RIBCTH1

construeren van een tennishal

constructierapport tennishal

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Inhoudsopgave

Conclusie

Na berekening van de houten gerberliggers van geschaafd hout 71x196 en ongeschaafd hout 63x200 bleken deze niet op vervorming accoord. Hierna is verder berekend om te kijken wat de goede formaat voor een houten gerberligger is. Voor geschaafd hout is dat 71x271 en voor ongeschaafd hout is dat 75x275.
Ook de IPE 120 is op alles accoord

De krachtverdeling in de driescharnierspanten zijn in everwicht.

1 Inleiding

1.1 Algemeen

project	:	Nieuwbouw Tennishal Rotterdam
in opdracht van	:	Hogeschool Rotterdam - IBB
onze opdracht	:	Het verzorgen van de gehele constructieadvies t.b.v. het bouwwerk
in dit rapport	:	Berekening staalconstructie Berekening houtconstructie

1.2 Situering bouwwerk : Straatweg 99 te Rotterdam

1.3 ***Controlerende instanties*** :

De constructieve stukken worden ter beoordeling ingediend bij:
Hogeschool Rotterdam - IBB
Afdeling constructie - ribCTH01
De heer M.J. Roos

1.4 ***Algemene uitgangspunten*** :

De van toepassing zijnde normen en voorschriften

- TGB1990

- Algemeen	NEN6700 / 6702
- Geotechniek	NEN6740 / 6743 / 6744
- Hout	NEN6760
- Staal	NEN6770 / 6771 / 6772
- Beton	NEN6720

2.0 Gebouwomschrijving

2.1 *Algemeen*

Bij de bestaande openlucht tennisbaan aan de Straatweg 99 te Rotterdam zal een tennishal worden gebouwd. De tennishal komt geheel los te staan van de bestaande bebouwing.

2.2 ***Opzet / Draagstruktuur***

De fundatie van dit bouwwerk wordt verzorgd door een in het werk gestorte betonvloer die op staal is gefundeerd. De opbouw is een combinatie van een houten dakconstructie en houten staanders.

2.3 ***Constructieve uitgangspunten***

fundering	:	op staal
vloer	:	in het werk gestorte betonvloer, dik 150 mm

Geometrie bouwwerk

hoogste dakrand	:	6,8 m + bouwpeil
2.4 grootste breedte	:	2,3 m
grootste lengte	:	26,4
dakhelling	:	afschot

3.0 Constructieve uitgangspunten

3.1 *Algemeen*

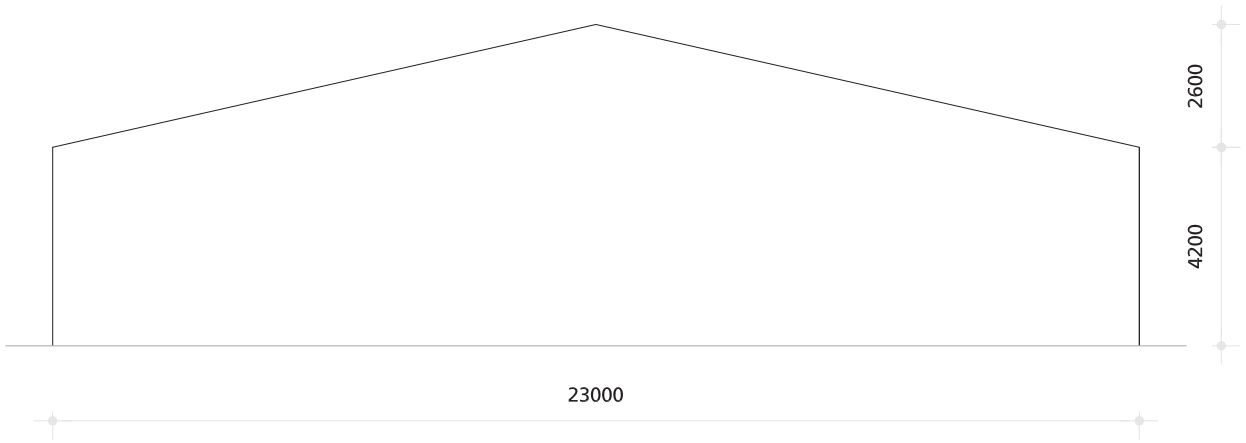
indeling bouwwerk in	:	n.v.t.
referentieperiode	:	n.v.t.
belastingfactoren	:	n.v.t.
windgebied	:	n.v.t.

3.2 ***Materialen***

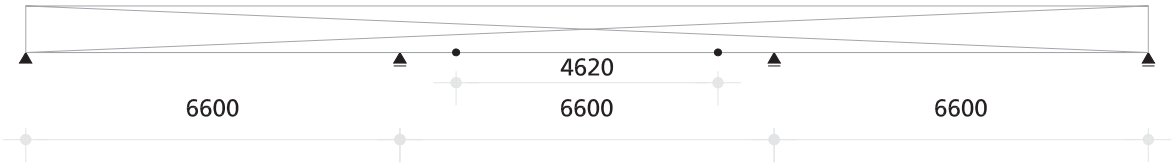
constructiestaal	:	n.v.t.
fundatie-bouten sterkteklasse	:	n.v.t.
montage-bouten sterkteklasse	:	n.v.t.
houtklasse	:	geschaafd hout 71x271
betonklasse	:	n.v.t.
wapeningstaal	:	n.v.t.

