nee	
stramien :	1,80	m	$\gamma_{s;t}$:	1,35	-	r_{gem} :	3,95	D_{eq}
oppervlak :	3,08	m^2	$\gamma_{m;var;qc}$:	1,25	-	e_{max} :	0,7	-
			γ_g :	1,10	-	e_{max} - e_{min}:	0,4	-
						n :	8	-

Bodemopbouw

bk-laag [m tov NAP]	ok-laag [m tov NAP]	dikte [m]	γ'_{sat} [kN/m³]	γ'_{rep} [kN/m³]	γ'_d [kN/m³]	$\sigma'_{v;z;i}$ [kPa]	$\sigma'_{v;d;0}$ [kPa]	$\theta_{c;rep;ontgr}$ [MPa]	$\theta_{c;d}$ [MPa]
-1,7	-2,2	0,5	16,0	16,0	16,0	0,0	0,0	0,0	0,0
-2,2	-3,3	1,1	16,0	6,0	6,0	0,0	0,0	0,0	0,0
-3,3	-4,0	0,7	16,0	6,0	4,5	4,2	3,2	0,1	0,0
-4,0	-5,0	1,0	16,0	6,0	4,5	10,2	7,7	0,2	0,1
-5,0	-6,0	1,0	16,0	6,0	4,5	16,2	12,3	0,3	0,1
-6,0	-7,0	1,0	16,0	6,0	4,5	22,2	16,8	0,4	0,2
-7,0	-8,0	1,0	16,0	6,0	4,5	28,2	21,4	0,5	0,2
-8,0	-9,0	1,0	16,0	6,0	4,5	34,2	25,9	0,5	0,2
-9,0	-10,0	1,0	17,0	7,0	5,5	41,2	31,4	2,0	0,9
-10,0	-11,0	1,0	13,0	3,0	1,8	44,2	33,2	1,0	0,5
-11,0	-12,0	1,0	20,0	10,0	8,2	54,2	41,4	11,0	5,2
-12,0	-13,0	1,0	20,0	10,0	8,2	64,2	49,5	14,0	6,6
-13,0	-14,0	1,0	20,0	10,0	8,2	74,2	57,7	6,0	2,8
-14,0	-15,0	1,0	20,0	10,0	8,2	84,2	65,9	4,5	2,1
-15,0	-16,0	1,0	20,0	10,0	8,2	94,2	74,1	10,0	4,7
-16,0	-17,0	1,0	20,0	10,0	8,2	104,2	82,3	6,0	2,8
-17,0	-18,0	1,0	20,0	10,0	8,2	114,2	90,5	5,0	2,4
-18,0	-19,0	1,0	20,0	10,0	8,2	124,2	98,6	4,5	2,1
-19,0	-20,0	1,0	20,0	10,0	8,2	134,2	106,8	7,5	3,5
-20,0	-21,0	1,0	20,0	10,0	8,2	144,2	115,0	11,0	5,2
-21,0	-22,0	1,0	20,0	10,0	8,2	154,2	123,2	9,0	4,2
-22,0	-23,0	1,0	20,0	10,0	8,2	164,2	131,4	10,0	4,7
-23,0	-24,0	1,0	20,0	10,0	8,2	174,2	139,5	11,0	5,2
-24,0	-25,0	1,0	20,0	10,0	8,2	184,2	147,7	15,0	7,1

Opspaneffect

R_e [-]	e_0 [-]	Δ e [-]	e_1 [-]	Δ R_e [-]	f_1 [-]
0,8	0,4	0,0	0,3	0,1	1,0
0,7	0,4	0,0	0,4	0,1	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,3	0,6	0,0	0,5	0,1	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,8	0,4	0,0	0,3	0,1	1,0
0,8	0,4	0,0	0,3	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,4	0,5	0,0	0,5	0,1	1,0
0,6	0,4	0,0	0,4	0,1	1,0
0,4	0,5	0,0	0,5	0,1	1,0
0,4	0,6	0,0	0,5	0,1	1,0
0,3	0,6	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,5	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,5	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0

