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YACHT GARAGE	**CALCULATION REPORT TEMPORARY STRUCTURE "CNPF"**	
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Page	Rev-1	Rev-2	Rev-3	Rev-4
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6	X			
7	X			
8	X			
9	X			
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26	X			
27	X			
28	X			
29	X			
30	X			
31	X			
32	X			
33	X			
34	X			
35	X			

Page	Rev-1	Rev-2	Rev-3	Rev-4
36	X			
37	X			
38	X			
39	X			
40	X			
41	X			
42	X			
43	X			
44	X			
45	X			
46	X			
47	X			
48	X			
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53	X			
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57	X			
58	X			
59	X			
60	X			
61	X			
62				
63				
64				
65				
66				
67				
68				
69				

INDEX

1 INTRODUCTION

The aim of this document is to show the structural design and calculation of the temporary structure shown in Figure 1, owned by CNPF in Port Frejus, France.

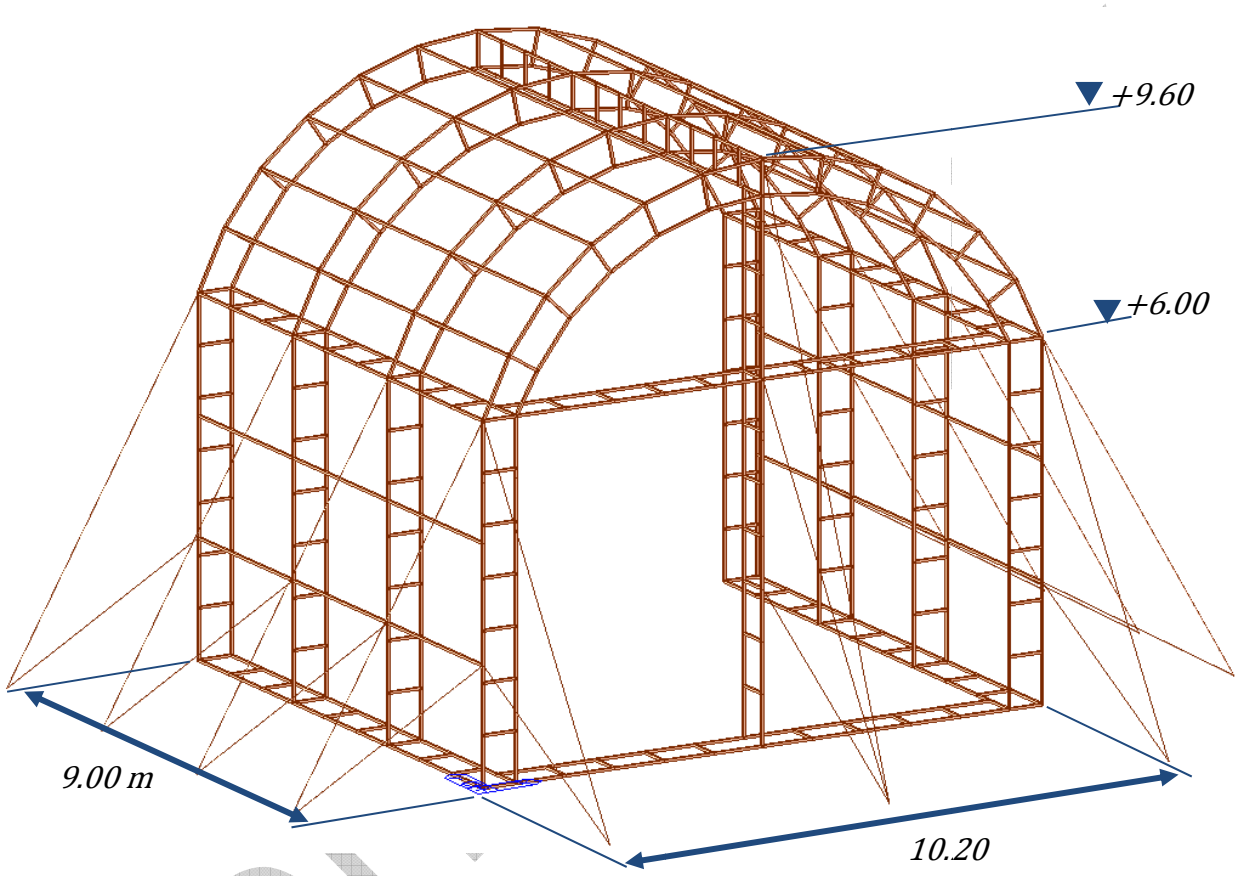


Figure 1-1 3D Model of the Temporary structure

The steel structure is installed and used as boats storage. It consists of trussed elements that will be hot galvanized. The roof has a segmental arch shape with a total height at the center of 9.60m. The overall plan dimensions , shown in Figure 1, are 9m x 10.2m and the lateral walls have an height of 6m. The base columns are equipped with rubber wheels that are blocked once the structure is erected. The anchor points of the Spiral strands have a distance from the structure of 3,50m. The Spiral strands are then connected at the elevation of +2.00m and +6.00m. Only the central ropes of the front side consist of three spiral strands at the elevation of +2.57m, +6.00m and +9.60m.

For a safe use of the structure it must be respected the "general prescriptions" described in §2 of this document.

2 REREFENCE CODES

The reference codes for structural calculation are Eurocodes. They are a set of harmonized technical rules developed by the European Committee for Standardisation for the structural design of construction works in the European Union.

The following Eurocodes are used:

- EN 13782:2005 Temporary structures - Tents - Safety
- EN 1990:2004 Eurocode: Basis of structural design.
- EN 1991-1-1:2004 Eurocode 1: Actions on structures - Part 1-1: Densities, self-weight, imposed loads for buildings.
- EN 1991-1-3:2004 Eurocode 1: Actions on structures – Part 1-3: General actions - Snow loads
- EN 1991-1-4:2004 Eurocode 1: Actions on structures – Part 1-4: General actions - Wind actions
- EN 1993-1-1: Eurocode 3: Design of steel structures - General rules and rules for buildings.
- EN 1993-1-2: Eurocode 3: Design of steel structures - General rules - Structural fire design.
- EN 1993-1-8: Eurocode 3: Design of steel structures - Design of joints.