4.0 Tekeningen

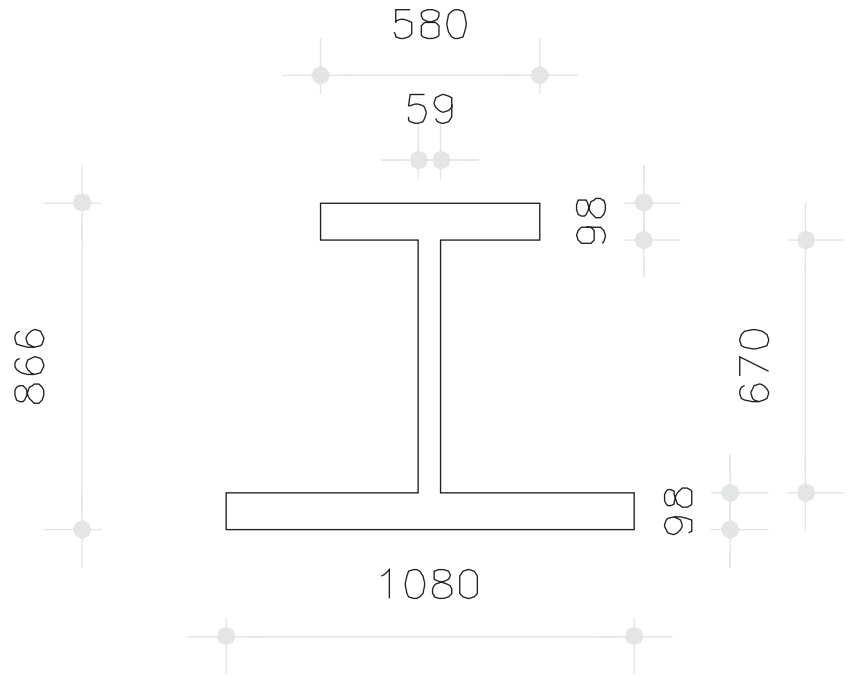
4.1 schematisering vooraanzicht



4.2 schematisering gerberligger

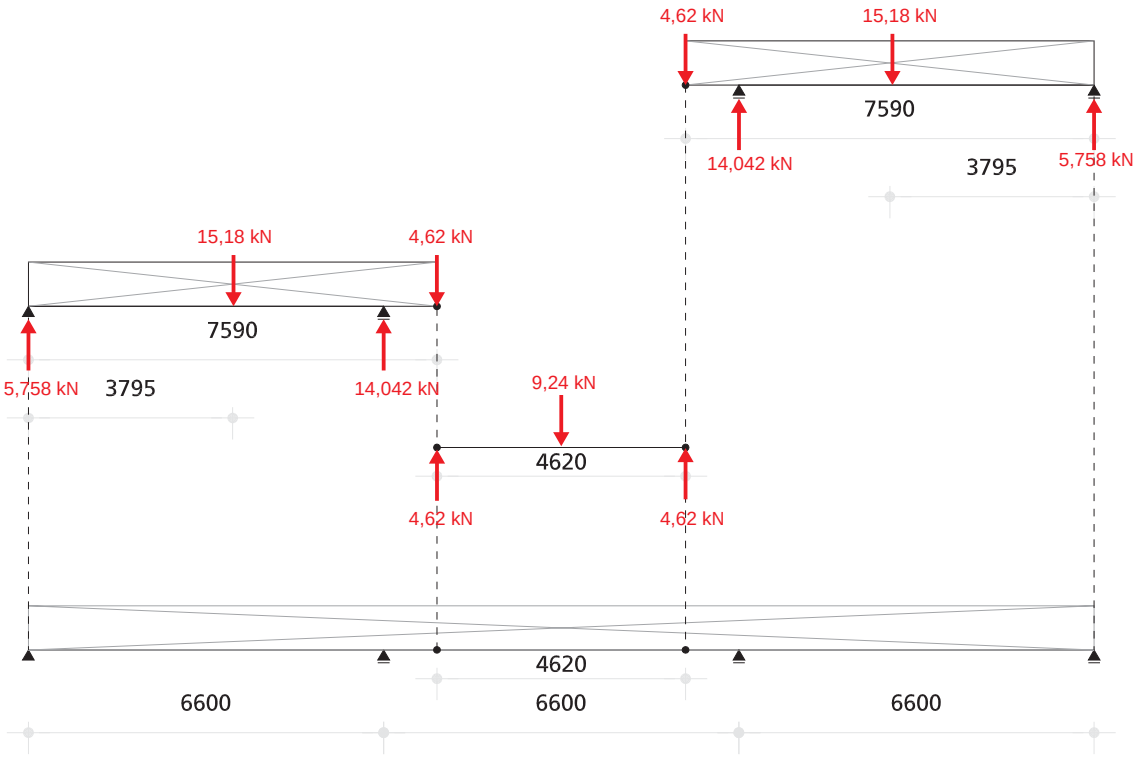


4.3 schematisering samengestelde ligger



5.0 Gerberligger

5.1 *lastenschema*



5.2 *berekeningen S_1 en S_2*

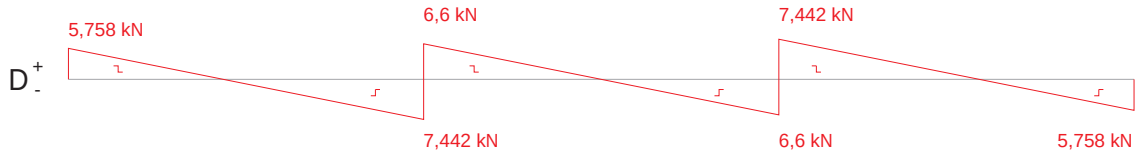
$Q_{S1, S2} = q * l = 2 * 4,62 = 9,24$ kN
$S_1 = 1/2ql = 1/2 * 2 * 4,62 = 4,62$ kN
$S_2 = 1/2ql = 1/2 * 2 * 4,62 = 4,62$ kN

5.3 *berekeningen F_A en F_B*

Σ M t.o.v. A = 0
$-(15,18 * 3,795) + (6,6F_B) - (4,62 * 7,59) = 0$
$6,6F_B = 57,608 + 35,066$
$F_B = 92,674 / 6,6$
$F_B = 14,042$ kN

$\Sigma F_v = 0$
$F_A + 15,18 - 14,042 + 4,62 = 0$
$F_A = -15,18 + 14,042 - 4,62$
$F_A = -5,758$ kN

5.4 *dwarskrachtlijn*



$D_1 = 5,758$ kN
$D_2 = 5,758$ kN - 13,2 kN = -7,442 kN
$D_3 = -7,442$ kN + 14,042 kN = 6,6 kN
$D_4 = 6,6$ kN - 13,2 kN = -6,6 kN
$D_5 = -6,6$ kN + 14,042 kN = 7,442 kN
$D_6 = 7,442$ kN - 13,2 kN = - 5,758 kN
$D_7 = -5,758$kN + 5,758 kN = 0 kN
$D_{max} = 7,442$ kN

5.5 *momentkrachtlijn*

M_1 = 5,758 * 2,879 / 2 = 8,287 kNm
M_2 = 8,287 - (7,442 * 3,721 / 2) = - 5,559 kNm
M_3 = -5,559 + (6,6 * 3,3 / 2) = 5,331 kNm
M_4 = 5,331 - (6,6 * 3,3 / 2) = -5,559 kNm
M_5 = -5,559 + (7,442 * 3,721 / 2) = 8,287 kNm
M_6 = 8,287 - (5,758 * 2,879 / 2) = 0 kNm
M_{max} = 8,287 kNm

5.6 *weerstandsmoment gelamineerd hout*

$M_y = W_y * f_m$
$W_y = M_y / f_m$
$W_y = 8{,}287 * 10^6 / 21$
$W_y = 394619\ mm^3$

keuze voor geschaafd hout met afmeting 71 x 196
keuze voor ongeschaafd hout met afmeting 63 x 200

weerstandmoment stalen balk

$M_y = W_y * f_m$
$W_y = M_y / f_m$
$W_y = 8{,}287 * 10^6 / 235$
$W_y = 35263\ mm^3$

keuze voor IPE 120

5.7 *buigspanning geschaafd hout europees naaldhout*

$\sigma = M_y / W_y$
$\sigma = 8{,}287*10^6 / 454*10^3$
$\sigma = 18{,}253\ N/mm^2$

buigspanning IPE 120

$\sigma = M_y / W_y$
$\sigma = 8{,}287*10^6 / 53*10^3$
$\sigma = 156{,}358\ N/mm^2$

5.8 *controle*

U.C = 18,253 / 21 = 0,86 ≤ 1

ligger op buigsterkte akkoord

controle

U.C = 156,358 / 235 = 0,67 ≤ 1

ligger op buigsterkte akkoord

5.9 *buigspanning ongeschaafd hout europees naaldhout*

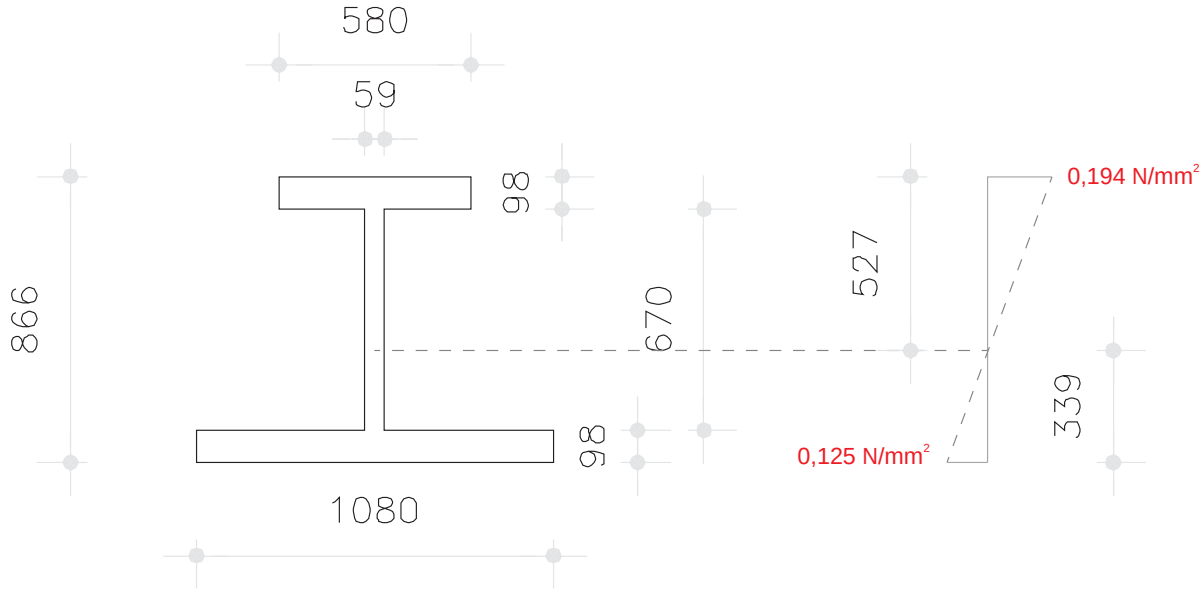
$\sigma = M_y / W_y$
$\sigma = 8{,}287*10^6 / 420*10^3$
$\sigma = 19{,}731\ N/mm^2$

