VELDEMAN
STRUCTURE SOLUTIONS

Calculation note

Project : Alu 15m + Alu 12m BS6399

June 2006

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Content

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Project : Alu15m + Alu12m prof.240

BS 6399 : wind : 25m/s
snow : 20kg/m²

mcd : Alu15+12 BS6399 v3.0
esa : Alu15+12 BS6399 v3.0
units : kN / m

version 3.0

date : June 2006

Reference:J:\Engineering\Berekeningen strukturen\Normen\BS\doc v3.0.mcd(R)

= Region for variable input

= Region for the input of forces from computer program Esa prima win

= Region for the output of results

Structural calculation of the Alu 15m + 12m structure accord. to the British standard 6399.

1. Introduction.

This note describes the structural calculations for the relocatable Alu 15m structure manufactured by **Georges Veldeman N.V.** Belgium. The length of the structure can reach any value as long as it's a multiple of the span distance. **This calculation note implies at the same time the alu 12m structure, because the 12m structure is the shortened version of the 15m structure.**

For a length of 35 m or less, two bays with bracing cables are needed. If the length is higher than 35 m, an additional bay with bracing cables is needed. The maximum distance between two bays with bracing cables is 25 m. There should always be a bay with bracing cables at both ends of the structure.

Building geometry

Distance between two arches	$Span\_distance := 5 \cdot m$	$Span\_distance = 196.85\,in$
Height of the peak	$H_{peak} := 5.2 \cdot m$	$H_{peak} = 204.724\,in$
Height of the eaves	$H_{eaves} := 2.8 \cdot m$	$H_{eaves} = 110.236\,in$
Width of structure	$Width := 15 \cdot m$	$Width = 49.213\,ft$
Length of structure	$Length := 35 \cdot m$	$Length = 114.829\,ft$
Slope of the roof :	$\alpha_{roof} := 18 \cdot deg$	

Design criteria

Mean recurrence interval :	$Recurrence_{Interval} := 1\,yr$
Site in country (0) or site in town (1):	$site := 1$
Distance of the site to the sea :	$dist\_to\_sea := 0km$

Ground snow load :	$s_k := 0.2 \cdot \frac{kN}{m^2}$	$s_k = 4.177\,psf$
Basic wind speed :	$V_b := 25 \frac{m}{sec}$	$V_b = 90 \frac{km}{hr}$

The external loadings on the fabric like wind, rain and snow, are transmitted directly to the main arch. The function of the purlins is to keep the distance between the arches and to ensure the longitudinal stability in combination with the cable bracing system.

The calculation is based on the finite element method and uses nodes which are connected by beams. Each beam has a material number. All materials are represented in a materials list.
The connections of the arches with the base plates are considered as hinges. The connections of the cable connections are considered as hinges too, as well as the connection of the purlins to the arches.

The profile is calculated as being continuous. The splices are checked with the results from the general arch calculation.

The hinged connection of the arch and base plate is situated at 160 mm above the ground level.

2. Determination of the loads.

2.1. Dead load.

2.1.1. Uniform loading.

The self weight of the aluminium structure is calculated by the computerprogram Esa prima win.

Weight of the fabric

$$Weight_{fabric} := 0.650 \cdot \frac{kg}{m^2} \cdot Span\_distance$$

$$Weight_{fabric} = 3.25 \frac{kg}{m}$$

2.1.2. Local loadings.

Local loadings are for example the weight of the peak splice and the connection splices.

$$Weight_{peak\_splice} := 22 \cdot kg$$

$$Weight_{eaves\_splice} := 18 \cdot kg$$

2.1.3. Lighting weight

We put on every arc 2 points with an extra weight of 50 kg, to take into account the weight of the lights inside the structure.

$ExtraWeight_{lighting} := 50 \cdot kg$ x 2 points for every arc

2.2. Snow load (acc. to ENV1991-2-3) <formulas: see document section 1.1>

The structure is able to withstand **a ground snow load** of :

$s_k = 4.177\,\text{psf}$ $s_k = 0.2\,\frac{kN}{m^2}$

exposure coefficient $C_{es} = 1$

thermal coefficient $C_{ts} = 1$

shape coefficient μ: Table 7.2

$\mu_1 = 0.8$ **<1.1>**

$\mu_2 = 0.86$ **<1.2>**

Case 1

$s_{case1\_wind} = 0.8\,\frac{kN}{m}$

$s_{case1\_lee} = 0.8\,\frac{kN}{m}$

Case 2

<1.3>

$s_{case2\_wind} = 0.8\,\frac{kN}{m}$

$s_{case2\_lee} = 0.86\,\frac{kN}{m}$

Case 3

$s_{case3\_lee} = 0.4\,\frac{kN}{m}$

2.3. Wind load (acc. to BS6399 part 2) <formulas: see document section 1.2>

Basic wind speed

$V_b = 25 \frac{m}{sec}$ $V_b = 90 \frac{km}{hr}$ $V_b = 55.923 \, mph$

Site wind speed

Altitude factor : $S_a = 1$

Direction factor : $S_d = 1$

Seasonal factor : $S_s = 1$

Probability factor (2.2.2.5) : $S_p = 0.749$ <1.4>

=> site wind speed :

$V_s = 18.737 \frac{m}{s}$ $V_s = 67.453 \frac{km}{hr}$ $V_s = 41.913 \, mph$ <1.5>

Effective wind speed

$S_b = 1.522$ <1.6>

$V_e = 28.51 \frac{m}{s}$ $V_e = 102.636 \frac{km}{hr}$ $V_e = 63.775 \, mph$ <1.7>

Dynamic pressure

$q_s = 0.498 \frac{kN}{m^2}$ <1.8>

Effective dynamic pressure

diagonal dimension of loaded areas : (fig. 5) **<1.9>**

$a_{side\_wall} = 35.112\,m$ for the wall

$a_{side\_roof} = 35.877\,m$ for the roof

$a_{gable} = 15.259\,m$ for the gable

$a_{in} = 128.058\,m$ for internal pressure

Size effect factor Ca : (fig. 4) **<1.10>**

So, for curve = "A" we become :

$C_{a\_wall} = 0.879$ for the wall

$C_{a\_roof} = 0.877$ for the roof

$C_{a\_gable} = 0.931$ for the gable

$C_{a\_in} = 0.798$ for internal pressure

=> Effective dynamic pressure : **<1.11>**

wind on side

$$q_{wall} = 0.438\,\frac{kN}{m^2}$$

$$q_{roof} = 0.437\,\frac{kN}{m^2}$$

wind on gable

$$q_{gable} = 0.464\,\frac{kN}{m^2}$$

internal wind pressure

$$q_{in} = 0.401\,\frac{kN}{m^2}$$

1. External wind pressure coefficients.

Wind normal on Side :

Wall pressure : **<1.12>**

sidewall	gable wall	zones
$C_{pe\_s\_windw} = 0.693$	$C_{pe\_s\_gA} = -1.3$	$L_{s\_gA} = 2.08\,m$
$C_{pe\_s\_leew} = -0.5$	$C_{pe\_s\_gB} = -0.8$	$L_{s\_gB} = 8.32\,m$
	$C_{pe\_s\_gC} = -0.5$	$L_{s\_gC} = 4.6\,m$

Roof pressure : **<1.14>**

windward roof	leeward roof	zones	
$C_{pe\_rs\_A.o} = -0.98$	$C_{pe\_rs\_E} = -1.22$	$Length_{rsA} = 5.2\,m$ $Width_{rsA} = 1.04\,m$	$Length_{rsE} = 5.2\,m$ $Width_{rsE} = 1.04\,m$
$C_{pe\_rs\_A.u} = 0.32$	$C_{pe\_rs\_F} = -0.82$	$Length_{rsB} = 24.6\,m$ $Width_{rsB} = 1.04\,m$	$Length_{rsF} = 24.6\,m$ $Width_{rsF} = 1.04\,m$
$C_{pe\_rs\_B.o} = -0.74$	$C_{pe\_rs\_G} = -0.5$		
$C_{pe\_rs\_B.u} = 0.26$			
$C_{pe\_rs\_C.o} = -0.36$			
$C_{pe\_rs\_C.u} = 0.24$			

Wind normal on Gable :

Wall pressure : **<1.13>**

gable wall	sidewall	zones
$C_{pe\_g\_windw} = 0.6$	$C_{pe\_g\_sA} = -1.3$	$L_{g\_sA} = 2.08\,m$
$C_{pe\_g\_leew} = -0.5$	$C_{pe\_g\_sB} = -0.8$	$L_{g\_sB} = 8.32\,m$
	$C_{pe\_g\_sC} = -0.5$	$L_{g\_sC} = 24.6\,m$

Roof pressure : <1.15>

zones

$C_{pe\_rg\_A} = -1.52$ $L_{g\_rA} = 1.04\,m$

$C_{pe\_rg\_B} = -1.42$ $L_{g\_rB} = 1.04\,m$

$C_{pe\_rg\_C} = -0.6$ $L_{g\_rC} = 4.16\,m$

$C_{pe\_rg\_D} = -0.42$ $L_{g\_rD} = 29.8\,m$

2. Internal wind pressure coefficients.

The wind also causes (table 16)

an overpressure: $C_{pi\_o} := 0.0$

an underpressure: $C_{pi\_u} := -0.3$

3. Global wind pressure.

Wind load normal to the side wall of the structure.

Overpressure <1.16>

side walls	gable walls	roofs
$Q_{sw\_ww.o} = 0.303\,\frac{kN}{m^2}$	$Q_{gA\_o} = -0.603\,\frac{kN}{m^2}$	$Q_{rA\_s.o} = -0.428\,\frac{kN}{m^2}$
$Q_{sw\_lw.o} = -0.219\,\frac{kN}{m^2}$	$Q_{gB\_o} = -0.371\,\frac{kN}{m^2}$	$Q_{rB\_s.o} = -0.323\,\frac{kN}{m^2}$
	$Q_{gC\_o} = -0.232\,\frac{kN}{m^2}$	$Q_{rC\_s.o} = -0.157\,\frac{kN}{m^2}$
		$Q_{rE\_s.o} = -0.533\,\frac{kN}{m^2}$
		$Q_{rF\_s.o} = -0.358\,\frac{kN}{m^2}$
		$Q_{rG\_s.o} = -0.219\,\frac{kN}{m^2}$

Underpressure **<1.17>**

side walls

$Q_{sw\_ww.u} = 0.424 \frac{kN}{m^2}$

$Q_{sw\_lw.u} = -0.099 \frac{kN}{m^2}$

gable walls

$Q_{gA\_u} = -0.482 \frac{kN}{m^2}$

$Q_{gB\_u} = -0.251 \frac{kN}{m^2}$

$Q_{gC\_u} = -0.111 \frac{kN}{m^2}$

roofs

$Q_{rA\_s.u} = 0.26 \frac{kN}{m^2}$

$Q_{rB\_s.u} = 0.234 \frac{kN}{m^2}$

$Q_{rC\_s.u} = 0.225 \frac{kN}{m^2}$

$Q_{rE\_s.u} = -0.413 \frac{kN}{m^2}$

$Q_{rF\_s.u} = -0.238 \frac{kN}{m^2}$

$Q_{rG\_s.u} = -0.098 \frac{kN}{m^2}$

Wind load normal to the gable wall of the structure.

Overpressure **<1.18>**

side walls

$Q_{sA\_o} = -0.569 \frac{kN}{m^2}$

$Q_{sB\_o} = -0.35 \frac{kN}{m^2}$

$Q_{sC\_o} = -0.219 \frac{kN}{m^2}$

gable walls

$Q_{g\_ww.o} = 0.278 \frac{kN}{m^2}$

$Q_{g\_lw.o} = -0.232 \frac{kN}{m^2}$

roofs

$Q_{rA\_g.o} = -0.664 \frac{kN}{m^2}$

$Q_{rB\_g.o} = -0.621 \frac{kN}{m^2}$

$Q_{rC\_g.o} = -0.262 \frac{kN}{m^2}$

$Q_{rD\_g.o} = -0.184 \frac{kN}{m^2}$

Underpressure **<1.18>**

side walls	gable walls	roofs
$Q_{sA\_u} = -0.449 \frac{kN}{m^2}$	$Q_{g\_ww.u} = 0.399 \frac{kN}{m^2}$	$Q_{rA\_g.u} = -0.544 \frac{kN}{m^2}$
$Q_{sB\_u} = -0.23 \frac{kN}{m^2}$	$Q_{g\_lw.u} = -0.111 \frac{kN}{m^2}$	$Q_{rB\_g.u} = -0.5 \frac{kN}{m^2}$
$Q_{sC\_u} = -0.099 \frac{kN}{m^2}$		$Q_{rC\_g.u} = -0.142 \frac{kN}{m^2}$
		$Q_{rD\_g.u} = -0.063 \frac{kN}{m^2}$

The wind pressure on one bay must be supported by one arch. The total wind load per arch equals :

$\text{Span\_distance} = 5\,\text{m}$

A. Wind normal on Side :

Overpressure :

foot beams

$P_{windward\_o} = 1.517\,\frac{kN}{m}$

$P_{leeward\_o} = -1.094\,\frac{kN}{m}$

roof beams

- *Load on the first arch :* **<1.19>**

windward

$P1_{roof.low.windw\_o} = -1.071\,\frac{kN}{m}$ $\text{relative\_length}_{lowAB} = 13\,\%$

$P1_{roof.up.windw\_o} = -0.393\,\frac{kN}{m}$ $\text{relative\_length}_{upC} = 87\,\%$

leeward

$P1_{roof.up.leew\_o} = -1.333\,\frac{kN}{m}$ $\text{relative\_length}_{upEF} = 13\,\%$

$P1_{roof.low.leew\_o} = -0.546\,\frac{kN}{m}$ $\text{relative\_length}_{lowG} = 87\,\%$

- *Load on the second arch :* **<1.20>**

windward

$P2_{roof.low.windw\_o} = -1.901\,\frac{kN}{m}$ $\text{relative\_length}_{lowAB} = 13\,\%$

$P2_{roof.up.windw\_o} = -0.787\,\frac{kN}{m}$ $\text{relative\_length}_{upC} = 87\,\%$

leeward

$P2_{roof.up.leew\_o} = -2.264\,\frac{kN}{m}$ $\text{relative\_length}_{upEF} = 13\,\%$

$P2_{roof.low.leew\_o} = -1.093\,\frac{kN}{m}$ $\text{relative\_length}_{lowG} = 87\,\%$

- *Load on the third arch :* **<1.21>**

windward:

$$P3_{roof.low.windw\_o} = -1.617\,\frac{kN}{m} \qquad relative\_length_{lowAB} = 13\,\%$$

$$P3_{roof.up.windw\_o} = -0.787\,\frac{kN}{m} \qquad relative\_length_{upC} = 87\,\%$$

leeward:

$$P3_{roof.up.leew\_o} = -1.792\,\frac{kN}{m} \qquad relative\_length_{upEF} = 13\,\%$$

$$P3_{roof.low.leew\_o} = -1.093\,\frac{kN}{m} \qquad relative\_length_{lowG} = 87\,\%$$

- *Load on the fourth arch :* **<1.22>**

windward:

$$P4_{roof.low.windw\_o} = -1.617\,\frac{kN}{m} \qquad relative\_length_{lowAB} = 13\,\%$$

$$P4_{roof.up.windw\_o} = -0.787\,\frac{kN}{m} \qquad relative\_length_{upC} = 87\,\%$$

leeward:

$$P4_{roof.up.leew\_o} = -1.792\,\frac{kN}{m} \qquad relative\_length_{upEF} = 13\,\%$$

$$P4_{roof.low.leew\_o} = -1.093\,\frac{kN}{m} \qquad relative\_length_{lowG} = 87\,\%$$

- *Load on the fifth arch :*

....

Underpressure :

foot beams

$P_{windward\_u} = 2.119 \frac{kN}{m}$

$P_{leeward\_u} = -0.493 \frac{kN}{m}$

roof beams

- *Load on the first arch :* **<1.23>**

windward

$P1_{roof.low.windw\_u} = 0.651 \frac{kN}{m}$ — $relative\_length_{lowAB} = 13\,\%$

$P1_{roof.up.windw\_u} = 0.563 \frac{kN}{m}$ — $relative\_length_{upC} = 87\,\%$

leeward

$P1_{roof.up.leew\_u} = -1.032 \frac{kN}{m}$ — $relative\_length_{upEF} = 13\,\%$

$P1_{roof.low.leew\_u} = -0.245 \frac{kN}{m}$ — $relative\_length_{lowG} = 87\,\%$

- *Load on the second arch :* **<1.24>**

windward

$P2_{roof.low.windw\_u} = 1.241 \frac{kN}{m}$ — $relative\_length_{lowAB} = 13\,\%$

$P2_{roof.up.windw\_u} = 1.126 \frac{kN}{m}$ — $relative\_length_{upC} = 87\,\%$

leeward

$P2_{roof.up.leew\_u} = -1.662 \frac{kN}{m}$ — $relative\_length_{upEF} = 13\,\%$

$P2_{roof.low.leew\_u} = -0.491 \frac{kN}{m}$ — $relative\_length_{lowG} = 87\,\%$

- *Load on the third arch :* **<1.25>**

windward
$P3_{roof.low.windw\_u} = 1.17\frac{kN}{m}$ — $relative\_length_{lowAB} = 13\,\%$
$P3_{roof.up.windw\_u} = 1.126\frac{kN}{m}$ — $relative\_length_{upC} = 87\,\%$

leeward
$P3_{roof.up.leew\_u} = -1.19\frac{kN}{m}$ — $relative\_length_{upEF} = 13\,\%$
$P3_{roof.low.leew\_u} = -0.491\frac{kN}{m}$ — $relative\_length_{lowG} = 87\,\%$

- *Load on the fourth arch :* **<1.26>**

windward
$P4_{roof.low.windw\_u} = 1.17\frac{kN}{m}$ — $relative\_length_{lowAB} = 13\,\%$
$P4_{roof.up.windw\_u} = 1.126\frac{kN}{m}$ — $relative\_length_{upC} = 87\,\%$

leeward
$P4_{roof.up.leew\_u} = -1.19\frac{kN}{m}$ — $relative\_length_{upEF} = 13\,\%$
$P4_{roof.low.leew\_u} = -0.491\frac{kN}{m}$ — $relative\_length_{lowG} = 87\,\%$

- *Load on the fifth arch :*

....

B. Wind normal on Gable :

Overpressure :

- *Load on the first arch :* **<1.27>**

foot beams $P1_{sidewall\_g.o} = -1.331 \frac{kN}{m}$

roof beams $P1_{g\_roof.low\_o} = -1.074 \frac{kN}{m}$ $relative\_length_{lowA} := 50\%$

$P1_{g\_roof.up\_o} = -1.028 \frac{kN}{m}$ $relative\_length_{upB} := 50\%$

- *Load on the second arch :* **<1.28>**

foot beams $P2_{sidewall\_g.o} = -1.757 \frac{kN}{m}$

roof beams $P2_{g\_roof.low\_o} = -1.13 \frac{kN}{m}$

$P2_{g\_roof.up\_o} = -1.13 \frac{kN}{m}$

- *Load on the third arch :* **<1.29>**

foot beams $P3_{sidewall\_g.o} = -1.562 \frac{kN}{m}$

roof beams $P3_{g\_roof.low\_o} = -0.918 \frac{kN}{m}$

$P3_{g\_roof.up\_o} = -0.918 \frac{kN}{m}$

- *Load on the fourth arch :* **<1.30>**

foot beams $P4_{sidewall\_g.o} = -1.159 \frac{kN}{m}$

roof beams $P4_{g\_roof.low\_o} = -0.918 \frac{kN}{m}$

$P4_{g\_roof.up\_o} = -0.918 \frac{kN}{m}$

- *Load on the fifth arch :* **<1.31>**

foot beams $P5_{sidewall\_g.o} = -1.159 \frac{kN}{m}$

roof beams $P5_{g\_roof.low\_o} = -0.918 \frac{kN}{m}$

$P5_{g\_roof.up\_o} = -0.918 \frac{kN}{m}$

- *Load on the sixth arch :*

...

Underpressure :

- *Load on the first arch :* **<1.27>**

foot beams $P1_{sidewall\_g.u} = -1.03\,\frac{kN}{m}$

roof beams $P1_{g\_roof.low\_u} = -0.773\,\frac{kN}{m}$ $relative\_length_{lowA} := 50\%$

$P1_{g\_roof.up\_u} = -0.727\,\frac{kN}{m}$ $relative\_length_{upB} := 50\%$

- *Load on the second arch :* **<1.28>**

foot beams $P2_{sidewall\_g.u} = -1.157\,\frac{kN}{m}$

roof beams $P2_{g\_roof.low\_u} = -0.528\,\frac{kN}{m}$

$P2_{g\_roof.up\_u} = -0.528\,\frac{kN}{m}$

- *Load on the third arch :* **<1.29>**

foot beams $P3_{sidewall\_g.u} = -0.962\,\frac{kN}{m}$

roof beams $P3_{g\_roof.low\_u} = -0.316\,\frac{kN}{m}$

$P3_{g\_roof.up\_u} = -0.316\,\frac{kN}{m}$

- *Load on the fourth arch :* **<1.30>**

foot beams $P4_{sidewall\_g.u} = -0.559\,\frac{kN}{m}$

roof beams $P4_{g\_roof.low\_u} = -0.316\,\frac{kN}{m}$

$P4_{g\_roof.up\_u} = -0.316\,\frac{kN}{m}$

- *Load on the fifth arch :* **<1.31>**

foot beams $P5_{sidewall\_g.u} = -0.559 \frac{kN}{m}$

roof beams $P5_{g\_roof.low\_u} = -0.316 \frac{kN}{m}$

$P5_{g\_roof.up\_u} = -0.316 \frac{kN}{m}$

- *Load on the sixth arch :*

...

3. Materials.

3.1. Properties.

$\gamma_M = 1.1$	partial safety factor
$\gamma_{Mb} = 1.25$	partial safety factor for bolts and pins
$\gamma_{Mr} = 1.25$	partial safety factor for rivets

3.2. Aluminium.

Quality = 6061 T6.

Yield stress	$R_{e\_alu} = 240 \frac{N}{mm^2}$
Tensile strength	$R_{t\_alu} = 260 \frac{N}{mm^2}$
Modulus of elasticity	$E_{alu} = 7 \times 10^4 \frac{N}{mm^2}$
Admissible stress	$\sigma_{adm\_alu} = 218.182 \frac{N}{mm^2}$

3.3. Steel.

	Steel quality S235.	Steel quality S355.
Yield stress	$R_{e\_S235} = 235 \frac{N}{mm^2}$	$R_{e\_S355} = 355 \frac{N}{mm^2}$
Tensile strength	$R_{t\_S235} = 360 \frac{N}{mm^2}$	$R_{t\_S355} = 510 \frac{N}{mm^2}$
Modulus of elasticity	$\sigma_{adm\_S235} = 213.636 \frac{N}{mm^2}$	$\sigma_{adm\_S355} = 322.727 \frac{N}{mm^2}$
Admissible stress	$E_{steel} = 2.1 \times 10^5 \frac{N}{mm^2}$	

3.4. Bolts - class = 8.8.

Yield stress	$R_{e\_bolt} = 640 \frac{N}{mm^2}$
Tensile strength	$R_{t\_bolt} = 800 \frac{N}{mm^2}$

3.5. Used profiles

Aluminium
0 = pas utilisé
1 = alu60/60/3
2 = alu70/50/2.5/3
3 = alu88/66/2
4 = alu70/70/4.5
5 = alu97/77/3.1
6 = alu129/89/3.1
7 = alu130/70
8 = alu133/70
9 = alu133/70+80/5
10 = alu158/100
20 = alu240/100
200 = alu232/92
220 = alu240+232
30 = alu270/100
300 = alu260/91
330 = alu270+260
40 = alu310/130
400 = alu297_8/117
401 = alu297_11/117
402 = alu297_24.5/117
440 = alu310+297_8
441 = alu310+297_11
442 = alu310+297_24.5
50 = alu380/166

Steel
60 = K70/70/2
70 = K70/70/3
80 = K80/80/4
90 = K120/120/3
100 = plat en acier 80/12

The principal profile of the foot

$prof\_foot_{prin} := 20$

$foot_{prin} = \text{"alu240/100"}$

$A_{foot\_prin} = 2.32 \times 10^{3}\ mm^{2}$

$I_{y\_foot\_prin} = 1.68 \times 10^{7}\ mm^{4}$

$I_{z\_foot\_prin} = 3.9 \times 10^{6}\ mm^{4}$

$W_{ely\_foot\_prin} = 1.4 \times 10^{5}\ mm^{3}$

$W_{elz\_foot\_prin} = 7.79 \times 10^{4}\ mm^{3}$

$h_{foot\_prin} = 240\ mm$

$b_{foot\_prin} = 100\ mm$

The reinforcement profile of the foot

$prof\_foot_{reinf} := 200$

$foot_{reinf} = \text{"alu232/92"}$

$A_{foot\_reinf} = 2.371 \times 10^{3}\ mm^{2}$

$I_{y\_foot\_reinf} = 1.62 \times 10^{7}\ mm^{4}$

$I_{z\_foot\_reinf} = 2.69 \times 10^{6}\ mm^{4}$

$W_{ely\_foot\_reinf} = 1.39 \times 10^{5}\ mm^{3}$

$W_{elz\_foot\_reinf} = 5.85 \times 10^{4}\ mm^{3}$

$h_{foot\_reinf} = 0.232\ m$

$b_{foot\_reinf} = 0.092\ m$

The reinforced profile of the foot

$prof\_foot_{prin\_reinf} := prof\_foot_{prin} + prof\_foot_{reinf}$

$foot_{prin\_reinf} = \text{"alu240+232"}$

$A_{foot\_p\_r} = 4.691 \times 10^{3}\ mm^{2}$

$I_{y\_foot\_p\_r} = 3.29 \times 10^{7}\ mm^{4}$

$I_{z\_foot\_p\_r} = 6.58 \times 10^{6}\ mm^{4}$

$W_{ely\_foot\_p\_r} = 2.74 \times 10^{5}\ mm^{3}$

$W_{elz\_foot\_p\_r} = 1.32 \times 10^{5}\ mm^{3}$

$h_{foot\_p\_r} = 240\ mm$

$b_{foot\_p\_r} = 100\ mm$

The principal profile of the roof

$prof\_roof_{prin} := 20$

$roof_{prin} = "alu240/100"$

$A_{roof\_prin} = 2.32 \times 10^{3}\ mm^{2}$

$I_{y\_roof\_prin} = 1.68 \times 10^{7}\ mm^{4}$

$I_{z\_roof\_prin} = 3.9 \times 10^{6}\ mm^{4}$

$W_{ely\_roof\_prin} = 1.4 \times 10^{5}\ mm^{3}$

$W_{elz\_roof\_prin} = 7.79 \times 10^{4}\ mm^{3}$

$h_{roof\_prin} = 240\ mm$

$b_{roof\_prin} = 100\ mm$

The reinforcement profile of the roof

$prof\_roof_{reinf} := 200$

$roof_{reinf} = "alu232/92"$

$A_{roof\_reinf} = 2.371 \times 10^{3}\ mm^{2}$

$I_{y\_roof\_reinf} = 1.62 \times 10^{7}\ mm^{4}$

$I_{z\_roof\_reinf} = 2.69 \times 10^{6}\ mm^{4}$

$W_{ely\_roof\_reinf} = 1.39 \times 10^{5}\ mm^{3}$

$W_{elz\_roof\_reinf} = 5.85 \times 10^{4}\ mm^{3}$

$h_{roof\_reinf} = 232\ mm$

$b_{roof\_reinf} = 92\ mm$

The reinforced profile of the roof

$prof\_roof_{prin\_reinf} := prof\_roof_{prin} + prof\_roof_{reinf}$

$roof_{prin\_reinf} = "alu240+232"$

$A_{roof\_p\_r} = 4.691 \times 10^{3}\ mm^{2}$

$I_{y\_roof\_p\_r} = 3.29 \times 10^{7}\ mm^{4}$

$I_{z\_roof\_p\_r} = 6.58 \times 10^{6}\ mm^{4}$

$W_{ely\_roof\_p\_r} = 2.74 \times 10^{5}\ mm^{3}$

$W_{elz\_roof\_p\_r} = 1.32 \times 10^{5}\ mm^{3}$

$h_{roof\_p\_r} = 240\ mm$

$b_{roof\_p\_r} = 100\ mm$

Gable upright

$prof\_gable_{up} := 8$

$gable_{up} = \text{"alu133/70"}$

$A_{gable\_up} = 1.604 \times 10^{3}\ mm^{2}$

$I_{y\_gable\_up} = 3.82 \times 10^{6}\ mm^{4}$

$I_{z\_gable\_up} = 1.06 \times 10^{6}\ mm^{4}$

$W_{ely\_gable\_up} = 5.74 \times 10^{4}\ mm^{3}$

$W_{elz\_gable\_up} = 3.02 \times 10^{4}\ mm^{3}$

$h_{gable\_up} = 133\ mm$

$b_{gable\_up} = 70\ mm$

Gable upright 2

$prof\_gable_{up2} := 0$

$gable_{up2} = \text{"not used"}$

$A_{gable\_up2} = \text{"not used"}$

$I_{y\_gable\_up2} = \text{"not used"}$

$I_{z\_gable\_up2} = \text{"not used"}$

$W_{ely\_gable\_up2} = \text{"not used"}$

$W_{elz\_gable\_up2} = \text{"not used"}$

$h_{gable\_up2} = \text{"not used"}$

$b_{gable\_up2} = \text{"not used"}$

Horizontal beam gable

$prof\_gable_{hor} := 7$

$gable_{hor} = \text{"alu130/70"}$

$A_{gable\_hor} = 1.497 \times 10^{3}\ mm^{2}$

$I_{y\_gable\_hor} = 3.12 \times 10^{6}\ mm^{4}$

$I_{z\_gable\_hor} = 1.12 \times 10^{6}\ mm^{4}$

$W_{ely\_gable\_hor} = 4.81 \times 10^{4}\ mm^{3}$

$W_{elz\_gable\_hor} = 3.19 \times 10^{4}\ mm^{3}$

$h_{gable\_hor} = 130\ mm$

$b_{gable\_hor} = 70\ mm$

Purlin: strong section 1

$prof\_purlin_{strong1} := 8$

$purlin_{strong1} = \text{"alu133/70"}$

$A_{purlin\_strong1} = 1.604 \times 10^3\ mm^2$

$I_{y\_purlin\_strong1} = 3.82 \times 10^6\ mm^4$

$I_{z\_purlin\_strong1} = 1.06 \times 10^6\ mm^4$

$W_{ely\_purlin\_strong1} = 5.74 \times 10^4\ mm^3$

$W_{elz\_purlin\_strong1} = 3.02 \times 10^4\ mm^3$

$h_{purlin\_strong1} = 133\ mm$

$b_{purlin\_strong1} = 70\ mm$

Purlin: strong section 2

$prof\_purlin_{strong2} := 0$

$purlin_{strong2} = \text{"not used"}$

$A_{purlin\_strong2} = \text{"not used"}$

$I_{y\_purlin\_strong2} = \text{"not used"}$

$I_{z\_purlin\_strong2} = \text{"not used"}$

$W_{ely\_purlin\_strong2} = \text{"not used"}$

$W_{elz\_purlin\_strong2} = \text{"not used"}$

$h_{purlin\_strong2} = \text{"not used"}$

$b_{purlin\_strong2} = \text{"not used"}$

Purlin: strong section 3

$prof\_purlin_{strong3} := 0$

$purlin_{strong3} = \text{"not used"}$

$A_{purlin\_strong3} = \text{"not used"}$

$I_{y\_purlin\_strong3} = \text{"not used"}$

$I_{z\_purlin\_strong3} = \text{"not used"}$

$W_{ely\_purlin\_strong3} = \text{"not used"}$

$W_{elz\_purlin\_strong3} = \text{"not used"}$

$h_{purlin\_strong3} = \text{"not used"}$

$b_{purlin\_strong3} = \text{"not used"}$

Purlin: weak section

$prof\_purlin_{weak} := 1$

$purlin_{weak} = \text{"alu60/60/3"}$

$A_{purlin\_weak} = 660\ mm^2$

$I_{y\_purlin\_weak} = 3.51 \times 10^5\ mm^4$

$I_{z\_purlin\_weak} = 3.51 \times 10^5\ mm^4$

$W_{ely\_purlin\_weak} = 1.17 \times 10^4\ mm^3$

$W_{elz\_purlin\_weak} = 1.17 \times 10^4\ mm^3$

$h_{purlin\_weak} = 60\ mm$

$b_{purlin\_weak} = 60\ mm$

Corner bar (steel)

$prof\_bar_{corner} := 0$

bar_{corner} = "not used"

A_{corner_bar} = "not used"

$I_{y\_corner\_bar}$ = "not used"

$I_{z\_corner\_bar}$ = "not used"

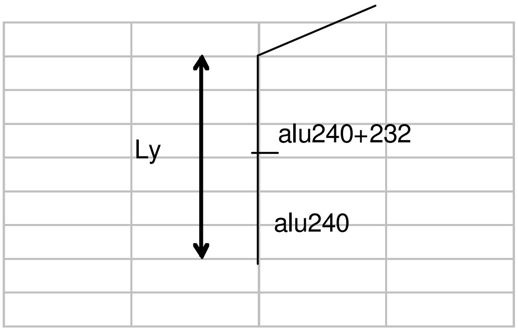
$W_{ely\_corner\_bar}$ = "not used"

$W_{elz\_corner\_bar}$ = "not used"

h_{corner_bar} = "not used"

b_{corner_bar} = "not used"

4. Control of the main profiles. <formulas: see document 3>



$k_y := 1.0$ $k_z := 1.0$ buckling factor

$L_{yf} := 2649 \cdot mm$ Buckling length of the foot profile in the strong direction

$L_{yr} := 7886 \cdot mm$ Buckling length of the roof profile in the strong direction

$L_{zf} := 2649mm$ buckling length of the foot profile in the weak direction

$L_{zr} := 2629mm$ buckling length of the roof profile in the weak direction (max. distance between two purlins)

4.1 Foot (alu240)

$L_y := L_{yf}$
$L_z := L_{zf}$

$profile := prof\_foot_{prin}$

$prof_{control}(profile) = $ "alu240/100"

$classification(profile) = 3$ **<3.1>**

Shape factor :

$\alpha_{y\_prof} = 1.002$ $\alpha_{z\_prof} = 1.001$ **<3.2>**

Profile capacity :

$N_{rd\_prof} = 506.182\,kN$

$M_{yrd\_prof} = 30.62\,kN \cdot m$ **<3.3>**

$M_{zrd\_prof} = 17.02\,kN \cdot m$

Slenderness :

$\lambda_{y\_prof} = 31.129$ $\lambda_{z\_prof} = 64.609$ **<3.4>**

$\lambda_{by\_prof} = 0.58$ $\lambda_{bz\_prof} = 1.204$ **<3.5>**

Reduction coefficient for buckling :

$\phi_{y\_prof} = 0.716$ $\phi_{z\_prof} = 1.335$ **<3.6>**

$\chi_{y\_prof} = 0.88$ $\chi_{z\_prof} = 0.523$ **<3.7>**

4.1.1 Bending and axial compression (art. 5.9.4)

4.1.1.1 Maximum moment

$M_y := 19.1 \cdot kN \cdot m$ **{comb. 26, member 40, x=0.0m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 11.9 \cdot kN$ normal force / compression

Buckling control

$buckling_{control\_unity} = 0.702$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 141.558 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.649$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.1.1.2 Maximum normal force

$M_y := 0.0 \cdot kN \cdot m$

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 16.4 \cdot kN$ **{comb. 26, member 10, x = 0.0m}**

Buckling control

$buckling_{control\_unity} = 0.108$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 7.069 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.032$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

4.1.2 Bending and axial traction (art. 5.9.3.3)

4.1.2.1 Maximum moment

$M_y := 11.2 \cdot kN \cdot m$ **{comb. 3, member 26, x = 1.344m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 8.3 \cdot kN$ normal force / traction

Unity control

$bending\_traction_{control\_unity} = 0.363$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 83.578 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.383$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.1.2.2 Maximum normal force

$M_y := 11.2 \cdot kN \cdot m$

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 8.3 \cdot kN$ **{comb. 3, member 26, x=1.344m}**

Unity control

$bending\_traction_{control\_unity} = 0.363$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 83.578 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.383$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

4.2 Foot (alu240+232)

$L_y := L_{yf}$
$L_z := L_{zf}$

$profile := prof\_foot_{prin\_reinf}$

$prof_{control}(profile) = "alu240+232"$

$classification(profile) = 1$ <3.1>

Shape factor :

$\alpha_{y\_prof} = 1.303$ $\alpha_{z\_prof} = 1.235$ <3.2>

Profile capacity :

$N_{rd\_prof} = 1.023 \times 10^3\ kN$

$M_{yrd\_prof} = 77.891\ kN \cdot m$ <3.3>

$M_{zrd\_prof} = 35.564\ kN \cdot m$

Slenderness :

$\lambda_{y\_prof} = 31.631$ $\lambda_{z\_prof} = 70.73$ <3.4>

$\lambda_{by\_prof} = 0.59$ $\lambda_{bz\_prof} = 1.318$ <3.5>

Reduction coefficient for buckling :

$\phi_{y\_prof} = 0.723$ $\phi_{z\_prof} = 1.491$ <3.6>

$\chi_{y\_prof} = 0.877$ $\chi_{z\_prof} = 0.457$ <3.7>

4.2.1 Bending and axial compression (art. 5.9.4)

4.2.1.1 Maximum moment

$M_y := 36.3 \cdot kN \cdot m$ {comb. 26, member 41, x=1.305m}

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 11.9 \cdot kN$ normal force / compression

Buckling control

$buckling_{control\_unity} = 0.512$ <3.8>

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 134.938 \frac{N}{mm^2}$ <3.10>

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.618$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.2.1.2 Maximum normal force

$M_y := 20.1 \cdot kN \cdot m$

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 11.1 \cdot kN$ **{comb. 14, member 27, x = 1.305 m}**

Buckling control

$buckling_{control\_unity} = 0.301$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 75.679 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.347$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

4.2.2 Bending and axial traction (art. 5.9.3.3)

4.2.2.1 Maximum moment

$M_y := 18.9 \cdot kN \cdot m$ **{comb. 3, member 27, x = 1.305m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 8.4 \cdot kN$ normal force / traction

Unity control

$bending\_traction_{control\_unity} = 0.238$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 70.727 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.324$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.2.2.2 Maximum normal force

$M_y := 18.9 \cdot kN \cdot m$

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 8.4 \cdot kN$ **{comb. 3, member 19, x=1.305m}**

Unity control

$bending\_traction_{control\_unity} = 0.238$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 70.727 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.324$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

4.3 Roof (alu240+232)

$L_y := L_{yr}$ $k_y := 0.7$

$L_z := L_{zr}$ $k_z := 0.7$

$profile := prof\_roof_{prin\_reinf}$

$prof_{control}(profile) = "alu240+232"$

classification(profile) = 1 <3.1>

Shape factor :

$\alpha_{y\_prof} = 1.303$ $\alpha_{z\_prof} = 1.235$ <3.2>

Profile capacity :

$N_{rd\_prof} = 1.023 \times 10^3\ kN$

$M_{yrd\_prof} = 77.891\ kN \cdot m$ <3.3>

$M_{zrd\_prof} = 35.564\ kN \cdot m$

Slenderness :

$\lambda_{y\_prof} = 65.916$ $\lambda_{z\_prof} = 49.137$ <3.4>

$\lambda_{by\_prof} = 1.229$ $\lambda_{bz\_prof} = 0.916$ <3.5>

Reduction coefficient for buckling :

$\phi_{y\_prof} = 1.368$ $\phi_{z\_prof} = 1.001$ <3.6>

$\chi_{y\_prof} = 0.508$ $\chi_{z\_prof} = 0.712$ <3.7>

4.3.1 Bending and axial compression (art. 5.9.4)

4.3.1.1 Maximum moment

$M_y := 36.3 \cdot kN \cdot m$ **{comb. 26, member 132, x=0.0m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 15.6 \cdot kN$ normal force / compression

Buckling control

$buckling_{control\_unity} = 0.519$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 135.727 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.622$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.3.1.2 Maximum normal force

$M_y := 20.7 \cdot kN \cdot m$

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 18.1 \cdot kN$ **{comb. 26, member 124, x = 0.0 m}**

Buckling control

$buckling_{control\_unity} = 0.327$ **<3.8>**

control := | "OK" if $buckling_{control\_unity} \le 1.0$
| "NOK" otherwise

control = "OK"

Stress control

$\sigma_{control} = 79.36 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.364$

stress := | "OK" if $\frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0$
| "NOK" otherwise

stress = "OK"

4.3.2 Bending and axial traction (art. 5.9.3.3)

4.3.2.1 Maximum moment

$M_y := 18.9 \cdot kN \cdot m$ **{comb. 3, member 28, x = 0.0m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 7.3 \cdot kN$ normal force / traction

Unity control

$bending\_traction_{control\_unity} = 0.237$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 70.492 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.323$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.3.2.2 Maximum normal force

$M_y := 18.9 \cdot kN \cdot m$

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 7.3 \cdot kN$ **{comb. 3, member 28, x=0.0m}**

Unity control

$bending\_traction_{control\_unity} = 0.237$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 70.492 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.323$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.4 Roof (alu240)

$L_y := L_{yr}$ $k_y = 0.7$

$L_z := L_{zr}$ $k_z = 0.7$

$profile := prof\_roof_{prin}$

$prof_{control}(profile) = $ "alu240/100"

classification(profile) = 3 <3.1>

Shape factor :

$\alpha_{y\_prof} = 1.002$ $\alpha_{z\_prof} = 1.001$ <3.2>

Profile capacity :

$N_{rd\_prof} = 506.182\,kN$

$M_{yrd\_prof} = 30.62\,kN \cdot m$ <3.3>

$M_{zrd\_prof} = 17.02\,kN \cdot m$

Slenderness :

$\lambda_{y\_prof} = 64.87$ $\lambda_{z\_prof} = 44.885$ <3.4>

$\lambda_{by\_prof} = 1.209$ $\lambda_{bz\_prof} = 0.837$ <3.5>

Reduction coefficient for buckling :

$\phi_{y\_prof} = 1.342$ $\phi_{z\_prof} = 0.924$ <3.6>

$\chi_{y\_prof} = 0.52$ $\chi_{z\_prof} = 0.76$ <3.7>

4.4.1 Bending and axial compression (art. 5.9.4)

4.4.1.1 Maximum moment

$M_y := 28.4 \cdot kN \cdot m$ **{comb. 26, member 133, x=0.0m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 15.0 \cdot kN$ normal force / compression

Buckling control

$buckling_{control\_unity} = 1$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 209.323 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.959$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.4.1.2 Maximum normal force

$M_y := 15.5 \cdot kN \cdot m$

$M_z := 0.3 \cdot kN \cdot m$

$N_v := 17.5 \cdot kN$ **{comb. 26, member 125, x = 0.0 m}**

Buckling control

$buckling_{control\_unity} = 0.615$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 122.104 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.56$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

4.4.2 Bending and axial traction (art. 5.9.3.3)

4.4.2.1 Maximum moment

$M_y := 11.5 \cdot kN \cdot m$ **{comb. 26, member 4, x = 0.0m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 1.5 \cdot kN$ normal force / traction

Unity control

$bending\_traction_{control\_unity} = 0.369$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 82.789 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.379$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

4.4.2.2 Maximum normal force

$M_y := 1.7 \cdot kN \cdot m$

$M_z := 0.6 \cdot kN \cdot m$

$N_v := 8.0 \cdot kN$ **{comb. 5, member 23, x=2.629m}**

Unity control

$bending\_traction_{control\_unity} = 0.07$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 23.283 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.107$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

5. Control of the rivets. <formulas: see document 5>

The principal profile is connected to the reinforcement profile by the rivets.

$R_{t\_rivet\_steel} := 308 \frac{N}{mm^2}$ $R_{t\_rivet\_alu} := 182 \frac{N}{mm^2}$

5.1 Foot profile

$D_{rivet} := 6.0 \cdot mm$ diameter of the rivet

$D_0 := 6.2 \cdot mm$ diameter of the rivethole

$e_1 := 46 \cdot mm$ end distance

$p_1 := 140 \cdot mm$ distance between two rivets

rivet := "alu" material of rivet pin = "steel" or "alu"

$prof\_prin := prof\_foot_{prin}$ $prof_{control}(prof_prin) = $ "alu240/100"

$prof\_reinf := prof\_foot_{reinf}$ $prof_{control}(prof_reinf) = $ "alu232/92"

$A_{rivet}(D_0) = 30.191\ mm^2$ <5.2>

The maximum shear force equals :

$F_{max} := 13.7 \cdot kN$ **{comb. 26, member 32, x=1.344m}**

Shear resistance for the rivets

$F_{vRd\_rivet} = 2.637\,kN$ <5.4>

Bearing resistance

$\alpha_r = 0.7$ <5.5>

$F_{bRd\_prin} = 6.77\,kN$ principal profile

<5.6>

$F_{bRd\_reinf} = 6.77\,kN$ reinforcement profile

The static moment of the reinforcement profile equals:

$S_{reinforcement}(prof\_reinf) = 88.83\,cm^3$ <5.13>

The maximum distance between two rivets equals:

$L_{Max} = 71.302\,mm$ <5.14>

We have 4 rivets per section. The real distance between the rivets equals : $p_1 = 140\,mm$
The maximum admissable distance between two rows of rivets equals:

$L_{Max\_row} = 285.209\,mm$ <5.15>

The real distance is smaller than the maximum admissable distance between two rows of rivets.
The real force on the rivets equals :

$F_{Max\_real} = 1.295\,kN$ <5.16>

Stress control in the rivets : **maximum stress**

$stress\_rivet = 89.338\,\frac{N}{mm^2}$ <5.17> <------> $R_{t\_rivet} = 182\,\frac{N}{mm^2}$

$stress\_control := \begin{cases} \text{"OK"} & \text{if } stress\_rivet \le R_{t\_rivet} \\ \text{"NOK"} & \text{otherwise} \end{cases}$

$stress\_control = \text{"OK"}$

Stress control in the principal profile : **maximum stress**

$stress\_prof_{prin} = 49.717\,\frac{N}{mm^2}$ <5.18> <------> $R_{t\_alu} = 260\,\frac{N}{mm^2}$

$stress\_control := \begin{cases} \text{"OK"} & \text{if } stress\_prof_{prin} \le R_{t\_alu} \\ \text{"NOK"} & \text{otherwise} \end{cases}$

$stress\_control = \text{"OK"}$

Stress control in the reinforcement profile : **maximum stress**

$stress\_prof_{reinf} = 49.717\,\frac{N}{mm^2}$ <5.19> <------> $R_{t\_alu} = 260\,\frac{N}{mm^2}$

$stress\_control := \begin{cases} \text{"OK"} & \text{if } stress\_prof_{reinf} \le R_{t\_alu} \\ \text{"NOK"} & \text{otherwise} \end{cases}$

$stress\_control = \text{"OK"}$

5.2 Roof profile

$D_{rivet} := 6.0 \cdot mm$	diameter of the rivet
$D_0 := 6.2 \cdot mm$	diameter of the rivethole
$e_1 := 40 \cdot mm$	end distance
$p_1 := 120 \cdot mm$	distance between two rivets
rivet := "alu"	material of rivet pin = "steel" or "alu"

$prof\_prin := prof\_roof_{prin}$	$prof_{control}(prof\_prin)$ = "alu240/100"
$prof\_reinf := prof\_roof_{reinf}$	$prof_{control}(prof\_reinf)$ = "alu232/92"

$A_{rivet}(D_0) = 30.191\ mm^2$ **<5.2>**

The maximum shear force equals :

$F_{max} := 12.1 \cdot kN$ **{comb. 26, member 12, x=0.0m}**

Shear resistance for the rivets

$F_{vRd\_rivet} = 2.637\, kN$ **<5.4>**

Bearing resistance

$\alpha_r = 0.7$ **<5.5>**

$F_{bRd\_prin} = 6.77\, kN$ principal profile

<5.6>

$F_{bRd\_reinf} = 6.77\, kN$ reinforcement profile

The static moment of the reinforcement profile equals:

$S_{reinforcement}(prof\_reinf) = 88.83\, cm^3$ **<5.13>**

The maximum distance between two rivets equals:

$L_{Max} = 80.731\ mm$ <5.14>

We have 4 rivets per section. The real distance between the rivets equals : $p_1 = 120\ mm$

The maximum admissable distance between two rows of rivets equals: $L_{Max\_row} = 322.923\ mm$ <5.15>

The real distance is smaller than the maximum admissable distance between two rows of rivets.
The real force on the rivets equals :

$F_{Max\_real} = 0.98\ kN$ <5.16>

Stress control in the rivets : **maximum stress**

$stress\_rivet = 67.632 \frac{N}{mm^2}$ <5.17> <------> $R_{t\_rivet} = 182 \frac{N}{mm^2}$

stress_control := | "OK" if stress_rivet ≤ R_{t_rivet} | "NOK" otherwise

stress_control = "OK"

Stress control in the principal profile : **maximum stress**

$stress\_prof_{prin} = 37.638 \frac{N}{mm^2}$ <5.18> <------> $R_{t\_alu} = 260 \frac{N}{mm^2}$

stress_control := | "OK" if $stress\_prof_{prin} \le R_{t\_alu}$ | "NOK" otherwise

stress_control = "OK"

Stress control in the reinforcement profile : **maximum stress**

$stress\_prof_{reinf} = 37.638 \frac{N}{mm^2}$ <5.19> <------> $R_{t\_alu} = 260 \frac{N}{mm^2}$

stress_control := | "OK" if $stress\_prof_{reinf} \le R_{t\_alu}$ | "NOK" otherwise

stress_control = "OK"

6. Peak splice.

6.1. Steel profile <formulas: see document 6>

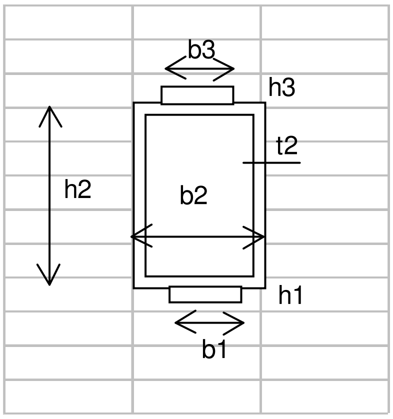
Section K160/90/5 + 2x 50/30/3 above and beneath.
The weakest section however is at the top : the tube K160/90/5 is shortened at the top.
The splice is connected to the main profiles by 2 bolts M16-8.8.

material := R_{e_S235}

Maximum moment at the section:

$M_y := 5.9$ kN·m
$M_z := 0.6$ kN·m
$S_v := 4.5$ kN
$N_v := 7.0$ kN

{Comb. 11, member 15, x = 2.629m}



example of section numbering

number of parts ([1]): $n := 4$

	Width	Height	Wall thickness ([2])	Gravity point of the part in y-direction	Gravity point of the part in z-direction
Part 1:	$b_1 := 90\cdot mm$	$h_1 := 5\cdot mm$	$t_1 := \frac{h_1}{2}$	$y1 := \frac{h_1}{2}$	$z1 := 45\cdot mm$
Part 2:	$b_2 := 5\cdot mm$	$h_2 := 135\cdot mm$	$t_2 := \frac{h_2}{2}$	$y2 := h_1 + \frac{h_2}{2}$	$z2 := 45\cdot mm$
Part 3:	$b_3 := 5\cdot mm$	$h_3 := 135\cdot mm$	$t_3 := \frac{h_3}{2}$	$y3 := h_1 + \frac{h_3}{2}$	$z3 := 45\cdot mm$
Part 4:	$b_4 := 79\cdot mm$	$h_4 := 12\cdot mm$	$t_4 := \frac{h_4}{2}$	$y4 := h_1 + h_2 - \frac{h_4}{2}$	$z4 := 45\cdot mm$

([1]) part = either a tube or a plate
([2]) if the part is a plate, the wall thickness = height / 2

Section

$A_{section} = 2.748 \times 10^{3}\ mm^{2}$ <6.1>

Gravity point

$y_{v} = 82.253\ mm$ <6.2>

$z_{v} = 45\ mm$ <6.3>

Moment of inertia

$I_{tot\_y} = 7.592 \times 10^{6}\ mm^{4}$ <6.4>

$I_{tot\_z} = 7.996 \times 10^{5}\ mm^{4}$ <6.5>

Von mise stress

$\sigma_{st} = 100.238\ \frac{N}{mm^{2}}$ <6.6>

$\tau_{st} = 1.638\ \frac{N}{mm^{2}}$ <6.7>

$\sigma_{vonmise} = 100.278\ \frac{N}{mm^{2}}$ <6.8>

$\sigma_{adm}(material) = 213.636\ \frac{N}{mm^{2}}$

stress := | "OK" if $\sigma_{vonmise} \le \sigma_{adm}(material)$
| "NOK" otherwise

stress = "OK"

6.2. Weld.

The connection is welded through the full cross section, so that the welded connection is as strong as the steel profile itself and hasn't to be checked.

6.3. Control of the bolts <formulas: see document 5>

Maximum moment at the gravity point of the bolted connection:

$M_v := 5.9$ kN·m {Comb. 11, member 15, x = 2.629m}

$N_v := 7.0$ kN

$S_v := 4.5$ kN

Number of bolts:

$n_{bolt} := 2$

The coordinates of the bolts are:

$x1 := 0mm$ $y1 := 0mm$ $x3 := 0mm$ $y3 := 0mm$ $x5 := 0mm$ $y5 := 0mm$

$x2 := 290mm$ $y2 := 0mm$ $x4 := 0mm$ $y4 := 0mm$ $x6 := 0mm$ $y6 := 0mm$

The properties of the bolt equal:

$D_b := 16 \cdot mm$ diameter of the bolt

$D_0 := 18 \cdot mm$ diameter of the bolthole

$F_{ub} := R_{t\_bolt}$ bolt material

The properties of the connection equal:

$e_{1\_out} := 48 \cdot mm$ enddistance of the outside profile

$e_{1\_in} := 50 \cdot mm$ enddistance of the inside profile

$p_1 := 290 \cdot mm$ distance between two bolts

$t_{out} := t_{alu}(prof\_roof_{prin})$ wall thickness of the outside profile

$t_{in} := 5mm$ wall thickness of the inside profile

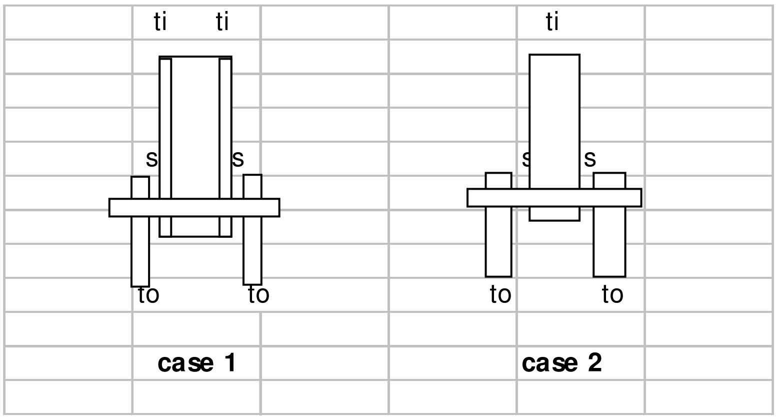
$s_{margin} := 2mm$ margin between the inside profile and the outside profile

$f_{y\_out} := R_{e\_alu}$ yield stress of the material on the outside

$f_{u\_out} := R_{t\_alu}$ tensile strength of the material on the outside

$f_{y\_in} := R_{e\_S235}$ yield stress of the material on the inside

$f_{u\_in} := R_{t\_S235}$ tensile strength of the material on the inside



case := 1

$$F_{res} := \begin{cases} F_R(M_v, N_v, S_v, n_{bolt}, x1, x2, x3, x4, x5, x6, y1, y2, y3, y4, y5, y6)\cdot kN & \text{if } n_{bolt} > 1 \\ \dfrac{\sqrt{N_v^2 + S_v^2}}{2}\cdot kN & \text{if } n_{bolt} = 1 \end{cases}$$ **<5.1>**

$F_{res} = 11.432\,kN$

$A_{bolt}(D_b) = 201.062\,mm^2$ **<5.2>**

Control of the shear force in the bolts

$c(F_{ub}) = 0.6$ **<5.3>**

bolt_force = 11.432 kN

shear_resist = 77.208 kN **<5.4>**

control_shear := | "OK" if bolt_force ≤ shear_resist
| "NOK" otherwise

control_shear = "OK"

Control of the bearing force in the aluminium profile

$\alpha_{out} = 0.889$ <5.5>

bolt_force = 11.432 kN

bearing_resist_out = 22.187 kN <5.6>

control_bearing := | "OK" if bolt_force ≤ bearing_resist_out
| "NOK" otherwise

control_bearing = "OK"

Control of the bearing force in the steel profile

$\alpha_{in} = 0.926$ <5.5>

bolt_force = 11.432 kN

bearing_resist_in = 53.333 kN <5.6>

control_bearing := | "OK" if bolt_force ≤ bearing_resist_in
| "NOK" otherwise

control_bearing = "OK"

Moment control in the bolts

$W(D_b) = 402.124\,mm^3$ <5.7>

d = 6 mm <5.9>

moment = 0.069 kN·m

moment_capacity = 0.206 kN·m <5.8>

control_moment := | "OK" if moment ≤ moment_capacity
| "NOK" otherwise

control_moment = "OK"

7. Eaves splice.

7.1. Steel profile **<formulas: see document 6>**

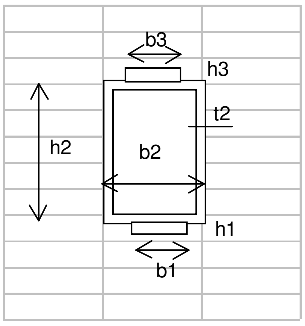
Section 2x 70/10 , 2x 140/4 , K120/40/3 , 45/10
The splice is connected to the main profiles by 6 bolts M16-8.8.