Groepswerking

M_i [kN/m²]	f_2 [-]	T_i [kN/m²]	Σ T_i [kN/m²]	R_k [kN]	$R_{skult;d}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-2,2
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-3,3
0,2	1,0	0,2	0,0	0,0	3	0,0	-4,0
0,5	1,0	0,5	0,5	2	17	2	-5,0
0,8	1,0	0,8	1,3	4	31	4	-6,0
1,1	0,9	1,0	2,3	7	45	7	-7,0
1,3	0,9	1,2	3,5	11	59	11	-8,0
1,3	0,9	1,2	4,7	14	73	14	-9,0
5,3	0,9	4,5	9,2	28	88	28	-10,0
2,6	0,8	2,1	11,3	35	99	35	-11,0
28,9	0,6	17,5	28,8	89	115	89	-12,0
36,8	0,4	15,4	44,2	136	140	136	-13,0
15,8	0,4	6,6	50,9	156	165	156	-14,0
11,8	0,4	5,3	56,1	173	190	173	-15,0
26,3	0,4	10,2	66,3	204	215	204	-16,0
15,8	0,4	6,3	72,6	223	241	223	-17,0
13,1	0,4	5,5	78,1	240	266	240	-18,0
11,8	0,4	5,1	83,3	256	291	256	-19,0
19,7	0,4	8,2	91,5	282	316	282	-20,0
28,9	0,4	10,8	###	315	341	315	-21,0
23,7	0,4	8,5	###	341	366	341	-22,0
26,3	0,3	8,9	###	369	392	369	-23,0
28,9	0,3	9,2	###	397	417	**397**	**-24,0**
39,4	0,3	11,0	###	431	442	431	-25,0

Enkele paal

$R_{t;d;i}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	0,0	-2,2
0,0	0,0	-3,3
0,6	0,0	-4,0
1,6	2	-5,0
2,4	4	-6,0
3,2	7	-7,0
4,0	11	-8,0
4,0	15	-9,0
16,2	32	-10,0
8,1	40	-11,0
88,9	129	-12,0
113,2	242	-13,0
48,5	290	-14,0
36,4	327	-15,0
80,9	407	-16,0
48,5	456	-17,0
40,4	496	-18,0
36,4	533	-19,0
60,6	593	-20,0
88,9	682	-21,0
72,8	755	-22,0
80,9	836	-23,0
88,9	**925**	**-24,0**
121,3	1046	-25,0

opneembare belasting trekpalen
volgens NEN 9997-1, art. 7.6.3

abt

postbus 82 6800 AB, Arnhem tel. 026 - 36 83 111
postbus 458 2600 AL, Delft tel. 015 - 27 03 611

Project :	WP Waardpolder, WT3	Werkcode :	15215
Onderwerp :	Bouwaanvraag	Referentie :	hgn
sondering:	DKM 7	Printdatum :	24-jan-17
Bestandsnaam :	P:\152\15215\02_Berekeningen ABT\DFoundation\[170124_15215_BER_WTG-3-trek_CT_V001_DEF.xlsx]abt-layout	Printtijd :	14:02:23
Versienummer :	F 01-04-12	Adviesgroep :	CT

modelnr.

Invoerparameters

paaltype :	Vibro		$F_{t;max;d}$:	640	kN (trek >0)	GWS:	-2,0	m tov NAP
paalvorm (r/v):	r	-	$F_{t;max;rep}$:	474,1	kN (trek >0)	ontgravingsniveau:	-3,0	m tov NAP
schachtafm.:	0,456	m	$F_{t;min;rep}$:	-1225	kN (druk <0)	paalpuntniveau	-22,0	m tov NAP
paalomtrek :	1,43	m	α_t :	0,012	-			
paalopp.:	0,16	m^2	ξ_3 :	1,26	-	controle sonderingen	nee	
stramien :	1,80	m	$\gamma_{s;t}$:	1,35	-	r_{gem} :	3,95	D_{eq}
oppervlak :	3,08	m^2	$\gamma_{m;var;qc}$:	1,25	-	e_{max} :	0,7	-
			γ_g :	1,10	-	e_{max} - e_{min}:	0,4	-
						n :	8	-