5.10 *controle*

U.C = 19,731 / 21 = 0,94 ≤ 1

ligger op buigsterkte akkoord

6.0 Samengestelde ligger



6.1 *berekeningen D_{max}*

D_{max} = 0,58 * (hoogte - 2 * flensdikte) * rompdikte * 235
= 0,58 * (866 - 2 * 98) * 59 * 235
= 5387939 N => 5387,939 kN

6.2 *controle*

U.C. = 7,442 / 5387,939 = 0,00138 ≤ 1

6.3 ***berekeningen van Steiner***

Opp A = 580 * 98 = 56840
Opp B = 670 * 59 = 39530
Opp C = 1080 * 98 = 105840
Opp_{tot} = 202210

a_1 = 817 - 339,95 = 477,05
a_2 = 433 - 339,95 = 93,05
a_3 = 49 - 339,95 = -290,95

$A * a_1 + B * a_2 + C * a_3 = Opp_{tot} * Z$
56840 * 817 + 39530 * 433 + 105840 * 49 = 202210 * Z
Z = 68740930 / 202210
Z = 339,95 mm

$I_A = 1/12bh^3$
$I_A = 580 * 98^3 / 12$
$I_A = 45490947\ mm^4$

$I_B = 1/12hb^3$
$I_B = 59 * 670^3 / 12$
$I_B = 1478751417\ mm^4$

$I_C = 1/12bh^3$
$I_C = 1080 * 98^3 / 12$
$I_C = 84707280\ mm^4$

$I_1 = I_A + a^2 * A_A$
$I_1 = 45490947 + (477,05)^2 * 56840$
$I_1 = 12980950716,77\ mm^4$

$I_2 = I_B + a^2 * A_B$
$I_2 = 1478751417 + (93,05)^2 * 39530$
$I_2 = 490137844,8\ mm^4$

$I_3 = I_C + a^2 * A_C$
$I_3 = 84707280 + (-290,95)^2 * 105840$
$I_3 = 9044264641\ mm^4$

$I_{totaal} = 22515353202,57\ mm^4$

6.4 ***Berekening op sterkte***

$W_y = I / e$

$e_1 = 866 - 339,95 = 526,05$
$e_2 = 866 - 526,05 = 339,95$

$W_{y1} = I / e_1$
$W_{y1} = 22515353202,57 / 526,05$
$W_{y1} = 42800785,48\ mm^3$

$W_{y2} = I / e_2$
$W_{y2} = 22515353202,57 / 339,95$
$W_{y2} = 66231366,97\ mm^3$

6.5 ***Berekening op spanning***

$\sigma = M / W_y$

$\sigma_{druk} = M / W_y$
$\sigma_{druk} = 8287000 / 42800785,48$
$\sigma_{druk} = 0,1936\ N/mm^2$

$\sigma_{trek} = M / W_y$
$\sigma_{trek} = 8287000 / 66231366,97$
$\sigma_{trek} = 0,1251\ N/mm^2$

De drukkracht is bepalend

6.6 *controle*

U.C. = 0,1936 / 235 ≤ 1

De samengestelde profiel is accoord.

7.0 Vervorming

7.1 *Vergeet me nietjes*

$\omega_1 = 5ql^4 / 384EI$
$\omega_1 = 5 * 2 * (6,6)^4 / 384EI$
$\omega_1 = 49,413 / EI$ ↓ (VMN 5)

$\varphi_{B1} = ql^3 / 24EI$
$\varphi_{B1} = 2 * (6,6)^3 / 24EI$
$\varphi_{B1} = 23,958 / EI$

$\omega_2 = Ml^2 / 16EI$
$\omega_2 = 5,559 * (6,6)^2 / 16EI$
$\omega_2 = 15,134 / EI$ ↑ (VMN 8)

$\varphi_{B2} = Ml / 3EI$
$\varphi_{B2} = 5,559 * 6,6 / 3EI$
$\varphi_{B2} = 12,23 / EI$

$\omega_{totaal} = \omega_1 + \omega_2 = - 49,413 / EI + 15,134 / EI = - 34,279 / EI$
$\varphi_{Btotaal} = \varphi_{B1} + \varphi_{B2} = 23,958 / EI + 12,23 / EI = 11,728 / EI$

$\omega_{S1} = \varphi_{Btotaal} * l$
$\omega_{S1} = 11,728 / EI * 0,99$
$\omega_{S1} = 11,611 / EI$ ↑ (VMN extra)

$\omega_{S1\text{-}qlast} = ql^4 / 8EI$
$\omega_{S1\text{-}qlast} = 6 * (0,99)^4 / 8EI$
$\omega_{S1\text{-}qlast} = 0,72 / EI$ ↓ (VMN 3)

$\omega_{S1\text{-}Flast} = Fl^3 / 3EI$
$\omega_{S1\text{-}Flast} = 4,62 * (0,99)^4 / 3EI$
$\omega_{S1\text{-}Flast} = 1,494 / EI$ ↓ (VMN 2)

$\omega_{totaal} = \omega_{S1} + \omega_{S1\text{-}qlast} + \omega_{S1\text{-}Flast} = 11,611 / EI - 0,72 / EI - 1,494 / EI = - 9,397 / EI$

7.2 ***maximale doorbuiging***

$u = 0,004l = 0,004 * 6600 = 26,4$ mm

7.3 ***zakking in M en S_1 voor geschaafd hout***

$I_{hout} = 4450 * 10^4$ mm^4
$EI_{hout} = 0,12 * 10^8 * 4450 * 10^{-8} = 534$

zakking in M = -34,279 / 534 = 0,06419 m = 64,19 mm
zakking in S_1 = - 9,397 / 534 = 0,01759 m = 17,59 mm

64,19 / 26,4 = 2,43 ≤ 1

7.4 *conclusie*

niet accoord op vervorming

7.5 ***zakking in M en S_1 voor ongeschaafd hout***

$I_{hout} = 4200 * 10^4$ mm^4
$EI_{hout} = 0,12 * 10^8 * 4200 * 10^{-8} = 504$

zakking in M = -34,279 / 504 = 0,06801 m = 68,01 mm
zakking in S_1 = - 9,397 / 504 = 0,01864 m = 18,64 mm

68,01 / 26,4 = 2,58 ≤ 1

7.6 *conclusie*

niet accoord op vervorming

7.7 *berekening goede sterkte*

0,0264 = 34,279 / EI
EI = 34,279 / 0,0264
EI = 1298,44697

I = 1298,44697 / E
I = 1298,44697 / 0,12 * 10^8
I = 0,00108203 = 10820,39412 * 10^4 mm^4

7.8 *conclusie*
geschaafd hout met de maat 71 * 271 en I_y van 11700 * 10^4 mm^4 is akkoord op vervorming
ongeschaafd hout met de maat 75 * 275 en I_y van 12900 * 10^4 mm^4 is akkoord op vervorming

De waardes komen uit het tabellenboek

7.9 ***zakking in M en S_1 voor IPE120***
I = 318 * 10^4 mm^4
EI = 210 * 10^8 * 318 * 10^{-8} = 66780