$material := R_{e\_S235}$

Maximum moment at the section:

$M_y := 36.3\ kN \cdot m$
$M_z := 0.0\ kN \cdot m$
$S_v := 12.7\ kN$
$N_v := 11.9\ kN$

{Comb. 26, member 40, x = 0.0m}



example of section numbering

number of parts ([1]): $n := 6$

([1]) part = either a tube or a plate
([2]) if the part is a plate, the wall thickness = height / 2

	Width	Height	Wall thickness ([2])	Gravity point of the part in y-direction	Gravity point of the part in z-direction
Part 1:	$b_1 := 70 \cdot mm$	$h_1 := 10 \cdot mm$	$t_1 := \frac{h_1}{2}$	$y1 := \frac{h_1}{2}$	$z1 := 41.5 \cdot mm$
Part 2:	$b_2 := 4 \cdot mm$	$h_2 := 140 \cdot mm$	$t_2 := \frac{h_2}{2}$	$y2 := 78mm$	$z2 := 41.5 \cdot mm$
Part 3:	$b_3 := 4 \cdot mm$	$h_3 := 140 \cdot mm$	$t_3 := \frac{h_3}{2}$	$y3 := 78mm$	$z3 := 41.5 \cdot mm$
Part 4:	$b_4 := 70 \cdot mm$	$h_4 := 10 \cdot mm$	$t_4 := \frac{h_4}{2}$	$y4 := 156mm - \frac{h_4}{2}$	$z4 := 41.5 \cdot mm$
Part 5:	$b_5 := 40 \cdot mm$	$h_5 := 120 \cdot mm$	$t_5 := 3mm$	$y5 := 156mm + \frac{h_5}{2}$	$z5 := 41.5 \cdot mm$
Part 6:	$b_6 := 45 \cdot mm$	$h_6 := 10 \cdot mm$	$t_6 := \frac{h_6}{2}$	$y6 := 156mm + h_5 + \frac{h_6}{2}$	$z6 := 41.5 \cdot mm$

Section

$A_{section} = 3.894 \times 10^{3}\ mm^{2}$ **<6.1>**

Gravity point

$y_{v} = 151.795\ mm$ **<6.2>**

$z_{v} = 41.5\ mm$ **<6.3>**

Moment of inertia

$I_{tot\_y} = 3.471 \times 10^{7}\ mm^{4}$ **<6.4>**

$I_{tot\_z} = 9.157 \times 10^{5}\ mm^{4}$ **<6.5>**

Von mise stress

$\sigma_{st} = 161.817 \frac{N}{mm^{2}}$ **<6.6>**

$\tau_{st} = 3.261 \frac{N}{mm^{2}}$ **<6.7>**

$\sigma_{vonmise} = 161.916 \frac{N}{mm^{2}}$ **<6.8>**

$\sigma_{adm}(material) = 213.636 \frac{N}{mm^{2}}$

$$stress := \begin{cases} \text{"OK"} & \text{if } \sigma_{vonmise} \le \sigma_{adm}(material) \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

7.2. Weld.

The connection is welded through the full cross section, so that the welded connection is as strong as the steel profile itself and has not to be checked.

7.3. Control of the bolts <formulas: see document 5>

Maximum moment at the gravity point of the bolted connection:

$M_v := 31.9$ kN·m **{Comb. 14, member 43, x = 0.652m}**

$N_v := 11.9$ kN

$S_v := 7.5$ kN

Number of bolts:

$n_{bolt} := 6$

The coordinates of the bolts are:

$x1 := 0mm$ $y1 := 100mm$ $x3 := 0mm$ $y3 := 50mm$ $x5 := 0mm$ $y5 := 0mm$

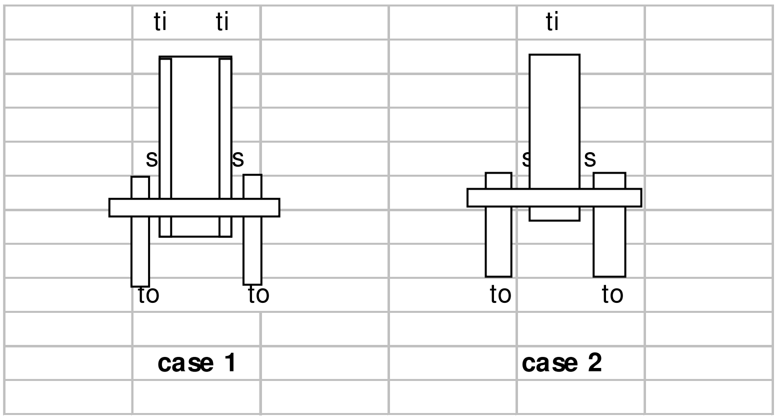
$x2 := 158mm$ $y2 := 100mm$ $x4 := 174mm$ $y4 := 50mm$ $x6 := 190mm$ $y6 := 0mm$

The properties of the bolt equal:

$D_b := 16 \cdot mm$	diameter of the bolt
$D_0 := 18.5 \cdot mm$	diameter of the bolthole
$F_{ub} := R_{t\_bolt}$	bolt material

The properties of the connection equal:

$e_{1\_out} := 40 \cdot mm$	enddistance of the outside profile
$e_{1\_in} := 41 \cdot mm$	enddistance of the inside profile
$p_1 := 158 \cdot mm$	distance between two bolts
$t_{out} := t_{alu}(prof\_foot_{prin\_reinf})$	wall thickness of the outside profile
$t_{in} := 4mm$	wall thickness of the inside profile
$s_{margin} := 1.0mm$	margin between the inside profile and the outside profile
$f_{y\_out} := R_{e\_alu}$	yield stress of the material on the outside
$f_{u\_out} := R_{t\_alu}$	tensile strength of the material on the outside
$f_{y\_in} := R_{e\_S235}$	yield stress of the material on the inside
$f_{u\_in} := R_{t\_S235}$	tensile strength of the material on the inside



case := 1

$$F_{res} := \begin{cases} F_R(M_v, N_v, S_v, n_{bolt}, x1, x2, x3, x4, x5, x6, y1, y2, y3, y4, y5, y6) \cdot kN & \text{if } n_{bolt} > 1 \\ \dfrac{\sqrt{N_v^2 + S_v^2}}{2} \cdot kN & \text{if } n_{bolt} = 1 \end{cases}$$ <5.1>

$F_{res} = 33.655\ kN$

$A_{bolt}(D_b) = 201.062\ mm^2$ <5.2>

Control of the shear force in the bolts

$c(F_{ub}) = 0.6$ <5.3>

bolt_force = 33.655 kN

shear_resist = 77.208 kN <5.4>

$$\text{control\_shear} := \begin{cases} \text{"OK"} & \text{if bolt\_force} \le \text{shear\_resist} \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control_shear = "OK"

Control of the bearing force in the aluminium profile

$\alpha_{out} = 0.721$ **<5.5>**

bolt_force = 33.655 kN

bearing_resist_out = 35.978 kN **<5.6>**

control_bearing := | "OK" if bolt_force ≤ bearing_resist_out
| "NOK" otherwise

control_bearing = "OK"

Control of the bearing force in the steel profile

$\alpha_{in} = 0.739$ **<5.5>**

bolt_force = 33.655 kN

bearing_resist_in = 34.041 kN **<5.6>**

control_bearing := | "OK" if bolt_force ≤ bearing_resist_in
| "NOK" otherwise

control_bearing = "OK"

Moment control in the bolts

$W(D_b) = 402.124\ mm^3$ **<5.7>**

d = 6 mm **<5.9>**

moment = 0.202 kN·m

moment_capacity = 0.206 kN·m **<5.8>**

control_moment := | "OK" if moment ≤ moment_capacity
| "NOK" otherwise

control_moment = "OK"

7.4. Aluminium rail profile : connection with roof.

The forces are :

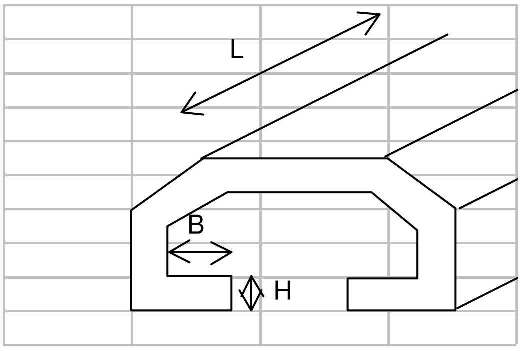
$M_v := 36.3 \cdot kN \cdot m$ **{comb. 26, member 132, x=0.0m}**

$S_v := 6.9 \cdot kN$

$N_v := 15.6 \cdot kN$

Section

$L := 390 \cdot mm$ $B := 10 \cdot mm$ $H := 14 \cdot mm$



Control of the alu profile

This moment causes stress in the alu profile.

$$M_{v2} := \frac{M_v}{2} \qquad S_{v2} := \frac{S_v}{2}$$

$$M_{v2} = 18.15\,kN \cdot m \qquad S_{v2} = 3.45\,kN$$

$$\sigma_c := \frac{M_{v2} \cdot \frac{L}{2}}{\frac{B \cdot L^3}{12}}$$

$$\sigma_c = 71.598\,\frac{N}{mm^2}$$

The force in the section equals :

$$F_S := \sigma_c \cdot B + \frac{S_{v2}}{L}$$

$$F_S = 724.822\,\frac{kN}{m}$$

So we become :

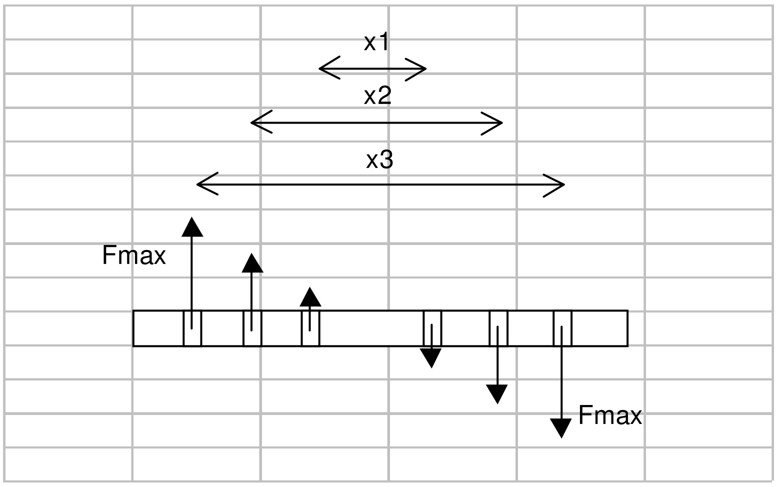
$$\tau_c := \frac{F_S}{H}$$

$$\tau_c = 51.773 \frac{N}{mm^2}$$

$$\sigma_{vonmise} := \sqrt{3 \cdot \tau_c^{\ 2}}$$

$$\sigma_{vonmise} = 89.674 \frac{N}{mm^2} \qquad \sigma_{adm\_alu} = 218.182 \frac{N}{mm^2}$$

The moment is supported by 6 bolts M16. The moment causes the following force in the outside bolts :



$x1 := 130 \cdot mm$ $\quad x2 := 220 \cdot mm$ $\quad x3 := 310 \cdot mm$

$$F_{max} := \frac{M_v \cdot x3}{x1^2 + x2^2 + x3^2} \qquad F_{max} = 69.721\,kN$$

$$F_N := \frac{N_v}{6}$$

$$F_N = 2.6\,kN$$

$D_b := 16mm$ diameter bolt

$A_{bolt}(D_b) = 201.062\ mm^2$ section bolt <5.2>

Control of the shear force in the bolts

$c(F_{ub}) = 0.6$ <5.3>

$bolt\_force := F_N$

$shear\_resist = 77.208\ kN$ <5.4>

$$control\_shear := \begin{cases} \text{"OK"} & \text{if } bolt\_force \le shear\_resist \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control\_shear = \text{"OK"}$

Control of the traction resistance in the bolts

$traction\_bolts := F_{max}$

$traction\_bolts = 69.721\ kN$

$traction\_resist = 115.812\ kN$ <5.10>

$$control\_traction := \begin{cases} \text{"OK"} & \text{if } traction\_bolts \le traction\_resist \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control\_traction = \text{"OK"}$

The unity control for bolts and pins resisting traction and shear force at the same time, must always be smaller than or equal to 1 (ENV9 form. 6.20, ENV3 form. 6.6)

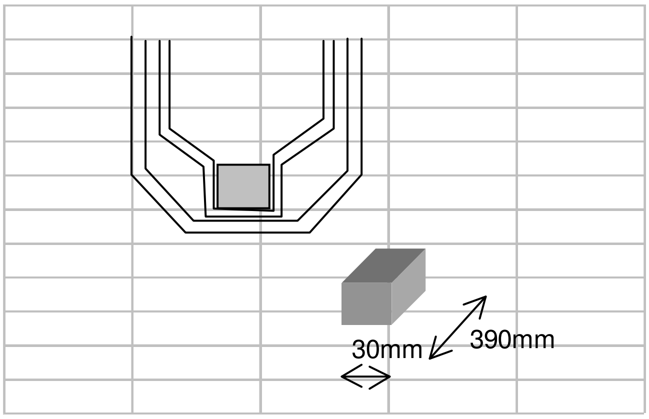
$$unity\_traction\_shear := \frac{F_N}{F_{vRd}(F_{ub}, D_b)} + \frac{F_{max}}{1.4 \cdot F_{tRd}(F_{ub}, D_b)}$$

$unity\_traction\_shear = 0.464$

$$unity\_control := \begin{cases} \text{"OK"} & \text{if } unity\_traction\_shear \le 1 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$unity\_control = \text{"OK"}$

Resistance against perforation in the alu main profile



$$F_{pRd} := \frac{(2 \cdot 390mm + 2 \cdot 30mm) \cdot t_{alu}(prof\_roof_{prin\_reinf}) \cdot R_{e\_alu}}{\sqrt{3}\,\gamma_M}$$

$F_{pRd} = 634.875\ kN$

$$F_p := S_v + \frac{M_v}{\frac{30 \cdot mm \cdot (390 \cdot mm)^2}{6}} \cdot 30mm \cdot 390mm$$

$F_p = 565.362\ kN$

$$control := \begin{cases} \text{"OK"} & \text{if } F_p \le F_{pRd} \\ \text{"NOK"} & \text{if } F_p > F_{pRd} \end{cases}$$

$control = \text{"OK"}$

Resistance against sliding between the two guide rails

Two pins dia 16mm (S235) prevent sliding between the inner and the outer guide rail.

$D_p := 16mm$ diameter pin

$A_{bolt}(D_p) = 201.062\,mm^2$ section pin **<5.2>**

$F_{ub} := R_{t\_S235}$ material pin

$N_{v\_max} := 18.1kN$ maximum force **{comb. 26, member 124, x=0.0}**

So we become :

$$pin\_force := \frac{N_{v\_max}}{2}$$

$pin\_force = 9.05\,kN$

$shear\_resist = 34.744\,kN$ **<5.4>**

$$control\_shear := \begin{cases} \text{"OK"} & \text{if } pin\_force \le shear\_resist \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control\_shear = \text{"OK"}$

8. Purlins. <formulas: see document 3>

$k_y := 1.0$ $k_z := 1.0$ $L_y := 4900mm$ $L_z := 4900mm$

8.1. Peak and eaves purlin : alu133/70.

$profile := prof\_purlin_{strong1}$

$prof_{control}(profile) = "alu133/70"$

$classification(profile) = 2$ <3.1>

Shape factor :

$\alpha_{y\_prof} = 1.256$ $\alpha_{z\_prof} = 1.248$ <3.2>

Profile capacity :

$N_{rd\_prof} = 349.964\,kN$

$M_{yrd\_prof} = 15.731\,kN\cdot m$ <3.3>

$M_{zrd\_prof} = 8.225\,kN\cdot m$

Slenderness :

$\lambda_{y\_prof} = 100.408$ $\lambda_{z\_prof} = 190.61$ <3.4>

$\lambda_{by\_prof} = 1.871$ $\lambda_{bz\_prof} = 3.553$ <3.5>

Reduction coefficient for buckling :

$\phi_{y\_prof} = 2.428$ $\phi_{z\_prof} = 7.156$ <3.6>

$\chi_{y\_prof} = 0.252$ $\chi_{z\_prof} = 0.075$ <3.7>

8.1.1 Compression

$M_y := 0.0 \cdot kN \cdot m$

$M_z := 0.0 \cdot kN \cdot m$

$N_{comp} := 9.8 \cdot kN$ **{comb. 30, member 80, x=0.0m}**

Buckling control

$buckling_{control\_unity} = 0.456$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 6.11 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.028$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

8.1.2 Traction

$N_{traction} := 6.2 \cdot kN$ **{comb. 26, member 82, x=0.0m}**

$bending\_traction_{control\_unity} = 5.283 \times 10^{-3}$ **<3.9>**

$$control := \begin{vmatrix} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{vmatrix}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 3.865 \frac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.018$$

$$stress := \begin{vmatrix} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{vmatrix}$$

$stress = \text{"OK"}$

8.2. Normal purlin : alu60/60/3.

$profile := prof\_purlin_{weak}$

$prof_{control}(profile) = "alu60/60/3"$

$classification(profile) = 1$ **<3.1>**

Shape factor :

$\alpha_{y\_prof} = 1.188$ $\alpha_{z\_prof} = 1.188$ **<3.2>**

Profile capacity :

$N_{rd\_prof} = 144\,kN$

$M_{yrd\_prof} = 3.033\,kN \cdot m$ **<3.3>**

$M_{zrd\_prof} = 3.033\,kN \cdot m$

Slenderness :

$\lambda_{y\_prof} = 212.478$ $\lambda_{z\_prof} = 212.478$ **<3.4>**

$\lambda_{by\_prof} = 3.96$ $\lambda_{bz\_prof} = 3.96$ **<3.5>**

Reduction coefficient for buckling :

$\phi_{y\_prof} = 8.728$ $\phi_{z\_prof} = 8.728$ **<3.6>**

$\chi_{y\_prof} = 0.061$ $\chi_{z\_prof} = 0.061$ **<3.7>**

8.2.1 Compression

$N_{comp} := 3.5 \cdot kN$ **{comb. 30, member 161, x=1.5m}**

Buckling control

$buckling_{control\_unity} = 0.482$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 5.303 \dfrac{N}{mm^2}$ **<3.10>**

$$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.024$$

$$stress := \begin{cases} \text{"OK"} & \text{if } \dfrac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

8.2.2 Traction

$N_{traction} := 3.9 \cdot kN$ **{comb. 3, member 161, x=0.0m}**

$bending\_traction_{control\_unity} = 9.173 \times 10^{-3}$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 5.909 \dfrac{N}{mm^2}$ **<3.10>**

$\dfrac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.027$

$$stress := \begin{cases} \text{"OK"} & \text{if } \dfrac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

9. Gable end.

<formulas: see document 3>

9.1. Gable upright : alu133/70

$k_y := 1.0$ $k_z := 1.0$ $L_y := 4250mm$ $L_z := 2649mm$

$profile := prof\_gable_{up}$

$prof_{control}(profile) = "alu133/70"$

$classification(profile) = 2$ <3.1>

Shape factor :

$\alpha_{y\_prof} = 1.256$ $\alpha_{z\_prof} = 1.248$ <3.2>

Profile capacity :

$N_{rd\_prof} = 349.964\,kN$

$M_{yrd\_prof} = 15.731\,kN{\cdot}m$ <3.3>

$M_{zrd\_prof} = 8.225\,kN{\cdot}m$

Slenderness :

$\lambda_{y\_prof} = 87.088$ $\lambda_{z\_prof} = 103.046$ <3.4>

$\lambda_{by\_prof} = 1.623$ $\lambda_{bz\_prof} = 1.921$ <3.5>

Reduction coefficient for buckling :

$\phi_{y\_prof} = 1.97$ $\phi_{z\_prof} = 2.526$ <3.6>

$\chi_{y\_prof} = 0.324$ $\chi_{z\_prof} = 0.24$ <3.7>

9.1.1 Bending + compression

$M_y := 3.7 \cdot kN \cdot m$ **{comb. 26, member 96, x=0.0m}**

$M_z := 0.3 \cdot kN \cdot m$

$N_v := 13.2 \cdot kN$ normal force / compression

Buckling control

$buckling_{control\_unity} = 0.462$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \leq 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 82.546 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.378$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \leq 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

9.1.2. Bending + traction

$M_y := 5.0 \cdot kN \cdot m$ **{comb. 30, member 89, x = 0.0m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 1.1 \cdot kN$ normal force / traction

Unity control

$bending\_traction_{control\_unity} = 0.311$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 87.728 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.402$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

9.2. Gable horizontal : alu130/70

$k_y := 1.0$ $k_z := 1.0$ $L_y := 4930mm$ $L_z := 4930mm$

$profile := prof\_gable_{hor}$

$prof_{control}(profile) = "alu130/70"$

classification(profile) = 2 <3.1>

Shape factor :

$\alpha_{y\_prof} = 1.312$ $\alpha_{z\_prof} = 1.191$ <3.2>

Profile capacity :

$N_{rd\_prof} = 326.618\,kN$

$M_{yrd\_prof} = 13.767\,kN\cdot m$ <3.3>

$M_{zrd\_prof} = 8.291\,kN\cdot m$

Slenderness :

$\lambda_{y\_prof} = 107.989$ $\lambda_{z\_prof} = 180.239$ <3.4>

$\lambda_{by\_prof} = 2.013$ $\lambda_{bz\_prof} = 3.359$ <3.5>

Reduction coefficient for buckling :

$\phi_{y\_prof} = 2.717$ $\phi_{z\_prof} = 6.469$ <3.6>

$\chi_{y\_prof} = 0.22$ $\chi_{z\_prof} = 0.083$ <3.7>

9.2.1 Bending + compression

$M_y := 3.2 \cdot kN \cdot m$ **{comb. 3, member 100, x=2.5m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 2.1 \cdot kN$ normal force / compression

Buckling control

$buckling_{control\_unity} = 0.355$ **<3.8>**

$$control := \begin{cases} \text{"OK"} & \text{if } buckling_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control = \text{"OK"}$

Stress control

$\sigma_{control} = 68.069 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.312$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$stress = \text{"OK"}$

9.2.2 Bending + traction

$M_y := 3.3 \cdot kN \cdot m$ **{comb. 6, member 93, x = 0.0m}**

$M_z := 0.0 \cdot kN \cdot m$

$N_v := 0.1 \cdot kN$ normal force / traction

Unity control

$bending\_traction_{control\_unity} = 0.233$ **<3.9>**

$$control := \begin{cases} \text{"OK"} & \text{if } bending\_traction_{control\_unity} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control = "OK"

Stress control

$\sigma_{control} = 68.817 \frac{N}{mm^2}$ **<3.10>**

$\frac{\sigma_{control}}{\sigma_{adm\_alu}} = 0.315$

$$stress := \begin{cases} \text{"OK"} & \text{if } \frac{\sigma_{control}}{\sigma_{adm\_alu}} \le 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

10. Wind bracing cable.

Side

The maximum force in the bracing cable equals :

$N_{max} := 5.3 \cdot kN$ **{Comb. 30, member 114}**

$$Security(S) := \begin{cases} \text{"OK"} & \text{if } S \geq 1.0 \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

1. Cable tightener : 3/4" x 12 Type 2 2360 kg

$MBL := 118 \cdot kN$ Minimum break load

The security factor equals :

$S := \frac{MBL}{N_{max}}$ $S = 22.264$ $Security(S) = \text{"OK"}$

2. Steel cable - diameter 10 mm - 6 x 19

$MBL := 58.9 \cdot kN$ Minimum break load

The security factor equals :

$S := \frac{MBL}{N_{max}}$ $S = 11.113$ $Security(S) = \text{"OK"}$

3. D-fastener - dia 9/16 - 0.6 ton

$MBL := 30 \cdot kN$ Minimum break load

The security factor equals :

$S := \frac{MBL}{N_{max}}$ $S = 5.66$ $Security(S) = \text{"OK"}$

4. Eyebolt M16

$MBL := 35 \cdot kN$ Minimum break load

The security factor equals :

$S := \frac{MBL}{N_{max}}$ $S = 6.604$ $Security(S) = \text{"OK"}$

Roof

The maximum force in the bracing cable equals :

$N_{max} := 11.2 \cdot kN$ **{Comb. 26, member 105}**

$$Security(S) := \begin{cases} "OK" & \text{if } S \geq 1.0 \\ "NOK" & \text{otherwise} \end{cases}$$

1. Cable tightener : 3/4" x 12 Type 2 2360 kg

$MBL := 118 \cdot kN$ Minimum break load

The security factor equals :

$S := \frac{MBL}{N_{max}}$ $S = 10.536$ $Security(S) = "OK"$

2. Steel cable - diameter 10 mm - 6 x 37 + TWK

$MBL := 52 \cdot kN$ Minimum break load

The security factor equals :

$S := \frac{MBL}{N_{max}}$ $S = 4.643$ $Security(S) = "OK"$

3. D-fastener - dia 9/16 - 0.6 ton

$MBL := 30 \cdot kN$ Minimum break load

The security factor equals :

$S := \frac{MBL}{N_{max}}$ $S = 2.679$ $Security(S) = "OK"$

4. Eyebolt M16

$MBL := 35 \cdot kN$ Minimum break load

The security factor equals :

$S := \frac{MBL}{N_{max}}$ $S = 3.125$ $Security(S) = "OK"$

11. Connection of arch to baseplate.

The reaction forces are (in kN):

$$R := \begin{pmatrix} 13.8 & 0.0 & 12.8 \\ 0.7 & 5.0 & 3.8 \\ 2.2 & 4.1 & 8.9 \\ 2.4 & 0.4 & 16.2 \end{pmatrix} \quad kN$$

row 1 = {comb. 26, node 28} with max Rx
row 2 = {comb. 31, node 5} with max Ry
row 3 = {comb. 5, node 49} with max Rz
row 4 = {comb. 26, node 43} with max Rz downforce

$R_x := R^{\langle 0 \rangle} \quad R_y := R^{\langle 1 \rangle} \quad R_z := R^{\langle 2 \rangle}$

$R_{x\_df} := \left(R^{\langle 0 \rangle T}\right)^{\langle 3 \rangle} \cdot kN \qquad R_{x\_df} = (2.4)\,kN$

$R_{y\_df} := \left(R^{\langle 1 \rangle T}\right)^{\langle 3 \rangle} \cdot kN \qquad R_{y\_df} = (0.4)\,kN$

$R_{z\_df} := \left(R^{\langle 2 \rangle T}\right)^{\langle 3 \rangle} \cdot kN \qquad R_{z\_df} = (16.2)\,kN$

11.1. Steel profile

<formulas: see document 6>

Section K90/90/3
The splice is connected to the main profiles by 2 bolts M12-8.8.

$material := R_{e\_S235}$

Maximum forces at the gravity point of the bolted connection:

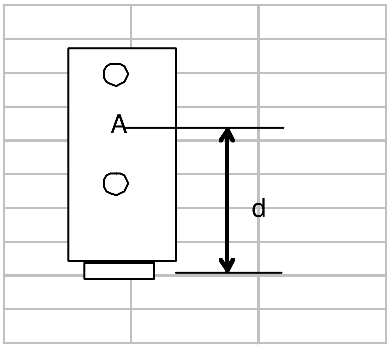
$d := 160mm$

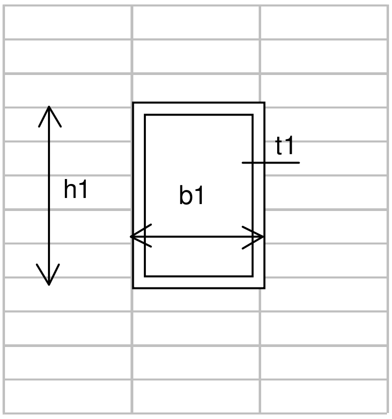
$M_y := R_x \cdot d$

$M_z := R_y \cdot d$

$N_v := R_z$

$S_v := \sqrt{R_x^{\ 2} + R_y^{\ 2}}$





$$M_y = \begin{pmatrix} 2.208 \\ 0.112 \\ 0.352 \\ 0.384 \end{pmatrix} m \qquad N_v = \begin{pmatrix} 12.8 \\ 3.8 \\ 8.9 \\ 16.2 \end{pmatrix} \qquad S_v = \begin{pmatrix} 13.8 \\ 5.049 \\ 4.653 \\ 2.433 \end{pmatrix}$$

$$M_z = \begin{pmatrix} 0 \\ 0.8 \\ 0.656 \\ 0.064 \end{pmatrix} m$$

number of parts (1): $n := 1$

	Width	Height	Wall thickness (2)	Gravity point of the part in y-direction	Gravity point of the part in z-direction
Part 1:	$b_1 := 90 \cdot mm$	$h_1 := 90 \cdot mm$	$t_1 := 3 \cdot mm$	$y1 := 45 \cdot mm$	$z1 := 45 \cdot mm$

(1) part = either a tube or a plate
(2) if the part is a plate, the wall thickness = height / 2

Section

$A_{section} = 1.044 \times 10^3\ mm^2$ **<6.1>**

Gravity point

$y_v = 45\ mm$ **<6.2>**

$z_v = 45\ mm$ **<6.3>**

Moment of inertia

$I_{tot\_y} = 1.319 \times 10^6\ mm^4$ **<6.4>**

$I_{tot\_z} = 1.319 \times 10^6\ mm^4$ **<6.5>**

Von mise stress

$\sigma_{st} = 87.615 \frac{N}{mm^2}$ **<6.6>**

$\tau_{st} = 13.218 \frac{N}{mm^2}$ **<6.7>**

$\sigma_{vonmise} = 90.557 \frac{N}{mm^2}$ **<6.8>**

$\sigma_{adm}(\text{material}) = 213.636 \frac{N}{mm^2}$

$$\text{stress} := \begin{cases} \text{"OK"} & \text{if } \sigma_{vonmise} \le \sigma_{adm}(\text{material}) \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

11.2. Control of the bolts (2xM12) <formulas: see document 5>

The forces in the bolts are:

$M_v := M_y$

$N_v := R_z$

$S_v := R_x$

$$M_v = \begin{pmatrix} 2.208 \\ 0.112 \\ 0.352 \\ 0.384 \end{pmatrix} m \qquad N_v = \begin{pmatrix} 12.8 \\ 3.8 \\ 8.9 \\ 16.2 \end{pmatrix} \qquad S_v = \begin{pmatrix} 13.8 \\ 0.7 \\ 2.2 \\ 2.4 \end{pmatrix}$$

Number of bolts:

$n_{bolt} := 2$

The coordinates of the bolts are:

$x1 := 0mm$ $y1 := 0mm$ $x3 := 0mm$ $y3 := 0mm$ $x5 := 0mm$ $y5 := 0mm$

$x2 := 200mm$ $y2 := 0mm$ $x4 := 0mm$ $y4 := 0mm$ $x6 := 0mm$ $y6 := 0mm$

The properties of the bolt equal:

$D_b := 12\cdot mm$ diameter of the bolt

$D_0 := 14\cdot mm$ diameter of the bolthole

$F_{ub} := R_{t\_bolt}$ bolt material

The properties of the connection equal:

$e_{1\_out} := 35\cdot mm$ enddistance of the outside profile

$e_{1\_in} := 35\cdot mm$ enddistance of the inside profile

$p_1 := 200\cdot mm$ distance between two bolts

$t_{out} := t_{alu}(prof\_foot_{prin})$ wall thickness of the outside profile

$t_{in} := t_1$ wall thickness of the inside profile

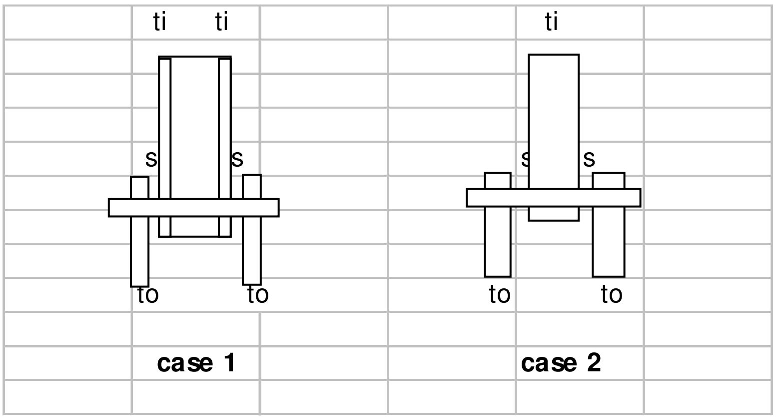
$s_{margin} := 2mm$ margin between the inside profile and the outside profile

$f_{y\_out} := R_{e\_alu}$ yield stress of the material on the outside

$f_{u\_out} := R_{t\_alu}$ tensile strength of the material on the outside

$f_{y\_in} := R_{e\_S235}$ yield stress of the material on the inside

$f_{u\_in} := R_{t\_S235}$ tensile strength of the material on the inside



case := 1

$F_{res} = 9.524\,kN$ <5.1>

$A_{bolt}(D_b) = 113.097\,mm^2$ <5.2>

Control of the shear force in the bolts

$c(F_{ub}) = 0.6$ <5.3>

bolt_force = 9.524 kN

shear_resist = 43.429 kN <5.4>

control_shear := | "OK" if bolt_force ≤ shear_resist
| "NOK" otherwise

control_shear = "OK"

Control of the bearing force in the aluminium profile

$\alpha_{out} = 0.833$ **<5.5>**

bolt_force = 9.524 kN

bearing_resist_out = 15.6 kN **<5.6>**

$$\text{control\_bearing} := \begin{cases} \text{"OK"} & \text{if bolt\_force} \le \text{bearing\_resist\_out} \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control_bearing = "OK"

Control of the bearing force in the steel profile

$\alpha_{in} = 0.833$ **<5.5>**

bolt_force = 9.524 kN

bearing_resist_in = 21.6 kN **<5.6>**

$$\text{control\_bearing} := \begin{cases} \text{"OK"} & \text{if bolt\_force} \le \text{bearing\_resist\_in} \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control_bearing = "OK"

Moment control in the bolts

$W(D_b) = 169.646\ mm^3$ **<5.7>**

d = 5 mm **<5.9>**

moment = 0.048 kN·m

moment_capacity = 0.087 kN·m **<5.8>**

$$\text{control\_moment} := \begin{cases} \text{"OK"} & \text{if moment} \le \text{moment\_capacity} \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

control_moment = "OK"

11.3. Control of the pin in the footplate M16 <formulas: see document 5>

$n_{bolt} := 1$ number of bolts

The properties of the bolt equal:

$D_b := 16 \cdot mm$ diameter of the bolt

$D_0 := 18.9 \cdot mm$ diameter of the bolthole

$F_{ub} := R_{t\_S235}$ bolt material

$F_{res} = 18.822\,kN$ <5.1>

$A_{bolt}(D_b) = 201.062\,mm^2$ <5.2>

Control of the shear force in the bolts

$c(F_{ub}) = 0.6$ <5.3>

$bolt\_force = 18.822\,kN$

$shear\_resist = 34.744\,kN$ <5.4>

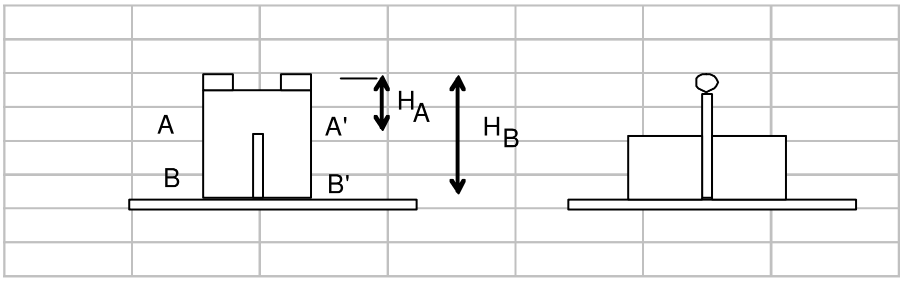
$$control\_shear := \begin{cases} \text{"OK"} & \text{if } bolt\_force \le shear\_resist \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

$control\_shear = \text{"OK"}$

12. Baseplate.

12.1. Bending of the vertical steel plates.

$material := R_{e\_S235}$



$H_A := 70mm$

$H_B := 163mm$

a) Section AA' (Fe 140/10)

The forces are:

$M_y := R_y \cdot H_A$

$M_z := R_x \cdot H_A$

$N_v := R_z$

$S_v := \sqrt{R_x^2 + R_y^2}$

$$M_y = \begin{pmatrix} 0 \\ 0.35 \\ 0.287 \\ 0.028 \end{pmatrix} m \quad M_z = \begin{pmatrix} 0.966 \\ 0.049 \\ 0.154 \\ 0.168 \end{pmatrix} m \quad N_v = \begin{pmatrix} 12.8 \\ 3.8 \\ 8.9 \\ 16.2 \end{pmatrix} \quad S_v = \begin{pmatrix} 13.8 \\ 5.049 \\ 4.653 \\ 2.433 \end{pmatrix}$$

number of parts (1): $n := 1$

	Width	Height	Wall thickness (2)	Gravity point of the part in y-direction	Gravity point of the part in z-direction
Part 1:	$b_1 := 140 \cdot mm$	$h_1 := 10 \cdot mm$	$t_1 := 5 \cdot mm$	$y1 := 5 \cdot mm$	$z1 := 70 \cdot mm$

(1) part = either a tube or a plate
(2) if the part is a plate, the wall thickness = height / 2

Section

$A_{section} = 1.4 \times 10^3\ mm^2$ <6.1>

Gravity point

$y_v = 5\ mm$ <6.2>

$z_v = 70\ mm$ <6.3>

Moment of inertia

$I_{tot\_y} = 1.167 \times 10^4\ mm^4$ <6.4>

$I_{tot\_z} = 2.287 \times 10^6\ mm^4$ <6.5>

Von mise stress

$\sigma_{st} = 154.214 \frac{N}{mm^2}$ <6.6>

$\tau_{st} = 3.606 \frac{N}{mm^2}$ <6.7>

$\sigma_{vonmise} = 154.341 \frac{N}{mm^2}$ <6.8>

$\sigma_{adm}(material) = 213.636 \frac{N}{mm^2}$

$$stress := \begin{cases} "OK" & \text{if } \sigma_{vonmise} \le \sigma_{adm}(material) \\ "NOK" & \text{otherwise} \end{cases}$$

stress = "OK"

b) Section BB' (Fe140/10 + 2x Fe70/10)

The forces are:

$M_y := R_y \cdot H_B$

$M_z := R_x \cdot H_B$

$N_v := R_z$

$S_v := \sqrt{R_x^2 + R_y^2}$

$M_y = \begin{pmatrix} 0 \\ 0.815 \\ 0.668 \\ 0.065 \end{pmatrix} m$ $M_z = \begin{pmatrix} 2.249 \\ 0.114 \\ 0.359 \\ 0.391 \end{pmatrix} m$ $N_v = \begin{pmatrix} 12.8 \\ 3.8 \\ 8.9 \\ 16.2 \end{pmatrix}$ $S_v = \begin{pmatrix} 13.8 \\ 5.049 \\ 4.653 \\ 2.433 \end{pmatrix}$

number of parts (1): $n := 3$

	Width	Height	Wall thickness (2)	Gravity point of the part in y-direction	Gravity point of the part in z-direction
Part 1:	$b_1 := 10 \cdot mm$	$h_1 := 70 \cdot mm$	$t_1 := 35 \cdot mm$	$y1 := 35 \cdot mm$	$z1 := 70 \cdot mm$
Part 2:	$b_2 := 140 \cdot mm$	$h_2 := 10 \cdot mm$	$t_2 := 5 \cdot mm$	$y2 := 75 \cdot mm$	$z2 := 70 \cdot mm$
Part 3:	$b_3 := 10 \cdot mm$	$h_3 := 70 \cdot mm$	$t_3 := 35 \cdot mm$	$y3 := 115 \cdot mm$	$z3 := 70 \cdot mm$

(1) part = either a tube or a plate
(2) if the part is a plate, the wall thickness = height / 2

Section

$A_{section} = 2.8 \times 10^3 \, mm^2$ **<6.1>**

Gravity point

$y_v = 75\,mm$ **<6.2>**

$z_v = 70\,mm$ **<6.3>**

Moment of inertia

$I_{tot\_y} = 2.823 \times 10^6 \, mm^4$ **<6.4>**

$I_{tot\_z} = 2.298 \times 10^6 \, mm^4$ **<6.5>**

Von mise stress

$$\sigma_{st} = 73.081 \frac{N}{mm^2}$$ **<6.6>**

$$\tau_{st} = 4.929 \frac{N}{mm^2}$$ **<6.7>**

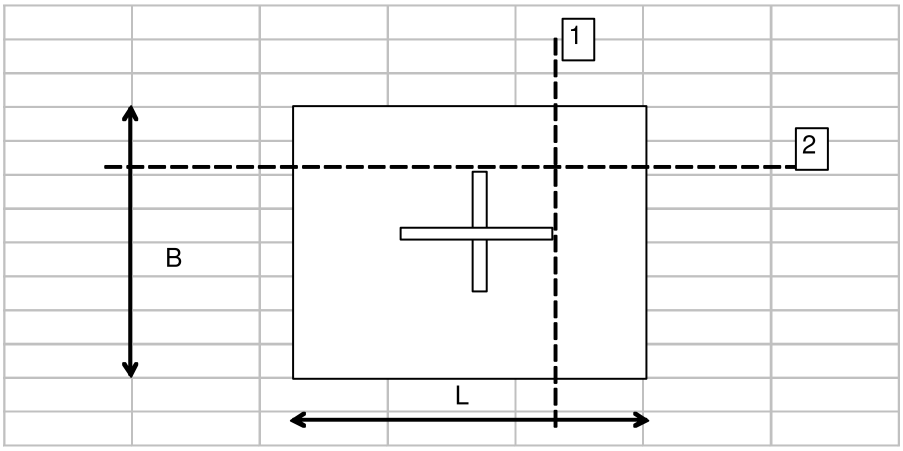
$$\sigma_{vonmise} = 73.578 \frac{N}{mm^2}$$ **<6.8>**

$$\sigma_{adm}(\text{material}) = 213.636 \frac{N}{mm^2}$$

$$\text{stress} := \begin{cases} \text{"OK"} & \text{if } \sigma_{vonmise} \le \sigma_{adm}(\text{material}) \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

12.2. Bending of the horizontal steel plate. <formulas: see document 7>



The checked sections

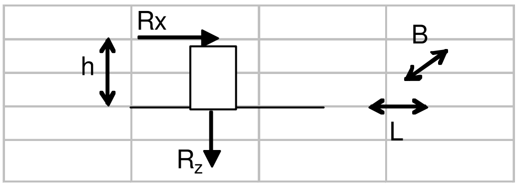
$B_p := 300 \cdot mm$ $H_p := 10 \cdot mm$ $L_p := 300 \cdot mm$

$material := R_{e\_S235}$

$baseplate := \text{"side"}$

L = length of the horizontal plate in y direction
B = width of the horizontal plate in x direction
H = thickness of the horizontal plate

a) Section 1



$R_{x\_df} = (2.4)\, kN$

$R_{z\_df} = (16.2)\, kN$ **{Comb 26, node 43}**

$h_p := H_B + H_p$

Maximum groundpressure : $p_{max\_ground} := 100 \frac{kN}{m^2}$

$$p_{ground}(\sigma) := \begin{cases} \text{"OK, no need for terrain verification"} & \text{if } \sigma \le p_{max\_ground} \\ \text{"terrain verrification needed"} & \text{otherwise} \end{cases}$$

$\sigma_{Max} = 0.272 \frac{N}{mm^2}$ <7.1> $p_{ground}(\sigma_{Max}) = \text{"terrain verrification needed"}$

$\sigma_{Min} = 0.088 \frac{N}{mm^2}$

$p_{Max} = 81.68 \frac{kN}{m}$ <7.2>

$p_{Min} = 26.32 \frac{kN}{m}$

$a_1 := 80mm$ distance from the border of the plate till section 1

$p_{r1} = 14.763 \frac{kN}{m}$ <7.3>

$a_{\Delta 1} = 226.889\,mm$ <7.4>

$p_{ax1} = 66.917 \frac{kN}{m}$ <7.5>

Gravity distance:

$a_{g1} = 41.325\,mm$ <7.6>

Maximum moment:

$M_{max1} = 0.246\,kN \cdot m$ <7.7>

Section 1: at distance a1

$M_y := \frac{M_{max1}}{kN}$

number of parts (1): $n := 1$

	Width	Height	Wall thickness (2)	Gravity point of the part in y-direction
Part 1:	$b_1 := B_p$	$h_1 := H_p$	$t_1 := \frac{H_p}{2}$	$y1 := \frac{H_p}{2}$

Section

$A_{section} = 3 \times 10^3\ mm^2$ <6.1>

Gravity point

$y_v = 5\ mm$ <6.2>

Moment of inertia

$I_{tot\_y} = 2.5 \times 10^4\ mm^4$ <6.4>

Von mise stress

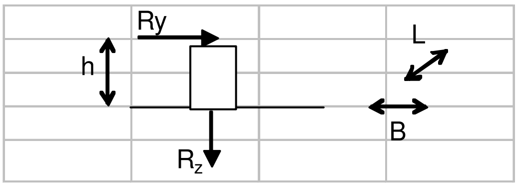
$\sigma_{vonmise} = 49.126\ \frac{N}{mm^2}$ <6.8>

$\sigma_{adm}(material) = 213.636\ \frac{N}{mm^2}$

$$stress := \begin{cases} "OK" & \text{if } \sigma_{vonmise} \le \sigma_{adm}(material) \\ "NOK" & \text{otherwise} \end{cases}$$

stress = "OK"

b) Section 2



$R_{y\_df} = (0.4)\,kN$

$R_{z\_df} = (16.2)\,kN$ **{Comb 26, node 43}**

$\sigma_{Max} = 0.195\,\frac{N}{mm^2}$ **<7.1>** $p_{ground}(\sigma_{Max})$ = "terrain verrification needed"

$\sigma_{Min} = 0.165\,\frac{N}{mm^2}$

$p_{Max} = 58.613\,\frac{kN}{m}$ **<7.2>**

$p_{Min} = 49.387\,\frac{kN}{m}$

$a_2 := 75mm$ distance from the border of the plate till section 2

$p_{r2} = 2.307\,\frac{kN}{m}$ **<7.3>**

$a_{\Delta 2} = 162.815\,mm$ **<7.4>**

$p_{ax2} = 56.307\,\frac{kN}{m}$ **<7.5>**

Gravity distance:

$a_{g2} = 37.751\,mm$ **<7.6>**

Maximum moment:

$M_{max2} = 0.163\,kN \cdot m$ **<7.7>**

Section 2: at distance a2

$$M_y := \frac{M_{max2}}{kN}$$

number of parts ([1]): $n := 1$

	Width	Height	Wall thickness ([2])	Gravity point of the part in y-direction
Part 1:	$b_1 := L_p$	$h_1 := H_p$	$t_1 := \frac{H_p}{2}$	$y1 := \frac{H_p}{2}$

([1]) part = either a tube or a plate
([2]) if the part is a plate, the wall thickness = height / 2

Section

$A_{section} = 3 \times 10^3\ mm^2$ **<6.1>**

Gravity point

$y_v = 5\ mm$ **<6.2>**

Moment of inertia

$I_{tot\_y} = 2.5 \times 10^4\ mm^4$ **<6.4>**

Von mise stress

$\sigma_{vonmise} = 32.537 \frac{N}{mm^2}$ **<6.8>**

$\sigma_{adm}(material) = 213.636 \frac{N}{mm^2}$

$$stress := \begin{cases} \text{"OK"} & \text{if } \sigma_{vonmise} \le \sigma_{adm}(material) \\ \text{"NOK"} & \text{otherwise} \end{cases}$$

stress = "OK"

13. Anchorage. acc to EN 13782, Art. 8

13.1. Anchorbars.

13.1.1. General remark:

The anchorage (number of anchor bars needed) of the structure is depending on the type of the ground on which the structure will be built and the dimensions of the anchor bars. For reason of safety, the client / builder needs to verify the effective resistance of a single anchor bar by means of at least 3 pull out tests at 3 different places.

A. at bracing cables

Every baseplate can be anchored by 4 steel anchorbars. The dimensions of the anchorbars are:

Length $l := 150 \cdot cm$

Section $d_{eq} := 2.8 \cdot cm$

Maximum number of bars $n_{max} := 4$

The reaction forces equal:

$R_{x\_f} := 1.3kN$

$R_{y\_f} := 2.6kN$

$R_{z\_f} := 7.4kN$ **{Foundation table: permanent load + wind on gable overpressure}**

$$R_{tot} := \sqrt{R_{x\_f}^{\,2} + R_{y\_f}^{\,2} + R_{z\_f}^{\,2}} \qquad R_{tot} = 7.95\,kN$$

The security factor must be less than or equal to 1.2, so the capacity (Z) of a single anchorbar for this security factor and this number of anchorbars has to be at least:

$S := 1.2$ Security factor

Tension force		Angle with the vertical force	
$Z_\beta := \frac{S \cdot R_{tot}}{n_{max}}$	$Z_\beta = 2.385\,kN$	$\beta := acos\left(\frac{R_{z\_f}}{R_{tot}}\right)$	$\beta = 21.446\,deg$
$Z_{0°} := \frac{S \cdot R_{z\_f}}{n_{max}}$	$Z_{0°} = 2.22\,kN$	$\beta_{0°} := 0deg$	

B. at side

Every baseplate can be anchored by 4 steel anchorbars. The dimensions of the anchorbars are:

Length $l := 150 \cdot cm$

Section $d_{eq} := 2.8 \cdot cm$

Maximum number of bars $n_{max} := 4$

The reaction forces equal:

$R_{x\_f} := 7.7kN$

$R_{y\_f} := 0.0kN$

$R_{z\_f} := 6.0kN$ **{Foundation table: permanent load + wind on side overpressure}**

$$R_{tot} := \sqrt{R_{x\_f}^2 + R_{y\_f}^2 + R_{z\_f}^2} \qquad R_{tot} = 9.762\,kN$$

The security factor must be less than or equal to 1.2, so the capacity (Z) of a single anchorbar for this security factor and this number of anchorbars has to be at least:

$S := 1.2$ Security factor

Tension force		Angle with the vertical force	
$Z_{\beta} := \frac{S \cdot R_{tot}}{n_{max}}$	$Z_{\beta} = 2.928\,kN$	$\beta := acos\left(\frac{R_{z\_f}}{R_{tot}}\right)$	$\beta = 52.074\,deg$
$Z_{0°} := \frac{S \cdot R_{z\_f}}{n_{max}}$	$Z_{0°} = 1.8\,kN$	$\beta_{0°} := 0deg$	

14. Conclusion.

The relocatable Alu 15m structure, and consequently the Alu 12m, manufactured by EFS N.V., Veldeman Structure Solutions in Bree Belgium complies with the stipulations of the British Standard 6399 under the following conditions:

basic windspeed = 25m/s
effective windspeed = 28.5m/s

ground snow load = 20kg/m²

The structure will be able to resist this load if the structure is good anchored to the ground and when it is completely closed.

Bree, June 2006

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for EFS nv,
Veldeman Structure Solutions

VELDEMAN
STRUCTURE SOLUTIONS

ENCLOSURE 1 :

$N := newton$

$kN := 1000 \cdot N$

$psf := \frac{lbf}{ft^2}$

$ksi := 1000 \cdot \frac{lbf}{in^2}$

$kip := 1000 \cdot lbf$

$psf := 47.88026 \cdot Pa$

$1 \cdot ksi = 6.89476 \frac{N}{mm^2}$

Document : formulas BS 6399, ENV1993-1-1 & 1999-1-1

Doc. 1. Wind + snow load.