Bodemopbouw

bk-laag [m tov NAP]	ok-laag [m tov NAP]	dikte [m]	γ'_{sat} [kN/m³]	γ'_{rep} [kN/m³]	γ'_d [kN/m³]	$\sigma'_{v;z;i}$ [kPa]	$\sigma'_{v;d;0}$ [kPa]	$\theta_{c;rep;ontgr}$ [MPa]	$\theta_{c;d}$ [MPa]
-1,4	-2,0	0,6	16,0	16,0	16,0	0,0	0,0	0,0	0,0
-2,0	-3,0	1,0	16,0	6,0	6,0	0,0	0,0	0,0	0,0
-3,0	-4,0	1,0	16,0	6,0	4,5	6,0	4,5	0,1	0,0
-4,0	-5,0	1,0	16,0	6,0	4,5	12,0	9,1	0,2	0,1
-5,0	-6,0	1,0	16,0	6,0	4,5	18,0	13,6	0,3	0,1
-6,0	-7,0	1,0	16,0	6,0	4,5	24,0	18,2	0,4	0,2
-7,0	-8,0	1,0	16,0	6,0	4,5	30,0	22,7	0,5	0,2
-8,0	-9,0	1,0	16,0	6,0	4,5	36,0	27,3	0,5	0,2
-9,0	-10,0	1,0	16,0	6,0	4,5	42,0	31,8	0,5	0,2
-10,0	-11,0	1,0	20,0	10,0	8,2	52,0	40,0	3,5	1,6
-11,0	-12,0	1,0	20,0	10,0	8,2	62,0	48,2	12,5	5,9
-12,0	-13,0	1,0	20,0	10,0	8,2	72,0	56,4	14,0	6,6
-13,0	-14,0	1,0	20,0	10,0	8,2	82,0	64,5	15,0	7,1
-14,0	-15,0	1,0	20,0	10,0	8,2	92,0	72,7	14,0	6,6
-15,0	-16,0	1,0	20,0	10,0	8,2	102,0	80,9	9,0	4,2
-16,0	-17,0	1,0	20,0	10,0	8,2	112,0	89,1	13,0	6,1
-17,0	-18,0	1,0	20,0	10,0	8,2	122,0	97,3	15,0	7,1
-18,0	-19,0	1,0	20,0	10,0	8,2	132,0	105,5	11,5	5,4
-19,0	-20,0	1,0	20,0	10,0	8,2	142,0	113,6	7,0	3,3
-20,0	-21,0	1,0	20,0	10,0	8,2	152,0	121,8	9,0	4,2
-21,0	-22,0	1,0	20,0	10,0	8,2	162,0	130,0	10,0	4,7
-22,0	-23,0	1,0	20,0	10,0	8,2	172,0	138,2	10,5	4,9
-23,0	-24,0	1,0	20,0	10,0	8,2	182,0	146,4	16,0	7,1
-24,0	-25,0	1,0	20,0	10,0	8,2	192,0	154,5	15,0	7,1

Opspaneffect

R_e [-]	e_0 [-]	Δ e [-]	e_1 [-]	ΔR_e [-]	f_1 [-]
1,6	0,1	0,0	0,0	0,1	1,0
1,4	0,1	0,0	0,1	0,1	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,4	0,5	0,0	0,5	0,1	1,0
0,8	0,4	0,0	0,3	0,1	1,0
0,8	0,4	0,0	0,3	0,1	1,0
0,8	0,4	0,0	0,3	0,1	1,0
0,8	0,4	0,0	0,3	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,7	0,4	0,0	0,4	0,1	1,0
0,7	0,4	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,4	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,6	0,4	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0

Groepswerking

M_i [kN/m²]	f_2 [-]	T_i [kN/m²]	ΣT_i [kN/m²]	R_k [kN]	$R_{kbuilt;d}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-2,0
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-3,0
0,3	1,0	0,3	0,0	0,0	7	0,0	-4,0
0,5	1,0	0,5	0,5	2	21	2	-5,0
0,8	1,0	0,8	1,3	4	35	4	-6,0
1,1	0,9	1,0	2,3	7	49	7	-7,0
1,3	0,9	1,2	3,5	11	63	11	-8,0
1,3	0,9	1,2	4,7	14	77	14	-9,0
1,3	0,9	1,2	5,9	18	91	18	-10,0
9,2	0,8	7,7	13,5	42	110	42	-11,0
32,8	0,6	19,8	33,3	103	136	103	-12,0
36,8	0,4	15,9	49,2	151	161	151	-13,0
39,4	0,3	12,5	61,7	190	186	186	-14,0
36,8	0,3	9,7	71,4	220	211	211	-15,0
23,7	0,3	6,7	78,2	240	236	236	-16,0
34,2	0,3	8,8	87,0	268	262	262	-17,0
39,4	0,2	9,0	96,0	295	287	287	-18,0
30,2	0,2	7,2	###	318	312	312	-19,0
18,4	0,3	5,2	###	334	337	334	-20,0
23,7	0,3	6,9	###	355	362	355	-21,0
26,3	0,3	7,6	###	378	387	**378**	**-22,0**
27,6	0,3	7,9	###	402	413	402	-23,0
39,4	0,3	10,0	###	433	438	433	-24,0
39,4	0,2	9,2	###	461	463	461	-25,0

Enkele paal

$R_{t;d;i}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	0,0	-2,0
0,1	0,0	-3,0
0,8	0,0	-4,0
1,6	2	-5,0
2,4	4	-6,0
3,2	7	-7,0
4,0	11	-8,0
4,0	15	-9,0
4,0	19	-10,0
28,3	48	-11,0
101,1	149	-12,0
113,2	262	-13,0
121,3	383	-14,0
113,2	496	-15,0
72,8	569	-16,0
105,1	674	-17,0
121,3	796	-18,0
93,0	889	-19,0
56,6	945	-20,0
72,8	1018	-21,0
80,9	**1099**	**-22,0**
84,9	1184	-23,0
121,3	1305	-24,0
121,3	1426	-25,0

opneembare belasting trekpalen
volgens NEN 9997-1, art. 7.6.3

modelnr.