3 GENERAL PRESCRIPTION

The following technical prescriptions have to be followed in order to safely use the structure:

1. The structure must always be fixed at the ground through tension components.

2. In case of snow accumulation on the load bearing structure, it is important to proceed with the removal of the same by mechanical devices, by heating of the surfaces or any suitable devices for the removal.

3.1 Use and Operation

According to EN 13782: 2004 Temporary structures - Tents – Safety, the following prescriptions have to be respected.

3.1.1 Periodic thorough examination

Each tent should be examined prior to the end of a period given in the tent book.

The period between two thorough examinations should be done according to local regulation but should not be longer than 3 years.

In general the examination should be carried out on the erected tent. Exceptionally there can be the possibility to check the tent being dismantled.

Mainly the following checks should be performed:

- correct erection;
- check of the structure, especially of modified, repaired or exchanged parts;
- identification of damages, tearing and corrosion;
- check of safety devices (if appropriate);
- fulfilment of conditions from previous examinations.

3.1.2 Installation examination

3.1.2.1 General

Tents should be subjected to an installation examination after each new installation, carried out by competent experts.

3.1.2.2 Extent of installation examination

The following procedure should be performed:

- observance of the conditions imposed by the tent book and their fulfilment;

- correct packing and anchoring according to the plans with respect to the local ground conditions;
- checking of anchorage;
- conformity with the construction documents, existence of all essential load-bearing components inclusive of bracing comparison of forms and cross-sections of load-carrying components. Attention is to be paid to the correct incorporation, staircases, platforms, linings, decorations and similar equipment;
- suitability of the site of tent;
- state of conservation of the essential load-bearing construction parts (random check on site);
- fastening.

3.1.3 Heating and cooking systems

Electrical heating system can be installed in tents.

Other heating system should be put outside at a sufficient distance.

The warm-air generators should be with heat exchangers.

To prepare meals and drinks tents can be equipped with fireplaces in kitchens, these areas should be separated. The heating system should comply with the relevant EN standards or, in absence, with the agreement by parts.

3.1.4 Electrical fittings

The electrical fittings should comply with the relevant EN standards or, in absence, with the agreement by parts.

3.1.5 Fire extinguishers

Types and numbers of extinguishers should be in accordance with EN 3.

4 BURNING BEHAVIOUR

The following is the identification of national standards about the burning behaviour of textile fabrics (for the covering of temporary structures).

4.1 European Standards

EN 1101:1996, Textiles and textile products — Burning behaviour — Curtains and drapes — Detailed procedure to determine the ignitability of vertically oriented specimens (small flame)

EN 1102:1995, Textiles and textile products — Burning behaviour — Curtains and drapes — Detailed procedure to determine the flame spread of vertically oriented specimens

EN 1624:1999, Textiles and textile products — Burning behaviour of industrial and technical textiles - Procedure to determine the flame spread of vertically oriented specimens

EN 1625:1999, Textiles and textile products — Burning behaviour of industrial and technical textiles — Procedure to determine the ignitability of vertically oriented specimens

EN 1363-1, Fire resistance tests — Part 1: General requirements

EN 1363-2, Fire resistance tests — Part 2: Alternative and additional procedures

EN 1364-1, Fire resistance tests for non-loadbearing elements — Part 1: Walls

EN 1364-2, Fire resistance tests for non-loadbearing elements — Part 2: Ceilings

EN 1365-1, Fire resistance tests for loadbearing elements — Part 1: Walls

EN 1365-2, Fire resistance tests for loadbearing elements — Part 2: Floors and roofs

EN 1365-3, Fire resistance tests for loadbearing elements — Part 3: Beams

EN 1365-4, Fire resistance tests for loadbearing elements — Part 4: Columns

EN 1365-5, Fire resistance tests for loadbearing elements — Part 5: Balconies and walkways

EN 1365-6, Fire resistance tests for loadbearing elements — Part 6: Stairs

EN 13501-1, Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests

EN 13501-2, Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services

4.2 National Standards – FRANCE

NF P 92-507:2004, Safety against fire — Building — Interior fitting materials — Classification according to their reaction to fire

NF P 92-503:1995, Safety against fire — Building materials — Reaction to fire tests — Electrical burner test used for flexible materials

FD G 07-180:1985, Textiles — Fire behaviour — Data for choosing standardized methods of test to be used

NF G 07-182:1985, Textiles — Fire behaviour — Measurement of flame spread properties of 45 degrees oriented

specimens - Determination of flame spread rate

NF G 07-184:1985, Textiles — Behaviour in fire — Classification method based on the surface destroyed

5 MATERIALS

The following are the main materials used.

5.1 Structual steel

All structural elements are steel Q345. The following table shows the mechanical characteristic of the material.

Steel Q345			
Yielding strength	f_{yk}	*345*	*N/mm²*
Tensile strength	f_{tk}	*500*	*N/mm²*
Young Modulus	E	*210000*	*N/mm²*
Poisson coefficient	v	*0.3*	
Thermal expansion coefficient	α	*1.20E-05*	
Mass density	ρ	*7850*	*kg/m³*

The section used for all elements of the temporary structure is a 40x40x2,5 mm square hollow section shown in the following picture extracted from the FEM software.

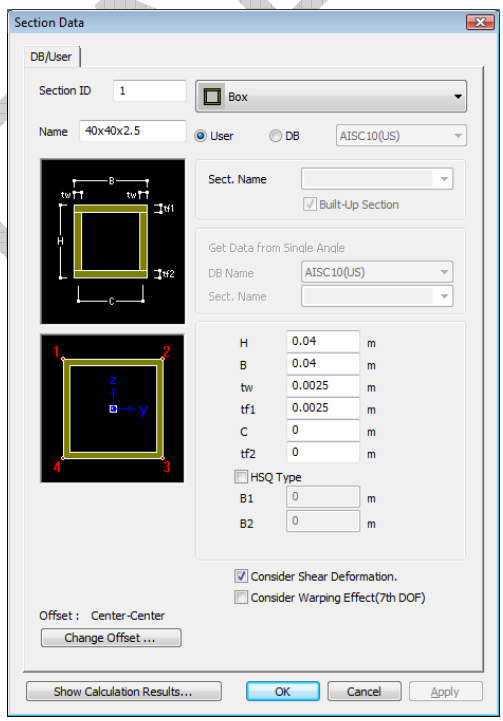


Figure 5-1 Section 40x40x2,5mm

5.2 Bolts

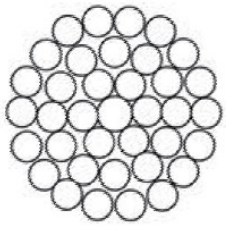
Bolts and nuts are according to EN ISO 898-1 and EN ISO 898-2. Bolts are Class 8.8 and nuts are Class 8.

