
mm
Inch
C1 B1 A1 C2 B2 A2 B5 A5 20 18 17 16 11
Patch Reference numbers on UTT
4.5
5.0
5.6
6.3
10 09 03 02 01 C7 B7 A7 C8 B8 A8 C9 B9
Image Engineering Scan Reference Chart TE263 Serial No. 546
the scale towards document

BIJLAGE 11 ESA Prima Win output trappenhuis

Inhoudsopgave Trap

Basisgegevens , gebruikte materialen

Materialenlijst

Doorsnede-eig. , standaard , gebruikte profielen

Groep van variabele lasten

Belastinggevallen

Combinaties

Niet-lineaire combinatie

Lokale niet-lineariteit

Verslag berekening.

Geometrie7

PB trapboom

VB trapboom

Interne krachten in staven (alles), UGT. comb (alles), extremen.

Reacties (alles), UGT. comb (alles), lokale extremen.

Vervorming in staven (alles), GGT. combi (alles), globale extremen.

Basisgegevens
Structuurtype : Raamwerk XYZ

Aantal knopen:	20
Aantal staven:	33
Aantal 1D macro's:	17
Aantal randlijnen:	0
Aantal 2D macro's:	0
Aantal profielen:	6
Aantal belastingsgev.:	2
Aantal materialen:	1

Materiaal

Naam
S235

Treksterkte	360.000 MPa
Vloeigrens	235.000 MPa
E-modulus	210000.00 MPa
Poisson coëff.	0.30
Specifiek gewicht	0.000 kg/mm^3
Uitzettingscoëff.	1.2e-005 mm/mm.K

Materialenlijst
Groep staven:
1/33

nr.	Naam	Kwaliteit	Eenh. gewicht kg/mm	Lengte mm	Massa kg
3	UPN160	S235	0.02	8300.00	156.37
4	UPN260	S235	0.04	31818.38	1206.41
5	IPE180	S235	0.02	7500.00	141.01
6	R22	S235	0.00	18744.60	55.91

Totaal gewicht van constructie: 1559.69 kg
Verfoppervlakte: 38697697.03 mm^2

Profielen



UPN160

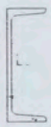
Doorsnedenr. 3 - UPN160
Materiaal : 7 - S235

A	:	2.400000e+003 mm^2			
Ay/A	:	0.282	Az/A	:	0.414
Iy	:	9.250000e+006 mm^4	Iz	:	8.530000e+005 mm^4
Iyz	:	-1.088437e-007 mm^4	It	:	7.390000e+004 mm^4
Iw	:	3.260000e+009 mm^6			
Wely	:	1.160000e+005 mm^3	Welz	:	1.830000e+004 mm^3
Wply	:	1.376000e+005 mm^3	Wplz	:	3.880000e+004 mm^3
cy	:	18.65 mm	cz	:	80.00 mm

A :	2.400000e+003 mm^2		
iy :	62.08 mm	iz :	18.85 mm
dy :	-40.08 mm	dz :	0.00 mm
Omtrek :		565.00 mm	

Controletype: C profiel

Hoogte	160.00 mm	Breedte	65.00 mm
Flensdikte	10.50 mm	Lijfdikte	7.50 mm
Straal	10.50 mm		



UPN260

Doorsnedenr. 4 - UPN260
Materiaal : 7 - S235

A :	4.830000e+003 mm^2		
Ay/A :	0.235	Az/A :	0.461
Iy :	4.820000e+007 mm^4	Iz :	3.170000e+006 mm^4
Iyz :	2.032879e-008 mm^4	It :	2.550000e+005 mm^4
Iw :	3.330000e+010 mm^6		
Wely :	3.710000e+005 mm^3	Welz :	4.770000e+004 mm^3
Wply :	4.420000e+005 mm^3	Wplz :	9.393059e+004 mm^3
cy :	24.02 mm	cz :	130.00 mm
iy :	99.90 mm	iz :	25.62 mm
dy :	-52.48 mm	dz :	-0.00 mm
Omtrek :		860.00 mm	

Controletype: C profiel

Hoogte	260.00 mm	Breedte	90.00 mm
Flensdikte	14.00 mm	Lijfdikte	10.00 mm
Straal	14.00 mm		



IPE180

Doorsnedenr. 5 - IPE180
Materiaal : 7 - S235

A :	2.395000e+003 mm^2		
Ay/A :	0.523	Az/A :	0.369
Iy :	1.317000e+007 mm^4	Iz :	1.009000e+006 mm^4
Iyz :	0.000000e+000 mm^4	It :	4.790000e+004 mm^4
Iw :	7.507044e+009 mm^6		
Wely :	1.463000e+005 mm^3	Welz :	2.216000e+004 mm^3
Wply :	1.664000e+005 mm^3	Wplz :	3.460000e+004 mm^3
cy :	45.50 mm	cz :	90.00 mm
iy :	74.15 mm	iz :	20.53 mm
dy :	-0.00 mm	dz :	0.00 mm
Omtrek :			713.40 mm

Controletype: I-profiel

Hoogte	180.00 mm	Breedte	91.00 mm
Flensdikte	8.00 mm	Lijfdikte	5.30 mm
Straal	9.00 mm		



R22

Doorsnedenr. 6 - R22
Materiaal : 7 - S235

A :	3.799400e+002 mm^2		
Ay/A :	0.850	Az/A :	0.850
Iy :	1.127712e+004 mm^4	Iz :	1.127712e+004 mm^4
Iyz :	-2.022396e-008 mm^4	It :	2.255424e+004 mm^4
Iw :	0.000000e+000 mm^6		
Wely :	1.032722e+003 mm^3	Welz :	1.032722e+003 mm^3
Wply :	1.772641e+003 mm^3	Wplz :	1.772641e+003 mm^3
cy :	0.00 mm	cz :	0.00 mm
iy :	5.45 mm	iz :	5.45 mm
dy :	0.00 mm	dz :	0.00 mm
Omtrek :			69.03 mm

Controletype: A-typische doorsnede

Groep van variabele lasten

Naam	Omschrijving
Wind	NEN - momentaan factor = 1.00
vb vloeren	NEN - momentaan factor = 1.00

Belastinggevallen

B G	Naam	Omschrijving
1	eg trap	Permanent - Lasten
2	vb trap	Variabel - vb vloeren
		Korte termijn

Combinaties

Combi	Norm	BG	coëff
1.vert	Lineair- GGT	1 eg trap	1.00
		2 vb trap	1.00
2.vert	Lineair- UGT	1 eg trap	1.20
		2 vb trap	1.50

Regels voor het genereren van uiterste combinaties:
1 : 1.20*BG1 / 1.50*BG2

Regels voor het genereren van gebruiks combinaties:
1 : 1.00*BG1 / 1.00*BG2

Lijst van extreme UGT combinaties
1/ 2 : +1.20*BG1+1.50*BG2

Lijst van extreme GGT combinaties
1/ 1 : +1.00*BG1+1.00*BG2

Niet-lineaire combinatie

Combi	Groep van voorvervormingen		dx mm/m	dy mm/m	Groep van voorkrommingen	BG	coëff
C 1		0	0.00	0.00		0 1 eg trap	1.00

Combi	Groep van voorvervormingen	dx mm/m	dy mm/m	Groep van voorkrommingen	BG	coëff
		0 0.00	0.00		0 2 vb trap	1.00
C 2		0 0.00	0.00		0 1 eg trap	1.00
		0 0.00	0.00		0 2 vb trap	1.00
C 3		0 0.00	0.00		0 1 eg trap	1.20
		0 0.00	0.00		0 2 vb trap	1.50
C 4		0 0.00	0.00		0 1 eg trap	1.20
		0 0.00	0.00		0 2 vb trap	1.50

Lokale niet-lineariteit

macro	Type
8	Alleen trek
9	Alleen trek
10	Alleen trek
11	Alleen trek
12	Alleen trek
13	Alleen trek

Verslag berekening.

