

**Hooiberg a/d Bergkappeweg 1
te Vorden.**

Onderdeel:

Statische berekening

Opdrachtgever:

Dijkman Bouw B.V.
Lage Weide 29
7231 NN Warnsveld

Projectnr.:

16.137

Datum:

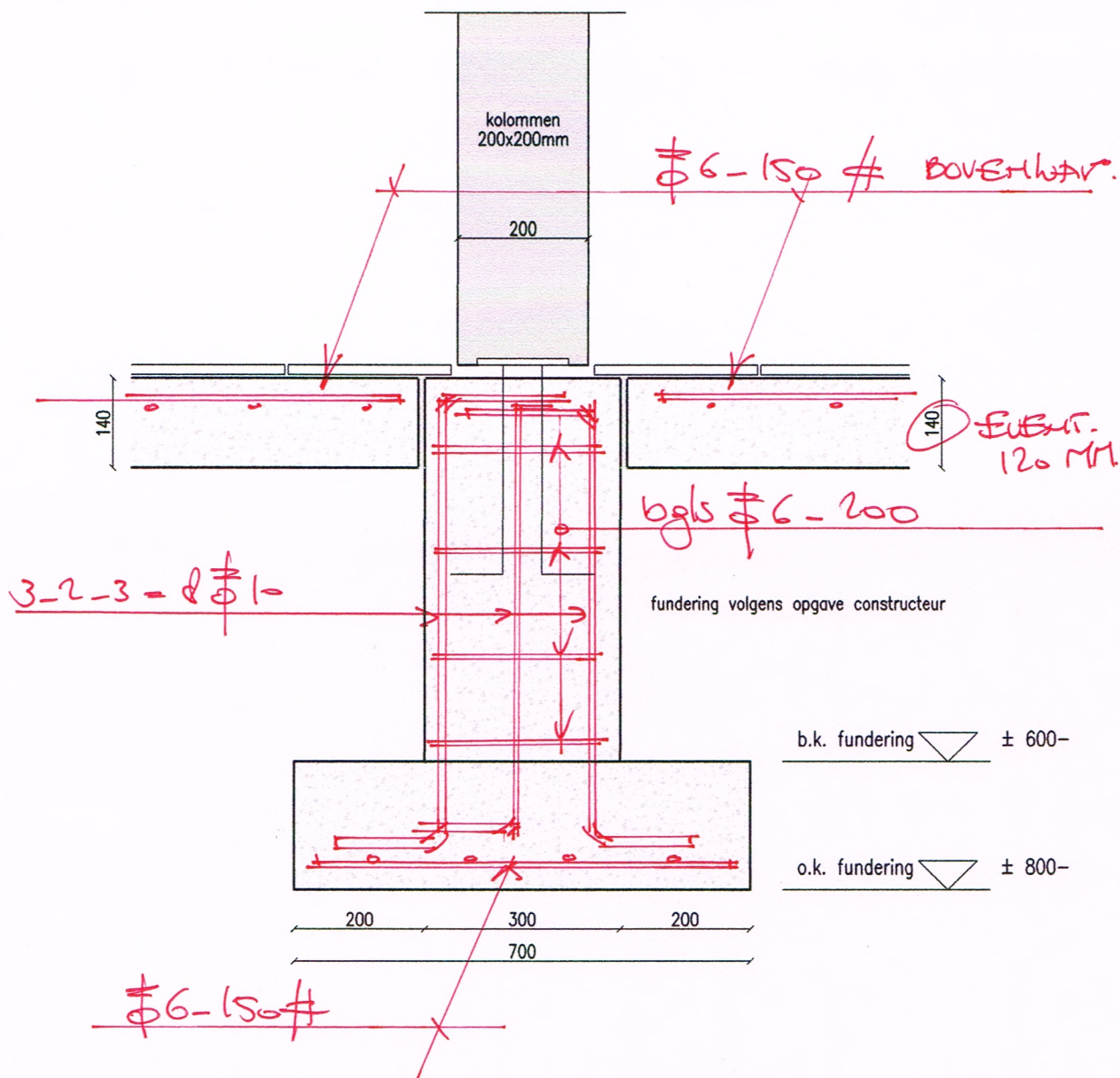
09-02-2017

Constructeur:

ing. J. Wassing

IBANnr. NL61 INGB 0006 0894 55 **K.v.K.** 58421564

Tenzij uitdrukkelijk anders overeengekomen, worden alle opdrachten aanvaard en uitgevoerd volgens De Nieuwe Regeling 2011 (DNR 2011) Rechtsverhouding opdrachtgever – architect, ingenieur en adviseur, uitgegeven door NLingenieurs te 's-Gravenhage en gedeponereerd ter griffie van de Rechtbank te Amsterdam onder nummer 78/2011



Realiseren v/e hooiberg a/d Bergkappeweg

i.o.v. Dhr. en mevr. E.G. Nijhoff
Bergkappeweg 1
7251 MH Vorden

tel:

Bouwaanvraag

Gemeente Bronckhorst

schaal 1:10

Jan Wassing
Adviseur Bouwconstructies

24-01-2017 TG

St. Martinusstraat 7
7231 CK Warnsveld
06-51424879
jan.wassing@wxs.nl

VO-03

DIJKMAN BOUW

Lage Weide 29, 7231 NN Warnsveld
tel. 0575 - 522577, fax 0575 - 521020

Detail fundering	
Proj.nr.	16.137
Datum	09/02-2017
Gecontr.	JWR
Opmerking	B/bd (A)



Project : Hooiberg a/d Bergkappeweg 1 te Vorden

Project nr. : 16.137 Datum : 02-01-2017

Blad (B)

geb. 09-02-2017

Jan Wassing

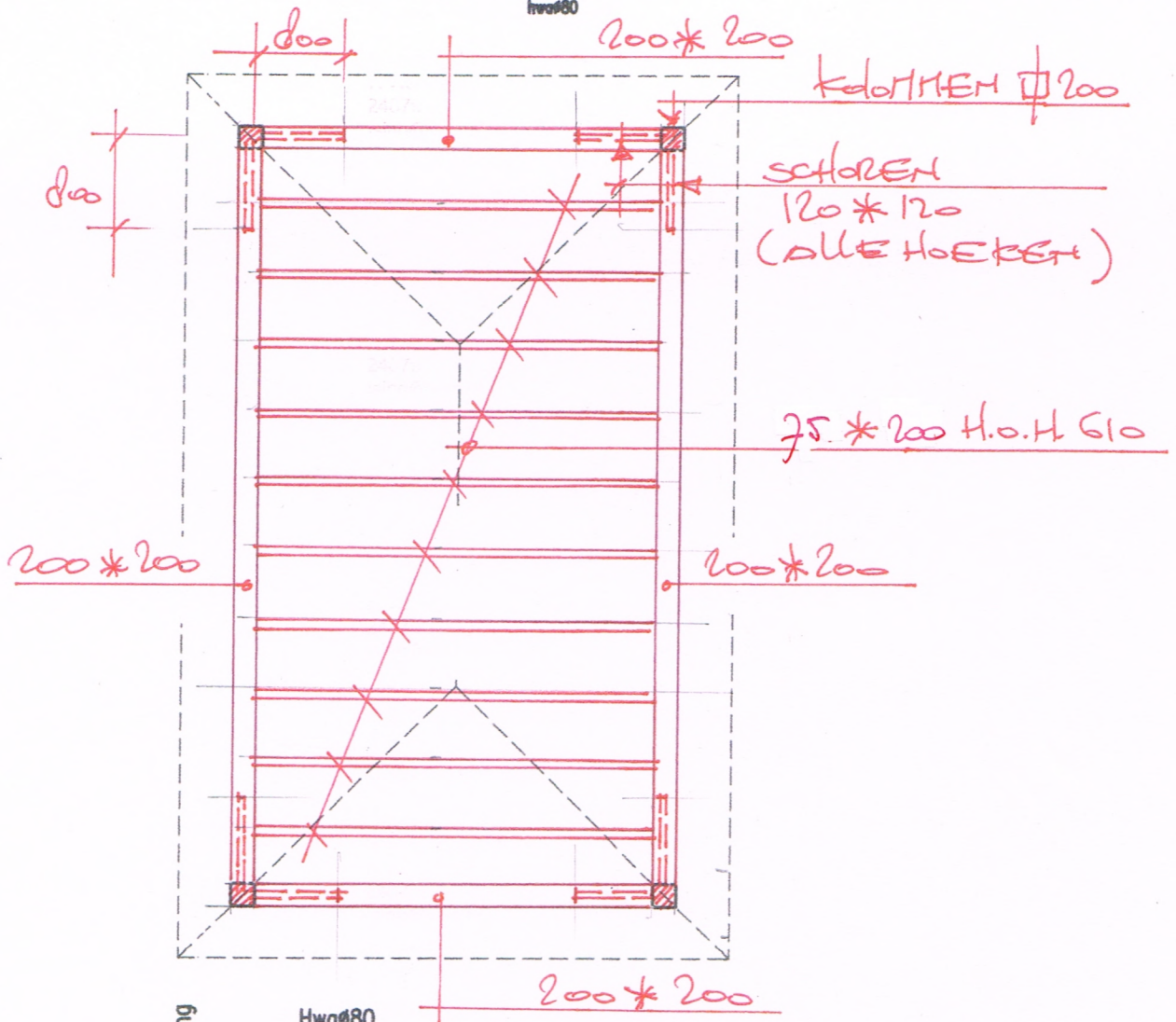
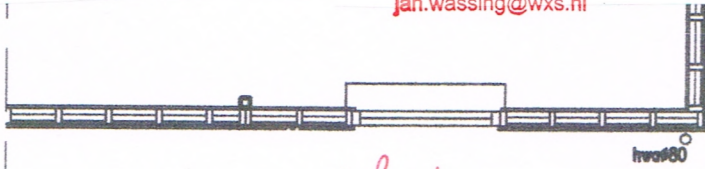
Adviseur Bouwconstructies

St. Martinusstraat 7
7231 CK Warnsveld
06-51424879
jan.wassing@wxs.nl

Jan Wassing Adviseur Bouwconstructies

Proj.nr.	16.137
Datum	02/03-2016
Gecontr.	JWG
Opmerking	Blad (B)

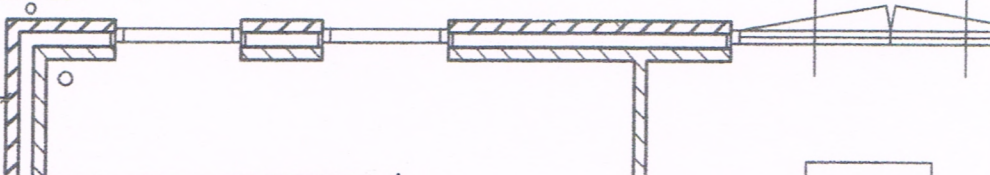
geb. 09/02-2017



taande afscheiding

Hwg#80

930



WOLDE

N.B.: NIET OP SCHAKEL



Project : Hooiberg a/d Bergkappeweg 1 te Vorden

Project nr. : 16.137 Datum : 02-01-2017

Blad (2)

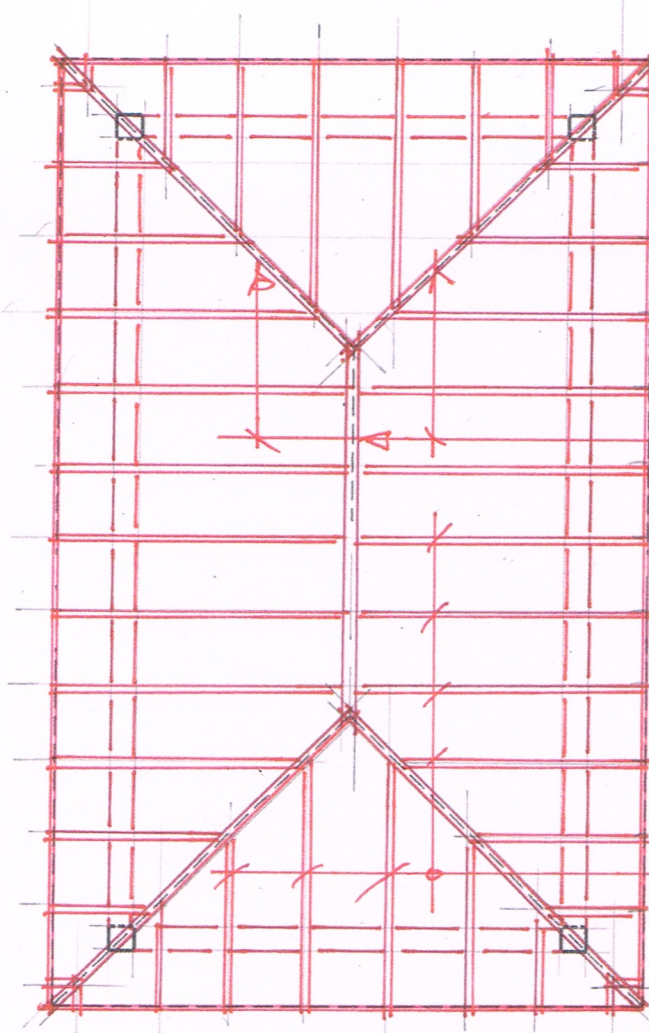
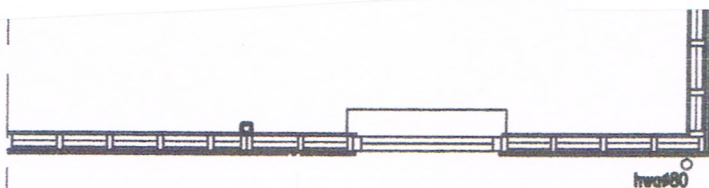
gfw. 09-02-2017

Jan Wassing Adviseur Bouwconstructies	
Proj.nr.	16.137
Datum	02-01-2017
Gecontr.	JWG
Opmerking	B/D ©

gfw. 09/02-2017



St. Martinusstraat 7
7231 CK Warnsveld
06-51424879
jan.wassing@wxs.nl



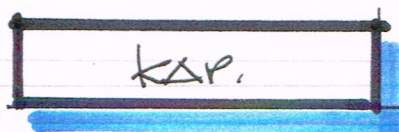
Niet gording /
Hoekbalken
46x121 o.g.
Douglas 50x150

Sporen 46x121
H.o.H. 610
of Douglas 50x150

toande afscheiding

930

Hwg 80



KAP.

N.B.: Niet op school.



Project : Hooiberg a/d Bergkappeweg 1 te Vorden

Project nr. : 16.137

Datum :

Blad 1

Algemeen:

Berekening: NEN-EN-1990 t/m 1999

Ontwerplevensduur: Bijgebouw: klasse 3; t=15 jaar

Gevolgklasse : Bijgebouw: Klasse 1 (CC1)

Grondslag: Aangehouden: zand, matig vast, $\phi' = 32,5^\circ$

In het werk te controleren: zo nodig grondverbetering toepassen.