Bolt Class 8.8			
Yielding strength	f_{yb}	*640*	*N/mm²*
Tensile strength	f_{tb}	*800*	*N/mm²*

5.3 Tension Elements

Tension elements, used as restraint for the horizontal movement of the load bearing structure are spiral strands with a diameter of 12 mm and a minimum breaking load in tension of 119 kN.

Funi spiroidali - *Spiral strands*
Formazione secondo EN 12385-10 - *Construction conforming to EN 12385-10*



- Elevata sezione metallica
- Zincatura "Pesante" EN 10264-3 cl "A"
- Lubrificazione interna anti ossidante
- Presirata al 50 % del MBF - su richiesta
- Modulo di elasticità 160 kN/mm2 (dopo prestiratura)
- *Very high metallic area*
- *Heavy galvanizzation EN 10264-3 cl "A"*
- *Special lubrication inside*
- *Pre stretched at 50% of MBF (on request)*
- *Elastic modulus 160 kN/mm2 (after prestetching)*

Diametro Diameter	Formazione Construction	Sezione Section	Peso Weight	Carico di rottura minimo garantito Minimum breaking load guaranteed	
				1570 N/mm²	1770 N/mm²
mm		mm²	Kg	kN	kN
12	1x19	84.1	0.69	119	
13	1x19	98.8	0.82		157
14	1x19	115	0.95	162	
14.5	1x19	123	1.02		196
16	1x19	150	1.24	211	238
18	1x19	189	1.71	268	302
19	1x19	211	1.82		336
22	1x37	282	2.44	390	439
24	1x37	336	2.90	464	526
26	1x37	394	3.56	544	614
30	1x37	524	4.56	725	817
32	1x37	597	5.17	824	930
36	1x61	754	6.88	1040	1170
38	1x61	840	7.37	1160	1310
40	1x61	931	8.50	1290	1450
42	1x91	1020	9.35	1410	1590
44	1x91	1120	9.80	1550	1750
48	1x91	1340	11.60	1850	2080
51	1x91	1510	13.60	2090	2350
54	1x91	1690	15.26	2340	
57	1x91	1890	17.11	2610	
60	1x91	2090	19.03	2890	
64	1x91	2380	21.47	3280	
66	1x91	2530	22.89	3490	

Figure 5-2 Spiral strands according to EN 12385-10.

6 LOADS

In this chapter it is described the determination of the loads acting on the structure.

6.1 Structural Self-Weight

The self-weight is considered directly by the software.

6.2 Non structural load

Non structural load is the self weight of the tent cover showed in the following table

Non structural load		
PVC Tent Cover	*950*	*g/m²*

The EN 13783 in §7.3 reports also that he dead load of dry canvas shall be assumed as being 5 N/m2 for the calculation of the structures in respect of wind pressure from below which is required for the assessment of the safety against overturning and for the sizing of the anchoring; for all other purposes, it shall be assumed as specified in EN standards or, in absence, in agreement by parts.

6.3 Wind Load

According to §6.4.2 of EN 13782:2005, the wind loads shall be based on EN 1991-1-4, assuming that the special nature of the textile covers are taken into account and regarding:

- location;
- duration and period of installation;
- use under supervision of an operator;
- possibilities of protecting and strengthening.

For $v_{ref} \leq 28$ m/s, as in the case of Port Frejus, the wind load is given in the following Table (extracted from §6.4.2.2 of EN 13782) and it may be applied with the distribution shown in Figure 3 and pressure coefficient shown in Figure 4.

Table 1 — Wind loads

height: *h* m	pressure: *q* N/m^2
$h \leq 5$	500
$5 < h \leq 10$	600
$10 < h \leq 15$	660
$15 < h < 20$	710
$20 < h \leq 25$	760

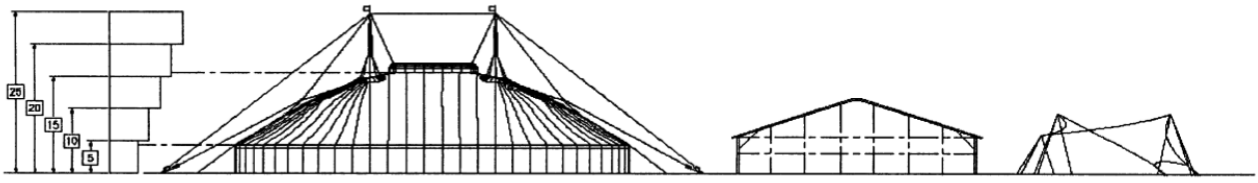


Figure 1 Application of wind load as per EN 13782

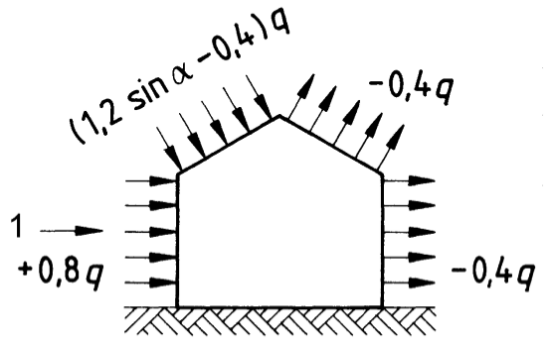


Figure 2 ***Aerodynamic coefficients for structures of conventional shape as per EN 13782***

Since the roof has a cylindrical section, the pressure coefficients shown in Figure 5 are considered for it, as per EN 1991-1-4(2005) considering that f/d is equal to 3,6/10,2 = 0,353.