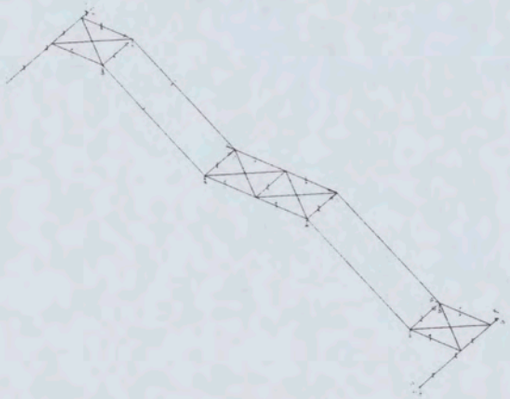
Lineaire berekening

Aantal 2D elementen	0
Aantal 1D elementen	33
Aantal netknopen	20
Aantal vergelijkingen	120
Belastinggevallen	BG 1 eg trap
	BG 2 vb trap
Start berekening	06.12.2005 11:51
Einde berekening	06.12.2005 11:51

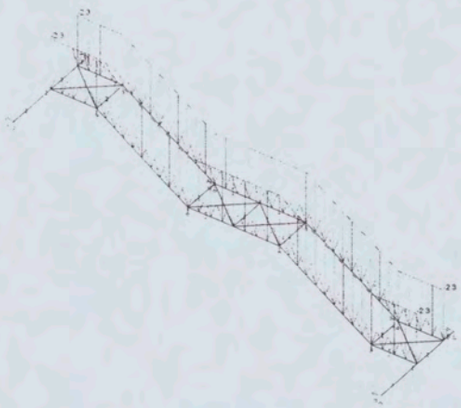
Som van lasten en reacties.

		X	Y	Z
belastinggeval 1	last	0.0	0.0	-72.5
	knoopreacties	0.0	0.0	72.5
	lijnreactions	0.0	0.0	0.0
	contact 1D	0.0	0.0	0.0

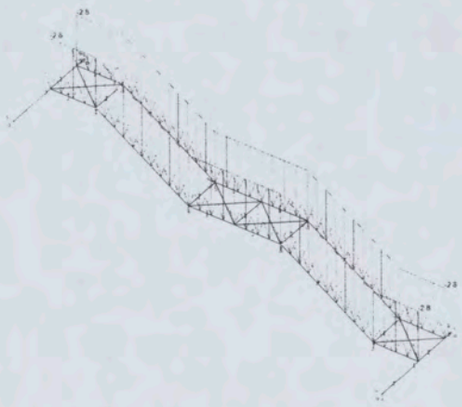
		X	Y	Z
	contact 2D	0.0	0.0	0.0
belastinggeval 2	last	-0.0	0.0	-87.5
	knoopreacties	0.0	0.0	87.5
	lijnreactions	0.0	0.0	0.0
	contact 1D	0.0	0.0	0.0
	contact 2D	0.0	0.0	0.0



Geometrie



PB trapboom



VB trapboom

Interne krachten in staven. Extremen per staaf

Lineair statisch - extreme van alle combinaties

Groep van staven:1/33

Groep van UGT combi:1

staaf	doorsn.	combi	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
1	3	1	0.0	**0.83**	**-0.01**	**4.03**	-0.00	-0.00	-0.00
			1650.0	0.83	-0.01	4.03	-0.00	**6.64**	**-0.01**
2			0.0	**0.83**	**-0.01**	**4.03**	-0.00	6.64	-0.01
			400.0	0.83	-0.01	4.03	-0.00	**8.25**	**-0.02**
3			0.0	**-0.45**	**0.02**	**-2.15**	**0.00**	**8.25**	**-0.02**
			1500.0	-0.45	0.02	-2.15	0.00	5.03	**0.02**
4			0.0	**-1.71**	**-0.03**	**-8.32**	0.00	**4.99**	**0.02**
5	4			**-1.58**	0.00	**-6.17**	**-0.00**	-0.00	-0.00
			1800.0	-1.58	0.00	**6.17**	-0.00	**0.00**	0.00
			900.0	-1.58	0.00	-0.00	-0.00	**-2.78**	0.00
6			0.0	**4.68**	-0.00	**-12.35**	-0.00	0.00	-0.00
			4354.6	**-12.13**	-0.00	**12.35**	-0.00	**0.00**	-0.00
			2177.3	-3.73	-0.00	0.00	-0.00	**-13.44**	-0.00
7			0.0	**-1.58**	**-0.01**	**-12.35**	**0.00**	**0.00**	0.00
			1800.0	-1.58	-0.01	-0.00	0.00	**-11.11**	**-0.01**
8			0.0	**1.58**	**-0.01**	0.00	**-0.00**	**-11.11**	**0.01**
			1800.0	1.58	-0.01	**12.35**	-0.00	**0.00**	-0.00
9			0.0	**12.13**	-0.00	**-12.35**	0.00	**0.00**	0.00
			4354.6	**-4.68**	-0.00	**12.35**	0.00	0.00	0.00
			2177.3	3.73	-0.00	0.00	0.00	**-13.44**	0.00
10			0.0	**1.58**	0.00	**-6.17**	**0.00**	**0.00**	-0.00
			1800.0	1.58	0.00	**6.17**	0.00	-0.00	0.00
			900.0	1.58	0.00	-0.00	0.00	**-2.78**	-0.00
11			0.0	**1.56**	-0.00	**6.17**	**-0.03**	0.00	0.00
			1800.0	1.56	-0.00	**-6.17**	-0.03	**-0.00**	-0.00
			900.0	1.56	-0.00	0.00	-0.03	**2.78**	-0.00