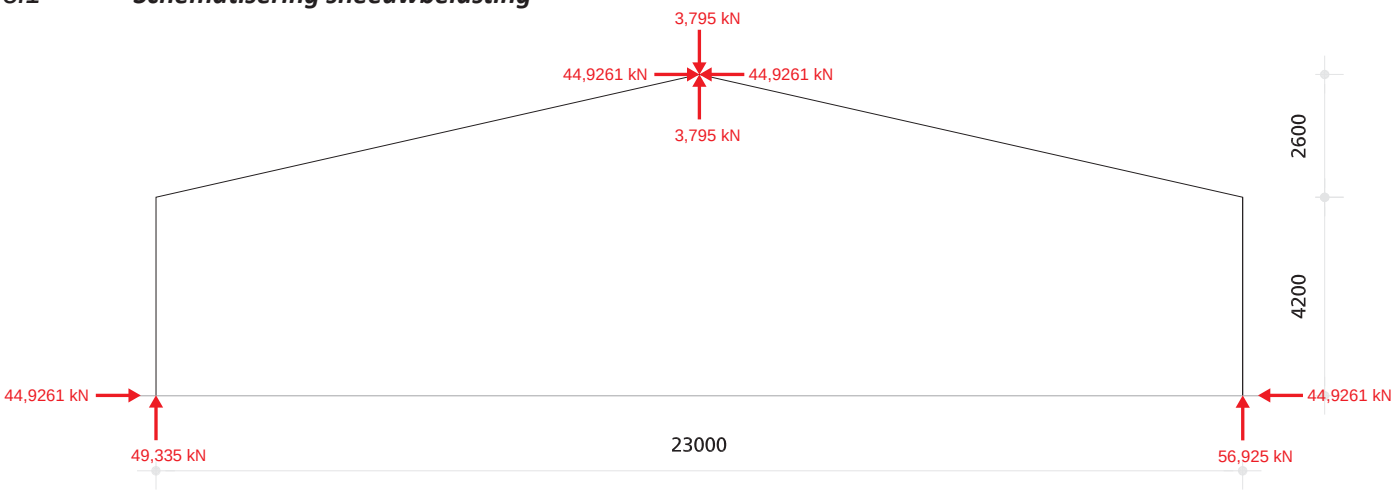
zakking in M = -34,279 / 66780 = 0,000513 m = 0,513 mm
zakking in S_1 = - 9,397 / 66780 = 0.000141m = 0.141 mm

0.513 / 26,4 = 0,02 ≤ 1

7.10 *conclusie*
accoord op vervorming

8.0 Driescharnierspanten

8.1 *Schematisering sneeuwbelasting*



h.o.h. = 6600 mm

$q_1 = 0,6 * 6,6 = 3,96$ kNm
$q_2 = 0,8 * 6,6 = 5,28$ kNm
$q_3 = 0,5 * 6,6 = 3,30$ kNm
$q_4 = 0,3 * 6,6 = 1,98$ kNm

$Q_1 = 3,96 * 11,5 = 45,54$ kN
$Q_2 = 5,28 * 11,5 = 60,72$ kN
$Q_3 = 3,30 * 11,5 = 37,95$ kN
$Q_4 = 1,98 * 11,5 = 22,77$ kN

8.2 *berekening sneeuwbelasting*

Σ M t.o.v. A = 0
$-(3,96 * 11,5 * 5,75) - (5,28 * 11,5 * 17,75) + (23F_{BV}) = 0$
$23F_{BV} = 261,855 + 1047,42$
$F_{BV} = 1309,275 / 23$
$F_{BV} = 56,925$ kN

$\Sigma F_v = 0$
$- F_{AV} + 45,54 + 60,72 - 56,925 = 0$
$F_{AV} = 49,335$ kN

linkerdeel A-S
$-(49,335 * 11,5) + (45,54 * 5,75) + (6,8F_{ah}) = 0$
$6,8F_{ah} = 567,3525 - 261,855$
$F_{ah} = 305,4975 / 6,8$
$F_{ah} = 44,926$ kN

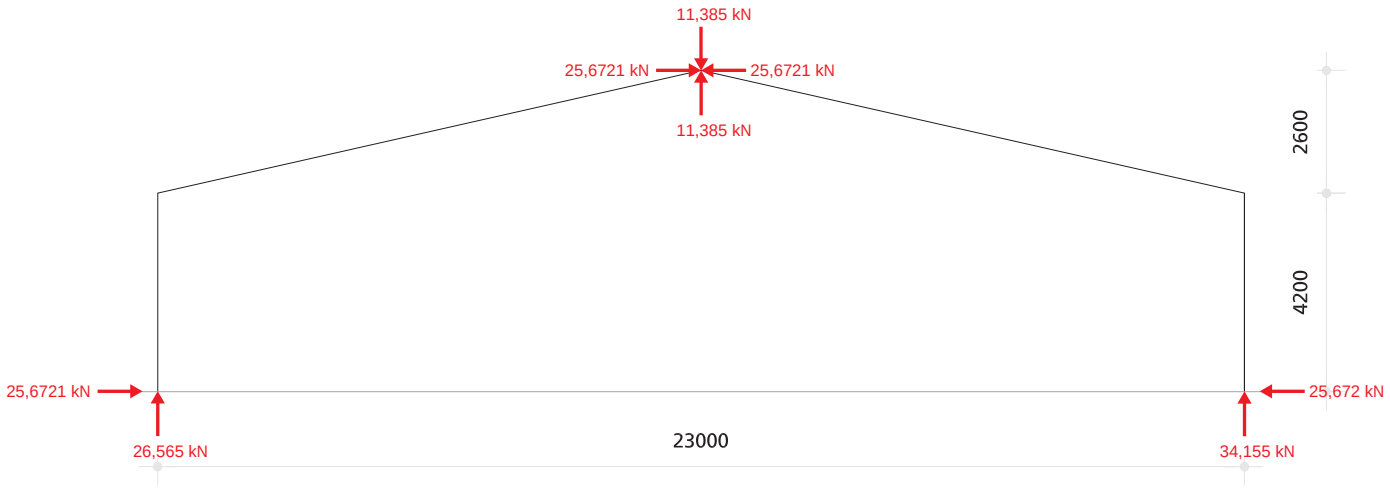
rechterdeel B-S
$(56,925 * 11,5) - (60,72 * 5,75) + (6,8F_{bh}) = 0$
$6,8F_{bh} = 654,6375 - 349,14$
$F_{bh} = 305,4975 / 6,8$
$F_{bh} = 44,926$ kN

$\Sigma F_h = 0$
$F_{ah} - F_{bh} = 0$
$44,926 - 44,926 = 0$

Scharnierkrachten
$S_{2v} = 60,72 - 56,925 = 3,795$ kN
$S_{1v} = 45,54 - 49,335 = - 3,795$ kN

$S_{1v} + S_{2v} = 0$
$-3,795 + 3,795 = 0$

8.3 *Schematisering windbelasting*



8.4 *berekening windbelasting*

Σ M t.o.v. A = 0
-(3,3 * 11,5 * 5,75) - (1,98 * 11,5 * 17,75) + (23F_{BV}) = 0
23F_{BV} = 218,2125 + 392,7825
F_{BV} = 610,995 / 23
F_{BV} = 26,565 kN

Σ F_v = 0
- F_{AV} + 37,95 + 22,77 -26,565 = 0
F_{AV} = 34,155 kN

linkerdeel A-S
-(34,155 * 11,5) + (37,95 * 5,75) + (6,8F_{ah}) = 0
6,8F_{ah} = 392,7825 - 218,2125
F_{ah} = 174,57 / 6,8
F_{ah} = 25,6721 kN

rechterdeel B-S
(26,565 * 11,5) - (22,77 * 5,75) + (6,8F_{bh}) = 0
6,8F_{bh} = 305,4975 - 130,9275
F_{bh} = 174,57 / 6,8
F_{bh} = 25,6721 kN