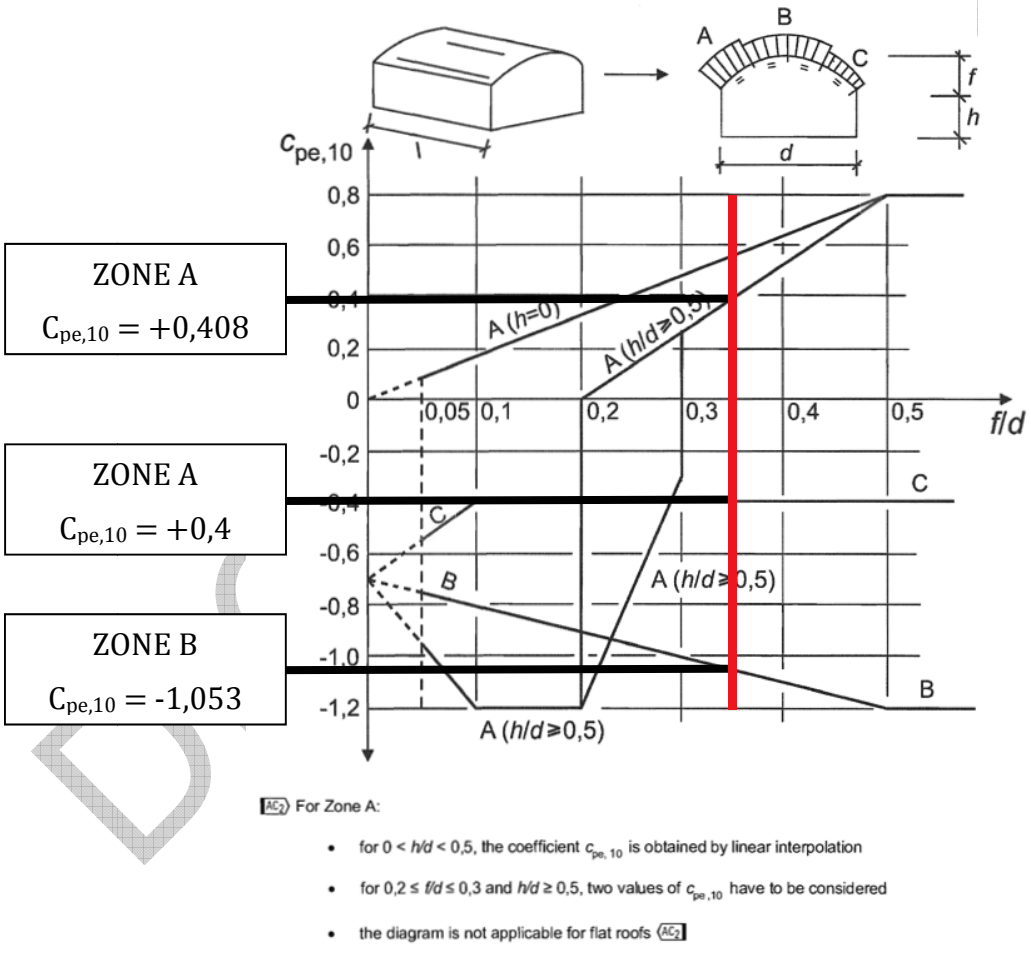


Figure 3 Recommended values of external pressure coefficients as per EN 1991-1-4:2005

The following picture summarizes the pressure coefficient used for the wind load on the load bearing structure.

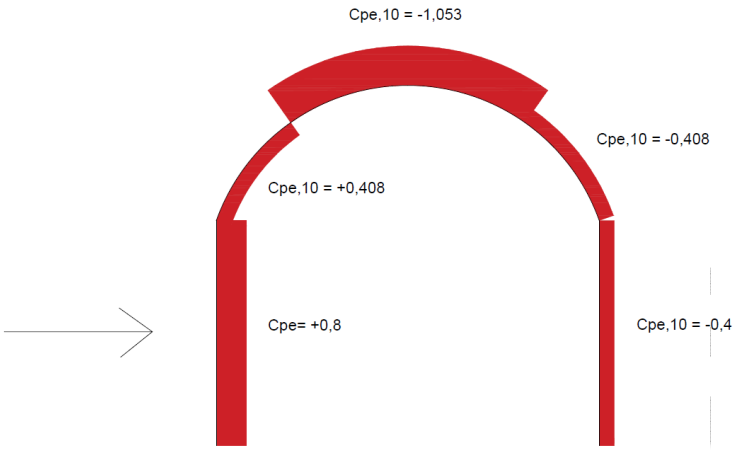


Figure 4 Pressure coeffcients used for the load bearing structure

6.4 Snow Load

As per §6.4.3 of EN 13782:2005, the snow loads need not to be taken into account for tents:

- erected in areas, where there is no likelihood of snow or;
- operated at a time of the year, where the likelihood of snow can be discounted or;
- where by design or operating conditions snow settling on the tent is prevented;
- where pre-planned operation action prevents snow settling on the tent.

This last condition may be achieved by:

- sufficient heating equipment is installed and is ready for use and;
- heating is started prior to snow fall and;
- tent is heated in such a way, that the whole roof cladding has an outside air temperature of more than + 2 °C;
- cladding is made and tensioned in such a way, that pounding of water or any other deformations of the cladding cannot take place.

As said in the "general prescription" chapter, it is not necessary to take into account the snow load.

6.5 Seismic Load

As per §6.5 of EN 13782:005, seismic forces may generally not be considered because of the flexibility and the light weight of the tent.

6.6 Load Cases

6.6.1 Permanent Action G_k

The permanent actions are due to selfweight of the structure and to the non structural element weight constituted by PVC cover.

The self-weight is considered directly by the software.

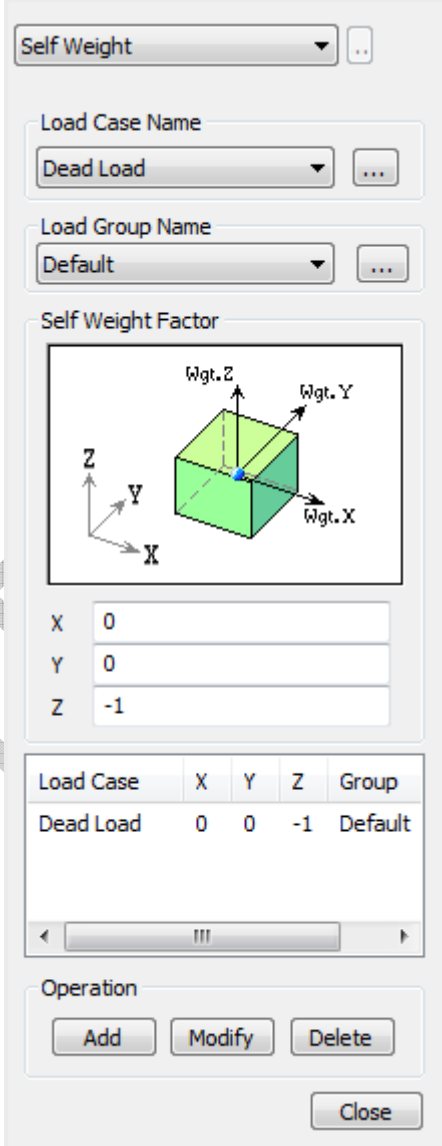


Figure 5 Self weight input

The load due to non structural element (§6.2) is directed in the vertical direction and is applied as floor load. The following picture shows the application of this load to the load bearing structure.