Voor draagvermogen fundering op staal:
zie bijlagen F1 en F2

BELASTINGEN.

kN/m ²		
g	q	ψ

* kap α = 45°

$$E.g. = 0.60 / \cos 45^\circ = 0.85$$

$$SNEEUW = 0.4 * 0.70 = 0.28 \quad 0$$

* ZOLDER:

$$E.g. Bolk + Besch. = 0.35$$

$$V.B. (CAT A) \quad 1.75 \quad 0.4$$

* BEG. GRONDZOLDER

$$E.g. = 0.12 * 24 = 2.90$$

$$AFW = 0.05 * 20 = 1.00$$

$$\hline 3.90$$

$$V.B. : CAT A - TERKOS \quad 2.50 \quad 0.4$$

* Wind:

GEBIED III
ONBEBOUWD (?)
h = 5.25 M.

$$\left\{ \begin{array}{l} p_w = 0.55 \quad 0 \end{array} \right.$$

* OVENKAPPINGEN:

$$E.g. Bolk + Besch. = 0.35$$

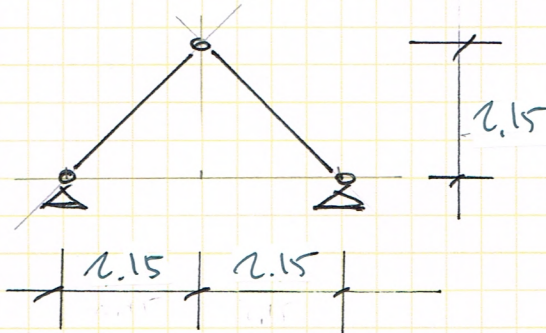
$$Isol + dak BED. = 0.15$$

$$\hline 0.50$$

$$SNEEUW. ; V.B \quad 1.00 \quad 0$$

* SPORREN

H.o.H. 610 mm



$$g_g = 0.61 * 0.85 = 0.52 \text{ kN/m} \downarrow$$

zie blad 101 t/m 112:

$$N_g = 1.19 \text{ kN}$$

$$g_g = 0.30 * 8 / 2 = 0.26 \text{ kN/m}$$

$$N_g = 0.38 \text{ kN}$$

$$g_g = \dots = 0.26$$

zie blad 113 + 114:

SPORREN 46 * 121 H.o.H. 610

OF DOUGLAS 50 * 150* HOEKKEPEREN :WIND HIET MAATGEVEND → OPGEHOTTEN DOOR
OBTULSTUKKEN.VERT. BELASTINGEN → OPGEHOTTEN DOOR
SPORREN.

HOEKKEPEREN PROEIJICH. 46 * 121

OF DOUGLAS 50 * 150* BALK LAAG ZOLWER :

$$l = 4.20 \text{ m.}$$

zie blad 115:

75 * 200 H.o.H. 610

SPANT - LANGSRICHTING:

$$\begin{aligned} \text{Dak} &= 2.65 * 0.85 = 2.25 \\ \text{Zold.} &= 2.15 * 0.35 = 0.75 \\ \text{B.q.} &= 0.20 \end{aligned}$$

$$\begin{aligned} 2.65 * 0.78 &= 0.74 \\ 2.15 * 1.75 &= 3.76 \end{aligned}$$

$$g = 3.20 \text{ kN/m}$$

$$g_g = 4.50 \text{ kN/m}$$

$$H_v = \left\{ (2.15 * 2.15 * \frac{1}{2}) * (0.70 + 0.30) + 2.15 \sqrt{2} * 4.50 * 0.02 \right\} * 0.55 = 1.40 \text{ kN}$$

zie blad 116 t/m 122,

ligger: $M_d = 14.2 \text{ kNm}$

$$W_{ber} = 852 \text{ cm}^3$$

$$\boxed{200 * 200 \text{ mm}}$$

$$W_{aerw} = 1333 \text{ cm}^3$$

$$UC = 0.64$$

$$u_{kf} = 19.1 \text{ mm} = 0.0033 \text{ l.}$$

$$u_g = 7.9 \text{ mm}$$

$$u_{by} = 11.20 \text{ mm} = 0.0019 \text{ l.}$$

teelort.

$$N_g = 9.20 \text{ kN}$$

$$N_g = 13.05 \text{ kN}$$

$$H_g = \frac{6.32}{0.55} = 11.49 \text{ kN}$$

$$H_g = \frac{16.01}{0.55} = 29.11 \text{ kN}$$

$$\boxed{\# 200 \text{ mm}}$$

$$l_k = 2700 \text{ mm}$$

zie blad 123 + 124 : $UC = 1.04$

schoren: $l_s = \sqrt{0.80^2 + 0.75^2} = 1.10 \text{ m}$

$$N_g = 15.87 \text{ kN}$$

$$H_g = 22.32 \text{ kN}$$

zie blad 125 + 126:

$$\boxed{\# 120 \text{ mm}}$$

$$\rightarrow UC = 0.20$$

SPANT - DWARSRICHTING

$$\text{overk.} = 0.60 * 0.50 = 0.30$$

$$\text{dak} = 2.65 * 0.85 = 2.25$$

$$\text{zold.} = 0.60 * 0.63 = 0.38$$

$$\text{B.G.} = \underline{\underline{0.22}}$$

$$0.60 * 1.00 = 0.60$$

$$2.65 * 0.20 = 0.53$$

$$0.60 * 1.75 = 1.05$$

$$q_g = 3.15 \text{ kN/m}^2$$

$$q_{g2} = 2.40 \text{ kN/m}^2$$

$$M_w = \left\{ \left(\frac{1}{2} * 2.15^2 + 2.15 * 1.50 \right) * (0.70 + 0.30) + 2.15^2 * 0.02 \right\} * 0.55 = 4.36 \text{ kN}$$

zie ook 127 t/m. 133:

aanhouden:

afmetingen als spant in
langsricting.

Fundering:

* T.P.V. kolommen:

$$F_g = 9.28 + 6.77 + (0.30 * 0.60 + 0.70 * 0.20) 24 = 19.70 \text{ kN}$$

$$F_g = 13.05 + 5.17 = 18.22 \text{ kN}$$

$$\Rightarrow F_d = 15.87 \text{ kN}$$

zie bladen F1 en F2:

FUND. PLaat Φ 200 mm.

$$F_u = 0.70 * 81.4 = 56.98 \text{ kN} > F_d.$$



Project : Hooiberg a/d Bergkappeweg 1 te Vorden

Project nr. : 16.137 Datum :

Blad 6

PLAAT T.B.V. TEGELSLAAG :

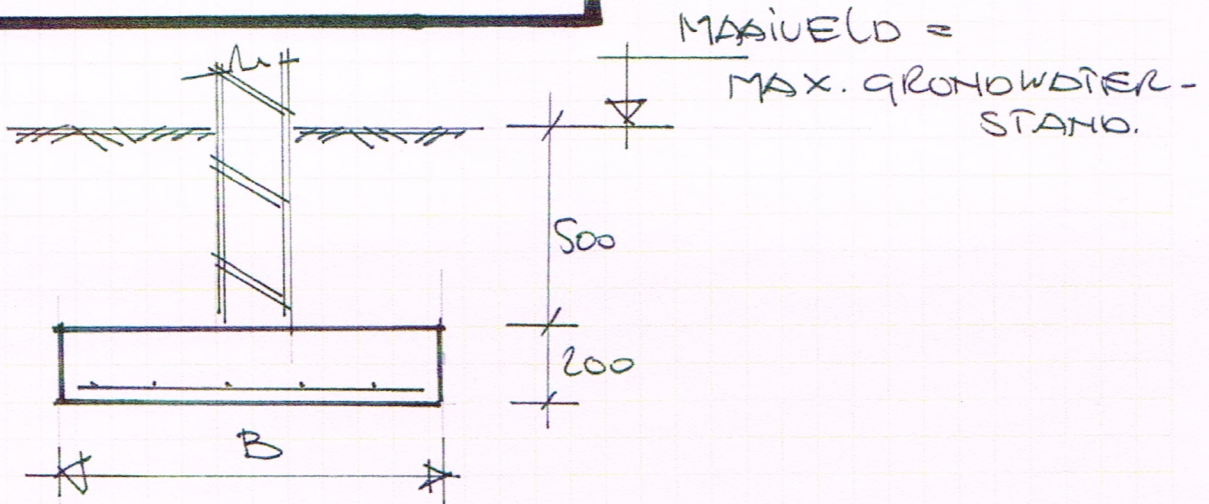
$d_{min.} = 120 \text{ mm.}$

PRAKTISCHE WAARNAME:

$\Phi 6-150 \#$ <u>BOVEN</u> WAARNAME.

DRAAGVERMOGEN FUNDERING OP STAAL

ZAND, MATIG VAST
GRONDDEKKING 700 MM.



$$\phi' = 32,5^\circ$$

$$\phi'_{e;d} = \frac{32,5}{1,15} = 28,3^\circ \Rightarrow N_q = 15,5 ; N_f = 16,5$$

ONDERSTROOK :

$$f_{e;d} = \frac{20}{1,1} - 10 = 8,18$$

$$N_f = 16,5 ; s_f = 1,0 ; i_f = 1,0$$

$$0,5 * 8,18 * 16,5 * B = 67,5 B \text{ [kN/m}^2\text{]}$$

GRONDDEKKING:

$$f = 10 \text{ kN/m}^3 ; \sigma'_{v;2;0;d} = \frac{10}{1,1} - 10 = 6,36 \text{ kN/m}^3$$

$$N_q = 15,5 ; 6,36 * 15,5 * 0,70 = 69,0 \text{ [kN/m}^2\text{]}$$

TOTAAL :

$$F_{r;v;d} = B (67,5 B + 69) \text{ [kN/m}^2\text{]}$$



ZAND, MATIG VAST : $\phi' = 32,5^\circ$
GRONDDEKING : 700 MM

BETON : C 20/25
STAAL : B 500 A

MIL. KLASSE : XC4
STROOKDICTIE : 200 MM
BETONDEKING : 40 MM (ONDER)

B m'	$F_{r,v;d}$ kN/m'	M_d kNm/m'	Δa mm ² /m'	WAPENING VOORSTEL.
0.40	30,4	1.92	35	
0.50	51,4	3.21	59	
0.60	65,7	4.93	91	$\phi 6-150 \#$
0.70	81,4	7.12	132	
0.80	98,4	9.84	183	
0.90	116,8	13.14	247	
1.00	136,5	17.06	322	$\phi 8-150 \#$
1.10	157,6	21.67	330	
1.20	180.0	27.0	418	$\phi 10-150$
1.30	203,8	33.12	518	
1.40	228,9	40.06	638	$\phi 12-150$

$$M_d = \frac{1}{2} \frac{q_d}{B} * \left(\frac{1}{2} B\right)^2 = \frac{1}{8} q_d \cdot B$$

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

Dimensies: kN;m;rad (tenzij anders aangegeven)

Datum....: 28/12/2016

Bestand...: G:\Projects (TS)\16.137 - 2.1.rww

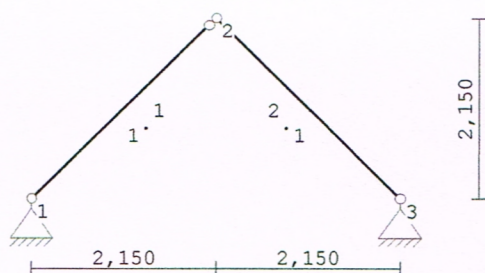
Belastingbreedte.: 0.610

Theorie voor de bepaling van de krachtsverdeling: Geometrisch lineair.

Gunstige werking van de permanente belasting wordt automatisch verwerkt.

Toegepaste normen volgens Eurocode met Nederlandse NB

Belastingen	NEN-EN 1990:2002	C2:2010	NB:2011(nl)
	NEN-EN 1991-1-1:2002	C1:2009	NB:2011(nl)
	NEN-EN 1991-1-3:2003	C1:2009	NB:2011(nl)
	NEN-EN 1991-1-4:2005	C2:2011	NB:2011(nl)

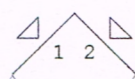
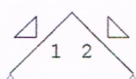
GEOMETRIE**PROFIELVORMEN [mm]**

1 B*H 46*121

**LASTVELDEN**

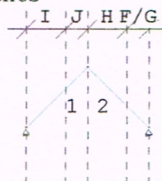
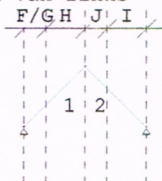
Wind staven