1.1. Snow load.

The snow load on a roof shall determined from : (acc. eurocode ENV 1991 - 2 - 3 : 1995, § 5.1)

$s = \mu_i \cdot C_{es} \cdot C_{ts} \cdot s_k$

the snow load shape coefficient μ_i

the exposure coefficient, which usually has the value 1 $C_{es} := 1.0$

the exposure coefficient, which usually has the value 1 $C_{ts} := 1.0$

the characteristic value of the snow load on the ground (kN/m2) $s_k(p_f) := p_f$

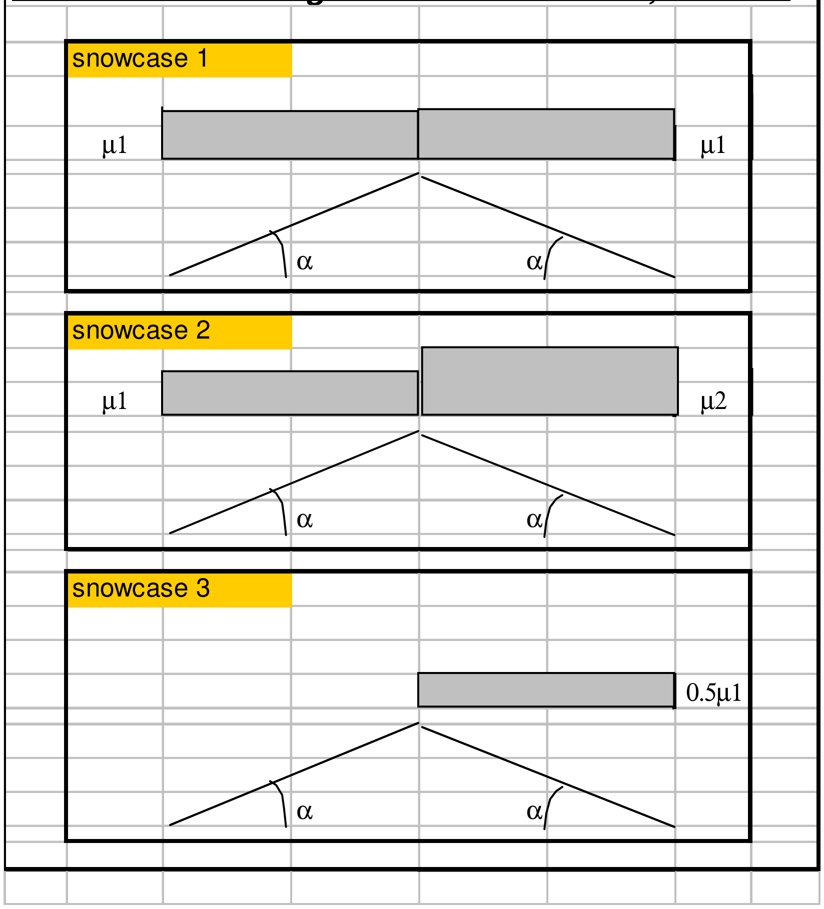
duopitch roof : acc eurocode env 1991-2-3 §7.2 (5), table 7.2

angle of pitch of roof α

$$\mu_1(\alpha) := \begin{cases} 0.8 & \text{if } 0\cdot deg \le \alpha \le 15\cdot deg \\ 0.8 & \text{if } 15\cdot deg < \alpha \le 30\cdot deg \\ \dfrac{0.8\cdot\left(60 - \dfrac{\alpha}{deg}\right)}{30} & \text{if } 30\cdot deg < \alpha \le 60\cdot deg \\ 0 & \text{if } \alpha \ge 60\cdot deg \end{cases} \qquad \text{<1.1>}$$

$$\mu_2(\alpha) := \begin{cases} 0.8 & \text{if } 0\cdot deg \le \alpha \le 15\cdot deg \\ 0.8 + \dfrac{0.6\cdot\left(\dfrac{\alpha}{deg} - 15\right)}{30} & \text{if } 15\cdot deg < \alpha \le 30\cdot deg \\ \dfrac{1.1\cdot\left(60 - \dfrac{\alpha}{deg}\right)}{30} & \text{if } 30\cdot deg < \alpha \le 60\cdot deg \\ 0 & \text{if } \alpha \ge 60\cdot deg \end{cases} \qquad \text{<1.2>}$$

Snowcase according to eurocode 1991-2-3, table 7.2



snowcase 1 :

$$s_{1\_windward}(\alpha, p_f, Span\_distance) := \mu_1(\alpha)\cdot(C_{es}\cdot C_{ts}\cdot s_k(p_f))\cdot Span\_distance$$

$$s_{1\_leeward}(\alpha, p_f, Span\_distance) := \mu_1(\alpha)\cdot(C_{es}\cdot C_{ts}\cdot s_k(p_f))\cdot Span\_distance$$

snowcase 2 :

$$s_{2\_windward}(\alpha, p_f, Span\_distance) := \mu_1(\alpha)\cdot(C_{es}\cdot C_{ts}\cdot s_k(p_f))\cdot Span\_distance$$ **<1.3>**

$$s_{2\_leeward}(\alpha, p_f, Span\_distance) := \mu_2(\alpha)\cdot(C_{es}\cdot C_{ts}\cdot s_k(p_f))\cdot Span\_distance$$

snowcase 3 :

$$s_{3\_leeward}(\alpha, p_f, Span\_distance) := 0.5\,\mu_1(\alpha)\cdot(C_{es}\cdot C_{ts}\cdot s_k(p_f))\cdot Span\_distance$$

1.2. Wind load.

The wind load is calculated according to **"BS 6399 part 2 - 1997"**

Basic wind speed

Basic wind speed acc. to fig. 6 V_b

Site wind speed

Altitude factor : $S_a := 1$

Direction factor : $S_d := 1$

Seasonal factor : $S_s(RI) := \begin{cases} 0.98 & \text{if } RI \le \frac{1}{12} yr \\ 1 & \text{otherwise} \end{cases}$

Probability factor (2.2.2.5) : S_p

Annex D, 1 year storm: the most likely annual maximum value

$$Q(RI) := \begin{cases} 0.632 & \text{if } RI \le 1 yr \\ \frac{yr}{RI} & \text{otherwise} \end{cases}$$

$$S_p(RI) := \sqrt{\frac{5 - \ln(-\ln(1 - Q(RI)))}{5 - \ln(-\ln(0.98))}} \quad \text{<1.4>}$$

=> site wind speed :

$$V_s(V_b, RI) := V_b \cdot S_a \cdot S_d \cdot S_s(RI) \cdot S_p(RI) \quad \text{<1.5>}$$

Effective wind speed

Terrain and building factor (2.2.3.3)

Interpolation of table 4 gives us:

Effective height — Closest distance to sea: — Site in country (0) or site in town (1):

site

$$H_e := \begin{pmatrix} 2m \\ 5m \\ 10m \\ 15m \\ 20m \\ 30m \\ 50m \\ 100m \end{pmatrix} \quad D_{s\_c} := \begin{pmatrix} 0km \\ 0.1km \\ 2km \\ 10km \\ 100km \end{pmatrix} \quad D_{s\_t} := \begin{pmatrix} 2km \\ 10km \\ 100km \end{pmatrix}$$

$$D_{s1} := \begin{pmatrix} 1.48 \\ 1.65 \\ 1.78 \\ 1.85 \\ 1.90 \\ 1.96 \\ 2.04 \\ 2.12 \end{pmatrix} \quad D_{s2} := \begin{pmatrix} 1.48 \\ 1.65 \\ 1.78 \\ 1.85 \\ 1.90 \\ 1.96 \\ 2.04 \\ 2.12 \end{pmatrix} \quad D_{s3} := \begin{pmatrix} 1.40 \\ 1.62 \\ 1.78 \\ 1.85 \\ 1.90 \\ 1.96 \\ 2.04 \\ 2.12 \end{pmatrix} \quad D_{s4} := \begin{pmatrix} 1.35 \\ 1.57 \\ 1.73 \\ 1.82 \\ 1.89 \\ 1.96 \\ 2.04 \\ 2.12 \end{pmatrix} \quad D_{s5} := \begin{pmatrix} 1.26 \\ 1.45 \\ 1.62 \\ 1.71 \\ 1.77 \\ 1.85 \\ 1.95 \\ 2.07 \end{pmatrix}$$

$$D_{s6} := \begin{pmatrix} 1.18 \\ 1.50 \\ 1.73 \\ 1.85 \\ 1.90 \\ 1.96 \\ 2.04 \\ 2.12 \end{pmatrix} \quad D_{s7} := \begin{pmatrix} 1.15 \\ 1.45 \\ 1.69 \\ 1.82 \\ 1.89 \\ 1.96 \\ 2.04 \\ 2.12 \end{pmatrix} \quad D_{s8} := \begin{pmatrix} 1.07 \\ 1.36 \\ 1.58 \\ 1.71 \\ 1.77 \\ 1.85 \\ 1.95 \\ 2.07 \end{pmatrix}$$

$S_{b1}(H_{peak}) := \text{linterp}(H_e, D_{s1}, H_{peak})$ $\quad S_{b4}(H_{peak}) := \text{linterp}(H_e, D_{s4}, H_{peak})$ $\quad S_{b7}(H_{peak}) := \text{linterp}(H_e, D_{s7}, H_{peak})$

$S_{b2}(H_{peak}) := \text{linterp}(H_e, D_{s2}, H_{peak})$ $\quad S_{b5}(H_{peak}) := \text{linterp}(H_e, D_{s5}, H_{peak})$ $\quad S_{b8}(H_{peak}) := \text{linterp}(H_e, D_{s8}, H_{peak})$

$S_{b3}(H_{peak}) := \text{linterp}(H_e, D_{s3}, H_{peak})$ $\quad S_{b6}(H_{peak}) := \text{linterp}(H_e, D_{s6}, H_{peak})$

$$S_{b\_c}(H_{peak}) := \begin{pmatrix} S_{b1}(H_{peak}) \\ S_{b2}(H_{peak}) \\ S_{b3}(H_{peak}) \\ S_{b4}(H_{peak}) \\ S_{b5}(H_{peak}) \end{pmatrix} \qquad S_{b\_t}(H_{peak}) := \begin{pmatrix} S_{b6}(H_{peak}) \\ S_{b7}(H_{peak}) \\ S_{b8}(H_{peak}) \end{pmatrix}$$

So we become:

$$S_b(H_{peak}, dist\_to\_sea, site) := \begin{vmatrix} linterp(D_{s\_c}, S_{b\_c}(H_{peak}), dist\_to\_sea) & \text{if } site = 0 \\ linterp(D_{s\_t}, S_{b\_t}(H_{peak}), dist\_to\_sea) & \text{if } site = 1 \end{vmatrix}$$ **<1.6>**

=> effective wind speed :

$$V_e(V_b, H_{peak}, sea, site, RI) := V_s(V_b, RI) \cdot S_b(H_{peak}, sea, site)$$ **<1.7>**

Dynamic pressure

$$q_s(V_b, H_{peak}, sea, site, RI) := 0.613 \cdot \left(\frac{sec^2 \cdot N}{m^4} \right) \cdot V_e(V_b, H_{peak}, sea, site, RI)^2$$ **<1.8>**

Effective dynamic pressure

$$a_{side\_w}(Length, H_{eave}) := \sqrt{Length^2 + H_{eave}^{\ 2}}$$

$$a_{side\_r}(Length, Width, \alpha_{roof}) := \sqrt{Length^2 + \left(\frac{Width}{2\cos(\alpha_{roof})} \right)^2}$$ diagonal of loaded areas (fig. 5)

<1.9>

$$a_{gable}(Width, H_{eave}) := \sqrt{Width^2 + H_{eave}^{\ 2}}$$

$$a_{in}(Width, H_{peak}, H_{eave}, Length) := 10 \cdot \left[(Width \cdot Length \cdot H_{eave}) \ldots + \frac{Width \cdot (H_{peak} - H_{eave})}{2} \cdot Length \right]^{\frac{1}{3}}$$

diagonal dimension for internal pressure 2.6.1.1

$$\mathrm{curve}(H_{peak}, dist\_to\_sea, site) := \begin{cases} \begin{cases} \begin{cases} \text{"A"} & \text{if } dist\_to\_sea < 2km \\ \text{"B"} & \text{if } dist\_to\_sea \ge 2km \end{cases} & \text{if } 0m < H_{peak} \le 5m \\ \begin{cases} \text{"A"} & \text{if } dist\_to\_sea < 10km \\ \text{"B"} & \text{if } dist\_to\_sea \ge 10km \end{cases} & \text{if } 5m < H_{peak} \le 20m \\ \begin{cases} \text{"A"} & \text{if } dist\_to\_sea < 100km \\ \text{"B"} & \text{if } dist\_to\_sea \ge 100km \end{cases} & \text{if } H_{peak} > 20m \end{cases} & \text{if } site = 0 \\ \begin{cases} \begin{cases} \text{"A"} & \text{if } dist\_to\_sea < 2km \\ \text{"C"} & \text{if } dist\_to\_sea \ge 2km \end{cases} & \text{if } 0m < H_{peak} \le 5m \\ \begin{cases} \text{"A"} & \text{if } dist\_to\_sea < 10km \\ \text{"C"} & \text{if } dist\_to\_sea \ge 10km \end{cases} & \text{if } 5m < H_{peak} \le 10m \\ \begin{cases} \text{"A"} & \text{if } dist\_to\_sea < 10km \\ \text{"B"} & \text{if } dist\_to\_sea \ge 10km \end{cases} & \text{if } 10m < H_{peak} \le 20m \\ \begin{cases} \text{"A"} & \text{if } dist\_to\_sea < 100km \\ \text{"B"} & \text{if } dist\_to\_sea \ge 100km \end{cases} & \text{if } H_{peak} > 20m \end{cases} & \text{if } site = 1 \end{cases}$$

Size effect factor Ca : (fig. 4) **<1.10>**

$$C_{a\_w}(L, H_e, H_p, sea, site) := \begin{cases} \left[\dfrac{\left(\log\left(\dfrac{a_{side\_w}(L, H_e)}{m}\right) - \log(5)\right)\cdot(0.67 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } \mathrm{curve}(H_p, sea, site) = \text{"A"} \\ \left[\dfrac{\left(\log\left(\dfrac{a_{side\_w}(L, H_e)}{m}\right) - \log(5)\right)\cdot(0.61 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } \mathrm{curve}(H_p, sea, site) = \text{"B"} \\ \left[\dfrac{\left(\log\left(\dfrac{a_{side\_w}(L, H_e)}{m}\right) - \log(5)\right)\cdot(0.52 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } \mathrm{curve}(H_p, sea, site) = \text{"C"} \end{cases}$$

$$C_{a\_r}(L, W, \alpha_r, H_p, sea, site) := \begin{cases} \left[\dfrac{\left(\log\left(\dfrac{a_{side\_r}(L, W, \alpha_r)}{m}\right) - \log(5)\right)\cdot(0.67 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } \mathrm{curve}(H_p, sea, site) = \text{"A"} \\ \left[\dfrac{\left(\log\left(\dfrac{a_{side\_r}(L, W, \alpha_r)}{m}\right) - \log(5)\right)\cdot(0.61 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } \mathrm{curve}(H_p, sea, site) = \text{"B"} \\ \left[\dfrac{\left(\log\left(\dfrac{a_{side\_r}(L, W, \alpha_r)}{m}\right) - \log(5)\right)\cdot(0.52 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } \mathrm{curve}(H_p, sea, site) = \text{"C"} \end{cases}$$

$$C_{a\_g}(W, H_e, H_p, sea, site) := \begin{cases} \left[\dfrac{\left(\log\left(\dfrac{a_{gable}(W, H_e)}{m}\right) - \log(5)\right)\cdot(0.67 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } curve(H_p, sea, site) = \text{"A"} \\ \left[\dfrac{\left(\log\left(\dfrac{a_{gable}(W, H_e)}{m}\right) - \log(5)\right)\cdot(0.61 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } curve(H_p, sea, site) = \text{"B"} \\ \left[\dfrac{\left(\log\left(\dfrac{a_{gable}(W, H_e)}{m}\right) - \log(5)\right)\cdot(0.52 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } curve(H_p, sea, site) = \text{"C"} \end{cases}$$

$$C_{a\_i}(W, L, H_e, H_p, sea, site) := \begin{cases} \left[\dfrac{\left(\log\left(\dfrac{a_{in}(W, H_p, H_e, L)}{m}\right) - \log(5)\right)\cdot(0.67 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } curve(H_p, sea, site) = \text{"A"} \\ \left[\dfrac{\left(\log\left(\dfrac{a_{in}(W, H_p, H_e, L)}{m}\right) - \log(5)\right)\cdot(0.61 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } curve(H_p, sea, site) = \text{"B"} \\ \left[\dfrac{\left(\log\left(\dfrac{a_{in}(W, H_p, H_e, L)}{m}\right) - \log(5)\right)\cdot(0.52 - 1)}{\log(1000) - \log(5)} + 1\right] & \text{if } curve(H_p, sea, site) = \text{"C"} \end{cases}$$

=> Effective dynamic pressure : **<1.11>**

wind on side

$$q_w(V_b, H_{peak}, sea, site, RI, Length, H_{eave}) := q_s(V_b, H_{peak}, sea, site, RI)\cdot C_{a\_w}(Length, H_{eave}, H_{peak}, sea, site)$$

$$q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_{roof}) := q_s(V_b, H_{peak}, sea, site, RI)\cdot C_{a\_r}(L, W, \alpha_{roof}, H_{peak}, sea, site)$$

wind on gable

$$q_g(V_b, H_{peak}, sea, site, RI, Width, H_{eave}) := q_s(V_b, H_{peak}, sea, site, RI)\cdot C_{a\_g}(Width, H_{eave}, H_{peak}, sea, site)$$

internal wind pressure

$$q_i(V_b, H_{peak}, sea, site, RI, Width, H_{eave}, Length) := q_s(V_b, H_{peak}, sea, site, RI)\cdot C_{a\_i}(Width, H_{peak}, H_{eave}, Length, sea, site)$$

1. External wind pressure coefficients.

a. Walls art. 2.4.1

Wind load normal to the sidewall of the structure. **<1.12>**

Side wall (D<B) :

B = Length
D = Width
H = Hight of peak

$$b_s(Length, H_{peak}) := \min(Length, 2 \cdot H_{peak})$$

Windward

$$C_{pe\_s\_ww}(Width, H_{peak}) := \begin{cases} \left[\dfrac{\left(\dfrac{Width}{H_{peak}} - 4\right)\cdot(0.85 - 0.6)}{1-4} + 0.6\right] & \text{if } 1 < \dfrac{Width}{H_{peak}} < 4 \\ 0.85 & \text{if } \dfrac{Width}{H_{peak}} \le 1 \\ 0.6 & \text{if } \dfrac{Width}{H_{peak}} \ge 4 \end{cases}$$

Table 5

Leeward

$$C_{pe\_s\_lw}(Width, H_{peak}) := \begin{cases} \left[\dfrac{\left(\dfrac{Width}{H_{peak}} - 4\right)\cdot[(-0.5) - (-0.5)]}{1-4} + (-0.5)\right] & \text{if } 1 < \dfrac{Width}{H_{peak}} < 4 \\ -0.5 & \text{if } \dfrac{Width}{H_{peak}} \le 1 \\ -0.5 & \text{if } \dfrac{Width}{H_{peak}} \ge 4 \end{cases}$$

Table 5

Gable wall :

$C_{pe\_s\_gA} := -1.3$ $C_{pe\_s\_gB} := -0.8$ $C_{pe\_s\_gC} := -0.5$ Table 5

Zones:

$$L_{sA}(Length, H_{peak}) := 0.2 \cdot b_s(Length, H_{peak})$$

$$L_{sB}(Length, H_{peak}, Width) := \min\left[b_s(Length, H_{peak}) - 0.2 \cdot b_s(Length, H_{peak}), \left(Width - L_{sA}(Length, H_{peak})\right)\right]$$

$$L_{sC}(Length, H_{peak}, Width) := Width - \left(L_{sA}(Length, H_{peak}) + L_{sB}(Length, H_{peak}, Width)\right)$$

Wind load normal to the gablewall of the structure. **<1.13>**

Gable wall (D>B) :

B = Width
D = Length
H = Hight of peak

$$b_g(Width, H_{peak}) := \min(Width, 2 \cdot H_{peak})$$

Windward

$$C_{pe\_g\_ww}(Length, H_{peak}) := \begin{cases} \left[\dfrac{\left(\dfrac{Length}{H_{peak}} - 4\right) \cdot (0.8 - 0.6)}{1 - 4} + 0.6\right] & \text{if } 1 < \dfrac{Length}{H_{peak}} < 4 \\ 0.8 & \text{if } \dfrac{Length}{H_{peak}} \le 1 \\ 0.6 & \text{if } \dfrac{Length}{H_{peak}} \ge 4 \end{cases}$$

Table 5

Leeward

$$C_{pe\_g\_lw}(Length, H_{peak}) := \begin{cases} \left[\dfrac{\left(\dfrac{Length}{H_{peak}} - 4\right) \cdot [(-0.5) - (-0.5)]}{1 - 4} + (-0.5)\right] & \text{if } 1 < \dfrac{Length}{H_{peak}} < 4 \\ -0.5 & \text{if } \dfrac{Length}{H_{peak}} \le 1 \\ -0.5 & \text{if } \dfrac{Length}{H_{peak}} \ge 4 \end{cases}$$

Table 5

Side wall :

$C_{pe\_g\_sA} := -1.3$ $C_{pe\_g\_sB} := -0.8$ $C_{pe\_g\_sC} := -0.5$ Table 5

Zones:

$$L_{gA}(Width, H_{peak}) := 0.2 \cdot b_g(Width, H_{peak})$$

$$L_{gB}(Width, H_{peak}, Length) := \min\left[b_g(Width, H_{peak}) - 0.2 \cdot b_g(Width, H_{peak}), (Length - L_{gA}(Width, H_{peak}))\right]$$

$$L_{gC}(Width, H_{peak}, Length) := Length - (L_{gA}(Width, H_{peak}) + L_{gB}(Width, H_{peak}, Length))$$

b. Roofs art. 2.5.2

$$b_L(Length, H_{peak}) := \min(Length, 2H_{peak})$$

$$b_W(Width, H_{peak}) := \min(Width, 2H_{peak})$$

Wind load normal to the sidewall of the structure. **<1.14>**

Table 10:

$$A_o := \begin{pmatrix} -1.8 \\ -1.1 \\ -0.5 \\ 0.0 \\ 0.8 \\ 0.8 \end{pmatrix} \quad B_o := \begin{pmatrix} -1.2 \\ -0.8 \\ -0.5 \\ 0.0 \\ 0.8 \\ 0.8 \end{pmatrix} \quad C_o := \begin{pmatrix} -0.6 \\ -0.4 \\ -0.2 \\ 0.0 \\ 0.8 \\ 0.8 \end{pmatrix} \quad E := \begin{pmatrix} -0.9 \\ -1.3 \\ -0.9 \\ -0.4 \\ -0.8 \\ -0.9 \end{pmatrix} \quad F := \begin{pmatrix} -0.3 \\ -0.9 \\ -0.5 \\ -0.3 \\ -0.7 \\ -0.6 \end{pmatrix} \quad G := \begin{pmatrix} -0.4 \\ -0.5 \\ -0.5 \\ -0.3 \\ -0.6 \\ -0.8 \end{pmatrix}$$

$$A_u := \begin{pmatrix} 0.0 \\ 0.2 \\ 0.8 \\ 0.8 \\ 0.8 \\ 0.8 \end{pmatrix} \quad B_u := \begin{pmatrix} 0.0 \\ 0.2 \\ 0.5 \\ 0.6 \\ 0.8 \\ 0.8 \end{pmatrix} \quad C_u := \begin{pmatrix} 0.0 \\ 0.2 \\ 0.4 \\ 0.7 \\ 0.8 \\ 0.8 \end{pmatrix} \quad \alpha_p := \begin{pmatrix} 5deg \\ 15deg \\ 30deg \\ 45deg \\ 60deg \\ 75deg \end{pmatrix}$$

$C_{pe\_rs\_A\_o}(\alpha_{roof}) := \text{linterp}(\alpha_p, A_o, \alpha_{roof})$

$C_{pe\_rs\_A\_u}(\alpha_{roof}) := \text{linterp}(\alpha_p, A_u, \alpha_{roof})$

$C_{pe\_rs\_B\_o}(\alpha_{roof}) := \text{linterp}(\alpha_p, B_o, \alpha_{roof})$

$C_{pe\_rs\_B\_u}(\alpha_{roof}) := \text{linterp}(\alpha_p, B_u, \alpha_{roof})$

$C_{pe\_rs\_C\_o}(\alpha_{roof}) := \text{linterp}(\alpha_p, C_o, \alpha_{roof})$

$C_{pe\_rs\_C\_u}(\alpha_{roof}) := \text{linterp}(\alpha_p, C_u, \alpha_{roof})$

$C_{pe\_rs\_E}(\alpha_{roof}) := \text{linterp}(\alpha_p, E, \alpha_{roof})$

$C_{pe\_rs\_F}(\alpha_{roof}) := \text{linterp}(\alpha_p, F, \alpha_{roof})$

$C_{pe\_rs\_G}(\alpha_{roof}) := \text{linterp}(\alpha_p, G, \alpha_{roof})$

Zones:

$$L_{rsA}(Length, H_{peak}) := \frac{b_L(Length, H_{peak})}{2}$$

$$L_{rsB}(Length, H_{peak}) := Length - 2 \cdot L_{rsA}(Length, H_{peak})$$

$$W_{rsA}(Length, H_{peak}) := \frac{b_L(Length, H_{peak})}{10}$$

$$W_{rsB}(Length, H_{peak}) := \frac{b_L(Length, H_{peak})}{10}$$

$$L_{rsE}(Length, H_{peak}) := \frac{b_L(Length, H_{peak})}{2}$$

$$L_{rsF}(Length, H_{peak}) := Length - 2 \cdot L_{rsE}(Length, H_{peak})$$

$$W_{rsE}(Length, H_{peak}) := \frac{b_L(Length, H_{peak})}{10}$$

$$W_{rsF}(Length, H_{peak}) := \frac{b_L(Length, H_{peak})}{10}$$

Wind load normal to the gablewall of the structure. **<1.15>**

Table 10:

$$A := \begin{pmatrix} -2.0 \\ -1.6 \\ -1.2 \\ -1.2 \\ -1.2 \\ -1.2 \end{pmatrix} \quad B := \begin{pmatrix} -1.1 \\ -1.5 \\ -1.1 \\ -1.2 \\ -1.2 \\ -1.2 \end{pmatrix} \quad C := \begin{pmatrix} -0.6 \\ -0.6 \\ -0.6 \\ -0.6 \\ -0.7 \\ -1.15 \end{pmatrix} \quad D := \begin{pmatrix} -0.5 \\ -0.4 \\ -0.5 \\ -0.4 \\ -0.6 \\ -0.6 \end{pmatrix}$$

$$C_{pe\_rg\_A}(\alpha_{roof}) := \text{linterp}(\alpha_p, A, \alpha_{roof})$$

$$C_{pe\_rg\_B}(\alpha_{roof}) := \text{linterp}(\alpha_p, B, \alpha_{roof})$$

$$C_{pe\_rg\_C}(\alpha_{roof}) := \text{linterp}(\alpha_p, C, \alpha_{roof})$$

$$C_{pe\_rg\_D}(\alpha_{roof}) := \text{linterp}(\alpha_p, D, \alpha_{roof})$$

Zones:

$$L_{rgA}(Width, H_{peak}) := \frac{b_W(Width, H_{peak})}{10} \qquad L_{rgB}(Width, H_{peak}) := \frac{b_W(Width, H_{peak})}{10}$$

$$L_{rgC}(Width, H_{peak}) := \frac{b_W(Width, H_{peak})}{2} - \frac{b_W(Width, H_{peak})}{10}$$

$$L_{rgD}(Width, H_{peak}, Length) := Length - \frac{b_W(Width, H_{peak})}{2}$$

2. Internal wind pressure coefficients.

The wind also causes (table 16)

an underpressure: C_{pi_u}

an overpressure: C_{pi_o}

3. Global wind pressure.

Wind load normal to the sidewall of the structure.

Overpressure **<1.16>**

$$q_{sw\_ww.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_o}) := C_{pe\_s\_ww}(W, H_{peak}) \cdot q_w(V_b, H_{peak}, sea, site, RI, L, H_{eave}) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{sw\_lw.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_o}) := C_{pe\_s\_lw}(W, H_{peak}) \cdot q_w(V_b, H_{peak}, sea, site, RI, L, H_{eave}) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rA\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) := C_{pe\_rs\_A\_o}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rB\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) := C_{pe\_rs\_B\_o}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rC\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) := C_{pe\_rs\_C\_o}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rE\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) := C_{pe\_rs\_E}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rF\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) := C_{pe\_rs\_F}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rG\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) := C_{pe\_rs\_G}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{gA\_o}(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L, C_{pi\_o}) := C_{pe\_s\_gA} \cdot q_g(V_b, H_{peak}, sea, site, RI, W, H_{eave}) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{gB\_o}(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L, C_{pi\_o}) := C_{pe\_s\_gB} \cdot q_g(V_b, H_{peak}, sea, site, RI, W, H_{eave}) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{gC\_o}(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L, C_{pi\_o}) := C_{pe\_s\_gC} \cdot q_g(V_b, H_{peak}, sea, site, RI, W, H_{eave}) \ldots + -(C_{pi\_o} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

Underpressure **<1.17>**

$$q_{sw\_ww.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_u}) := C_{pe\_s\_ww}(W, H_{peak}) \cdot q_w(V_b, H_{peak}, sea, site, RI, L, H_{eave}) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{sw\_lw.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_u}) := C_{pe\_s\_lw}(W, H_{peak}) \cdot q_w(V_b, H_{peak}, sea, site, RI, L, H_{eave}) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rA\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) := C_{pe\_rs\_A\_u}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rB\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) := C_{pe\_rs\_B\_u}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rC\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) := C_{pe\_rs\_C\_u}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rE\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) := C_{pe\_rs\_E}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rF\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) := C_{pe\_rs\_F}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rG\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) := C_{pe\_rs\_G}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{gA\_u}(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L, C_{pi\_u}) := C_{pe\_s\_gA} \cdot q_g(V_b, H_{peak}, sea, site, RI, W, H_{eave}) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{gB\_u}(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L, C_{pi\_u}) := C_{pe\_s\_gB} \cdot q_g(V_b, H_{peak}, sea, site, RI, W, H_{eave}) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{gC\_u}(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L, C_{pi\_u}) := C_{pe\_s\_gC} \cdot q_g(V_b, H_{peak}, sea, site, RI, W, H_{eave}) \ldots + -(C_{pi\_u} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

Wind load normal to the gablewall of the structure.

Overpressure / Underpressure **<1.18>**

$$q_{sA\_o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi}) := C_{pe\_g\_sA} \cdot q_w(V_b, H_{peak}, sea, site, RI, L, H_{eave}) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{sB\_o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi}) := C_{pe\_g\_sB} \cdot q_w(V_b, H_{peak}, sea, site, RI, L, H_{eave}) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{sC\_o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi}) := C_{pe\_g\_sC} \cdot q_w(V_b, H_{peak}, sea, site, RI, L, H_{eave}) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rA\_g.o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi}) := C_{pe\_rg\_A}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rB\_g.o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi}) := C_{pe\_rg\_B}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rC\_g.o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi}) := C_{pe\_rg\_C}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{rD\_g.o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi}) := C_{pe\_rg\_D}(\alpha_r) \cdot q_r(V_b, H_{peak}, sea, site, RI, L, W, \alpha_r) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{g\_ww.o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, C_{pi}) := C_{pe\_g\_ww}(L, H_{peak}) \cdot q_g(V_b, H_{peak}, sea, site, RI, W, H_{eave}) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

$$q_{g\_lw.o.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, C_{pi}) := C_{pe\_g\_lw}(L, H_{peak}) \cdot q_g(V_b, H_{peak}, sea, site, RI, W, H_{eave}) \ldots + -(C_{pi} \cdot q_i(V_b, H_{peak}, sea, site, RI, W, H_{eave}, L))$$

The wind pressure on one bay must be supported by one arch. The total wind load per arch equals :

Wind normal on Side :

Overpressure :

Load on the first arch: **<1.19>**

Walls:

$$P_{side1\_o}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_o}, S) := q_{sw\_ww.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_o}) \cdot S$$

$$P_{side4\_o}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_o}, S) := q_{sw\_lw.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_o}) \cdot S$$

Lower roof:

$$load1(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rA\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2}$$

$$load2(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rA\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot L_{rsA}(L, H_p) \ldots$$
$$+ q_{rB\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \left(\frac{S}{2} - L_{rsA}(L, H_p)\right)$$

$$case1(L, H_p, S) := \frac{S}{2} \le L_{rsA}(L, H_p)$$

$$case2(L, H_p, S) := L_{rsA}(L, H_p) < \frac{S}{2} < (L_{rsA}(L, H_p) + L_{rsB}(L, H_p))$$

$$P1_{side2.lower\_o}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) := \begin{array}{|l} load1(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) \text{ if } case1(L, H_p, S) \\ load2(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) \text{ if } case2(L, H_p, S) \end{array}$$

$$P1_{side3.lower\_o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rG\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2}$$

Upper roof:

$$load3(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2}$$

$$load4(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot L_{rsE}(L, H_p) \ldots + q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \left(\frac{S}{2} - L_{rsE}(L, H_p)\right)$$

$$case3(L, H_p, S) := \frac{S}{2} \le L_{rsE}(L, H_p)$$

$$case4(L, H_p, S) := L_{rsE}(L, H_p) < \frac{S}{2} < \left(L_{rsE}(L, H_p) + L_{rsF}(L, H_p)\right)$$

$$P1_{side3.upper\_o}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) := \begin{cases} load3(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case3(L, H_p, S) \\ load4(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case4(L, H_p, S) \end{cases}$$

$$P1_{side2.upper\_o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rC\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2}$$

Load on the second arch: **<1.20>**

Lower roof:

$$load5(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rB\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

$$load6(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rA\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \left(L_{rsA}(L, H_p) - \frac{S}{2}\right) \ldots + q_{rB\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot (S - L_{rsA}(L, H_p)) \ldots + q_{rB\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2}$$

$$load7(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rA\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2} \ldots + q_{rA\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot (L_{rsA}(L, H_p) - S) \ldots + q_{rB\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \left(\frac{3S}{2} - L_{rsA}(L, H_p)\right)$$

$$load8(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rA\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

$$case5(L, H_p, S) := \left(L_{rsA}(L, H_p) \le \frac{S}{2}\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$case6(L, H_p, S) := \left(\frac{S}{2} < L_{rsA}(L, H_p) \le S\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$case7(L, H_p, S) := \left(L_{rsA}(L, H_p) \le \frac{3S}{2}\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$case8(L, H_p, S) := L_{rsA}(L, H_p) > \frac{3S}{2} \vee L_{rsB}(L, H_p) = 0$$

$$P2_{side2.lower\_o}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) := \begin{array}{|ll} load5(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case5(L, H_p, S) \\ load6(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case6(L, H_p, S) \\ load7(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case7(L, H_p, S) \\ load8(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case8(L, H_p, S) \end{array}$$

$$P2_{side3.lower\_o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rG\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

Upper roof:

$$load9(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rF\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

$$load10(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rE\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\left(L_{rsE}(L,H_p)-\frac{S}{2}\right) ... \\ +q_{rF\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot(S-L_{rsE}(L,H_p)) ... \\ +q_{rF\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\frac{S}{2}$$

$$load11(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rE\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\frac{S}{2} ... \\ +q_{rE\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot(L_{rsE}(L,H_p)-S) ... \\ +q_{rF\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\left(\frac{3S}{2}-L_{rsE}(L,H_p)\right)$$

$$load12(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rE\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

$$case9(L,H_p,S) := \left(L_{rsE}(L,H_p)\le\frac{S}{2}\right)\wedge L_{rsF}(L,H_p)\ne 0$$

$$case10(L,H_p,S) := \left(\frac{S}{2}<L_{rsE}(L,H_p)\le S\right)\wedge L_{rsF}(L,H_p)\ne 0$$

$$case11(L,H_p,S) := \left(L_{rsE}(L,H_p)\le\frac{3S}{2}\right)\wedge L_{rsF}(L,H_p)\ne 0$$

$$case12(L,H_p,S) := L_{rsE}(L,H_p)>\frac{3S}{2}\vee L_{rsF}(L,H_p)=0$$

$$P2_{side3.upper\_o}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S) := \left| \begin{array}{l} load9(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S)\ \text{ if }\ case9(L,H_p,S) \\ load10(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S)\ \text{ if }\ case10(L,H_p,S) \\ load11(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S)\ \text{ if }\ case11(L,H_p,S) \\ load12(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S)\ \text{ if }\ case12(L,H_p,S) \end{array} \right.$$

$$P2_{side2.upper\_o}(V_b,H_{peak},H_{eave},sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rC\_s.o}(V_b,H_{peak},H_{eave},sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

Load on the third arch: **<1.21>**

Lower roof:

$$\mathrm{load13}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rB\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

$$\mathrm{load14}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rA\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\left(L_{rsA}(L,H_p)-\frac{3S}{2}\right)\ ...\\ +q_{rB\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot(2S-L_{rsA}(L,H_p))\ ...\\ +q_{rB\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\frac{S}{2}$$

$$\mathrm{load15}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rA\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\frac{S}{2}\ ...\\ +q_{rA\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot(L_{rsA}(L,H_p)-2S)\ ...\\ +q_{rB\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\left(\frac{5S}{2}-L_{rsA}(L,H_p)\right)$$

$$\mathrm{load16}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rA\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

$$\mathrm{case13}(L,H_p,S) := \left(L_{rsA}(L,H_p)\le\frac{3S}{2}\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\mathrm{case14}(L,H_p,S) := \left(\frac{3S}{2}<L_{rsA}(L,H_p)\le 2S\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\mathrm{case15}(L,H_p,S) := \left(2S<L_{rsA}(L,H_p)\le\frac{5S}{2}\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\mathrm{case16}(L,H_p,S) := L_{rsA}(L,H_p)>\frac{5S}{2}\vee L_{rsB}(L,H_p)=0$$

$$P3_{side2.lower\_o}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S) := \left|\begin{array}{ll}\mathrm{load13}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S) & \text{if } \mathrm{case13}(L,H_p,S)\\ \mathrm{load14}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S) & \text{if } \mathrm{case14}(L,H_p,S)\\ \mathrm{load15}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S) & \text{if } \mathrm{case15}(L,H_p,S)\\ \mathrm{load16}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S) & \text{if } \mathrm{case16}(L,H_p,S)\end{array}\right.$$

$$P3_{side3.lower\_o}(V_b,H_{peak},H_{eave},sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rG\_s.o}(V_b,H_{peak},H_{eave},sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

Upper roof:

$$load17(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

$$load18(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \left(L_{rsE}(L, H_p) - \frac{3S}{2}\right) \ldots$$
$$+ q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot (2S - L_{rsE}(L, H_p)) \ldots$$
$$+ q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2}$$

$$load19(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2} \ldots$$
$$+ q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot (L_{rsE}(L, H_p) - 2S) \ldots$$
$$+ q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \left(\frac{5S}{2} - L_{rsE}(L, H_p)\right)$$

$$load20(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

$$case17(L, H_p, S) := \left(L_{rsE}(L, H_p) \le \frac{3S}{2}\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case18(L, H_p, S) := \left(\frac{3S}{2} < L_{rsE}(L, H_p) \le 2S\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case19(L, H_p, S) := \left(2S < L_{rsE}(L, H_p) \le \frac{5S}{2}\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case20(L, H_p, S) := L_{rsE}(L, H_p) > \frac{5S}{2} \vee L_{rsF}(L, H_p) = 0$$

$$P3_{side3.upper\_o}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) := \left| \begin{array}{l} load17(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) \ \text{ if } \ case17(L, H_p, S) \\ load18(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) \ \text{ if } \ case18(L, H_p, S) \\ load19(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) \ \text{ if } \ case19(L, H_p, S) \\ load20(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) \ \text{ if } \ case20(L, H_p, S) \end{array} \right.$$

$$P3_{side2.upper\_o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rC\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

Load on the fourth arch: **<1.22>**

Lower roof:

$$\text{load21}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rB\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

$$\begin{aligned}\text{load22}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := {} & q_{rA\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\left(L_{rsA}(L,H_p)-\frac{5S}{2}\right)\ldots \\ & + q_{rB\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot(3S-L_{rsA}(L,H_p))\ldots \\ & + q_{rB\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\frac{S}{2}\end{aligned}$$

$$\begin{aligned}\text{load23}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := {} & q_{rA\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\frac{S}{2}\ldots \\ & + q_{rA\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot(L_{rsA}(L,H_p)-3S)\ldots \\ & + q_{rB\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot\left(\frac{7S}{2}-L_{rsA}(L,H_p)\right)\end{aligned}$$

$$\text{load24}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rA\_s.o}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

$$\text{case21}(L,H_p,S) := \left(L_{rsA}(L,H_p)\le\frac{5S}{2}\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\text{case22}(L,H_p,S) := \left(\frac{5S}{2}<L_{rsA}(L,H_p)\le 3S\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\text{case23}(L,H_p,S) := \left(3S<L_{rsA}(L,H_p)\le\frac{7S}{2}\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\text{case24}(L,H_p,S) := L_{rsA}(L,H_p)>\frac{7S}{2}\vee L_{rsB}(L,H_p)=0$$

$$P4_{side2.lower\_o}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S) := \begin{array}{|l} \text{load21}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S)\ \text{ if }\ \text{case21}(L,H_p,S) \\ \text{load22}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S)\ \text{ if }\ \text{case22}(L,H_p,S) \\ \text{load23}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S)\ \text{ if }\ \text{case23}(L,H_p,S) \\ \text{load24}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_o},S)\ \text{ if }\ \text{case24}(L,H_p,S)\end{array}$$

$$P4_{side3.lower\_o}(V_b,H_{peak},H_{eave},sea,site,RI,L,W,\alpha_r,C_{pi\_o},S) := q_{rG\_s.o}(V_b,H_{peak},H_{eave},sea,site,RI,L,W,\alpha_r,C_{pi\_o})\cdot S$$

Upper roof:

$$load25(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

$$load26(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \left(L_{rsE}(L, H_p) - \frac{5S}{2}\right) \ldots$$
$$+ q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot (3S - L_{rsE}(L, H_p)) \ldots$$
$$+ q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2}$$

$$load27(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \frac{S}{2} \ldots$$
$$+ q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot (L_{rsE}(L, H_p) - 3S) \ldots$$
$$+ q_{rF\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot \left(\frac{7S}{2} - L_{rsE}(L, H_p)\right)$$

$$load28(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rE\_s.o}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

$$case25(L, H_p, S) := \left(L_{rsE}(L, H_p) \le \frac{5S}{2}\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case26(L, H_p, S) := \left(\frac{5S}{2} < L_{rsE}(L, H_p) \le 3S\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case27(L, H_p, S) := \left(3S < L_{rsE}(L, H_p) \le \frac{7S}{2}\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case28(L, H_p, S) := L_{rsE}(L, H_p) > \frac{7S}{2} \vee L_{rsF}(L, H_p) = 0$$

$$P4_{side3.upper\_o}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) := \left| \begin{array}{ll} load25(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case25(L, H_p, S) \\ load26(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case26(L, H_p, S) \\ load27(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case27(L, H_p, S) \\ load28(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_o}, S) & \text{if } case28(L, H_p, S) \end{array} \right.$$

$$P4_{side2.upper\_o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}, S) := q_{rC\_s.o}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_o}) \cdot S$$

Underpressure :

Load on the first arch: **<1.23>**

Walls:

$$P_{side1\_u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_u}, S) := q_{sw\_ww.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_u}) \cdot S$$

$$P_{side4\_u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_u}, S) := q_{sw\_lw.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, W, L, C_{pi\_u}) \cdot S$$

Lower roof:

$$load1(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2}$$

$$load2(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot L_{rsA}(L, H_p) \dots + q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(\frac{S}{2} - L_{rsA}(L, H_p)\right)$$

$$case1(L, H_p, S) := \frac{S}{2} \le L_{rsA}(L, H_p)$$

$$case2(L, H_p, S) := L_{rsA}(L, H_p) < \frac{S}{2} < (L_{rsA}(L, H_p) + L_{rsB}(L, H_p))$$

$$P1_{side2.lower\_u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) := \left| \begin{array}{l} load1(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case1(L, H_p, S) \\ load2(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case2(L, H_p, S) \end{array} \right.$$

$$P1_{side3.lower\_u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rG\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2}$$

Upper roof:

$$load3(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2}$$

$$load4(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot L_{rsE}(L, H_p) \ldots + q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(\frac{S}{2} - L_{rsE}(L, H_p)\right)$$

$$case3(L, H_p, S) := \frac{S}{2} \le L_{rsE}(L, H_p)$$

$$case4(L, H_p, S) := L_{rsE}(L, H_p) < \frac{S}{2} < (L_{rsE}(L, H_p) + L_{rsF}(L, H_p))$$

$$P1_{side3.upper\_u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) := \begin{vmatrix} load3(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case3(L, H_p, S) \\ load4(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case4(L, H_p, S) \end{vmatrix}$$

$$P1_{side2.upper\_u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rC\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2}$$

Load on the second arch: **<1.24>**

Lower roof:

$$load5(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

$$load6(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(L_{rsA}(L, H_p) - \frac{S}{2}\right) ... + q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot (S - L_{rsA}(L, H_p)) ... + q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2}$$

$$load7(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2} ... + q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot (L_{rsA}(L, H_p) - S) ... + q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(\frac{3S}{2} - L_{rsA}(L, H_p)\right)$$

$$load8(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

$$case5(L, H_p, S) := \left(L_{rsA}(L, H_p) \le \frac{S}{2}\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$case6(L, H_p, S) := \left(\frac{S}{2} < L_{rsA}(L, H_p) \le S\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$case7(L, H_p, S) := \left(L_{rsA}(L, H_p) \le \frac{3S}{2}\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$case8(L, H_p, S) := L_{rsA}(L, H_p) > \frac{3S}{2} \vee L_{rsB}(L, H_p) = 0$$

$$P2_{side2.lower\_u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) := \begin{cases} load5(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) & \text{if } case5(L, H_p, S) \\ load6(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) & \text{if } case6(L, H_p, S) \\ load7(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) & \text{if } case7(L, H_p, S) \\ load8(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) & \text{if } case8(L, H_p, S) \end{cases}$$

$$P2_{side3.lower\_u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rG\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

Upper roof:

$$load9(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

$$load10(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(L_{rsE}(L, H_p) - \frac{S}{2}\right) \ldots$$
$$+ q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot (S - L_{rsE}(L, H_p)) \ldots$$
$$+ q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2}$$

$$load11(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2} \ldots$$
$$+ q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot (L_{rsE}(L, H_p) - S) \ldots$$
$$+ q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(\frac{3S}{2} - L_{rsE}(L, H_p)\right)$$

$$load12(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

$$case9(L, H_p, S) := \left(L_{rsE}(L, H_p) \le \frac{S}{2}\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case10(L, H_p, S) := \left(\frac{S}{2} < L_{rsE}(L, H_p) \le S\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case11(L, H_p, S) := \left(L_{rsE}(L, H_p) \le \frac{3S}{2}\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case12(L, H_p, S) := L_{rsE}(L, H_p) > \frac{3S}{2} \vee L_{rsF}(L, H_p) = 0$$

$$P2_{side3.upper\_u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) := \begin{array}{|l} load9(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case9(L, H_p, S) \\ load10(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case10(L, H_p, S) \\ load11(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case11(L, H_p, S) \\ load12(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case12(L, H_p, S) \end{array}$$

$$P2_{side2.upper\_u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rC\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

Load on the third arch: **<1.25>**

Lower roof:

$$\text{load13}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

$$\text{load14}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(L_{rsA}(L, H_p) - \frac{3S}{2}\right) \ldots \\ + q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot (2S - L_{rsA}(L, H_p)) \ldots \\ + q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2}$$

$$\text{load15}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2} \ldots \\ + q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot (L_{rsA}(L, H_p) - 2S) \ldots \\ + q_{rB\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(\frac{5S}{2} - L_{rsA}(L, H_p)\right)$$

$$\text{load16}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rA\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

$$\text{case13}(L, H_p, S) := \left(L_{rsA}(L, H_p) \le \frac{3S}{2}\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$\text{case14}(L, H_p, S) := \left(\frac{3S}{2} < L_{rsA}(L, H_p) \le 2S\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$\text{case15}(L, H_p, S) := \left(2S < L_{rsA}(L, H_p) \le \frac{5S}{2}\right) \wedge L_{rsB}(L, H_p) \ne 0$$

$$\text{case16}(L, H_p, S) := L_{rsA}(L, H_p) > \frac{5S}{2} \vee L_{rsB}(L, H_p) = 0$$

$$P3_{side2.lower\_u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) := \begin{array}{|l} \text{load13}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } \text{case13}(L, H_p, S) \\ \text{load14}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } \text{case14}(L, H_p, S) \\ \text{load15}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } \text{case15}(L, H_p, S) \\ \text{load16}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } \text{case16}(L, H_p, S) \end{array}$$

$$P3_{side3.lower\_u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rG\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

Upper roof:

$$\mathrm{load17}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u},S) := q_{rF\_s.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot S$$

$$\mathrm{load18}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u},S) := q_{rE\_s.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot\left(L_{rsE}(L,H_p)-\frac{3S}{2}\right) \ldots$$
$$+q_{rF\_s.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot(2S-L_{rsE}(L,H_p)) \ldots$$
$$+q_{rF\_s.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot\frac{S}{2}$$

$$\mathrm{load19}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u},S) := q_{rE\_s.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot\frac{S}{2} \ldots$$
$$+q_{rE\_s.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot(L_{rsE}(L,H_p)-2S) \ldots$$
$$+q_{rF\_s.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot\left(\frac{5S}{2}-L_{rsE}(L,H_p)\right)$$

$$\mathrm{load20}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u},S) := q_{rE\_s.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot S$$

$$\mathrm{case17}(L,H_p,S) := \left(L_{rsE}(L,H_p)\le\frac{3S}{2}\right)\wedge L_{rsF}(L,H_p)\ne 0$$

$$\mathrm{case18}(L,H_p,S) := \left(\frac{3S}{2}<L_{rsE}(L,H_p)\le 2S\right)\wedge L_{rsF}(L,H_p)\ne 0$$

$$\mathrm{case19}(L,H_p,S) := \left(2S<L_{rsE}(L,H_p)\le\frac{5S}{2}\right)\wedge L_{rsF}(L,H_p)\ne 0$$

$$\mathrm{case20}(L,H_p,S) := L_{rsE}(L,H_p)>\frac{5S}{2}\vee L_{rsF}(L,H_p)=0$$

$$P3_{side3.upper\_u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) := \left|\begin{array}{ll} \mathrm{load17}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) & \text{if } \mathrm{case17}(L,H_p,S)\\ \mathrm{load18}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) & \text{if } \mathrm{case18}(L,H_p,S)\\ \mathrm{load19}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) & \text{if } \mathrm{case19}(L,H_p,S)\\ \mathrm{load20}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) & \text{if } \mathrm{case20}(L,H_p,S)\end{array}\right.$$

$$P3_{side2.upper\_u}(V_b,H_{peak},H_{eave},sea,site,RI,L,W,\alpha_r,C_{pi\_u},S) := q_{rC\_s.u}(V_b,H_{peak},H_{eave},sea,site,RI,L,W,\alpha_r,C_{pi\_u})\cdot S$$

Load on the fourth arch: **<1.26>**

Lower roof:

$$\text{load21}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u},S) := q_{rB\_s.u}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot S$$

$$\begin{aligned}\text{load22}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u},S) := {} & q_{rA\_s.u}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot\left(L_{rsA}(L,H_p)-\frac{5S}{2}\right)\ \ldots\\ & +q_{rB\_s.u}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot(3S-L_{rsA}(L,H_p))\ \ldots\\ & +q_{rB\_s.u}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot\frac{S}{2}\end{aligned}$$

$$\begin{aligned}\text{load23}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u},S) := {} & q_{rA\_s.u}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot\frac{S}{2}\ \ldots\\ & +q_{rA\_s.u}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot(L_{rsA}(L,H_p)-3S)\ \ldots\\ & +q_{rB\_s.u}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot\left(\frac{7S}{2}-L_{rsA}(L,H_p)\right)\end{aligned}$$

$$\text{load24}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u},S) := q_{rA\_s.u}(V_b,H_p,H_e,\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot S$$

$$\text{case21}(L,H_p,S) := \left(L_{rsA}(L,H_p)\le\frac{5S}{2}\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\text{case22}(L,H_p,S) := \left(\frac{5S}{2}<L_{rsA}(L,H_p)\le 3S\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\text{case23}(L,H_p,S) := \left(3S<L_{rsA}(L,H_p)\le\frac{7S}{2}\right)\wedge L_{rsB}(L,H_p)\ne 0$$

$$\text{case24}(L,H_p,S) := L_{rsA}(L,H_p)>\frac{7S}{2}\vee L_{rsB}(L,H_p)=0$$

$$P4_{side2.lower\_u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) := \left|\begin{array}{ll}\text{load21}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) & \text{if case21}(L,H_p,S)\\ \text{load22}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) & \text{if case22}(L,H_p,S)\\ \text{load23}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) & \text{if case23}(L,H_p,S)\\ \text{load24}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi\_u},S) & \text{if case24}(L,H_p,S)\end{array}\right.$$

$$P4_{side3.lower\_u}(V_b,H_{peak},H_{eave},\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u},S) := q_{rG\_s.u}(V_b,H_{peak},H_{eave},\text{sea},\text{site},RI,L,W,\alpha_r,C_{pi\_u})\cdot S$$

Upper roof:

$$load25(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

$$load26(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(L_{rsE}(L, H_p) - \frac{5S}{2}\right) \ldots$$
$$+ q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot (3S - L_{rsE}(L, H_p)) \ldots$$
$$+ q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2}$$

$$load27(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \frac{S}{2} \ldots$$
$$+ q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot (L_{rsE}(L, H_p) - 3S) \ldots$$
$$+ q_{rF\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot \left(\frac{7S}{2} - L_{rsE}(L, H_p)\right)$$

$$load28(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rE\_s.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

$$case25(L, H_p, S) := \left(L_{rsE}(L, H_p) \le \frac{5S}{2}\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case26(L, H_p, S) := \left(\frac{5S}{2} < L_{rsE}(L, H_p) \le 3S\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case27(L, H_p, S) := \left(3S < L_{rsE}(L, H_p) \le \frac{7S}{2}\right) \wedge L_{rsF}(L, H_p) \ne 0$$

$$case28(L, H_p, S) := L_{rsE}(L, H_p) > \frac{7S}{2} \vee L_{rsF}(L, H_p) = 0$$

$$P4_{side3.upper\_u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) := \begin{array}{|l} load25(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case25(L, H_p, S) \\ load26(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case26(L, H_p, S) \\ load27(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case27(L, H_p, S) \\ load28(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi\_u}, S) \text{ if } case28(L, H_p, S) \end{array}$$

$$P4_{side2.upper\_u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}, S) := q_{rC\_s.u}(V_b, H_{peak}, H_{eave}, sea, site, RI, L, W, \alpha_r, C_{pi\_u}) \cdot S$$

Wind normal on gable :

Overpressure / Underpressure :

Load on the first arch: **<1.27>**

Walls:

$$\text{load1}(V_b, H_p, H_e, sea, site, RI, L, C_{pi}, S) := q_{sA\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \frac{S}{2}$$

$$\text{load2}(V_b, H_p, H_e, sea, site, RI, L, W, C_{pi}, S) := q_{sA\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot L_{gA}(W, H_p) \ldots + q_{sB\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \left(\frac{S}{2} - L_{gA}(W, H_p)\right)$$

$$\text{case1}(W, H_p, S) := \frac{S}{2} \le L_{gA}(W, H_p)$$

$$\text{case2}(W, L, H_p, S) := L_{gA}(W, H_p) < \frac{S}{2} < \left(L_{gA}(W, H_p) + L_{gB}(W, H_p, L)\right)$$

$$P1_{gab1.4\_o.u}(V_b, H_p, H_e, se, si, RI, L, W, C_{pi}, S) := \begin{vmatrix} \text{load1}(V_b, H_p, H_e, se, si, RI, L, C_{pi}, S) \text{ if } \text{case1}(W, H_p, S) \\ \text{load2}(V_b, H_p, H_e, se, si, RI, L, W, C_{pi}, S) \text{ if } \text{case2}(W, L, H_p, S) \end{vmatrix}$$

Roof:

$$load3a(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rA\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2}$$

$$load3b(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rB\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2}$$

$$load4a(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rA\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot L_{rgA}(W, H_p) \ldots + q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(\frac{S}{2} - L_{rgA}(W, H_p)\right)$$

$$load4b(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rB\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot L_{rgB}(W, H_p) \ldots + q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(\frac{S}{2} - L_{rgB}(W, H_p)\right)$$

$$case3(W, H_p, S) := \frac{S}{2} \le L_{rgA}(W, H_p)$$

$$case4(W, H_p, S) := L_{rgA}(W, H_p) < \frac{S}{2} < \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right)$$

$$P1_{g2.3a\_o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := \begin{vmatrix} load3a(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) \ \text{ if } \ case3(W, H_p, S) \\ load4a(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) \ \text{ if } \ case4(W, H_p, S) \end{vmatrix}$$

$$P1_{g2.3b\_o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := \begin{vmatrix} load3b(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) \ \text{ if } \ case3(W, H_p, S) \\ load4b(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) \ \text{ if } \ case4(W, H_p, S) \end{vmatrix}$$

Load on the second arch: **<1.28>**

Walls:

$$load5(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S) := q_{sB\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot S$$

$$load6(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S) := q_{sA\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \left(L_{gA}(W, H_p) - \frac{S}{2}\right) \ldots$$
$$+ q_{sB\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot (S - L_{gA}(W, H_p)) \ldots$$
$$+ q_{sB\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \frac{S}{2}$$

$$load7(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S) := q_{sA\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \frac{S}{2} \ldots$$
$$+ q_{sA\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot (L_{gA}(W, H_p) - S) \ldots$$
$$+ q_{sB\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \left(\frac{3S}{2} - L_{gA}(W, H_p)\right)$$

$$load8(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S) := q_{sA\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot S$$

$$case5(W, H_p, S) := L_{gA}(W, H_p) \le \frac{S}{2}$$

$$case6(W, H_p, S) := \frac{S}{2} < L_{gA}(W, H_p) \le S$$

$$case7(W, H_p, S) := L_{gA}(W, H_p) \le \frac{3S}{2}$$

$$case8(W, H_p, S) := L_{gA}(W, H_p) > \frac{3S}{2}$$

$$P2_{gab1.4\_o.u}(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) := \left| \begin{array}{l} load5(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) \ \text{ if } \ case5(W, H_p, S) \\ load6(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) \ \text{ if } \ case6(W, H_p, S) \\ load7(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) \ \text{ if } \ case7(W, H_p, S) \\ load8(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) \ \text{ if } \ case8(W, H_p, S) \end{array} \right.$$

Roof:

$$load9(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rD\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot S$$

$$load10(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p) - \frac{S}{2}\right) + q_{rD\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left[S - \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right)\right] + q_{rD\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2}$$

$$load11(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := q_{rC\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2} + q_{rC\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left[\left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) - S\right] + q_{rD\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left[\frac{3S}{2} + -\left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right)\right]$$

$$load12(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot S$$

$$load13a(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rA\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(L_{rgA}(W, H_p) - \frac{S}{2}\right) + q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(S - L_{rgA}(W, H_p)\right) + q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2}$$

$$load13b(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rB\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(L_{rgB}(W, H_p) - \frac{S}{2}\right) + q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(S - L_{rgB}(W, H_p)\right) + q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2}$$

$$load14a(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rA\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2} + q_{rA\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(L_{rgA}(W, H_p) - S\right) + q_{rC\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot \left(\frac{3S}{2} - L_{rgA}(W, H_p)\right)$$

$$\mathrm{load14b}\left(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi},S\right) := q_{rB\_g.o.u}\left(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi}\right)\cdot\frac{S}{2}\ ...$$
$$+\,q_{rB\_g.o.u}\left(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi}\right)\cdot\left(L_{rgB}\left(W,H_p\right)-S\right)\ ...$$
$$+\,q_{rC\_g.o.u}\left(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi}\right)\cdot\left(\frac{3S}{2}-L_{rgB}\left(W,H_p\right)\right)$$

$$\mathrm{case9}\left(W,H_p,S\right) := \left(L_{rgA}\left(W,H_p\right)+L_{rgC}\left(W,H_p\right)\right)\le\frac{S}{2}$$

$$\mathrm{case10}\left(W,H_p,S\right) := \frac{S}{2}<\left(L_{rgA}\left(W,H_p\right)+L_{rgC}\left(W,H_p\right)\right)\le S$$

$$\mathrm{case11}\left(W,H_p,S\right) := S<\left(L_{rgA}\left(W,H_p\right)+L_{rgC}\left(W,H_p\right)\right)\le\frac{3S}{2}$$

$$\mathrm{case12}\left(W,H_p,S\right) := \left(L_{rgA}\left(W,H_p\right)+L_{rgC}\left(W,H_p\right)\right)>\frac{3S}{2}$$

$$\mathrm{case13}\left(W,H_p,S\right) := \frac{S}{2}<L_{rgA}\left(W,H_p\right)\le S$$

$$\mathrm{case14}\left(W,H_p,S\right) := S<L_{rgA}\left(W,H_p\right)\le\frac{3S}{2}$$

$$P2_{g2.3a\_o.u}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right) := \left|\begin{array}{l}\mathrm{load9}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case9}\left(W,H_p,S\right)\\ \mathrm{load10}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case10}\left(W,H_p,S\right)\\ \mathrm{load11}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case11}\left(W,H_p,S\right)\\ \mathrm{load12}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case12}\left(W,H_p,S\right)\\ \mathrm{load13a}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case13}\left(W,H_p,S\right)\\ \mathrm{load14a}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case14}\left(W,H_p,S\right)\end{array}\right.$$

$$P2_{g2.3b\_o.u}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right) := \left|\begin{array}{l}\mathrm{load9}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case9}\left(W,H_p,S\right)\\ \mathrm{load10}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case10}\left(W,H_p,S\right)\\ \mathrm{load11}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case11}\left(W,H_p,S\right)\\ \mathrm{load12}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case12}\left(W,H_p,S\right)\\ \mathrm{load13b}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case13}\left(W,H_p,S\right)\\ \mathrm{load14b}\left(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S\right)\ \text{if}\ \mathrm{case14}\left(W,H_p,S\right)\end{array}\right.$$