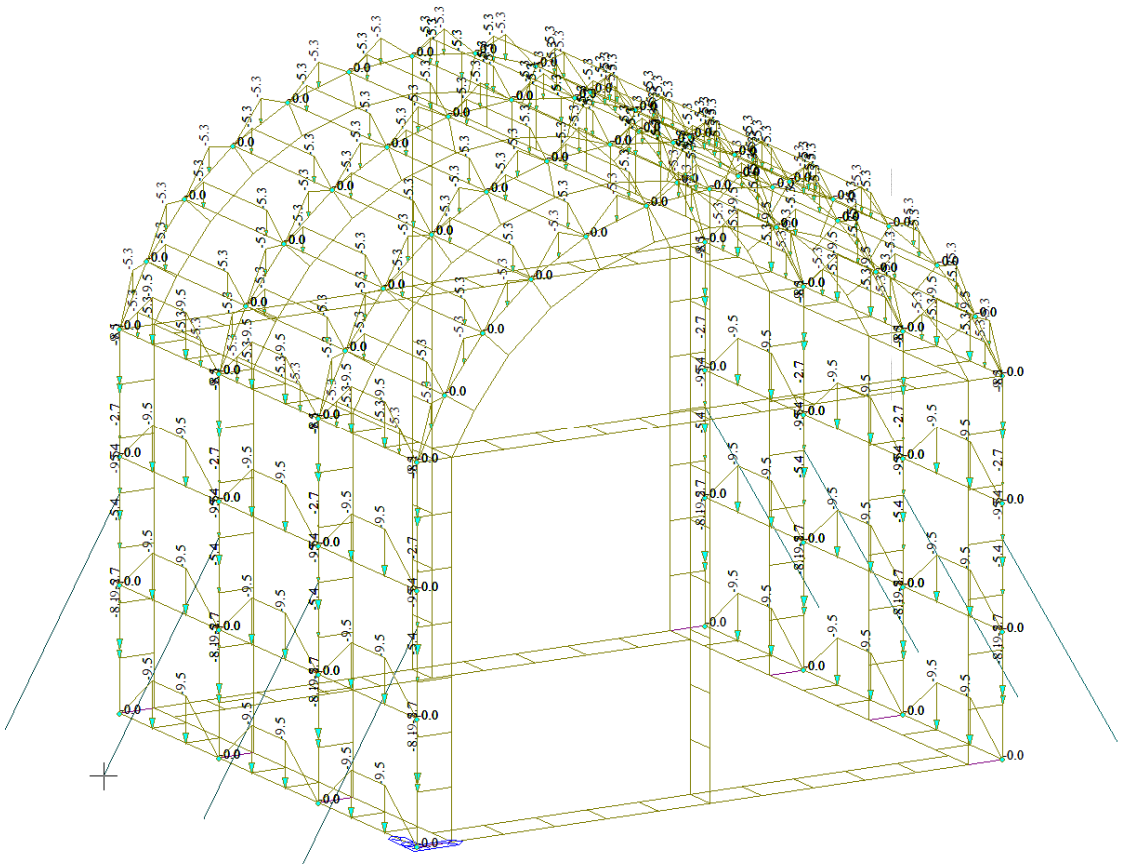


Figure 6-1 Application of load due to non structural element

6.6.2 Variable Action Q_k

The variable action is due to wind load on the load bearing structure.

It is applied on the structure as described in §6.3 it is shown in the following picture.