Sneeuw staven

**WIND ZONES**

Wind van links

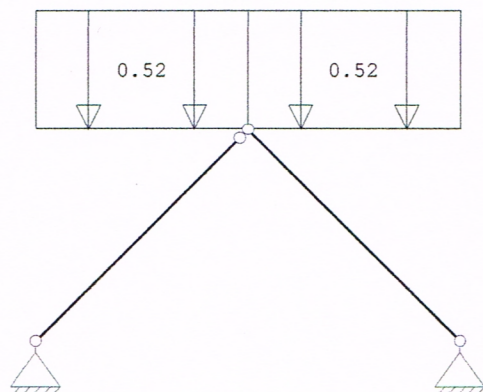
Wind van rechts



Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
Onderdeel: Sporenkap

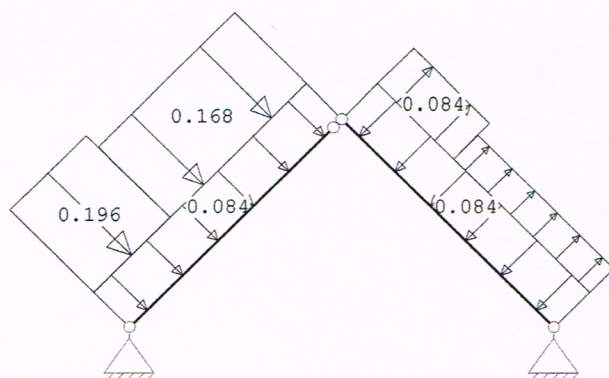
BELASTINGEN

B.G:1 Permanente belasting



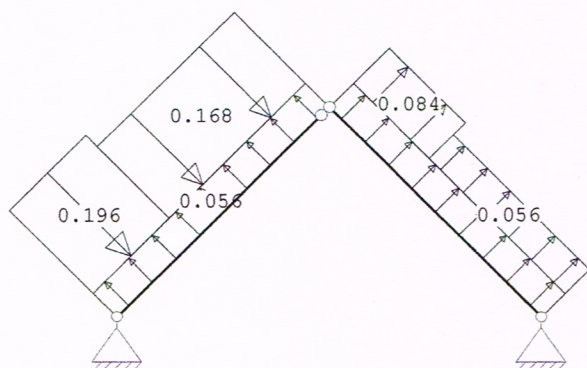
BELASTINGEN

B.G:2 Wind van links onderdruk A



BELASTINGEN

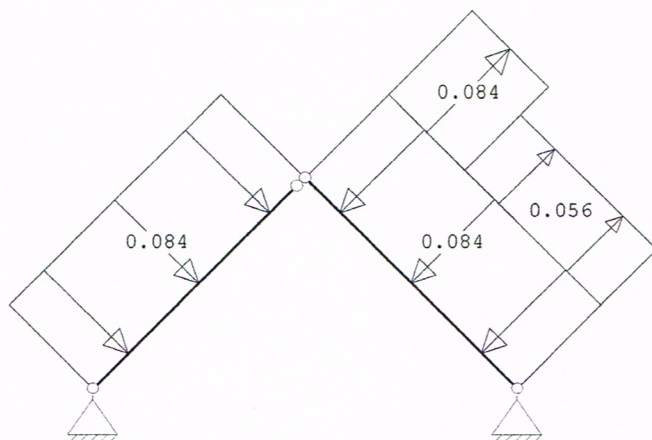
B.G:3 Wind van links overdruk A



Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
Onderdeel: Sporenkap

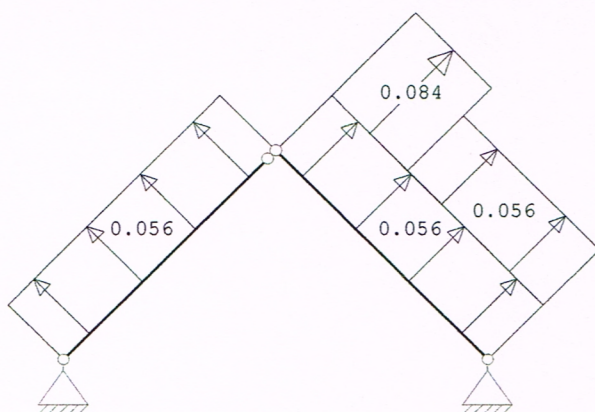
BELASTINGEN

B.G:4 Wind van links onderdruk B



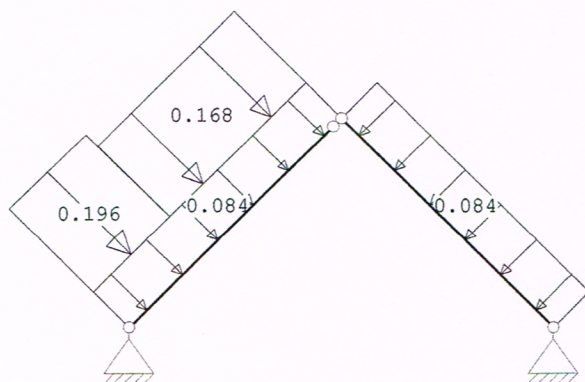
BELASTINGEN

B.G:5 Wind van links overdruk B



BELASTINGEN

B.G:6 Wind van links onderdruk C

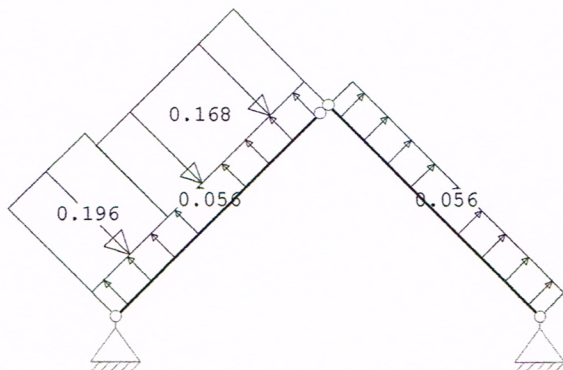


Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

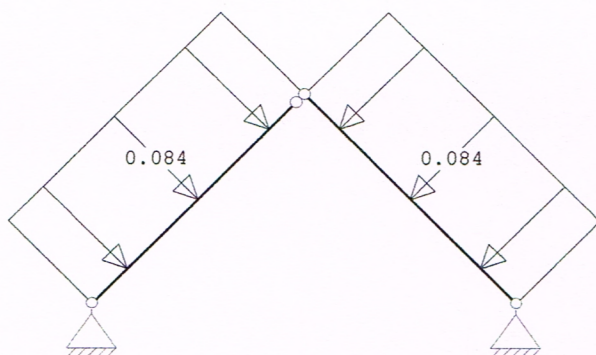
BELASTINGEN

B.G:7 Wind van links overdruk C



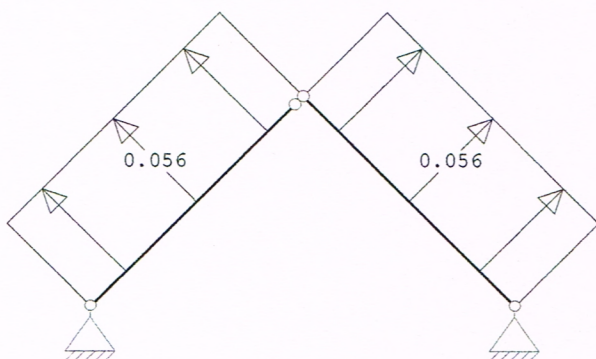
BELASTINGEN

B.G:8 Wind van links onderdruk D



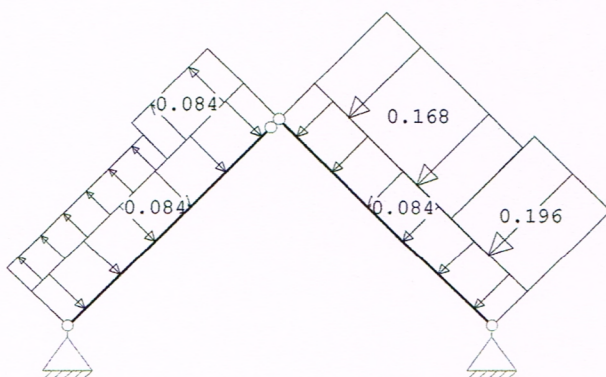
BELASTINGEN

B.G:9 Wind van links overdruk D



BELASTINGEN

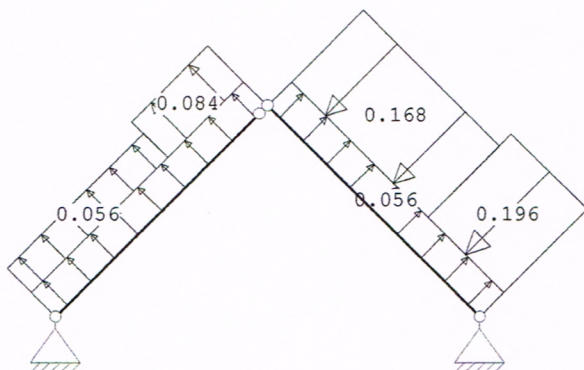
B.G:10 Wind van rechts onderdruk A



Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
Onderdeel: Sporenkap

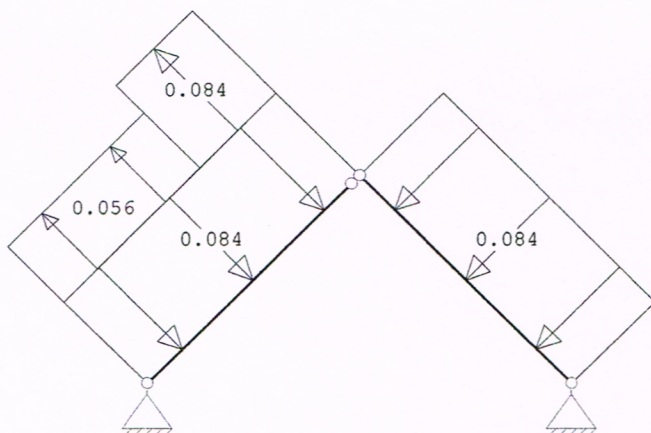
BELASTINGEN

B.G:11 Wind van rechts overdruk A



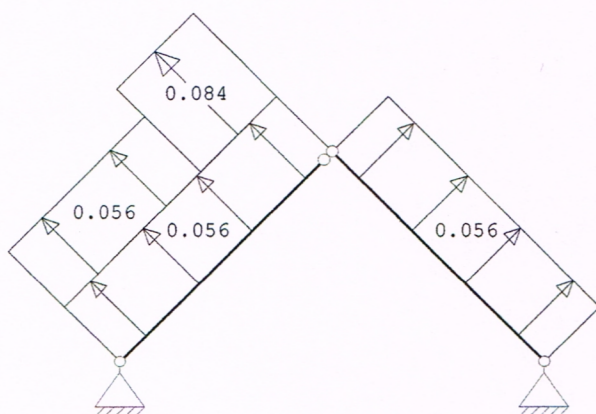
BELASTINGEN

B.G:12 Wind van rechts onderdruk B



BELASTINGEN

B.G:13 Wind van rechts overdruk B

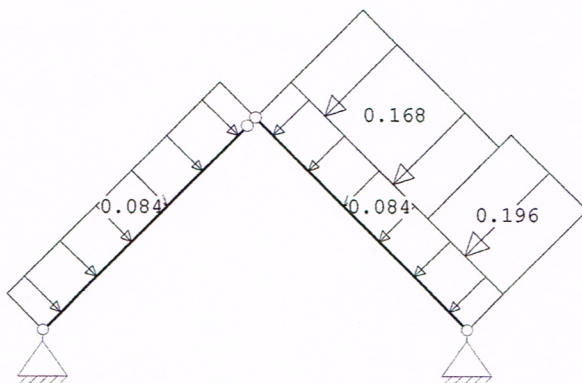


Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

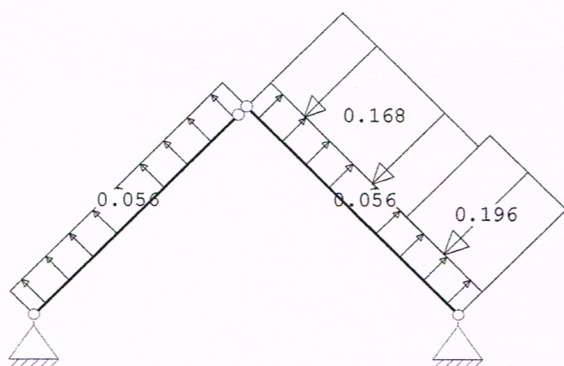
BELASTINGEN

B.G:14 Wind van rechts onderdruk C



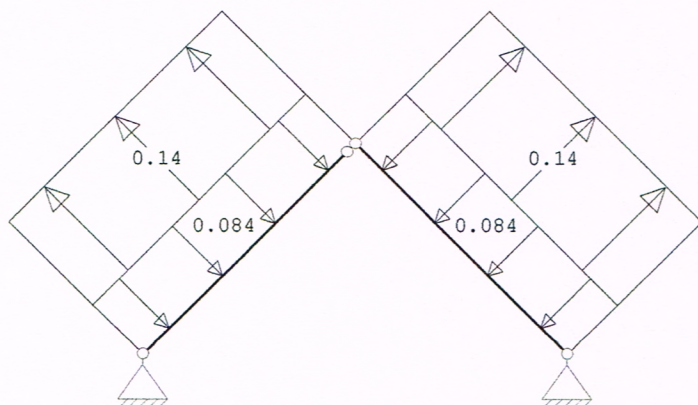
BELASTINGEN

B.G:15 Wind van rechts overdruk C



BELASTINGEN

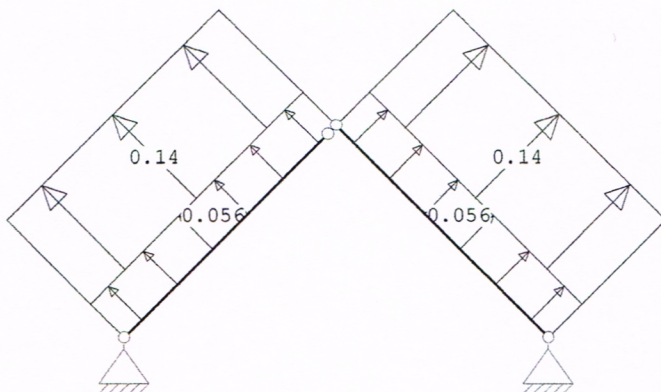
B.G:16 Wind loodrecht onderdruk A



Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
Onderdeel: Sporenkap

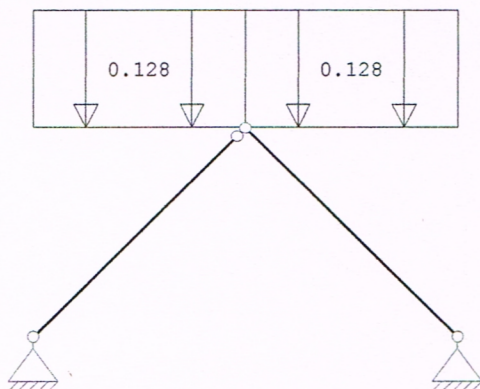
BELASTINGEN

B.G:17 Wind loodrecht overdruk A



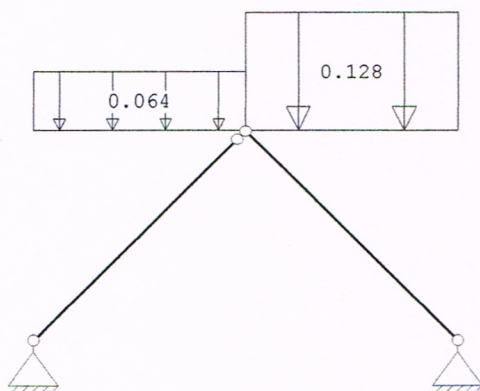
BELASTINGEN

B.G:18 Sneeuw A



BELASTINGEN

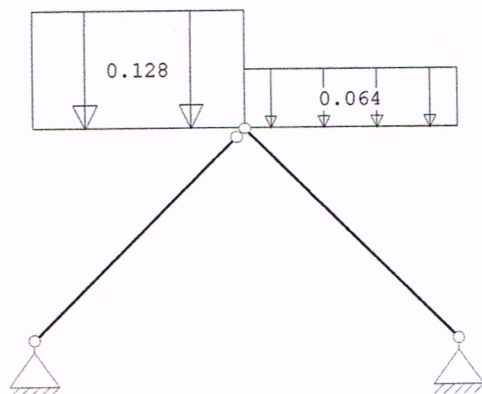
B.G:19 Sneeuw B



Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel: Sporenkap

BELASTINGEN

B.G:20 Sneeuw C

**BELASTINGCOMBINATIES**

BC Type	BG Gen. Factor	BG Gen. Factor	BG Gen. Factor	BG Gen. Factor
1 Fund.	1 Perm	1.22		
2 Fund.	1 Perm	0.90		
3 Fund.	1 Perm	1.08	2 Extr	1.35
4 Fund.	1 Perm	1.08	3 Extr	1.35
5 Fund.	1 Perm	1.08	4 Extr	1.35
6 Fund.	1 Perm	1.08	5 Extr	1.35
7 Fund.	1 Perm	1.08	6 Extr	1.35
8 Fund.	1 Perm	1.08	7 Extr	1.35
9 Fund.	1 Perm	1.08	8 Extr	1.35
10 Fund.	1 Perm	1.08	9 Extr	1.35
11 Fund.	1 Perm	1.08	10 Extr	1.35
12 Fund.	1 Perm	1.08	11 Extr	1.35
13 Fund.	1 Perm	1.08	12 Extr	1.35
14 Fund.	1 Perm	1.08	13 Extr	1.35
15 Fund.	1 Perm	1.08	14 Extr	1.35
16 Fund.	1 Perm	1.08	15 Extr	1.35
17 Fund.	1 Perm	1.08	16 Extr	1.35
18 Fund.	1 Perm	1.08	17 Extr	1.35
19 Fund.	1 Perm	1.08	18 Extr	1.35
20 Fund.	1 Perm	1.08	19 Extr	1.35
21 Fund.	1 Perm	1.08	20 Extr	1.35
22 Fund.	1 Perm	0.90	2 Extr	1.35
23 Fund.	1 Perm	0.90	3 Extr	1.35
24 Fund.	1 Perm	0.90	4 Extr	1.35
25 Fund.	1 Perm	0.90	5 Extr	1.35
26 Fund.	1 Perm	0.90	6 Extr	1.35
27 Fund.	1 Perm	0.90	7 Extr	1.35
28 Fund.	1 Perm	0.90	8 Extr	1.35
29 Fund.	1 Perm	0.90	9 Extr	1.35
30 Fund.	1 Perm	0.90	10 Extr	1.35
31 Fund.	1 Perm	0.90	11 Extr	1.35
32 Fund.	1 Perm	0.90	12 Extr	1.35
33 Fund.	1 Perm	0.90	13 Extr	1.35
34 Fund.	1 Perm	0.90	14 Extr	1.35
35 Fund.	1 Perm	0.90	15 Extr	1.35
36 Fund.	1 Perm	0.90	16 Extr	1.35
37 Fund.	1 Perm	0.90	17 Extr	1.35
38 Fund.	1 Perm	0.90	18 Extr	1.35
39 Fund.	1 Perm	0.90	19 Extr	1.35
40 Fund.	1 Perm	0.90	20 Extr	1.35
41 Kar.	1 Perm	1.00	2 Extr	1.00
42 Kar.	1 Perm	1.00	3 Extr	1.00
43 Kar.	1 Perm	1.00	4 Extr	1.00
44 Kar.	1 Perm	1.00	5 Extr	1.00
45 Kar.	1 Perm	1.00	6 Extr	1.00
46 Kar.	1 Perm	1.00	7 Extr	1.00