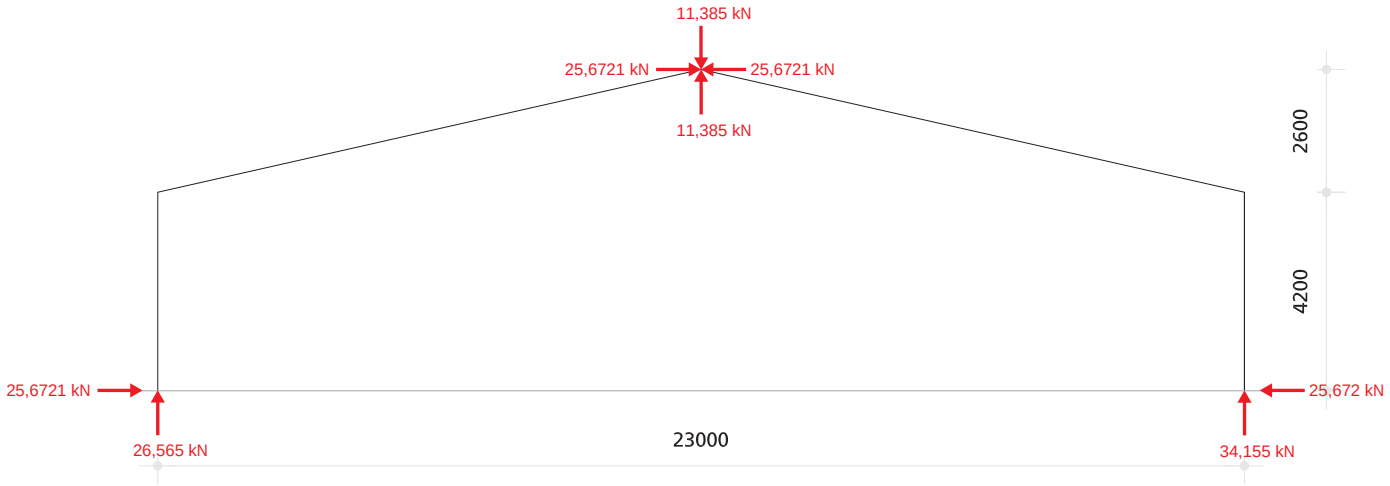
Σ F_h = 0
F_{ah} - F_{bh} = 0
25,6721 - 25,6721 = 0

Scharnierkrachten
S_{2v} = 37,95 - 26,565 = 11,385 kN
S_{1v} = 22,77 - 34,155 = - 11,385 kN

S_{1v} + S_{2v} = 0
- 11,385 + 11,385 = 0

9.0 Driescharnierspanten krachtverdeling

9.1 *Schematisering*



9.2 *berekeningen*

tan α = 2600 / 11500
tan α = 0,22608
α = 12,74 °

ontbinden in vectoren van de verticale kracht F_{av} = 26,565 kN
F_h = sin 12,74 * 26,565 = 5,858 kN
F_v = cos 12,74 * 26,565 = 25,911 kN

ontbinden in vectoren van de verticale kracht F_{ah} = 25,6721 kN
F_h = cos 12,74 * 25,6721 = 25,04 kN
F_v = sin 12,74 * 25,6721 = 5,661 kN

ontbinden in vectoren van de verticale kracht F_s = -25,6721 kN
F_h = cos 12,74 * -25,6721 = -25,04 kN
F_v = sin 12,74 * -25,6721 = -5,661 kN

ontbinden in vectoren van de gelijkmatig verdeelde belasting q = 3,3 kNm
F_h = cos 12,74 * 3,3 = 3,219 kNm
F_v = sin 12,74 * 3,3 = 0,728 kNm

staaf CB

punt C
- verticale krachten

-25,911 + 5,661 = -20,25 kN
- horizontale krachten

25,04 + 5,858 = 30,898 kN

punt B
- verticale krachten

F_{sv} = 5,661 kN
- horizontale krachten

F_{sh} = 25,04 kN

Op de plaats van het dwarskrachtennulpunt in CB moet de momentlijk een extreme waarde aannemen.
De afstand van dit punt to A bedraagt 5,661 / 11,5 = 0,492 m

De waarde van het maximale veldmoment is dan (5,661 * 0,492) / 2 = 1,393 kNm

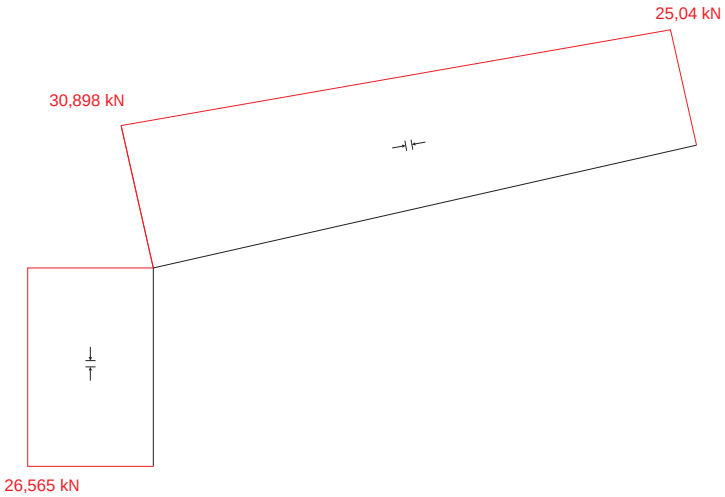
Staaf AC

$\sum F_v = 0$
$- 26{,}565 + F_v = 0$
$F_v = 26{,}565$ kN

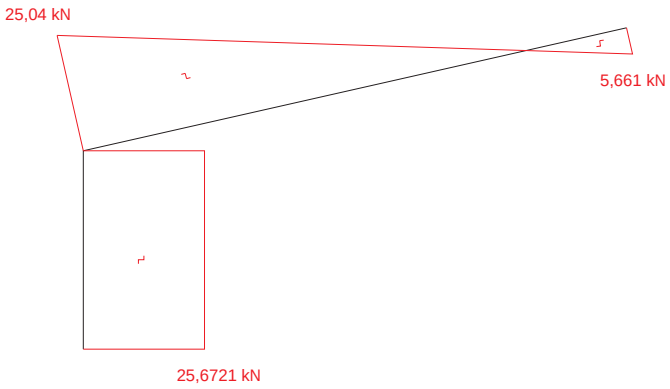
$\sum F_h = 0$
$25{,}671 - F_{sh} = 0$
$F_{sh} = 25{,}671$ kN

$\sum M = 0$
$25{,}671 * 4{,}2 = 107{,}8182$ kNm

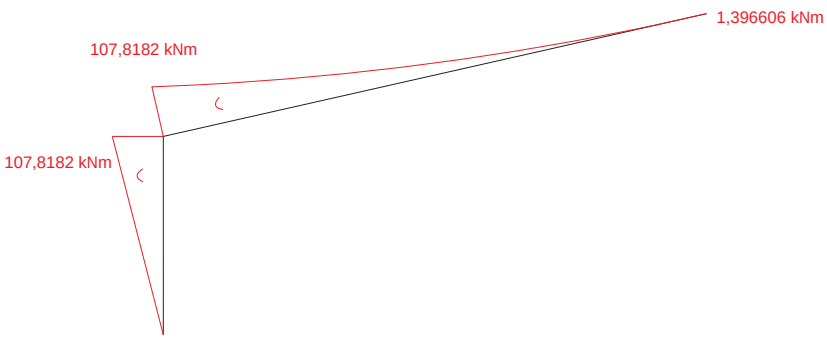
9.3 *N-lijn*



9.4 *D-lijn*



9.5 *M-lijn*



10 Bijlage Matrix-frame geschaafd hout 71 x196

350 missed resource	Constructie Tennishal	351 missed resource	CTH1
531 missed resource		879 missed resource	C.L. Weber
53 missed resource	HRo	890 missed resource	m, kN, kNm
916 missed resource	Z:\semester 2\O3\opdrachten\CTH1\CTH-geschaafd hout 71x196.mxe		

608 missed resource

IDL_REP_PROJECTTYPE missed resource	IDL_REP_NODES missed resource	IDL_REP_MEMBERS missed resource	IDL_REP_SUPPORTS missed resource	IDL_REP_CONCRETE_SECTIONS missed resource	IDL_REP_LCASES_SHORT missed resource	IDL_REP_LCOMBS_SHORT missed resource
1 missed resource	6	5	4	3	1	0