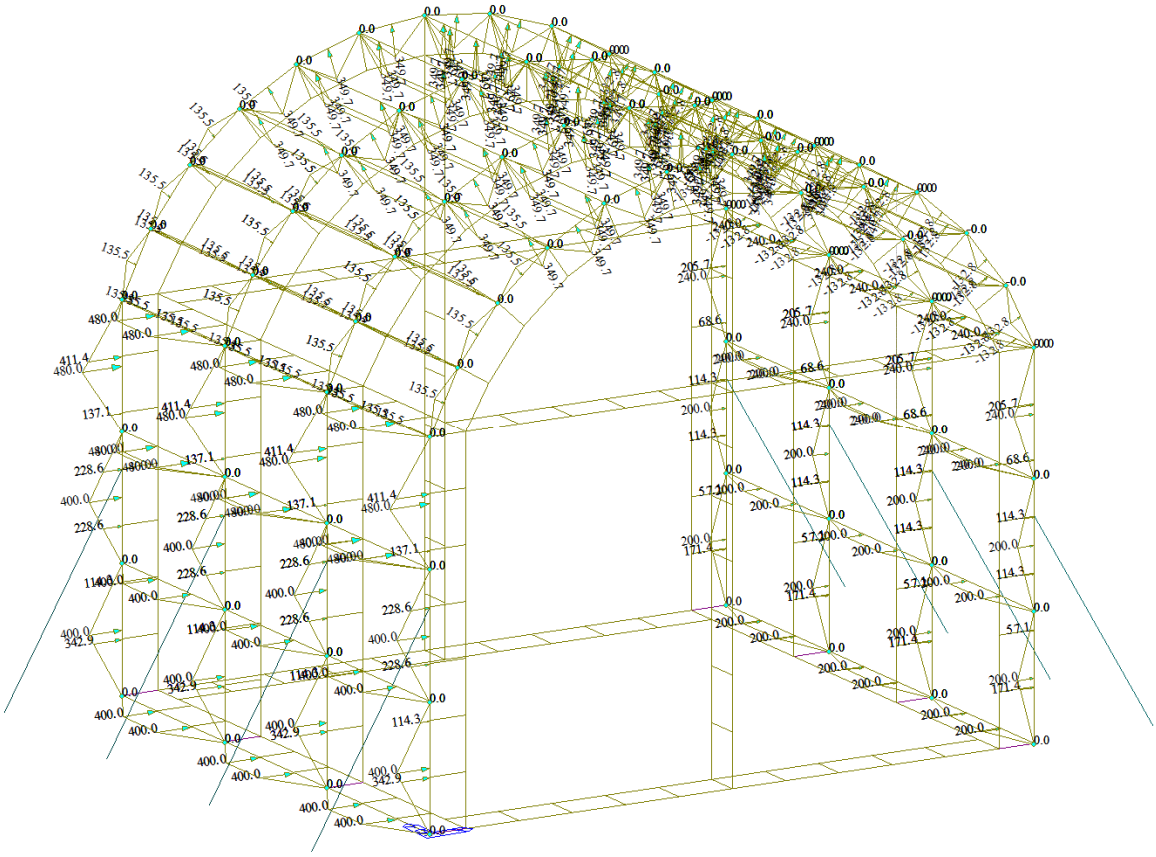


Figure 6-2 Application of Wind Load

6.7 Load Combinations

According to §6.6.2 of EN 13782:2006, the design values of the actions shall be combined in the following way:

$$\gamma_G G_k + \gamma_F Q_{k,1}$$

$$\gamma_G G_k + \sum \gamma_F Q_{k,i}$$

where:

$\gamma_G = 1{,}35$ partial safety factor for unfavourable permanent actions;

$\gamma_G = 1{,}00$ partial safety factor for favourable permanent actions;

$\gamma_F = 1{,}5$ partial safety factor for only one variable actions;

$\gamma_F = 1{,}35$ partial safety factor for more variable actions;

G_k characteristic value of permanent actions;

$Q_{k,i}$ characteristic value of one of the variable actions;

In this case, there is only the wind load as variable action so the following load combinations are considered.

N°	Combination	Name
1	1.35 G_k	ULS - Vertical Load
2	1.35 G_k + 1.5 W_x	ULS - Wind Load 1
3	1.00 G_k + 1.5 W_x	ULS - Wind Load 2
4	1.35 G_k + 1.5 W_y	ULS - Wind Load 3
5	1.00 G_k + 1.5 W_y	ULS - Wind Load 4
6	1.00 G_k + 1.00 W_x	SLS - Wind Load
7	1.00 G_k + 1.00 W_y	SLS - Wind Load
8	1.00 G_k + 1.20 W_x	Stability
9	1.00 G_k + 1.20 W_y	Stability

6.8 Verification philosophy of stability and equilibrium

According to §7.1 of EN 13782:2005, the limit states due to the combinations of actions shall be calculated. It shall be verified that the design value of internal forces or moments does not exceed the corresponding design resistance of the respective part and the ultimate or serviceability limit state is not exceeded.

Design resistance shall be evaluated in accordance with the following equation:

$$R_d = \frac{R_k}{\gamma_M}$$

where

R_d is the design value of material properties

R_k is the characteristic value of material properties

$\gamma_M = 1{,}1$ is the partial safety factor for the material property in static load combination for steel

According to §7.2 of EN13782:2005, it must be also checked the safety against overturning, sliding and lifting. Favourably acting permanent actions shall be taken into account with their lower value only.

Safety factor against overturning, sliding and lifting are taken according to EN13782 and are hereafter shown.

Loading		γ
1	Favourably acting proportions of the dead load	1
2	Unfavourably acting proportions of the dead load	1,1
3	Unfavourably acting wind loads	1,2
4	Unfavourably acting proportions of loads other than the loads listed in items 2 and 3	1,3
NOTE If loads are resolved into components, then these components should be multiplied by the same value of γ.		

Figure 6-3 Safety factor against overturning, sliding and lifting

According to §7.3 of EN13782:2005, the dead load of dry canvas is taken equal to 5 N/m² for the calculation of the structures in respect of wind pressure from below which is required for the assessment of the safety against overturning and for the sizing of the anchoring; for all other purposes, it is taken as described in §6.2 of this document.

7 Results and Structural Check

This chapter first shows the main results of the calculation, then all the relevant structural check are shown.

In the FEM model we considered the load bearing structure pinned at the base as indicated in the following picture. For this reason, once the temporary structure is erected, all movements of the base of the structure must be prevent.

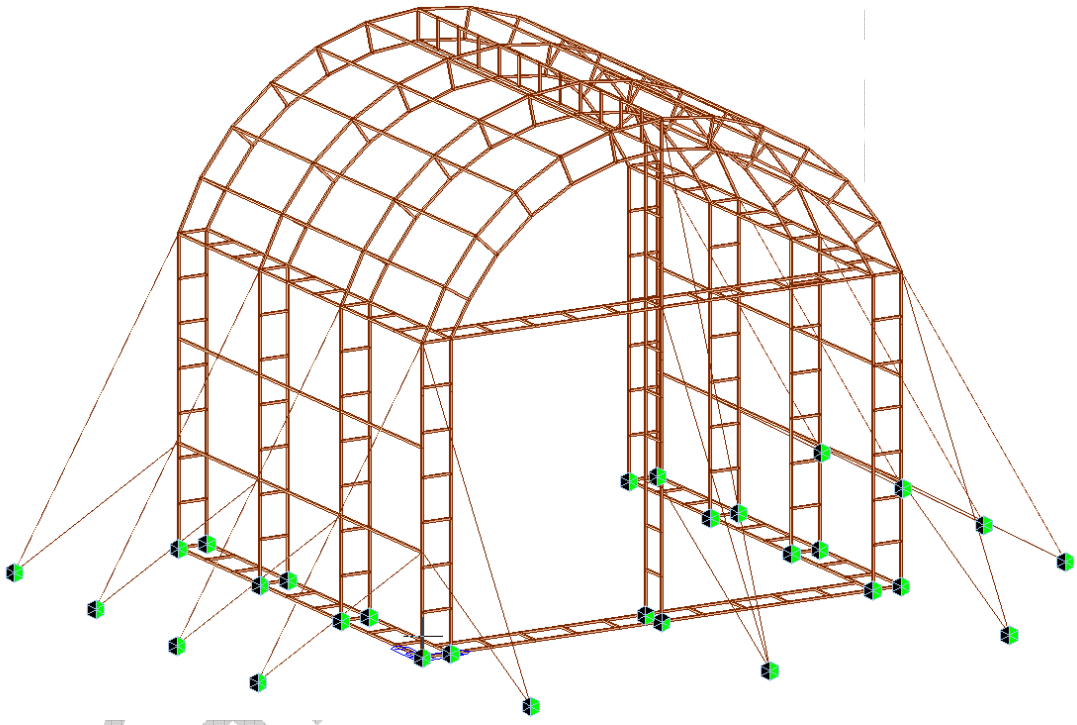


Figure 7-1 FEM Model with boundary condition

The ropes are modeled as Truss elements while elements in 40x40x2,5mm are Beam elements.