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel: Sporenkap

BELASTINGCOMBINATIES

BC Type	BG Gen.	Factor	BG Gen.	Factor	BG Gen.	Factor	BG Gen.	Factor
47 Kar.	1 Perm	1.00	8 Extr	1.00				
48 Kar.	1 Perm	1.00	9 Extr	1.00				
49 Kar.	1 Perm	1.00	10 Extr	1.00				
50 Kar.	1 Perm	1.00	11 Extr	1.00				
51 Kar.	1 Perm	1.00	12 Extr	1.00				
52 Kar.	1 Perm	1.00	13 Extr	1.00				
53 Kar.	1 Perm	1.00	14 Extr	1.00				
54 Kar.	1 Perm	1.00	15 Extr	1.00				
55 Kar.	1 Perm	1.00	16 Extr	1.00				
56 Kar.	1 Perm	1.00	17 Extr	1.00				
57 Kar.	1 Perm	1.00	18 Extr	1.00				
58 Kar.	1 Perm	1.00	19 Extr	1.00				
59 Kar.	1 Perm	1.00	20 Extr	1.00				
60 Quas.	1 Perm	1.00						
61 Freq.	1 Perm	1.00						
62 Freq.	1 Perm	1.00	2 psil	1.00				
63 Freq.	1 Perm	1.00	3 psil	1.00				
64 Freq.	1 Perm	1.00	4 psil	1.00				
65 Freq.	1 Perm	1.00	5 psil	1.00				
66 Freq.	1 Perm	1.00	6 psil	1.00				
67 Freq.	1 Perm	1.00	7 psil	1.00				
68 Freq.	1 Perm	1.00	8 psil	1.00				
69 Freq.	1 Perm	1.00	9 psil	1.00				
70 Freq.	1 Perm	1.00	10 psil	1.00				
71 Freq.	1 Perm	1.00	11 psil	1.00				
72 Freq.	1 Perm	1.00	12 psil	1.00				
73 Freq.	1 Perm	1.00	13 psil	1.00				
74 Freq.	1 Perm	1.00	14 psil	1.00				
75 Freq.	1 Perm	1.00	15 psil	1.00				
76 Freq.	1 Perm	1.00	16 psil	1.00				
77 Freq.	1 Perm	1.00	17 psil	1.00				
78 Freq.	1 Perm	1.00	18 psil	1.00				
79 Freq.	1 Perm	1.00	19 psil	1.00				
80 Freq.	1 Perm	1.00	20 psil	1.00				
81 Blij.	1 Perm	1.00						

GUNSTIGE WERKING PERMANENTE BELASTINGEN

BC Staven met gunstige werking

- 1 Geen
- 2 Alle staven de factor:0.90
- 3 Geen
- 4 Geen
- 5 Geen
- 6 Geen
- 7 Geen
- 8 Geen
- 9 Geen
- 10 Geen
- 11 Geen
- 12 Geen
- 13 Geen
- 14 Geen
- 15 Geen
- 16 Geen
- 17 Geen
- 18 Geen
- 19 Geen
- 20 Geen
- 21 Geen
- 22 Alle staven de factor:0.90
- 23 Alle staven de factor:0.90
- 24 Alle staven de factor:0.90

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

GUNSTIGE WERKING PERMANENTE BELASTINGEN

BC Staven met gunstige werking

25 Alle staven de factor:0.90
 26 Alle staven de factor:0.90
 27 Alle staven de factor:0.90
 28 Alle staven de factor:0.90
 29 Alle staven de factor:0.90
 30 Alle staven de factor:0.90
 31 Alle staven de factor:0.90
 32 Alle staven de factor:0.90
 33 Alle staven de factor:0.90
 34 Alle staven de factor:0.90
 35 Alle staven de factor:0.90
 36 Alle staven de factor:0.90
 37 Alle staven de factor:0.90
 38 Alle staven de factor:0.90
 39 Alle staven de factor:0.90
 40 Alle staven de factor:0.90

OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES**STAAFKRACHTEN**

Fundamentele combinatie

St.	Kn.	Pos.	NXi/NXj		Dzi/Dzj		MYi/MYj	
			Min BC	Max BC	Min BC	Max BC	Min BC	Max BC
1	1		-1.81 15	-0.66 37	-0.98 3	0.05 37	0.00 3	0.00 37
1	1.455		-1.40 15	-0.32 37	-0.03 3	0.00 37	-0.73 3	0.04 37
1	1.508		-1.38 15	-0.31 37	-0.00 5	0.01 31	-0.73 3	0.04 37
1	1.520		-1.38 15	-0.31 37	0.00 5	0.01 31	-0.73 3	0.04 37
1	2		-0.95 15	0.05 37	-0.05 37	0.95 3	0.00 3	0.00 37
2	2		-0.95 3	0.05 37	-0.95 11	0.05 37	0.00 11	0.00 37
2	1.520		-1.38 3	-0.31 37	-0.01 11	0.00 37	-0.73 11	0.04 37
2	1.532		-1.38 3	-0.31 37	-0.01 25	0.00 7	-0.73 11	0.04 37
2	1.585		-1.40 3	-0.32 37	-0.00 25	0.03 11	-0.73 11	0.04 37
2	3		-1.81 3	-0.66 37	-0.05 37	0.98 11	-0.00 11	0.00 37

REACTIES

Fundamentele combinatie

Kn.	X-min	X-max	Z-min	Z-max	M-min	M-max
1	0.13	0.94	0.44	1.72		
3	-0.94	-0.13	0.44	1.72		

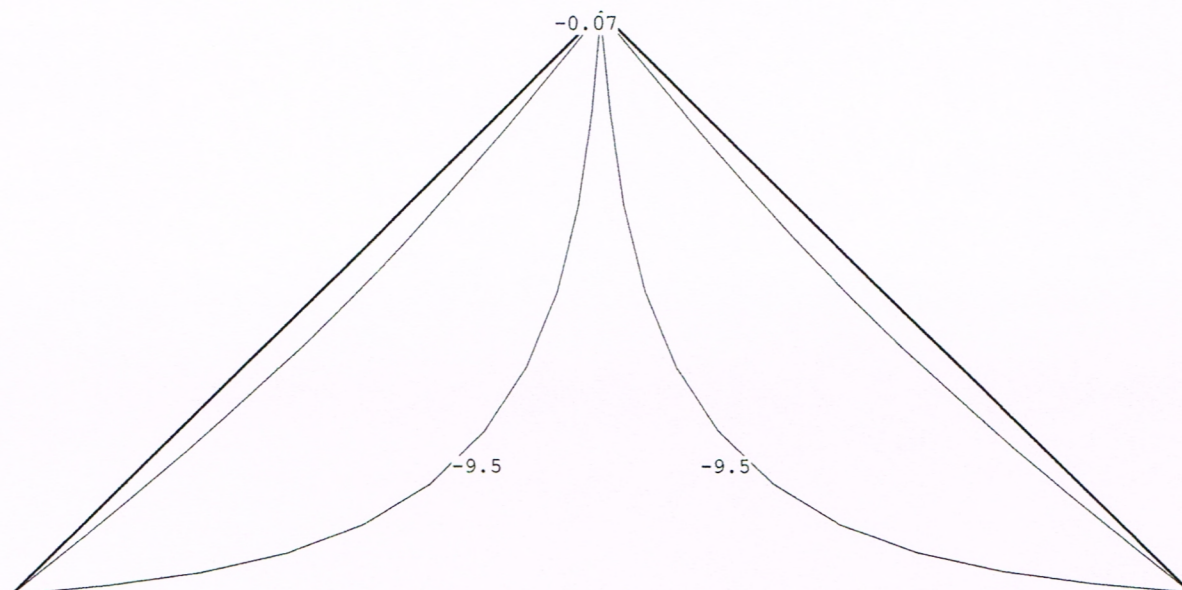
Project.: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES**VERPLAATSINGEN**

[mm]

Karakteristieke combinatie

**STAAFKRACHTEN**

Karakteristieke combinatie

St.	Kn.	Pos.	NXi/NXj		Dzi/Dzj		MYi/MYj	
			Min BC	Max BC	Min BC	Max BC	Min BC	Max BC
1	1		-1.57 49	-0.89 56	-0.80 41	-0.10 56	0.00 41	0.00 56
1	1.510		-1.18 49	-0.50 56	-0.00 43	0.00 50	-0.60 41	-0.07 56
1	1.520		-1.18 49	-0.49 56	0.00 43	0.01 50	-0.60 41	-0.07 56
1	2		-0.78 49	-0.10 56	0.10 56	0.78 41	0.00 41	0.00 56
2	2		-0.78 45	-0.10 56	-0.78 49	-0.10 56	0.00 49	0.00 56
2	1.520		-1.18 45	-0.49 56	-0.01 49	0.00 56	-0.60 49	-0.07 56
2	1.531		-1.18 45	-0.50 56	-0.00 42	0.00 45	-0.60 49	-0.07 56
2	3		-1.57 45	-0.89 56	0.10 56	0.80 49	-0.00 49	0.00 56

REACTIES

Karakteristieke combinatie

Kn.	X-min	X-max	Z-min	Z-max	M-min	M-max
1	0.28	0.81	0.70	1.50		
3	-0.81	-0.28	0.70	1.50		

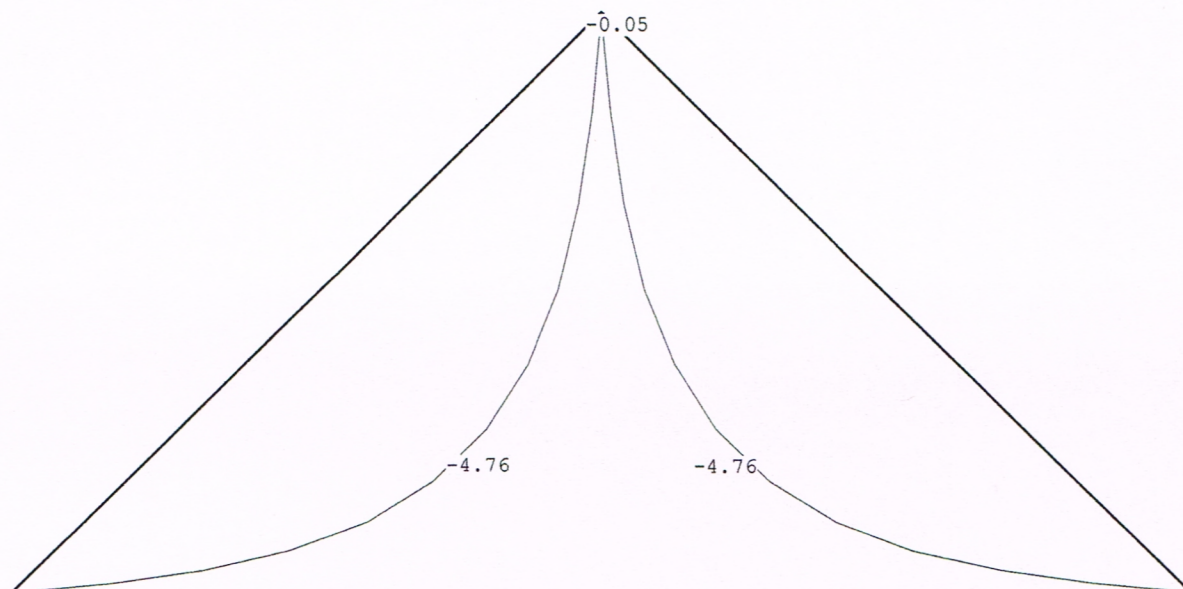
Project.: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

OMHULLENDE VAN DE BLIJVENDE COMBINATIES**VERPLAATSINGEN**

[mm]

Blijvende combinatie

**STAAFKRACHTEN**

Blijvende combinatie

St.	Kn.	Pos.	NX_i/NX_j	DZ_i/DZ_j	MY_i/MY_j
1	1		-1.19	-0.40	0.00
1	1.520			0.00	-0.30
1	2		-0.40	0.40	0.00
2	2		-0.40	-0.40	0.00
2	1.520			0.00	-0.30
2	3		-1.19	0.40	0.00

REACTIES

Blijvende combinatie

Kn.	X	Z	M
1	0.56	1.12	
3	-0.56	1.12	

Project : 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel : Sporen
 Datum : 07/02/2017
 Eenheden : kN/m/rad

Toegepaste normen volgens Eurocode met Nederlandse NB

Belastingen	NEN-EN 1990:2002	C2:2010	NB:2011(nl)
	NEN-EN 1991-1-1:2002	C1:2009	NB:2011(nl)
Hout	NEN-EN 1995-1-1:2005	A1:2011,C1:2006	NB:2011(nl)
	NEN-EN 14080:2013		

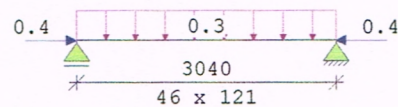
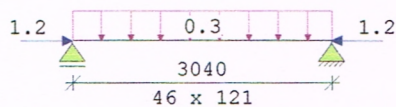
Berekening willekeurige staaf. (H)

Algemene gegevens

B x H	[mm] :	46 x 121	Referentie periode [j]:	50
l_{sys}	[mm] :	3040		
$l_{buc,y}$	[mm] :	3040	Toelaatbare doorbuiging	
$l_{buc,z}$	[mm] :	600	Bijkomend [* 1] :	0.004
Plaats kipsteun	:	Bovenkant		
Steunpunt links	:	Rol	Eind [* 1] :	0.004
Steunpunt rechts	:	Scharnier		
Sterkteklasse	:	C18	Klimaatklasse :	I

Belastingen

		Permanent	Veranderlijk
q_z	[kN/m] :	-0.26	-0.26
Ψ_0	[-] :		0.00
Ψ_2	[-] :		0.00
F_z	[kN] :	0.00	0.00
Vanaf links	[mm] :	0	
N_x	[kN] :	1.19	0.38
$M_{y,links}$	[kNm] :	0.00	0.00
$M_{y,rechts}$	[kNm] :	0.00	0.00



Belastingfactoren (NEN-EN 1990)

Formule 6.10a:	γ_G :	1.22	γ_Q :	1.35
Formule 6.10b:	$\xi\gamma_G$:	1.08	γ_Q :	1.35

Partiële factor (Tabel 2.3 NEN-EN 1995-1-1)