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Patch Reference numbers on UTT

staaf	doorsn.	combi	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
12			0.0	**12.09**	0.00	**12.35**	**0.01**	-0.00	-0.00
			4354.6	**-4.72**	0.00	**-12.35**	0.01	**-0.00**	0.00
			2177.3	3.68	0.00	-0.00	0.01	**13.44**	-0.00
13			0.0	**1.52**	**0.01**	**12.35**	**0.00**	**-0.00**	-0.00
			1800.0	1.52	0.01	**-0.00**	0.00	**11.11**	**0.01**
14			0.0	**-1.52**	**0.01**	**0.00**	**-0.00**	**11.11**	**-0.01**
			1800.0	-1.52	0.01	**-12.35**	-0.00	**-0.00**	0.00
15			0.0	**4.72**	0.00	**12.35**	**-0.01**	**-0.00**	-0.00
			4354.6	**-12.09**	0.00	**-12.35**	-0.01	-0.00	0.00
			2177.3	-3.68	0.00	-0.00	-0.01	**13.44**	0.00
16			0.0	**-1.56**	-0.00	**6.17**	**0.03**	**-0.00**	0.00
			1800.0	-1.56	-0.00	**-6.17**	0.03	0.00	-0.00
			900.0	-1.56	-0.00	0.00	0.03	**2.78**	0.00
17	5		0.0	**-1.25**	**0.00**	**-0.03**	**-0.00**	0.00	0.00
			1500.0	-1.25	0.00	-0.03	-0.00	**-0.04**	**0.00**
18	3		0.0	**-0.83**	**0.01**	**-4.03**	0.00	0.00	-0.00
			1650.0	-0.83	0.01	-4.03	0.00	**-6.64**	**0.01**
19			0.0	**-0.83**	**0.01**	**-4.03**	0.00	-6.64	0.01
			400.0	-0.83	0.01	-4.03	0.00	**-8.25**	**0.02**
20			0.0	**0.45**	**-0.02**	**2.15**	**-0.00**	**-8.25**	**0.02**
			1500.0	0.45	-0.02	2.15	-0.00	-5.03	**-0.02**
21			0.0	**1.71**	**0.03**	**8.32**	0.00	**-4.99**	**-0.02**
22	5			**1.26**	**-0.00**	**0.00**	-0.00	-0.00	-0.00
			1500.0	1.26	-0.00	0.00	-0.00	**0.01**	**-0.00**
23			0.0	**-1.26**	**-0.00**	**0.00**	**0.00**	-0.00	-0.00
			1500.0	-1.26	-0.00	0.00	0.00	**0.01**	**-0.00**
24	6		0.0	**-1.96**	0.00	0.00	0.00	0.00	0.00
25				**2.01**	0.00	0.00	0.00	0.00	0.00
26				**2.03**	0.00	0.00	0.00	0.00	0.00
27				**-1.95**	0.00	0.00	0.00	0.00	0.00
28				**1.96**	0.00	0.00	0.00	0.00	0.00
29				**-2.01**	0.00	0.00	0.00	0.00	0.00
30	5			**1.25**	**0.00**	**-0.03**	**0.00**	0.00	0.00
			1500.0	1.25	0.00	-0.03	0.00	**-0.04**	**0.00**
31			0.0	**0.00**	**-0.04**	**0.00**	0.00	**-0.00**	**0.03**
			1500.0	0.00	-0.04	0.00	0.00	**0.00**	**-0.03**
32	6		0.0	**1.95**	0.00	-0.00	**0.00**	0.00	0.00
33				**-2.03**	0.00	-0.00	**-0.00**	0.00	0.00

Reacties in steunpunten - waardes in knopen. Lokale extremen

Lineair statisch - extreme van alle combinaties

Groep van knopen:1/20

Groep van UGT combi:1

Steunpunt	knoop	combi	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]

Steunpunt	knoop	combi	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
1	1	1	**0.01**	**-0.83**	**4.03**	0.00	0.00	0.00
2	2		**0.06**	**-2.54**	**23.21**	0.00	0.00	0.00
3	4		**-0.03**	**-1.71**	**8.32**	0.00	0.00	0.00
4	5		**0.06**	**2.54**	**23.21**	0.00	0.00	0.00
5	6		0.00	0.00	**18.99**	0.00	0.00	0.00
6	9		0.00	0.00	**29.39**	0.00	0.00	0.00
7	10		0.00	0.00	**29.39**	0.00	0.00	0.00
8	11		0.00	0.00	**18.99**	0.00	0.00	0.00
9	13		**-0.04**	**2.57**	**25.21**	0.00	0.00	0.00
10	14		**-0.04**	**-2.57**	**25.21**	0.00	0.00	0.00
11	16		**0.01**	**0.83**	**4.03**	0.00	0.00	0.00
12	20		**-0.03**	**1.71**	**8.32**	0.00	0.00	0.00

Vervormingen van staven. Globale extremen

Lineair statisch - extreme van alle combinaties

Groep van staven:1/33

Groep van GebruiksGT combi:1

staaf	doorsn.	combi	dx [mm]	ux [mm]	uy [mm]	uz [mm]	fix [mrad]	fiy [mrad]	fiz [mrad]
6	4	1	1209.6	**4.67**	0.26	8.04	2.01	-0.50	0.22
22	5		0.0	**-0.94**	-0.86	-7.02	-838.91	-4.68	0.57
32	6		2343.1	0.05	**1.27**	-7.02	3.59	2.51	0.54
27			0.0	0.05	**-1.27**	-7.02	0.00	0.00	0.00
5	4		1800.0	-0.06	0.00	**8.39**	-0.28	-1.75	0.00
17	5		0.0	0.00	0.06	**-8.39**	**-45889.47**	-5.59	-0.04
30				-0.00	0.06	-8.39	**45889.47**	**-5.59**	-0.04
21	3		600.0	-0.00	0.00	0.00	-45670.57	**4.04**	-0.00
31	5		750.0	0.00	-0.44	-4.64	-0.00	-4.68	**0.57**
7	4		1800.0	0.85	-0.00	8.15	4.68	-0.00	**-0.53**

Inhoudsopgave Bordes

Basisgegevens , gebruikte materialen

Materialenlijst

Doorsnede-eig. , standaard , gebruikte profielen

Belastinggevallen

Combinaties

Niet-lineaire combinatie

Lokale niet-lineariteit

Verslag berekening.

Geometrie

EG bordes

VB bordes

Windbelasting druk

Windbelasting zuiging

Interne krachten in staven (alles), UGT. comb (alles), extremen.

Reacties (alles), UGT. comb (alles), lokale extremen.

Vervorming in staven (alles), GGT. combi (alles), globale extremen.