Please consider that it has been considered only the tension ropes for the horizontal load considered.

7.1 Main Results

7.1.1 Self Weight

The self weight of the structure is about 1650-1700 kg.

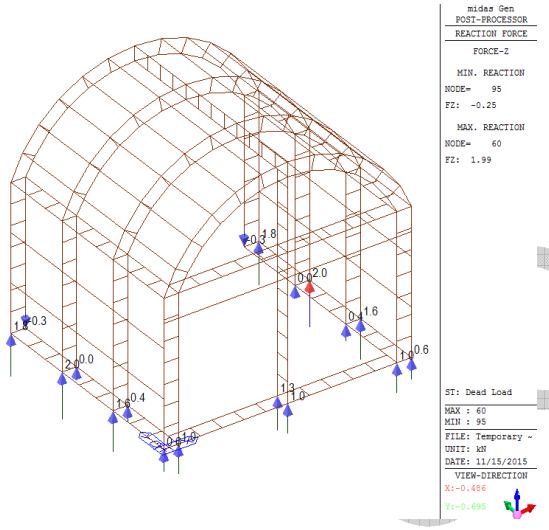


Figure 7-2 Self-Weight Reaction

7.1.2 Tent Cover

The following picture shows the tent cover reaction. The sum of the following reaction is equal to 3kN.

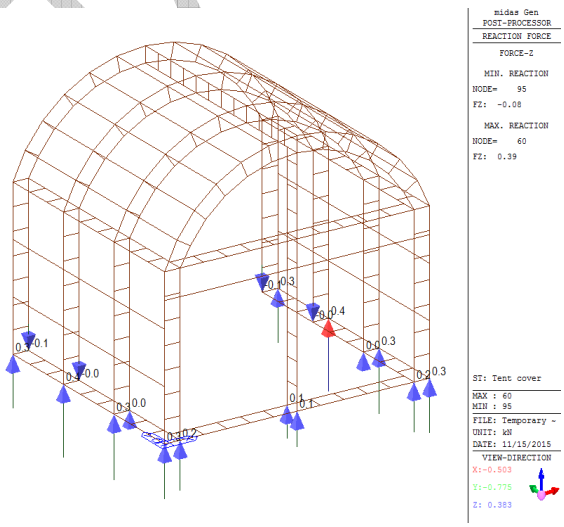


Figure 7-3 Tent Cover Reaction

7.1.3 Wind Load

The following picture shows the base shear due to wind load in +X direction.

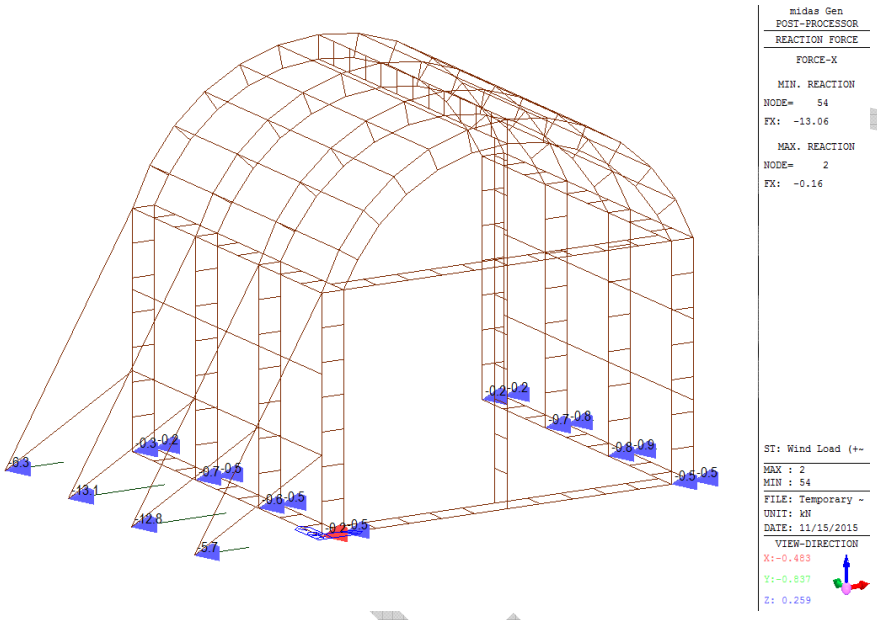


Figure 7-4 Base shear due to wind load in +X

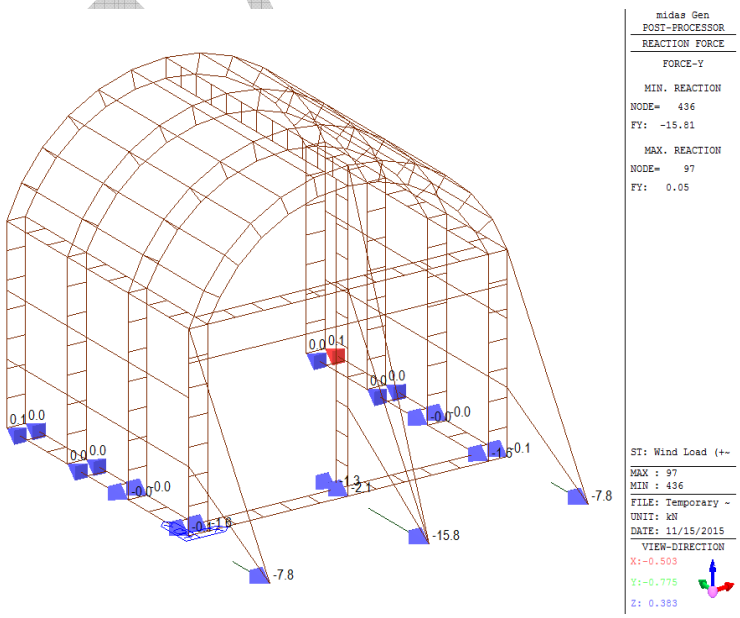


Figure 7-5 Base shear due to wind load in +Y

7.2 Structural Check

7.2.1 SLS Check

The maximum displacement is on the top of the load bearing structure and it is equal to 22mm for wind in +Y direction and 27mm for wind in +Y. Both displacement are less than H/150 = 64mm (recommended limit for single-storey industrial building), so the check is passed.