589 missed resource

IDL_REP_CONCRETE_MEMBER missed resource	IDL_REP_NODE missed resource	IDL_REP_RELEASE missed resource		IDL_REP_NODE missed resource	IDL_REP_CONCRETE_SECTION missed resource	X-IDL_REP_BEGIN_ONE_LETTER missed resource	Z-IDL_REP_BEGIN_	X-IDL_REP_END_ONE_LETTER missed resource	Z-IDL_REP_END_ONE_LETTER missed resource	IDL_REP_CONCRETE_LENGTH missed resource
	IDL_REP_BEGIN_ONE_LETTER missed resource	IDL_REP_BEGIN_ONE_LETTER missed resource	IDL_REP_END_ONE_LETTER missed resource	IDL_REP_END_ONE_LETTER missed resource						
M1	N1	NVM	NVM	N2	P3	0.000	0.000	6.600	0.000	6.600
M2	N2	NVM	NV-	N3	P3	6.600	0.000	7.590	0.000	0.990
M3	N3	NVM	NVM	N4	P3	7.590	0.000	12.210	0.000	4.620
M4	N4	NV-	NVM	N5	P3	12.210	0.000	13.200	0.000	0.990
M5	N5	NVM	NVM	N6	P3	13.200	0.000	19.800	0.000	6.600
-	-	-	-	-	-	m	m	m	m	m

597 missed resource

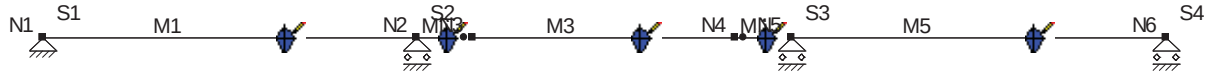
IDL_REP_CONCRETE_SECTION missed resource	IDL_REP_SECTIONNAME missed resource	IDL_REP_AREA missed resource	IDL_REP_SECTION_IY missed resource	IDL_REP_MATERIAL missed resource	IDL_REP_ANGLE missed resource
P3		1.3916e-02	4.4500e+03	Mat. 3	0
-	-	m2	m4	-	°

586 missed resource

IDL_REP_MATERIALNAME missed resource	IDL_REP_DENSITY missed resource	IDL_REP_YOUNGSMOD missed resource	IDL_REP_LINEXP missed resource
Mat. 3	0.00	1.2000e-01	0.0000e-01
-	kN/m3	kN/m2	C°m

610 missed resource

IDL_REP_CONCRETE_SUPPORT missed resource	IDL_REP_NODE missed resource	X	Z	Yr	IDL_REP_ANGLE missed resourceYr
S1	N1	316 missed resource	316 missed resource	346 missed resource	0
S2	N2	346 missed resource	316 missed resource	346 missed resource	0
S3	N5	346 missed resource	316 missed resource	346 missed resource	0
S4	N6	346 missed resource	316 missed resource	346 missed resource	0
-	-	kN/m	kN/m	kNmrad	°



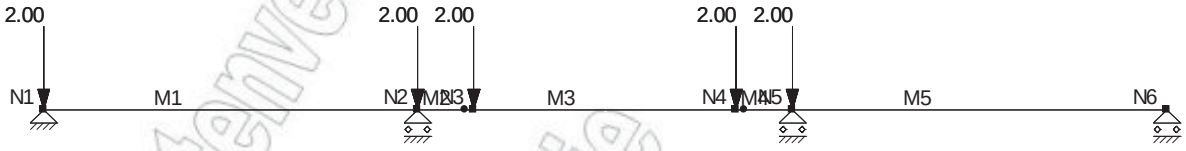
534 missed resource Geometrie 1

545 missed resource

27 missed resource

546 missed resource

27 missed resource



534 missed resource Lasten B.G.1 Permanent

489 missed resource

IDL_REP_CONCRETE_TYPE missed resource	IDL_REP_VALUEBEGIN missed resource	IDL_REP_VALUEEND missed resource	IDL_REP_DISTBEGIN missed resource	IDL_REP_DISTEND missed resource	IDL_REP_CONCRETE_DIRECTION missed resource	IDL_REP_MEMBERNODE missed resource
B.G.1: Permanent						
q	2.00	2.00	0.000	0.000(L)	Z'	M1-M5
IDL_REP_SUMOFLOADS missed resource	**X:**	**0,00 kN**	**Z:**	**39.60 kN**		
-	**-**	**-**	**m**	**m**	**- -**	

1308 missed resource

IDL_REP_CONCRETE_LABEL missed resource	IDL_REP_CONCRETE_GENERAL_DESCRIPTION missed resource	IDL_REP_LCTYPE_LCTYPE missed resource	IDL_REP_LCTYPE_FAVUNFAV missed resource	IDL_REP_LCTYPE_ELEMENT missed resource	IDL_REP_LCTYPE_LEVEL missed resource	IDL_REP_FIELD missed resource	PsiK	PsiI
B.G.1	Permanent	1310 missed resource	-		IDL_REP_NONE missed resource	IDL_REP_NONE missed resource		

1375 missed resource

1376 missed resource: Woning

1378 missed resource: 50

1377 missed resource: 2

1379 missed resource:

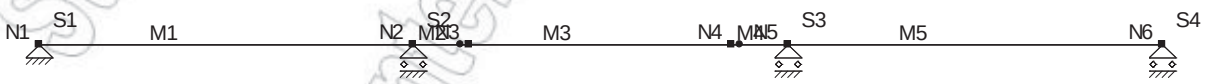
NEN6702#6.3.3.1 Fig. 3

NEN6702#6.3.3.3

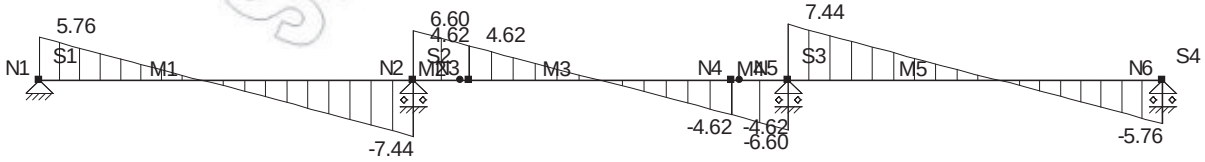
B.G. 593 missed resource

IDL_REP_CONCRETE_MEMBER	IDL_REP_CONCRETE_LC	IDL_REP_NODE missed resource	IDL_REP_TC missed resource	Nx	Vz	My
M1	B.G.1	IDL_REP_BEGIN_ONE_LETTER missed resource N1		0.00	-5.76	0.00

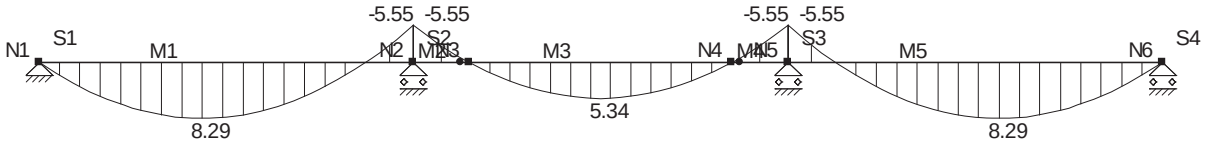
IDL_REP_CONCRETE_MEMBER	IDL_REP_CONCRETE_LC	IDL_REP_NODE missed resource	IDL_REP_TC missed resource	Nx	Vz	My
		ID L_ RE P_ EN D_ O NE _L ET TE R mi ss ed res ou rce N6		0.00	-5.76	0.00
-	-	-	-	kN	kN	kNm



534 missed resource B.G.1: Permanent Normaalkracht (Nx)



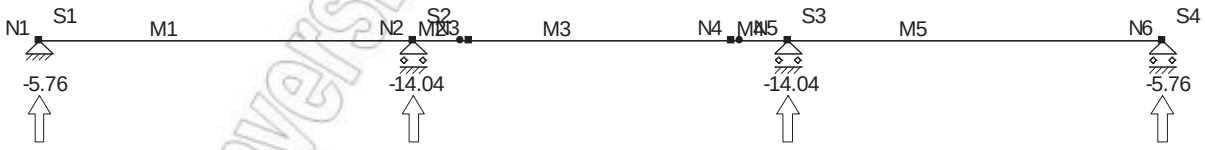
534 missed resource B.G.1: Permanent Dwarskracht (Vz)