Load on the third arch: **<1.29>**

Walls:

$$load15(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi},S) := q_{sC\_o.u}(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi})\cdot S$$

$$load16(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi},S) := q_{sB\_o.u}(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi})\cdot\left(L_{gA}(W,H_p) + L_{gB}(W,H_p,L) - \frac{3S}{2}\right) + q_{sC\_o.u}(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi})\cdot\left[2S - \left(L_{gA}(W,H_p) + L_{gB}(W,H_p,L)\right)\right] + q_{sC\_o.u}(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi})\cdot\frac{S}{2}$$

$$load17(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi},S) := q_{sB\_o.u}(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi})\cdot\frac{S}{2} + q_{sB\_o.u}(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi})\cdot\left[\left(L_{gA}(W,H_p) + L_{gB}(W,H_p,L)\right) - 2S\right] + q_{sC\_o.u}(V_b,H_p,H_e,sea,site,RI,W,L,C_{pi})\cdot\left[\frac{5S}{2} - \left(L_{gA}(W,H_p) + L_{gB}(W,H_p,L)\right)\right]$$

$$case15(W,H_p,L,S) := \left(L_{gA}(W,H_p) + L_{gB}(W,H_p,L)\right) \le \frac{3S}{2}$$

$$case16(W,H_p,L,S) := \frac{3\cdot S}{2} < \left(L_{gA}(W,H_p) + L_{gB}(W,H_p,L)\right) \le 2S$$

$$case17(W,H_p,L,S) := 2\cdot S < \left(L_{gA}(W,H_p) + L_{gB}(W,H_p,L)\right) \le \frac{5S}{2}$$

$$P3_{gab1.4\_o.u}(V_b,H_p,H_e,se,si,RI,W,L,C_{pi},S) := \begin{array}{|ll} load15(V_b,H_p,H_e,se,si,RI,W,L,C_{pi},S) & \text{if } case15(W,H_p,L,S) \\ load16(V_b,H_p,H_e,se,si,RI,W,L,C_{pi},S) & \text{if } case16(W,H_p,L,S) \\ load17(V_b,H_p,H_e,se,si,RI,W,L,C_{pi},S) & \text{if } case17(W,H_p,L,S) \end{array}$$

Roof:

$$load18(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rD\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot S$$

$$load19(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := q_{rC\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p) - \frac{3S}{2}\right) + q_{rD\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left[2S - \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right)\right] + q_{rD\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2}$$

$$load20(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := q_{rC\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2} + q_{rC\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left[\left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) - 2S\right] + q_{rD\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left[\frac{5S}{2} + -\left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right)\right]$$

$$case18(W, H_p, S) := \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) \le \frac{3S}{2}$$

$$case19(W, H_p, S) := \frac{3S}{2} < \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) \le 2S$$

$$case20(W, H_p, S) := 2S < \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) \le \frac{5S}{2}$$

$$P3_{g2.3\_o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := \begin{cases} load18(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) & \text{if } case18(W, H_p, S) \\ load19(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) & \text{if } case19(W, H_p, S) \\ load20(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) & \text{if } case20(W, H_p, S) \end{cases}$$

Load on the fourth arch: **<1.30>**

Walls:

$$\text{load21}\left(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S\right) := q_{sC\_o.u}\left(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}\right)\cdot S$$

$$\text{load22}\left(V_b, H_p, H_e, sea, site, RI, W, L, c, C_{pi}, S\right) := q_{sB\_o.u}\left(V_b, H_p, H_e, sea, site, RI, W, L, c, C_{pi}\right)\cdot\left(L_{gA}\left(W, H_p\right) + L_{gB}\left(W, H_p, L\right) - \frac{5S}{2}\right) + q_{sC\_o.u}\left(V_b, H_p, H_e, sea, site, RI, W, L, c, C_{pi}\right)\cdot\left[3S - \left(L_{gA}\left(W, H_p\right) + L_{gB}\left(W, H_p, L\right)\right)\right] + q_{sC\_o.u}\left(V_b, H_p, H_e, sea, site, RI, W, L, c, C_{pi}\right)\cdot\frac{S}{2}$$

$$\text{load23}\left(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S\right) := q_{sB\_o.u}\left(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}\right)\cdot\frac{S}{2} + q_{sB\_o.u}\left(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}\right)\cdot\left[\left(L_{gA}\left(W, H_p\right) + L_{gB}\left(W, H_p, L\right)\right) - 3S\right] + q_{sC\_o.u}\left(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}\right)\cdot\left[\frac{7S}{2} - \left(L_{gA}\left(W, H_p\right) + L_{gB}\left(W, H_p, L\right)\right)\right]$$

$$\text{case21}\left(W, H_p, L, S\right) := \left(L_{gA}\left(W, H_p\right) + L_{gB}\left(W, H_p, L\right)\right) \le \frac{5S}{2}$$

$$\text{case22}\left(W, H_p, L, S\right) := \frac{5\cdot S}{2} < \left(L_{gA}\left(W, H_p\right) + L_{gB}\left(W, H_p, L\right)\right) \le 3S$$

$$\text{case23}\left(W, H_p, L, S\right) := 3\cdot S < \left(L_{gA}\left(W, H_p\right) + L_{gB}\left(W, H_p, L\right)\right) \le \frac{7S}{2}$$

$$P4_{gab1.4\_o.u}\left(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S\right) := \begin{cases} \text{load21}\left(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S\right) & \text{if } \text{case21}\left(W, H_p, L, S\right) \\ \text{load22}\left(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S\right) & \text{if } \text{case22}\left(W, H_p, L, S\right) \\ \text{load23}\left(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S\right) & \text{if } \text{case23}\left(W, H_p, L, S\right) \end{cases}$$

Roof:

$$load24(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}, S) := q_{rD\_g.o.u}(V_b, H_p, H_e, sea, site, RI, L, W, \alpha_r, C_{pi}) \cdot S$$

$$load25(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := q_{rC\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p) - \frac{5S}{2}\right) + q_{rD\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left[3S - \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right)\right] + q_{rD\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2}$$

$$load26(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := q_{rC\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \frac{S}{2} + q_{rC\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left[\left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) - 3S\right] + q_{rD\_g.o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}) \cdot \left[\frac{7S}{2} + -\left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right)\right]$$

$$case24(W, H_p, S) := \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) \le \frac{5S}{2}$$

$$case25(W, H_p, S) := \frac{5S}{2} < \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) \le 3S$$

$$case26(W, H_p, S) := 3S < \left(L_{rgA}(W, H_p) + L_{rgC}(W, H_p)\right) \le \frac{7S}{2}$$

$$P4_{g2.3\_o.u}(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) := \begin{cases} load24(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) & \text{if } case24(W, H_p, S) \\ load25(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) & \text{if } case25(W, H_p, S) \\ load26(V_b, H_p, H_e, se, si, RI, L, W, \alpha_r, C_{pi}, S) & \text{if } case26(W, H_p, S) \end{cases}$$

Load on the fifth arch: **<1.31>**

Walls:

$$load27(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S) := q_{sC\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot S$$

$$load28(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S) := q_{sB\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \left(L_{gA}(W, H_p) + L_{gB}(W, H_p, L) - \frac{7S}{2}\right) + q_{sC\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \left[4S - \left(L_{gA}(W, H_p) + L_{gB}(W, H_p, L)\right)\right] + q_{sC\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \frac{S}{2}$$

$$load29(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}, S) := q_{sB\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \frac{S}{2} + q_{sB\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \left[\left(L_{gA}(W, H_p) + L_{gB}(W, H_p, L)\right) - 4S\right] + q_{sC\_o.u}(V_b, H_p, H_e, sea, site, RI, W, L, C_{pi}) \cdot \left[\frac{9S}{2} - \left(L_{gA}(W, H_p) + L_{gB}(W, H_p, L)\right)\right]$$

$$case27(W, H_p, L, S) := \left(L_{gA}(W, H_p) + L_{gB}(W, H_p, L)\right) \le \frac{7S}{2}$$

$$case28(W, H_p, L, S) := \frac{7 \cdot S}{2} < \left(L_{gA}(W, H_p) + L_{gB}(W, H_p, L)\right) \le 4S$$

$$case29(W, H_p, L, S) := 4 \cdot S < \left(L_{gA}(W, H_p) + L_{gB}(W, H_p, L)\right) \le \frac{9S}{2}$$

$$P5_{gab1.4\_o.u}(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) := \begin{cases} load27(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) & \text{if } case27(W, H_p, L, S) \\ load28(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) & \text{if } case28(W, H_p, L, S) \\ load29(V_b, H_p, H_e, se, si, RI, W, L, C_{pi}, S) & \text{if } case29(W, H_p, L, S) \end{cases}$$

Roof:

$$\text{load30}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi},S) := q_{rD\_g.o.u}(V_b,H_p,H_e,sea,site,RI,L,W,\alpha_r,C_{pi})\cdot S$$

$$\text{load31}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S) := q_{rC\_g.o.u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi})\cdot\left(L_{rgA}(W,H_p) + L_{rgC}(W,H_p) - \frac{7S}{2}\right) + q_{rD\_g.o.u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi})\cdot\left[4S - \left(L_{rgA}(W,H_p) + L_{rgC}(W,H_p)\right)\right] + q_{rD\_g.o.u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi})\cdot\frac{S}{2}$$

$$\text{load32}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S) := q_{rC\_g.o.u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi})\cdot\frac{S}{2} + q_{rC\_g.o.u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi})\cdot\left[\left(L_{rgA}(W,H_p) + L_{rgC}(W,H_p)\right) - 4S\right] + q_{rD\_g.o.u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi})\cdot\left[\frac{9S}{2} + -\left(L_{rgA}(W,H_p) + L_{rgC}(W,H_p)\right)\right]$$

$$\text{case30}(W,H_p,S) := \left(L_{rgA}(W,H_p) + L_{rgC}(W,H_p)\right) \le \frac{7S}{2}$$

$$\text{case31}(W,H_p,S) := \frac{7S}{2} < \left(L_{rgA}(W,H_p) + L_{rgC}(W,H_p)\right) \le 4S$$

$$\text{case32}(W,H_p,S) := 4S < \left(L_{rgA}(W,H_p) + L_{rgC}(W,H_p)\right) \le \frac{9S}{2}$$

$$P5_{g2.3\_o.u}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S) := \begin{cases} \text{load30}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S) & \text{if } \text{case30}(W,H_p,S) \\ \text{load31}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S) & \text{if } \text{case31}(W,H_p,S) \\ \text{load32}(V_b,H_p,H_e,se,si,RI,L,W,\alpha_r,C_{pi},S) & \text{if } \text{case32}(W,H_p,S) \end{cases}$$

1.3. Load combinations.

The different load combinations that will be checked, (+ the combination factors), are automatically generated by the computer program according to the desired norm.

Doc. 2. Materials.

2.1. Properties.

$\gamma_M := 1.1$	partial safety factor
$\gamma_{Mb} := 1.25$	partial safety factor for bolts and pins
$\gamma_{Mr} := 1.25$	partial safety factor for rivets

2.2. Aluminium.

Quality = 6061 T6.

Yield stress	$R_{e\_alu} := 240 \cdot \frac{N}{mm^2}$	Modulus of elasticity	$E_{alu} := 70000 \cdot \frac{N}{mm^2}$
Tensile strength	$R_{t\_alu} := 260 \cdot \frac{N}{mm^2}$	Admissible stress	$\sigma_{adm\_alu} := \frac{R_{e\_alu}}{\gamma_M}$

	2.2.1. ALU 380/166	2.2.2. ALU 310/130
Wall thickness	$t_{alu380} := 6mm$	$t_{alu310} := 4.5mm$
Section	$A_{alu380} := 7216 \cdot mm^2$	$A_{alu310} := 4375 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu380} := 1.27 \cdot 10^8 \cdot mm^4$	$I_{y\_alu310} := 5.05 \cdot 10^7 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu380} := 3.33 \cdot 10^7 \cdot mm^4$	$I_{z\_alu310} := 1.25 \cdot 10^7 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu380} := 190 \cdot mm$	$y_{y\_alu310} := 155 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu380} := 83 \cdot mm$	$y_{z\_alu310} := 65 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu380} := 6.66 \cdot 10^5 \cdot mm^3$	$W_{ely\_alu310} := 3.26 \cdot 10^5 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu380} := 4.01 \cdot 10^5 \cdot mm^3$	$W_{elz\_alu310} := 1.92 \cdot 10^5 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu380} := 8.66 \cdot 10^5 \cdot mm^3$	$W_{ply\_alu310} := 4.26 \cdot 10^5 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu380} := 4.66 \cdot 10^5 \cdot mm^3$	$W_{plz\_alu310} := 2.22 \cdot 10^5 \cdot mm^3$

	2.2.3. ALU 297_8/117	**2.2.4. ALU 297_11/117**
Wall thickness	$t_{alu297\_8} := 4mm$	$t_{alu297\_11} := 4.5mm$
Section	$A_{alu297\_8} := 3509 \cdot mm^2$	$A_{alu297\_11} := 4237 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu297\_8} := 3.86 \cdot 10^7 \cdot mm^4$	$I_{y\_alu297\_11} := 4.89 \cdot 10^7 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu297\_8} := 6.88 \cdot 10^6 \cdot mm^4$	$I_{z\_alu297\_11} := 7.78 \cdot 10^6 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu297\_8} := 148.5 \cdot mm$	$y_{y\_alu297\_11} := 148.5 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu297\_8} := 58.5 \cdot mm$	$y_{z\_alu297\_11} := 58.5 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu297\_8} := 2.56 \cdot 10^5 \cdot mm^3$	$W_{ely\_alu297\_11} := 3.25 \cdot 10^5 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu297\_8} := 1.18 \cdot 10^5 \cdot mm^3$	$W_{elz\_alu297\_11} := 1.33 \cdot 10^5 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu297\_8} := 3.30 \cdot 10^5 \cdot mm^3$	$W_{ply\_alu297\_11} := 4.11 \cdot 10^5 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu297\_8} := 1.41 \cdot 10^5 \cdot mm^3$	$W_{plz\_alu297\_11} := 1.63 \cdot 10^5 \cdot mm^3$

	2.2.5. ALU 297_24.5/117	**2.2.6. ALU 310+297_8**
Wall thickness	$t_{alu297\_24.5} := 4mm$	$t_{alu310297\_8} := t_{alu310} + t_{alu297\_8}$
Section	$A_{alu297\_24.5} := 5574 \cdot mm^2$	$A_{alu310297\_8} := 7884 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu297\_24.5} := 7.46 \cdot 10^7 \cdot mm^4$	$I_{y\_alu310297\_8} := 8.91 \cdot 10^7 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu297\_24.5} := 7.60 \cdot 10^6 \cdot mm^4$	$I_{z\_alu310297\_8} := 1.94 \cdot 10^7 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu297\_24.5} := 148.5 \cdot mm$	$y_{y\_alu310297\_8} := 155 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu297\_24.5} := 58.5 \cdot mm$	$y_{z\_alu310297\_8} := 65 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu297\_24.5} := 5.02 \cdot 10^5 \cdot mm^3$	$W_{ely\_alu310297\_8} := 5.75 \cdot 10^5 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu297\_24.5} := 1.30 \cdot 10^5 \cdot mm^3$	$W_{elz\_alu310297\_8} := 2.98 \cdot 10^5 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu297\_24.5} := 6.02 \cdot 10^5 \cdot mm^3$	$W_{ply\_alu310297\_8} := 7.56 \cdot 10^5 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu297\_24.5} := 1.75 \cdot 10^5 \cdot mm^3$	$W_{plz\_alu310297\_8} := 3.64 \cdot 10^5 \cdot mm^3$

	2.2.7. ALU 310+297_11	**2.2.8. ALU 310+297_24.5**
Wall thickness	$t_{alu310297\_11} := t_{alu310} + t_{alu297\_11}$	$t_{alu310297\_24.5} := t_{alu310} + t_{alu297\_24.5}$
Section	$A_{alu310297\_11} := 8612 \cdot mm^2$	$A_{alu310297\_24.5} := 9949 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu310297\_11} := 9.94 \cdot 10^7 \cdot mm^4$	$I_{y\_alu310297\_24.5} := 1.25 \cdot 10^8 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu310297\_11} := 2.03 \cdot 10^7 \cdot mm^4$	$I_{z\_alu310297\_24.5} := 2.01 \cdot 10^7 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu310297\_11} := 155 \cdot mm$	$y_{y\_alu310297\_24.5} := 155 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu310297\_11} := 65 \cdot mm$	$y_{z\_alu310297\_24.5} := 65 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu310297\_11} := 6.41 \cdot 10^5 \cdot mm^3$	$W_{ely\_alu310297\_24.5} := 8.07 \cdot 10^5 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu310297\_11} := 3.12 \cdot 10^5 \cdot mm^3$	$W_{elz\_alu310297\_24.5} := 3.09 \cdot 10^5 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu310297\_11} := 8.37 \cdot 10^5 \cdot mm^3$	$W_{ply\_alu310297\_24.5} := 1.03 \cdot 10^6 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu310297\_11} := 3.86 \cdot 10^5 \cdot mm^3$	$W_{plz\_alu310297\_24.5} := 3.97 \cdot 10^5 \cdot mm^3$

	2.2.9. ALU 270/100	**2.2.10. ALU 260/91**
Wall thickness	$t_{alu270} := 3.5 \cdot mm$	$t_{alu260} := 4mm$
Section	$A_{alu270} := 3110 \cdot mm^2$	$A_{alu260} := 3257 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu270} := 2.71 \cdot 10^7 \cdot mm^4$	$I_{y\_alu260} := 2.55 \cdot 10^7 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu270} := 5.11 \cdot 10^6 \cdot mm^4$	$I_{z\_alu260} := 3.58 \cdot 10^6 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu270} := 135 \cdot mm$	$y_{y\_alu260} := 130 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu270} := 50 \cdot mm$	$y_{z\_alu260} := 45.5 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu270} := 2.01 \cdot 10^5 \cdot mm^3$	$W_{ely\_alu260} := 1.96 \cdot 10^5 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu270} := 1.02 \cdot 10^5 \cdot mm^3$	$W_{elz\_alu260} := 7.86 \cdot 10^4 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu270} := 2.64 \cdot 10^5 \cdot mm^3$	$W_{ply\_alu260} := 2.60 \cdot 10^5 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu270} := 1.20 \cdot 10^5 \cdot mm^3$	$W_{plz\_alu260} := 9.95 \cdot 10^4 \cdot mm^3$

	2.2.11. ALU 270+260	2.2.12. ALU 240/100
Wall thickness	$t_{alu270260} := t_{alu270} + t_{alu260}$	$t_{alu240} := 3\cdot mm$
Section	$A_{alu270260} := 6367\cdot mm^2$	$A_{alu240} := 2320\cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu270260} := 5.26\cdot 10^7\cdot mm^4$	$I_{y\_alu240} := 1.68\cdot 10^7\cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu270260} := 8.69\cdot 10^6\cdot mm^4$	$I_{z\_alu240} := 3.90\cdot 10^6\cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu270260} := 135\cdot mm$	$y_{y\_alu240} := 120\cdot mm$
Height of the profile in z-direction	$y_{z\_alu270260} := 50\cdot mm$	$y_{z\_alu240} := 50\cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu270260} := 3.90\cdot 10^5\cdot mm^3$	$W_{ely\_alu240} := 1.40\cdot 10^5\cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu270260} := 1.74\cdot 10^5\cdot mm^3$	$W_{elz\_alu240} := 7.79\cdot 10^4\cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu270260} := 5.25\cdot 10^5\cdot mm^3$	$W_{ply\_alu240} := 1.79\cdot 10^5\cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu270260} := 2.19\cdot 10^5\cdot mm^3$	$W_{plz\_alu240} := 9.04\cdot 10^4\cdot mm^3$

	2.2.13. ALU 232/92	2.2.14. ALU 240+232
Wall thickness	$t_{alu232} := 3mm$	$t_{alu240232} := t_{alu240} + t_{alu232}$
Section	$A_{alu232} := 2371\cdot mm^2$	$A_{alu240232} := 4691\cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu232} := 1.62\cdot 10^7\cdot mm^4$	$I_{y\_alu240232} := 3.29\cdot 10^7\cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu232} := 2.69\cdot 10^6\cdot mm^4$	$I_{z\_alu240232} := 6.58\cdot 10^6\cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu232} := 116\cdot mm$	$y_{y\_alu240232} := 120\cdot mm$
Height of the profile in z-direction	$y_{z\_alu232} := 46\cdot mm$	$y_{z\_alu240232} := 50\cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu232} := 1.39\cdot 10^5\cdot mm^3$	$W_{ely\_alu240232} := 2.74\cdot 10^5\cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu232} := 5.85\cdot 10^4\cdot mm^3$	$W_{elz\_alu240232} := 1.32\cdot 10^5\cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu232} := 1.78\cdot 10^5\cdot mm^3$	$W_{ply\_alu240232} := 3.57\cdot 10^5\cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu232} := 7.25\cdot 10^4\cdot mm^3$	$W_{plz\_alu240232} := 1.63\cdot 10^5\cdot mm^3$

	2.2.15. ALU 158/100	**2.2.16. ALU 133/70**
Wall thickness	$t_{alu158} := 2.5mm$	$t_{alu133} := 3mm$
Section	$A_{alu158} := 1836 \cdot mm^2$	$A_{alu133} := 1604 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu158} := 6.41 \cdot 10^6 \cdot mm^4$	$I_{y\_alu133} := 3.82 \cdot 10^6 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu158} := 2.74 \cdot 10^6 \cdot mm^4$	$I_{z\_alu133} := 1.06 \cdot 10^6 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu158} := 79 \cdot mm$	$y_{y\_alu133} := 66.5 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu158} := 50 \cdot mm$	$y_{z\_alu133} := 35 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu158} := 8.12 \cdot 10^4 \cdot mm^3$	$W_{ely\_alu133} := 5.74 \cdot 10^4 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu158} := 5.49 \cdot 10^4 \cdot mm^3$	$W_{elz\_alu133} := 3.02 \cdot 10^4 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu158} := 1.01 \cdot 10^5 \cdot mm^3$	$W_{ply\_alu133} := 7.21 \cdot 10^4 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu158} := 6.67 \cdot 10^4 \cdot mm^3$	$W_{plz\_alu133} := 3.77 \cdot 10^4 \cdot mm^3$

	2.2.17. ALU 133/70 + ALU 80/5	**2.2.18. ALU 130/70**
Wall thickness	$t_{alu133r} := 8mm$	$t_{alu130} := 3mm$
Section	$A_{alu133r} := 2404 \cdot mm^2$	$A_{alu130} := 1497 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu133r} := 4.25 \cdot 10^6 \cdot mm^4$	$I_{y\_alu130} := 3.12 \cdot 10^6 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu133r} := 2.18 \cdot 10^6 \cdot mm^4$	$I_{z\_alu130} := 1.12 \cdot 10^6 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu133r} := 66.5 \cdot mm$	$y_{y\_alu130} := 65 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu133r} := 40 \cdot mm$	$y_{z\_alu130} := 35 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu133r} := 6.37 \cdot 10^4 \cdot mm^3$	$W_{ely\_alu130} := 4.81 \cdot 10^4 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu133r} := 5.46 \cdot 10^4 \cdot mm^3$	$W_{elz\_alu130} := 3.19 \cdot 10^4 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu133r} := 8.81 \cdot 10^4 \cdot mm^3$	$W_{ply\_alu130} := 6.31 \cdot 10^4 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu133r} := 6.77 \cdot 10^4 \cdot mm^3$	$W_{plz\_alu130} := 3.80 \cdot 10^4 \cdot mm^3$

	2.2.19. ALU 129/89/3.1	2.2.20. ALU 97/77/2.25
Wall thickness	$t_{alu129} := 3.1mm$	$t_{alu97} := 3.1mm$
Section	$A_{alu129} := 1290 \cdot mm^2$	$A_{alu97} := 747 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu129} := 3.05 \cdot 10^6 \cdot mm^4$	$I_{y\_alu97} := 1.04 \cdot 10^6 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu129} := 1.72 \cdot 10^6 \cdot mm^4$	$I_{z\_alu97} := 7.29 \cdot 10^5 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu129} := 64.5 \cdot mm$	$y_{y\_alu97} := 48.5 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu129} := 44.5 \cdot mm$	$y_{z\_alu97} := 38.5 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu129} := 4.72 \cdot 10^4 \cdot mm^3$	$W_{ely\_alu97} := 2.14 \cdot 10^4 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu129} := 3.87 \cdot 10^4 \cdot mm^3$	$W_{elz\_alu97} := 1.89 \cdot 10^4 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu129} := 5.66 \cdot 10^4 \cdot mm^3$	$W_{ply\_alu97} := 2.53 \cdot 10^4 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu129} := 4.39 \cdot 10^4 \cdot mm^3$	$W_{plz\_alu97} := 2.16 \cdot 10^4 \cdot mm^3$

	2.2.21. ALU 70/70/4.5	2.2.22. ALU 88/66/2/3
Wall thickness	$t_{alu70} := 4.5mm$	$t_{alu88} := 2mm$
Section	$A_{alu70} := 1165 \cdot mm^2$	$A_{alu88} := 720 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu70} := 8.29 \cdot 10^5 \cdot mm^4$	$I_{y\_alu88} := 8.90 \cdot 10^5 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu70} := 8.29 \cdot 10^5 \cdot mm^4$	$I_{z\_alu88} := 4.75 \cdot 10^5 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu70} := 35 \cdot mm$	$y_{y\_alu88} := 44 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu70} := 35 \cdot mm$	$y_{z\_alu88} := 33 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu70} := 2.37 \cdot 10^4 \cdot mm^3$	$W_{ely\_alu88} := 2.02 \cdot 10^4 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu70} := 2.37 \cdot 10^4 \cdot mm^3$	$W_{elz\_alu88} := 1.44 \cdot 10^4 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu70} := 2.85 \cdot 10^4 \cdot mm^3$	$W_{ply\_alu88} := 2.34 \cdot 10^4 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu70} := 2.85 \cdot 10^4 \cdot mm^3$	$W_{plz\_alu88} := 1.69 \cdot 10^4 \cdot mm^3$

	2.2.23. ALU 70/50/2.5/3	**2.2.24. ALU 60/60/3**
Wall thickness	$t_{alu7050} := 2.5mm$	$t_{alu60} := 3mm$
Section	$A_{alu7050} := 596 \cdot mm^2$	$A_{alu60} := 660 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_alu7050} := 4.18 \cdot 10^5 \cdot mm^4$	$I_{y\_alu60} := 3.51 \cdot 10^5 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_alu7050} := 2.29 \cdot 10^5 \cdot mm^4$	$I_{z\_alu60} := 3.51 \cdot 10^5 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_alu7050} := 35 \cdot mm$	$y_{y\_alu60} := 30 \cdot mm$
Height of the profile in z-direction	$y_{z\_alu7050} := 25 \cdot mm$	$y_{z\_alu60} := 30 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_alu7050} := 1.19 \cdot 10^4 \cdot mm^3$	$W_{ely\_alu60} := 1.17 \cdot 10^4 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_alu7050} := 9.17 \cdot 10^3 \cdot mm^3$	$W_{elz\_alu60} := 1.17 \cdot 10^4 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_alu7050} := 1.44 \cdot 10^4 \cdot mm^3$	$W_{ply\_alu60} := 1.39 \cdot 10^4 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_alu7050} := 1.08 \cdot 10^4 \cdot mm^3$	$W_{plz\_alu60} := 1.39 \cdot 10^4 \cdot mm^3$

2.3. Steel.

	Steel quality S235.	**Steel quality S355.**
Yield stress	$R_{e\_S235} := 235 \cdot \frac{N}{mm^2}$	$R_{e\_S355} := 355 \cdot \frac{N}{mm^2}$
Tensile strength	$R_{t\_S235} := 360 \cdot \frac{N}{mm^2}$	$R_{t\_S355} := 510 \cdot \frac{N}{mm^2}$
Admissible stress	$\sigma_{adm\_S235} := \frac{R_{e\_S235}}{\gamma_M}$	$\sigma_{adm\_S355} := \frac{R_{e\_S355}}{\gamma_M}$
Modulus of elasticity	$E_{steel} := 210000 \cdot \frac{N}{mm^2}$	

	2.3.1. K70/70/2.	**2.3.2. K70/70/3.**
Section	$A_{K70\_2} := 544 \cdot mm^2$	$A_{K70\_3} := 800 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_K70\_2} := 4.20 \cdot 10^5 \cdot mm^4$	$I_{y\_K70\_3} := 6.01 \cdot 10^5 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_K70\_2} := 4.20 \cdot 10^5 \cdot mm^4$	$I_{z\_K70\_3} := 6.01 \cdot 10^5 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_K70\_2} := 35 \cdot mm$	$y_{y\_K70\_3} := 35 \cdot mm$
Height of the profile in z-direction	$y_{z\_K70\_2} := 35 \cdot mm$	$y_{z\_K70\_3} := 35 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_K70\_2} := 1.20 \cdot 10^4 \cdot mm^3$	$W_{ely\_K70\_3} := 1.72 \cdot 10^4 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_K70\_2} := 1.20 \cdot 10^4 \cdot mm^3$	$W_{elz\_K70\_3} := 1.72 \cdot 10^4 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_K70\_2} := 1.39 \cdot 10^4 \cdot mm^3$	$W_{ply\_K70\_3} := 2.02 \cdot 10^4 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_K70\_2} := 1.39 \cdot 10^4 \cdot mm^3$	$W_{plz\_K70\_3} := 2.02 \cdot 10^4 \cdot mm^3$

	2.3.3. K80/80/4.	**2.3.4. K120/120/3.**
Section	$A_{K80} := 1200 \cdot mm^2$	$A_{K120} := 1380 \cdot mm^2$
Moment of inertia in the y-direction	$I_{y\_K80} := 1.17 \cdot 10^7 \cdot mm^4$	$I_{y\_K120} := 3.12 \cdot 10^6 \cdot mm^4$
Moment of inertia in the z-direction	$I_{z\_K80} := 1.17 \cdot 10^7 \cdot mm^4$	$I_{z\_K120} := 3.12 \cdot 10^6 \cdot mm^4$
Height of the profile in y-direction	$y_{y\_K80} := 40 \cdot mm$	$y_{y\_K120} := 60 \cdot mm$
Height of the profile in z-direction	$y_{z\_K80} := 40 \cdot mm$	$y_{z\_K120} := 60 \cdot mm$
Elastic resistance in the y-direction	$W_{ely\_K80} := 2.93 \cdot 10^4 \cdot mm^3$	$W_{ely\_K120} := 5.21 \cdot 10^4 \cdot mm^3$
Elastic resistance in the z-direction	$W_{elz\_K80} := 2.93 \cdot 10^4 \cdot mm^3$	$W_{elz\_K120} := 5.34 \cdot 10^4 \cdot mm^3$
Plastic resistance in the y-direction	$W_{ply\_K80} := 3.47 \cdot 10^4 \cdot mm^3$	$W_{ply\_K120} := 6.16 \cdot 10^4 \cdot mm^3$
Plastic resistance in the z-direction	$W_{plz\_K80} := 3.47 \cdot 10^4 \cdot mm^3$	$W_{plz\_K120} := 6.16 \cdot 10^4 \cdot mm^3$

2.4. Bolts - class = 8.8.

Yield stress $R_{e\_bolt} := 640 \cdot \frac{N}{mm^2}$

Tensile strength $R_{t\_bolt} := 800 \cdot \frac{N}{mm^2}$

$$\sigma_{adm}(material) := \begin{vmatrix} \sigma_{adm\_alu} & \text{if } material = R_{e\_alu} \\ \sigma_{adm\_S235} & \text{if } material = R_{e\_S235} \\ \sigma_{adm\_S355} & \text{if } material = R_{e\_S355} \end{vmatrix}$$

Doc. 3. Aluminium profile. acc. to ENV 1999-1-1: Mai 1998

$$t_{alu}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ t_{alu60} & \text{if } profile = 1 \\ t_{alu7050} & \text{if } profile = 2 \\ t_{alu88} & \text{if } profile = 3 \\ t_{alu70} & \text{if } profile = 4 \\ t_{alu97} & \text{if } profile = 5 \\ t_{alu129} & \text{if } profile = 6 \\ t_{alu130} & \text{if } profile = 7 \\ t_{alu133} & \text{if } profile = 8 \\ t_{alu133r} & \text{if } profile = 9 \\ t_{alu158} & \text{if } profile = 10 \\ t_{alu240} & \text{if } profile = 20 \\ t_{alu232} & \text{if } profile = 200 \\ t_{alu240232} & \text{if } profile = 220 \\ t_{alu270} & \text{if } profile = 30 \\ t_{alu260} & \text{if } profile = 300 \\ t_{alu270260} & \text{if } profile = 330 \\ t_{alu310} & \text{if } profile = 40 \\ t_{alu297\_8} & \text{if } profile = 400 \\ t_{alu297\_11} & \text{if } profile = 401 \\ t_{alu297\_24.5} & \text{if } profile = 402 \\ t_{alu310297\_8} & \text{if } profile = 440 \\ t_{alu310297\_11} & \text{if } profile = 441 \\ t_{alu310297\_24.5} & \text{if } profile = 442 \\ t_{alu380} & \text{if } profile = 50 \end{cases}$$

$$d_{alu}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ (54mm) & \text{if } profile = 1 \\ (64mm) & \text{if } profile = 2 \\ (82mm) & \text{if } profile = 3 \\ (61mm) & \text{if } profile = 4 \\ (92.5mm) & \text{if } profile = 5 \\ (122.8mm) & \text{if } profile = 6 \\ (96mm) & \text{if } profile = 7 \\ (122mm) & \text{if } profile = 8 \\ (80mm) & \text{if } profile = 9 \\ (100mm) & \text{if } profile = 10 \\ (168mm) & \text{if } profile = 20 \\ (162mm) & \text{if } profile = 200 \\ (162mm) & \text{if } profile = 220 \\ (170mm) & \text{if } profile = 30 \\ (164mm) & \text{if } profile = 300 \\ (164mm) & \text{if } profile = 330 \\ (205mm) & \text{if } profile = 40 \\ (200mm) & \text{if } profile = 400 \\ (200mm) & \text{if } profile = 401 \\ (200mm) & \text{if } profile = 402 \\ (200mm) & \text{if } profile = 440 \\ (200mm) & \text{if } profile = 441 \\ (200mm) & \text{if } profile = 442 \\ (245mm) & \text{if } profile = 50 \end{cases}$$

$$A_{alu}(\text{profile}) := \begin{cases} \text{"not used"} & \text{if profile} = 0 \\ A_{alu60} & \text{if profile} = 1 \\ A_{alu7050} & \text{if profile} = 2 \\ A_{alu88} & \text{if profile} = 3 \\ A_{alu70} & \text{if profile} = 4 \\ A_{alu97} & \text{if profile} = 5 \\ A_{alu129} & \text{if profile} = 6 \\ A_{alu130} & \text{if profile} = 7 \\ A_{alu133} & \text{if profile} = 8 \\ A_{alu133r} & \text{if profile} = 9 \\ A_{alu158} & \text{if profile} = 10 \\ A_{alu240} & \text{if profile} = 20 \\ A_{alu232} & \text{if profile} = 200 \\ A_{alu240232} & \text{if profile} = 220 \\ A_{alu270} & \text{if profile} = 30 \\ A_{alu260} & \text{if profile} = 300 \\ A_{alu270260} & \text{if profile} = 330 \\ A_{alu310} & \text{if profile} = 40 \\ A_{alu297\_8} & \text{if profile} = 400 \\ A_{alu297\_11} & \text{if profile} = 401 \\ A_{alu297\_24.5} & \text{if profile} = 402 \\ A_{alu310297\_8} & \text{if profile} = 440 \\ A_{alu310297\_11} & \text{if profile} = 441 \\ A_{alu310297\_24.5} & \text{if profile} = 442 \\ A_{alu380} & \text{if profile} = 50 \end{cases}$$

$$y_{y\_alu}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ y_{y\_alu60} & \text{if } profile = 1 \\ y_{y\_alu7050} & \text{if } profile = 2 \\ y_{y\_alu88} & \text{if } profile = 3 \\ y_{y\_alu70} & \text{if } profile = 4 \\ y_{y\_alu97} & \text{if } profile = 5 \\ y_{y\_alu129} & \text{if } profile = 6 \\ y_{y\_alu130} & \text{if } profile = 7 \\ y_{y\_alu133} & \text{if } profile = 8 \\ y_{y\_alu133r} & \text{if } profile = 9 \\ y_{y\_alu158} & \text{if } profile = 10 \\ y_{y\_alu240} & \text{if } profile = 20 \\ y_{y\_alu232} & \text{if } profile = 200 \\ y_{y\_alu240232} & \text{if } profile = 220 \\ y_{y\_alu270} & \text{if } profile = 30 \\ y_{y\_alu260} & \text{if } profile = 300 \\ y_{y\_alu270260} & \text{if } profile = 330 \\ y_{y\_alu310} & \text{if } profile = 40 \\ y_{y\_alu297\_8} & \text{if } profile = 400 \\ y_{y\_alu297\_11} & \text{if } profile = 401 \\ y_{y\_alu297\_24.5} & \text{if } profile = 402 \\ y_{y\_alu310297\_8} & \text{if } profile = 440 \\ y_{y\_alu310297\_11} & \text{if } profile = 441 \\ y_{y\_alu310297\_24.5} & \text{if } profile = 442 \\ y_{y\_alu380} & \text{if } profile = 50 \end{cases}$$

$$y_{z\_alu}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ y_{z\_alu60} & \text{if } profile = 1 \\ y_{z\_alu7050} & \text{if } profile = 2 \\ y_{z\_alu88} & \text{if } profile = 3 \\ y_{z\_alu70} & \text{if } profile = 4 \\ y_{z\_alu97} & \text{if } profile = 5 \\ y_{z\_alu129} & \text{if } profile = 6 \\ y_{z\_alu130} & \text{if } profile = 7 \\ y_{z\_alu133} & \text{if } profile = 8 \\ y_{z\_alu133r} & \text{if } profile = 9 \\ y_{z\_alu158} & \text{if } profile = 10 \\ y_{z\_alu240} & \text{if } profile = 20 \\ y_{z\_alu232} & \text{if } profile = 200 \\ y_{z\_alu240232} & \text{if } profile = 220 \\ y_{z\_alu270} & \text{if } profile = 30 \\ y_{z\_alu260} & \text{if } profile = 300 \\ y_{z\_alu270260} & \text{if } profile = 330 \\ y_{z\_alu310} & \text{if } profile = 40 \\ y_{z\_alu297\_8} & \text{if } profile = 400 \\ y_{z\_alu297\_11} & \text{if } profile = 401 \\ y_{z\_alu297\_24.5} & \text{if } profile = 402 \\ y_{z\_alu310297\_8} & \text{if } profile = 440 \\ y_{z\_alu310297\_11} & \text{if } profile = 441 \\ y_{z\_alu310297\_24.5} & \text{if } profile = 442 \\ y_{z\_alu380} & \text{if } profile = 50 \end{cases}$$

$$I_{y\_alu}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ I_{y\_alu60} & \text{if } profile = 1 \\ I_{y\_alu7050} & \text{if } profile = 2 \\ I_{y\_alu88} & \text{if } profile = 3 \\ I_{y\_alu70} & \text{if } profile = 4 \\ I_{y\_alu97} & \text{if } profile = 5 \\ I_{y\_alu129} & \text{if } profile = 6 \\ I_{y\_alu130} & \text{if } profile = 7 \\ I_{y\_alu133} & \text{if } profile = 8 \\ I_{y\_alu133r} & \text{if } profile = 9 \\ I_{y\_alu158} & \text{if } profile = 10 \\ I_{y\_alu240} & \text{if } profile = 20 \\ I_{y\_alu232} & \text{if } profile = 200 \\ I_{y\_alu240232} & \text{if } profile = 220 \\ I_{y\_alu270} & \text{if } profile = 30 \\ I_{y\_alu260} & \text{if } profile = 300 \\ I_{y\_alu270260} & \text{if } profile = 330 \\ I_{y\_alu310} & \text{if } profile = 40 \\ I_{y\_alu297\_8} & \text{if } profile = 400 \\ I_{y\_alu297\_11} & \text{if } profile = 401 \\ I_{y\_alu297\_24.5} & \text{if } profile = 402 \\ I_{y\_alu310297\_8} & \text{if } profile = 440 \\ I_{y\_alu310297\_11} & \text{if } profile = 441 \\ I_{y\_alu310297\_24.5} & \text{if } profile = 442 \\ I_{y\_alu380} & \text{if } profile = 50 \end{cases}$$

$$I_{z\_alu}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ I_{z\_alu60} & \text{if } profile = 1 \\ I_{z\_alu7050} & \text{if } profile = 2 \\ I_{z\_alu88} & \text{if } profile = 3 \\ I_{z\_alu70} & \text{if } profile = 4 \\ I_{z\_alu97} & \text{if } profile = 5 \\ I_{z\_alu129} & \text{if } profile = 6 \\ I_{z\_alu130} & \text{if } profile = 7 \\ I_{z\_alu133} & \text{if } profile = 8 \\ I_{z\_alu133r} & \text{if } profile = 9 \\ I_{z\_alu158} & \text{if } profile = 10 \\ I_{z\_alu240} & \text{if } profile = 20 \\ I_{z\_alu232} & \text{if } profile = 200 \\ I_{z\_alu240232} & \text{if } profile = 220 \\ I_{z\_alu270} & \text{if } profile = 30 \\ I_{z\_alu260} & \text{if } profile = 300 \\ I_{z\_alu270260} & \text{if } profile = 330 \\ I_{z\_alu310} & \text{if } profile = 40 \\ I_{z\_alu297\_8} & \text{if } profile = 400 \\ I_{z\_alu297\_11} & \text{if } profile = 401 \\ I_{z\_alu297\_24.5} & \text{if } profile = 402 \\ I_{z\_alu310297\_8} & \text{if } profile = 440 \\ I_{z\_alu310297\_11} & \text{if } profile = 441 \\ I_{z\_alu310297\_24.5} & \text{if } profile = 442 \\ I_{z\_alu380} & \text{if } profile = 50 \end{cases}$$

$$W_{ply}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ W_{ply\_alu60} & \text{if } profile = 1 \\ W_{ply\_alu7050} & \text{if } profile = 2 \\ W_{ply\_alu88} & \text{if } profile = 3 \\ W_{ply\_alu70} & \text{if } profile = 4 \\ W_{ply\_alu97} & \text{if } profile = 5 \\ W_{ply\_alu129} & \text{if } profile = 6 \\ W_{ply\_alu130} & \text{if } profile = 7 \\ W_{ply\_alu133} & \text{if } profile = 8 \\ W_{ply\_alu133r} & \text{if } profile = 9 \\ W_{ply\_alu158} & \text{if } profile = 10 \\ W_{ply\_alu240} & \text{if } profile = 20 \\ W_{ply\_alu232} & \text{if } profile = 200 \\ W_{ply\_alu240232} & \text{if } profile = 220 \\ W_{ply\_alu270} & \text{if } profile = 30 \\ W_{ply\_alu260} & \text{if } profile = 300 \\ W_{ply\_alu270260} & \text{if } profile = 330 \\ W_{ply\_alu310} & \text{if } profile = 40 \\ W_{ply\_alu297\_8} & \text{if } profile = 400 \\ W_{ply\_alu297\_11} & \text{if } profile = 401 \\ W_{ply\_alu297\_24.5} & \text{if } profile = 402 \\ W_{ply\_alu310297\_8} & \text{if } profile = 440 \\ W_{ply\_alu310297\_11} & \text{if } profile = 441 \\ W_{ply\_alu310297\_24.5} & \text{if } profile = 442 \\ W_{ply\_alu380} & \text{if } profile = 50 \end{cases}$$

$$W_{plz}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ W_{plz\_alu60} & \text{if } profile = 1 \\ W_{plz\_alu7050} & \text{if } profile = 2 \\ W_{plz\_alu88} & \text{if } profile = 3 \\ W_{plz\_alu70} & \text{if } profile = 4 \\ W_{plz\_alu97} & \text{if } profile = 5 \\ W_{plz\_alu129} & \text{if } profile = 6 \\ W_{plz\_alu130} & \text{if } profile = 7 \\ W_{plz\_alu133} & \text{if } profile = 8 \\ W_{plz\_alu133r} & \text{if } profile = 9 \\ W_{plz\_alu158} & \text{if } profile = 10 \\ W_{plz\_alu240} & \text{if } profile = 20 \\ W_{plz\_alu232} & \text{if } profile = 200 \\ W_{plz\_alu240232} & \text{if } profile = 220 \\ W_{plz\_alu270} & \text{if } profile = 30 \\ W_{plz\_alu260} & \text{if } profile = 300 \\ W_{plz\_alu270260} & \text{if } profile = 330 \\ W_{plz\_alu310} & \text{if } profile = 40 \\ W_{plz\_alu297\_8} & \text{if } profile = 400 \\ W_{plz\_alu297\_11} & \text{if } profile = 401 \\ W_{plz\_alu297\_24.5} & \text{if } profile = 402 \\ W_{plz\_alu310297\_8} & \text{if } profile = 440 \\ W_{plz\_alu310297\_11} & \text{if } profile = 441 \\ W_{plz\_alu310297\_24.5} & \text{if } profile = 442 \\ W_{plz\_alu380} & \text{if } profile = 50 \end{cases}$$

$$W_{ely}(\text{profile}) := \begin{cases} \text{"not used"} & \text{if profile} = 0 \\ W_{ely\_alu60} & \text{if profile} = 1 \\ W_{ely\_alu7050} & \text{if profile} = 2 \\ W_{ely\_alu88} & \text{if profile} = 3 \\ W_{ely\_alu70} & \text{if profile} = 4 \\ W_{ely\_alu97} & \text{if profile} = 5 \\ W_{ely\_alu129} & \text{if profile} = 6 \\ W_{ely\_alu130} & \text{if profile} = 7 \\ W_{ely\_alu133} & \text{if profile} = 8 \\ W_{ely\_alu133r} & \text{if profile} = 9 \\ W_{ely\_alu158} & \text{if profile} = 10 \\ W_{ely\_alu240} & \text{if profile} = 20 \\ W_{ely\_alu232} & \text{if profile} = 200 \\ W_{ely\_alu240232} & \text{if profile} = 220 \\ W_{ely\_alu270} & \text{if profile} = 30 \\ W_{ely\_alu260} & \text{if profile} = 300 \\ W_{ely\_alu270260} & \text{if profile} = 330 \\ W_{ely\_alu310} & \text{if profile} = 40 \\ W_{ely\_alu297\_8} & \text{if profile} = 400 \\ W_{ely\_alu297\_11} & \text{if profile} = 401 \\ W_{ely\_alu297\_24.5} & \text{if profile} = 402 \\ W_{ely\_alu310297\_8} & \text{if profile} = 440 \\ W_{ely\_alu310297\_11} & \text{if profile} = 441 \\ W_{ely\_alu310297\_24.5} & \text{if profile} = 442 \\ W_{ely\_alu380} & \text{if profile} = 50 \end{cases}$$

$$W_{elz}(\text{profile}) := \begin{cases} \text{"not used"} & \text{if profile} = 0 \\ W_{elz\_alu60} & \text{if profile} = 1 \\ W_{elz\_alu7050} & \text{if profile} = 2 \\ W_{elz\_alu88} & \text{if profile} = 3 \\ W_{elz\_alu70} & \text{if profile} = 4 \\ W_{elz\_alu97} & \text{if profile} = 5 \\ W_{elz\_alu129} & \text{if profile} = 6 \\ W_{elz\_alu130} & \text{if profile} = 7 \\ W_{elz\_alu133} & \text{if profile} = 8 \\ W_{elz\_alu133r} & \text{if profile} = 9 \\ W_{elz\_alu158} & \text{if profile} = 10 \\ W_{elz\_alu240} & \text{if profile} = 20 \\ W_{elz\_alu232} & \text{if profile} = 200 \\ W_{elz\_alu240232} & \text{if profile} = 220 \\ W_{elz\_alu270} & \text{if profile} = 30 \\ W_{elz\_alu260} & \text{if profile} = 300 \\ W_{elz\_alu270260} & \text{if profile} = 330 \\ W_{elz\_alu310} & \text{if profile} = 40 \\ W_{elz\_alu297\_8} & \text{if profile} = 400 \\ W_{elz\_alu297\_11} & \text{if profile} = 401 \\ W_{elz\_alu297\_24.5} & \text{if profile} = 402 \\ W_{elz\_alu310297\_8} & \text{if profile} = 440 \\ W_{elz\_alu310297\_11} & \text{if profile} = 441 \\ W_{elz\_alu310297\_24.5} & \text{if profile} = 442 \\ W_{elz\_alu380} & \text{if profile} = 50 \end{cases}$$

$prof_{control}(profile) :=$

```
"not used"   if  profile = 0
"alu60/60/3"   if  profile = 1
"alu70/50/2.5/3"   if  profile = 2
"alu88/66/2"   if  profile = 3
"alu70/70/4.5"   if  profile = 4
"alu97/77/3.1"   if  profile = 5
"alu129/89/3.1"   if  profile = 6
"alu130/70"   if  profile = 7
"alu133/70"   if  profile = 8
"alu133/70+80/5"   if  profile = 9
"alu158/100"   if  profile = 10
"alu240/100"   if  profile = 20
"alu232/92"   if  profile = 200
"alu240+232"   if  profile = 220
"alu270/100"   if  profile = 30
"alu260/91"   if  profile = 300
"alu270+260"   if  profile = 330
"alu310/130"   if  profile = 40
"alu297_8/117"   if  profile = 400
"alu297_11/117"   if  profile = 401
"alu297_24.5/117"   if  profile = 402
"alu310+297_8"   if  profile = 440
"alu310+297_11"   if  profile = 441
"alu310+297_24.5"   if  profile = 442
"alu380/166"   if  profile = 50
```

$$b_{alu}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ 60mm & \text{if } profile = 1 \\ 50mm & \text{if } profile = 2 \\ 66mm & \text{if } profile = 3 \\ 70mm & \text{if } profile = 4 \\ 77mm & \text{if } profile = 5 \\ 89mm & \text{if } profile = 6 \\ 70mm & \text{if } profile = 7 \\ 70mm & \text{if } profile = 8 \\ 80mm & \text{if } profile = 9 \\ 100mm & \text{if } profile = 10 \\ 100mm & \text{if } profile = 20 \\ 92mm & \text{if } profile = 200 \\ 100mm & \text{if } profile = 220 \\ 100mm & \text{if } profile = 30 \\ 91mm & \text{if } profile = 300 \\ 100mm & \text{if } profile = 330 \\ 130mm & \text{if } profile = 40 \\ 117mm & \text{if } profile = 400 \\ 117mm & \text{if } profile = 401 \\ 117mm & \text{if } profile = 402 \\ 130mm & \text{if } profile = 440 \\ 130mm & \text{if } profile = 441 \\ 130mm & \text{if } profile = 442 \\ 166mm & \text{if } profile = 50 \end{cases}$$

$$h_{alu}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ 60mm & \text{if } profile = 1 \\ 70mm & \text{if } profile = 2 \\ 88mm & \text{if } profile = 3 \\ 70mm & \text{if } profile = 4 \\ 97mm & \text{if } profile = 5 \\ 129mm & \text{if } profile = 6 \\ 130mm & \text{if } profile = 7 \\ 133mm & \text{if } profile = 8 \\ 133mm & \text{if } profile = 9 \\ 158mm & \text{if } profile = 10 \\ 240mm & \text{if } profile = 20 \\ 232mm & \text{if } profile = 200 \\ 240mm & \text{if } profile = 220 \\ 270mm & \text{if } profile = 30 \\ 260mm & \text{if } profile = 300 \\ 270mm & \text{if } profile = 330 \\ 310mm & \text{if } profile = 40 \\ 297mm & \text{if } profile = 400 \\ 297mm & \text{if } profile = 401 \\ 297mm & \text{if } profile = 402 \\ 310mm & \text{if } profile = 440 \\ 310mm & \text{if } profile = 441 \\ 310mm & \text{if } profile = 442 \\ 380mm & \text{if } profile = 50 \end{cases}$$

Bending and axiale compression

Profil classification

$$\beta(\text{profile}) := 0.40\cdot\left(\frac{d_{alu}(\text{profile})}{t_{alu}(\text{profile})}\right)$$

Slenderness parameter (art.5.4.3)

$$\varepsilon := \sqrt{\frac{250\cdot\frac{N}{mm^2}}{R_{e\_alu}}} \qquad \varepsilon = 1.021$$

$$\beta 1 := 11\cdot\varepsilon \qquad \beta 1 = 11.227$$

Table 5.1 (heat treated, unwelded)

$$\beta 2 := 16\cdot\varepsilon \qquad \beta 2 = 16.33$$

$$\beta 3 := 22\cdot\varepsilon \qquad \beta 3 = 22.454$$

$$\text{classification}(\text{profile}) := \begin{cases} 1 & \text{if } \beta(\text{profile}) \le \beta 1 \\ 2 & \text{if } \beta 1 < \beta(\text{profile}) \le \beta 2 \\ 3 & \text{if } \beta 2 < \beta(\text{profile}) \le \beta 3 \\ 4 & \text{if } \beta 3 < \beta(\text{profile}) \end{cases}$$

<3.1>

Profile properties

Shape factor (table 5.3, no welding)

$$\alpha_y(\text{profile}) := \begin{cases} \dfrac{W_{ply}(\text{profile})}{W_{ely}(\text{profile})} & \text{if classification(profile)} = 1 \vee 2 \\ \left[1 + \dfrac{\beta 3 - \beta(\text{profile})}{\beta 3 - \beta 2}\cdot\left(\dfrac{W_{ply}(\text{profile})}{W_{ely}(\text{profile})} - 1\right)\right] & \text{if classification(profile)} = 3 \end{cases}$$

<3.2> form 5.15

$$\alpha_z(\text{profile}) := \begin{cases} \min\left(1.25, \dfrac{W_{plz}(\text{profile})}{W_{elz}(\text{profile})}\right) & \text{if classification(profile)} = 1 \vee 2 \\ \min\left[1.25, 1 + \dfrac{\beta 3 - \beta(\text{profile})}{\beta 3 - \beta 2}\cdot\left(\dfrac{W_{plz}(\text{profile})}{W_{elz}(\text{profile})} - 1\right)\right] & \text{if classification(profile)} = 3 \end{cases}$$

ENV 1999-1-1, art. 5.9.4(6): Profile capacity

$$N_{rd}(profile) := A_{alu}(profile) \cdot \frac{R_{e\_alu}}{\gamma_M}$$ **<3.3>**

$$M_{yrd}(profile) := \frac{\alpha_y(profile) \cdot W_{ely}(profile) \cdot R_{e\_alu}}{\gamma_M}$$

$$M_{zrd}(profile) := \frac{\alpha_z(profile) \cdot W_{elz}(profile) \cdot R_{e\_alu}}{\gamma_M}$$

Buckling control

Hollow cross sections (art. 5.9.4.2(4))

$\psi_c := 0.8$

$\omega o := 1.0$ $\quad \omega x := 1.0$ for beams without localized welds

Buckling stress (art. 5.8.4.1)

$\alpha := 0.20$ Values of imperfection factor (table 5.6, heat treated)

$\lambda o := 0.1$ Values of imperfection factor (table 5.6, heat treated)

$\eta := 1.0$

<u>*Slenderness :*</u>

$$\lambda_1 := \pi \cdot \sqrt{\frac{E_{alu}}{\eta \cdot R_{e\_alu}}} \qquad \lambda_1 = 53.653$$

$$\lambda_y(profile, k_y, L_y) := \frac{k_y \cdot L_y}{\sqrt{\frac{I_{y\_alu}(profile)}{A_{alu}(profile)}}} \qquad \lambda_z(profile, k_z, L_z) := \frac{k_z \cdot L_z}{\sqrt{\frac{I_{z\_alu}(profile)}{A_{alu}(profile)}}}$$ **<3.4>**

$$\lambda_{by}(profile, k_y, L_y) := \frac{\lambda_y(profile, k_y, L_y)}{\lambda_1} \qquad \lambda_{bz}(profile, k_z, L_z) := \frac{\lambda_z(profile, k_z, L_z)}{\lambda_1}$$ **<3.5>**

Reduction coefficients :

$$\phi_y(profile, k_y, L_y) := 0.5\cdot\left[1 + \alpha\cdot\left(\lambda_{by}(profile, k_y, L_y) - \lambda o\right) + \lambda_{by}(profile, k_y, L_y)^2\right]$$ **<3.6>**

$$\phi_z(profile, k_z, L_z) := 0.5\cdot\left[1 + \alpha\cdot\left(\lambda_{bz}(profile, k_z, L_z) - \lambda o\right) + \lambda_{bz}(profile, k_z, L_z)^2\right]$$

$$\chi_y(profile, k_y, L_y) := \frac{1}{\phi_y(profile, k_y, L_y) + \sqrt{\phi_y(profile, k_y, L_y)^2 - \lambda_{by}(profile, k_y, L_y)^2}}$$ form 5.33 **<3.7>**

$$\chi_z(profile, k_z, L_z) := \frac{1}{\phi_z(profile, k_z, L_z) + \sqrt{\phi_z(profile, k_z, L_z)^2 - \lambda_{bz}(profile, k_z, L_z)^2}}$$ form 5.33

$$\chi_{min}(profile, k_y, k_z, L_y, L_z) := \min\left(\chi_y(profile, k_y, L_y), \chi_z(profile, k_z, L_z)\right)$$

$$buckling(profile, k_y, k_z, L_y, L_z, N_{Ed}, M_{yEd}, M_{zEd}) := \left(\frac{N_{Ed}}{\chi_{min}(profile, k_y, k_z, L_y, L_z)\cdot \omega x\cdot N_{rd}(profile)}\right)^{\psi_c} \ldots + \left(\frac{1}{\omega o}\right)\cdot\left[\left(\frac{M_{yEd}}{M_{yrd}(profile)}\right)^{1.7} \ldots + \left(\frac{M_{zEd}}{M_{zrd}(profile)}\right)^{1.7}\right]^{0.6}$$ form 5.46 **<3.8>**

Bending and axial tension

Hollow cross sections (art. 5.9.3.3(1))