Project :	WP Waardpolder, WT4	Werkcode	:	15215
Onderwerp :	Bouwaanvraag	Referentie	:	hgn
sondering:	DKM 10	Printdatum	:	24-jan-17
Bestandsnaam :	P:\152\15215\02_Berekeningen ABT\DFoundation\[170124_15215_BER_WTG-4-trek_CT_V001_DEF.xlsx]abt-layout	Printtijd	:	14:13:27
Versienummer :	F 01-04-12	Adviesgroep	:	CT

Invoerparameters

paaltype :	Vibro		$F_{t;max;d}$:	640	kN (trek >0)	GWS:	-2,0	m tov NAP
paalvorm (r/v):	r	-	$F_{t;max;rep}$:	474,1	kN (trek >0)	ontgravingsniveau:	-3,1	m tov NAP
schachtafm.:	0,456	m	$F_{t;min;rep}$:	-1225	kN (druk <0)	paalpuntniveau	-25,0	m tov NAP
paalomtrek :	1,43	m	α_t :	0,012	-			
paalopp.:	0,16	m^2	ξ_3 :	1,26	-	controle sonderinger	nee	
stramien :	1,80	m	$\gamma_{s;t}$:	1,35	-	r_{qem} :	3,95	D_{eq}
oppervlak :	3,08	m^2	$\gamma_{m;var;qc}$:	1,25	-	e_{max} :	0,7	-
			γ_g :	1,10	-	e_{max} - e_{min}:	0,4	-
						n :	8	-

Bodemopbouw

bk-laag [m tov NAP]	ok-laag	dikte [m]	γ'_{sat} [kN/m^3]	γ'_{rep} [kN/m^3]	γ'_d [kN/m^3]	$\sigma'_{v;z;i}$ [kPa]	$\sigma'_{v;d;0}$ [kPa]	$\theta_{c;rep;ontgr}$ [MPa]	$\theta_{c;d}$ [MPa]
-1,5	-2,0	0,5	16,0	16,0	16,0	0,0	0,0	0,0	0,0
-2,0	-3,1	1,1	16,0	6,0	6,0	0,0	0,0	0,0	0,0
-3,1	-4,0	0,9	16,0	6,0	4,5	5,4	4,1	0,1	0,0
-4,0	-5,0	1,0	16,0	6,0	4,5	11,4	8,6	0,2	0,1
-5,0	-6,0	1,0	16,0	6,0	4,5	17,4	13,2	0,3	0,1
-6,0	-7,0	1,0	16,0	6,0	4,5	23,4	17,7	0,4	0,2
-7,0	-8,0	1,0	16,0	6,0	4,5	29,4	22,3	0,4	0,2
-8,0	-9,0	1,0	16,0	6,0	4,5	35,4	26,8	0,4	0,2
-9,0	-10,0	1,0	16,0	6,0	4,5	41,4	31,4	0,4	0,2
-10,0	-11,0	1,0	16,0	6,0	4,5	47,4	35,9	0,5	0,2
-11,0	-12,0	1,0	20,0	10,0	8,2	57,4	44,1	10,0	4,7
-12,0	-13,0	1,0	20,0	10,0	8,2	67,4	52,3	23,0	7,1
-13,0	-14,0	1,0	20,0	10,0	8,2	77,4	60,5	14,0	6,6
-14,0	-15,0	1,0	20,0	10,0	8,2	87,4	68,6	8,5	4,0
-15,0	-16,0	1,0	20,0	10,0	8,2	97,4	76,8	6,5	3,1
-16,0	-17,0	1,0	20,0	10,0	8,2	107,4	85,0	6,5	3,1
-17,0	-18,0	1,0	20,0	10,0	8,2	117,4	93,2	8,5	4,0
-18,0	-19,0	1,0	20,0	10,0	8,2	127,4	101,4	7,0	3,3
-19,0	-20,0	1,0	20,0	10,0	8,2	137,4	109,5	3,5	1,6
-20,0	-21,0	1,0	20,0	10,0	8,2	147,4	117,7	2,5	1,2
-21,0	-22,0	1,0	20,0	10,0	8,2	157,4	125,9	3,0	1,4
-22,0	-23,0	1,0	20,0	10,0	8,2	167,4	134,1	8,0	3,8
-23,0	-24,0	1,0	20,0	10,0	8,2	177,4	142,3	10,0	4,7
-24,0	-25,0	1,0	20,0	10,0	8,2	187,4	150,5	13,0	6,1