$\gamma_M[-]$: 1.30

Stabiliteit

1. Factoren t.b.v. toetsing knikstabiliteit volgens par. 6.3.2.:

k_y	[-] :	1.77 frm(6.27)	$k_{c,y}$	[-] :	0.37 frm(6.25)
k_z	[-] :	0.86 frm(6.28)	$k_{c,z}$	[-] :	0.83 frm(6.26)

2. Factoren t.b.v. toetsing kipstabiliteit volgens par. 6.3.3.:

Fundamentele combinatie (6.10a):

$k_{crit,y}$ [-] : 1.00 frm(6.34)

Fundamentele combinatie (6.10b):

$k_{crit,y}$ [-] : 1.00 frm(6.34)

Fundamentele combinatie (6.10a)

			frm(6.23)	u.c.	0.46
Normaalkracht [kN]	1.5	$\sigma_{c,0,d}$	[N/mm ²] 0.26		
Dwarskracht [kN]	-0.5	$\sigma_{v,d}$	[N/mm ²] 0.13		
Moment [kNm]	-0.4	$\sigma_{m,y,d}$	[N/mm ²] 3.26		
$f_{m,y,d}$	[N/mm ²] 8.7	$f_{c,0,d}$	[N/mm ²] 8.31	b_{ef}	46[mm] frm(6.13a)
$f_{t,0,d}$	[N/mm ²] 5.3	$f_{v,d}$	[N/mm ²] 1.57	k_{mod}	0.60 [-] tab(3.1)

TS/Construct

Rel: 6.01 8 feb 2017

Project : 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel : Sporen
 Datum : 07/02/2017
 Eenheden : kN/m/rad

Fundamentele combinatie (6.10b) **frm(6.23)** **u.c.** **0.57**

Normaalkracht [kN]	1.8	$\sigma_{c,0,d}$	[N/mm ²]	0.32		
Dwarskracht [kN]	-1.0	$\sigma_{v,d}$	[N/mm ²]	0.26		
Moment [kNm]	-0.7	$\sigma_{m,y,d}$	[N/mm ²]	6.50		
$f_{m,y,d}$ [N/mm ²]	13.0	$f_{c,0,d}$	[N/mm ²]	12.46	b_{ef} 46[mm] frm(6.13a)	
$f_{t,0,d}$ [N/mm ²]	7.9	$f_{v,d}$	[N/mm ²]	2.35	k_{mod} 0.90 [-] tab(3.1)	

Doorbuiging **u.c.**

u_{bij}	=	7.57 < 12.16 [mm]	0.62
$u_{net,fin}$	=	12.30 < 12.16 [mm]	<u>1.01</u>

Project : 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel : Balklaag zolder
 Datum : 07/02/2017
 Eenheden : kN/m/rad

Toegepaste normen volgens Eurocode met Nederlandse NB

Belastingen	NEN-EN 1990:2002	C2:2010	NB:2011(nl)
	NEN-EN 1991-1-1:2002	C1:2009	NB:2011(nl)
Hout	NEN-EN 1995-1-1:2005	A1:2011, C1:2006	NB:2011(nl)
	NEN-EN 14080:2013		

Balklaag berekening. (H)

Algemene gegevens

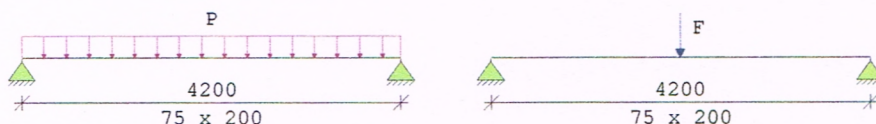
B x H	[mm] : 75 x 200	Sterkteklasse	: C18
Overspanning	[mm] : 4200	Klimaatklasse	: I
Oplegglengte	[mm] : 100	Referentie periode [j]	: 50
H.o.h. afstand	[mm] : 610	Min. eigenfreq. [Hz]	: 3
Beschot sterkteklasse:	C18		
Dikte beschot	[mm] : 19	$E_{0,mean} \times I$ [Nm ² /m]	: 5144

Permanente belastingen G_{rep}

EG balklaag	: 0.35
Extra belasting	: 0.00
Totaal [kN/m ²]	: 0.35

Veranderlijke belastingen

$P_{rep} + P_{wanden}$ [kN/m ²]	: 1.75 = 1.75 + 0.00
Ψ_0 [-]	: 0.40
Ψ_2 [-]	: 0.30
F_{rep} [kN]	: 3.00
F_{rep} oppervlak [m ²]	: 0.10 x 0.10
Reductiefactor	: 0.76



Belastingfactoren (NEN-EN 1990)

Formule 6.10a:	γ_G : 1.22	γ_Q : 1.35
Formule 6.10b:	$\xi \gamma_G$: 1.08	γ_Q : 1.35

Partiële factor (Tabel 2.3 NEN-EN 1995-1-1)

γ_M [-]: 1.30

Meegenomen combinaties in de berekening :	k_{mod} [-]	b_{ef} [mm]	$k_{c,90,q}$	$k_{c,90,F}$
* Perm. + q-last (6.10a) ($G_{rep} + P_{rep}$)	0.80	75	1.00	
* Perm. + q-last (6.10b) ($G_{rep} + P_{rep}$)	0.80	75	1.00	
* Perm. + puntlast (6.10a) ($G_{rep} + F_{rep}$)	1.10	75	1.00	1.00
* Perm. + puntlast (6.10b) ($G_{rep} + F_{rep}$)	1.10	75	1.00	1.00

Resultaten (maatgevende combinaties)

	eis	u.c.
Perm + qlast(6.10b) frm(6.11) $\sigma_{m,y,d}$	= 7.37 < 11.08 [N/mm ²]	0.67
Perm + qlast(6.10b) frm(6.13) $\sigma_{v,d}$	= 0.31 < 2.09 [N/mm ²]	0.15
Perm + qlast(6.10b) frm(6.3) $\sigma_{c,90,q,d} / (k_{c,90,q} * f_{c,90,d}) + \sigma_{c,90,F,d} / (k_{c,90,F} * f_{c,90,d})$	< 1.00	
	= 0.46/ 1.35+ 0.00/ 1.35 = 0.34	

Verdeelde belasting u_{bij}	= 12.49 < 12.60 [mm]	0.99
Verdeelde belasting $u_{net,fin}$	= 14.41 < 16.80 [mm]	0.86

Resonantie : eerste eigen frequentie = 7.39 > 3.00 [Hz] 0.41

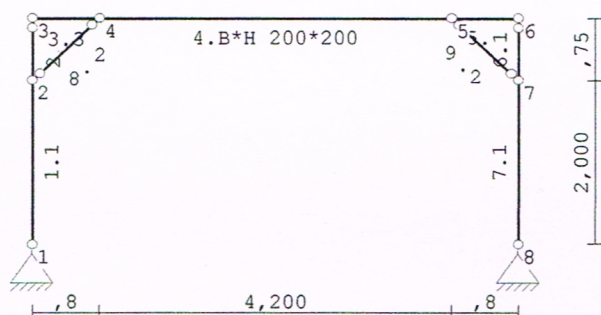
Belastingbreedte.: 0.610

Theorie voor de bepaling van de krachtsverdeling: Geometrisch lineair.

Gunstige werking van de permanente belasting wordt automatisch verwerkt.

Belastingen	NEN-EN 1990:2002	C2:2010	NB:2011(nl)
	NEN-EN 1991-1-1:2002	C1:2009	NB:2011(nl)

GEOMETRIE



PROFIELVORMEN [mm]

- 1 B*H 200*200



- 2 B*H 120*120

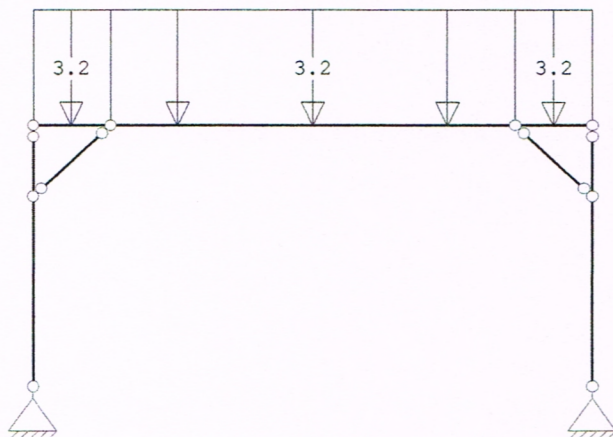


- 3 B*H 200*200



BELASTINGEN

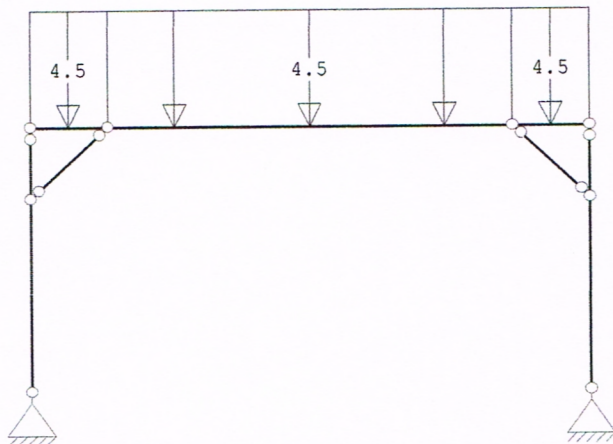
B.G:1 Permanente belasting



Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
Onderdeel: Sporenkap

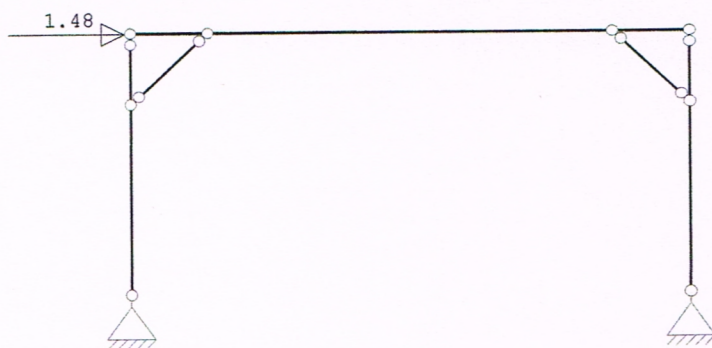
BELASTINGEN

B.G:2 Variabele belasting



BELASTINGEN

B.G:3 Wind belasting



BELASTINGCOMBINATIES

BC Type	BG Gen. Factor	BG Gen. Factor	BG Gen. Factor	BG Gen. Factor
1 Fund.	1 Perm	1.22		
2 Fund.	1 Perm	0.90		
3 Fund.	1 Perm	1.22	2 psi0	1.35
4 Fund.	1 Perm	1.08	2 Extr	1.35
5 Fund.	1 Perm	1.08	3 Extr	1.35
6 Fund.	1 Perm	0.90	2 psi0	1.35
7 Fund.	1 Perm	0.90	2 Extr	1.35
8 Fund.	1 Perm	0.90	3 Extr	1.35
9 Fund.	1 Perm	1.08	3 Extr	1.35
10 Fund.	1 Perm	0.90	3 Extr	1.35
11 Kar.	1 Perm	1.00	2 Extr	1.00
12 Kar.	1 Perm	1.00	3 Extr	1.00
13 Kar.	1 Perm	1.00	3 Extr	1.00
14 Quas.	1 Perm	1.00	2 psi0	1.35
15 Quas.	1 Perm	1.00	2 psi2	1.00
16 Freq.	1 Perm	1.00		
17 Freq.	1 Perm	1.00	2 psi1	1.00
18 Freq.	1 Perm	1.00	3 psi1	1.00
19 Freq.	1 Perm	1.00	3 psi1	1.00
20 Blij.	1 Perm	1.00	2 psi2	1.00

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
Onderdeel: Sporenkap

GUNSTIGE WERKING PERMANENTE BELASTINGEN

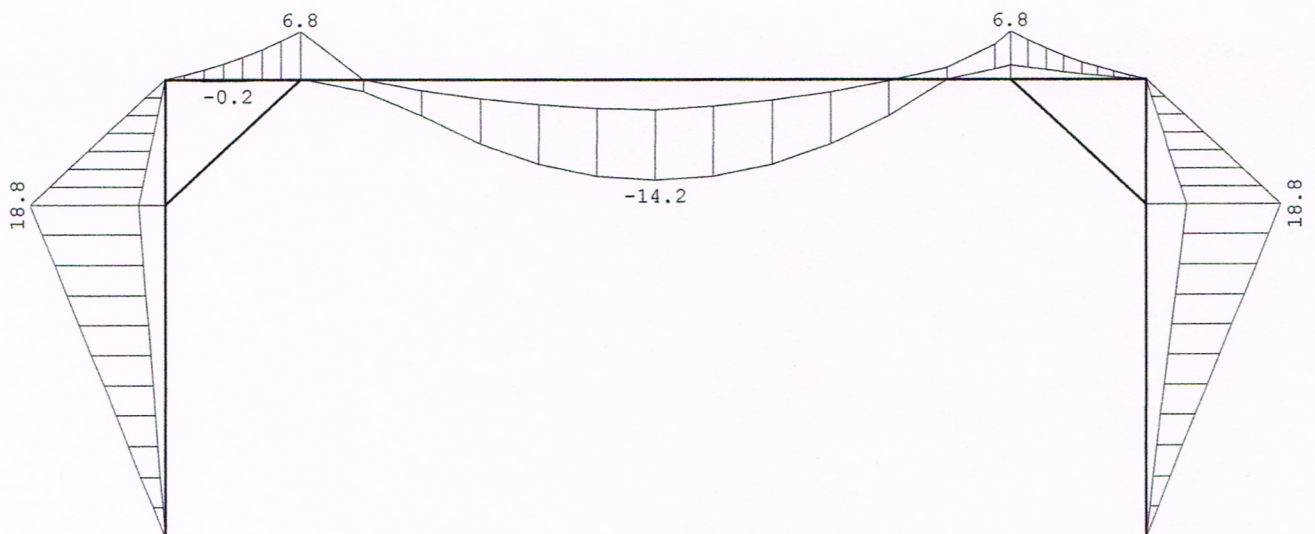
BC Staven met gunstige werking

- 1 Geen
- 2 Alle staven de factor:0.90
- 3 Geen
- 4 Geen
- 5 Geen
- 6 Alle staven de factor:0.90
- 7 Alle staven de factor:0.90
- 8 Alle staven de factor:0.90
- 9 Geen
- 10 Alle staven de factor:0.90

OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES

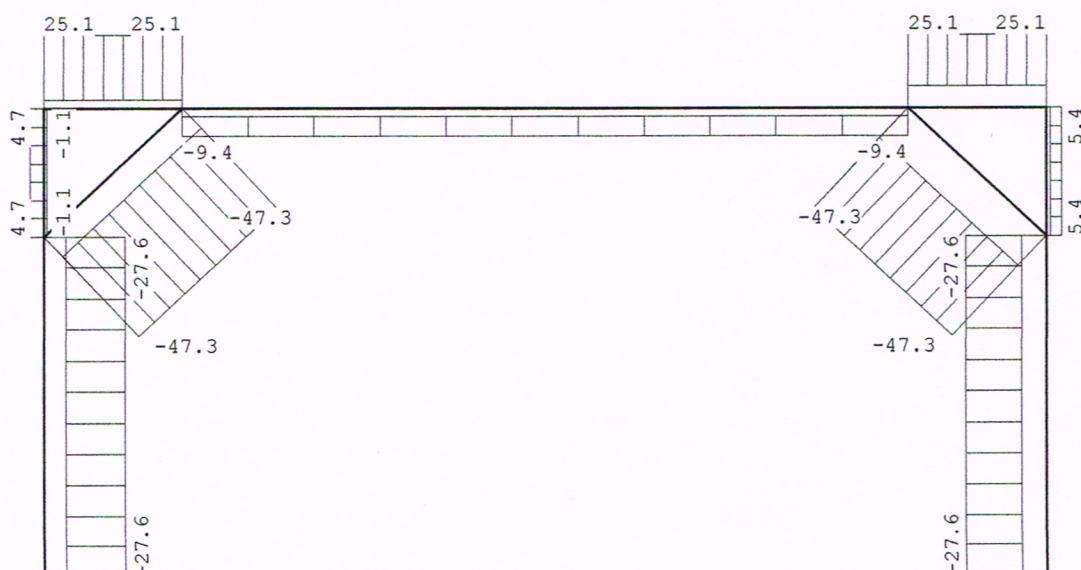
MOMENTEN

Fundamentele combinatie



NORMAALKRACHTEN

Fundamentele combinatie



Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel: Sporenkap

STAAFKRACHTEN

Fundamentele combinatie

St.	Kn.	Pos.	NXi/NXj			DZi/DZj			MYi/MYj					
			Min	BC	Max	BC	Min	BC	Max	BC	Min	BC	Max	BC
1	1		-27.64	4	-7.40	8	1.84	8	9.41	4	0.00	8	0.00	4
1	2		-27.64	4	-7.40	8	1.84	8	9.41	4	3.69	8	18.81	4
2	2		-1.07	8	4.69	4	-25.08	4	-4.92	8	3.69	8	18.81	4
2	3		-1.07	8	4.69	4	-25.08	4	-4.92	8	0.00	8	0.00	4
3	3		2.92	8	25.08	4	-1.07	8	4.69	4	0.00	8	0.00	4
3	0.371		2.92	8	25.08	4	0.00	8	8.23	4	-0.20	8	2.40	4
3	0.742		2.92	8	25.08	4	1.07	8	11.77	4	-0.00	8	6.11	4
3	4		2.92	8	25.08	4	1.24	8	12.32	4	0.07	8	6.80	4
4	4		-9.41	4	-2.84	2	-20.02	4	-5.10	8	0.07	8	6.80	4
4	0.013		-9.41	4	-2.84	2	-19.89	4	-5.06	8	-0.00	8	6.54	4
4	0.373		-9.41	4	-2.84	2	-16.46	4	-4.03	8	-1.64	8	-0.00	4
4	2.100		-9.41	4	-2.84	2	-0.00	4	0.95	8	-14.21	4	-4.29	2
4	3.529		-9.41	4	-2.84	2	4.12	2	13.62	4	-4.48	4	-0.00	8
4	3.827		-9.41	4	-2.84	2	4.97	2	16.46	4	-0.00	4	1.64	8
4	5		-9.41	4	-2.84	2	6.05	2	20.02	4	2.06	2	6.80	4
5	5		7.58	2	25.08	4	-12.32	4	-3.72	2	2.06	2	6.80	4
5	6		7.58	2	25.08	4	-5.38	9	-1.42	2	0.00	2	0.00	9
6	6		1.42	2	5.38	9	7.58	2	25.08	4	0.00	2	0.00	4
6	7		1.42	2	5.38	9	7.58	2	25.08	4	5.68	2	18.81	4
7	7		-27.64	4	-8.35	2	-9.41	4	-2.84	2	5.68	2	18.81	4
7	8		-27.64	4	-8.35	2	-9.41	4	-2.84	2	0.00	2	0.00	4
8	2		-47.27	4	-9.26	8	0.00	1	0.00	1	0.00	1	0.00	1
8	4		-47.27	4	-9.26	8	0.00	1	0.00	1	0.00	1	0.00	1
9	5		-47.27	4	-14.28	2	0.00	1	0.00	1	0.00	1	0.00	1
9	7		-47.27	4	-14.28	2	0.00	1	0.00	1	0.00	1	0.00	1

REACTIES

Fundamentele combinatie

Kn.	X-min	X-max	Z-min	Z-max	M-min	M-max
1	1.84	9.41	7.40	27.64		
8	-9.41	-2.84	8.35	27.64		

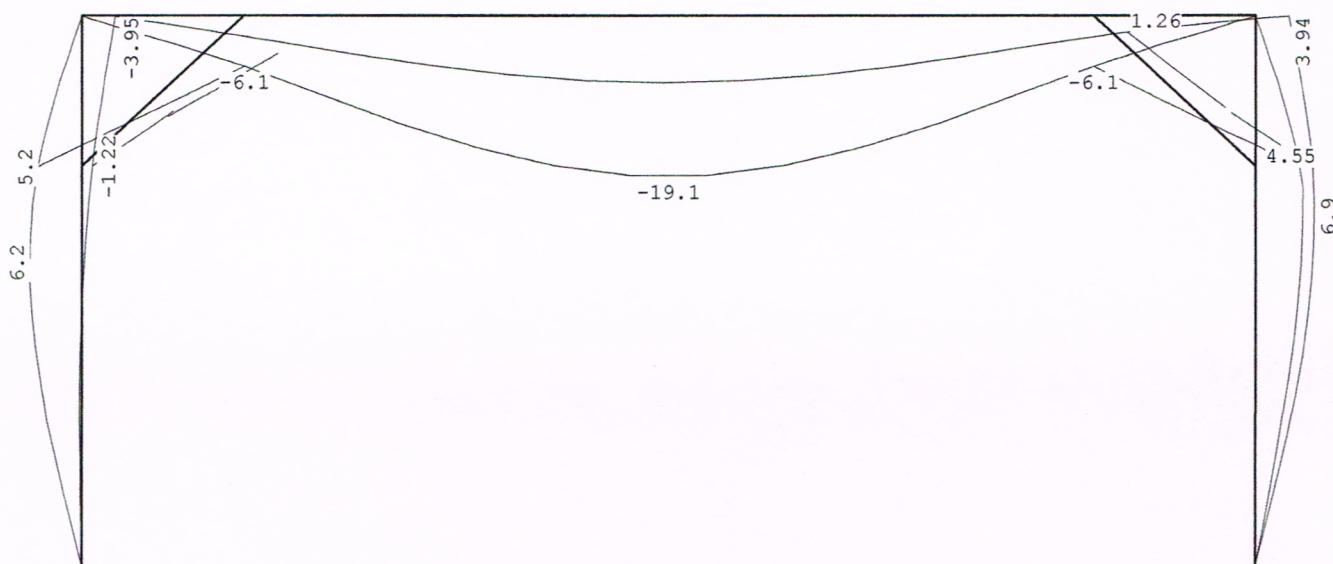
Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES**VERPLAATSINGEN**

[mm]

Karakteristieke combinatie

**STAAFKRACHTEN**

Karakteristieke combinatie

St.	Kn.	Pos.	NXi/NXj		DZi/DZj		MYi/MYj	
			Min BC	Max BC	Min BC	Max BC	Min BC	Max BC
1	1		-22.33 11	-8.58 12	2.42 12	7.60 11	0.00 12	0.00 11
1	2		-22.33 11	-8.58 12	2.42 12	7.60 11	4.84 12	15.20 11
2	2		-0.27 12	3.79 11	-20.26 11	-6.45 12	4.84 12	15.20 11
2	3		-0.27 12	3.79 11	-20.26 11	-6.45 12	0.00 12	0.00 11
3	3		4.97 12	20.26 11	-0.27 12	3.79 11	0.00 12	0.00 11
3	0.083		4.97 12	20.26 11	0.00 12	4.43 11	-0.01 12	0.34 11
3	0.166		4.97 12	20.26 11	0.27 12	5.07 11	-0.00 12	0.74 11
3	4		4.97 12	20.26 11	2.29 12	9.95 11	0.81 12	5.50 11
4	4		-7.60 11	-3.90 12	-16.17 11	-6.02 12	0.81 12	5.50 11
4	0.140		-7.60 11	-3.90 12	-15.09 11	-5.57 12	-0.00 12	3.31 11
4	0.373		-7.60 11	-3.90 12	-13.30 11	-4.82 12	-1.21 12	-0.00 11
4	1.881		-7.60 11	-3.90 12	-1.69 11	0.00 12	-11.30 11	-4.85 12
4	2.100		-7.60 11	-3.90 12	0.00 11	0.70 12	-11.48 11	-4.77 12
4	3.621		-7.60 11	-3.90 12	5.57 12	11.72 11	-2.57 11	-0.00 12
4	3.827		-7.60 11	-3.90 12	6.23 12	13.30 11	-0.00 11	1.21 12
4	5		-7.60 11	-3.90 12	7.42 12	16.17 11	3.76 12	5.50 11
5	5		10.39 12	20.26 11	-9.95 11	-5.98 12	3.76 12	5.50 11
5	6		10.39 12	20.26 11	-4.30 13	-3.42 12	0.00 12	0.00 13
6	6		3.42 12	4.30 13	10.39 12	20.26 11	0.00 12	0.00 11
6	7		3.42 12	4.30 13	10.39 12	20.26 11	7.80 12	15.20 11
7	7		-22.33 11	-9.98 12	-7.60 11	-3.90 12	7.80 12	15.20 11
7	8		-22.33 11	-9.98 12	-7.60 11	-3.90 12	0.00 12	0.00 11
8	2		-38.19 11	-12.15 12	0.00 11	0.00 11	0.00 11	0.00 11
8	4		-38.19 11	-12.15 12	0.00 11	0.00 11	0.00 11	0.00 11
9	5		-38.19 11	-19.59 12	0.00 11	0.00 11	0.00 11	0.00 11

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

STAAFKRACHTEN

Karakteristieke combinatie

St.	Kn.	Pos.	NXi/NXj		DZi/DZj		MYi/MYj	
			Min BC	Max BC	Min BC	Max BC	Min BC	Max BC
9	7		-38.19 11	-19.59 12	0.00 11	0.00 11	0.00 11	0.00 11

REACTIES

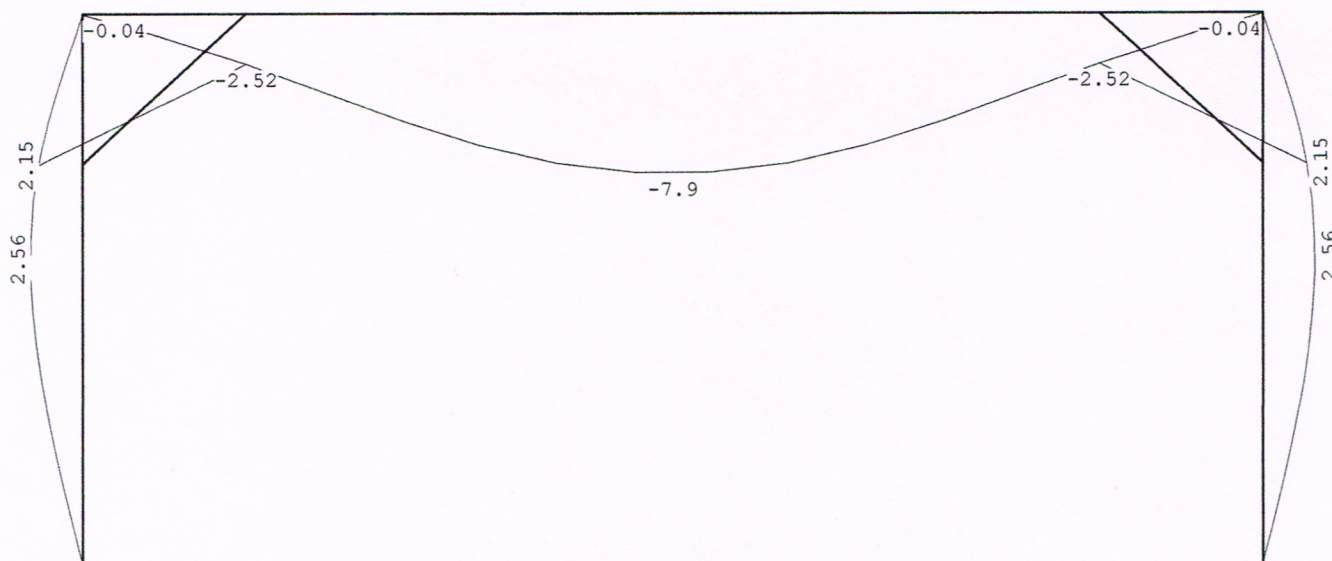
Karakteristieke combinatie

Kn.	X-min	X-max	Z-min	Z-max	M-min	M-max
1	2.42	7.60	8.58	22.33		
8	-7.60	-3.90	9.98	22.33		

OMHULLENDE VAN DE BLIJVENDE COMBINATIES**VERPLAATSINGEN**

[mm]

Blijvende combinatie

**STAAFKRACHTEN**

Blijvende combinatie

St.	Kn.	Pos.	NXi/NXj	DZi/DZj	MYi/MYj
1	1		-9.28	3.16	0.00
1	2		-9.28	3.16	6.32
2	2		1.58	-8.42	6.32
2	3		1.58	-8.42	0.00
3	3		8.42	1.58	0.00
3	4		8.42	4.14	2.28
4	4		-3.16	-6.72	2.28
4		0.373			-0.00
4		2.100		0.00	-4.77
4		3.827			-0.00
4	5		-3.16	6.72	2.28
5	5		8.42	-4.14	2.28
5	6		8.42	-1.58	0.00
6	6		1.58	8.42	0.00
6	7		1.58	8.42	6.32
7	7		-9.28	-3.16	6.32

TS/Raamwerken

Rel: 6.08 8 feb 2017

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Sporenkap

STAAFKRACHTEN

Blijvende combinatie

St.	Kn.	Pos.	NXi/NXj	DZi/DZj	MYi/MYj
7	8		-9.28	-3.16	0.00
8	2		-15.87	0.00	0.00
8	4		-15.87	0.00	0.00
9	5		-15.87	0.00	0.00
9	7		-15.87	0.00	0.00

REACTIES

Blijvende combinatie

Kn.	X	Z	M
1	3.16	9.28	
8	-3.16	9.28	

Project : 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel : Kolom
 Datum : 07/02/2017
 Eenheden : kN/m/rad

Toegepaste normen volgens Eurocode met Nederlandse NB

Belastingen	NEN-EN 1990:2002	C2:2010	NB:2011(nl)
	NEN-EN 1991-1-1:2002	C1:2009	NB:2011(nl)
Hout	NEN-EN 1995-1-1:2005	A1:2011, C1:2006	NB:2011(nl)
	NEN-EN 14080:2013		

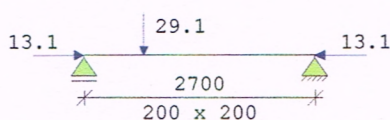
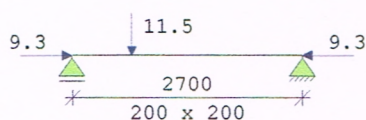
Berekening willekeurige staaf. (H)

Algemene gegevens

B x H	[mm] :	200 x 200	Referentie periode [j]:	15
l_{sys}	[mm] :	2700		
$l_{buc,y}$	[mm] :	2700	Toelaatbare doorbuiging	
$l_{buc,z}$	[mm] :	1950	Bijkomend [* 1] :	0.004
Plaats kipsteun	:	Bovenkant		
Steunpunt links	:	Rol	Eind [* 1] :	0.004
Steunpunt rechts	:	Scharnier		
Sterkteklasse	:	C24	Klimaatklasse :	I