Basisgegevens
Structuurtype : Raamwerk XYZ

Aantal knopen:	20
Aantal staven:	43
Aantal 1D macro's:	29
Aantal randlijnen:	0
Aantal 2D macro's:	0
Aantal profielen:	6
Aantal belastingsgev.:	4
Aantal materialen:	1

Materiaal

Naam
S235

Treksterkte	360.000 MPa
Vloeigrens	235.000 MPa
E-modulus	210000.00 MPa
Poisson coëff.	0.30
Specifiek gewicht	0.000 kg/mm^3
Uitzettingscoëff.	1.2e-005 mm/mm.K

Materialenlijst
Groep staven:
1/43

nr.	Naam	Kwaliteit	Eenh. gewicht kg/mm	Lengte mm	Massa kg
2	UPN180	S235	0.02	6600.00	145.07
3	HEA180	S235	0.04	4300.00	152.91
4	UPN260	S235	0.04	25200.00	955.47
5	IPE180	S235	0.02	10500.00	197.41
6	R22	S235	0.00	37489.20	111.81

Totaal gewicht van constructie: 1562.67 kg
Verfoppervlakte: 40383879.78 mm^2

Profielen



UPN180

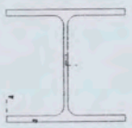
Doorsnedenr. 2 - UPN180
Materiaal : 7 - S235

A	:	2.800000e+003 mm^2			
Ay/A	:	0.267	Az/A	:	0.431
Iy	:	1.350000e+007 mm^4	Iz	:	1.140000e+006 mm^4
Iyz	:	-1.185846e-008 mm^4	It	:	9.550000e+004 mm^4
Iw	:	5.570000e+009 mm^6			

A :	2.800000e+003 mm^2		
Wely :	1.500000e+005 mm^3	Welz :	2.240000e+004 mm^3
Wply :	1.792000e+005 mm^3	Wplz :	4.820000e+004 mm^3
cy :	19.56 mm	cz :	90.00 mm
iy :	69.44 mm	iz :	20.18 mm
dy :	-42.25 mm	dz :	0.00 mm
Omtrek :		624.00 mm	

Controletype: C profiel

Hoogte	180.00 mm	Breedte	70.00 mm
Flensdikte	11.00 mm	Lijfdikte	8.00 mm
Straal	11.00 mm		



HEA180

Doorsnedenr. 3 - HEA180
Materiaal : 7 - S235

A :	4.530000e+003 mm^2		
Ay/A :	0.653	Az/A :	0.201
Iy :	2.510000e+007 mm^4	Iz :	9.250000e+006 mm^4
Iyz :	0.000000e+000 mm^4	It :	1.480000e+005 mm^4
Iw :	6.038901e+010 mm^6		
Wely :	2.940000e+005 mm^3	Welz :	1.030000e+005 mm^3
Wply :	3.240000e+005 mm^3	Wplz :	1.560000e+005 mm^3
cy :	90.00 mm	cz :	85.50 mm
iy :	74.44 mm	iz :	45.19 mm
dy :	-0.00 mm	dz :	-0.00 mm
Omtrek :		1050.00 mm	

Controletype: I-profiel

Hoogte	171.00 mm	Breedte	180.00 mm
Flensdikte	9.50 mm	Lijfdikte	6.00 mm
Straal	15.00 mm		



UPN260

Doorsnedenr. 4 - UPN260
Materiaal : 7 - S235

A :	4.830000e+003 mm^2		
Ay/A :	0.235	Az/A :	0.461
Iy :	4.820000e+007 mm^4	Iz :	3.170000e+006 mm^4
Iyz :	2.032879e-008 mm^4	It :	2.550000e+005 mm^4
Iw :	3.330000e+010 mm^6		
Wely :	3.710000e+005 mm^3	Welz :	4.770000e+004 mm^3
Wply :	4.420000e+005 mm^3	Wplz :	9.393059e+004 mm^3
cy :	24.02 mm	cz :	130.00 mm
iy :	99.90 mm	iz :	25.62 mm
dy :	-52.48 mm	dz :	-0.00 mm
Omtrek :		860.00 mm	

Controletype: C profiel

Hoogte	260.00 mm	Breedte	90.00 mm
Flensdikte	14.00 mm	Lijfdikte	10.00 mm
Straal	14.00 mm		



IPE180

Doorsnedenr. 5 - IPE180
Materiaal : 7 - S235

A :	2.395000e+003 mm^2		
Ay/A :	0.523	Az/A :	0.369
Iy :	1.317000e+007 mm^4	Iz :	1.009000e+006 mm^4
Iyz :	0.000000e+000 mm^4	It :	4.790000e+004 mm^4
Iw :	7.507044e+009 mm^6		
Wely :	1.463000e+005 mm^3	Welz :	2.216000e+004 mm^3
Wply :	1.664000e+005 mm^3	Wplz :	3.460000e+004 mm^3
cy :	45.50 mm	cz :	90.00 mm

A :	2.395000e+003 mm^2		
iy :	74.15 mm	iz :	20.53 mm
dy :	-0.00 mm	dz :	0.00 mm
Omtrek :		713.40 mm	

Controletype: I-profiel

Hoogte	180.00 mm	Breedte	91.00 mm
Flensdikte	8.00 mm	Lijfdikte	5.30 mm
Straal	9.00 mm		



R22

Doorsnedenr. 6 - R22
Materiaal : 7 - S235

A :	3.799400e+002 mm^2		
Ay/A :	0.850	Az/A :	0.850
Iy :	1.127712e+004 mm^4	Iz :	1.127712e+004 mm^4
Iyz :	-2.022396e-008 mm^4	It :	2.255424e+004 mm^4
Iw :	0.000000e+000 mm^6		
Wely :	1.032722e+003 mm^3	Welz :	1.032722e+003 mm^3
Wply :	1.772641e+003 mm^3	Wplz :	1.772641e+003 mm^3
cy :	0.00 mm	cz :	0.00 mm
iy :	5.45 mm	iz :	5.45 mm
dy :	0.00 mm	dz :	0.00 mm
Omtrek :		69.03 mm	

Controletype: A-typische doorsnede

Belastinggevallen

B	Naam	Omschrijving
G		
1	Wind in	Variabel - Wind Korte termijn
2	Wind uit	Variabel - Wind Korte termijn
3	eg balustrade (incluisef liggers)	Permanent - Lasten

B	Naam	Omschrijving
G		
4 vb balustrade		Variabel - vb vloeren Lange termijn

Combinaties

Combi	Norm	BG	coëff
1.wind in	Lineair- UGT	1 Wind in	1.50
2.wind in	Lineair- GGT	1 Wind in	1.00
3.wind uit	Lineair- UGT	2 Wind uit	1.50
4.wind uit	Lineair- GGT	2 Wind uit	1.00
5.vert		3 eg balustrade (incluisef liggers)	1.00
		4 vb balustrade	1.00
6.vert	Lineair- UGT	3 eg balustrade (incluisef liggers)	1.20
		4 vb balustrade	1.50
7.vert + wind in	Lineair- GGT	3 eg balustrade (incluisef liggers)	1.00
		4 vb balustrade	1.00
		1 Wind in	1.00
8.vert + wind uit		3 eg balustrade (incluisef liggers)	1.00
		4 vb balustrade	1.00
		2 Wind uit	1.00
9.vert + wind in	Lineair- UGT	3 eg balustrade (incluisef liggers)	1.20
		4 vb balustrade	1.50
		1 Wind in	1.50
10.vert + wind uit		3 eg balustrade (incluisef liggers)	1.20
		4 vb balustrade	1.50
		2 Wind uit	1.50
11.uz bij in	Lineair- GGT	4 vb balustrade	1.00
		1 Wind in	1.00
12.uz bij uit		4 vb balustrade	1.00
		2 Wind uit	1.00
13.vert eg		3 eg balustrade (incluisef liggers)	1.00
14.vert vb		4 vb balustrade	1.00