534 missed resource B.G.1: Permanent Momenten (My)

B.G. 588 missed resource

IDL_REP_CONCRETE_MEMBER missed resource	IDL_REP_CONCRETE_LCOMB missed resource	IDL_REP_CONCRETE_MB missed resource	IDL_REP_CONCRETE_MMAX missed resource	IDL_REP_XMMAX missed resource	IDL_REP_CONCRETE_ME missed resource	IDL_REP_XMO missed resource	IDL_REP_XMO missed resource	IDL_REP_TC missed resource	IDL_REP_NMAX missed resource	IDL_REP_VB missed resource	IDL_REP_VMAX missed resource	IDL_REP_VE missed resource
M1	B.G.1	0.00	8.29	2.879	-5.55	5.759	0.000		0.00	5.76	-7.44	-7.44
M2	B.G.1	-5.55			0.00	0.000	0.000		0.00	6.60	6.60	4.62
M3	B.G.1	0.00	5.34	2.310	0.00	0.000	0.000		0.00	4.62	4.62	-4.62
M4	B.G.1	0.00			-5.55	0.000	0.000		0.00	-4.62	-6.60	-6.60
M5	B.G.1	-5.55	8.29	3.721	0.00	0.841	0.000		0.00	7.44	7.44	-5.76
-	-	kNm	kNm	m	kNm	m	m	-	kN	kN	kN	kN



534 missed resource B.G.1: Permanent Oplegreacties

B.G. 609 missed resource

IDL_REP_CONCRETE_LC	IDL_REP_CONCRETE_SUPPORT missed resource	IDL_REP_NODE missed resource	X	Z	My
B.G.1	S1	N1	0.00	-5.76	0.00
	S2	N2	0.00	-14.04	0.00
	S3	N5	0.00	-14.04	0.00
	S4	N6	0.00	-5.76	0.00
	IDL_REP_SUMREACTIONS missed resource		**0.00**	**-39.60**	
	IDL_REP_SUMLOADS missed resource		**0.00**	**39.60**	
-	**-**	**-**	**kN**	**kN**	**kNm**

534 missed resource B.G.1: Permanent Verplaatsingen

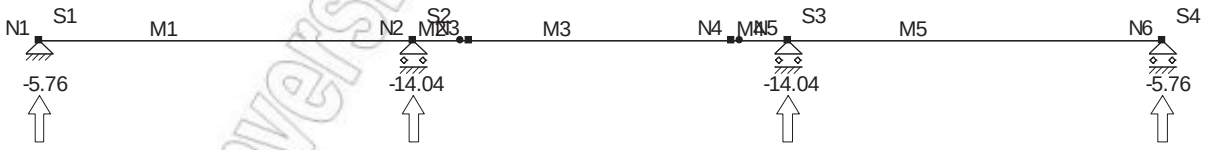
B.G. 592 missed resource

IDL_REP_NODE missed	IDL_REP_CONCRETE_LC	X	Z	Ry
N1	B.G.1	0.0000	0.0000	-33.425e-03
N2		0.0000	0.0000	21.984e-03
N3		0.0000	-0.0185	-15.389e-03
N4		0.0000	-0.0185	15.389e-03
N5		0.0000	0.0000	-21.984e-03
N6		0.0000	0.0000	33.425e-03
-	**-**	**m**	**m**	**rad**

B.G. 587 missed resource

IDL_REP_CONCRETE_MEMBER missed resource	IDL_REP_CONCRETE_LC	IDL_REP_NODEBEGIN missed resource		IDL_REP_CONCRETE_MEMBER missed resource				IDL_REP_NODEEND missed resource	
		X	Z	IDL_REP_ZDIST missed resource	Z'	IDL_REP_ZGLBDIST missed resource	IDL_REP_ZGLB missed resource	X	Z
M1	B.G.1	0.000	0.000	3.000	0.0644	3.000	0.0644	0.000	0.000
M2	B.G.1	0.000	0.000	0.495	-0.0006	0.990	-0.0185	0.000	-0.019
M3	B.G.1	0.000	-0.019	2.310	0.0222	0.000	-0.0185	0.000	-0.019
M4	B.G.1	0.000	-0.019	0.500	-0.0006	0.000	-0.0185	0.000	0.000
M5	B.G.1	0.000	0.000	3.600	0.0644	3.600	0.0644	0.000	0.000
-	**-**	**m**	**m**	**m**	**m**	**m**	**m**	**m**	**m**

10 Bijlage Matrix-frame geschaafd hout 71 x271



534 missed resource B.G.1: Permanent Oplegreacties

B.G. 609 missed resource

IDL_REP_CONCRETE_LC	IDL_REP_CONCRETE_SUPPORT missed resource	IDL_REP_NODE missed resource	X	Z	My
B.G.1	S1	N1	0.00	-5.76	0.00
	S2	N2	0.00	-14.04	0.00
	S3	N5	0.00	-14.04	0.00
	S4	N6	0.00	-5.76	0.00
	IDL_REP_SUMREACTIONS missed resource		**0.00**	**-39.60**	
	IDL_REP_SUMLOADS missed resource		**0.00**	**39.60**	
-	**-**	**-**	**kN**	**kN**	**kNm**

534 missed resource B.G.1: Permanent Verplaatsingen

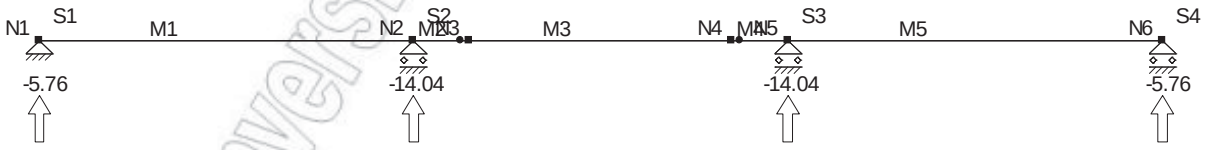
B.G. 592 missed resource

IDL_REP_NODE missed	IDL_REP_CONCRETE_LC	X	Z	Ry
N1	B.G.1	0.0000	0.0000	-12.713e-03
N2		0.0000	0.0000	8.361e-03
N3		0.0000	-0.0070	-5.853e-03
N4		0.0000	-0.0070	5.853e-03
N5		0.0000	0.0000	-8.361e-03
N6		0.0000	0.0000	12.713e-03
-	**-**	**m**	**m**	**rad**

B.G. 587 missed resource

IDL_REP_CONCRETE_MEMBER missed resource	IDL_REP_CONCRETE_LC	IDL_REP_NODEBEGIN missed resource		IDL_REP_CONCRETE_MEMBER missed resource				IDL_REP_NODEEND missed resource	
		X	Z	IDL_REP_ZDIST missed resource	Z'	IDL_REP_ZGLBDIST missed resource	IDL_REP_ZGLB missed resource	X	Z
M1	B.G.1	0.000	0.000	3.000	0.0245	3.000	0.0245	0.000	0.000
M2	B.G.1	0.000	0.000	0.495	-0.0002	0.990	-0.0070	0.000	-0.007
M3	B.G.1	0.000	-0.007	2.310	0.0085	0.000	-0.0070	0.000	-0.007
M4	B.G.1	0.000	-0.007	0.500	-0.0002	0.000	-0.0070	0.000	0.000
M5	B.G.1	0.000	0.000	3.600	0.0245	3.600	0.0245	0.000	0.000
-	**-**	**m**	**m**	**m**	**m**	**m**	**m**	**m**	**m**

10 Bijlage Matrix-frame ongeschaafd hout 63 x200



534 missed resource B.G.1: Permanent Oplegreacties

B.G. 609 missed resource

IDL_REP_CONCRETE_LC	IDL_REP_CONCRETE_SUPPORT missed resource	IDL_REP_NODE missed resource	X	Z	My
B.G.1	S1	N1	0.00	-5.76	0.00
	S2	N2	0.00	-14.04	0.00
	S3	N5	0.00	-14.04	0.00
	S4	N6	0.00	-5.76	0.00
	IDL_REP_SUMREACTIONS missed resource		**0.00**	**-39.60**	
	IDL_REP_SUMLOADS missed resource		**0.00**	**39.60**	
-	**-**	**-**	**kN**	**kN**	**kNm**