$\psi := 1.3$

$\omega o = 1$

$$\text{equation}(\text{profile}, N_{Ed}, M_{yEd}, M_{zEd}) := \left[\left(\frac{N_{Ed}}{\omega o \cdot N_{rd}(\text{profile})}\right)^{\psi} \cdots + \left[\left(\frac{M_{yEd}}{\omega o \cdot M_{yrd}(\text{profile})}\right)^{1.7} + \left(\frac{M_{zEd}}{\omega o \cdot M_{zrd}(\text{profile})}\right)^{1.7}\right]^{0.6}\right]$$

form 5.43

<3.9>

Stress

$$\sigma_s(\text{profile}, N_{Ed}, M_{yEd}, M_{zEd}) := \frac{N_{Ed}}{A_{alu}(\text{profile})} + \frac{M_{yEd} \cdot y_{y\_alu}(\text{profile})}{I_{y\_alu}(\text{profile})} + \frac{M_{zEd} \cdot y_{z\_alu}(\text{profile})}{I_{z\_alu}(\text{profile})}$$

<3.10>

Doc. 4. Steel profile. acc. to ENV 1993-1-1: April 1992

$$t_w(profile) := \begin{cases} (2mm) & \text{if } profile = 60 \\ (3mm) & \text{if } profile = 70 \\ (4mm) & \text{if } profile = 80 \\ (3mm) & \text{if } profile = 90 \\ (10mm) & \text{if } profile = 100 \end{cases}$$

$$t_f(profile) := \begin{cases} (2mm) & \text{if } profile = 60 \\ (3mm) & \text{if } profile = 70 \\ (4mm) & \text{if } profile = 80 \\ (3mm) & \text{if } profile = 90 \\ (0mm) & \text{if } profile = 100 \end{cases}$$

$$d_{st}(profile) := \begin{cases} (66mm) & \text{if } profile = 60 \\ (64mm) & \text{if } profile = 70 \\ (72mm) & \text{if } profile = 80 \\ (114mm) & \text{if } profile = 90 \\ (80mm) & \text{if } profile = 100 \end{cases}$$

$$b_{st}(profile) := \begin{cases} (70mm) & \text{if } profile = 60 \\ (70mm) & \text{if } profile = 70 \\ (80mm) & \text{if } profile = 80 \\ (120mm) & \text{if } profile = 90 \\ (130mm) & \text{if } profile = 100 \end{cases}$$

$$A_{steel}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ A_{K70\_2} & \text{if } profile = 60 \\ A_{K70\_3} & \text{if } profile = 70 \\ A_{K80} & \text{if } profile = 80 \\ A_{K120} & \text{if } profile = 90 \\ 2\left(t_w(profile)\cdot d_{st}(profile)\right) & \text{if } profile = 100 \end{cases}$$

$$y_{y\_steel}(profile) := \begin{cases} y_{y\_K70\_2} & \text{if } profile = 60 \\ y_{y\_K70\_3} & \text{if } profile = 70 \\ y_{y\_K80} & \text{if } profile = 80 \\ y_{y\_K120} & \text{if } profile = 90 \\ \dfrac{d_{st}(profile)}{2} & \text{if } profile = 100 \end{cases}$$

$$y_{z\_steel}(profile) := \begin{cases} y_{z\_K70\_2} & \text{if } profile = 60 \\ y_{z\_K70\_3} & \text{if } profile = 70 \\ y_{z\_K80} & \text{if } profile = 80 \\ y_{z\_K120} & \text{if } profile = 90 \\ \dfrac{t_w(profile)}{2} & \text{if } profile = 100 \end{cases}$$

$$I_{y\_steel}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ I_{y\_K70\_2} & \text{if } profile = 60 \\ I_{y\_K70\_3} & \text{if } profile = 70 \\ I_{y\_K80} & \text{if } profile = 80 \\ I_{y\_K120} & \text{if } profile = 90 \\ \left(2\cdot\dfrac{t_w(profile)\cdot d_{st}(profile)^3}{12}\right) & \text{if } profile = 100 \end{cases}$$

$$I_{z\_steel}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ I_{z\_K70\_2} & \text{if } profile = 60 \\ I_{z\_K70\_3} & \text{if } profile = 70 \\ I_{z\_K80} & \text{if } profile = 80 \\ I_{z\_K120} & \text{if } profile = 90 \\ \left(\dfrac{d_{st}(profile)\cdot t_w(profile)^3}{12}\right) & \text{if } profile = 100 \end{cases}$$

$$W_{ely\_steel}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ W_{ely\_K70\_2} & \text{if } profile = 60 \\ W_{ely\_K70\_3} & \text{if } profile = 70 \\ W_{ely\_K80} & \text{if } profile = 80 \\ W_{ely\_K120} & \text{if } profile = 90 \end{cases}$$

$$W_{elz\_steel}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ W_{elz\_K70\_2} & \text{if } profile = 60 \\ W_{elz\_K70\_3} & \text{if } profile = 70 \\ W_{elz\_K80} & \text{if } profile = 80 \\ W_{elz\_K120} & \text{if } profile = 90 \end{cases}$$

$$W_{ply\_steel}(profile) := \begin{cases} W_{ply\_K70\_2} & \text{if } profile = 60 \\ W_{ply\_K70\_3} & \text{if } profile = 70 \\ W_{ply\_K80} & \text{if } profile = 80 \\ W_{ply\_K120} & \text{if } profile = 90 \end{cases}$$

$$W_{plz\_steel}(profile) := \begin{cases} W_{plz\_K70\_2} & \text{if } profile = 60 \\ W_{plz\_K70\_3} & \text{if } profile = 70 \\ W_{plz\_K80} & \text{if } profile = 80 \\ W_{plz\_K120} & \text{if } profile = 90 \end{cases}$$

$$prof_{contr\_steel}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ \text{"K70/70/2"} & \text{if } profile = 60 \\ \text{"K70/70/3"} & \text{if } profile = 70 \\ \text{"K80/80/4"} & \text{if } profile = 80 \\ \text{"K120/120/3"} & \text{if } profile = 90 \\ \text{"plat 80/10"} & \text{if } profile = 100 \end{cases}$$

$$b_{steel}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ (70mm) & \text{if } profile = 60 \\ (70mm) & \text{if } profile = 70 \\ (80mm) & \text{if } profile = 80 \\ (120mm) & \text{if } profile = 90 \end{cases}$$

$$h_{steel}(profile) := \begin{cases} \text{"not used"} & \text{if } profile = 0 \\ (70mm) & \text{if } profile = 60 \\ (70mm) & \text{if } profile = 70 \\ (80mm) & \text{if } profile = 80 \\ (120mm) & \text{if } profile = 90 \end{cases}$$

Buckling control

Profile classification

$$\varepsilon(R_e) := \sqrt{\frac{235\cdot\left(\frac{N}{mm^2}\right)}{R_e}}$$

Table 5.3.1

$$classification_{web}(profile, R_e) := \begin{cases} 1 & \text{if } \frac{d_{st}(profile)}{t_w(profile)} \le 72\cdot\varepsilon(R_e) \\ 2 & \text{if } 72\cdot\varepsilon(R_e) < \frac{d_{st}(profile)}{t_w(profile)} \le 83\cdot\varepsilon(R_e) \\ 3 & \text{if } 83\cdot\varepsilon(R_e) < \frac{d_{st}(profile)}{t_w(profile)} \le 124\cdot\varepsilon(R_e) \end{cases}$$

$$classification_{flange}(profile, R_e) := \begin{cases} 1 & \text{if } \frac{b_{st}(profile) - 3\cdot t_f(profile)}{t_f(profile)} \le 33\cdot\varepsilon(R_e) \\ 2 & \text{if } 10\cdot\varepsilon(R_e) < \frac{b_{st}(profile) - 3\cdot t_f(profile)}{t_f(profile)} \le 38\cdot\varepsilon(R_e) \\ 3 & \text{if } 11\cdot\varepsilon(R_e) < \frac{b_{st}(profile) - 3\cdot t_f(profile)}{t_f(profile)} \le 42\cdot\varepsilon(R_e) \end{cases}$$

$$classification_{tot}(profile, R_e) := \begin{cases} classification_{web}(profile, R_e) & \text{if } t_f(profile) = 0 \\ \max(classification_{web}(profile, R_e), classification_{flange}(profile, R_e)) & \text{otherwise} \end{cases} \quad \text{<4.1>}$$

Profile art. 5.5.1

$$\beta_A(profile, R_e) := \begin{cases} 1 & \text{if } classification_{tot}(profile, R_e) = 1 \vee 2 \vee 3 \\ \text{"A.eff/A"} & \text{otherwise} \end{cases}$$ **<4.2>**

Slenderness :

$$\lambda_{steel\_y}(profile, k_y, L_y) := \frac{k_y \cdot L_y}{\sqrt{\frac{I_{y\_steel}(profile)}{A_{steel}(profile)}}} \qquad \lambda_{steel\_z}(profile, k_z, L_z) := \frac{k_z \cdot L_z}{\sqrt{\frac{I_{z\_steel}(profile)}{A_{steel}(profile)}}}$$ **<4.3>**

$$\lambda_{steel\_1}(R_e) := \pi \cdot \sqrt{\frac{E_{steel}}{R_e}}$$ **<4.4>**

$$\lambda_{steel\_by}(profile, k_y, L_y, R_e) := \frac{\lambda_{steel\_y}(profile, k_y, L_y)}{\lambda_{steel\_1}(R_e)} \cdot \sqrt{\beta_A(profile, R_e)}$$

<4.5>

$$\lambda_{steel\_bz}(profile, k_z, L_z, R_e) := \frac{\lambda_{steel\_z}(profile, k_z, L_z)}{\lambda_{steel\_1}(R_e)} \cdot \sqrt{\beta_A(profile, R_e)}$$

Shape factor :

$$\alpha_{st\_y}(profile) := \begin{cases} 0.49 & \text{if } t_f(profile) = 0 \\ 0.21 & \text{otherwise} \end{cases} \qquad \alpha_{st\_z}(profile) := \begin{cases} 0.49 & \text{if } t_f(profile) = 0 \\ 0.21 & \text{otherwise} \end{cases}$$

Table 5.5.1
Table 5.5.3 **<4.6>**

Reduction coefficients :

$$\phi_{steel\_y}(profile, k_y, L_y, R_e) := 0.5 \cdot \left[1 + \alpha_{st\_y}(profile) \cdot \left(\lambda_{steel\_by}(profile, k_y, L_y, R_e) - 0.2\right) + \lambda_{steel\_by}(profile, k_y, L_y, R_e)^2\right]$$

<4.7>

$$\phi_{steel\_z}(profile, k_z, L_z, R_e) := 0.5 \cdot \left[1 + \alpha_{st\_z}(profile) \cdot \left(\lambda_{steel\_bz}(profile, k_z, L_z, R_e) - 0.2\right) + \lambda_{steel\_bz}(profile, k_z, L_z, R_e)^2\right]$$

$$\chi_{steel\_y}(profile, k_y, L_y, R_e) := \frac{1}{\phi_{steel\_y}(profile, k_y, L_y, R_e) \ldots + \sqrt{\phi_{steel\_y}(profile, k_y, L_y, R_e)^2 - \lambda_{steel\_by}(profile, k_y, L_y, R_e)^2}}$$

form 5.46 **<4.8>**

$$\chi_{steel\_z}(profile, k_z, L_z, R_e) := \frac{1}{\phi_{steel\_z}(profile, k_z, L_z, R_e) + \sqrt{\phi_{steel\_z}(profile, k_z, L_z, R_e)^2 - \lambda_{steel\_bz}(profile, k_z, L_z, R_e)^2}}$$

$$\chi_{steel\_min}(profile, k_z, k_y, L_z, L_y, R_e) := \min(\chi_{steel\_z}(profile, k_z, L_z, R_e), \chi_{steel\_y}(profile, k_y, L_y, R_e))$$ reduction factor

Bending + axial compression (art. 5.5.4)

Factor relating to the equivalent uniform moment (fig 5.5.3):

$$\psi_y(M_{1\_y}, M_{2\_y}) := \begin{cases} \frac{M_{2\_y}}{M_{1\_y}} & \text{if } -1 \le \frac{M_{2\_y}}{M_{1\_y}} \le 1 \\ (-1) & \text{if } \frac{M_{2\_y}}{M_{1\_y}} < -1 \\ 1 & \text{if } \frac{M_{2\_y}}{M_{1\_y}} > 1 \end{cases} \qquad \psi_z(M_{1\_z}, M_{2\_z}) := \begin{cases} \frac{M_{2\_z}}{M_{1\_z}} & \text{if } -1 \le \frac{M_{2\_z}}{M_{1\_z}} \le 1 \\ (-1) & \text{if } \frac{M_{2\_z}}{M_{1\_z}} < -1 \\ 1 & \text{if } \frac{M_{2\_z}}{M_{1\_z}} > 1 \end{cases}$$ **<4.9>**

$$\beta_{M\psi y}(M_{1\_y}, M_{2\_y}) := 1.8 - 0.7 \cdot \psi_y(M_{1\_y}, M_{2\_y}) \qquad \beta_{M\psi z}(M_{1\_z}, M_{2\_z}) := 1.8 - 0.7 \cdot \psi_z(M_{1\_z}, M_{2\_z})$$ **<4.10>**

$\beta_{MQ} := 1.3$ **<4.11>** distributed load

Moments du to the shear load (fig. 5.5.3):

$$M_{Qy}(M_{1\_y}, M_{2\_y}, M_{m\_y}) := \left| \frac{M_{1\_y} - M_{2\_y}}{2} + M_{2\_y} - M_{m\_y} \right|$$

$$M_{Qz}(M_{1\_z}, M_{2\_z}, M_{m\_z}) := \left| \frac{M_{1\_z} - M_{2\_z}}{2} + M_{2\_z} - M_{m\_z} \right|$$ **<4.12>**

$$\Delta M_y(M_{1\_y}, M_{2\_y}, M_{m\_y}) := \begin{cases} \max(|M_{1\_y}|, |M_{2\_y}|, |M_{m\_y}|) & \text{if } (\text{sign}(M_{1\_y}) = \text{sign}(M_{m\_y})) \land (\text{sign}(M_{2\_y}) = \text{sign}(M_{m\_y})) \\ |\max(M_{1\_y}, M_{2\_y}, M_{m\_y})| + |\min(M_{1\_y}, M_{2\_y}, M_{m\_y})| & \text{otherwise} \end{cases}$$ **<4.13>**

$$\Delta M_z(M_{1\_z}, M_{2\_z}, M_{m\_z}) := \begin{cases} \max(|M_{1\_z}|, |M_{2\_z}|, |M_{m\_z}|) & \text{if } (\text{sign}(M_{1\_z}) = \text{sign}(M_{m\_z})) \land (\text{sign}(M_{2\_z}) = \text{sign}(M_{m\_z})) \\ |\max(M_{1\_z}, M_{2\_z}, M_{m\_z})| + |\min(M_{1\_z}, M_{2\_z}, M_{m\_z})| & \text{otherwise} \end{cases}$$

$$\beta_{My}(M_{1\_y},M_{2\_y},M_{m\_y}) := \beta_{M\psi y}(M_{1\_y},M_{2\_y}) + \frac{M_{Qy}(M_{1\_y},M_{2\_y},M_{m\_y})}{\Delta M_y(M_{1\_y},M_{2\_y},M_{m\_y})}\cdot(\beta_{MQ} - \beta_{M\psi y}(M_{1\_y},M_{2\_y}))$$

<4.14>

$$\beta_{Mz}(M_{1\_z},M_{2\_z},M_{m\_z}) := \beta_{M\psi z}(M_{1\_z},M_{2\_z}) + \frac{M_{Qz}(M_{1\_z},M_{2\_z},M_{m\_z})}{\Delta M_z(M_{1\_z},M_{2\_z},M_{m\_z})}\cdot(\beta_{MQ} - \beta_{M\psi z}(M_{1\_z},M_{2\_z}))$$

Coefficients μ (art 5.5.4)

classification = 1 or 2 :

$$\mu_{yc1\_2}(profile,k_y,L_y,R_e,M_{1\_y},M_{2\_y},M_{m\_y}) := \min\left[0.9,\left[\lambda_{steel\_by}(profile,k_y,L_y,R_e)\cdot(2\cdot\beta_{My}(M_{1\_y},M_{2\_y},M_{m\_y}) - 4) \ldots + \frac{W_{ply\_steel}(profile) - W_{ely\_steel}(profile)}{W_{ely\_steel}(profile)}\right]\right]$$

$$\mu_{zc1\_2}(profile,k_z,L_z,R_e,M_{1\_z},M_{2\_z},M_{m\_z}) := \min\left[0.9,\left[\lambda_{steel\_bz}(profile,k_z,L_z,R_e)\cdot(2\cdot\beta_{My}(M_{1\_z},M_{2\_z},M_{m\_z}) - 4) \ldots + \frac{W_{plz\_steel}(profile) - W_{elz\_steel}(profile)}{W_{elz\_steel}(profile)}\right]\right]$$

classification = 3 :

$$\mu_{yc3}(profile,k_y,L_y,R_e,M_{1\_y},M_{2\_y},M_{m\_y}) := \min\left[0.9,\lambda_{steel\_by}(profile,k_y,L_y,R_e)\cdot(2\cdot\beta_{My}(M_{1\_y},M_{2\_y},M_{m\_y}) - 4)\right]$$

$$\mu_{zc3}(profile,k_z,L_z,R_e,M_{1\_z},M_{2\_z},M_{m\_z}) := \min\left[0.9,\lambda_{steel\_bz}(profile,k_z,L_z,R_e)\cdot(2\cdot\beta_{Mz}(M_{1\_z},M_{2\_z},M_{m\_z}) - 4)\right]$$

$$\mu_y(profile,k_y,L_y,R_e,M_{1\_y},M_{2\_y},M_{m\_y}) := \begin{cases}\mu_{yc1\_2}(profile,k_y,L_y,R_e,M_{1\_y},M_{2\_y},M_{m\_y}) & \text{if } classification_{tot}(profile,R_e) = 1 \vee 2\\ \mu_{yc3}(profile,k_y,L_y,R_e,M_{1\_y},M_{2\_y},M_{m\_y}) & \text{if } classification_{tot}(profile,R_e) = 3\end{cases}$$

<4.15>

$$\mu_z(profile,k_z,L_z,R_e,M_{1\_z},M_{2\_z},M_{m\_z}) := \begin{cases}\mu_{zc1\_2}(profile,k_z,L_z,R_e,M_{1\_z},M_{2\_z},M_{m\_z}) & \text{if } classification_{tot}(profile,R_e) = 1 \vee 2\\ \mu_{zc3}(profile,k_z,L_z,R_e,M_{1\_z},M_{2\_z},M_{m\_z}) & \text{if } classification_{tot}(profile,R_e) = 3\end{cases}$$

Coefficients k (art 5.5.4)

$$K_y(profile,k_y,L_y,R_e,M_{1\_y},M_{2\_y},M_{m\_y},N_{Ed}) := \min\left(1 - \frac{\mu_y(profile,k_y,L_y,R_e,M_{1\_y},M_{2\_y},M_{m\_y})\cdot N_{Ed}}{\chi_{steel\_y}(profile,k_y,L_y,R_e)\cdot A_{steel}(profile)\cdot R_e},1.5\right)$$

<4.16>

$$K_z(profile,k_z,L_z,R_e,M_{1\_z},M_{2\_z},M_{m\_z},N_{Ed}) := \min\left(1 - \frac{\mu_z(profile,k_z,L_z,R_e,M_{1\_z},M_{2\_z},M_{m\_z})\cdot N_{Ed}}{\chi_{steel\_z}(profile,k_z,L_z,R_e)\cdot A_{steel}(profile)\cdot R_e},1.5\right)$$

Stress: bending + axial compression

$$\sigma_{bending\_comp}(profile, N_{Ed}, M_{1\_y}, M_{1\_z}, M_{m\_y}, M_{m\_z}) := \frac{N_{Ed}}{A_{steel}(profile)} + \frac{\max(|M_{1\_y}|, |M_{m\_y}|) \cdot y_{y\_steel}(profile)}{I_{y\_steel}(profile)} \dots + \frac{\max(|M_{1\_z}|, |M_{m\_z}|) \cdot y_{z\_steel}(profile)}{I_{z\_steel}(profile)}$$

<4.17>

Stress: bending + axial traction

$$\sigma_{flexion\_traction}(profile, N_{Ed}, M_{yEd}, M_{zEd}) := \frac{N_{Ed}}{A_{steel}(profile)} + \frac{M_{yEd} \cdot y_{y\_steel}(profile)}{I_{y\_steel}(profile)} \dots + \frac{M_{zEd} \cdot y_{z\_steel}(profile)}{I_{z\_steel}(profile)}$$

<4.18>

Axial compression (art. 5.5.1)

Profile capacity :

$$N_{bRd}(profile, R_e, k_y, k_z, L_y, L_z) := \chi_{steel\_min}(profile, k_z, k_y, L_z, L_y, R_e) \cdot \beta_A(profile, R_e) \cdot A_{steel}(profile) \cdot \frac{R_e}{\gamma_M}$$

<4.19>

form 5.45

$$buckling_{steel}(profile, R_e, k_y, k_z, L_y, L_z, N_{Ed}) := \begin{cases} \dfrac{\frac{N_{Ed}}{2}}{N_{bRd}(profile, R_e, k_y, k_z, L_y, L_z)} & \text{if } t_f(profile) = 0 \\ \dfrac{N_{Ed}}{N_{bRd}(profile, R_e, k_y, k_z, L_y, L_z)} & \text{otherwise} \end{cases}$$

<4.20>

Stress: axial compression or traction

$$\sigma_{comp\_trac}(profile, N_{Ed}) := \frac{N_{Ed}}{A_{steel}(profile)}$$

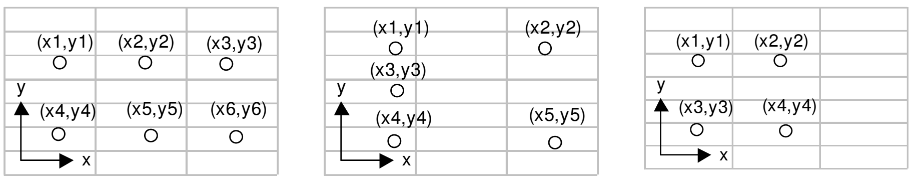
<4.21>

Doc. 5. Bolts, pins and rivets acc. to ENV1999-1-1:1998 + ENV1993-1-1:1992

The coordinates for max 6 bolts:

$$x(x_1, x_2, x_3, x_4, x_5, x_6) := \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \\ x_6 \end{pmatrix} \qquad y(y_1, y_2, y_3, y_4, y_5, y_6) := \begin{pmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \\ y_5 \\ y_6 \end{pmatrix}$$

A few examples :



Resulting force on one bolt:

$$F_R(m_v, n_v, v_v, n, x_1, x_2, x_3, x_4, x_5, x_6, y_1, y_2, y_3, y_4, y_5, y_6) :=$$

<5.1>

{kN,kNm}			{m}		{m}		{m}
M	-1.8	y1	0	x1	0	Xz	0.0725
N	-17	y2	0	x2	0.15	Yz	0
V	-14	y3	0	x3	0	B	0.0105
n	2	y4	0	x4	0		
	-7.5	y5	0	x5	0		
	9.6	y6	0	x6	0		
Forces on the bolts:							
			{kN}		{kN}		{kN}
Fx1	0	Fy1	-6.4	Fm1	6.38	Fm	6.3753
Fx2	0	Fy2	-6.4	Fm2	6.38	Fmx	0
Fx3	0	Fy3	-6.4	Fm3	6.38	Fmy	-6.375
Fx4	0	Fy4	-6.4	Fm4	6.38	Fn	-4.175
Fx5	0	Fy5	-6.4	Fm5	6.38	Fv	-3.375
Fx6	0	Fy6	-6.4	Fm6	6.38	Fr	10.607

$$\left(m_v \;\; n_v \;\; v_v \;\; n \;\; y(y_1, y_2, y_3, y_4, y_5, y_6) \;\; x(x_1, x_2, x_3, x_4, x_5, x_6)\right)$$

with:
* M, N and V : the outside forces on the bolts
* n : number of the bolts
* Xz : centre of gravity of the bolts in x direction
* Yz : centre of gravity of the bolts in y direction
* Fx, Fy : The force on 1 bolt in x or y direction, due to the moment force
* Fmx, Fmy : The biggest force on 1 bolt with Fx and Fy the moment force in the same bolt
* Fn : The force on 1 bolt due to the normal force
* Fv : The force on 1 bolt due to the shear force
* Fr : The resulting force on 1 bolt

Shear resistance for bolts, pins and rivets :
(ENV1999 table 6.4, 6.7 and 6.5, ENV1993 table 6.5.3, 6.5.7 and 6.5.5)

$$A_{bolt}(D_{bolt}) := \frac{\pi \cdot D_{bolt}^2}{4}$$ area of the bolt and the pin **<5.2>**

$$A_{rivet}(d_0) := \frac{\pi \cdot d_0^2}{4}$$ area of the rivet **<5.2>**

$$c(f_{ub}) := \begin{cases} 0.6 & \text{if } f_{ub} < 1000 \frac{N}{mm^2} \\ 0.5 & \text{if } f_{ub} \geq 1000 \frac{N}{mm^2} \end{cases}$$ **<5.3>**

$$F_{vRd}(f_{ub}, D_{bolt}) := \frac{c(f_{ub}) \cdot f_{ub} \cdot A_{bolt}(D_{bolt})}{\gamma_{Mb}}$$

Shear resistance for bolts and pins
(ENV9: table 6.4 form. 6.13) **<5.4>**

$$F_{vRd\_r}(f_{ub}, d_0) := \frac{0.6 \cdot f_{ub} \cdot A_{rivet}(d_0)}{\gamma_{Mr}}$$

Shear resistance for rivets
(ENV9: table 6.5 form. 6.22) **<5.4>**

Bearing resistance for bolts, pins and rivets :
(ENV1999 table 6.4 and 6.7, ENV1993 table 6.5.3 and 6.5.7)

$$\alpha(e_1, p_1, d_0, f_{ub}, f_u) := \min\left(\frac{e_1}{3 \cdot d_0}, \frac{p_1}{3 \cdot d_0} - \frac{1}{4}, \frac{f_{ub}}{f_u}, 1.0\right)$$

ENV9: table 6.4 form. 6.16 **<5.5>**
table 6.5 form. 6.24

$$F_{bRd}(e_1, p_1, d_0, f_{ub}, f_u, f_y, D_{bolt}, t, n) := \begin{cases} \dfrac{2.5 \cdot \alpha(e_1, p_1, d_0, f_{ub}, f_u) \cdot f_u \cdot D_{bolt} \cdot t}{\gamma_{Mb}} & \text{if } n > 1 \\ \dfrac{1.5 \cdot t \cdot D_{bolt} \cdot f_y}{\gamma_{Mb}} & \text{if } n = 1 \end{cases}$$

ENV9: table 6.4 form. 6.15 (free rotation not required)

ENV9: table 6.7 (free rotation required)

<5.6>

$$F_{bRd\_r}(e_1, p_1, d_0, f_{ub}, f_u, t) := \frac{2.5 \cdot \alpha(e_1, p_1, d_0, f_{ub}, f_u) \cdot f_u \cdot d_0 \cdot t}{\gamma_{Mr}}$$

ENV9: table 6.5 form. 6.23

Moment resistance for bolts and pins : (ENV1999 table 6.7, ENV1993 table 6.5.7)

$$W(D_{bolt}) := \pi \cdot \left(\frac{D_{bolt}^{3}}{32}\right)$$

moment resistance **<5.7>**

$$M_{Rd}(f_{ub}, D_{bolt}) := \frac{0.8 \cdot f_{ub} \cdot W(D_{bolt})}{\gamma_{Mb}}$$

moment capacity **<5.8>**

$$sp(t_i, t_o, s, C) := \begin{cases} \left(\frac{t_i}{2} + s + \frac{t_o}{2}\right) & \text{if } C = 1 \\ \frac{(2 \cdot t_o + 4 \cdot s + t_i)}{8} & \text{if } C = 2 \end{cases}$$

margin between connected parts **<5.9>**

C = 1 : exterior tube is connected with interior tube
C = 2 : 3 plates are connected together

Traction resistance for bolts : (ENV1999 tableau 6.4, ENV1993 tableau 6.5.3)

$$F_{tRd}(f_{ub}, D_{bolt}) := \frac{0.9 \cdot f_{ub} \cdot A_{bolt}(D_{bolt})}{\gamma_{Mb}}$$

ENV9: table 6.4 form. 6.17 **<5.10>**

Resistance against perforation of the bolts and the nuts (ENV3 form. 6.5)

$$d_{nut}(D_{bolt}) := \begin{cases} 10mm & \text{if } D_{bolt} = 6mm \\ 13mm & \text{if } D_{bolt} = 8mm \\ 17mm & \text{if } D_{bolt} = 10mm \\ 19mm & \text{if } D_{bolt} = 12mm \\ 22mm & \text{if } D_{bolt} = 14mm \\ 24mm & \text{if } D_{bolt} = 16mm \\ 27mm & \text{if } D_{bolt} = 18mm \\ 30mm & \text{if } D_{bolt} = 20mm \\ 34mm & \text{if } D_{bolt} = 22mm \\ 36mm & \text{if } D_{bolt} = 24mm \\ 41mm & \text{if } D_{bolt} = 27mm \\ 46mm & \text{if } D_{bolt} = 30mm \\ 50mm & \text{if } D_{bolt} = 33mm \\ 55mm & \text{if } D_{bolt} = 36mm \end{cases}$$

<5.11>

$$B_{pRd}(D_{bolt}, t, f_u) := \frac{0.6 \cdot \pi \cdot d_{nut}(D_{bolt}) \cdot t \cdot f_u}{\gamma_{Mb}}$$

maximum perforation force **<5.12>**

Connection by rivets :

Connection between the principal profile and the reinforcement profile

The static moment of the reinforcement profile equals:

$$s(reinf) := \begin{cases} (91.27mm) & \text{if } A_{alu}(reinf) = A_{alu297\_8} \\ (79.97mm) & \text{if } A_{alu}(reinf) = A_{alu260} \\ (74.93mm) & \text{if } A_{alu}(reinf) = A_{alu232} \end{cases}$$

$$S_{reinforcement}(reinf) := 0.5 \cdot A_{alu}(reinf) \cdot s(reinf)$$ **<5.13>**

The maximum distance between two rivets equals:

$$L_{max}(F_{max}, e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}, prin, reinf) := \frac{\min\begin{pmatrix} F_{vRd\_r}(R_{t\_rivet}, D_0) \\ F_{bRd\_r}(e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}, t_{alu}(prin)) \\ F_{bRd\_r}(e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}, t_{alu}(reinf)) \end{pmatrix} \cdot I_{y\_alu}(prin + reinf)}{F_{max} \cdot S_{reinforcement}(reinf)}$$

<5.14>

We have 4 rivets per section.
The maximum distance between two rows of rivets equals:

$$L_{max\_row}(F_{max}, e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}, prin, reinf) := L_{max}(F_{max}, e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}, prin, reinf) \cdot 4$$ **<5.15>**

The real force on the rivets becomes:

$$F_{max\_real}(p_1, F_{max}, prin, reinf) := \frac{p_1 \cdot F_{max} \cdot S_{reinforcement}(reinf)}{I_{y\_alu}(prin + reinf) \cdot 4}$$ **<5.16>**

The stress in the rivet:

$$R_{t\_rivet\_real}(p_1, D_0, F_{max}, prin, reinf) := \frac{F_{max\_real}(p_1, F_{max}, prin, reinf) \cdot \gamma_{Mr}}{0.6 \cdot A_{rivet}(D_0)}$$ **<5.17>**

The stress in the principal profile:

$$R_{t\_prin\_real}(e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}, F_{max}, prin, reinf) := \frac{F_{max\_real}(p_1, F_{max}, prin, reinf) \cdot \gamma_{Mr}}{2.5 \cdot \alpha(e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}) \cdot D_0 \cdot t_{alu}(prin)}$$ **<5.18>**

The stress in the reinforcement profile:

$$R_{t\_reinf\_real}(e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}, F_{max}, prin, reinf) := \frac{F_{max\_real}(p_1, F_{max}, prin, reinf) \cdot \gamma_{Mr}}{2.5 \cdot \alpha(e_1, p_1, D_0, R_{t\_rivet}, R_{t\_alu}) \cdot D_0 \cdot t_{alu}(reinf)}$$ **<5.19>**

Doc. 6. Steel connection

$$B(b_1, b_2, b_3, b_4, b_5, b_6, b_7) := \begin{pmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \\ b_5 \\ b_6 \\ b_7 \end{pmatrix} \qquad H(h_1, h_2, h_3, h_4, h_5, h_6, h_7) := \begin{pmatrix} h_1 \\ h_2 \\ h_3 \\ h_4 \\ h_5 \\ h_6 \\ h_7 \end{pmatrix}$$

$$T(t_1, t_2, t_3, t_4, t_5, t_6, t_7) := \begin{pmatrix} t_1 \\ t_2 \\ t_3 \\ t_4 \\ t_5 \\ t_6 \\ t_7 \end{pmatrix}$$

$$Y(y1, y2, y3, y4, y5, y6, y7) := \begin{pmatrix} y1 \\ y2 \\ y3 \\ y4 \\ y5 \\ y6 \\ y7 \end{pmatrix} \qquad Z(z1, z2, z3, z4, z5, z6, z7) := \begin{pmatrix} z1 \\ z2 \\ z3 \\ z4 \\ z5 \\ z6 \\ z7 \end{pmatrix}$$

Length [m]		Height [m]		Thickness [m]		Gravity point [m]			
b1	0.03	h1	0.04	t1	0.00	y1	0.02	z1	0.05
b2	0.07	h2	0.01	t2	0.01	y2	0.05	z2	0.05
b3	0.00	h3	0.14	t3	0.07	y3	0.12	z3	0.05
b4	0.00	h4	0.14	t4	0.07	y4	0.12	z4	0.08
b5	0.07	h5	0.07	t5	0.01	y5	0.20	z5	0.08
b6	0.05	h6	0.15	t6	0.00	y6	0.31	z6	0.08
b7	0.15	h7	0.25	t7	0.01	y7	0.01	z7	0.08
						H	0.3844		
n	6								

Section

A=b x h - (b-2t)(h-2t)

A1	0.00	m²	A5	0.00	m²
A2	0.00	m²	A6	0.00	m²
A3	0.00	m²	A7	0.00	m²
A4	0.00	m²			

Atot	4.67E-03	m²	**<6.1>**

Gravity point

Yg = [(A1 x y1) + (A2 x y2) + …] / Atot

Yg	0.17	m	
Yv	0.22	m	**<6.2>**

Zg = [(A1 x z1) + (A2 x z2) + …] / Atot

Zg	0.06	m	
Zv	0.06	m	**<6.3>**

Moment of inertia

Iy = [b x h^3 - (b-2t)(h-2t)^3] / 12

I1	8.14E-08	m^4	I5	9.21E-07	m^4
I2	5.83E-09	m^4	I6	3.11E-06	m^4
I3	9.15E-07	m^4	I7	4.03E-05	m^4
I4	9.15E-07	m^4			

Iz = [h x b^3 - (b-2t)(b-2t)^3] / 12

I1	5.08E-08	m^4		I5	9.21E-07	m^4
I2	2.86E-07	m^4		I6	5.40E-07	m^4
I3	7.47E-10	m^4		I7	1.82E-05	m^4
I4	7.47E-10	m^4				

a_y = y - Yg

a1	-0.15	m		a5	0.03	m
a2	-0.12	m		a6	0.14	m
a3	-0.05	m		a7	-0.16	m
a4	-0.05	m				

a_z = z - Zg

a1	-0.02	m		a5	0.01	m
a2	-0.02	m		a6	0.01	m
a3	-0.02	m		a7	0.01	m
a4	0.01	m				

Itot = (I1 + a1^2 . A1) + (I2 + a2^2 . A2) + …

Iy_tot	5.24E-05	m^4	**<6.4>**
Iz_tot	2.76E-06	m^4	**<6.5>**

Von mises stress control

σ = (Nv / Atot) + [(My x Yv)/Iy_tot] + [(Mz x Zv)/Iz_tot]

σ	8.08E+04	kN/m²	**<6.6>**

τ = Sv / Atot

τ	1.15E+04	kN/m²	**<6.7>**

σ_{vm} = sqrt(σ^2 + 3.τ^2)

σ_{vm}	8.32E+04	kN/m²	**<6.8>**

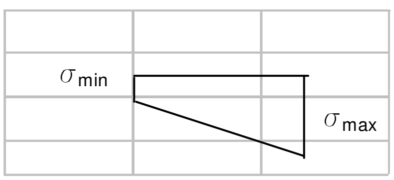
Doc. 7. Baseplate

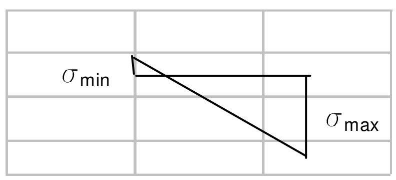
7.1. Bending of the horizontal steel plate.

$$\sigma_{max}(R_x,R_z,B_p,L,h_p,v,P) := \begin{cases} \dfrac{|R_z|}{B_p \cdot L} + \dfrac{|R_x| \cdot (h_p)}{\dfrac{B_p \cdot L^2}{6}} & \text{if } P = \text{"side"} \\[2ex] \dfrac{|R_z|}{B_p \cdot L} + \dfrac{|R_x| \cdot (h_p) \cdot v}{\dfrac{B_p \cdot L^3}{12} + \left(v - \dfrac{L}{2}\right)^2 \cdot B_p \cdot L} & \text{if } P = \text{"corner"} \end{cases}$$

$$\sigma_{min}(R_x,R_z,B_p,L,h_p,v,P) := \begin{cases} \dfrac{|R_z|}{B_p \cdot L} - \dfrac{|R_x| \cdot (h_p)}{\dfrac{B_p \cdot L^2}{6}} & \text{if } P = \text{"side"} \\[2ex] \dfrac{|R_z|}{B_p \cdot L} - \dfrac{|R_x| \cdot (h_p) \cdot v}{\dfrac{B_p \cdot L^3}{12} + \left(v - \dfrac{L}{2}\right)^2 \cdot B_p \cdot L} & \text{if } P = \text{"corner"} \end{cases}$$

<7.1>

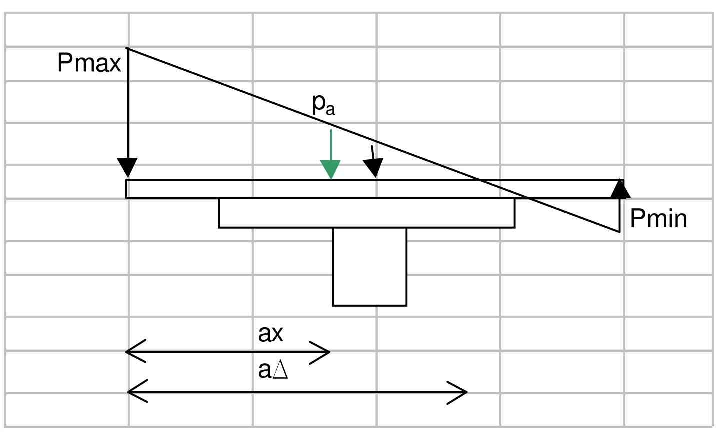


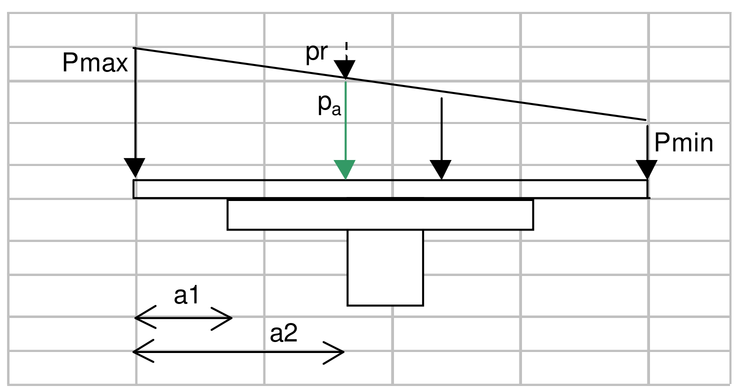


$$p_{max}(R_x,R_z,B_p,L,h_p,v,P) := \sigma_{max}(R_x,R_z,B_p,L,h_p,v,P) \cdot B_p$$

<7.2>

$$p_{min}(R_x,R_z,B_p,L,h_p,v,P) := \sigma_{min}(R_x,R_z,B_p,L,h_p,v,P) \cdot B_p$$





a_1 distance from the side of the plate to the reinforcement

a_2 distance from the side of the plate to the support

$$p_r(a_x,R_x,R_z,B_p,L,h_p,v,P) := \frac{a_x\cdot\left(p_{max}(R_x,R_z,B_p,L,h_p,v,P) - p_{min}(R_x,R_z,B_p,L,h_p,v,P)\right)}{L}$$ **<7.3>**

$$a_\Delta(R_x,R_z,B_p,L,h_p,v,P) := \frac{L}{\left|\frac{p_{min}(R_x,R_z,B_p,L,h_p,v,P)}{p_{max}(R_x,R_z,B_p,L,h_p,v,P)}\right| + 1}$$ **<7.4>**

$$p_{ax}(a_x,R_x,R_z,B_p,L,h_p,v,P) := \begin{cases} \left(p_{max}(R_x,R_z,B_p,L,h_p,v,P) \ldots + -p_r(a_x,R_x,R_z,B_p,L,h_p,v,P)\right) & \text{if } p_{min}(R_x,R_z,B_p,L,h_p,v,P) \ge 0 \\ \frac{p_{max}(R_x,R_z,B_p,L,h_p,v,P)\cdot\left(a_\Delta(R_x,R_z,B_p,L,h_p,v,P) - a_x\right)}{a_\Delta(R_x,R_z,B_p,L,h_p,v,P)} & \text{otherwise} \end{cases}$$ **<7.5>**

Distance of the gravity point:

$$a_g(a_x,R_x,R_z,B_p,L,h_p,v,P) := \begin{cases} \frac{\left(p_{ax}(a_x,R_x,R_z,B_p,L,h_p,v,P)\cdot a_x\cdot\frac{a_x}{2}\right) \ldots + \frac{\left(p_{max}(R_x,R_z,B_p,L,h_p,v,P) \ldots + -p_{ax}(a_x,R_x,R_z,B_p,L,h_p,v,P)\right)\cdot a_x}{2}\cdot\frac{2\cdot a_x}{3}}{\left(\frac{p_{max}(R_x,R_z,B_p,L,h_p,v,P) \ldots + p_{ax}(a_x,R_x,R_z,B_p,L,h_p,v,P)}{2}\right)\cdot a_x} & \text{if } p_{ax}(a_x,R_x,R_z,B_p,L,h_p,v,P) > 0 \\ \left(\frac{2}{3}\cdot a_\Delta(R_x,R_z,B_p,L,h_p,v,P)\right) & \text{if } p_{ax}(a_x,R_x,R_z,B_p,L,h_p,v,P) \le 0 \end{cases}$$

<7.6>

Maximum moment:

$$M_{max}(a_x,R_x,R_z,B_p,L,h_p,v,P) := \left(\frac{p_{max}(R_x,R_z,B_p,L,h_p,v,P) \ldots + p_{ax}(a_x,R_x,R_z,B_p,L,h_p,v,P)}{2}\right)\cdot a_x\cdot a_g(a_x,R_x,R_z,B_p,L,h_p,v,P)$$ **<7.7>**

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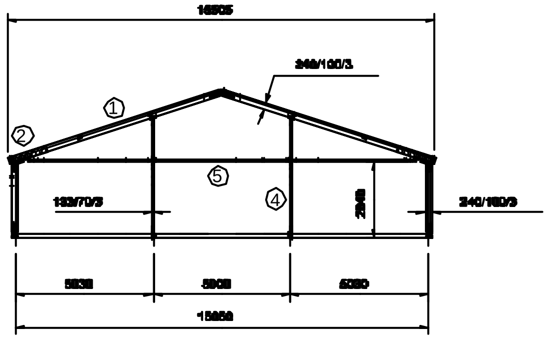
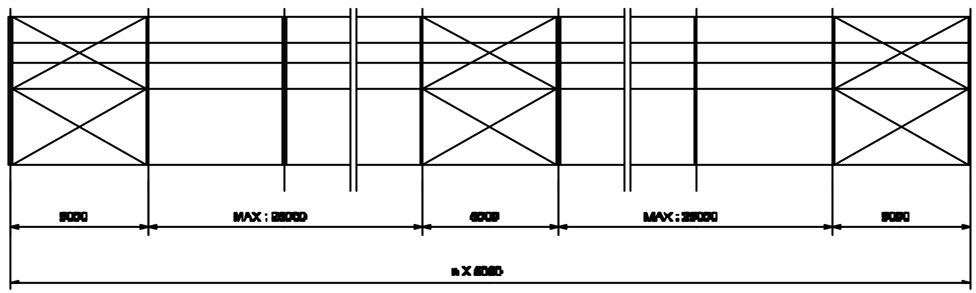
ENCLOSURE 2 :

Drawings of the Alu 15m (+12m) structure

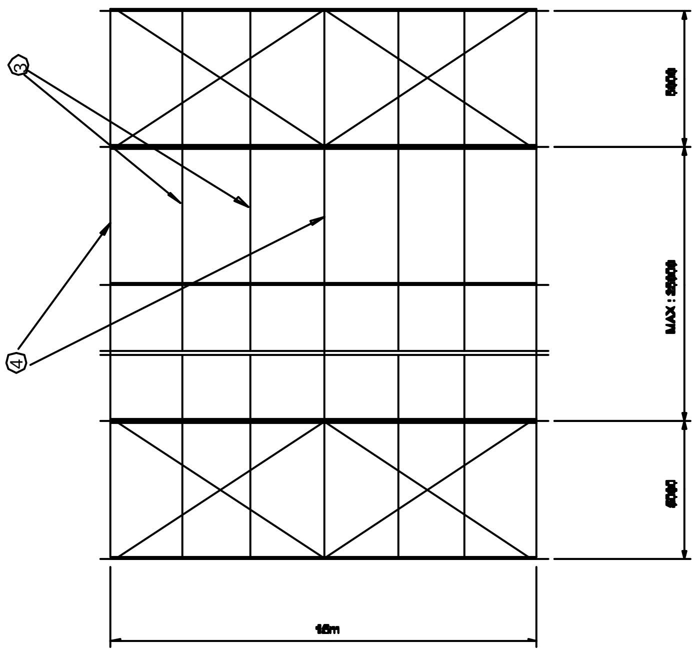
Front view

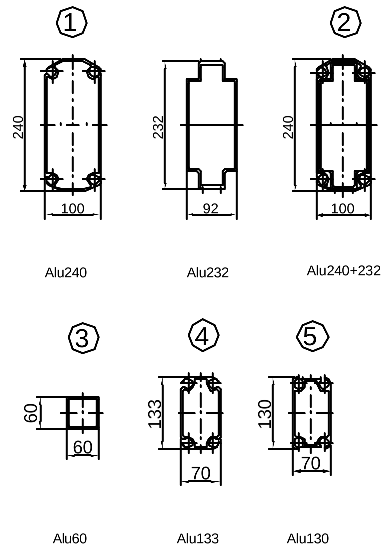


Side view



View from above





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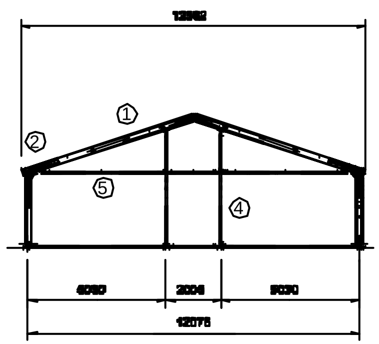
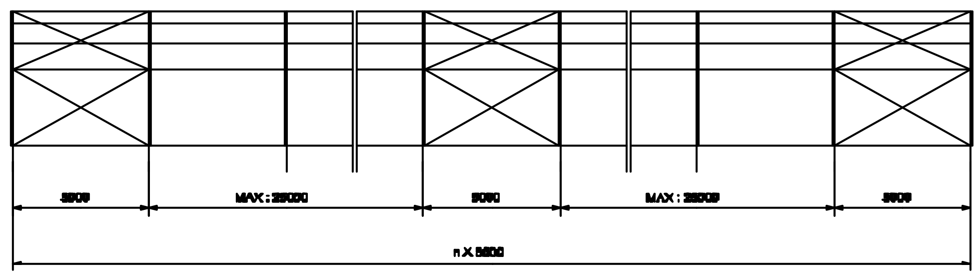
Global structure alu15m

PROJECTIE			NR. ONGEGALV.	
SCHAAL		A4		
DATUM	08/02/05	EB	CODENR.	BAL15E01

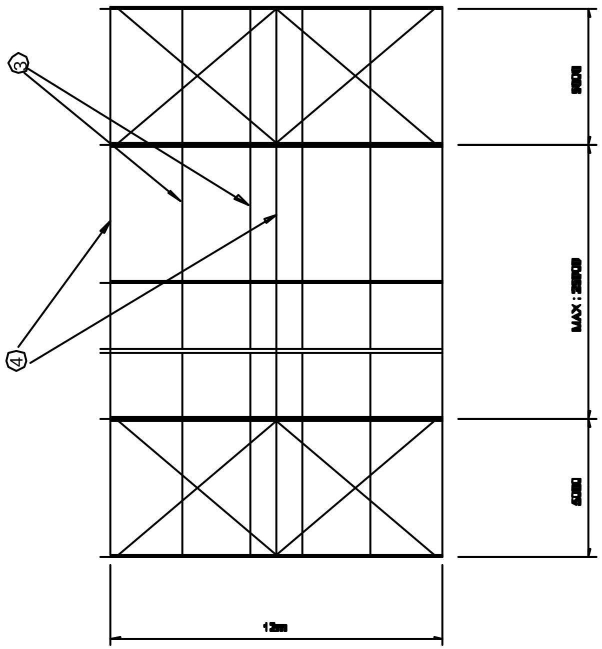
Front view

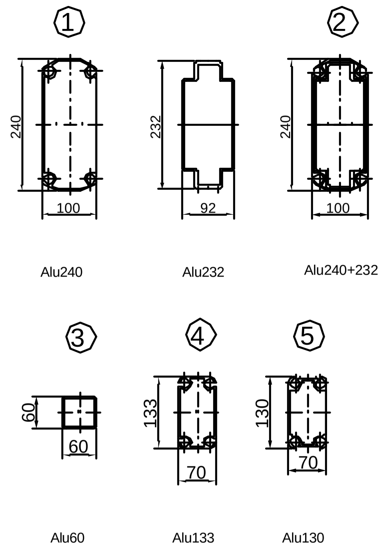


Side view



View from above





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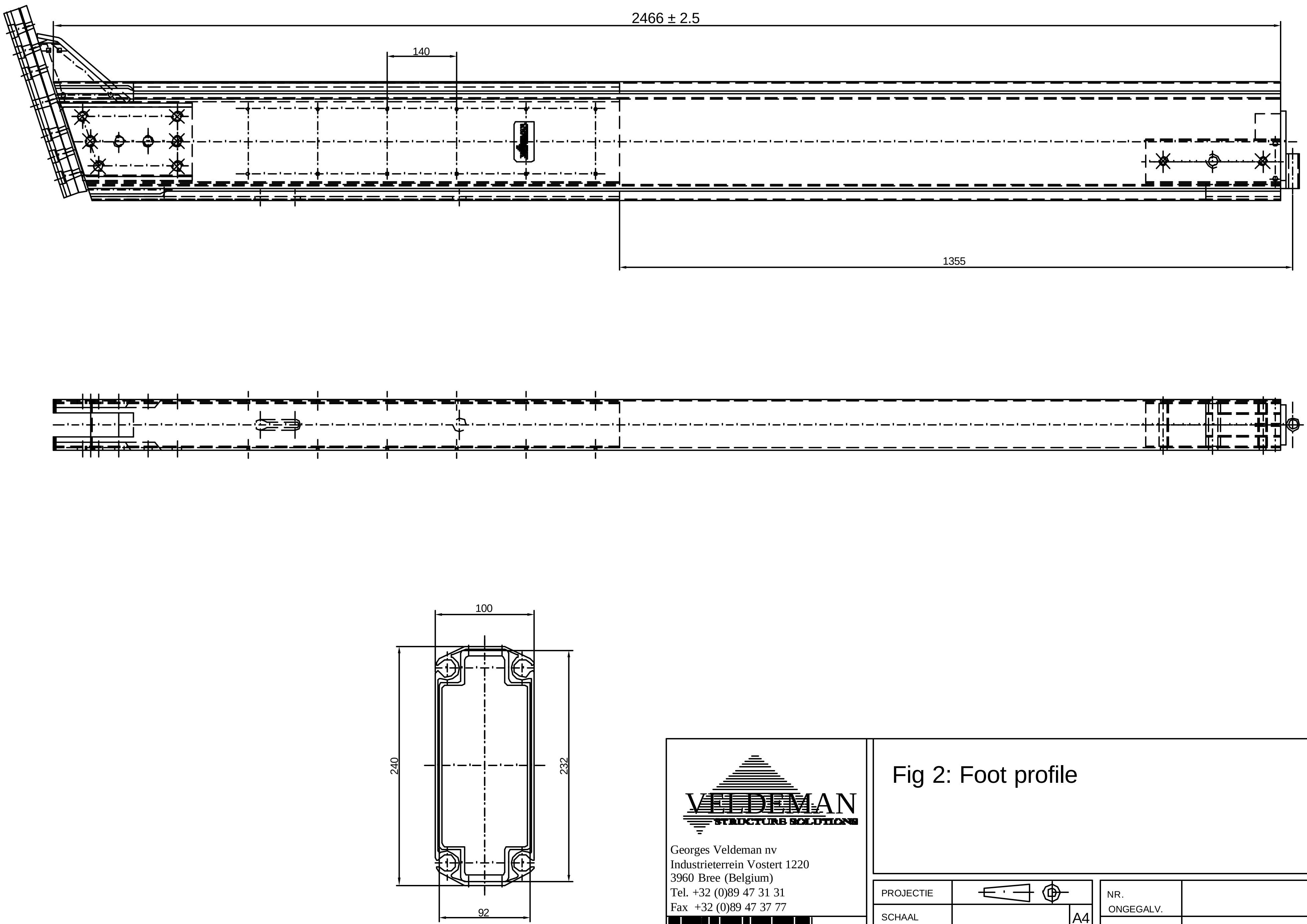
Global structure alu12m prof.240

PROJECTIE			NR. ONGEGALV.	
SCHAAL		A4		
DATUM	08/02/05	EB	CODENR.	BAL12p240_E01



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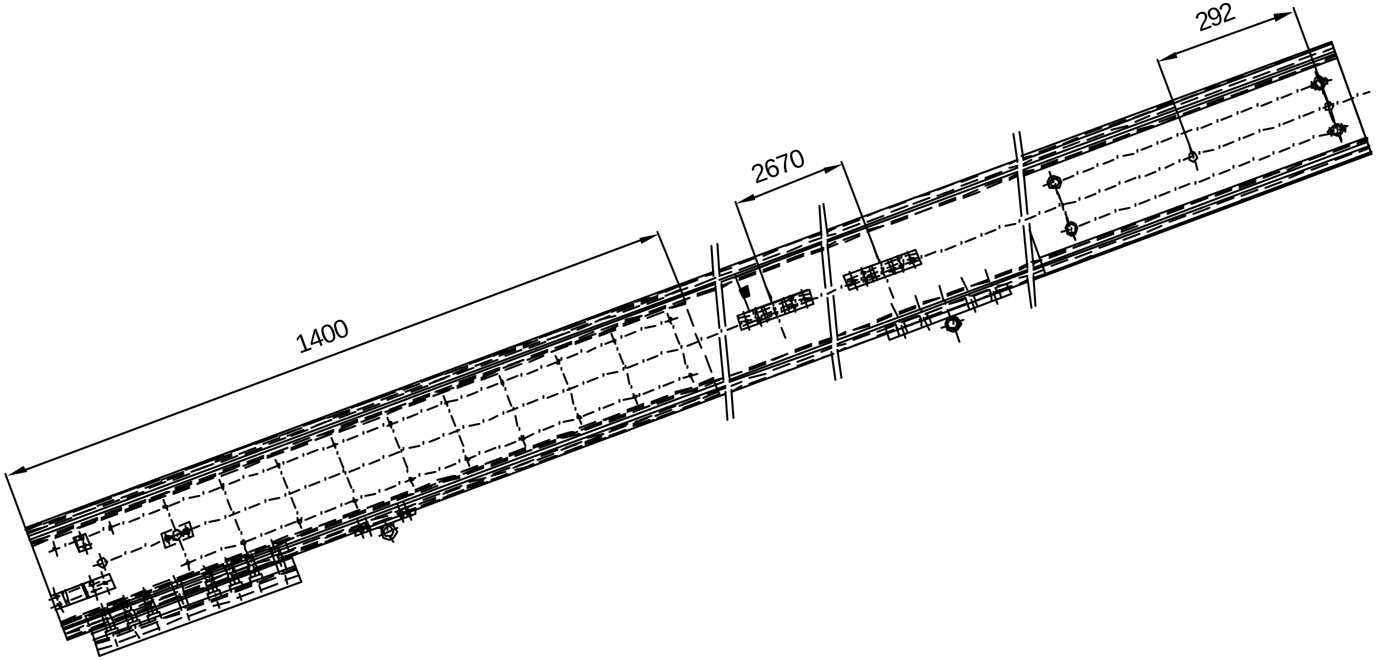
[redacted]