Opspaneffect

R_e [-]	e_0 [-]	Δ e [-]	e_1 [-]	Δ R_e [-]	f_1 [-]
1,6	0,1	0,0	0,0	0,1	1,0
1,4	0,1	0,0	0,1	0,1	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,8	0,4	0,0	0,3	0,1	1,0
1,0	0,3	0,0	0,3	0,1	1,0
0,8	0,4	0,0	0,3	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,5	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,4	0,5	0,0	0,5	0,1	1,0
0,2	0,6	0,0	0,6	0,1	1,0
0,1	0,7	0,0	0,6	0,2	1,0
0,1	0,7	0,0	0,6	0,1	1,0
0,4	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,5	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0

Groepswerking

M_i [kN/m^2]	f_2 [-]	T_i [kN/m^2]	Σ T_i [kN/m^2]	R_t [kN]	$R_{kluit;d}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-2,0
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-3,1
0,2	1,0	0,2	0,0	0,0	6	0,0	-4,0
0,5	1,0	0,5	0,5	2	20	2	-5,0
0,8	1,0	0,8	1,3	4	34	4	-6,0
1,1	0,9	1,0	2,3	7	48	7	-7,0
1,1	0,9	1,0	3,2	10	62	10	-8,0
1,1	0,9	1,0	4,2	13	76	13	-9,0
1,1	0,9	1,0	5,2	16	90	16	-10,0
1,3	0,9	1,2	6,4	20	103	20	-11,0
26,3	0,7	18,3	24,7	76	123	76	-12,0
39,4	0,5	18,8	43,5	134	148	134	-13,0
36,8	0,4	13,0	56,5	174	173	173	-14,0
22,3	0,3	7,7	64,2	197	199	197	-15,0
17,1	0,4	6,2	70,3	216	224	216	-16,0
17,1	0,4	6,4	76,7	236	249	236	-17,0
22,3	0,4	8,0	84,7	261	274	261	-18,0
18,4	0,4	6,7	91,4	281	299	281	-19,0
9,2	0,4	3,7	95,1	293	324	293	-20,0
6,6	0,4	2,9	98,0	302	350	302	-21,0
7,9	0,5	3,7	###	313	375	313	-22,0
21,0	0,4	9,3	###	342	400	342	-23,0
26,3	0,4	10,8	###	375	425	375	-24,0
34,2	0,4	12,4	###	413	450	**413**	**-25,0**

Enkele paal

$R_{t;d;i}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	0,0	-2,0
0,1	0,0	-3,1
0,7	0,0	-4,0
1,6	2	-5,0
2,4	4	-6,0
3,2	7	-7,0
3,2	11	-8,0
3,2	14	-9,0
3,2	17	-10,0
4,0	21	-11,0
80,9	102	-12,0
121,3	223	-13,0
113,2	336	-14,0
68,7	405	-15,0
52,6	458	-16,0
52,6	510	-17,0
68,7	579	-18,0
56,6	635	-19,0
28,3	664	-20,0
20,2	684	-21,0
24,3	708	-22,0
64,7	773	-23,0
80,9	854	-24,0
105,1	**959**	**-25,0**

opneembare belasting trekpalen
volgens NEN 9997-1, art. 7.6.3

modelnr.

Project :	WP Waardpolder, WT5	Werkcode :	15215
Onderwerp :	Bouwaanvraag	Referentie :	hgn
sondering:	DKM14	Printdatum :	24-jan-17
Bestandsnaam :	P:\152\15215\02_Berekeningen ABT\DFoundation\[170124_15215_BER_WTG-5-trek_CT_V001_DEF.xlsx]abt-layout	Printtijd :	14:14:17
Versienummer :	F 01-04-12	Adviesgroep :	CT

Invoerparameters

paaltype :	Vibro	
paalvorm (r/v):	r	-
schachtafm.:	0,456	m
paalomtrek :	1,43	m
paalopp.:	0,16	m^2
stramien :	1,80	m
oppervlak :	3,08	m^2

$F_{t;max;d:}$	640	kN (trek >0)
$F_{t;max;rep}$:	474,1	kN (trek >0)
$F_{t;min;rep}$:	-1225	kN (druk <0)
α_t :	0,012	-
ξ_3 :	1,26	-
$\gamma_{s;t}$:	1,35	-
$\gamma_{m;var;qc}$:	1,25	-
γ_g :	1,10	-

GWS:	-2,3	m tov NAP
ontgravingsniveau:	-3,4	m tov NAP
paalpuntniveau	-26,0	m tov NAP
controle sonderinger	nee	
r_{qem} :	3,95	D_{eq}
e_{max} :	0,7	-
e_{max} - e_{min}:	0,4	-
n :	8	-