Belastingen

	Permanent	Veranderlijk
q_z	[kN/m] : 0.00	0.00
Ψ_0	[-] :	0.00
Ψ_2	[-] :	0.00
F_z	[kN] : -11.49	-29.11
Vanaf links	[mm] : 700	
N_x	[kN] : 9.28	13.05
$M_{y,links}$	[kNm] : 0.00	0.00
$M_{y,rechts}$	[kNm] : 0.00	0.00



Belastingfactoren (NEN-EN 1990)

Formule 6.10a:	γ_G :	1.22	γ_Q :	1.35
Formule 6.10b:	$\xi \gamma_G$:	1.08	γ_Q :	1.35

Partiële factor (Tabel 2.3 NEN-EN 1995-1-1)

$\gamma_M[-]$: 1.30

Stabiliteit

1. Factoren t.b.v. toetsing knikstabiliteit volgens par. 6.3.2.:

k_y	[-] :	0.86 frm(6.27)	$k_{c,y}$	[-] :	0.83 frm(6.25)
k_z	[-] :	0.69 frm(6.28)	$k_{c,z}$	[-] :	0.93 frm(6.26)

2. Factoren t.b.v. toetsing kipstabiliteit volgens par. 6.3.3.:

Fundamentele combinatie (6.10a):

$\kappa_{crit,y}$ [-] : 1.00 frm(6.34)

Fundamentele combinatie (6.10b):

$\kappa_{crit,y}$ [-] : 1.00 frm(6.34)

Fundamentele combinatie (6.10a) frm(6.23) u.c. 0.53

Normaalkracht [kN]	11.3	$\sigma_{c,0,d}$ [N/mm ²]	0.28		
Dwarskracht [kN]	-10.4	$\sigma_{v,d}$ [N/mm ²]	0.39		
Moment [kNm]	-7.3	$\sigma_{m,y,d}$ [N/mm ²]	5.45		
$f_{m,y,d}$ [N/mm ²]	11.1	$f_{c,0,d}$ [N/mm ²]	9.69	b_{ef} 200 [mm] frm(6.13a)	
$f_{t,0,d}$ [N/mm ²]	6.5	$f_{v,d}$ [N/mm ²]	1.85	k_{mod} 0.60 [-] tab(3.1)	

TS/Construct

Rel: 6.01 8 feb 2017

Project : 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel : Kolom
 Datum : 07/02/2017
 Eenheden : kN/m/rad

Fundamentele combinatie (6.10b) **frm(6.23)** **u.c.** 1.04

Normaalkracht [kN]	27.6	$\sigma_{c,0,d}$	[N/mm ²]	0.69	
Dwarskracht [kN]	-38.3	$\sigma_{v,d}$	[N/mm ²]	1.44	
Moment [kNm]	-26.8	$\sigma_{m,y,d}$	[N/mm ²]	20.11	
$f_{m,y,d}$ [N/mm ²]	20.3	$f_{c,0,d}$	[N/mm ²]	17.77	b_{ef} 200[mm] frm(6.13a)
$f_{t,0,d}$ [N/mm ²]	11.8	$f_{v,d}$	[N/mm ²]	3.38	k_{mod} 1.10 [-] tab(3.1)

Doorbuiging**u.c.**

u_{bij}	=	7.24 < 10.80 [mm]	0.67
$u_{net,fin}$	=	9.55 < 10.80 [mm]	0.88

Project : 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel : Schoren
 Datum : 07/02/2017
 Eenheden : kN/m/rad

Toegepaste normen volgens Eurocode met Nederlandse NB

Belastingen	NEN-EN 1990:2002	C2:2010	NB:2011(nl)
	NEN-EN 1991-1-1:2002	C1:2009	NB:2011(nl)
Hout	NEN-EN 1995-1-1:2005	A1:2011, C1:2006	NB:2011(nl)
	NEN-EN 14080:2013		

Berekening willekeurige staaf. (H)**Algemene gegevens**

B x H	[mm] :	120 x 120	Referentie periode [j]:	15
l_{sys}	[mm] :	1100		
$l_{buc,y}$	[mm] :	1100	Toelaatbare doorbuiging	
$l_{buc,z}$	[mm] :	1100	Bijkomend [* 1] :	0.004
Plaats kipsteun	:	Bovenkant		
Steunpunt links	:	Rol	Eind [* 1] :	0.004
Steunpunt rechts	:	Scharnier		
Sterkteklasse	:	C24	Klimaatklasse :	I

Belastingen

		Permanent	Veranderlijk
q_z	[kN/m] :	0.00	0.00
Ψ_0	[-] :		0.00
Ψ_2	[-] :		0.00
F_z	[kN] :	0.00	0.00
Vanaf links	[mm] :	0	
N_x	[kN] :	15.87	22.32
$M_{y,links}$	[kNm] :	0.00	0.00
$M_{y,rechts}$	[kNm] :	0.00	0.00

**Belastingfactoren (NEN-EN 1990)**

Formule 6.10a: γ_G : 1.22 γ_Q : 1.35
 Formule 6.10b: $\xi \gamma_G$: 1.08 γ_Q : 1.35

Partiële factor (Tabel 2.3 NEN-EN 1995-1-1)

γ_M [-]: 1.30

Stabiliteit

1. Factoren t.b.v. toetsing knikstabiliteit volgens par. 6.3.2.:

k_y	[-] :	0.67 frm(6.27)	$k_{c,y}$	[-] :	0.94 frm(6.25)
k_z	[-] :	0.67 frm(6.28)	$k_{c,z}$	[-] :	0.94 frm(6.26)

2. Toetsing kipstabiliteit volgens par. 6.3.3. is n.v.t.:

- geen buigend moment op de staaf.

Fundamentele combinatie (6.10a)

		frm(6.23)	u.c.	0.15
Normaalkracht [kN]	19.4	$\sigma_{c,0,d}$ [N/mm ²]	1.34	
Dwarskracht [kN]	0.0	$\sigma_{v,d}$ [N/mm ²]	0.00	
Moment [kNm]	0.0	$\sigma_{m,y,d}$ [N/mm ²]	0.00	
$f_{m,y,d}$ [N/mm ²]	11.6	$f_{c,0,d}$ [N/mm ²]	9.69	b_{ef} 120 [mm] frm(6.13a)
$f_{t,0,d}$ [N/mm ²]	6.8	$f_{v,d}$ [N/mm ²]	1.85	k_{mod} 0.60 [-] tab(3.1)

TS/Construct

Rel: 6.01 8 feb 2017

Project : 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel : Schoren
 Datum : 07/02/2017
 Eenheden : kN/m/rad

Fundamentele combinatie (6.10b) frm(6.23) u.c. 0.20

Normaalkracht [kN]	47.3	$\sigma_{c,0,d}$	[N/mm ²]	3.28	
Dwarskracht [kN]	0.0	$\sigma_{v,d}$	[N/mm ²]	0.00	
Moment [kNm]	0.0	$\sigma_{m,y,d}$	[N/mm ²]	0.00	
$f_{m,y,d}$ [N/mm ²]	21.2	$f_{c,0,d}$	[N/mm ²]	17.77	b_{ef} 120[mm] frm(6.13a)
$f_{t,0,d}$ [N/mm ²]	12.4	$f_{v,d}$	[N/mm ²]	3.38	k_{mod} 1.10 [-] tab(3.1)

Doorbuiging

u.c.

u_{bij}	=	0.00 <	4.40 [mm]	0.00
$u_{net,fin}$	=	0.00 <	4.40 [mm]	0.00

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel: Spant Dwarsrichting
 Dimensies: kN;m;rad (tenzij anders aangegeven)
 Datum....: 28/12/2016
 Bestand...: G:\Projects (TS)\16.137 - 2.3.rww

Belastingbreedte.: 1.000

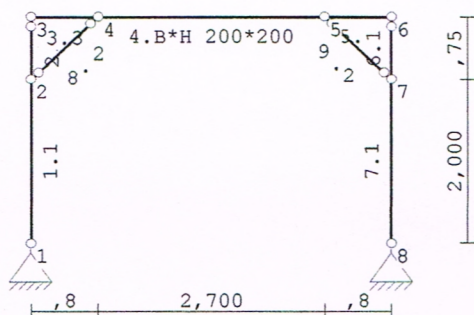
Theorie voor de bepaling van de krachtsverdeling: Geometrisch lineair.

Gunstige werking van de permanente belasting wordt automatisch verwerkt.

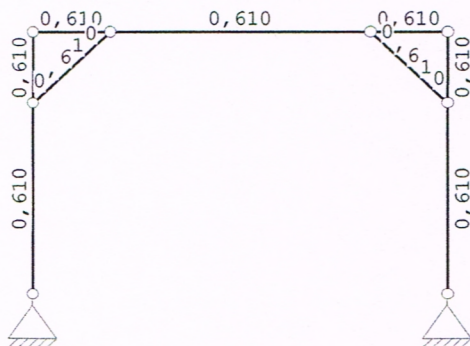
Toegepaste normen volgens Eurocode met Nederlandse NB

Belastingen	NEN-EN 1990:2002	C2:2010	NB:2011(nl)
	NEN-EN 1991-1-1:2002	C1:2009	NB:2011(nl)

GEOMETRIE



BELASTINGBREEDTEN



PROFIELVORMEN [mm]

1 B*H 200*200



2 B*H 120*120



3 B*H 200*200

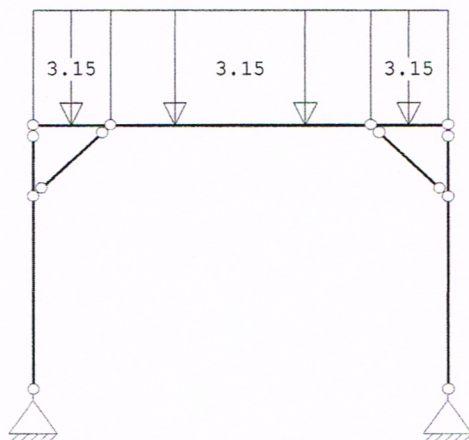


Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

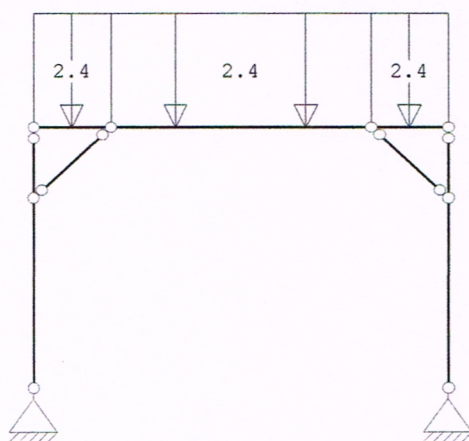
Onderdeel: Spant Dwarsrichting

BELASTINGEN

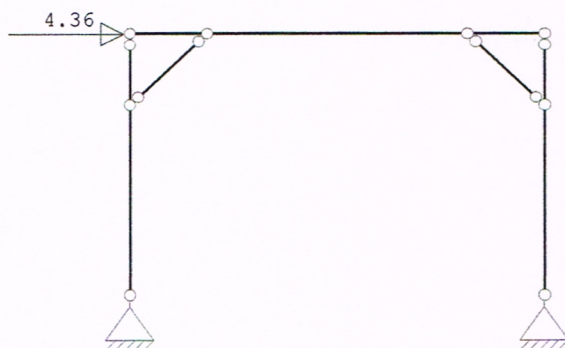
B.G:1 Permanente belasting

**BELASTINGEN**

B.G:2 Variabele belasting

**BELASTINGEN**

B.G:3 Wind belasting

**BELASTINGCOMBINATIES**

BC Type	BG Gen.	Factor	BG Gen.	Factor	BG Gen.	Factor	BG Gen.	Factor
1 Fund.	1 Perm	1.22						
2 Fund.	1 Perm	0.90						
3 Fund.	1 Perm	1.22	2 psi0	1.35				
4 Fund.	1 Perm	1.08	2 Extr	1.35				
5 Fund.	1 Perm	1.08	3 Extr	1.35				
6 Fund.	1 Perm	0.90	2 psi0	1.35				
7 Fund.	1 Perm	0.90	2 Extr	1.35				

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden
 Onderdeel: Spant Dwarsrichting

BELASTINGCOMBINATIES

BC Type	BG Gen.	Factor	BG Gen.	Factor	BG Gen.	Factor	BG Gen.	Factor
8 Fund.	1 Perm	0.90	3 Extr	1.35				
9 Fund.	1 Perm	1.08	3 Extr	1.35	2 psi0	1.35		
10 Fund.	1 Perm	0.90	3 Extr	1.35	2 psi0	1.35		
11 Kar.	1 Perm	1.00	2 Extr	1.00				
12 Kar.	1 Perm	1.00	3 Extr	1.00				
13 Kar.	1 Perm	1.00	3 Extr	1.00	2 psi0	1.00		
14 Quas.	1 Perm	1.00						
15 Quas.	1 Perm	1.00	2 psi2	1.00				
16 Freq.	1 Perm	1.00						
17 Freq.	1 Perm	1.00	2 psi1	1.00				
18 Freq.	1 Perm	1.00	3 psi1	1.00				
19 Freq.	1 Perm	1.00	3 psi1	1.00	2 psi2	1.00		
20 Blij.	1 Perm	1.00						

GUNSTIGE WERKING PERMANENTE BELASTINGEN

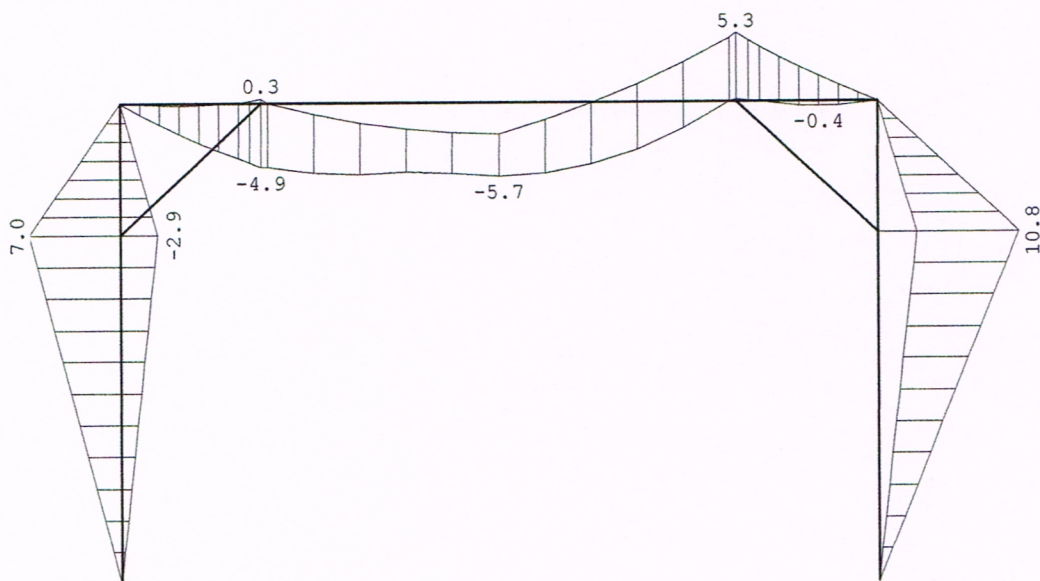
BC Staven met gunstige werking

- 1 Geen
- 2 Alle staven de factor:0.90
- 3 Geen
- 4 Geen
- 5 Geen
- 6 Alle staven de factor:0.90
- 7 Alle staven de factor:0.90
- 8 Alle staven de factor:0.90
- 9 Geen
- 10 Alle staven de factor:0.90