Regels voor het genereren van uiterste combinaties:

1 : 1.50*BG1

2 : 1.50*BG2

3 : 1.20*BG3 / 1.50*BG4

4 : 1.20*BG3 / 1.50*BG4 / 1.50*BG1

5 : 1.20*BG3 / 1.50*BG4 / 1.50*BG2

Regels voor het genereren van gebruiks combinaties:

1 : 1.00*BG1

2 : 1.00*BG2

3 : 1.00*BG3 / 1.00*BG4

4 : 1.00*BG3 / 1.00*BG4 / 1.00*BG1
5 : 1.00*BG3 / 1.00*BG4 / 1.00*BG2
6 : 1.00*BG4 / 1.00*BG1
7 : 1.00*BG4 / 1.00*BG2
8 : 1.00*BG3
9 : 1.00*BG4

Lijst van extreme UGT combinaties
1/ 1 : +1.50*BG1
2/ 3 : +1.50*BG2
3/ 6 : +1.20*BG3+1.50*BG4
4/ 9 : +1.50*BG1+1.20*BG3+1.50*BG4
5/ 10 : +1.50*BG2+1.20*BG3+1.50*BG4

Lijst van extreme GGT combinaties
1/ 2 : +1.00*BG1
2/ 4 : +1.00*BG2
3/ 13 : +1.00*BG3
4/ 14 : +1.00*BG4
5/ 11 : +1.00*BG1+1.00*BG4
6/ 12 : +1.00*BG2+1.00*BG4
7/ 5 : +1.00*BG3+1.00*BG4
8/ 7 : +1.00*BG1+1.00*BG3+1.00*BG4
9/ 8 : +1.00*BG2+1.00*BG3+1.00*BG4

Niet-lineaire combinatie

Combi	Groep van voorvervormingen		dx mm/m	dy mm/m	Groep van voorkrommingen	BG	coëff
C 1		0	0.00	0.00		0 1 Wind in	1.00
		0	0.00	0.00		0 4 vb balustrade	1.00
C 2		0	0.00	0.00		0 2 Wind uit	1.00
		0	0.00	0.00		0 4 vb balustrade	1.00
C 3		0	0.00	0.00		0 1 Wind in	1.00
		0	0.00	0.00		0 3 eg balustrade (incluisef liggers)	1.00
		0	0.00	0.00		0 4 vb balustrade	1.00
C 4		0	0.00	0.00		0 2 Wind uit	1.00
		0	0.00	0.00		0 3 eg balustrade (incluisef liggers)	1.00
		0	0.00	0.00		0 4 vb balustrade	1.00
C 5		0	0.00	0.00		0 1 Wind in	1.50
		0	0.00	0.00		0 3 eg balustrade (incluisef liggers)	1.20
		0	0.00	0.00		0 4 vb balustrade	1.50
C 6		0	0.00	0.00		0 2 Wind uit	1.50
		0	0.00	0.00		0 3 eg balustrade (incluisef liggers)	1.20
		0	0.00	0.00		0 4 vb balustrade	1.50
C 7		0	0.00	0.00		0 3 eg balustrade (incluisef liggers)	1.00
C 8		0	0.00	0.00		0 4 vb balustrade	1.00



Lokale niet-lineariteit

macro	Type
6	Alleen trek
7	Alleen trek
9	Alleen trek
10	Alleen trek
11	Alleen trek
12	Alleen trek
15	Alleen trek
16	Alleen trek
17	Alleen trek
18	Alleen trek
19	Alleen trek
20	Alleen trek
21	Alleen trek
22	Alleen trek
23	Alleen trek
24	Alleen trek

Verslag berekening.

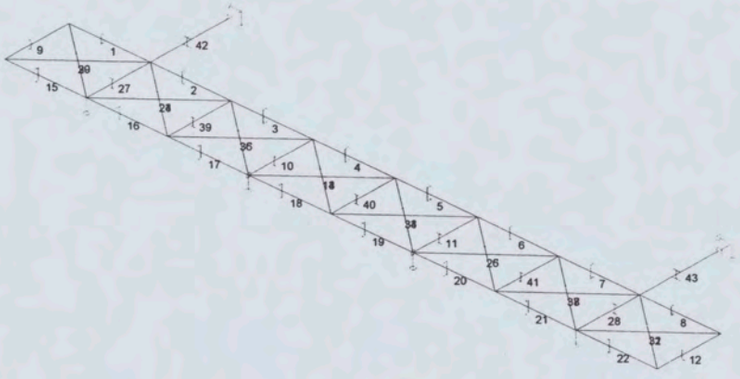
Lineaire berekening

Aantal 2D elementen		0
Aantal 1D elementen		43
Aantal netknopen		20
Aantal vergelijkingen		120
Belastinggevallen	BG 1 Wind in	
	BG 2 Wind uit	
	BG 3 eg balustrade (incluisef liggers)	
	BG 4 vb balustrade	
Start berekening	06.12.2005 12:41	
Einde berekening	06.12.2005 12:41	

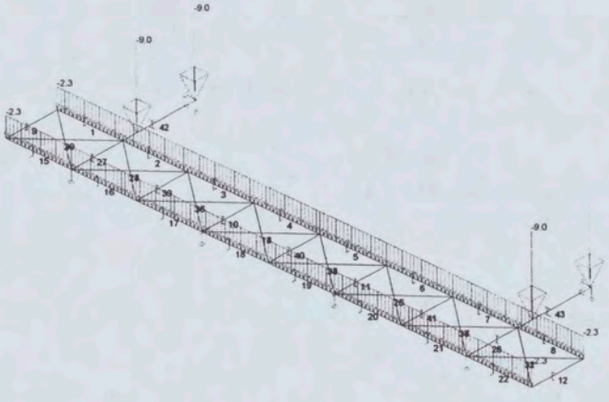
Som van lasten en reacties.