Bodemopbouw

bk-laag [m tov NAP]	ok-laag [m tov NAP]	dikte [m]	γ'_{sat} [kN/m^3]	γ'_{rep} [kN/m^3]	γ'_d [kN/m^3]	$\sigma'_{v;z;i}$ [kPa]	$\sigma'_{v;d;0}$ [kPa]	$\theta_{c;rep;ontgr}$ [MPa]	$\theta_{c;d}$ [MPa]
-1,8	-2,3	0,5	16,0	16,0	16,0	0,0	0,0	0,0	0,0
-2,3	-3,4	1,1	16,0	6,0	6,0	0,0	0,0	0,0	0,0
-3,4	-4,0	0,6	16,0	6,0	4,5	3,6	2,7	0,1	0,0
-4,0	-5,0	1,0	16,0	6,0	4,5	9,6	7,3	0,2	0,1
-5,0	-6,0	1,0	16,0	6,0	4,5	15,6	11,8	0,3	0,1
-6,0	-7,0	1,0	16,0	6,0	4,5	21,6	16,4	0,3	0,1
-7,0	-8,0	1,0	16,0	6,0	4,5	27,6	20,9	0,3	0,1
-8,0	-9,0	1,0	16,0	6,0	4,5	33,6	25,5	0,3	0,1
-9,0	-10,0	1,0	16,0	6,0	4,5	39,6	30,0	0,3	0,1
-10,0	-11,0	1,0	16,0	6,0	4,5	45,6	34,5	0,3	0,1
-11,0	-12,0	1,0	16,0	6,0	4,5	51,6	39,1	0,4	0,2
-12,0	-13,0	1,0	16,0	6,0	4,5	57,6	43,6	0,8	0,4
-13,0	-14,5	1,5	13,0	3,0	1,8	62,1	46,4	1,0	0,5
-14,5	-15,0	0,5	20,0	10,0	8,2	67,1	50,5	4,0	1,9
-15,0	-16,0	1,0	20,0	10,0	8,2	77,1	58,6	7,5	3,5
-16,0	-17,0	1,0	20,0	10,0	8,2	87,1	66,8	10,0	4,7
-17,0	-18,0	1,0	20,0	10,0	8,2	97,1	75,0	9,5	4,5
-18,0	-19,0	1,0	20,0	10,0	8,2	107,1	83,2	10,0	4,7
-19,0	-20,0	1,0	20,0	10,0	8,2	117,1	91,4	10,5	4,9
-20,0	-21,0	1,0	20,0	10,0	8,2	127,1	99,5	9,0	4,2
-21,0	-22,0	1,0	20,0	10,0	8,2	137,1	107,7	9,5	4,5
-22,0	-23,0	1,0	20,0	10,0	8,2	147,1	115,9	8,5	4,0
-23,0	-24,0	1,0	20,0	10,0	8,2	157,1	124,1	11,0	5,2
-24,0	-25,0	1,0	20,0	10,0	8,2	167,1	132,3	13,5	6,3
-25,0	-26,0	1,0	20,0	10,0	8,2	177,1	140,5	14,0	6,6

Opspaneffect

R_e [-]	e_0 [-]	Δ e [-]	e_1 [-]	Δ R_e [-]	f_1 [-]
1,6	0,1	0,0	0,0	0,1	1,0
1,4	0,1	0,0	0,1	0,1	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,4	0,5	0,0	0,5	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,7	0,4	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,5	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0

Groepswerking

M_i [kN/m^2]	f_2 [-]	T_i [kN/m^2]	Σ T_i [kN/m^2]	R_t [kN]	$R_{kluit;d}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-2,3
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-3,4
0,2	1,0	0,2	0,0	0,0	1	0,0	-4,0
0,5	1,0	0,5	0,5	2	15	2	-5,0
0,8	1,0	0,8	1,3	4	29	4	-6,0
0,8	0,9	0,7	2,0	6	43	6	-7,0
0,8	0,9	0,7	2,7	8	57	8	-8,0
0,8	0,9	0,7	3,5	11	71	11	-9,0
0,8	0,9	0,7	4,2	13	85	13	-10,0
0,8	0,9	0,7	5,0	15	99	15	-11,0
1,1	0,9	1,0	5,9	18	113	18	-12,0
2,1	0,9	1,9	7,8	24	127	24	-13,0
3,9	0,9	3,4	11,3	35	140	35	-14,5
5,3	0,8	4,4	15,7	48	143	48	-15,0
19,7	0,7	14,2	29,9	92	168	92	-16,0
26,3	0,6	15,7	45,6	140	193	140	-17,0
25,0	0,5	12,8	58,4	180	218	180	-18,0
26,3	0,4	11,7	70,1	216	243	216	-19,0
27,6	0,4	10,8	80,9	249	269	249	-20,0
23,7	0,4	8,7	89,6	276	294	276	-21,0
25,0	0,3	8,7	98,3	302	319	302	-22,0
22,3	0,3	7,7	###	326	344	326	-23,0
28,9	0,3	9,2	###	354	369	354	-24,0
35,5	0,3	10,1	###	385	394	385	-25,0
36,8	0,3	9,5	###	415	420	**415**	**-26,0**