Fig 2: Foot profile

PROJECTIE			NR. ONGEGALV.	
SCHAAL		A4		
DATUM	10/05/06	eb	CODENR.	BAL15E02



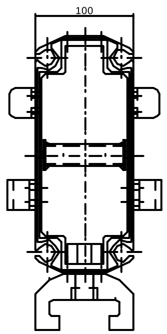


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Fig 3: Roof profile

PROJECTIE		NR. ONGEGALV.	
SCHAAL	A4	CODENR.	BAL15E03
DATUM	eb		

Datum afdruk : donderdag 8 juni 2006 15:13:37 Door : ####

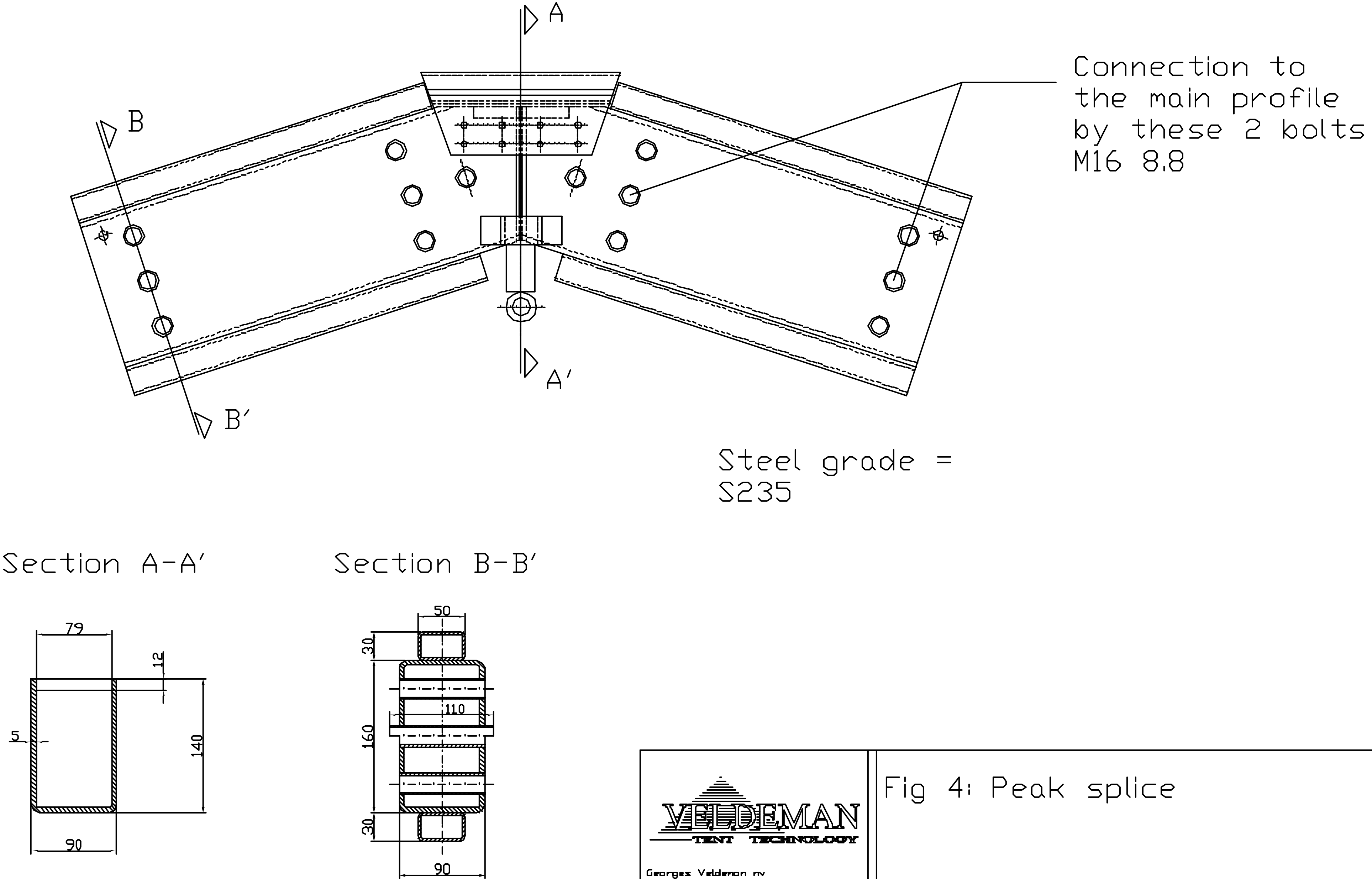

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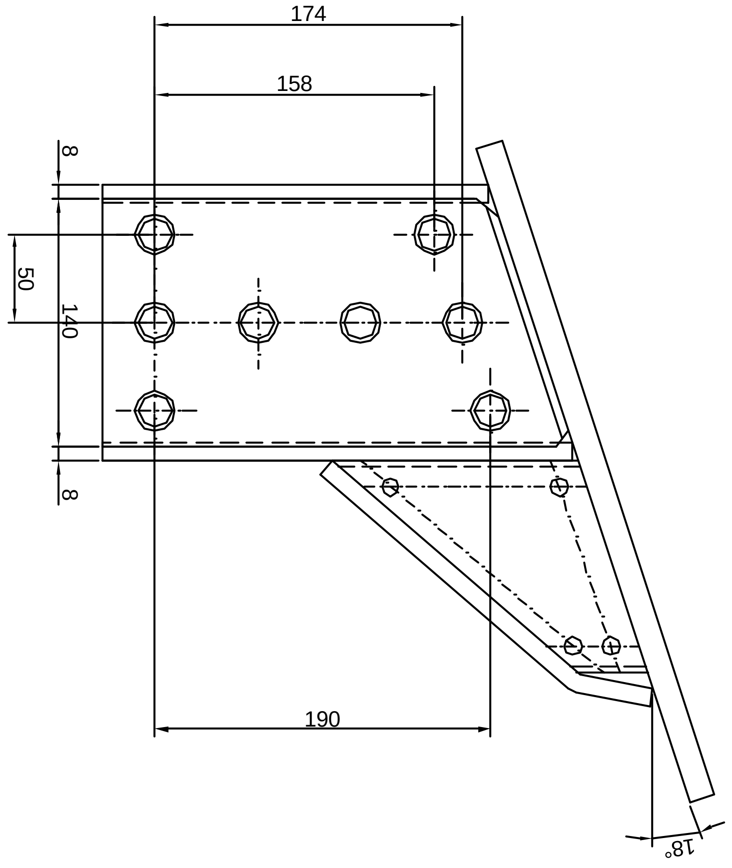
Fig 4: Peak splice

PROJECTIE		NR. ONGEGALV.	
SCHAAL		CODENR.	BAL15E04
DATUM			



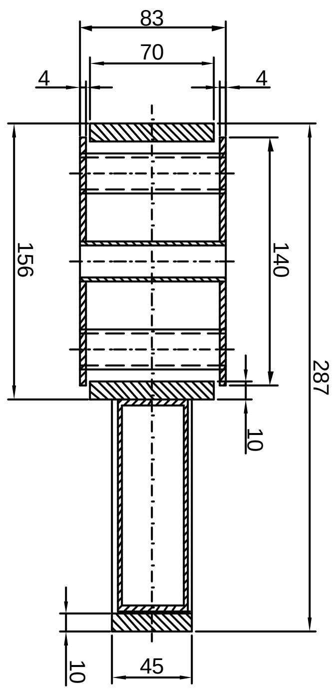


Fig 5: Eaves splice

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PROJECTIE	
SCHAAL	A4
DATUM	eb
NR. ONGEGALV.	
CODENR.	BAL15E05

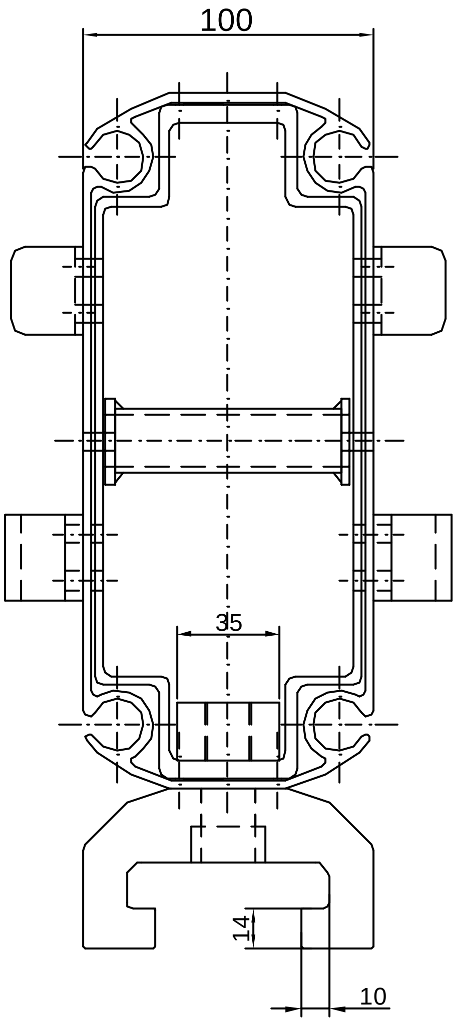

Fig 6: Aluminium rail profile

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PROJECTIE		NR. ONGEGALV.	
SCHAAL	A4		
DATUM	eb	CODENR.	BAL15E06

Datum afdruk : donderdag 8 juni 2006 15:12:48 Door : ####

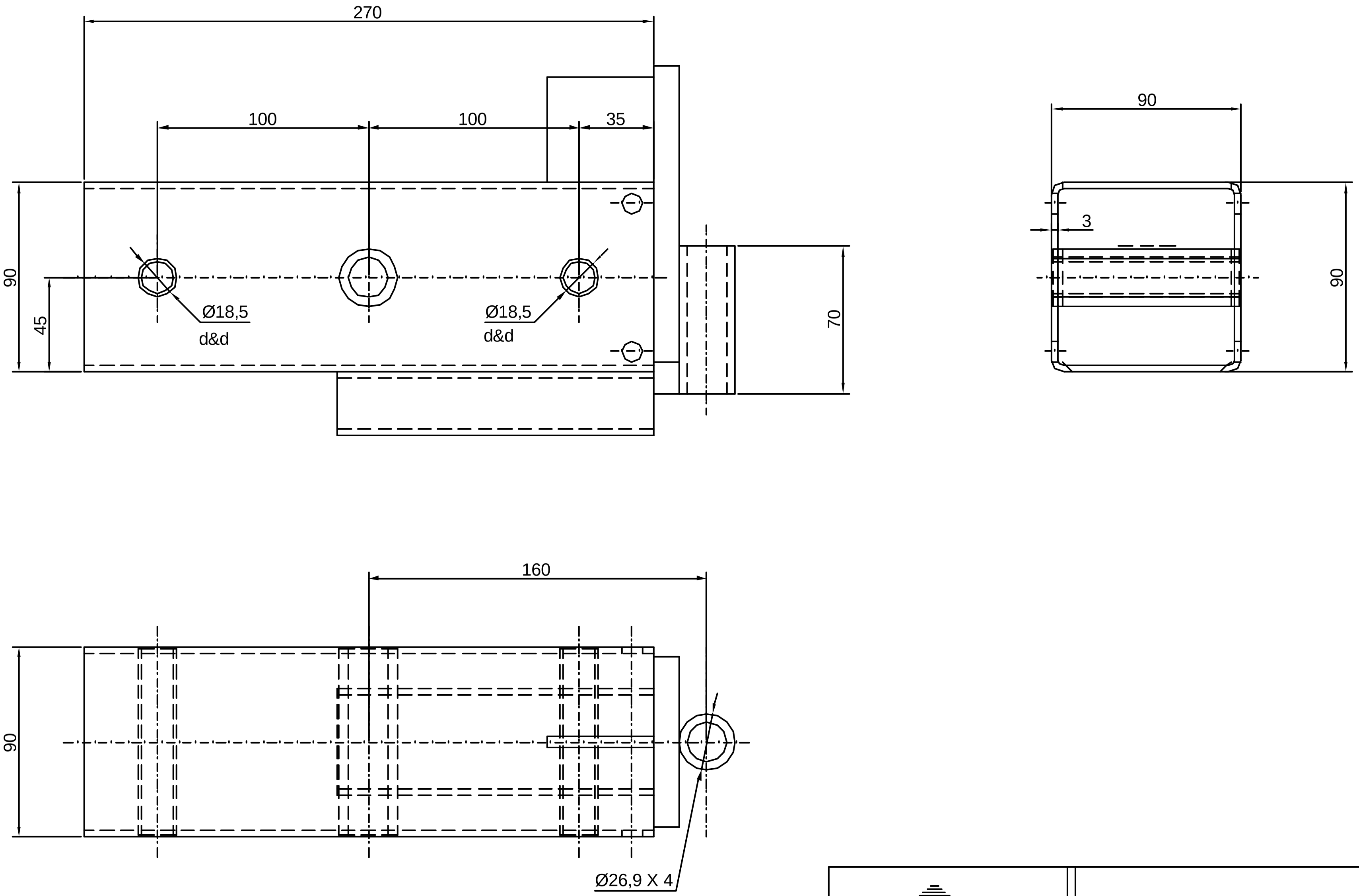

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Fig 7: Connection of arch to baseplate

PROJECTIE			NR. ONGEGALV.	
SCHAAL		A4	CODENR.	BAL15E07
DATUM		eb		

Datum afdruk : donderdag 8 juni 2006 15:12:32 Door : ####

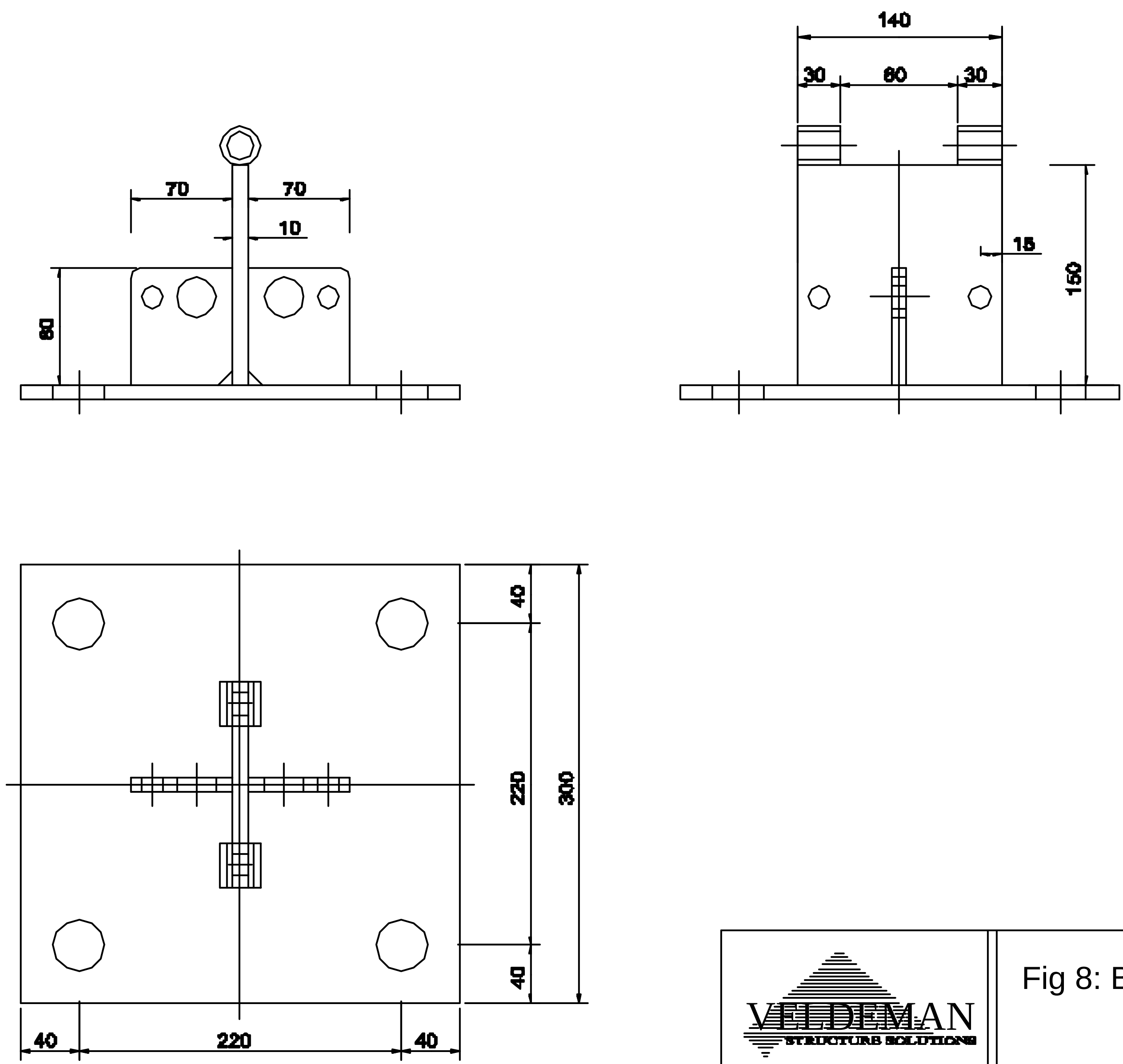

Fig 8: Baseplate

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PROJECTIE			NR. ONGEGALV.	
SCHAAL		A4	CODENR.	BAL15E08
DATUM	10/05/06	eb		

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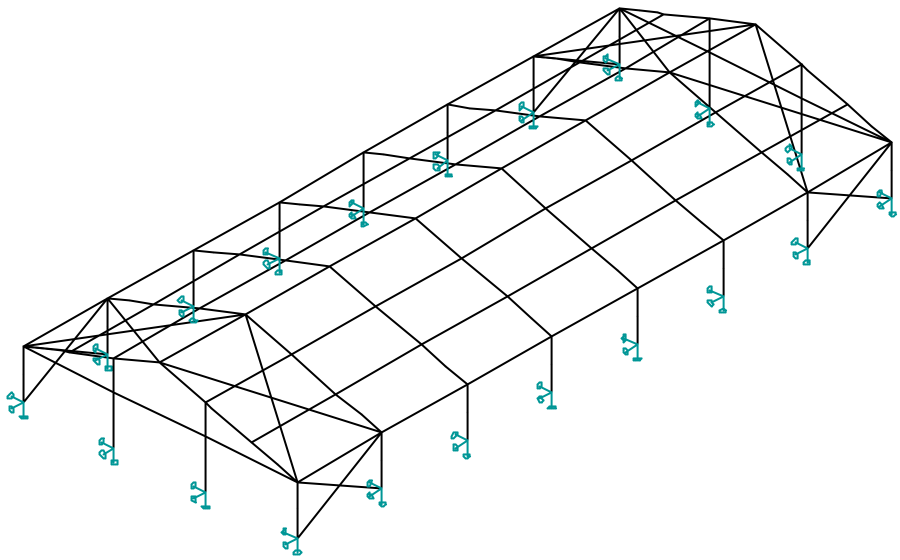
ENCLOSURE 3 :

Print out of calculation results of the Alu 15m x 35m structure by program ESA PRIMA WIN (release 3.50.63).

Contents



Basic data
Type of structure : Frame XYZ

Number of nodes:	118
Number of members:	181
Number of 1D macros:	61
Number of bound. lines:	0
Number of 2D macros:	0
Number of profiles :	7
Number of cases:	12
Number of materials:	2

Material

Name:		
6061 T6		
	E modulus	71000.00 MPa
	Poisson coeff.	0.30
	Density	0.000 kg/mm^3
	Extensibility	2.4e-005 mm/mm.K
6x37 +1TWK		
	Ultimate strength	1770.000 MPa
	Yield design	664.000 MPa
	E modulus	80000.00 MPa
	Poisson coeff.	0.30
	Density	0.000 kg/mm^3
	Extensibility	1.2e-005 mm/mm.K

List of material
Group of members : 1/181

no.	Name:	quality	unit weight kg/mm	length mm	weight kg
1	ALU 240 (General)	6061 T6	0.01	128635.03	805.77
2	ALU240/232 (General)	6061 T6	0.01	39920.00	500.12
3	Alu133/70 (General)	6061 T6	0.00	105000.00	454.76
4	Alu60/60/3 (General)	6061 T6	0.00	140000.00	249.68
5	Alu130/70 (General)	6061 T6	0.00	30000.00	121.27
6	Alu133/70 (General)	6061 T6	0.00	17097.98	74.05
7	Dia 10 6x37 + 1TWK (R10)	6x37 +1TWK	0.00	119964.93	41.56

The total weight of the structure: 2247.20 kg
Surface for painting:
mm^2

Nodes

node	X mm	Y mm	Z mm
1	0	0	0
2	0	0	2649
3	7500	0	5085
4	15000	0	2649
5	15000	0	0
6	1132	0	3017
7	13868	0	3017
8	0	5000	0
9	0	5000	2649
10	1132	5000	3017
11	7500	5000	5085
12	13868	5000	3017
13	15000	5000	2649
14	15000	5000	0
15	0	10000	0
16	0	10000	2649
17	1132	10000	3017
18	7500	10000	5085
19	13868	10000	3017
20	15000	10000	2649
21	15000	10000	0
22	0	15000	0
23	0	15000	2649
24	1132	15000	3017
25	7500	15000	5085
26	13868	15000	3017
27	15000	15000	2649
28	15000	15000	0
29	0	20000	0
30	0	20000	2649
31	1132	20000	3017
32	7500	20000	5085
33	13868	20000	3017
34	15000	20000	2649
35	15000	20000	0
36	0	25000	0

node	X mm	Y mm	Z mm
37	0	25000	2649
38	1132	25000	3017
39	7500	25000	5085
40	13868	25000	3017
41	15000	25000	2649
42	15000	25000	0
43	0	30000	0
44	0	30000	2649
45	1132	30000	3017
46	7500	30000	5085
47	13868	30000	3017
48	15000	30000	2649
49	15000	30000	0
50	0	35000	0
51	0	35000	2649
52	1132	35000	3017
53	7500	35000	5085
54	13868	35000	3017
55	15000	35000	2649
56	15000	35000	0
57	5000	0	0
58	10000	0	0
59	5000	0	4274
60	10000	0	4274
61	5000	0	2649
62	10000	0	2649
63	5000	35000	0
64	10000	35000	0
65	5000	35000	2649
66	5000	35000	4274
67	10000	35000	2649
68	10000	35000	4274
69	0	35000	1344
70	0	30000	1344
71	0	25000	1344
72	0	20000	1344
73	0	15000	1344
74	0	10000	1344
75	0	5000	1344
76	0	0	1344
77	2100	0	3332
78	2100	35000	3332
79	10350	0	4161

node	X mm	Y mm	Z mm
80	10350	35000	4161
81	12500	35000	3462
82	10000	35000	4274
83	12500	30000	3461
84	10000	30000	4273
85	12500	25000	3461
86	10000	25000	4273
87	12500	20000	3461
88	10000	20000	4273
89	12500	15000	3461
90	10000	15000	4273
91	12500	10000	3461
92	10000	10000	4273
93	12500	5000	3461
94	10000	5000	4273
95	12500	0	3462
96	10000	0	4274
97	2500	35000	3462
98	2500	30000	3461
99	5000	30000	4273
100	2500	25000	3461
101	5000	25000	4273
102	2500	20000	3461
103	5000	20000	4273
104	2500	15000	3461
105	5000	15000	4273
106	2500	10000	3461
107	5000	10000	4273
108	2500	5000	3461
109	5000	5000	4273
110	2500	0	3462
111	15000	35000	1344
112	15000	30000	1344
113	15000	25000	1344
114	15000	20000	1344
115	15000	15000	1344
116	15000	10000	1344
117	15000	5000	1344
118	15000	0	1344

Members

macro	memb	node 1	node 2	length mm	Rx deg	profile	quality
1	1	1	76	1344	0.00	1 - ALU 240 (General)	6061 T6
	2	76	2	1305	0.00	2 - ALU240/232 (General)	6061 T6
2	3	2	6	1190	0.00	2 - ALU240/232 (General)	6061 T6
	4	6	77	1018	0.00	1 - ALU 240 (General)	6061 T6
	5	77	110	420	0.00	1 - ALU 240 (General)	6061 T6
	6	110	59	2629	0.00	1 - ALU 240 (General)	6061 T6
	7	59	3	2628	0.00	1 - ALU 240 (General)	6061 T6
3	8	5	118	1344	0.00	1 - ALU 240 (General)	6061 T6
	9	118	4	1305	0.00	2 - ALU240/232 (General)	6061 T6
4	10	8	75	1344	0.00	1 - ALU 240 (General)	6061 T6
	11	75	9	1305	0.00	2 - ALU240/232 (General)	6061 T6
5	12	9	10	1190	0.00	2 - ALU240/232 (General)	6061 T6
	13	10	108	1439	0.00	1 - ALU 240 (General)	6061 T6
	14	108	109	2629	0.00	1 - ALU 240 (General)	6061 T6
	15	109	11	2629	0.00	1 - ALU 240 (General)	6061 T6
6	16	14	117	1344	0.00	1 - ALU 240 (General)	6061 T6
	17	117	13	1305	0.00	2 - ALU240/232 (General)	6061 T6
7	18	15	74	1344	0.00	1 - ALU 240 (General)	6061 T6
	19	74	16	1305	0.00	2 - ALU240/232 (General)	6061 T6
8	20	16	17	1190	0.00	2 - ALU240/232 (General)	6061 T6
	21	17	106	1439	0.00	1 - ALU 240 (General)	6061 T6
	22	106	107	2629	0.00	1 - ALU 240 (General)	6061 T6
	23	107	18	2629	0.00	1 - ALU 240 (General)	6061 T6
9	24	21	116	1344	0.00	1 - ALU 240 (General)	6061 T6
	25	116	20	1305	0.00	2 - ALU240/232 (General)	6061 T6
10	26	22	73	1344	0.00	1 - ALU 240 (General)	6061 T6
	27	73	23	1305	0.00	2 - ALU240/232 (General)	6061 T6
11	28	23	24	1190	0.00	2 - ALU240/232 (General)	6061 T6
	29	24	104	1439	0.00	1 - ALU 240 (General)	6061 T6
	30	104	105	2629	0.00	1 - ALU 240 (General)	6061 T6
	31	105	25	2629	0.00	1 - ALU 240 (General)	6061 T6
12	32	28	115	1344	0.00	1 - ALU 240 (General)	6061 T6
	33	115	27	1305	0.00	2 - ALU240/232 (General)	6061 T6
13	34	29	72	1344	0.00	1 - ALU 240 (General)	6061 T6
	35	72	30	1305	0.00	2 - ALU240/232 (General)	6061 T6
14	36	30	31	1190	0.00	2 - ALU240/232 (General)	6061 T6
	37	31	102	1439	0.00	1 - ALU 240 (General)	6061 T6
	38	102	103	2629	0.00	1 - ALU 240 (General)	6061 T6
	39	103	32	2629	0.00	1 - ALU 240 (General)	6061 T6
15	40	35	114	1344	0.00	1 - ALU 240 (General)	6061 T6

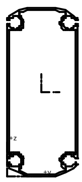
macro	memb	node 1	node 2	length mm	Rx deg	profile	quality
	41	114	34	1305	0.00	2 - ALU240/232 (General)	6061 T6
16	42	36	71	1344	0.00	1 - ALU 240 (General)	6061 T6
	43	71	37	1305	0.00	2 - ALU240/232 (General)	6061 T6
17	44	37	38	1190	0.00	2 - ALU240/232 (General)	6061 T6
	45	38	100	1439	0.00	1 - ALU 240 (General)	6061 T6
	46	100	101	2629	0.00	1 - ALU 240 (General)	6061 T6
	47	101	39	2629	0.00	1 - ALU 240 (General)	6061 T6
18	48	42	113	1344	0.00	1 - ALU 240 (General)	6061 T6
	49	113	41	1305	0.00	2 - ALU240/232 (General)	6061 T6
19	50	43	70	1344	0.00	1 - ALU 240 (General)	6061 T6
	51	70	44	1305	0.00	2 - ALU240/232 (General)	6061 T6
20	52	44	45	1190	0.00	2 - ALU240/232 (General)	6061 T6
	53	45	98	1439	0.00	1 - ALU 240 (General)	6061 T6
	54	98	99	2629	0.00	1 - ALU 240 (General)	6061 T6
	55	99	46	2629	0.00	1 - ALU 240 (General)	6061 T6
21	56	49	112	1344	0.00	1 - ALU 240 (General)	6061 T6
	57	112	48	1305	0.00	2 - ALU240/232 (General)	6061 T6
22	58	50	69	1344	0.00	1 - ALU 240 (General)	6061 T6
	59	69	51	1305	0.00	2 - ALU240/232 (General)	6061 T6
23	60	51	52	1190	0.00	2 - ALU240/232 (General)	6061 T6
	61	52	78	1018	0.00	1 - ALU 240 (General)	6061 T6
	62	78	97	420	0.00	1 - ALU 240 (General)	6061 T6
	63	97	66	2629	0.00	1 - ALU 240 (General)	6061 T6
	64	66	53	2628	0.00	1 - ALU 240 (General)	6061 T6
24	65	56	111	1344	0.00	1 - ALU 240 (General)	6061 T6
	66	111	55	1305	0.00	2 - ALU240/232 (General)	6061 T6
25	67	2	9	5000	0.00	3 - Alu133/70 (General)	6061 T6
	68	9	16	5000	0.00	3 - Alu133/70 (General)	6061 T6
	69	16	23	5000	0.00	3 - Alu133/70 (General)	6061 T6
	70	23	30	5000	0.00	3 - Alu133/70 (General)	6061 T6
	71	30	37	5000	0.00	3 - Alu133/70 (General)	6061 T6
	72	37	44	5000	0.00	3 - Alu133/70 (General)	6061 T6
	73	44	51	5000	0.00	3 - Alu133/70 (General)	6061 T6
26	74	3	11	5000	0.00	3 - Alu133/70 (General)	6061 T6
	75	11	18	5000	0.00	3 - Alu133/70 (General)	6061 T6
	76	18	25	5000	0.00	3 - Alu133/70 (General)	6061 T6
	77	25	32	5000	0.00	3 - Alu133/70 (General)	6061 T6
	78	32	39	5000	0.00	3 - Alu133/70 (General)	6061 T6
	79	39	46	5000	0.00	3 - Alu133/70 (General)	6061 T6
	80	46	53	5000	0.00	3 - Alu133/70 (General)	6061 T6
27	81	4	13	5000	0.00	3 - Alu133/70 (General)	6061 T6
	82	13	20	5000	0.00	3 - Alu133/70 (General)	6061 T6
	83	20	27	5000	0.00	3 - Alu133/70 (General)	6061 T6

macro	memb	node 1	node 2	length mm	Rx deg	profile	quality
	84	27	34	5000	0.00	3 - Alu133/70 (General)	6061 T6
	85	34	41	5000	0.00	3 - Alu133/70 (General)	6061 T6
	86	41	48	5000	0.00	3 - Alu133/70 (General)	6061 T6
	87	48	55	5000	0.00	3 - Alu133/70 (General)	6061 T6
28	88	57	61	2649	90.00	6 - Alu133/70 (General)	6061 T6
	89	61	59	1625	90.00	6 - Alu133/70 (General)	6061 T6
29	90	58	62	2649	90.00	6 - Alu133/70 (General)	6061 T6
	91	62	60	1625	90.00	6 - Alu133/70 (General)	6061 T6
30	92	2	61	5000	90.00	5 - Alu130/70 (General)	6061 T6
	93	61	62	5000	90.00	5 - Alu130/70 (General)	6061 T6
	94	62	4	5000	90.00	5 - Alu130/70 (General)	6061 T6
31	95	63	65	2649	90.00	6 - Alu133/70 (General)	6061 T6
	96	65	66	1625	90.00	6 - Alu133/70 (General)	6061 T6
32	97	64	67	2649	90.00	6 - Alu133/70 (General)	6061 T6
	98	67	68	1625	90.00	6 - Alu133/70 (General)	6061 T6
33	99	51	65	5000	90.00	5 - Alu130/70 (General)	6061 T6
	100	65	67	5000	90.00	5 - Alu130/70 (General)	6061 T6
	101	67	55	5000	90.00	5 - Alu130/70 (General)	6061 T6
34	102	5	13	5658	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
35	103	14	4	5658	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
36	104	4	11	9337	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
37	105	13	3	9337	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
38	106	1	9	5658	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
39	107	8	2	5658	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
40	108	2	11	9337	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
41	109	9	3	9337	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
42	110	49	55	5658	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
43	111	56	48	5658	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
44	112	48	53	9337	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
45	113	55	46	9337	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
46	114	43	51	5658	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
47	115	50	44	5658	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
48	116	44	53	9337	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
49	117	51	46	9337	0.00	7 - Dia 10 6x37 + 1TWK (R10...	6x37 +1TWK
50	118	4	7	1190	0.00	2 - ALU240/232 (General)	6061 T6
	119	7	95	1439	0.00	1 - ALU 240 (General)	6061 T6
	120	95	79	2261	0.00	1 - ALU 240 (General)	6061 T6
	121	79	96	368	0.00	1 - ALU 240 (General)	6061 T6
	122	96	60	0	0.00	1 - ALU 240 (General)	6061 T6
	123	60	3	2628	0.00	1 - ALU 240 (General)	6061 T6
51	124	13	12	1190	0.00	2 - ALU240/232 (General)	6061 T6
	125	12	93	1439	0.00	1 - ALU 240 (General)	6061 T6
	126	93	94	2629	0.00	1 - ALU 240 (General)	6061 T6

macro	memb	node 1	node 2	length mm	Rx deg	profile	quality
	127	94	11	2629	0.00	1 - ALU 240 (General)	6061 T6
52	128	20	19	1190	0.00	2 - ALU240/232 (General)	6061 T6
	129	19	91	1439	0.00	1 - ALU 240 (General)	6061 T6
	130	91	92	2629	0.00	1 - ALU 240 (General)	6061 T6
	131	92	18	2629	0.00	1 - ALU 240 (General)	6061 T6
53	132	27	26	1190	0.00	2 - ALU240/232 (General)	6061 T6
	133	26	89	1439	0.00	1 - ALU 240 (General)	6061 T6
	134	89	90	2629	0.00	1 - ALU 240 (General)	6061 T6
	135	90	25	2629	0.00	1 - ALU 240 (General)	6061 T6
54	136	34	33	1190	0.00	2 - ALU240/232 (General)	6061 T6
	137	33	87	1439	0.00	1 - ALU 240 (General)	6061 T6
	138	87	88	2629	0.00	1 - ALU 240 (General)	6061 T6
	139	88	32	2629	0.00	1 - ALU 240 (General)	6061 T6
55	140	41	40	1190	0.00	2 - ALU240/232 (General)	6061 T6
	141	40	85	1439	0.00	1 - ALU 240 (General)	6061 T6
	142	85	86	2629	0.00	1 - ALU 240 (General)	6061 T6
	143	86	39	2629	0.00	1 - ALU 240 (General)	6061 T6
56	144	48	47	1190	0.00	2 - ALU240/232 (General)	6061 T6
	145	47	83	1439	0.00	1 - ALU 240 (General)	6061 T6
	146	83	84	2629	0.00	1 - ALU 240 (General)	6061 T6
	147	84	46	2629	0.00	1 - ALU 240 (General)	6061 T6
57	148	55	54	1190	0.00	2 - ALU240/232 (General)	6061 T6
	149	54	81	1439	0.00	1 - ALU 240 (General)	6061 T6
	150	81	80	2261	0.00	1 - ALU 240 (General)	6061 T6
	151	80	82	368	0.00	1 - ALU 240 (General)	6061 T6
	152	82	68	0	0.00	1 - ALU 240 (General)	6061 T6
	153	68	53	2628	0.00	1 - ALU 240 (General)	6061 T6
58	154	110	108	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	155	108	106	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	156	106	104	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	157	104	102	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	158	102	100	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	159	100	98	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	160	98	97	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
59	161	59	109	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	162	109	107	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	163	107	105	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	164	105	103	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	165	103	101	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	166	101	99	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	167	99	66	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
60	168	60	94	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	169	94	92	5000	0.00	4 - Alu60/60/3 (General)	6061 T6

macro	memb	node 1	node 2	length mm	Rx deg	profile	quality
	170	92	90	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	171	90	88	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	172	88	86	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	173	86	84	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	174	84	68	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
61	175	95	93	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	176	93	91	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	177	91	89	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	178	89	87	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	179	87	85	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	180	85	83	5000	0.00	4 - Alu60/60/3 (General)	6061 T6
	181	83	81	5000	0.00	4 - Alu60/60/3 (General)	6061 T6

Profiles

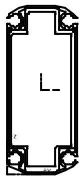


ALU 240 (General)

Profile no. 1 - ALU 240 (General)
Material : 19 - 6061 T6

A:	2.319993e+003 mm^2		
Ay/A:	1.000	Az/A:	1.000
Iy:	1.675432e+007 mm^4	Iz:	3.895877e+006 mm^4
Iyz:	3.870310e+000 mm^4	It:	2.065020e+007 mm^4
Iw:	0.000000e+000 mm^6		
Wely:	1.396194e+005 mm^3	Welz:	7.791748e+004 mm^3
Wply:	1.788524e+005 mm^3	Wplz:	9.035651e+004 mm^3
cy:	50.00 mm	cz:	120.00 mm
iy:	84.98 mm	iz:	40.98 mm
dy:	0.00 mm	dz:	0.00 mm
Outline :		0.00 mm	

Type for check: Untypical section



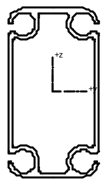
ALU240/232 (General)

Profile no. 2 - ALU240/232 (General)
Material : 19 - 6061 T6

1	- 6061 T6
2	- 6061 T6

A:	4.690648e+003 mm^2		
Ay/A:	1.000	Az/A:	1.000
Iy:	3.291946e+007 mm^4	Iz:	6.585148e+006 mm^4
Iyz:	-1.390684e+001 mm^4	It:	3.950460e+007 mm^4
Iw:	0.000000e+000 mm^6		
Wely:	2.743242e+005 mm^3	Welz:	1.317015e+005 mm^3
Wply:	3.570655e+005 mm^3	Wplz:	1.628792e+005 mm^3
cy:	50.00 mm	cz:	120.00 mm
iy:	83.77 mm	iz:	37.47 mm
dy:	0.00 mm	dz:	0.00 mm
Outline :		0.00 mm	

Type for check: Untypical section



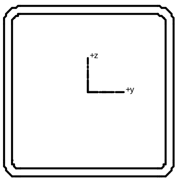
Alu133/70 (General)

Profile no. 3 - Alu133/70 (General)
Material : 19 - 6061 T6

A:	1.604102e+003 mm^2		
Ay/A:	1.000	Az/A:	1.000
Iy:	3.818656e+006 mm^4	Iz:	1.057790e+006 mm^4
Iyz:	2.525217e-008 mm^4	It:	4.876446e+006 mm^4
Iw:	0.000000e+000 mm^6		
Wely:	5.742340e+004 mm^3	Welz:	3.022257e+004 mm^3
Wply:	7.213053e+004 mm^3	Wplz:	3.774137e+004 mm^3
cy:	0.00 mm	cz:	0.00 mm
iy:	48.79 mm	iz:	25.68 mm

A:	1.604102e+003 mm^2		
dy:	0.00 mm	dz:	0.00 mm
Outline :		0.00 mm	

Type for check: Untypical section

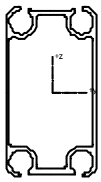


Alu60/60/3 (General)

Profile no. 4 - Alu60/60/3 (General)
Material : 19 - 6061 T6

A:	6.605234e+002 mm^2		
Ay/A:	1.000	Az/A:	1.000
Iy:	3.510982e+005 mm^4	Iz:	3.510982e+005 mm^4
Iyz:	-1.092637e+001 mm^4	It:	7.021964e+005 mm^4
Iw:	0.000000e+000 mm^6		
Wely:	1.170302e+004 mm^3	Welz:	1.170302e+004 mm^3
Wply:	1.394310e+004 mm^3	Wplz:	1.394310e+004 mm^3
cy:	0.00 mm	cz:	0.00 mm
iy:	23.06 mm	iz:	23.06 mm
dy:	0.00 mm	dz:	0.00 mm
Outline :		0.00 mm	

Type for check: Untypical section



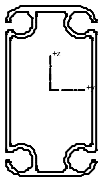
Alu130/70 (General)

Profile no. 5 - Alu130/70 (General)
Material : 19 - 6061 T6

A:	1.497113e+003 mm^2		
Ay/A:	1.000	Az/A:	1.000
Iy:	3.124341e+006 mm^4	Iz:	1.116041e+006 mm^4
Iyz:	6.637474e+002 mm^4	It:	4.240382e+006 mm^4
Iw:	0.000000e+000 mm^6		
Wely:	4.805314e+004 mm^3	Welz:	3.187422e+004 mm^3
Wply:	6.307383e+004 mm^3	Wplz:	3.804318e+004 mm^3
cy:	0.00 mm	cz:	0.00 mm

A:	1.497113e+003 mm^2		
iy:	45.68 mm	iz:	27.30 mm
dy:	0.00 mm	dz:	0.00 mm
Outline :		0.00 mm	

Type for check: Untypical section

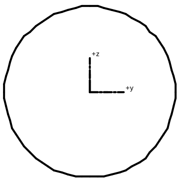


Alu133/70 (General)

Profile no. 6 - Alu133/70 (General)
Material : 19 - 6061 T6

A:	1.604102e+003 mm^2		
Ay/A:	1.000	Az/A:	1.000
Iy:	3.818656e+006 mm^4	Iz:	1.057790e+006 mm^4
Iyz:	2.525217e-008 mm^4	It:	4.876446e+006 mm^4
Iw:	0.000000e+000 mm^6		
Wely:	5.742340e+004 mm^3	Welz:	3.022257e+004 mm^3
Wply:	7.213053e+004 mm^3	Wplz:	3.774137e+004 mm^3
cy:	0.00 mm	cz:	0.00 mm
iy:	48.79 mm	iz:	25.68 mm
dy:	0.00 mm	dz:	0.00 mm
Outline :		0.00 mm	

Type for check: Untypical section



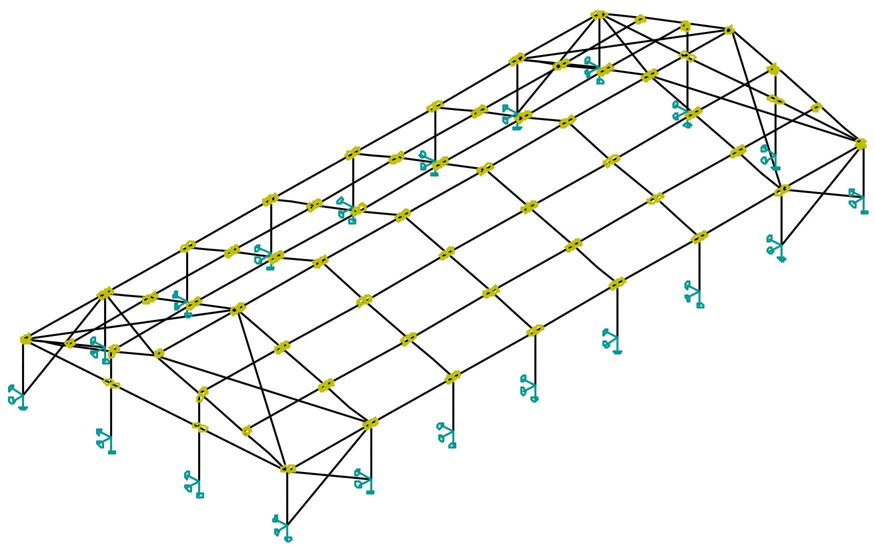
Dia 10 6x37 + 1TWK (R10)

Profile no. 7 - Dia 10 6x37 + 1TWK (R10)
Material : 20 - 6x37 +1TWK

A:	7.850000e+001 mm^2		
Ay/A:	0.850	Az/A:	0.850
Iy:	4.814015e+002 mm^4	Iz:	4.814015e+002 mm^4
Iyz:	0.000000e+000 mm^4	It:	9.628029e+002 mm^4
Iw:	0.000000e+000 mm^6		
Wely:	9.698743e+001 mm^3	Welz:	9.698743e+001 mm^3
Wply:	1.664764e+002 mm^3	Wplz:	1.664764e+002 mm^3

A:	7.850000e+001 mm^2		
cy:	0.00 mm	cz:	0.00 mm
iy:	2.48 mm	iz:	2.48 mm
dy:	0.00 mm	dz:	0.00 mm
Outline :		31.38 mm	

Type for check: Untypical section



Hinges

Hinges

memb	type	pos
67	fiyfiz	beg
	fiyfiz	end
68	fiyfiz	beg
	fiyfiz	end
69	fiyfiz	beg
	fiyfiz	end
70	fiyfiz	beg
	fiyfiz	end
71	fiyfiz	beg
	fiyfiz	end

memb	type	pos
72	fiyfiz	beg
	fiyfiz	end
73	fiyfiz	beg
	fiyfiz	end
74	fiyfiz	beg
	fiyfiz	end
75	fiyfiz	beg
	fiyfiz	end
76	fiyfiz	beg
	fiyfiz	end
77	fiyfiz	beg
	fiyfiz	end
78	fiyfiz	beg
	fiyfiz	end
79	fiyfiz	beg
	fiyfiz	end
80	fiyfiz	beg
	fiyfiz	end
81	fiyfiz	beg
	fiyfiz	end
82	fiyfiz	beg
	fiyfiz	end
83	fiyfiz	beg
	fiyfiz	end
84	fiyfiz	beg
	fiyfiz	end
85	fiyfiz	beg
	fiyfiz	end
86	fiyfiz	beg
	fiyfiz	end
87	fiyfiz	beg
	fiyfiz	end
89	fiy	end
91	fiy	end
94	fiy	beg
	fiy	end
92	fiy	beg
	fiy	end
93	fiy	beg
	fiy	end
96	fiy	end
98	fiy	end
99	fiy	beg

memb	type	pos
	fiy	end
100	fiy	beg
	fiy	end
101	fiy	beg
	fiy	end
154	fiyfiz	beg
	fiyfiz	end
155	fiyfiz	beg
	fiyfiz	end
156	fiyfiz	beg
	fiyfiz	end
157	fiyfiz	beg
	fiyfiz	end
158	fiyfiz	beg
	fiyfiz	end
159	fiyfiz	beg
	fiyfiz	end
160	fiyfiz	beg
	fiyfiz	end
161	fiyfiz	beg
	fiyfiz	end
162	fiyfiz	beg
	fiyfiz	end
163	fiyfiz	beg
	fiyfiz	end
164	fiyfiz	beg
	fiyfiz	end
165	fiyfiz	beg
	fiyfiz	end
166	fiyfiz	beg
	fiyfiz	end
167	fiyfiz	beg
	fiyfiz	end
168	fiyfiz	beg
	fiyfiz	end
169	fiyfiz	beg
	fiyfiz	end
170	fiyfiz	beg
	fiyfiz	end
171	fiyfiz	beg
	fiyfiz	end
172	fiyfiz	beg
	fiyfiz	end

memb	type	pos
173	fiyfiz	beg
	fiyfiz	end
174	fiyfiz	beg
	fiyfiz	end
175	fiyfiz	beg
	fiyfiz	end
176	fiyfiz	beg
	fiyfiz	end
177	fiyfiz	beg
	fiyfiz	end
178	fiyfiz	beg
	fiyfiz	end
179	fiyfiz	beg
	fiyfiz	end
180	fiyfiz	beg
	fiyfiz	end
181	fiyfiz	beg
	fiyfiz	end

Supports

support	node	type	Size mm
1	1	XYZ	0.00
2	5	XYZ	0.00
3	8	XYZ	0.00
4	14	XYZ	0.00
5	15	XYZ	0.00
6	21	XYZ	0.00
7	22	XYZ	0.00
8	28	XYZ	0.00
9	29	XYZ	0.00
10	35	XYZ	0.00
11	36	XYZ	0.00
12	42	XYZ	0.00
13	43	XYZ	0.00
14	49	XYZ	0.00
15	50	XYZ	0.00
16	56	XYZ	0.00
17	57	XYZ	0.00

support	node	type	Size mm
18	58	XYZ	0.00
19	63	XYZ	0.00
20	64	XYZ	0.00

Loadcases

Case	Name:	Description
1	self weight	Self weight. Direction -Z
2	dead load - fabric	Permanent - Loads
3	dead load - connections	Permanent - Loads
4	dead load - sum	Permanent Summational load case 2. dead load - fabric, 1.00 3. dead load - connections, 1.00
5	dead load - extra	Permanent - Loads
6	snow - case 1	Variable - snow Excl.
7	snow - case 2	Variable - snow Excl.
8	snow - case 3	Variable - snow Excl.
9	wind on side - overpr	Variable - wind Excl.
10	wind on side - underpr	Variable - wind Excl.
11	wind on gable - overpr	Variable - wind Excl.
12	wind on gable - underpr	Variable - wind Excl.

Variable loads group

Name:		Description
snow	Excl.	BS - load type I - imposed load
wind	Excl.	BS - load type W - wind load

Loadcase no. 3 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
2	0.00	0.00	-0.18	0.00	0.00	0.00
3	0.00	0.00	-0.22	0.00	0.00	0.00
4	0.00	0.00	-0.18	0.00	0.00	0.00
9	0.00	0.00	-0.18	0.00	0.00	0.00
11	0.00	0.00	-0.22	0.00	0.00	0.00
13	0.00	0.00	-0.18	0.00	0.00	0.00
16	0.00	0.00	-0.18	0.00	0.00	0.00
18	0.00	0.00	-0.22	0.00	0.00	0.00

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
20	0.00	0.00	-0.18	0.00	0.00	0.00
23	0.00	0.00	-0.18	0.00	0.00	0.00
25	0.00	0.00	-0.22	0.00	0.00	0.00
27	0.00	0.00	-0.18	0.00	0.00	0.00
30	0.00	0.00	-0.18	0.00	0.00	0.00
32	0.00	0.00	-0.22	0.00	0.00	0.00
34	0.00	0.00	-0.18	0.00	0.00	0.00
37	0.00	0.00	-0.18	0.00	0.00	0.00
39	0.00	0.00	-0.22	0.00	0.00	0.00
41	0.00	0.00	-0.18	0.00	0.00	0.00
44	0.00	0.00	-0.18	0.00	0.00	0.00
46	0.00	0.00	-0.22	0.00	0.00	0.00
48	0.00	0.00	-0.18	0.00	0.00	0.00
51	0.00	0.00	-0.18	0.00	0.00	0.00
53	0.00	0.00	-0.22	0.00	0.00	0.00
55	0.00	0.00	-0.18	0.00	0.00	0.00

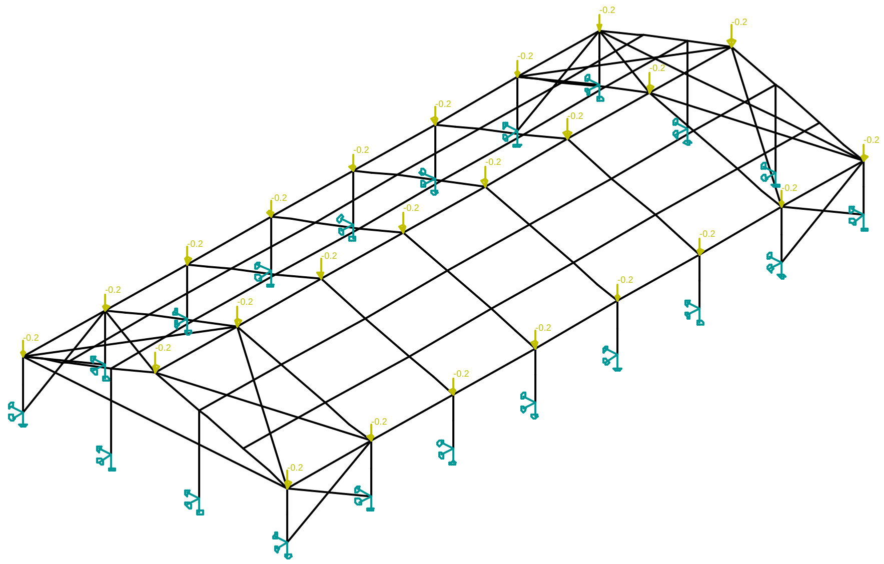
Loadcase no. 4 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
2	0.00	0.00	-0.18	0.00	0.00	0.00
3	0.00	0.00	-0.22	0.00	0.00	0.00
4	0.00	0.00	-0.18	0.00	0.00	0.00
9	0.00	0.00	-0.18	0.00	0.00	0.00
11	0.00	0.00	-0.22	0.00	0.00	0.00
13	0.00	0.00	-0.18	0.00	0.00	0.00
16	0.00	0.00	-0.18	0.00	0.00	0.00
18	0.00	0.00	-0.22	0.00	0.00	0.00
20	0.00	0.00	-0.18	0.00	0.00	0.00
23	0.00	0.00	-0.18	0.00	0.00	0.00
25	0.00	0.00	-0.22	0.00	0.00	0.00
27	0.00	0.00	-0.18	0.00	0.00	0.00
30	0.00	0.00	-0.18	0.00	0.00	0.00
32	0.00	0.00	-0.22	0.00	0.00	0.00
34	0.00	0.00	-0.18	0.00	0.00	0.00
37	0.00	0.00	-0.18	0.00	0.00	0.00
39	0.00	0.00	-0.22	0.00	0.00	0.00
41	0.00	0.00	-0.18	0.00	0.00	0.00
44	0.00	0.00	-0.18	0.00	0.00	0.00
46	0.00	0.00	-0.22	0.00	0.00	0.00
48	0.00	0.00	-0.18	0.00	0.00	0.00

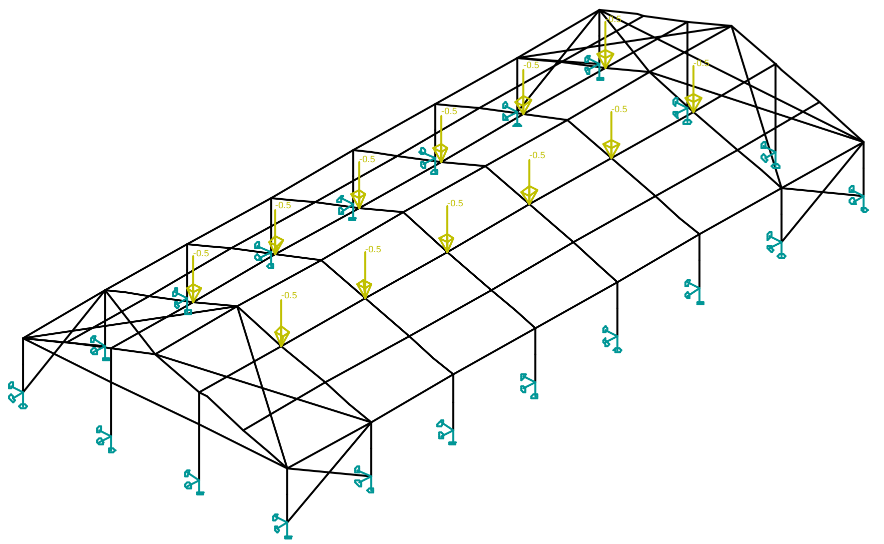
node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
51	0.00	0.00	-0.18	0.00	0.00	0.00
53	0.00	0.00	-0.22	0.00	0.00	0.00
55	0.00	0.00	-0.18	0.00	0.00	0.00

Loadcase no. 5 - nodal loads

node	Fx kN	Fy kN	Fz kN	Mx kNm	My kNm	Mz kNm
84	0.00	0.00	-0.50	0.00	0.00	0.00
86	0.00	0.00	-0.50	0.00	0.00	0.00
88	0.00	0.00	-0.50	0.00	0.00	0.00
90	0.00	0.00	-0.50	0.00	0.00	0.00
92	0.00	0.00	-0.50	0.00	0.00	0.00
94	0.00	0.00	-0.50	0.00	0.00	0.00
99	0.00	0.00	-0.50	0.00	0.00	0.00
101	0.00	0.00	-0.50	0.00	0.00	0.00
103	0.00	0.00	-0.50	0.00	0.00	0.00
105	0.00	0.00	-0.50	0.00	0.00	0.00
107	0.00	0.00	-0.50	0.00	0.00	0.00
109	0.00	0.00	-0.50	0.00	0.00	0.00



Nodal loads.Loadcases - 3



Nodal loads.Loadcases - 5

Loadcase no. 2 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
2	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.02 -0.02
5	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
8	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
11	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
14	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
17	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
20	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
23	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.02 -0.02
50	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.02 -0.02
51	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
52	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
53	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
54	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
55	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
56	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
57	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.02 -0.02

Loadcase no. 4 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
2	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.02 -0.02
5	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
8	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
11	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
14	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
17	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
20	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
23	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.02 -0.02
50	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.02 -0.02
51	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
52	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
53	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
54	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
55	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
56	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.03 -0.03
57	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.02 -0.02

Loadcase no. 6 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
2	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
5	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
8	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
11	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
14	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
17	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
20	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
23	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
50	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
51	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
52	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
53	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
54	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
55	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
56	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
57	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40

Loadcase no. 7 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
2	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
5	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
8	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
11	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
14	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
17	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
20	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.80 -0.80
23	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
50	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.43 -0.43
51	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.86 -0.86
52	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.86 -0.86
53	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.86 -0.86
54	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.86 -0.86

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
55	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.86 -0.86
56	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.86 -0.86
57	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.43 -0.43

Loadcase no. 8 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
50	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.20 -0.20
51	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
52	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
53	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
54	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
55	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
56	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.40 -0.40
57	force kN/m	0.00 rel 1.00	0.00	0.00	glo len	0.00 0.00	0.00 0.00	-0.20 -0.20

Loadcase no. 9 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
1	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.76 -0.76
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	-0.79 0.00	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.80	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	-0.80 -0.79	0.00 0.00
2	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.07 1.07
	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.39 0.39