		X	Y	Z
belastinggeval 1	last	0.0	136.0	0.0
	knooppreacties	0.0	-136.0	0.0

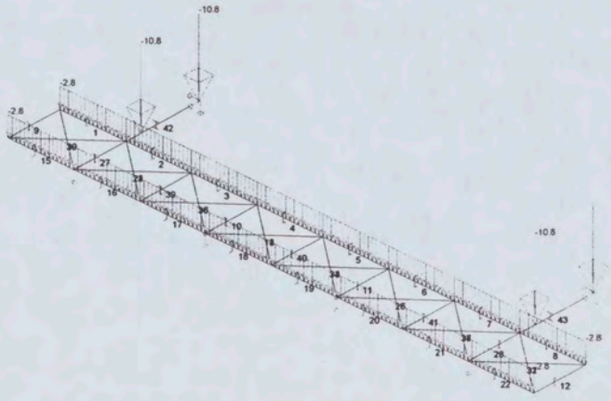
		X	Y	Z
	lijnreactions	0.0	0.0	0.0
	contact 1D	0.0	0.0	0.0
	contact 2D	0.0	0.0	0.0
belastinggeval 2	last	0.0	-94.0	0.0
	knoopreacties	0.0	94.0	0.0
	lijnreactions	0.0	0.0	0.0
	contact 1D	0.0	0.0	0.0
	contact 2D	0.0	0.0	0.0
belastinggeval 3	last	0.0	0.0	-102.2
	knoopreacties	0.0	0.0	102.2
	lijnreactions	0.0	0.0	0.0
	contact 1D	0.0	0.0	0.0
	contact 2D	0.0	0.0	0.0
belastinggeval 4	last	0.0	0.0	-123.8
	knoopreacties	0.0	0.0	123.8
	lijnreactions	0.0	0.0	0.0
	contact 1D	0.0	0.0	0.0
	contact 2D	0.0	0.0	0.0



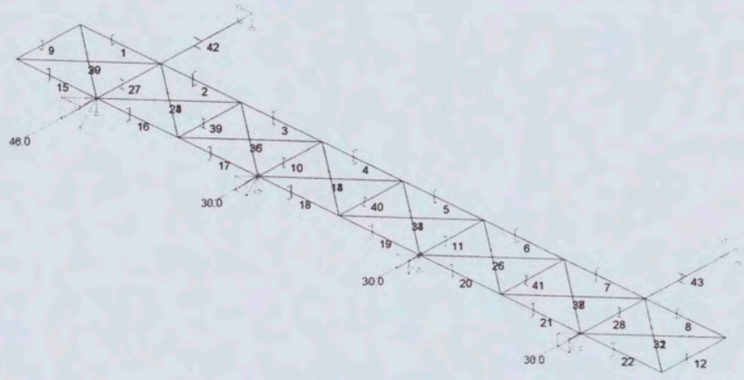
Geometrie



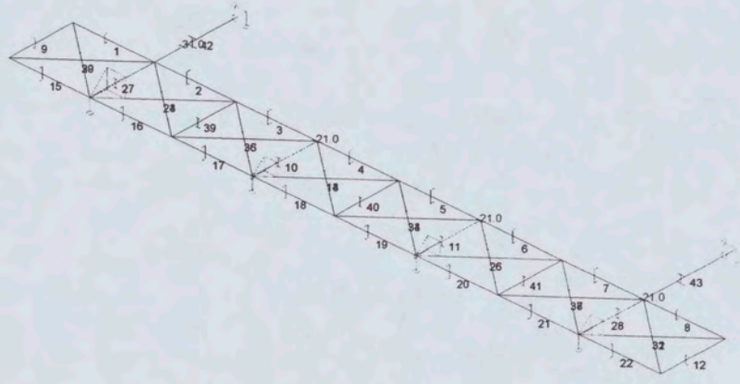
EG bordes



VB bordes



Windbelasting druk



Windbelasting zuiging

Interne krachten in staven. Extremen per staaf

Lineair statisch - extreme van alle combinaties

Groep van staven:1/43

Groep van UGT combi:1/5

staaf	doorsn.	combi	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
1	2	1	0.0	**2.18**	**-0.01**	-0.00	0.00	0.00	-0.00
		2		**-1.48**	**0.01**	0.00	-0.00	-0.00	0.00
		3		-0.00	0.00	**0.03**	**-0.05**	-0.00	0.00
			1800.0	-0.00	0.00	**-12.50**	-0.05	-11.22	0.00
		5		-1.48	0.01	-12.50	-0.05	**-11.22**	0.02
		2		-1.48	0.01	0.00	-0.00	0.00	**0.02**
		1		2.18	-0.01	-0.00	0.00	-0.00	**-0.03**
2	4		0.0	**27.86**	**-1.00**	0.00	-0.00	-0.00	**1.37**
		2		**-19.46**	**0.70**	-0.00	0.00	0.00	**-0.96**
		3		-0.00	0.00	**15.64**	-0.00	-11.21	-0.00
		4		27.86	-1.00	15.64	**-0.00**	-11.21	1.37
		5	1800.0	-19.46	0.70	3.11	-0.00	**5.67**	0.31
			0.0	-19.46	0.70	15.64	-0.00	**-11.21**	-0.96
3		1		**79.67**	**0.24**	0.00	-0.00	-0.00	**-0.44**
		2		**-55.77**	**-0.17**	-0.00	0.00	0.00	**0.31**
		3		-0.00	-0.00	**3.11**	-0.00	5.67	0.00
			1800.0	-0.00	-0.00	**-9.41**	-0.00	-0.00	0.00
		4	0.0	79.67	0.24	3.11	**-0.00**	5.67	-0.44
		5	400.0	-55.77	-0.17	0.33	-0.00	**6.36**	0.24
			1800.0	-55.77	-0.17	-9.41	-0.00	**-0.00**	0.00
4		1	0.0	**106.78**	**-0.09**	-0.00	-0.00	0.00	-0.00
		2		**-74.74**	0.06	0.00	0.00	-0.00	0.00
		5		-74.74	**0.06**	12.53	-0.00	**-0.00**	0.00
		3		-0.00	0.00	**12.53**	-0.00	-0.00	0.00
		5	1800.0	-74.74	0.06	0.00	-0.00	**11.28**	0.11
		2		-74.74	0.06	0.00	0.00	0.00	**0.11**
		1		106.78	-0.09	-0.00	-0.00	-0.00	**-0.16**
5			0.0	**106.78**	**0.09**	-0.00	-0.00	0.00	**-0.16**
		2		**-74.74**	-0.06	0.00	0.00	-0.00	**0.11**
		5		-74.74	**-0.06**	0.00	0.00	**11.28**	0.11
		3		-0.00	-0.00	**0.00**	0.00	11.28	0.00
			1800.0	-0.00	-0.00	**-12.53**	0.00	-0.00	0.00
		5		-74.74	-0.06	-12.53	0.00	**-0.00**	0.00
6		1	0.0	**79.68**	**-0.24**	-0.00	-0.00	-0.00	-0.00
		2		**-55.77**	**0.16**	0.00	0.00	0.00	0.00
		3		-0.00	0.00	**9.41**	0.00	-0.00	0.00
			1800.0	-0.00	0.00	**-3.11**	0.00	5.67	0.00
		5	0.0	-55.77	0.16	9.41	**0.00**	**-0.00**	0.00
			1400.0	-55.77	0.16	-0.33	0.00	**6.36**	0.23
		2	1800.0	-55.77	0.16	0.00	0.00	0.00	**0.30**
		1		79.68	-0.24	-0.00	-0.00	-0.00	**-0.42**
7			0.0	**27.31**	**0.99**	-0.00	-0.00	-0.00	-0.42