534 missed resource B.G.1: Permanent Verplaatsingen

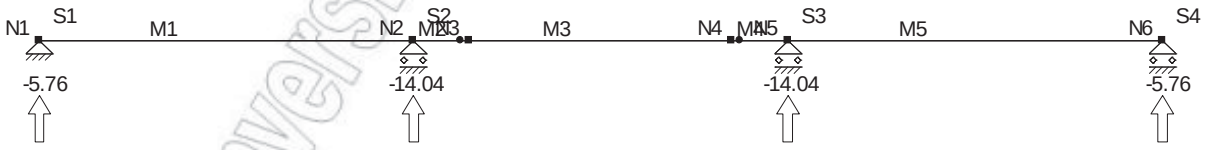
B.G. 592 missed resource

IDL_REP_NODE missed	IDL_REP_CONCRETE_LC	X	Z	Ry
N1	B.G.1	0.0000	0.0000	-35.414e-03
N2		0.0000	0.0000	23.293e-03
N3		0.0000	-0.0196	-16.305e-03
N4		0.0000	-0.0196	16.305e-03
N5		0.0000	0.0000	-23.293e-03
N6		0.0000	0.0000	35.414e-03
-	**-**	**m**	**m**	**rad**

B.G. 587 missed resource

IDL_REP_CONCRETE_MEMBER missed resource	IDL_REP_CONCRETE_LC	IDL_REP_NODEBEGIN missed resource		IDL_REP_CONCRETE_MEMBER missed resource				IDL_REP_NODEEND missed resource	
		X	Z	IDL_REP_ZDIST missed resource	Z'	IDL_REP_ZGLBDIST missed resource	IDL_REP_ZGLB missed resource	X	Z
M1	B.G.1	0.000	0.000	3.000	0.0682	3.000	0.0682	0.000	0.000
M2	B.G.1	0.000	0.000	0.495	-0.0006	0.990	-0.0196	0.000	-0.020
M3	B.G.1	0.000	-0.020	2.310	0.0235	0.000	-0.0196	0.000	-0.020
M4	B.G.1	0.000	-0.020	0.500	-0.0006	0.000	-0.0196	0.000	0.000
M5	B.G.1	0.000	0.000	3.600	0.0682	3.600	0.0682	0.000	0.000
-	**-**	**m**	**m**	**m**	**m**	**m**	**m**	**m**	**m**

10 Bijlage Matrix-frame ongeschaafd hout 75 x275



534 missed resource B.G.1: Permanent Oplegreacties

B.G. 609 missed resource

IDL_REP_CONCRETE_LC	IDL_REP_CONCRETE_SUPPORT missed resource	IDL_REP_NODE missed resource	X	Z	My
B.G.1	S1	N1	0.00	-5.76	0.00
	S2	N2	0.00	-14.04	0.00
	S3	N5	0.00	-14.04	0.00
	S4	N6	0.00	-5.76	0.00
	IDL_REP_SUMREACTIONS missed resource		**0.00**	**-39.60**	
	IDL_REP_SUMLOADS missed resource		**0.00**	**39.60**	
-	**-**	**-**	**kN**	**kN**	**kNm**

534 missed resource B.G.1: Permanent Verplaatsingen

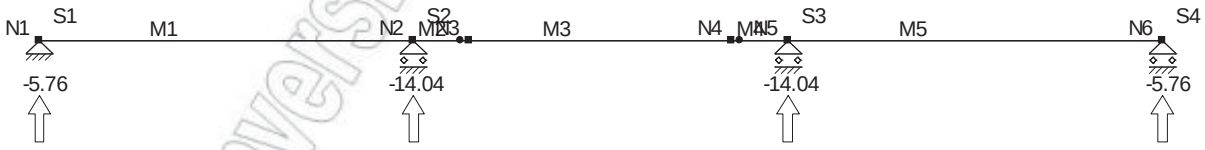
B.G. 592 missed resource

IDL_REP_NODE missed	IDL_REP_CONCRETE_LC	X	Z	Ry
N1	B.G.1	0.0000	0.0000	-11.530e-03
N2		0.0000	0.0000	7.584e-03
N3		0.0000	-0.0064	-5.309e-03
N4		0.0000	-0.0064	5.309e-03
N5		0.0000	0.0000	-7.584e-03
N6		0.0000	0.0000	11.530e-03
-	**-**	**m**	**m**	**rad**

B.G. 587 missed resource

IDL_REP_CONCRETE_MEMBER missed resource	IDL_REP_CONCRETE_LC	IDL_REP_NODEBEGIN missed resource		IDL_REP_CONCRETE_MEMBER missed resource				IDL_REP_NODEEND missed resource	
		X	Z	IDL_REP_ZDIST missed resource	Z'	IDL_REP_ZGLBDIST missed resource	IDL_REP_ZGLB missed resource	X	Z
M1	B.G.1	0.000	0.000	3.000	0.0222	3.000	0.0222	0.000	0.000
M2	B.G.1	0.000	0.000	0.495	-0.0002	0.990	-0.0064	0.000	-0.006
M3	B.G.1	0.000	-0.006	2.310	0.0077	0.000	-0.0064	0.000	-0.006
M4	B.G.1	0.000	-0.006	0.500	-0.0002	0.000	-0.0064	0.000	0.000
M5	B.G.1	0.000	0.000	3.600	0.0222	3.600	0.0222	0.000	0.000
-	**-**	**m**	**m**	**m**	**m**	**m**	**m**	**m**	**m**

10 Bijlage Matrix-frame IPE 120



534 missed resource B.G.1: Permanent Oplegreacties

B.G. 609 missed resource

IDL_REP_CONCRETE_LC	IDL_REP_CONCRETE_SUPPORT missed resource	IDL_REP_NODE missed resource	X	Z	My
B.G.1	S1	N1	0.00	-5.76	0.00
	S2	N2	0.00	-14.04	0.00
	S3	N5	0.00	-14.04	0.00
	S4	N6	0.00	-5.76	0.00
	IDL_REP_SUMREACTIONS missed resource		**0.00**	**-39.60**	
	IDL_REP_SUMLOADS missed resource		**0.00**	**39.60**	
-	**-**	**-**	**kN**	**kN**	**kNm**

534 missed resource B.G.1: Permanent Verplaatsingen

B.G. 592 missed resource

IDL_REP_NODE missed	IDL_REP_CONCRETE_LC	X	Z	Ry
N1	B.G.1	0.0000	0.0000	-26.748e-03
N2		0.0000	0.0000	17.593e-03
N3		0.0000	-0.0148	-12.315e-03
N4		0.0000	-0.0148	12.315e-03
N5		0.0000	0.0000	-17.593e-03
N6		0.0000	0.0000	26.748e-03
-	**-**	**m**	**m**	**rad**

B.G. 587 missed resource

IDL_REP_CONCRETE_MEMBER missed resource	IDL_REP_CONCRETE_LC	IDL_REP_NODEBEGIN missed resource		IDL_REP_CONCRETE_MEMBER missed resource				IDL_REP_NODEEND missed resource	
		X	Z	IDL_REP_ZDIST missed resource	Z'	IDL_REP_ZGLBDIST missed resource	IDL_REP_ZGLB missed resource	X	Z
M1	B.G.1	0.000	0.000	3.000	0.0515	3.000	0.0515	0.000	0.000
M2	B.G.1	0.000	0.000	0.495	-0.0005	0.990	-0.0148	0.000	-0.015
M3	B.G.1	0.000	-0.015	2.310	0.0178	0.000	-0.0148	0.000	-0.015
M4	B.G.1	0.000	-0.015	0.500	-0.0005	0.000	-0.0148	0.000	0.000
M5	B.G.1	0.000	0.000	3.600	0.0515	3.600	0.0515	0.000	0.000
-	**-**	**m**	**m**	**m**	**m**	**m**	**m**	**m**	**m**