Enkele paal

$R_{t;d;i}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	0,0	-2,3
0,1	0,0	-3,4
0,5	0,0	-4,0
1,6	2	-5,0
2,4	4	-6,0
2,4	6	-7,0
2,4	9	-8,0
2,4	11	-9,0
2,4	14	-10,0
2,4	16	-11,0
3,2	19	-12,0
6,5	26	-13,0
12,1	38	-14,5
16,2	54	-15,0
60,6	115	-16,0
80,9	196	-17,0
76,8	272	-18,0
80,9	353	-19,0
84,9	438	-20,0
72,8	511	-21,0
76,8	588	-22,0
68,7	657	-23,0
88,9	745	-24,0
109,1	855	-25,0
113,2	**968**	**-26,0**

opneembare belasting trekpalen
volgens NEN 9997-1, art. 7.6.3

modelnr.
Project : WP Waardpolder, WT6
Onderwerp : Bouwaanvraag
sondering: DKM16
Bestandsnaam : P:\152\15215\02_Berekeningen ABT\DFoundation\[170124_15215_BER_WTG-6-trek_CT_V001_DEF.xlsx]abt-layout
Versienummer : F 01-04-12

Werkcode : 15215
Referentie : hgn
Printdatum : 24-jan-17
Printtijd : 14:10:45
Adviesgroep : CT

Invoerparameters

paaltype : Vibro
paalvorm (r/v): r -
schachtafm.: 0,456 m
paalomtrek : 1,43 m
paalopp.: 0,16 m^2
stramien : 1,80 m
oppervlak : 3,08 m^2

$F_{t;max;d:}$ 640 kN (trek >0)
$F_{t;max;rep}$: 474,1 kN (trek >0)
$F_{t;min;rep}$: -1225 kN (druk <0)
α_t : 0,012 -
ξ_3 : 1,26 -
$\gamma_{s;t}$: 1,35 -
$\gamma_{m;var;qc}$: 1,25 -
γ_g : 1,10 -

GWS: -2,0 m tov NAP
ontgravingsniveau: -3,1 m tov NAP
paalpuntniveau -26,0 m tov NAP

controle sonderinger nee
r_{qem} : 3,95 D_{eq}
e_{max} : 0,7 -
e_{max} - e_{min}: 0,4 -
n : 8 -

Bodemopbouw

bk-laag [m tov NAP]	ok-laag	dikte [m]	γ'_{sat} [kN/m^3]	γ'_{rep} kN/m^3	γ'_d kN/m^3	$\sigma'_{v;z;i}$ [kPa]	$\sigma'_{v;d;0}$ [kPa]	$\theta_{c;rep;ontgr}$ [MPa]	$\theta_{c;d}$ [MPa]
-1,5	-2,0	0,5	16,0	16,0	16,0	0,0	0,0	0,0	0,0
-2,0	-3,1	1,1	16,0	6,0	6,0	0,0	0,0	0,0	0,0
-3,1	-4,0	0,9	16,0	6,0	4,5	5,4	4,1	0,1	0,0
-4,0	-5,0	1,0	16,0	6,0	4,5	11,4	8,6	0,3	0,1
-5,0	-6,0	1,0	16,0	6,0	4,5	17,4	13,2	0,6	0,3
-6,0	-7,0	1,0	16,0	6,0	4,5	23,4	17,7	0,8	0,4
-7,0	-8,0	1,0	16,0	6,0	4,5	29,4	22,3	0,5	0,2
-8,0	-9,0	1,0	16,0	6,0	4,5	35,4	26,8	0,7	0,3
-9,0	-10,0	1,0	16,0	6,0	4,5	41,4	31,4	0,5	0,2
-10,0	-11,0	1,0	16,0	6,0	4,5	47,4	35,9	0,5	0,2
-11,0	-12,0	1,0	16,0	6,0	4,5	53,4	40,5	0,5	0,2
-12,0	-13,0	1,0	16,0	6,0	4,5	59,4	45,0	0,5	0,2
-13,0	-14,0	1,0	13,0	3,0	1,8	62,4	46,8	1,0	0,5
-14,0	-15,0	1,0	20,0	10,0	8,2	72,4	55,0	3,0	1,4
-15,0	-16,0	1,0	20,0	10,0	8,2	82,4	63,2	3,0	1,4
-16,0	-17,0	1,0	20,0	10,0	8,2	92,4	71,4	14,5	6,8
-17,0	-18,0	1,0	20,0	10,0	8,2	102,4	79,5	7,0	3,3
-18,0	-19,0	1,0	20,0	10,0	8,2	112,4	87,7	6,5	3,1
-19,0	-20,0	1,0	20,0	10,0	8,2	122,4	95,9	7,0	3,3
-20,0	-21,0	1,0	20,0	10,0	8,2	132,4	104,1	9,0	4,2
-21,0	-22,0	1,0	20,0	10,0	8,2	142,4	112,3	12,0	5,6
-22,0	-23,0	1,0	20,0	10,0	8,2	152,4	120,5	12,5	5,9
-23,0	-24,0	1,0	20,0	10,0	8,2	162,4	128,6	11,5	5,4
-24,0	-25,0	1,0	20,0	10,0	8,2	172,4	136,8	11,5	5,4
-25,0	-26,0	1,0	20,0	10,0	8,2	182,4	145,0	14,0	6,6