staaf	doorsn.	combi	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
		2		**-19.12**	**-0.69**	0.00	0.00	0.00	0.30
		3	1800.0	-0.00	-0.00	**-15.64**	0.00	-11.21	-0.00
		5	0.0	-19.12	-0.69	-3.11	**0.00**	**5.67**	0.30
			1800.0	-19.12	-0.69	-15.64	0.00	**-11.21**	-0.95
		1		27.31	0.99	-0.00	-0.00	-0.00	**1.35**
		2		-19.12	-0.69	0.00	0.00	0.00	**-0.95**
8	2	1	0.0	**1.64**	**0.02**	0.00	-0.00	-0.00	**-0.04**
		2		**-1.15**	**-0.01**	-0.00	0.00	0.00	**0.03**
		3		-0.00	-0.00	**12.50**	**0.05**	-11.22	0.00
			1800.0	-0.00	-0.00	**-0.03**	0.05	-0.00	-0.00
		5	0.0	-1.15	-0.01	12.50	0.05	**-11.22**	0.03
9		1		**1.83**	-0.00	-0.00	-0.00	0.00	0.00
		2		**-1.25**	0.00	0.00	0.00	-0.00	-0.00
		3		-0.00	-0.00	**0.03**	**-0.00**	-0.00	0.00
		5	1500.0	-1.25	0.00	0.03	-0.00	**0.05**	0.00
10	5	2	0.0	**15.09**	-0.00	0.00	0.00	-0.00	0.00
		1		**-21.56**	0.00	-0.00	-0.00	0.00	-0.00
		3		0.00	-0.00	**21.94**	-0.00	-32.91	0.00
		4		-21.56	0.00	21.94	-0.00	**-32.91**	-0.00
11		2		**15.09**	0.00	0.00	-0.00	-0.00	-0.00
		1		**-21.56**	-0.00	-0.00	0.00	0.00	0.00
		3		0.00	0.00	**21.94**	0.00	-32.91	-0.00
		4		-21.56	-0.00	21.94	0.00	**-32.91**	0.00
12	2	1		**1.39**	-0.00	0.00	0.00	-0.00	0.00
		2		**-0.97**	0.00	-0.00	-0.00	0.00	-0.00
		3		-0.00	0.00	**-0.03**	**0.00**	0.00	0.00
		5	1500.0	-0.97	0.00	-0.03	0.00	**-0.05**	-0.00
13	6	2	0.0	**0.55**	0.00	0.00	0.00	0.00	0.00
		1		**-0.78**	0.00	0.00	0.00	0.00	0.00
14		5		**0.38**	0.00	0.00	0.00	0.00	0.00
		1		**-0.55**	0.00	0.00	0.00	0.00	0.00
15	4			**1.93**	-0.22	-0.00	-0.00	-0.00	0.00
		2		**-1.31**	**0.16**	0.00	0.00	0.00	-0.00
		4		1.93	**-0.22**	0.03	-0.00	0.00	0.00
		3	1800.0	-0.00	-0.00	**12.56**	-0.00	11.33	-0.00
			0.0	-0.00	-0.00	0.03	**-0.00**	0.00	-0.00
		5	1800.0	-1.31	0.16	12.56	-0.00	**11.33**	0.28
		2		-1.31	0.16	0.00	0.00	0.00	**0.28**
		4		1.93	-0.22	12.56	-0.00	11.33	**-0.40**
16		2	0.0	**17.09**	**-0.20**	-0.00	-0.00	0.00	**0.28**
		1		**-24.35**	0.28	0.00	0.00	-0.00	-0.40
		4		-24.35	**0.28**	-15.68	-0.00	**11.34**	**-0.40**
		3		0.00	0.00	**-15.68**	**-0.00**	11.34	-0.00
		4	1800.0	-24.35	0.28	-3.15	-0.00	**-5.61**	0.10
17		2	0.0	**55.55**	**0.04**	0.00	-0.00	-0.00	**-0.07**
		1		**-79.36**	-0.05	-0.00	0.00	0.00	0.10
		4		-79.36	**-0.05**	-3.15	-0.00	-5.61	**0.10**

staaf	doorsn.	combi	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
		3	1800.0	0.00	-0.00	**9.38**	-0.00	0.00	-0.00
			0.0	0.00	-0.00	**-3.15**	**-0.00**	-5.61	0.00
		4	1800.0	-79.36	-0.05	9.38	-0.00	**0.00**	0.00
			400.0	-79.36	-0.05	-0.37	-0.00	**-6.31**	0.08
18		2	0.0	**74.50**	**-0.04**	-0.00	0.00	-0.00	-0.00
		1		**-106.43**	0.06	0.00	-0.00	0.00	0.00
		4		-106.43	**0.06**	-12.53	0.00	**0.00**	0.00
		3		0.00	0.00	**-12.53**	0.00	0.00	-0.00
		4	1800.0	-106.43	0.06	-0.00	0.00	**-11.28**	**0.12**
		2		74.50	-0.04	-0.00	0.00	-0.00	**-0.08**
19			0.0	**74.50**	**0.04**	0.00	0.00	-0.00	**-0.08**
		1		**-106.43**	-0.06	-0.00	-0.00	0.00	0.12
		4		-106.43	**-0.06**	**-0.00**	-0.00	**-11.28**	**0.12**
		3	1800.0	0.00	-0.00	**12.53**	-0.00	0.00	-0.00
		4		-106.43	-0.06	12.53	-0.00	**0.00**	0.00
20		2	0.0	**55.55**	**-0.04**	-0.00	0.00	-0.00	-0.00
		1		**-79.35**	0.06	0.00	-0.00	0.00	0.00
		4		-79.35	**0.06**	-9.38	0.00	**0.00**	0.00
		3	1800.0	0.00	0.00	**3.15**	0.00	-5.61	0.00
			0.0	0.00	0.00	**-9.38**	**0.00**	0.00	-0.00
		4	1400.0	-79.35	0.06	0.37	0.00	**-6.31**	0.09
			1800.0	-79.35	0.06	3.15	0.00	-5.61	**0.12**
		2		55.55	-0.04	-0.00	0.00	-0.00	**-0.08**
21			0.0	**17.43**	**0.21**	0.00	0.00	-0.00	-0.08
		1		**-24.90**	-0.30	-0.00	-0.00	0.00	0.12
		4		-24.90	**-0.30**	3.15	0.00	**-5.61**	0.12
		3	1800.0	0.00	-0.00	**15.68**	0.00	11.34	-0.00
			0.0	0.00	-0.00	3.15	**0.00**	-5.61	0.00
		4	1800.0	-24.90	-0.30	15.68	0.00	**11.34**	**-0.43**
		2		17.43	0.21	0.00	0.00	0.00	**0.30**
22		1	0.0	**1.38**	0.24	0.00	0.00	-0.00	-0.43
		5		**-0.97**	-0.17	-12.56	0.00	**11.33**	**0.30**
		4		1.38	**0.24**	-12.56	0.00	11.33	**-0.43**
		2		-0.97	**-0.17**	-0.00	-0.00	0.00	0.30
		3		-0.00	0.00	**-12.56**	**0.00**	11.33	-0.00
23	6	2		**25.75**	0.00	0.00	0.00	0.00	0.00
		1		**-36.86**	0.00	0.00	0.00	0.00	0.00
24				**31.43**	0.00	0.00	0.00	0.00	0.00
		2		**-22.05**	0.00	0.00	0.00	0.00	0.00
25				**25.22**	0.00	0.00	0.00	0.00	0.00
		1		**-36.03**	0.00	0.00	0.00	0.00	0.00
26				**34.73**	0.00	0.00	0.00	0.00	0.00
		2		**-24.31**	0.00	0.00	0.00	0.00	0.00
27	5			**59.73**	**0.03**	-0.00	0.00	0.00	0.00
		1		**-87.81**	**-0.04**	0.00	-0.00	-0.00	-0.00
		3		0.00	0.00	**29.73**	**0.00**	-0.00	0.00
		4	1500.0	-87.81	-0.04	29.73	0.00	**44.59**	-0.06