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	2100.00 abs 2153.56	0.00	0.00	glo len	0.00 0.00	-0.20 -0.10	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	-0.10 0.00	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.11	0.00 0.00
	force kN/m	1190.00 abs 2100.00	0.00	0.00	glo len	0.00 0.00	-0.11 -0.20	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	-0.43 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 -0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	-0.01 -0.01	0.00 0.00
	force kN/m	2100.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.00 -0.06	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	-0.06 -0.13	0.00 0.00
	force kN/m	2208.25 abs 4309.94	0.00	0.00	glo len	0.00 0.00	-0.13 -0.25	0.00 0.00
	force kN/m	4309.94 abs 5202.95	0.00	0.00	glo len	0.00 0.00	-0.25 -0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	-0.01 0.00	0.00 0.00
	force kN/m	5258.36 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 -0.12	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	-0.12 -0.16	0.00 0.00
	force kN/m	5204.62 abs 5256.13	0.00	0.00	glo len	0.00 0.00	-0.01 0.00	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	-0.36 -0.43	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	-0.12 -0.36	0.00 0.00
3	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.55 -0.55
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	-0.31 -0.30	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.31	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	-0.30 0.00	0.00 0.00
4	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.52 -1.52
5	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.90 1.90
	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.79 0.79

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
6	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.09 -1.09
7	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.52 -1.52
8	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.79 0.79
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.62 1.62
9	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.09 -1.09
10	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.52 -1.52
11	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.79 0.79
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.62 1.62
12	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.09 -1.09
13	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.52 -1.52
14	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.62 1.62
	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.79 0.79
15	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.09 -1.09
16	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.52 -1.52
17	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.79 0.79
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.62 1.62
18	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.09 -1.09
19	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.52 -1.52
20	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.79 0.79
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.90 1.90
21	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.09 -1.09
22	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.76 -0.76
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.80	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.80 0.79	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.79 0.00	0.00 0.00
23	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.39 0.39
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.07 1.07
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.11	0.00 0.00
	force kN/m	1190.00 abs 2100.00	0.00	0.00	glo len	0.00 0.00	0.11 0.20	0.00 0.00
	force kN/m	2100.00 abs 2153.56	0.00	0.00	glo len	0.00 0.00	0.20 0.10	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	0.10 0.00	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	2100.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.00 0.06	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	0.06 0.13	0.00 0.00
	force kN/m	2208.25 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.13 0.25	0.00 0.00
	force kN/m	4309.94 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.25 0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.12 0.16	0.00 0.00
	force kN/m	5204.62 abs 5256.13	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5258.36 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.12	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.43 0.00	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.12 0.36	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.36 0.43	0.00 0.00
24	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.55 -0.55
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.30 0.00	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.31	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.31 0.30	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
28	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	-0.18 -0.05	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	-0.98 0.00	0.00 0.00
	force kN/m	4221.52 abs 4273.04	0.00	0.00	glo len	0.00 0.00	-0.04 -0.00	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	-0.05 -0.04	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 -0.51	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	-0.51 -0.55	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	-0.55 -0.55	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.98	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	-0.34 -0.18	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	-0.55 -0.34	0.00 0.00
	force kN/m	4273.04 abs 4273.72	0.00	0.00	glo len	0.00 0.00	-0.00 0.00	0.00 0.00
29	force kN/m	350.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	-0.26 -0.62	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	-0.34 -0.18	0.00 0.00
	force kN/m	3340.98 abs 3811.76	0.00	0.00	glo len	0.00 0.00	-0.08 0.00	0.00 0.00
	force kN/m	4221.52 abs 4274.35	0.00	0.00	glo len	0.00 0.00	-0.04 -0.00	0.00 0.00
	force kN/m	350.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.23	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	-0.18 -0.05	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	-0.05 -0.04	0.00 0.00
	force kN/m	1324.50 abs 2299.00	0.00	0.00	glo len	0.00 0.00	-0.23 0.00	0.00 0.00
	force kN/m	2999.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 -0.08	0.00 0.00
	force kN/m	4274.35 abs 4274.42	0.00	0.00	glo len	0.00 0.00	-0.00 0.00	0.00 0.00
	force kN/m	3735.55 abs 3811.76	0.00	0.00	glo len	0.00 0.00	-0.53 -0.49	0.00 0.00
	force kN/m	0.00 abs 350.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.26	0.00 0.00
	force kN/m	2299.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	-0.26 0.00	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	2649.00 abs 2999.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.26	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	-0.53 -0.53	0.00 0.00
	force kN/m	1324.50 abs 2299.00	0.00	0.00	glo len	0.00 0.00	-0.62 -0.26	0.00 0.00
	force kN/m	3811.76 abs 4004.33	0.00	0.00	glo len	0.00 0.00	-0.49 -0.34	0.00 0.00
	force kN/m	2999.00 abs 3721.67	0.00	0.00	glo len	0.00 0.00	-0.26 -0.53	0.00 0.00
30	force kN/m	5951.59 abs 6324.50	0.00	0.00	glo len	0.00 0.00	-0.71 -0.87	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.93	0.00 0.00
	force kN/m	5000.00 abs 5951.59	0.00	0.00	glo len	0.00 0.00	0.00 -0.71	0.00 0.00
	force kN/m	10350.00 abs 10691.25	0.00	0.00	glo len	0.00 0.00	-0.16 -0.32	0.00 0.00
	force kN/m	10691.25 abs 11324.50	0.00	0.00	glo len	0.00 0.00	-0.32 -0.44	0.00 0.00
	force kN/m	6324.50 abs 7500.00	0.00	0.00	glo len	0.00 0.00	-0.87 -0.94	0.00 0.00
	force kN/m	12116.42 abs 12116.85	0.00	0.00	glo len	0.00 0.00	-0.42 -0.41	0.00 0.00
	force kN/m	12116.85 abs 13675.50	0.00	0.00	glo len	0.00 0.00	-0.41 -0.36	0.00 0.00
	force kN/m	13675.50 abs 15000.00	0.00	0.00	glo len	0.00 0.00	-0.36 0.00	0.00 0.00
	force kN/m	9048.41 abs 10000.00	0.00	0.00	glo len	0.00 0.00	-0.71 0.00	0.00 0.00
	force kN/m	8675.50 abs 9048.41	0.00	0.00	glo len	0.00 0.00	-0.87 -0.71	0.00 0.00
	force kN/m	3675.50 abs 4308.75	0.00	0.00	glo len	0.00 0.00	-0.71 -0.51	0.00 0.00
	force kN/m	11324.50 abs 12116.42	0.00	0.00	glo len	0.00 0.00	-0.44 -0.42	0.00 0.00
	force kN/m	4308.75 abs 5000.00	0.00	0.00	glo len	0.00 0.00	-0.51 0.00	0.00 0.00
	force kN/m	2883.15 abs 2883.58	0.00	0.00	glo len	0.00 0.00	-0.66 -0.66	0.00 0.00
	force kN/m	2883.58 abs 3675.50	0.00	0.00	glo len	0.00 0.00	-0.66 -0.71	0.00 0.00
	force kN/m	7500.00 abs 8675.50	0.00	0.00	glo len	0.00 0.00	-0.94 -0.87	0.00 0.00
	force kN/m	1324.50 abs 2100.00	0.00	0.00	glo len	0.00 0.00	-0.93 -1.00	0.00 0.00
	force kN/m	2100.00 abs 2883.15	0.00	0.00	glo len	0.00 0.00	-0.61 -0.66	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	10000.00 abs 10350.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.26	0.00 0.00
31	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.98	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.05 0.04	0.00 0.00
	force kN/m	4221.52 abs 4273.04	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.34 0.18	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.18 0.05	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.98 0.00	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.51	0.00 0.00
	force kN/m	4273.04 abs 4273.72	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.55 0.55	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.55 0.34	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.51 0.55	0.00 0.00
32	force kN/m	2299.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.26 0.00	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.05 0.04	0.00 0.00
	force kN/m	1324.50 abs 2299.00	0.00	0.00	glo len	0.00 0.00	0.62 0.26	0.00 0.00
	force kN/m	4274.35 abs 4274.42	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	3735.55 abs 3811.76	0.00	0.00	glo len	0.00 0.00	0.53 0.49	0.00 0.00
	force kN/m	4221.52 abs 4274.35	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.34 0.18	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.18 0.05	0.00 0.00
	force kN/m	2649.00 abs 2999.00	0.00	0.00	glo len	0.00 0.00	0.00 0.26	0.00 0.00
	force kN/m	2999.00 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.26 0.53	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.53 0.53	0.00 0.00
	force kN/m	3340.98 abs 3811.76	0.00	0.00	glo len	0.00 0.00	0.08 0.00	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	3811.76 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.49 0.34	0.00 0.00
	force kN/m	0.00 abs 350.00	0.00	0.00	glo len	0.00 0.00	0.00 0.26	0.00 0.00
	force kN/m	350.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.26 0.62	0.00 0.00
	force kN/m	350.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.23	0.00 0.00
	force kN/m	1324.50 abs 2299.00	0.00	0.00	glo len	0.00 0.00	0.23 0.00	0.00 0.00
	force kN/m	2999.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.08	0.00 0.00
33	force kN/m	2100.00 abs 2883.15	0.00	0.00	glo len	0.00 0.00	0.61 0.66	0.00 0.00
	force kN/m	7500.00 abs 8675.50	0.00	0.00	glo len	0.00 0.00	0.94 0.87	0.00 0.00
	force kN/m	8675.50 abs 9048.41	0.00	0.00	glo len	0.00 0.00	0.87 0.71	0.00 0.00
	force kN/m	9048.41 abs 10000.00	0.00	0.00	glo len	0.00 0.00	0.71 0.00	0.00 0.00
	force kN/m	4308.75 abs 5000.00	0.00	0.00	glo len	0.00 0.00	0.51 0.00	0.00 0.00
	force kN/m	5000.00 abs 5951.59	0.00	0.00	glo len	0.00 0.00	0.00 0.71	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.93	0.00 0.00
	force kN/m	5951.59 abs 6324.50	0.00	0.00	glo len	0.00 0.00	0.71 0.87	0.00 0.00
	force kN/m	6324.50 abs 7500.00	0.00	0.00	glo len	0.00 0.00	0.87 0.94	0.00 0.00
	force kN/m	2883.15 abs 2883.58	0.00	0.00	glo len	0.00 0.00	0.66 0.66	0.00 0.00
	force kN/m	2883.58 abs 3675.50	0.00	0.00	glo len	0.00 0.00	0.66 0.71	0.00 0.00
	force kN/m	3675.50 abs 4308.75	0.00	0.00	glo len	0.00 0.00	0.71 0.51	0.00 0.00
	force kN/m	10000.00 abs 10350.00	0.00	0.00	glo len	0.00 0.00	0.00 0.26	0.00 0.00
	force kN/m	1324.50 abs 2100.00	0.00	0.00	glo len	0.00 0.00	0.93 1.00	0.00 0.00
	force kN/m	13675.50 abs 15000.00	0.00	0.00	glo len	0.00 0.00	0.36 0.00	0.00 0.00
	force kN/m	11324.50 abs 12116.42	0.00	0.00	glo len	0.00 0.00	0.44 0.42	0.00 0.00
	force kN/m	10350.00 abs 10691.25	0.00	0.00	glo len	0.00 0.00	0.16 0.32	0.00 0.00
	force kN/m	10691.25 abs 11324.50	0.00	0.00	glo len	0.00 0.00	0.32 0.44	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	12116.42 abs 12116.85	0.00	0.00	glo len	0.00 0.00	0.42 0.41	0.00 0.00
	force kN/m	12116.85 abs 13675.50	0.00	0.00	glo len	0.00 0.00	0.41 0.36	0.00 0.00
50	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	-0.01 -0.01	0.00 0.00
	force kN/m	5257.66 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 -0.12	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	-0.04 -0.08	0.00 0.00
	force kN/m	4781.67 abs 4889.62	0.00	0.00	glo len	0.00 0.00	-0.08 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 -0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	-0.01 -0.01	0.00 0.00
	force kN/m	4889.62 abs 5202.95	0.00	0.00	glo len	0.00 0.00	-0.09 -0.01	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 -0.08	0.00 0.00
	force kN/m	5204.62 abs 5257.45	0.00	0.00	glo len	0.00 0.00	-0.01 0.00	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	-0.08 0.00	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	-0.43 0.00	0.00 0.00
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.33 1.33
	force kN/m	2153.58 abs 4309.94	0.00	0.00	glo len	0.00 0.00	-0.08 -0.16	0.00 0.00
	force kN/m	4309.94 abs 4781.67	0.00	0.00	glo len	0.00 0.00	-0.16 -0.08	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	-0.12 -0.16	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	-0.12 -0.36	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	-0.36 -0.43	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.04	0.00 0.00
	force kN/m	4781.67 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.00 -0.09	0.00 0.00
	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.55 0.55
51	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.09 1.09
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	2.26 2.26

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
52	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.09 1.09
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.79 1.79
53	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.79 1.79
	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.09 1.09
54	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.09 1.09
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.79 1.79
55	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.79 1.79
	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.09 1.09
56	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.09 1.09
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	2.26 2.26
57	force kN/m	5204.62 abs 5257.45	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.04	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.04 0.08	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.08 0.00	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.08	0.00 0.00
	force kN/m	2153.58 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.08 0.16	0.00 0.00
	force kN/m	4309.94 abs 4781.67	0.00	0.00	glo len	0.00 0.00	0.16 0.08	0.00 0.00
	force kN/m	4781.67 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.08 0.00	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.33 1.33
	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.55 0.55
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.12 0.16	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.12 0.36	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.36 0.43	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.43 0.00	0.00 0.00
	force kN/m	5257.66 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.12	0.00 0.00
	force kN/m	4781.67 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.00 0.09	0.00 0.00
	force kN/m	4889.62 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.09 0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00

Loadcase no. 10 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
1	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.06 -1.06
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	-0.63 0.00	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.64	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	-0.64 -0.63	0.00 0.00
2	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.65 -0.65
	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.56 -0.56
	force kN/m	2100.00 abs 2153.56	0.00	0.00	glo len	0.00 0.00	-0.16 -0.08	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	-0.08 0.00	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.09	0.00 0.00
	force kN/m	1190.00 abs 2100.00	0.00	0.00	glo len	0.00 0.00	-0.09 -0.16	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	-0.29 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 -0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	-0.01 -0.01	0.00 0.00
	force kN/m	2100.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.00 -0.04	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	-0.04 -0.09	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	2208.25 abs 4309.94	0.00	0.00	glo len	0.00 0.00	-0.09 -0.17	0.00 0.00
	force kN/m	4309.94 abs 5202.95	0.00	0.00	glo len	0.00 0.00	-0.17 -0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	-0.01 0.00	0.00 0.00
	force kN/m	5258.36 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 -0.08	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	-0.08 -0.11	0.00 0.00
	force kN/m	5204.62 abs 5256.13	0.00	0.00	glo len	0.00 0.00	-0.01 0.00	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	-0.24 -0.29	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	-0.08 -0.24	0.00 0.00
3	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.25 -0.25
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	-0.15 -0.14	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.15	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	-0.14 0.00	0.00 0.00
4	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-2.12 -2.12
5	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.24 -1.24
	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.13 -1.13
6	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.49 -0.49
7	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-2.12 -2.12
8	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.13 -1.13
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.17 -1.17
9	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.49 -0.49
10	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-2.12 -2.12
11	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.13 -1.13
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.17 -1.17
12	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.49 -0.49

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
13	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-2.12 -2.12
14	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.17 -1.17
	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.13 -1.13
15	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.49 -0.49
16	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-2.12 -2.12
17	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.13 -1.13
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.17 -1.17
18	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.49 -0.49
19	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-2.12 -2.12
20	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.13 -1.13
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.24 -1.24
21	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.49 -0.49
22	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.06 -1.06
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.64	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.64 0.63	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.63 0.00	0.00 0.00
23	force kN/m	0.13 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.56 -0.56
	force kN/m	0.00 rel 0.13	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.65 -0.65
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.09	0.00 0.00
	force kN/m	1190.00 abs 2100.00	0.00	0.00	glo len	0.00 0.00	0.09 0.16	0.00 0.00
	force kN/m	2100.00 abs 2153.56	0.00	0.00	glo len	0.00 0.00	0.16 0.08	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	0.08 0.00	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	2100.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.00 0.04	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	0.04 0.09	0.00 0.00
	force kN/m	2208.25 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.09 0.17	0.00 0.00
	force kN/m	4309.94 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.17 0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.08 0.11	0.00 0.00
	force kN/m	5204.62 abs 5256.13	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5258.36 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.08	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.29 0.00	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.08 0.24	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.24 0.29	0.00 0.00
24	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.25 -0.25
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.14 0.00	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.15	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.15 0.14	0.00 0.00
28	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	-0.12 -0.03	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	-0.66 0.00	0.00 0.00
	force kN/m	4221.52 abs 4273.04	0.00	0.00	glo len	0.00 0.00	-0.03 -0.00	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	-0.03 -0.03	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 -0.35	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	-0.35 -0.37	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	-0.37 -0.37	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.66	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	-0.23 -0.12	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	-0.37 -0.23	0.00 0.00
	force kN/m	4273.04 abs 4273.72	0.00	0.00	glo len	0.00 0.00	-0.00 0.00	0.00 0.00
29	force kN/m	350.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	-0.18 -0.42	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	-0.23 -0.12	0.00 0.00
	force kN/m	3340.98 abs 3811.76	0.00	0.00	glo len	0.00 0.00	-0.04 0.00	0.00 0.00
	force kN/m	4221.52 abs 4274.35	0.00	0.00	glo len	0.00 0.00	-0.03 -0.00	0.00 0.00
	force kN/m	350.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.11	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	-0.12 -0.03	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	-0.03 -0.03	0.00 0.00
	force kN/m	1324.50 abs 2299.00	0.00	0.00	glo len	0.00 0.00	-0.11 0.00	0.00 0.00
	force kN/m	2999.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 -0.04	0.00 0.00
	force kN/m	4274.35 abs 4274.42	0.00	0.00	glo len	0.00 0.00	-0.00 0.00	0.00 0.00
	force kN/m	3735.55 abs 3811.76	0.00	0.00	glo len	0.00 0.00	-0.36 -0.33	0.00 0.00
	force kN/m	0.00 abs 350.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.18	0.00 0.00
	force kN/m	2299.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	-0.18 0.00	0.00 0.00
	force kN/m	2649.00 abs 2999.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.18	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	-0.36 -0.36	0.00 0.00
	force kN/m	1324.50 abs 2299.00	0.00	0.00	glo len	0.00 0.00	-0.42 -0.18	0.00 0.00
	force kN/m	3811.76 abs 4004.33	0.00	0.00	glo len	0.00 0.00	-0.33 -0.23	0.00 0.00
	force kN/m	2999.00 abs 3721.67	0.00	0.00	glo len	0.00 0.00	-0.18 -0.36	0.00 0.00
30	force kN/m	5951.59 abs 6324.50	0.00	0.00	glo len	0.00 0.00	-0.48 -0.59	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 -0.74	0.00 0.00
	force kN/m	5000.00 abs 5951.59	0.00	0.00	glo len	0.00 0.00	0.00 -0.48	0.00 0.00
	force kN/m	10350.00 abs 10691.25	0.00	0.00	glo len	0.00 0.00	-0.08 -0.15	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	10691.25 abs 11324.50	0.00	0.00	glo len	0.00 0.00	-0.15 -0.21	0.00 0.00
	force kN/m	6324.50 abs 7500.00	0.00	0.00	glo len	0.00 0.00	-0.59 -0.63	0.00 0.00
	force kN/m	12116.42 abs 12116.85	0.00	0.00	glo len	0.00 0.00	-0.20 -0.20	0.00 0.00
	force kN/m	12116.85 abs 13675.50	0.00	0.00	glo len	0.00 0.00	-0.20 -0.17	0.00 0.00
	force kN/m	13675.50 abs 15000.00	0.00	0.00	glo len	0.00 0.00	-0.17 0.00	0.00 0.00
	force kN/m	9048.41 abs 10000.00	0.00	0.00	glo len	0.00 0.00	-0.48 0.00	0.00 0.00
	force kN/m	8675.50 abs 9048.41	0.00	0.00	glo len	0.00 0.00	-0.59 -0.48	0.00 0.00
	force kN/m	3675.50 abs 4308.75	0.00	0.00	glo len	0.00 0.00	-0.48 -0.35	0.00 0.00
	force kN/m	11324.50 abs 12116.42	0.00	0.00	glo len	0.00 0.00	-0.21 -0.20	0.00 0.00
	force kN/m	4308.75 abs 5000.00	0.00	0.00	glo len	0.00 0.00	-0.35 0.00	0.00 0.00
	force kN/m	2883.15 abs 2883.58	0.00	0.00	glo len	0.00 0.00	-0.45 -0.45	0.00 0.00
	force kN/m	2883.58 abs 3675.50	0.00	0.00	glo len	0.00 0.00	-0.45 -0.48	0.00 0.00
	force kN/m	7500.00 abs 8675.50	0.00	0.00	glo len	0.00 0.00	-0.63 -0.59	0.00 0.00
	force kN/m	1324.50 abs 2100.00	0.00	0.00	glo len	0.00 0.00	-0.74 -0.80	0.00 0.00
	force kN/m	2100.00 abs 2883.15	0.00	0.00	glo len	0.00 0.00	-0.42 -0.45	0.00 0.00
	force kN/m	10000.00 abs 10350.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.18	0.00 0.00
31	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.66	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.03 0.03	0.00 0.00
	force kN/m	4221.52 abs 4273.04	0.00	0.00	glo len	0.00 0.00	0.03 0.00	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.23 0.12	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.12 0.03	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.66 0.00	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.35	0.00 0.00
	force kN/m	4273.04 abs 4273.72	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.37 0.37	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.37 0.23	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.35 0.37	0.00 0.00
32	force kN/m	2299.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.18 0.00	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.03 0.03	0.00 0.00
	force kN/m	1324.50 abs 2299.00	0.00	0.00	glo len	0.00 0.00	0.42 0.18	0.00 0.00
	force kN/m	4274.35 abs 4274.42	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	3735.55 abs 3811.76	0.00	0.00	glo len	0.00 0.00	0.36 0.33	0.00 0.00
	force kN/m	4221.52 abs 4274.35	0.00	0.00	glo len	0.00 0.00	0.03 0.00	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.23 0.12	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.12 0.03	0.00 0.00
	force kN/m	2649.00 abs 2999.00	0.00	0.00	glo len	0.00 0.00	0.00 0.18	0.00 0.00
	force kN/m	2999.00 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.18 0.36	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.36 0.36	0.00 0.00
	force kN/m	3340.98 abs 3811.76	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	3811.76 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.33 0.23	0.00 0.00
	force kN/m	0.00 abs 350.00	0.00	0.00	glo len	0.00 0.00	0.00 0.18	0.00 0.00
	force kN/m	350.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.18 0.42	0.00 0.00
	force kN/m	350.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.11	0.00 0.00
	force kN/m	1324.50 abs 2299.00	0.00	0.00	glo len	0.00 0.00	0.11 0.00	0.00 0.00
	force kN/m	2999.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.04	0.00 0.00
33	force kN/m	2100.00 abs 2883.15	0.00	0.00	glo len	0.00 0.00	0.42 0.45	0.00 0.00
	force kN/m	7500.00 abs 8675.50	0.00	0.00	glo len	0.00 0.00	0.63 0.59	0.00 0.00
	force kN/m	8675.50 abs 9048.41	0.00	0.00	glo len	0.00 0.00	0.59 0.48	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	9048.41 abs 10000.00	0.00	0.00	glo len	0.00 0.00	0.48 0.00	0.00 0.00
	force kN/m	4308.75 abs 5000.00	0.00	0.00	glo len	0.00 0.00	0.35 0.00	0.00 0.00
	force kN/m	5000.00 abs 5951.59	0.00	0.00	glo len	0.00 0.00	0.00 0.48	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.74	0.00 0.00
	force kN/m	5951.59 abs 6324.50	0.00	0.00	glo len	0.00 0.00	0.48 0.59	0.00 0.00
	force kN/m	6324.50 abs 7500.00	0.00	0.00	glo len	0.00 0.00	0.59 0.63	0.00 0.00
	force kN/m	2883.15 abs 2883.58	0.00	0.00	glo len	0.00 0.00	0.45 0.45	0.00 0.00
	force kN/m	2883.58 abs 3675.50	0.00	0.00	glo len	0.00 0.00	0.45 0.48	0.00 0.00
	force kN/m	3675.50 abs 4308.75	0.00	0.00	glo len	0.00 0.00	0.48 0.35	0.00 0.00
	force kN/m	10000.00 abs 10350.00	0.00	0.00	glo len	0.00 0.00	0.00 0.18	0.00 0.00
	force kN/m	1324.50 abs 2100.00	0.00	0.00	glo len	0.00 0.00	0.74 0.80	0.00 0.00
	force kN/m	13675.50 abs 15000.00	0.00	0.00	glo len	0.00 0.00	0.17 0.00	0.00 0.00
	force kN/m	11324.50 abs 12116.42	0.00	0.00	glo len	0.00 0.00	0.21 0.20	0.00 0.00
	force kN/m	10350.00 abs 10691.25	0.00	0.00	glo len	0.00 0.00	0.08 0.15	0.00 0.00
	force kN/m	10691.25 abs 11324.50	0.00	0.00	glo len	0.00 0.00	0.15 0.21	0.00 0.00
	force kN/m	12116.42 abs 12116.85	0.00	0.00	glo len	0.00 0.00	0.20 0.20	0.00 0.00
	force kN/m	12116.85 abs 13675.50	0.00	0.00	glo len	0.00 0.00	0.20 0.17	0.00 0.00
50	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	-0.01 -0.01	0.00 0.00
	force kN/m	5257.66 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 -0.08	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	-0.02 -0.04	0.00 0.00
	force kN/m	4781.67 abs 4889.62	0.00	0.00	glo len	0.00 0.00	-0.04 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 -0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	-0.01 -0.01	0.00 0.00
	force kN/m	4889.62 abs 5202.95	0.00	0.00	glo len	0.00 0.00	-0.06 -0.01	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 -0.04	0.00 0.00
	force kN/m	5204.62 abs 5257.45	0.00	0.00	glo len	0.00 0.00	-0.01 0.00	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	-0.04 0.00	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	-0.29 0.00	0.00 0.00
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.03 1.03
	force kN/m	2153.58 abs 4309.94	0.00	0.00	glo len	0.00 0.00	-0.04 -0.07	0.00 0.00
	force kN/m	4309.94 abs 4781.67	0.00	0.00	glo len	0.00 0.00	-0.07 -0.04	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	-0.08 -0.11	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	-0.08 -0.24	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	-0.24 -0.29	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 -0.02	0.00 0.00
	force kN/m	4781.67 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.00 -0.06	0.00 0.00
	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.25 0.25
51	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.49 0.49
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.66 1.66
52	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.19 1.19
	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.49 0.49
53	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.49 0.49
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.19 1.19
54	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.19 1.19
	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.49 0.49
55	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.49 0.49
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.19 1.19
56	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.49 0.49

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.66 1.66
57	force kN/m	5204.62 abs 5257.45	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.02	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.02 0.04	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.04	0.00 0.00
	force kN/m	2153.58 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.04 0.07	0.00 0.00
	force kN/m	4309.94 abs 4781.67	0.00	0.00	glo len	0.00 0.00	0.07 0.04	0.00 0.00
	force kN/m	4781.67 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	0.87 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.03 1.03
	force kN/m	0.00 rel 0.87	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.25 0.25
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.08 0.11	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.08 0.24	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.24 0.29	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.29 0.00	0.00 0.00
	force kN/m	5257.66 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.08	0.00 0.00
	force kN/m	4781.67 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.00 0.06	0.00 0.00
	force kN/m	4889.62 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.06 0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00

Loadcase no. 11 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
1	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.33 1.33
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.37	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.37 0.36	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.36 0.00	0.00 0.00
2	force kN/m	0.00 rel 0.50	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.07 1.07
	force kN/m	0.50 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.03 1.03
	force kN/m	5258.62 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.09	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.05	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.05 0.09	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.09 0.00	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.09	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	0.09 0.09	0.00 0.00
	force kN/m	2208.25 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.09 0.19	0.00 0.00
	force kN/m	4309.94 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.19 0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	5204.62 abs 5255.63	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.27 0.32	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.09 0.12	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.09 0.27	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.32 0.00	0.00 0.00
3	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.33 -1.33

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.37	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.37 0.36	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.36 0.00	0.00 0.00
4	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.76 1.76
5	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.13 1.13
6	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.76 -1.76
7	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.56 1.56
8	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
9	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.56 -1.56
10	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.16 1.16
11	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
12	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.16 -1.16
13	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.16 1.16
14	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
15	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.16 -1.16
16	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.16 1.16
17	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
18	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.16 -1.16
19	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.16 1.16
20	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
21	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.16 -1.16
22	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.58 0.58
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.31 0.30	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.30 0.00	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.31	0.00 0.00
23	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.04	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.08 0.00	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.08	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.04 0.08	0.00 0.00
	force kN/m	2208.25 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.08 0.16	0.00 0.00
	force kN/m	4309.94 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.16 0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	0.08 0.08	0.00 0.00
	force kN/m	5258.62 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.07	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.07 0.10	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.08 0.22	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.22 0.27	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.27 0.00	0.00 0.00
	force kN/m	5204.62 abs 5255.63	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.46 0.46
24	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.31	0.00 0.00
	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.58 -0.58
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.31 0.30	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.30 0.00	0.00 0.00
28	force kN/m	4272.54 abs 4273.46	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.25 0.14	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	4221.52 abs 4272.54	0.00	0.00	glo len	0.00 0.00	0.03 0.00	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.41 0.25	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.74	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.14 0.03	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.74 0.00	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.38	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.38 0.41	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.41 0.41	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.03 0.03	0.00 0.00
29	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.38	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.74 0.00	0.00 0.00
	force kN/m	4272.54 abs 4273.46	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.74	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.38 0.41	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.41 0.41	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.03 0.03	0.00 0.00
	force kN/m	4221.52 abs 4272.54	0.00	0.00	glo len	0.00 0.00	0.03 0.00	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.25 0.14	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.14 0.03	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.41 0.25	0.00 0.00
30	force kN/m	12116.85 abs 13675.50	0.00	0.00	glo len	0.00 0.00	0.50 0.43	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.43	0.00 0.00
	force kN/m	1324.50 abs 2883.15	0.00	0.00	glo len	0.00 0.00	0.43 0.50	0.00 0.00
	force kN/m	2883.15 abs 2883.58	0.00	0.00	glo len	0.00 0.00	0.50 0.50	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	2883.58 abs 3675.50	0.00	0.00	glo len	0.00 0.00	0.50 0.53	0.00 0.00
	force kN/m	3675.50 abs 4308.75	0.00	0.00	glo len	0.00 0.00	0.53 0.38	0.00 0.00
	force kN/m	6324.50 abs 7500.00	0.00	0.00	glo len	0.00 0.00	0.65 0.70	0.00 0.00
	force kN/m	7500.00 abs 8675.50	0.00	0.00	glo len	0.00 0.00	0.70 0.65	0.00 0.00
	force kN/m	8675.50 abs 9048.41	0.00	0.00	glo len	0.00 0.00	0.65 0.53	0.00 0.00
	force kN/m	9048.41 abs 10000.00	0.00	0.00	glo len	0.00 0.00	0.53 0.00	0.00 0.00
	force kN/m	10000.00 abs 10691.25	0.00	0.00	glo len	0.00 0.00	0.00 0.38	0.00 0.00
	force kN/m	10691.25 abs 11324.50	0.00	0.00	glo len	0.00 0.00	0.38 0.53	0.00 0.00
	force kN/m	11324.50 abs 12116.42	0.00	0.00	glo len	0.00 0.00	0.53 0.50	0.00 0.00
	force kN/m	12116.42 abs 12116.85	0.00	0.00	glo len	0.00 0.00	0.50 0.50	0.00 0.00
	force kN/m	5000.00 abs 5951.59	0.00	0.00	glo len	0.00 0.00	0.00 0.53	0.00 0.00
	force kN/m	5951.59 abs 6324.50	0.00	0.00	glo len	0.00 0.00	0.53 0.65	0.00 0.00
	force kN/m	13675.50 abs 15000.00	0.00	0.00	glo len	0.00 0.00	0.43 0.00	0.00 0.00
	force kN/m	4308.75 abs 5000.00	0.00	0.00	glo len	0.00 0.00	0.38 0.00	0.00 0.00
31	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.32 0.35	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.35 0.34	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.61	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.61 0.00	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.32	0.00 0.00
	force kN/m	4221.52 abs 4272.54	0.00	0.00	glo len	0.00 0.00	0.03 0.00	0.00 0.00
	force kN/m	4272.54 abs 4273.46	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.11 0.03	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.34 0.21	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.21 0.11	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.03 0.03	0.00 0.00
32	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.61	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.34 0.21	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.21 0.11	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.61 0.00	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.32	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.32 0.35	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.35 0.34	0.00 0.00
	force kN/m	4272.54 abs 4273.46	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.03 0.03	0.00 0.00
	force kN/m	4221.52 abs 4272.54	0.00	0.00	glo len	0.00 0.00	0.03 0.00	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.11 0.03	0.00 0.00
33	force kN/m	1324.50 abs 2883.15	0.00	0.00	glo len	0.00 0.00	0.36 0.41	0.00 0.00
	force kN/m	2883.15 abs 2883.58	0.00	0.00	glo len	0.00 0.00	0.41 0.42	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.36	0.00 0.00
	force kN/m	5951.59 abs 6324.50	0.00	0.00	glo len	0.00 0.00	0.44 0.54	0.00 0.00
	force kN/m	6324.50 abs 7500.00	0.00	0.00	glo len	0.00 0.00	0.54 0.58	0.00 0.00
	force kN/m	2883.58 abs 3675.50	0.00	0.00	glo len	0.00 0.00	0.42 0.44	0.00 0.00
	force kN/m	3675.50 abs 4308.75	0.00	0.00	glo len	0.00 0.00	0.44 0.32	0.00 0.00
	force kN/m	4308.75 abs 5000.00	0.00	0.00	glo len	0.00 0.00	0.32 0.00	0.00 0.00
	force kN/m	5000.00 abs 5951.59	0.00	0.00	glo len	0.00 0.00	0.00 0.44	0.00 0.00
	force kN/m	10000.00 abs 10691.25	0.00	0.00	glo len	0.00 0.00	0.00 0.32	0.00 0.00
	force kN/m	10691.25 abs 11324.50	0.00	0.00	glo len	0.00 0.00	0.32 0.44	0.00 0.00
	force kN/m	11324.50 abs 12116.42	0.00	0.00	glo len	0.00 0.00	0.44 0.42	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	12116.42 abs 12116.85	0.00	0.00	glo len	0.00 0.00	0.42 0.41	0.00 0.00
	force kN/m	12116.85 abs 13675.50	0.00	0.00	glo len	0.00 0.00	0.41 0.36	0.00 0.00
	force kN/m	13675.50 abs 15000.00	0.00	0.00	glo len	0.00 0.00	0.36 0.00	0.00 0.00
	force kN/m	9048.41 abs 10000.00	0.00	0.00	glo len	0.00 0.00	0.44 0.00	0.00 0.00
	force kN/m	7500.00 abs 8675.50	0.00	0.00	glo len	0.00 0.00	0.58 0.54	0.00 0.00
	force kN/m	8675.50 abs 9048.41	0.00	0.00	glo len	0.00 0.00	0.54 0.44	0.00 0.00
50	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.05	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.09 0.27	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.09 0.12	0.00 0.00
	force kN/m	0.00 rel 0.50	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.07 1.07
	force kN/m	0.50 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.03 1.03
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	5204.62 abs 5255.63	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5258.62 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.09	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.09	0.00 0.00
	force kN/m	2153.58 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.09 0.19	0.00 0.00
	force kN/m	4309.94 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.19 0.07	0.00 0.00
	force kN/m	4889.62 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.07 0.01	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.05 0.09	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.09 0.00	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.27 0.32	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.32 0.00	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
51	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.13 1.13
52	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
53	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
54	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
55	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
56	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.92 0.92
57	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.08 0.22	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.27 0.00	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.08	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.22 0.27	0.00 0.00
	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.46 0.46
	force kN/m	4889.62 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.06 0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	5204.62 abs 5255.63	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5258.62 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.07	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.07 0.10	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.04	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.04 0.08	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.08 0.00	0.00 0.00
	force kN/m	2153.58 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.08 0.16	0.00 0.00
	force kN/m	4309.94 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.16 0.06	0.00 0.00

Loadcase no. 12 - distributed loads

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
1	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.03 1.03
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.53	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.53 0.52	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.52 0.00	0.00 0.00
2	force kN/m	0.00 rel 0.50	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.77 0.77
	force kN/m	0.50 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.73 0.73
	force kN/m	5258.62 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.13	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.08	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.08 0.14	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.14 0.00	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.13	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	0.13 0.14	0.00 0.00
	force kN/m	2208.25 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.14 0.27	0.00 0.00
	force kN/m	4309.94 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.27 0.01	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	5204.62 abs 5255.63	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.38 0.47	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.13 0.17	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.13 0.38	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.47 0.00	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
3	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.03 -1.03
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.53	0.00 0.00
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.53 0.52	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.52 0.00	0.00 0.00
4	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	1.16 1.16
5	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.53 0.53
6	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-1.16 -1.16
7	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.96 0.96
8	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
9	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.96 -0.96
10	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.56 0.56
11	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
12	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.56 -0.56
13	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.56 0.56
14	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
15	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.56 -0.56
16	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.56 0.56
17	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
18	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.56 -0.56
19	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.56 0.56
20	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
21	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.56 -0.56
22	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.28 0.28
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.15 0.14	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.14 0.00	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.15	0.00 0.00
23	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.02	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.04	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.02 0.04	0.00 0.00
	force kN/m	2208.25 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.04 0.07	0.00 0.00
	force kN/m	4309.94 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.07 0.00	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	2153.58 abs 2208.25	0.00	0.00	glo len	0.00 0.00	0.04 0.04	0.00 0.00
	force kN/m	5258.62 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.03	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.03 0.05	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.04 0.11	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.11 0.13	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.13 0.00	0.00 0.00
	force kN/m	5204.62 abs 5255.63	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.16 0.16
24	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.15	0.00 0.00
	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	-0.28 -0.28
	force kN/m	1324.50 abs 1344.00	0.00	0.00	glo len	0.00 0.00	0.15 0.14	0.00 0.00
	force kN/m	1344.00 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.14 0.00	0.00 0.00
28	force kN/m	4272.54 abs 4273.46	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00

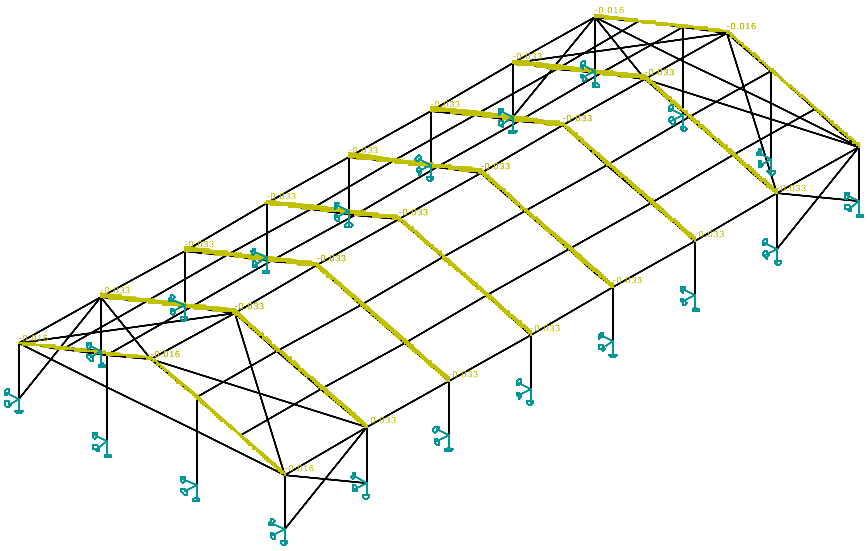
macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.37 0.20	0.00 0.00
	force kN/m	4221.52 abs 4272.54	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.59 0.37	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 1.06	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.20 0.05	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	1.06 0.00	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.55	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.55 0.59	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.59 0.59	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.05 0.04	0.00 0.00
29	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.55	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	1.06 0.00	0.00 0.00
	force kN/m	4272.54 abs 4273.46	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 1.06	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.55 0.59	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.59 0.59	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.05 0.04	0.00 0.00
	force kN/m	4221.52 abs 4272.54	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.37 0.20	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.20 0.05	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.59 0.37	0.00 0.00
30	force kN/m	12116.85 abs 13675.50	0.00	0.00	glo len	0.00 0.00	0.71 0.61	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.61	0.00 0.00
	force kN/m	1324.50 abs 2883.15	0.00	0.00	glo len	0.00 0.00	0.61 0.71	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	2883.15 abs 2883.58	0.00	0.00	glo len	0.00 0.00	0.71 0.71	0.00 0.00
	force kN/m	2883.58 abs 3675.50	0.00	0.00	glo len	0.00 0.00	0.71 0.76	0.00 0.00
	force kN/m	3675.50 abs 4308.75	0.00	0.00	glo len	0.00 0.00	0.76 0.55	0.00 0.00
	force kN/m	6324.50 abs 7500.00	0.00	0.00	glo len	0.00 0.00	0.93 1.01	0.00 0.00
	force kN/m	7500.00 abs 8675.50	0.00	0.00	glo len	0.00 0.00	1.01 0.93	0.00 0.00
	force kN/m	8675.50 abs 9048.41	0.00	0.00	glo len	0.00 0.00	0.93 0.76	0.00 0.00
	force kN/m	9048.41 abs 10000.00	0.00	0.00	glo len	0.00 0.00	0.76 0.00	0.00 0.00
	force kN/m	10000.00 abs 10691.25	0.00	0.00	glo len	0.00 0.00	0.00 0.55	0.00 0.00
	force kN/m	10691.25 abs 11324.50	0.00	0.00	glo len	0.00 0.00	0.55 0.76	0.00 0.00
	force kN/m	11324.50 abs 12116.42	0.00	0.00	glo len	0.00 0.00	0.76 0.71	0.00 0.00
	force kN/m	12116.42 abs 12116.85	0.00	0.00	glo len	0.00 0.00	0.71 0.71	0.00 0.00
	force kN/m	5000.00 abs 5951.59	0.00	0.00	glo len	0.00 0.00	0.00 0.76	0.00 0.00
	force kN/m	5951.59 abs 6324.50	0.00	0.00	glo len	0.00 0.00	0.76 0.93	0.00 0.00
	force kN/m	13675.50 abs 15000.00	0.00	0.00	glo len	0.00 0.00	0.61 0.00	0.00 0.00
	force kN/m	4308.75 abs 5000.00	0.00	0.00	glo len	0.00 0.00	0.55 0.00	0.00 0.00
31	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.15 0.17	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.17 0.16	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.29	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.29 0.00	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.15	0.00 0.00
	force kN/m	4221.52 abs 4272.54	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	4272.54 abs 4273.46	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.05 0.01	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.16 0.10	0.00 0.00

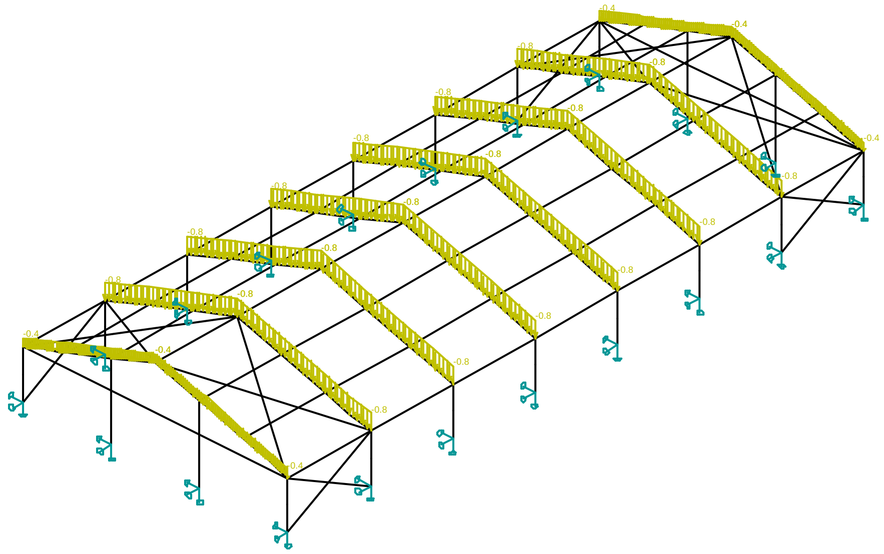
macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.10 0.05	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
32	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.29	0.00 0.00
	force kN/m	3735.55 abs 4004.33	0.00	0.00	glo len	0.00 0.00	0.16 0.10	0.00 0.00
	force kN/m	4004.33 abs 4045.10	0.00	0.00	glo len	0.00 0.00	0.10 0.05	0.00 0.00
	force kN/m	1324.50 abs 2649.00	0.00	0.00	glo len	0.00 0.00	0.29 0.00	0.00 0.00
	force kN/m	2649.00 abs 3340.98	0.00	0.00	glo len	0.00 0.00	0.00 0.15	0.00 0.00
	force kN/m	3340.98 abs 3721.67	0.00	0.00	glo len	0.00 0.00	0.15 0.17	0.00 0.00
	force kN/m	3721.67 abs 3735.55	0.00	0.00	glo len	0.00 0.00	0.17 0.16	0.00 0.00
	force kN/m	4272.54 abs 4273.46	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	4221.35 abs 4221.52	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	4221.52 abs 4272.54	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	4045.10 abs 4221.35	0.00	0.00	glo len	0.00 0.00	0.05 0.01	0.00 0.00
33	force kN/m	1324.50 abs 2883.15	0.00	0.00	glo len	0.00 0.00	0.17 0.20	0.00 0.00
	force kN/m	2883.15 abs 2883.58	0.00	0.00	glo len	0.00 0.00	0.20 0.20	0.00 0.00
	force kN/m	0.00 abs 1324.50	0.00	0.00	glo len	0.00 0.00	0.00 0.17	0.00 0.00
	force kN/m	5951.59 abs 6324.50	0.00	0.00	glo len	0.00 0.00	0.21 0.26	0.00 0.00
	force kN/m	6324.50 abs 7500.00	0.00	0.00	glo len	0.00 0.00	0.26 0.28	0.00 0.00
	force kN/m	2883.58 abs 3675.50	0.00	0.00	glo len	0.00 0.00	0.20 0.21	0.00 0.00
	force kN/m	3675.50 abs 4308.75	0.00	0.00	glo len	0.00 0.00	0.21 0.15	0.00 0.00
	force kN/m	4308.75 abs 5000.00	0.00	0.00	glo len	0.00 0.00	0.15 0.00	0.00 0.00
	force kN/m	5000.00 abs 5951.59	0.00	0.00	glo len	0.00 0.00	0.00 0.21	0.00 0.00
	force kN/m	10000.00 abs 10691.25	0.00	0.00	glo len	0.00 0.00	0.00 0.15	0.00 0.00
	force kN/m	10691.25 abs 11324.50	0.00	0.00	glo len	0.00 0.00	0.15 0.21	0.00 0.00

macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	11324.50 abs 12116.42	0.00	0.00	glo len	0.00 0.00	0.21 0.20	0.00 0.00
	force kN/m	12116.42 abs 12116.85	0.00	0.00	glo len	0.00 0.00	0.20 0.20	0.00 0.00
	force kN/m	12116.85 abs 13675.50	0.00	0.00	glo len	0.00 0.00	0.20 0.17	0.00 0.00
	force kN/m	13675.50 abs 15000.00	0.00	0.00	glo len	0.00 0.00	0.17 0.00	0.00 0.00
	force kN/m	9048.41 abs 10000.00	0.00	0.00	glo len	0.00 0.00	0.21 0.00	0.00 0.00
	force kN/m	7500.00 abs 8675.50	0.00	0.00	glo len	0.00 0.00	0.28 0.26	0.00 0.00
	force kN/m	8675.50 abs 9048.41	0.00	0.00	glo len	0.00 0.00	0.26 0.21	0.00 0.00
50	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.08	0.00 0.00
	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.13 0.38	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.13 0.17	0.00 0.00
	force kN/m	0.00 rel 0.50	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.77 0.77
	force kN/m	0.50 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.73 0.73
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.01	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.01 0.01	0.00 0.00
	force kN/m	5204.62 abs 5255.63	0.00	0.00	glo len	0.00 0.00	0.01 0.00	0.00 0.00
	force kN/m	5258.62 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.13	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.13	0.00 0.00
	force kN/m	2153.58 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.13 0.27	0.00 0.00
	force kN/m	4309.94 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.27 0.10	0.00 0.00
	force kN/m	4889.62 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.10 0.01	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.08 0.14	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.14 0.00	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.38 0.47	0.00 0.00

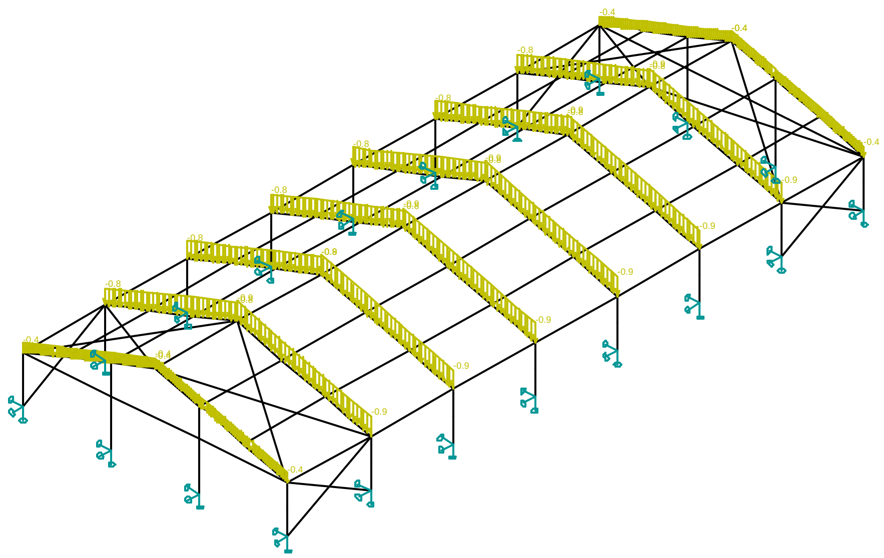
macro	type	dx mm	exY mm	exZ mm		X beg end	Y beg end	Z beg end
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.47 0.00	0.00 0.00
51	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.53 0.53
52	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
53	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
54	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
55	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
56	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.32 0.32
57	force kN/m	5742.87 abs 6197.59	0.00	0.00	glo len	0.00 0.00	0.04 0.11	0.00 0.00
	force kN/m	7506.84 abs 7885.69	0.00	0.00	glo len	0.00 0.00	0.13 0.00	0.00 0.00
	force kN/m	2153.57 abs 2153.58	0.00	0.00	glo len	0.00 0.00	0.00 0.04	0.00 0.00
	force kN/m	6197.59 abs 7506.84	0.00	0.00	glo len	0.00 0.00	0.11 0.13	0.00 0.00
	force kN/m	0.00 rel 1.00	0.00	0.00	loc len	0.00 0.00	0.00 0.00	0.16 0.16
	force kN/m	4889.62 abs 5202.95	0.00	0.00	glo len	0.00 0.00	0.03 0.00	0.00 0.00
	force kN/m	5202.95 abs 5202.97	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	5202.97 abs 5203.07	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	5203.07 abs 5204.62	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	5204.62 abs 5255.63	0.00	0.00	glo len	0.00 0.00	0.00 0.00	0.00 0.00
	force kN/m	5258.62 abs 5486.99	0.00	0.00	glo len	0.00 0.00	0.00 0.03	0.00 0.00
	force kN/m	5486.99 abs 5742.87	0.00	0.00	glo len	0.00 0.00	0.03 0.05	0.00 0.00
	force kN/m	0.00 abs 1190.00	0.00	0.00	glo len	0.00 0.00	0.00 0.02	0.00 0.00
	force kN/m	1190.00 abs 2153.55	0.00	0.00	glo len	0.00 0.00	0.02 0.04	0.00 0.00
	force kN/m	2153.55 abs 2153.57	0.00	0.00	glo len	0.00 0.00	0.04 0.00	0.00 0.00
	force kN/m	2153.58 abs 4309.94	0.00	0.00	glo len	0.00 0.00	0.04 0.07	0.00 0.00
	force kN/m	4309.94 abs 4889.62	0.00	0.00	glo len	0.00 0.00	0.07 0.03	0.00 0.00



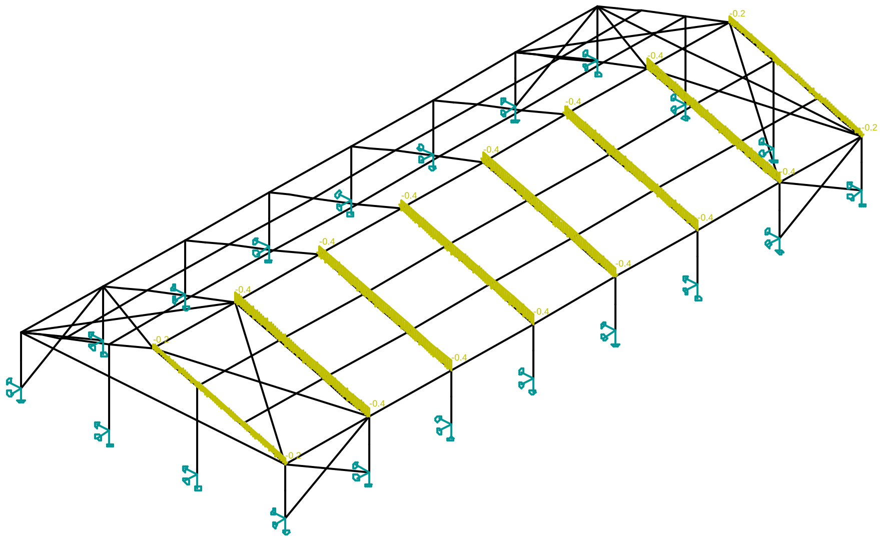
Distributed loads.Loadcases - 2



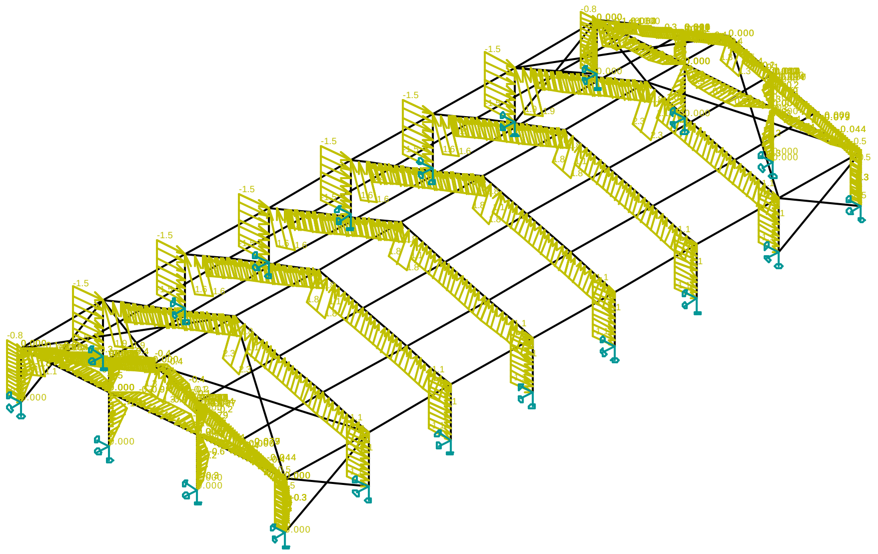
Distributed loads.Loadcases - 6



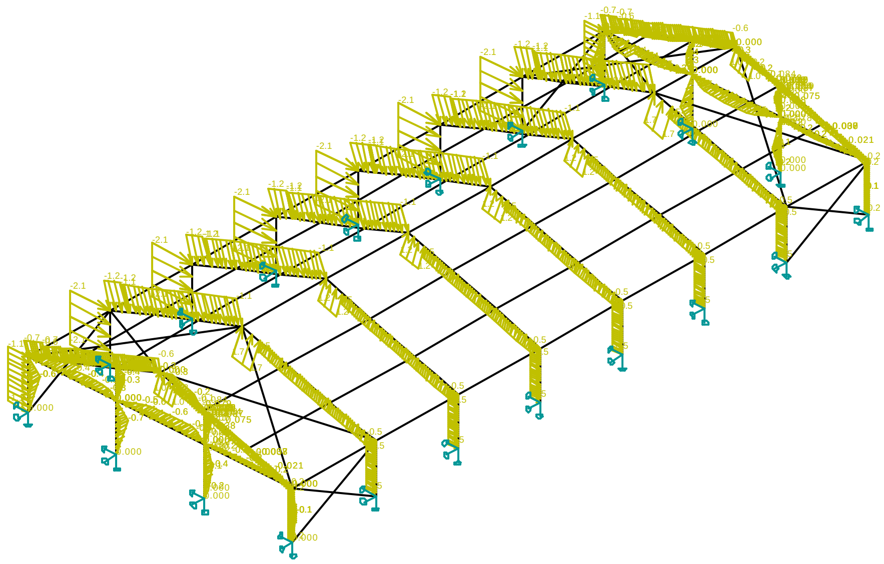
Distributed loads.Loadcases - 7



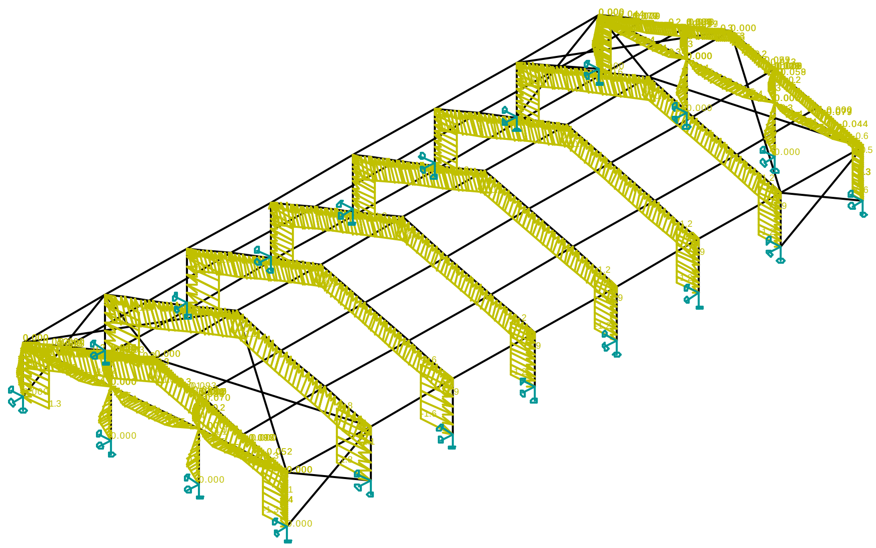
Distributed loads.Loadcases - 8



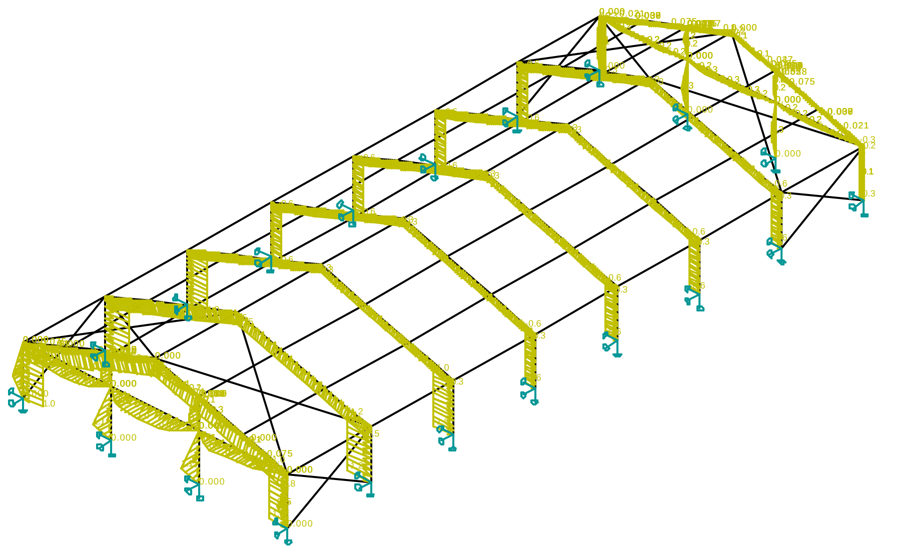
Distributed loads.Loadcases - 9



Distributed loads.Loadcases - 10



Distributed loads.Loadcases - 11



Distributed loads.Loadcases - 12

Combinations

Combi	Norm	Case	coeff
1.	User-ultimate	1 self weight	1.20
		4 dead load - sum	1.20
		5 dead load - extra	1.20
		6 snow - case 1	1.33
2.		1 self weight	1.20
		4 dead load - sum	1.20
		5 dead load - extra	1.20
		7 snow - case 2	1.33
		8 snow - case 3	1.33
		9 wind on side - overpr	1.20
		10 wind on side - underpr	1.20
		11 wind on gable - overpr	1.20
		12 wind on gable - underpr	1.20
3.		1 self weight	0.80
		4 dead load - sum	0.80
		5 dead load - extra	0.80
		6 snow - case 1	1.33
4.		1 self weight	0.80
		4 dead load - sum	0.80