Opspaneffect

R_e [-]	e_0 [-]	Δ e [-]	e_1 [-]	ΔR_e [-]	f_1 [-]
1,6	0,1	0,0	0,0	0,1	1,0
1,4	0,1	0,0	0,1	0,1	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,1	0,7	0,0	0,6	0,1	1,0
0,1	0,7	0,0	0,6	0,1	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,0	0,7	0,0	0,6	0,2	1,0
0,3	0,6	0,0	0,5	0,1	1,0
0,3	0,6	0,0	0,5	0,1	1,0
0,8	0,4	0,0	0,3	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,4	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,5	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0
0,5	0,5	0,0	0,4	0,1	1,0
0,6	0,5	0,0	0,4	0,1	1,0

Groepswerking

M_i [kN/m^2]	f_2 [-]	T_i kN/m^2	ΣT_i kN/m^2	R_t [kN]	$R_{kluit;d}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-2,0
0,0	1,0	0,0	0,0	0,0	0,0	0,0	-3,1
0,2	1,0	0,2	0,0	0,0	6	0,0	-4,0
0,8	1,0	0,8	0,8	2	20	2	-5,0
1,6	0,9	1,5	2,2	7	34	7	-6,0
2,1	0,9	1,9	4,1	13	48	13	-7,0
1,3	0,9	1,2	5,3	16	62	16	-8,0
1,8	0,9	1,6	6,9	21	76	21	-9,0
1,3	0,9	1,1	8,0	25	90	25	-10,0
1,3	0,9	1,1	9,2	28	103	28	-11,0
1,3	0,9	1,1	10,3	32	117	32	-12,0
1,3	0,9	1,1	11,4	35	131	35	-13,0
2,6	0,8	2,2	13,7	42	141	42	-14,0
7,9	0,8	6,4	20,1	62	157	62	-15,0
7,9	0,8	6,2	26,2	81	182	81	-16,0
38,1	0,6	22,6	48,9	150	207	150	-17,0
18,4	0,5	10,0	58,9	181	232	181	-18,0
17,1	0,5	8,8	67,6	208	257	208	-19,0
18,4	0,5	8,9	76,5	235	282	235	-20,0
23,7	0,4	10,5	87,0	268	308	268	-21,0
31,5	0,4	12,1	99,1	305	333	305	-22,0
32,8	0,3	11,1	###	339	358	339	-23,0
30,2	0,3	9,5	###	368	383	368	-24,0
30,2	0,3	8,9	###	396	408	396	-25,0
36,8	0,3	9,8	###	426	434	**426**	**-26,0**

Enkele paal

$R_{t;d;i}$ [kN]	$R_{t;d}$ [kN]	puntniveau [m tov NAP]
0,0	0,0	-2,0
0,1	0,0	-3,1
0,7	0,0	-4,0
2,4	2	-5,0
4,9	7	-6,0
6,5	14	-7,0
4,0	18	-8,0
5,7	23	-9,0
4,0	27	-10,0
4,0	32	-11,0
4,0	36	-12,0
4,0	40	-13,0
8,1	48	-14,0
24,3	72	-15,0
24,3	96	-16,0
117,2	213	-17,0
56,6	270	-18,0
52,6	323	-19,0
56,6	379	-20,0
72,8	452	-21,0
97,0	549	-22,0
101,1	650	-23,0
93,0	743	-24,0
93,0	836	-25,0
113,2	**949**	**-26,0**

opneembare belasting trekpalen
volgens NEN 9997-1, art. 7.6.3