OMHULLENDE VAN DE FUNDAMENTELE COMBINATIES

MOMENTEN

Fundamentele combinatie

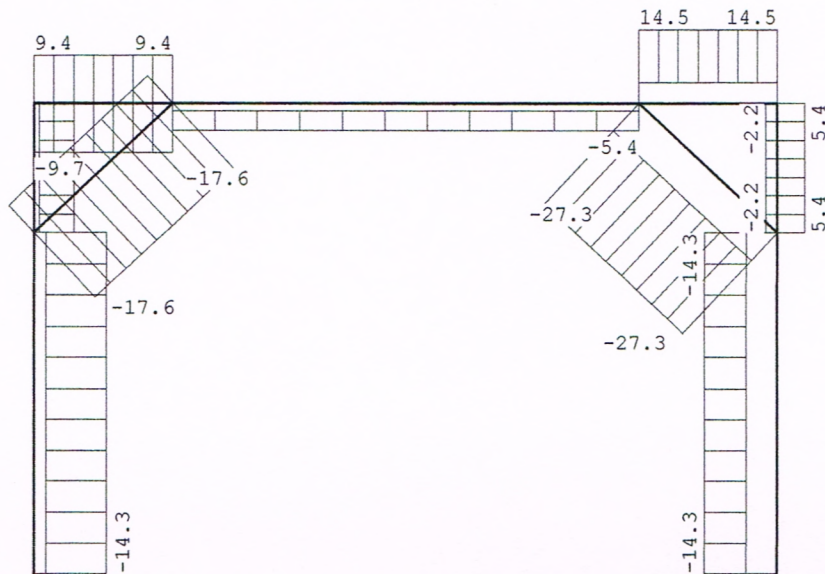


Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Spant Dwarsrichting

NORMAALKRACHTEN

Fundamentele combinatie

**STAAFKRACHTEN**

Fundamentele combinatie

St.	Kn.	Pos.	NXi/NXj			DZi/DZj			MYi/MYj					
			Min	BC	Max	BC	Min	BC	Max	BC	Min	BC	Max	BC
1	1		-14.28	4	-2.33	8	-1.45	8	3.51	4	0.00	8	0.00	4
1	2		-14.28	4	-2.33	8	-1.45	8	3.51	4	-2.89	8	7.02	4
2	2		-7.92	9	-0.95	2	-9.35	4	3.85	8	-2.89	8	7.02	4
2	3		-7.92	9	-0.95	2	-9.35	4	3.85	8	0.00	8	0.00	4
3	3		-9.74	8	9.35	4	-7.92	9	-0.95	2	0.00	9	0.00	2
3	0.335		-9.74	8	9.35	4	-6.35	9	0.00	2	-2.39	9	-0.16	2
3	0.669		-9.74	8	9.35	4	-5.40	8	2.22	4	-4.25	9	-0.00	2
3	4		-9.74	8	9.35	4	-5.03	8	3.09	4	-4.93	8	0.35	4
4	4		-5.42	9	-1.50	2	-8.97	4	-0.06	8	-4.93	8	0.35	4
4	0.022		-5.42	9	-1.50	2	-8.82	4	0.00	8	-4.93	8	0.15	4
4	0.039		-5.42	9	-1.50	2	-8.71	4	0.05	8	-4.93	8	-0.00	4
4	0.549		-5.42	9	-1.50	2	-5.32	4	1.49	8	-5.54	9	-1.53	2
4	0.948		-5.42	9	-1.50	2	-2.67	4	2.62	8	-5.17	9	-2.21	2
4	1.350		-5.42	9	-1.50	2	-0.00	4	3.76	8	-5.71	4	-2.44	2
4	1.888		-5.42	9	-1.50	2	1.52	2	6.29	9	-4.74	4	-0.00	8
4	2.661		-5.42	9	-1.50	2	3.72	2	9.92	9	-0.00	4	4.94	8
4	5		-5.42	9	-1.50	2	3.83	2	10.11	9	0.15	2	5.33	9
5	5		3.99	2	14.47	9	-8.54	9	-1.32	2	0.15	2	5.33	9
5	0.131		3.99	2	14.47	9	-7.93	9	-0.95	2	-0.00	2	4.25	9
5	0.465		3.99	2	14.47	9	-6.35	9	0.00	2	-0.37	4	1.97	8
5	6		3.99	2	14.47	9	-5.41	8	2.22	4	0.00	4	0.00	8
6	6		-2.22	4	5.41	8	3.99	2	14.47	9	0.00	2	0.00	9
6	7		-2.22	4	5.41	8	3.99	2	14.47	9	2.99	2	10.85	9
7	7		-14.28	4	-6.10	2	-5.42	9	-1.50	2	2.99	2	10.85	9
7	8		-14.28	4	-6.10	2	-5.42	9	-1.50	2	0.00	2	0.00	9
8	2		-17.63	4	7.26	8	0.00	1	0.00	1	0.00	1	0.00	1
8	4		-17.63	4	7.26	8	0.00	1	0.00	1	0.00	1	0.00	1
9	5		-27.26	9	-7.53	2	0.00	1	0.00	1	0.00	1	0.00	1
9	7		-27.26	9	-7.53	2	0.00	1	0.00	1	0.00	1	0.00	1

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Spant Dwarsrichting

REACTIES

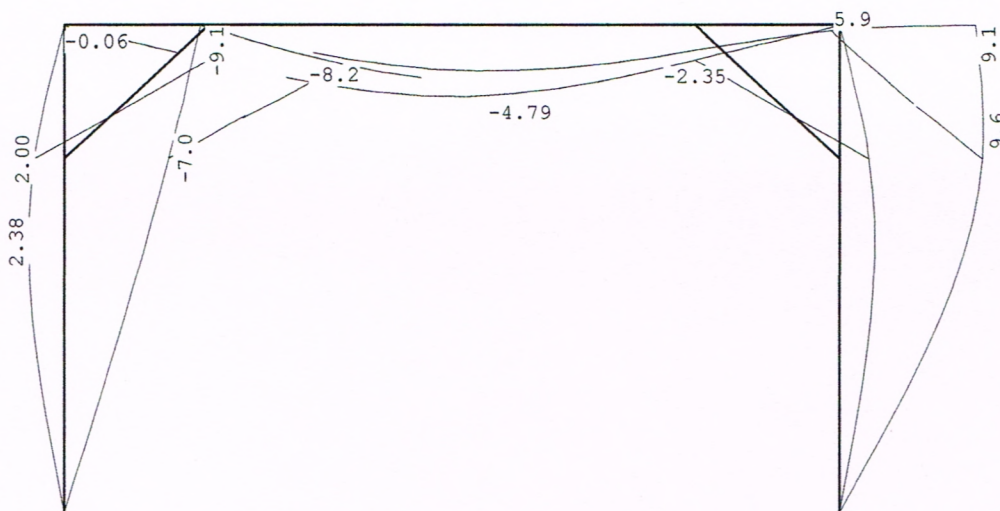
Fundamentele combinatie

Kn.	X-min	X-max	Z-min	Z-max	M-min	M-max
1	-1.45	3.51	2.33	14.28		
8	-5.42	-1.50	6.10	14.28		

OMHULLENDE VAN DE KARAKTERISTIEKE COMBINATIES**VERPLAATSINGEN**

[mm]

Karakteristieke combinatie

**STAAFKRACHTEN**

Karakteristieke combinatie

St.	Kn.	Pos.	NXi/NXj		Dzi/DZj		MYi/MYj	
			Min BC	Max BC	Min BC	Max BC	Min BC	Max BC
1	1		-11.93 11	-3.98 12	-0.52 12	2.93 11	0.00 12	0.00 11
1	2		-11.93 11	-3.98 12	-0.52 12	2.93 11	-1.03 12	5.86 11
2	2		-6.08 13	-1.86 11	-7.82 11	1.38 12	-1.03 12	5.86 11
2	3		-6.08 13	-1.86 11	-7.82 11	1.38 12	0.00 12	0.00 11
3	3		-5.74 12	7.82 11	-6.08 13	-1.86 11	0.00 13	0.00 11
3	0.335		-5.74 12	7.82 11	-4.70 13	0.00 11	-1.80 13	-0.31 11
3	0.669		-5.74 12	7.82 11	-3.65 12	1.86 11	-3.15 13	-0.00 11
3	4		-5.74 12	7.82 11	-3.24 12	2.58 11	-3.60 12	0.29 11
4	4		-4.35 13	-2.93 11	-7.49 11	-1.46 12	-3.60 12	0.29 11
4	0.039		-4.35 13	-2.93 11	-7.27 11	-1.34 12	-3.65 12	-0.00 11
4	0.672		-4.35 13	-2.93 11	-3.77 11	0.65 12	-4.48 13	-3.49 11
4	0.760		-4.35 13	-2.93 11	-3.27 11	0.93 12	-4.46 13	-3.80 11
4	0.948		-4.35 13	-2.93 11	-2.23 11	1.52 12	-4.32 13	-3.57 12
4	1.350		-4.35 13	-2.93 11	0.00 11	2.79 12	-4.77 11	-2.70 12
4	2.046		-4.35 13	-2.93 11	3.86 11	5.65 13	-3.42 11	-0.00 12
4	2.661		-4.35 13	-2.93 11	6.92 12	8.18 13	-0.00 11	3.66 12
4	5		-4.35 13	-2.93 11	7.04 12	8.34 13	0.29 11	3.98 13
5	5		7.82 11	11.60 13	-6.62 13	-2.58 11	0.29 11	3.98 13
5	0.131		7.82 11	11.60 13	-6.08 13	-1.86 11	-0.00 11	3.15 13
5	0.465		7.82 11	11.60 13	-4.71 13	0.00 11	-0.31 11	1.40 12
5	6		7.82 11	11.60 13	-3.65 12	1.86 11	0.00 11	0.00 12
6	6		-1.86 11	3.65 12	7.82 11	11.60 13	0.00 11	0.00 13
6	7		-1.86 11	3.65 12	7.82 11	11.60 13	5.86 11	8.70 13

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Spant Dwarsrichting

STAAFKRACHTEN

Karakteristieke combinatie

St.	Kn.	Pos.	NXi/NXj		DZi/DZj		MYi/MYj	
			Min BC	Max BC	Min BC	Max BC	Min BC	Max BC
7	7		-11.93 11	-9.56 12	-4.35 13	-2.93 11	5.86 11	8.70 13
7	8		-11.93 11	-9.56 12	-4.35 13	-2.93 11	0.00 11	0.00 13
8	2		-14.73 11	2.59 12	0.00 11	0.00 11	0.00 11	0.00 11
8	4		-14.73 11	2.59 12	0.00 11	0.00 11	0.00 11	0.00 11
9	5		-21.87 13	-14.73 11	0.00 11	0.00 11	0.00 11	0.00 11
9	7		-21.87 13	-14.73 11	0.00 11	0.00 11	0.00 11	0.00 11

REACTIES

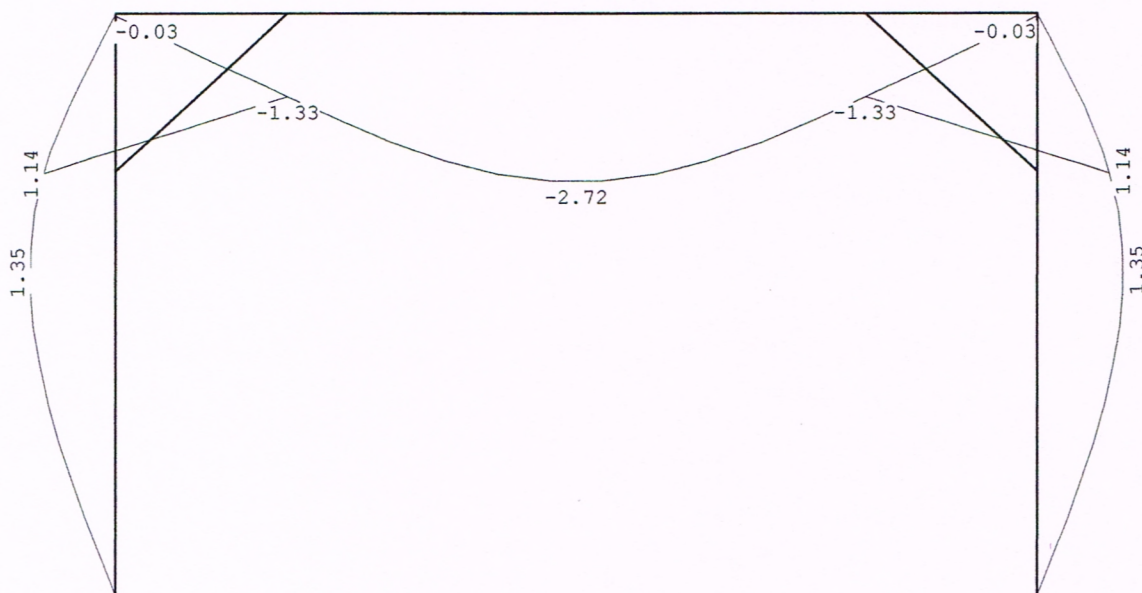
Karakteristieke combinatie

Kn.	X-min	X-max	Z-min	Z-max	M-min	M-max
1	-0.52	2.93	3.98	11.93		
8	-4.35	-2.93	9.56	11.93		

OMHULLENDE VAN DE BLIJVENDE COMBINATIES**VERPLAATSINGEN**

[mm]

Blijvende combinatie

**STAAFKRACHTEN**

Blijvende combinatie

St.	Kn.	Pos.	NXi/NXj	DZi/DZj	MYi/MYj
1	1		-6.77	1.66	0.00
1	2		-6.77	1.66	3.33
2	2		-1.05	-4.44	3.33
2	3		-1.05	-4.44	0.00
3	3		4.44	-1.05	0.00
3	0.335			0.00	-0.18
3	0.669				-0.00
3	4		4.44	1.47	0.16
4	4		-1.66	-4.25	0.16
4	0.039				-0.00
4	1.350			0.00	-2.71

TS/Raamwerken

Rel: 6.08 8 feb 2017

Project...: 16.137 Hooiberg a/d Bergkappeweg 1 Vorden

Onderdeel: Spant Dwarsrichting

STAAFKRACHTEN

Blijvende combinatie

St.	Kn.	Pos.	NXi/NXj	DZi/DZj	MYi/MYj
4		2.661			-0.00
4	5		-1.66	4.25	0.16
5	5		4.44	-1.47	0.16
5		0.131			-0.00
5		0.465		0.00	-0.18
5	6		4.44	1.05	0.00
6	6		-1.05	4.44	0.00
6	7		-1.05	4.44	3.33
7	7		-6.77	-1.66	3.33
7	8		-6.77	-1.66	0.00
8	2		-8.36	0.00	0.00
8	4		-8.36	0.00	0.00
9	5		-8.36	0.00	0.00
9	7		-8.36	0.00	0.00

REACTIES

Blijvende combinatie

Kn.	X	Z	M
1	1.66	6.77	
8	-1.66	6.77	