Combi	Norm	Case	coeff
		5 dead load - extra	0.80
		7 snow - case 2	1.33
		8 snow - case 3	1.33
		9 wind on side - overpr	1.20
		10 wind on side - underpr	1.20
		11 wind on gable - overpr	1.20
		12 wind on gable - underpr	1.20

Basic rules for generation of ultimate load combinations:
1 : 1.20*LC1 / 1.20*LC4 / 1.20*LC5 / 1.33*LC6
2 : 1.20*LC1 / 1.20*LC4 / 1.20*LC5 / 1.33*LC7 / 1.33*LC8 / 1.20*LC9 / 1.20*LC10 / 1.20*LC11 / 1.20*LC12
3 : 0.80*LC1 / 0.80*LC4 / 0.80*LC5 / 1.33*LC6
4 : 0.80*LC1 / 0.80*LC4 / 0.80*LC5 / 1.33*LC7 / 1.33*LC8 / 1.20*LC9 / 1.20*LC10 / 1.20*LC11 / 1.20*LC12

List of extreme ultimate load combinations
1/ 3 : +0.80*LC1+0.80*LC4+0.80*LC5
2/ 1 : +1.20*LC1+1.20*LC4+1.20*LC5
3/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.20*LC9
4/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.20*LC10
5/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.20*LC11
6/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.20*LC12
7/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC7
8/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC8
9/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.20*LC9
10/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.20*LC10
11/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.20*LC11
12/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.20*LC12
13/ 1 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC6
14/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC7
15/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC8
16/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC7+1.20*LC9
17/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC8+1.20*LC9
18/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC7+1.20*LC10
19/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC8+1.20*LC10
20/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC7+1.20*LC11
21/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC7+1.20*LC12
22/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC8+1.20*LC11
23/ 4 : +0.80*LC1+0.80*LC4+0.80*LC5+1.33*LC8+1.20*LC12
24/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC7+1.20*LC9
25/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC8+1.20*LC9
26/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC7+1.20*LC10
27/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC7+1.20*LC11
28/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC8+1.20*LC10
29/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC8+1.20*LC11
30/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC7+1.20*LC12
31/ 2 : +1.20*LC1+1.20*LC4+1.20*LC5+1.33*LC8+1.20*LC12

Nonlinear combination

Combi	Group of init. deformations	dx mm/m	dy mm/m	Group of init. curvatures	Case	coeff
C 1	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
C 2	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
C 3	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	9 wind on side - overpr	1.20
C 4	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	10 wind on side - underpr	1.20
C 5	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	11 wind on gable - overpr	1.20
C 6	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	12 wind on gable - underpr	1.20
C 7	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	7 snow - case 2	1.33
C 8	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	8 snow - case 3	1.33
C 9	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	9 wind on side - overpr	1.20
C 10	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	10 wind on side - underpr	1.20
C 11	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20

Combi	Group of init. deformations	dx mm/m	dy mm/m	Group of init. curvatures	Case	coeff
	0	0.00	0.00	0	11 wind on gable - overpr	1.20
C 12	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	12 wind on gable - underpr	1.20
C 13	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	6 snow - case 1	1.33
C 14	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	7 snow - case 2	1.33
C 15	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	8 snow - case 3	1.33
C 16	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	7 snow - case 2	1.33
	0	0.00	0.00	0	9 wind on side - overpr	1.20
C 17	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	8 snow - case 3	1.33
	0	0.00	0.00	0	9 wind on side - overpr	1.20
C 18	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	7 snow - case 2	1.33
	0	0.00	0.00	0	10 wind on side - underpr	1.20
C 19	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	8 snow - case 3	1.33
	0	0.00	0.00	0	10 wind on side - underpr	1.20
C 20	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	7 snow - case 2	1.33
	0	0.00	0.00	0	11 wind on gable - overpr	1.20
C 21	0	0.00	0.00	0	1 self weight	0.80

Combi	Group of init. deformations	dx mm/m	dy mm/m	Group of init. curvatures	Case	coeff
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	7 snow - case 2	1.33
	0	0.00	0.00	0	12 wind on gable - underpr	1.20
C 22	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	8 snow - case 3	1.33
	0	0.00	0.00	0	11 wind on gable - overpr	1.20
C 23	0	0.00	0.00	0	1 self weight	0.80
	0	0.00	0.00	0	4 dead load - sum	0.80
	0	0.00	0.00	0	5 dead load - extra	0.80
	0	0.00	0.00	0	8 snow - case 3	1.33
	0	0.00	0.00	0	12 wind on gable - underpr	1.20
C 24	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	7 snow - case 2	1.33
	0	0.00	0.00	0	9 wind on side - overpr	1.20
C 25	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	8 snow - case 3	1.33
	0	0.00	0.00	0	9 wind on side - overpr	1.20
C 26	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	7 snow - case 2	1.33
	0	0.00	0.00	0	10 wind on side - underpr	1.20
C 27	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	7 snow - case 2	1.33
	0	0.00	0.00	0	11 wind on gable - overpr	1.20
C 28	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	8 snow - case 3	1.33
	0	0.00	0.00	0	10 wind on side - underpr	1.20
C 29	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	8 snow - case 3	1.33

Combi	Group of init. deformations	dx mm/m	dy mm/m	Group of init. curvatures	Case	coeff
	0	0.00	0.00	0	11 wind on gable - overpr	1.20
C 30	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	7 snow - case 2	1.33
	0	0.00	0.00	0	12 wind on gable - underpr	1.20
C 31	0	0.00	0.00	0	1 self weight	1.20
	0	0.00	0.00	0	4 dead load - sum	1.20
	0	0.00	0.00	0	5 dead load - extra	1.20
	0	0.00	0.00	0	8 snow - case 3	1.33
	0	0.00	0.00	0	12 wind on gable - underpr	1.20

Internal forces on foot (alu240)

Group of member(s) :1,8,10,16,18,24,26,32,34,40,42,48,50,56,58,65
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
1	1	5	1344.0	**4.4**	-0.1	1.2	-0.0	0.1	-0.4
		14	0.0	**-4.3**	0.0	-0.5	0.0	-0.0	-0.0
		4	1344.0	3.2	0.0	5.2	0.0	**8.2**	0.5
		15		-2.3	0.0	-0.6	0.0	**-0.7**	0.0
8		5		**4.4**	-0.1	-1.2	0.0	-0.1	-0.4
		26	0.0	**-9.3**	0.2	7.0	-0.0	0.0	-0.0
			1344.0	-9.2	0.1	6.6	0.0	**9.2**	0.2
		22		3.8	-0.1	-1.4	0.0	**-0.4**	-0.4
10		3		**6.8**	0.0	5.1	-0.0	**8.4**	0.0
		26	0.0	**-16.4**	0.0	-2.1	0.0	0.0	0.0
		30	1344.0	-8.9	-0.1	-5.0	0.0	**-8.0**	-0.1
16		3		**6.8**	0.0	-2.9	0.0	**-2.7**	0.0
		14	0.0	**-10.2**	0.0	5.9	-0.0	-0.0	0.0
		26	1344.0	-8.1	0.0	7.7	-0.0	**10.9**	0.0
18		3		**8.3**	0.0	7.1	0.0	**11.1**	0.0
		26	0.0	**-15.6**	0.0	-0.1	-0.0	0.0	0.0
		14	1344.0	-11.2	0.0	-7.6	-0.0	**-10.3**	0.0
24		3		**6.8**	0.0	-2.5	-0.0	-2.1	0.0
		26		**-11.8**	0.0	13.6	0.0	**19.0**	0.0
		5		6.4	-0.1	-3.4	0.0	**-2.8**	-0.1
26		3		**8.3**	0.0	7.1	0.0	**11.2**	0.0
		26	0.0	**-15.5**	0.0	-0.0	-0.0	-0.0	0.0
		14	1344.0	-11.2	0.0	-7.6	-0.0	**-10.3**	0.0

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
32		3		**6.8**	0.0	-2.4	-0.0	-2.1	0.0
		26		**-11.9**	0.0	13.7	0.0	**19.1**	0.0
		5		6.4	-0.1	-3.6	0.0	**-3.5**	-0.1
34		3		**8.3**	-0.0	7.1	-0.0	**11.2**	-0.0
		26	0.0	**-15.5**	-0.0	-0.0	0.0	-0.0	-0.0
		14	1344.0	-11.2	-0.0	-7.6	0.0	**-10.3**	-0.0
40		3		**6.8**	-0.0	-2.4	0.0	-2.1	-0.0
		26		**-11.9**	-0.0	13.7	-0.0	**19.1**	-0.0
		5		6.4	-0.1	-3.6	0.0	**-3.5**	-0.1
42		3		**8.3**	-0.0	7.1	-0.0	**11.1**	-0.0
		26	0.0	**-15.6**	-0.0	-0.1	0.0	0.0	-0.0
		14	1344.0	-11.2	-0.0	-7.6	0.0	**-10.3**	-0.0
48		3		**6.8**	-0.0	-2.5	0.0	-2.1	-0.0
		26		**-11.8**	-0.0	13.6	-0.0	**19.0**	-0.0
		5		6.4	-0.1	-3.6	0.0	**-3.5**	-0.1
50				**6.8**	-0.1	4.0	-0.0	4.2	-0.1
		26	0.0	**-16.4**	-0.0	-2.1	-0.0	0.0	-0.0
		3	1344.0	6.8	-0.0	5.1	0.0	**8.4**	-0.0
		14		-9.7	-0.0	-5.8	-0.0	**-7.8**	-0.0
56		5		**6.8**	-0.1	-4.0	0.0	**-4.2**	-0.1
		14	0.0	**-10.2**	-0.0	5.9	0.0	-0.0	-0.0
		26	1344.0	-8.1	-0.0	7.7	0.0	**10.9**	-0.0
58		3		**4.3**	-0.0	2.8	-0.0	4.5	-0.6
		30	0.0	**-6.5**	-0.2	-0.8	-0.0	-0.0	0.0
		4	1344.0	3.2	-0.0	5.2	-0.0	**8.2**	-0.5
		31		-4.5	-0.1	-0.3	-0.0	**-0.7**	-0.2
65		26	0.0	**-9.3**	-0.2	7.0	0.0	0.0	0.0
			1344.0	-9.2	-0.1	6.6	-0.0	**9.2**	-0.2
		22		-2.3	-0.1	-0.7	0.0	**-0.3**	-0.3

Internal forces on foot (alu240+232)

Group of member(s) :2,9,11,17,19,25,27,33,35,41,43,49,51,57,59,66
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
2	2	5	1305.0	**4.5**	0.2	3.3	-0.0	3.0	-0.2
		14	0.0	**-4.2**	0.0	-0.5	0.0	-0.7	0.0
		4	1305.0	3.3	-0.5	3.6	0.0	**14.0**	0.1
		15		-2.1	0.0	-0.6	0.0	**-1.5**	0.0
9		5		**4.5**	0.2	-3.3	0.0	-3.0	-0.2

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
		26	0.0	**-9.2**	0.1	6.6	0.0	9.2	0.2
			1305.0	-9.1	-0.1	6.1	0.0	**17.5**	0.2
		22		3.9	0.2	-3.5	0.0	**-3.6**	-0.2
11		3		**6.9**	0.0	2.7	0.0	**13.5**	0.0
		26	0.0	**-16.4**	0.0	-5.5	0.0	-5.1	0.0
		14	1305.0	-9.6	0.0	-5.7	-0.0	**-15.3**	0.0
17		3		**6.9**	0.0	-4.7	-0.0	**-7.7**	0.0
		14	0.0	**-10.1**	0.0	5.9	-0.0	8.0	0.0
		26	1305.0	-8.0	0.0	6.8	0.0	**20.4**	0.0
19		3		**8.4**	0.0	4.8	0.0	**18.8**	0.0
		26	0.0	**-15.5**	0.0	-3.5	-0.0	-2.5	0.0
		14	1305.0	-11.1	0.0	-7.5	-0.0	**-20.2**	0.0
25		3		**6.9**	0.0	-4.2	-0.0	-6.4	0.0
		26		**-11.9**	0.0	12.6	0.0	**36.1**	0.0
		5		6.6	-0.1	-5.8	0.0	**-8.8**	-0.2
27		3		**8.4**	0.0	4.8	0.0	**18.9**	0.0
		26	0.0	**-15.5**	0.0	-3.4	-0.0	-2.3	0.0
		14	1305.0	-11.1	0.0	-7.5	-0.0	**-20.1**	0.0
33		3		**6.9**	0.0	-4.2	-0.0	-6.4	0.0
		26		**-11.9**	0.0	12.7	0.0	**36.3**	0.0
		5		6.6	-0.1	-5.4	0.0	**-9.4**	-0.2
35		3		**8.4**	-0.0	4.8	-0.0	**18.9**	-0.0
		26	0.0	**-15.5**	-0.0	-3.4	0.0	-2.3	-0.0
		14	1305.0	-11.1	-0.0	-7.5	0.0	**-20.1**	-0.0
41		3		**6.9**	-0.0	-4.2	0.0	-6.4	-0.0
		26		**-11.9**	-0.0	12.7	-0.0	**36.3**	-0.0
		5		6.6	-0.1	-5.4	0.0	**-9.4**	-0.2
43		3		**8.4**	-0.0	4.8	-0.0	**18.8**	-0.0
		26	0.0	**-15.5**	-0.0	-3.5	0.0	-2.5	-0.0
		14	1305.0	-11.1	-0.0	-7.5	0.0	**-20.2**	-0.0
49		3		**6.9**	-0.0	-4.2	0.0	-6.4	-0.0
		26		**-11.9**	-0.0	12.6	-0.0	**36.1**	-0.0
		5		6.6	-0.1	-5.4	0.0	**-9.4**	-0.2
51				**7.0**	-0.1	5.9	-0.0	10.6	-0.2
		26	0.0	**-16.4**	-0.0	-5.5	-0.0	-5.1	-0.0
		3	1305.0	6.9	-0.0	2.7	-0.0	**13.5**	-0.0
		14		-9.6	-0.0	-5.7	0.0	**-15.3**	-0.0
57		5		**7.0**	-0.1	-5.9	0.0	**-10.6**	-0.2
		14	0.0	**-10.1**	-0.0	5.9	0.0	8.0	-0.0
		26	1305.0	-8.0	-0.0	6.8	-0.0	**20.4**	-0.0
59		3		**4.4**	0.6	1.6	-0.0	7.4	-0.2

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
		30	0.0	**-6.4**	-0.1	-0.3	-0.0	-0.7	-0.2
		4	1305.0	3.3	0.5	3.6	-0.0	**14.0**	-0.1
		15		-2.1	-0.0	-0.6	-0.0	**-1.5**	-0.0
66		26	0.0	**-9.2**	-0.1	6.6	-0.0	9.2	-0.2
			1305.0	-9.1	0.1	6.1	-0.0	**17.5**	-0.2
		22		-2.1	0.2	-1.6	0.0	**-1.8**	-0.2

Internal forces on roof (alu240+232)

Group of member(s) :3,12,20,28,36,44,52,60,118,124,128,132,136,140,144,148
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
3	2	4	1190.0	**2.7**	-0.0	-2.7	0.0	10.7	0.0
		14	0.0	**-5.8**	-0.0	1.6	0.0	**-1.3**	0.0
		10		2.5	0.0	-1.6	0.0	**13.3**	-0.0
12		5	1190.0	**7.1**	-0.2	-3.4	-0.2	1.6	-0.3
		26	0.0	**-14.6**	-0.0	12.1	0.0	-14.2	0.0
		3		4.7	-0.0	-6.1	0.0	**13.6**	0.0
		14		-13.9	-0.0	6.7	0.0	**-15.4**	0.0
20		5	1190.0	**7.7**	-0.2	-3.5	-0.2	3.9	-0.3
		26	0.0	**-11.1**	-0.0	12.1	0.0	-9.6	0.0
		3		7.2	-0.0	-6.8	0.0	**18.7**	0.0
		14		-10.5	-0.0	7.8	0.0	**-20.2**	0.0
28		3	1190.0	**7.4**	-0.0	-4.7	0.0	12.1	-0.0
		26	0.0	**-11.0**	-0.0	12.0	0.0	-9.0	0.0
		3		7.3	-0.0	-6.8	0.0	**18.9**	0.0
		14		-10.4	-0.0	7.8	0.0	**-20.1**	0.0
36		3	1190.0	**7.4**	0.0	-4.7	-0.0	12.1	0.0
		26	0.0	**-11.0**	0.0	12.0	-0.0	-9.0	-0.0
		3		7.3	0.0	-6.8	-0.0	**18.9**	-0.0
		14		-10.4	0.0	7.8	-0.0	**-20.1**	-0.0
44		5	1190.0	**7.3**	-0.2	-3.7	-0.2	4.3	-0.3
		26	0.0	**-11.1**	0.0	12.1	-0.0	-9.6	-0.0
		3		7.2	0.0	-6.8	-0.0	**18.7**	-0.0
		14		-10.5	0.0	7.8	-0.0	**-20.2**	-0.0
52		5	1190.0	**6.2**	-0.2	-4.0	-0.2	5.2	-0.3
		26	0.0	**-14.6**	0.0	12.1	-0.0	-14.2	-0.0
		3		4.7	0.0	-6.1	-0.0	**13.6**	-0.0
		14		-13.9	0.0	6.7	-0.0	**-15.4**	-0.0
60		4	1190.0	**2.7**	0.0	-2.7	-0.0	10.7	-0.0

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
		30	0.0	**-7.6**	-0.2	1.0	-0.3	-0.7	-0.1
		10		2.5	-0.0	-1.6	-0.0	**13.3**	0.0
		14		-5.8	0.0	1.6	-0.0	**-1.3**	-0.0
118		26		**-11.3**	0.1	4.8	-0.1	**-16.6**	-0.0
		22		-0.8	0.2	-2.9	0.2	**3.6**	0.1
124		5	1190.0	**7.1**	0.2	-3.4	0.2	1.6	0.3
		26	0.0	**-18.1**	0.0	4.7	-0.0	**-20.7**	-0.0
		3		6.5	0.0	-5.6	-0.0	**7.6**	-0.0
128		5	1190.0	**7.7**	0.2	-3.5	0.2	3.9	0.3
		26	0.0	**-15.6**	0.0	6.9	-0.0	**-35.6**	-0.0
		5		7.7	0.2	-4.7	0.2	**8.8**	0.1
132			1190.0	**7.3**	0.2	-3.7	0.2	4.3	0.3
		26	0.0	**-15.6**	0.0	6.9	-0.0	**-36.3**	-0.0
		5		7.3	0.2	-4.9	0.2	**9.4**	0.1
136			1190.0	**7.3**	0.2	-3.7	0.2	4.3	0.3
		26	0.0	**-15.6**	-0.0	6.9	0.0	**-36.3**	0.0
		5		7.3	0.2	-4.9	0.2	**9.4**	0.1
140			1190.0	**7.3**	0.2	-3.7	0.2	4.3	0.3
		26	0.0	**-15.6**	-0.0	6.9	0.0	**-35.6**	0.0
		5		7.3	0.2	-4.9	0.2	**9.4**	0.1
144		3	1190.0	**6.6**	-0.0	-4.1	0.0	1.9	-0.0
		26	0.0	**-18.1**	-0.0	4.7	0.0	**-20.7**	0.0
		5		6.1	0.2	-5.2	0.2	**10.6**	0.1
148		26		**-11.3**	-0.1	4.8	0.1	**-16.6**	0.0
		22		-1.9	0.2	-1.0	0.2	**1.9**	0.1

Internal forces on roof (alu240)

Group of member(s)
:4/7,13/15,21/23,29/31,37/39,45/47,53/55,61/64,119/123,125/127,129/131,133/135,137/139,
141/143,145/147,149/153
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
4	1	4	1018.2	**2.8**	-0.2	-3.4	0.0	7.6	-0.1
		14	0.0	**-5.5**	-0.0	0.8	0.0	0.1	-0.0
		26		1.5	-0.0	-2.2	0.1	**11.5**	0.0
		22	1018.2	-0.7	-0.1	-0.4	-0.2	**-1.8**	-0.4
5		4	420.3	**2.8**	-0.2	-3.7	0.0	6.1	-0.2
		14	0.0	**-5.3**	-0.0	0.2	0.0	0.6	-0.0
		26		1.8	-0.2	-3.4	0.1	**8.6**	-0.1
		22	420.3	-0.7	-0.0	0.1	-0.2	**-1.9**	-0.4

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
6		4	2629.0	**2.9**	-0.1	-5.7	0.0	-6.1	-0.1
		14	0.0	**-5.2**	0.0	-0.1	0.0	0.7	-0.0
		26		1.9	0.2	-4.0	0.1	**7.2**	-0.2
			2629.0	2.4	-0.1	-7.4	0.1	**-7.8**	-0.1
7		22	2628.1	**1.2**	1.0	0.5	-0.2	-0.2	0.8
		14	0.0	**-5.9**	-0.1	1.8	0.0	-1.6	0.1
		22		1.2	0.3	-2.6	-0.2	**2.5**	-0.7
		26		-1.7	0.2	5.0	0.0	**-7.4**	0.0
13		5	1438.6	**7.1**	-0.2	-1.6	-0.2	-2.0	-0.5
		26	0.0	**-14.2**	-0.0	9.0	0.0	-1.6	-0.0
		4	1438.6	-5.9	-0.0	2.0	0.0	**9.8**	-0.1
		30	0.0	-4.9	-0.2	3.9	-0.2	**-8.3**	-0.3
14		5	2628.6	**7.2**	-0.2	1.7	-0.2	-1.9	-0.9
		26	0.0	**-13.7**	0.1	5.3	0.0	8.7	-0.1
			2102.9	-13.0	0.1	-0.2	0.0	**14.0**	0.1
		22	1051.4	6.3	-0.1	-0.1	-0.2	**-3.9**	-0.6
15		5	2628.6	**7.4**	0.6	4.6	-0.2	5.8	0.6
		26	0.0	**-12.6**	-0.1	-2.3	0.0	**13.5**	0.1
		22		6.5	0.6	1.5	-0.2	**-2.5**	-0.8
21		5	1438.6	**7.8**	-0.2	-2.0	-0.2	-0.1	-0.5
		26	0.0	**-10.7**	-0.0	9.0	0.0	2.9	-0.0
		4	1438.6	-2.4	-0.0	1.1	0.0	**14.9**	-0.0
		14	0.0	-9.9	-0.0	6.4	0.0	**-11.7**	-0.0
22		5	2628.6	**7.8**	-0.1	0.6	-0.2	-2.2	-0.8
		26	0.0	**-10.3**	0.1	5.2	0.0	13.2	-0.0
			2102.9	-9.6	0.1	-0.3	0.0	**18.4**	0.1
		14	0.0	-9.4	0.0	4.8	0.0	**-3.5**	-0.0
23		5	2628.6	**8.0**	0.5	2.8	-0.2	1.7	0.6
		26	0.0	**-9.2**	-0.1	-2.3	0.0	**17.9**	0.1
		22		6.3	0.5	0.6	-0.2	**-2.9**	-0.8
29		3	1438.6	**7.4**	-0.0	-3.4	0.0	6.3	-0.0
		26	0.0	**-10.6**	-0.0	9.0	0.0	3.5	-0.0
		4	1438.6	-2.3	-0.0	1.1	0.0	**15.3**	-0.0
		14	0.0	-9.9	-0.0	6.4	0.0	**-11.7**	-0.0
30		3	2628.6	**7.5**	0.0	-1.1	0.0	0.2	0.0
		26	0.0	**-10.2**	0.0	5.2	0.0	13.8	-0.0
			2102.9	-9.6	0.0	-0.3	0.0	**18.9**	0.0
		14	0.0	-9.3	0.0	4.8	0.0	**-3.5**	-0.0
31		3	2628.6	**7.8**	-0.0	0.7	0.0	-1.0	-0.0
		26	0.0	**-9.1**	-0.0	-2.4	0.0	**18.3**	0.0
		22		5.9	0.5	0.5	-0.2	**-3.1**	-0.8

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
37		3	1438.6	**7.4**	0.0	-3.4	-0.0	6.3	0.0
		26	0.0	**-10.6**	0.0	9.0	-0.0	3.5	0.0
		4	1438.6	-2.3	0.0	1.1	-0.0	**15.3**	0.0
		14	0.0	-9.9	0.0	6.4	-0.0	**-11.7**	0.0
38		3	2628.6	**7.5**	-0.0	-1.1	-0.0	0.2	-0.0
		26	0.0	**-10.2**	-0.0	5.2	-0.0	13.8	0.0
			2102.9	-9.6	-0.0	-0.3	-0.0	**18.9**	-0.0
		14	0.0	-9.3	-0.0	4.8	-0.0	**-3.5**	0.0
39		3	2628.6	**7.8**	0.0	0.7	-0.0	-1.0	0.0
		26	0.0	**-9.1**	0.0	-2.4	-0.0	**18.3**	-0.0
		22		5.9	0.5	0.5	-0.2	**-3.1**	-0.8
45		3	1438.6	**7.4**	0.0	-3.4	-0.0	6.1	0.0
		26	0.0	**-10.7**	0.0	9.0	-0.0	2.9	0.0
		4	1438.6	-2.4	0.0	1.1	-0.0	**14.9**	0.0
		14	0.0	-9.9	0.0	6.4	-0.0	**-11.7**	0.0
46		3	2628.6	**7.5**	-0.0	-1.1	-0.0	0.1	-0.1
		26	0.0	**-10.3**	-0.1	5.2	-0.0	13.2	0.0
			2102.9	-9.6	-0.1	-0.3	-0.0	**18.4**	-0.1
		14	0.0	-9.4	-0.0	4.8	-0.0	**-3.5**	0.0
47		3	2628.6	**7.7**	0.0	0.7	-0.0	-1.0	0.0
		26	0.0	**-9.2**	0.1	-2.3	-0.0	**17.9**	-0.1
		22		5.9	0.5	0.5	-0.2	**-3.0**	-0.8
53		5	1438.6	**6.2**	-0.2	-2.5	-0.2	0.6	-0.5
		26	0.0	**-14.2**	0.0	9.0	-0.0	-1.6	0.0
		4	1438.6	-5.9	0.0	2.0	-0.0	**9.8**	0.1
		14	0.0	-13.4	0.0	5.4	-0.0	**-8.2**	0.0
54		5	2628.6	**6.3**	-0.1	0.1	-0.2	-2.6	-0.8
		26	0.0	**-13.7**	-0.1	5.3	-0.0	8.7	0.1
			2102.9	-13.0	-0.1	-0.2	-0.0	**14.0**	-0.1
		22		4.0	-0.1	-0.2	-0.2	**-3.2**	-0.7
55		5	2628.6	**6.5**	0.5	2.4	-0.2	0.1	0.5
		26	0.0	**-12.6**	0.1	-2.3	-0.0	**13.5**	-0.1
		22		4.2	0.5	-0.1	-0.2	**-3.2**	-0.8
61		4	1018.2	**2.8**	0.2	-3.4	-0.0	7.6	0.1
		30	0.0	**-7.3**	-0.2	0.5	-0.3	0.1	-0.4
		26		1.5	0.0	-2.2	-0.1	**11.5**	-0.0
		22	1018.2	-2.6	-0.1	-0.0	-0.2	**-1.1**	-0.4
62		4	420.3	**2.8**	0.2	-3.7	-0.0	6.1	0.2
		30	0.0	**-7.1**	-0.2	0.0	-0.3	0.4	-0.5
		26		1.8	0.2	-3.4	-0.1	**8.6**	0.1
		22		-2.6	-0.1	-0.0	-0.2	**-1.1**	-0.4

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
63		4	2629.0	**2.9**	0.1	-5.7	-0.0	-6.1	0.1
		30	0.0	**-7.0**	-0.2	-0.2	-0.3	0.4	-0.6
		26		1.9	-0.2	-4.0	-0.1	**7.2**	0.2
			2629.0	2.4	0.1	-7.4	-0.1	**-7.8**	0.1
64		3	2628.1	**0.5**	0.6	0.7	-0.0	-0.4	0.2
		30	0.0	**-7.7**	0.5	1.8	-0.3	-1.7	-0.9
			2628.1	-7.2	0.8	0.8	-0.3	**1.8**	0.8
		26	0.0	-1.7	-0.2	5.0	-0.0	**-7.4**	-0.0
119				**-11.0**	0.1	4.4	-0.1	**-11.1**	0.0
		15	479.5	-1.9	0.0	0.0	-0.0	**1.0**	0.0
120		26	0.0	**-10.7**	-0.2	3.9	-0.1	-5.1	0.2
		4	2261.1	-6.2	0.0	4.3	-0.1	**3.6**	-0.0
			0.0	-6.2	-0.1	3.8	-0.1	**-5.5**	0.1
121		26		**-10.2**	-0.0	3.2	-0.1	2.9	-0.1
		4	367.5	-6.2	0.0	4.4	-0.1	**5.2**	-0.0
		14		-4.5	-0.0	-1.8	-0.0	**-1.8**	-0.1
122		26	0.0	**-10.1**	-0.0	3.0	-0.1	4.1	-0.1
		4	0.5	-6.2	0.0	4.4	-0.1	**5.2**	-0.0
		14		-4.5	-0.0	-1.8	-0.0	**-1.8**	-0.1
123		5	2628.1	**1.2**	-1.0	0.6	0.2	-0.3	-0.8
		26	0.0	**-8.9**	-0.2	-0.9	-0.1	3.7	-0.1
		4		-4.0	-0.2	-2.4	-0.1	**4.9**	0.0
		14		-5.8	0.1	2.0	-0.0	**-1.8**	-0.1
125		5	1438.6	**7.1**	0.2	-1.6	0.2	-2.0	0.5
		26	0.0	**-17.6**	0.0	4.0	-0.0	**-15.5**	0.0
		3		6.6	0.0	-4.1	-0.0	**1.9**	0.0
126		5	2628.6	**7.2**	0.2	1.7	0.2	-1.9	0.9
		26	0.0	**-16.9**	-0.1	3.3	-0.0	**-10.1**	0.1
		14	2628.6	-11.9	-0.0	0.7	-0.0	**4.8**	-0.1
127		5		**7.4**	-0.6	4.6	0.2	5.8	-0.6
		26	0.0	**-15.6**	0.1	1.3	-0.0	-3.1	-0.2
		11	2628.6	7.0	-0.6	4.5	0.2	**5.9**	-0.6
		4	0.0	-5.9	0.1	1.0	-0.0	**-6.8**	-0.1
129		5	1438.6	**7.8**	0.2	-2.0	0.2	-0.1	0.5
		26	0.0	**-15.0**	0.0	6.4	-0.0	**-27.8**	0.0
		5		7.7	0.2	-3.5	0.2	**3.9**	0.3
130			2628.6	**7.8**	0.1	0.6	0.2	-2.2	0.8
		26	0.0	**-14.2**	-0.1	5.8	-0.0	**-18.9**	0.1
		14	2628.6	-8.4	-0.0	1.7	-0.0	**5.8**	-0.0
131		5		**8.0**	-0.5	2.8	0.2	1.7	-0.6
		26	0.0	**-13.0**	0.1	3.8	-0.0	-5.2	-0.1

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
		14	1051.4	-7.8	0.0	-0.3	-0.0	**6.2**	-0.0
		4	0.0	-5.8	0.0	2.5	-0.0	**-9.3**	-0.1
133		5	1438.6	**7.4**	0.2	-2.2	0.2	0.1	0.5
		26	0.0	**-15.0**	0.0	6.4	-0.0	**-28.4**	0.0
		5		7.3	0.2	-3.7	0.2	**4.3**	0.3
134			2628.6	**7.4**	0.1	0.4	0.2	-2.3	0.8
		26	0.0	**-14.2**	-0.0	5.8	-0.0	**-19.4**	0.0
		14	2628.6	-8.4	-0.0	1.7	-0.0	**5.8**	-0.0
135		5		**7.6**	-0.5	2.7	0.2	1.2	-0.6
		26	0.0	**-12.9**	0.0	3.9	-0.0	-5.6	-0.0
		14	1051.4	-7.8	0.0	-0.3	-0.0	**6.2**	-0.0
		4	0.0	-5.8	0.0	2.6	-0.0	**-9.6**	-0.0
137		5	1438.6	**7.4**	0.2	-2.2	0.2	0.1	0.5
		26	0.0	**-15.0**	-0.0	6.4	0.0	**-28.4**	-0.0
		5		7.3	0.2	-3.7	0.2	**4.3**	0.3
138			2628.6	**7.4**	0.1	0.4	0.2	-2.3	0.8
		26	0.0	**-14.2**	0.0	5.8	0.0	**-19.4**	-0.0
		14	2628.6	-8.4	0.0	1.7	0.0	**5.8**	0.0
139		5		**7.6**	-0.5	2.7	0.2	1.2	-0.5
		26	0.0	**-12.9**	-0.0	3.9	0.0	-5.6	0.0
		14	1051.4	-7.8	-0.0	-0.3	0.0	**6.2**	0.0
		4	0.0	-5.8	-0.0	2.6	0.0	**-9.6**	0.0
141		5	1438.6	**7.4**	0.2	-2.2	0.2	0.1	0.5
		26	0.0	**-15.0**	-0.0	6.4	0.0	**-27.8**	-0.0
		5		7.3	0.2	-3.7	0.2	**4.3**	0.3
142			2628.6	**7.4**	0.1	0.4	0.2	-2.3	0.8
		26	0.0	**-14.2**	0.1	5.8	0.0	**-18.9**	-0.1
		14	2628.6	-8.4	0.0	1.7	0.0	**5.8**	0.0
143		5		**7.7**	-0.5	2.7	0.2	1.2	-0.5
		26	0.0	**-13.0**	-0.1	3.8	0.0	-5.2	0.1
		14	1051.4	-7.8	-0.0	-0.3	0.0	**6.2**	0.0
		4	0.0	-5.8	-0.0	2.5	0.0	**-9.3**	0.1
145		3	1438.6	**6.6**	-0.0	-2.3	0.0	-2.8	-0.1
		26	0.0	**-17.6**	-0.0	4.0	0.0	**-15.5**	-0.0
		5		6.2	0.2	-4.0	0.2	**5.2**	0.3
146		3	2628.6	**6.7**	0.1	0.8	0.0	-4.9	0.1
		26	0.0	**-16.9**	0.1	3.3	0.0	**-10.1**	-0.1
		14	2628.6	-11.9	0.0	0.7	0.0	**4.8**	0.1
147		3		**6.9**	-0.1	5.0	0.0	0.9	-0.1
		26	0.0	**-15.6**	-0.1	1.3	0.0	-3.1	0.2
		14		-11.7	-0.1	-0.0	0.0	**4.8**	0.1

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
		4		-5.9	-0.1	1.0	0.0	**-6.8**	0.1
149		26		**-11.0**	-0.1	4.4	0.1	**-11.1**	-0.0
		15	479.5	-1.9	-0.0	0.0	0.0	**1.0**	-0.0
150		26	0.0	**-10.7**	0.2	3.9	0.1	-5.1	-0.2
		4	2261.1	-6.2	-0.0	4.3	0.1	**3.6**	0.0
			0.0	-6.2	0.1	3.8	0.1	**-5.5**	-0.1
151		26		**-10.2**	0.0	3.2	0.1	2.9	0.1
		4	367.5	-6.2	-0.0	4.4	0.1	**5.2**	0.0
		14		-4.5	0.0	-1.8	0.0	**-1.8**	0.1
152		26	0.0	**-10.1**	0.0	3.0	0.1	4.1	0.1
		4	0.5	-6.2	-0.0	4.4	0.1	**5.2**	0.0
		14		-4.5	0.0	-1.8	0.0	**-1.8**	0.1
153		3	2628.1	**0.6**	-0.5	0.1	0.1	-0.6	-0.2
		26	0.0	**-8.9**	0.2	-0.9	0.1	3.7	0.1
		4		-4.0	0.2	-2.4	0.1	**4.9**	-0.0
		30		-7.6	-0.5	2.0	0.3	**-1.8**	0.9

Control of the rivets : shear force in foot

Group of member(s) :2,8,11,16,19,24,27,32,35,40,43,48,51,56,59,65
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
40	1	26	0.0	-11.8	-0.0	**14.6**	0.0	-0.0	-0.0
51	2		1305.0	-16.2	-0.0	**-8.7**	0.0	-14.4	-0.0

Control of the rivets : shear force in roof

Group of member(s) :3,12,20,28,36,44,52,60,118,124,128,132,136,140,144,148
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
12	2	26	0.0	-14.6	-0.0	**12.1**	0.0	-14.2	0.0
28		3		7.3	-0.0	**-6.8**	0.0	18.9	0.0

Peak splice : N,V,M

Group of member(s) :7,15,23,31,39,47,55,64,123,127,131,135,139,143,147,153
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
23	1	5	2628.6	**8.0**	0.5	2.8	-0.2	1.7	0.6
15		26		**-11.6**	-0.1	-8.9	0.0	-1.3	-0.1
		22		6.6	0.6	**4.8**	-0.2	5.8	0.6
31		26		-8.0	-0.0	**-9.1**	0.0	3.1	-0.0
15		11		7.0	0.6	4.5	-0.2	**5.9**	0.6
		19		-6.4	-0.1	-6.0	0.0	**-1.8**	-0.1

Eave splice : connection with foot

Group of member(s) :2,8,11,16,19,24,27,32,35,40,43,48,51,56,59,65
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
27	2	3	1305.0	**8.4**	0.0	4.8	0.0	**18.9**	0.0
51		26		**-16.2**	-0.0	**-8.7**	0.0	-14.4	-0.0
40	1		0.0	-11.8	-0.0	**14.6**	0.0	-0.0	-0.0
19	2	14	1305.0	-11.1	0.0	-7.5	-0.0	**-20.2**	0.0

Eave splice : connection with roof

Group of member(s) :3,12,20,28,36,44,52,60,118,124,128,132,136,140,144,148
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
20	2	5	0.0	**7.7**	-0.2	-4.7	-0.2	8.8	-0.1
144		26		**-18.1**	-0.0	4.7	0.0	-20.7	0.0
12				-14.6	-0.0	**12.1**	0.0	-14.2	0.0
28		3		7.3	-0.0	**-6.8**	0.0	18.9	0.0
36				7.3	0.0	-6.8	-0.0	**18.9**	-0.0
132		26		-15.6	0.0	6.9	-0.0	**-36.3**	-0.0

Peak and eave purlin : N

Group of member(s) :1/181
Group of nonlinear combination(s) :1/31
Cross-section : 3 - Alu133/70

memb	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
86	26	5000.0	**6.2**	-0.1	-0.1	0.5	0.0	-0.0
80	30	0.0	**-9.8**	-0.0	0.1	0.0	-0.0	-0.0

Normal purlin : N

Group of member(s) :1/181
Group of nonlinear combination(s):1/31
Cross-section : 4 - Alu60/60/3

memb	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
161	3	0.0	**3.9**	0.0	0.0	0.0	-0.0	-0.0
	30	1500.0	**-3.5**	0.0	-0.0	-0.0	0.1	-0.0

Gable end : upright

Group of member(s) :1/181
Group of nonlinear combination(s):1/31
Cross-section : 6 - Alu133/70

memb	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
88	22	2649.0	**5.9**	-0.0	0.8	-0.0	3.4	-0.1
	26	0.0	**-13.7**	0.6	-2.0	0.0	0.0	0.0
	30	2649.0	0.9	-0.0	1.1	-0.0	**5.0**	-0.0
	24		-3.5	0.2	-1.0	-0.0	**-4.9**	0.6
89	22	1625.5	**6.1**	-0.1	-2.3	-0.0	0.0	-0.1
	26	0.0	**-13.2**	0.1	1.9	-0.0	-3.7	0.3
	30		1.1	-0.0	-2.8	-0.0	**5.0**	0.0
	24		-3.1	-0.0	2.7	-0.0	**-5.0**	0.2
90	4	2649.0	**7.1**	0.7	-0.5	-0.0	-2.4	1.4
	14	0.0	**-4.6**	-0.0	0.0	-0.0	-0.0	-0.0
	30	2649.0	0.6	-0.0	1.1	-0.0	**5.0**	-0.0
	24		2.3	0.2	-0.8	-0.0	**-3.9**	0.6
91	4	1625.5	**7.1**	0.0	1.8	-0.0	-0.0	0.3
	14	0.0	**-4.2**	0.1	0.0	0.0	-0.0	-0.0
	30		0.8	0.0	-2.8	-0.0	**5.0**	-0.0
	24		2.5	-0.0	2.2	-0.0	**-4.0**	0.2
95	22	2649.0	**2.0**	-0.0	0.6	-0.0	2.9	-0.1
	26	0.0	**-13.7**	0.6	2.0	-0.0	-0.0	0.0
	24	2649.0	-3.5	0.2	1.0	0.0	**4.9**	0.6
	13		-4.1	0.0	-0.0	-0.0	**-0.0**	0.0
96	22	1625.5	**2.2**	-0.1	-2.0	-0.0	0.0	-0.1
	26	0.0	**-13.2**	0.1	-1.9	0.0	3.7	0.3
	24		-3.1	-0.0	-2.7	0.0	**5.0**	0.2
	4	1625.5	-9.6	-0.0	-2.3	0.1	**-0.0**	0.4
97		2649.0	**7.1**	0.7	0.5	0.0	2.4	1.4
	14	0.0	**-4.6**	-0.0	-0.0	0.0	0.0	-0.0
	24	2649.0	2.3	0.2	0.8	0.0	**3.9**	0.6

memb	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
	14		-4.4	-0.0	-0.0	0.0	**-0.0**	-0.0
98	4	1625.5	**7.1**	0.0	-1.8	0.0	0.0	0.3
	14	0.0	**-4.2**	0.1	-0.0	-0.0	0.0	-0.0
	24		2.5	-0.0	-2.2	0.0	**4.0**	0.2
	26	1625.5	4.0	0.0	-1.8	0.0	**-0.0**	0.4

Gable end : horizontal

Group of member(s) :1/181
Group of nonlinear combination(s) :1/31
Cross-section : 5 - Alu130/70

memb	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
92	14	500.0	**4.3**	0.1	-0.0	0.0	0.0	-0.0
	3	2500.0	**-2.3**	-0.1	0.1	0.1	**-2.7**	0.1
	6		0.1	0.0	0.1	0.0	**2.4**	0.0
93	14	1000.0	**4.3**	0.1	-0.0	0.0	-0.0	-0.0
	3	2500.0	**-2.1**	-0.1	-0.0	-0.0	**-3.2**	0.0
	6		0.1	-0.0	0.0	0.0	**3.3**	0.0
94	14	4500.0	**4.3**	-0.1	0.0	-0.0	0.0	-0.0
	3	2500.0	**-1.8**	-0.1	0.0	-0.1	**-1.4**	-0.0
	6		0.1	-0.0	-0.1	-0.0	**2.4**	0.0
99	30	0.0	**6.9**	0.1	0.4	0.1	-0.0	-0.1
	3	2500.0	**-2.3**	-0.1	-0.1	-0.1	**2.7**	0.1
	18	0.0	1.8	-0.3	1.4	-0.1	**-0.0**	1.0
100	30	5000.0	**7.0**	-0.1	-0.6	-0.0	-0.0	-0.1
	3	2500.0	**-2.1**	-0.1	0.0	0.0	**3.2**	0.0
	18	0.0	2.0	-0.1	1.4	0.0	**-0.0**	0.3
101	30	5000.0	**6.9**	-0.1	-0.4	-0.1	-0.0	-0.1
	3	2500.0	**-1.8**	-0.1	-0.0	0.1	**1.4**	-0.0
	18	0.0	2.7	-0.3	0.5	0.1	**-0.0**	0.6

Wind bracing cable side

Group of member(s) :102/103,106/107,110/111,114/115
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
114	7	30	5658.7	**5.3**	0.0	0.0	0.0	0.0	0.0

Wind bracing cable roof

Group of member(s) :104/105,108/109,112/113,116/117
Group of nonlinear combination(s) :1/31

memb	cr.nr	non. c.	dx [mm]	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
105	7	26	8405.0	**11.2**	0.0	0.0	0.0	0.0	0.0

Reactions in support(s) - nodal values. Global extreme

Nonlinear calculation, local nonlinearities, II. order
Group of node(s) :1/118
Group of nonlinear combination(s) :1/31

support	node	non. c.	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
5	15	30	**7.7**	-0.0	8.6	0.0	0.0	0.0
10	35	26	**-13.8**	-0.0	12.8	0.0	0.0	0.0
17	57	3	-0.2	**2.6**	0.3	0.0	0.0	0.0
2	5	31	-0.7	**-5.0**	-3.8	0.0	0.0	0.0
13	43	26	2.4	-0.4	**16.2**	0.0	0.0	0.0
		5	-2.2	-4.1	**-8.9**	0.0	0.0	0.0

Foundation table : baseplates at bracings

Group of node(s) :1,5,8,14,43,49/50,56
Group of load case(s) :1,4/12
Foundation table:

Loadcase/Node		1	5	8	14	43	49
Permanent loads							
LC: 1,4,5	Rx [kN]	0.1	-0.1	1.3	-1.3	1.3	-1.3
	Ry [kN]	-0.4	-0.4	0.4	0.4	-0.4	-0.4
	Rz [kN]	1.1	1.1	2.4	2.4	2.4	2.4
Variable loads - exclusive - 6: snow - case 1							
	Rx [kN]	0.3	-0.3	4.2	-4.2	4.2	-4.2
	Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0
	Rz [kN]	1.3	1.3	6.3	6.3	6.3	6.3
Variable loads - exclusive - 7: snow - case 2							
	Rx [kN]	0.3	-0.3	4.4	-4.4	4.4	-4.4
	Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0
	Rz [kN]	1.3	1.4	6.4	6.6	6.4	6.6
Variable loads - exclusive - 8: snow - case 3							
	Rx [kN]	0.1	-0.1	1.0	-1.1	1.0	-1.1
	Ry [kN]	0.0	0.0	0.0	-0.0	-0.0	0.0
	Rz [kN]	0.1	0.5	0.8	2.4	0.8	2.4
Variable loads - exclusive - 9: wind on side - overpr							
	Rx [kN]	-2.5	-1.4	-9.1	1.7	-9.1	1.7
	Ry [kN]	0.6	0.3	0.0	0.0	-0.0	-0.0
	Rz [kN]	-2.9	-0.7	-8.8	-7.5	-8.8	-7.5

Loadcase/Node		1	5	8	14	43	49
Variable loads - exclusive - 10: wind on side - underpr							
	Rx [kN]	-3.3	-2.6	-5.8	-4.8	-5.8	-4.8
	Ry [kN]	0.5	0.1	0.0	0.0	-0.0	-0.0
	Rz [kN]	-0.8	1.6	3.5	0.2	3.5	0.2
Variable loads - exclusive - 11: wind on gable - overpr							
	Rx [kN]	0.7	-0.7	-1.9	1.9	-2.6	2.6
	Ry [kN]	-2.2	-2.2	-2.2	-2.2	-2.2	-2.2
	Rz [kN]	-6.1	-6.1	-5.5	-5.5	-9.8	-9.8
Variable loads - exclusive - 12: wind on gable - underpr							
	Rx [kN]	0.6	-0.6	-0.2	0.2	-0.8	0.8
	Ry [kN]	-2.3	-2.3	-2.2	-2.2	-2.2	-2.2
	Rz [kN]	-5.2	-5.2	-1.0	-1.0	-5.3	-5.3
Extremes							
	Max Rz [kN]	2.4	4.0	12.3	9.3	12.3	9.3
	Min Rz [kN]	-5.0	-5.0	-6.4	-5.1	-7.4	-7.4
	Max Rx [kN]	1.1	-0.1	5.7	0.6	5.7	1.3
	Min Rx [kN]	-3.2	-3.0	-7.8	-10.5	-7.8	-10.5
	Max Ry [kN]	0.2	-0.1	0.4	0.4	-0.4	-0.4
	Min Ry [kN]	-2.7	-2.7	-1.9	-1.9	-2.6	-2.6

Loadcase/Node		50	56
Permanent loads			
LC: 1,4,5	Rx [kN]	0.1	-0.1
	Ry [kN]	0.4	0.4
	Rz [kN]	1.1	1.1
Variable loads - exclusive - 6: snow - case 1			
	Rx [kN]	0.3	-0.3
	Ry [kN]	-0.0	-0.0
	Rz [kN]	1.3	1.3
Variable loads - exclusive - 7: snow - case 2			
	Rx [kN]	0.3	-0.3
	Ry [kN]	-0.0	-0.0
	Rz [kN]	1.3	1.4
Variable loads - exclusive - 8: snow - case 3			
	Rx [kN]	0.1	-0.1
	Ry [kN]	-0.0	-0.0
	Rz [kN]	0.1	0.5
Variable loads - exclusive - 9: wind on side - overpr			
	Rx [kN]	-2.5	-1.4
	Ry [kN]	-0.6	-0.3
	Rz [kN]	-2.9	-0.7
Variable loads - exclusive - 10: wind on side - underpr			
	Rx [kN]	-3.3	-2.6

Loadcase/Node		50	56
	Ry [kN]	-0.5	-0.1
	Rz [kN]	-0.8	1.6
Variable loads - exclusive - 11: wind on gable - overpr			
	Rx [kN]	0.3	-0.3
	Ry [kN]	-2.2	-2.2
	Rz [kN]	1.4	1.4
Variable loads - exclusive - 12: wind on gable - underpr			
	Rx [kN]	0.2	-0.2
	Ry [kN]	-2.0	-2.0
	Rz [kN]	2.3	2.3
Extremes			
	Max Rz [kN]	4.7	4.8
	Min Rz [kN]	-1.8	0.4
	Max Rx [kN]	0.7	-0.1
	Min Rx [kN]	-3.2	-3.0
	Max Ry [kN]	0.4	0.4
	Min Ry [kN]	-1.8	-1.8

Foundation table : baseplates at side

Group of node(s) :15,21/22,28/29,35/36,42
Group of load case(s) :1,4/12
Foundation table:

Loadcase/Node		15	21	22	28	29	35
Permanent loads							
LC: 1,4,5	Rx [kN]	1.3	-1.3	1.3	-1.3	1.3	-1.3
	Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0
	Rz [kN]	2.4	2.4	2.4	2.4	2.4	2.4
Variable loads - exclusive - 6: snow - case 1							
	Rx [kN]	4.2	-4.2	4.2	-4.2	4.2	-4.2
	Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0
	Rz [kN]	6.3	6.3	6.3	6.3	6.3	6.3
Variable loads - exclusive - 7: snow - case 2							
	Rx [kN]	4.4	-4.4	4.4	-4.4	4.4	-4.4
	Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0
	Rz [kN]	6.4	6.7	6.4	6.7	6.4	6.7
Variable loads - exclusive - 8: snow - case 3							
	Rx [kN]	1.1	-1.1	1.1	-1.1	1.1	-1.1
	Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0
	Rz [kN]	0.8	2.4	0.8	2.4	0.8	2.4
Variable loads - exclusive - 9: wind on side - overpr							
	Rx [kN]	-9.0	1.4	-9.0	1.4	-9.0	1.4
	Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0
	Rz [kN]	-8.4	-7.2	-8.4	-7.2	-8.4	-7.2
Variable loads - exclusive - 10: wind on side - underpr							

Loadcase/Node		15	21	22	28	29	35
	Rx [kN]	-5.8	-5.3	-5.8	-5.3	-5.8	-5.3
	Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0
	Rz [kN]	3.4	0.7	3.4	0.7	3.4	0.7
Variable loads - exclusive - 11: wind on gable - overpr							
	Rx [kN]	-1.6	1.6	-2.3	2.3	-2.3	2.3
	Ry [kN]	0.3	0.3	0.3	0.3	0.3	0.3
	Rz [kN]	-6.9	-6.9	-6.9	-6.9	-6.9	-6.9
Variable loads - exclusive - 12: wind on gable - underpr							
	Rx [kN]	0.2	-0.2	-0.5	0.5	-0.5	0.5
	Ry [kN]	0.3	0.3	0.3	0.3	0.3	0.3
	Rz [kN]	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4
Extremes							
	Max Rz [kN]	12.2	9.7	12.2	9.7	12.2	9.7
	Min Rz [kN]	-6.0	-4.8	-6.0	-4.8	-6.0	-4.8
	Max Rx [kN]	5.9	0.3	5.7	1.0	5.7	1.0
	Min Rx [kN]	-7.7	-11.0	-7.7	-11.0	-7.7	-11.0
	Max Ry [kN]	0.3	0.3	0.3	0.3	0.3	0.3
	Min Ry [kN]	0.0	0.0	0.0	0.0	-0.0	-0.0

Loadcase/Node		36	42
Permanent loads			
LC: 1,4,5	Rx [kN]	1.3	-1.3
	Ry [kN]	-0.0	-0.0
	Rz [kN]	2.4	2.4
Variable loads - exclusive - 6: snow - case 1			
	Rx [kN]	4.2	-4.2
	Ry [kN]	-0.0	-0.0
	Rz [kN]	6.3	6.3
Variable loads - exclusive - 7: snow - case 2			
	Rx [kN]	4.4	-4.4
	Ry [kN]	-0.0	-0.0
	Rz [kN]	6.4	6.7
Variable loads - exclusive - 8: snow - case 3			
	Rx [kN]	1.1	-1.1
	Ry [kN]	-0.0	-0.0
	Rz [kN]	0.8	2.4
Variable loads - exclusive - 9: wind on side - overpr			
	Rx [kN]	-9.0	1.4
	Ry [kN]	-0.0	-0.0
	Rz [kN]	-8.4	-7.2
Variable loads - exclusive - 10: wind on side - underpr			
	Rx [kN]	-5.8	-5.3
	Ry [kN]	-0.0	-0.0

Loadcase/Node		36	42
	Rz [kN]	3.4	0.7
Variable loads - exclusive - 11: wind on gable - overpr			
	Rx [kN]	-2.3	2.3
	Ry [kN]	0.3	0.3
	Rz [kN]	-6.9	-6.9
Variable loads - exclusive - 12: wind on gable - underpr			
	Rx [kN]	-0.5	0.5
	Ry [kN]	0.3	0.3
	Rz [kN]	-2.4	-2.4
Extremes			
	Max Rz [kN]	12.2	9.7
	Min Rz [kN]	-6.0	-4.8
	Max Rx [kN]	5.7	1.0
	Min Rx [kN]	-7.7	-11.0
	Max Ry [kN]	0.3	0.3
	Min Ry [kN]	-0.0	-0.0