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Patch Reference numbers on LITT

staaf	doorsn.	combi	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
		2		59.73	0.03	-0.00	0.00	-0.00	**0.04**
		1		-87.81	-0.04	0.00	-0.00	0.00	**-0.06**
28		2	0.0	**45.32**	**-0.03**	0.00	-0.00	-0.00	**0.04**
		1		**-64.74**	**0.04**	-0.00	0.00	0.00	**-0.06**
		3		0.00	-0.00	**-29.73**	**-0.00**	44.59	0.00
		4		-64.74	0.04	-29.73	-0.00	**44.59**	-0.06
29	6	2		**1.70**	0.00	0.00	0.00	0.00	0.00
		1		**-2.51**	0.00	0.00	0.00	0.00	0.00
30		2		**1.93**	0.00	0.00	0.00	0.00	0.00
		1		**-2.83**	0.00	0.00	0.00	0.00	0.00
31		2		**1.50**	0.00	0.00	0.00	0.00	0.00
		1		**-2.14**	0.00	0.00	0.00	0.00	0.00
32		2		**1.26**	0.00	0.00	0.00	0.00	0.00
		1		**-1.80**	0.00	0.00	0.00	0.00	0.00
33		2		**0.55**	0.00	0.00	0.00	0.00	0.00
		1		**-0.78**	0.00	0.00	0.00	0.00	0.00
34		5		**0.38**	0.00	0.00	0.00	0.00	0.00
		1		**-0.55**	0.00	0.00	0.00	0.00	0.00
35		2		**25.21**	0.00	0.00	0.00	0.00	0.00
		1		**-36.02**	0.00	0.00	0.00	0.00	0.00
36				**34.74**	0.00	0.00	0.00	0.00	0.00
		2		**-24.32**	0.00	0.00	0.00	0.00	0.00
37		1		**32.13**	0.00	0.00	0.00	0.00	0.00
		2		**-22.49**	0.00	0.00	0.00	0.00	0.00
38				**25.30**	0.00	0.00	0.00	0.00	0.00
		1		**-36.15**	0.00	0.00	0.00	0.00	0.00
39	5			**1.69**	0.00	0.00	0.00	-0.00	-0.00
		2		**-1.15**	-0.00	0.00	-0.00	-0.00	0.00
		3		-0.00	-0.00	0.00	**0.00**	-0.00	0.00
40		1		**0.83**	0.00	-0.00	0.00	0.00	-0.00
		2		**-0.58**	-0.00	0.00	-0.00	-0.00	0.00
41		1		**1.27**	-0.00	-0.00	-0.00	0.00	0.00
		2		**-0.89**	0.00	0.00	0.00	-0.00	-0.00
		3		-0.00	0.00	0.00	**-0.00**	-0.00	-0.00
42	3	2		**78.00**	**-0.47**	0.00	-0.00	-0.00	**1.02**
		1		**-114.00**	**0.68**	-0.00	0.00	0.00	**-1.45**
		3		0.00	-0.00	**1.59**	0.00	44.64	0.00
			2100.0	0.00	-0.00	**-52.41**	0.00	2.62	0.00
		4	420.0	-114.00	0.68	1.59	0.00	**45.31**	-1.17
43		5	0.0	**63.00**	0.47	1.59	-0.00	44.64	-1.02
		1		**-90.00**	**-0.68**	-0.00	-0.00	0.00	**1.45**
		2		63.00	**0.47**	0.00	0.00	-0.00	**-1.02**
		3		0.00	0.00	**1.59**	-0.00	44.64	-0.00
			2100.0	0.00	0.00	**-52.41**	-0.00	2.62	-0.00
		4	420.0	-90.00	-0.68	1.59	-0.00	**45.31**	1.17

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Patch Reference numbers on UTT

Reacties in steunpunten - waardes in knopen. Lokale extremen

Lineair statisch - extreme van alle combinaties

Groep van knopen:1/20

Groep van UGT combi:1/5

Steunpunt	knoop	combi	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
1	2	3	0.00	0.00	**43.85**	**32.91**	0.00	0.00
2	3		0.00	0.00	**43.85**	**32.91**	0.00	0.00
3	11		0.00	0.00	**57.97**	0.00	0.00	0.00
4	12		0.00	0.00	**57.97**	0.00	0.00	0.00
5	19	1	**0.68**	**-114.00**	0.00	0.00	0.00	0.00
		2	**-0.47**	**78.00**	-0.00	0.00	0.00	0.00
		3	-0.00	0.00	**52.41**	0.00	0.00	0.00
6	20	2	**0.47**	63.00	-0.00	0.00	0.00	0.00
		1	**-0.68**	**-90.00**	0.00	0.00	0.00	0.00
		5	0.47	**63.00**	52.41	0.00	0.00	0.00
		3	0.00	0.00	**52.41**	0.00	0.00	0.00

Vervormingen van staven. Globale extremen

Lineair statisch - extreme van alle combinaties

Groep van staven:1/43

Groep van GebruiksGT combi:1/9

staaf	doorsn.	combi	dx [mm]	ux [mm]	uy [mm]	uz [mm]	fix [mrad]	fiy [mrad]	fiz [mrad]
40	5	1	1500.0	**3.49**	0.00	0.00	-0.00	-0.00	-0.01
		2		**-2.44**	-0.00	-0.00	0.00	0.00	0.00
4	4	1	1800.0	-0.00	**3.49**	0.00	0.00	-0.00	-0.01
18				-0.01	**-3.48**	-0.00	0.00	-0.00	0.01
12	2	7	1500.0	0.00	-0.00	**14.18**	-60.07	-8.95	-0.00
1			0.0	0.00	0.00	**-14.18**	-8.95	-2.49	-0.00
9			1285.7	0.00	-0.00	-12.26	**60.07**	8.95	-0.00
12				0.00	-0.00	12.26	**-60.07**	-8.95	-0.00
27	5	9	0.0	-0.24	0.17	-0.00	-0.02	**9.58**	-0.26
28		8	1500.0	-0.26	-0.26	-0.00	-0.02	**-9.58**	-0.39
2	4	1	1400.0	-0.23	1.40	0.00	0.00	-0.00	**1.17**
7			400.0	0.22	1.36	0.00	0.00	0.00	**-1.17**

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