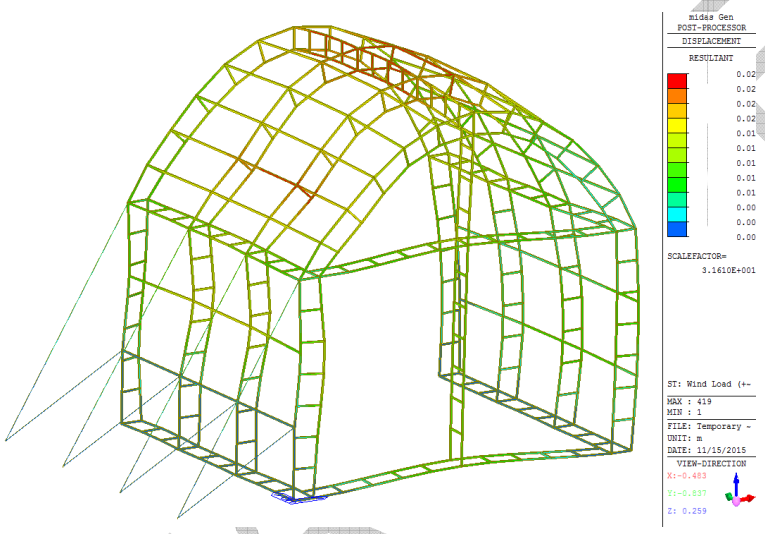


Figure 7-6 SLS Displacement due to wind load in +X

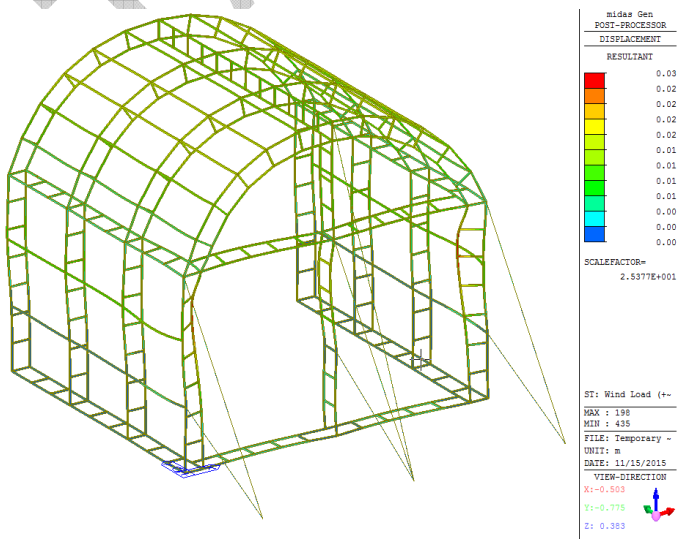


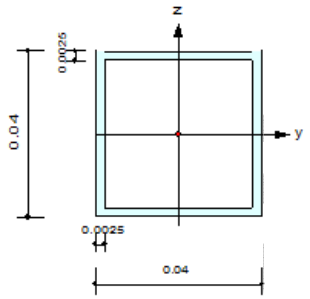
Figure 7-7 SLS Displacement due to wind load in +Y

7.2.2 ULS Check

The following pictures show the checks of the worst section 40x40x2,5 due to ULS with wind in +X and +Y direction. The maximum ratio between internal forces and design strength is equal to 0,937 so the checks are passed.

1. Design Information

Design Code : Eurocode3:05
Unit System : kN, m
Member No : 485
Material : Q345 (No:1)
(Fy = 345000, Es = 210000000)
Section Name : 40x40x2.5 (No:1)
(Built-up Section).
Member Length : 0.78988



Depth	0.04000	Web Thick	0.00250
Flg Width	0.04000	Top F Thick	0.00250
Web Center	0.03750	Bot.F Thick	0.00250
Area	0.00038	Asz	0.00020
Qyb	0.00053	Qzb	0.00053
Iyy	0.00000	Izz	0.00000
Ybar	0.02000	Zbar	0.02000
Wely	0.00000	Welz	0.00000
ry	0.01534	rz	0.01534

2. Member Forces

Axial Force Fxx = 5.17367 (LCB: 2, POS:I)
Bending Moments My = -1.4475, Mz = -0.0324
End Moments Myi = -1.4475, Myj = 1.15783 (for Lb)
Myi = -1.4475, Myj = 1.15783 (for Ly)
Mzi = -0.0324, Mzj = 0.01593 (for Lz)
Shear Forces Fyy = -0.0612 (LCB: 2, POS:I)
Fzz = -3.3135 (LCB: 1, POS:I)

3. Design Parameters

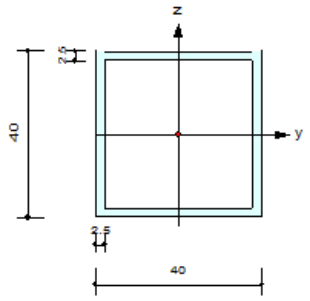
Unbraced Lengths Ly = 0.78988, Lz = 0.78988, Lb = 0.78988
Effective Length Factors Ky = 1.00, Kz = 1.00
Equivalent Uniform Moment Factors Cmy = 1.00, Cmz = 1.00, CmLT = 1.00

4. Checking Results

Slenderness Ratio
KL/r = 195.5 < 200.0 (Memb:197, LCB: 2)..... O.K
Axial Resistance
N_Ed/Nt_Rd = 5.174/117.614 = 0.044 < 1.000 ..... O.K
Bending Resistance
M_Edy/M_Rdy = 1.44751/1.65639 = 0.874 < 1.000 ..... O.K
M_Edz/M_Rdz = 0.03238/1.65639 = 0.020 < 1.000 ..... O.K
Combined Resistance
RNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
Rmax1 = (M_Edy/Mny_Rd)^Alpha + (M_Edz/Mnz_Rd)^Beta
Room = N_Ed/(A*fy/Gamma_M0), Rbend = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[RNRd, Rmax1, (Room+Rbend)] = 0.937 < 1.000 ..... O.K
Shear Resistance
V_Edy/Vy_Rd = 0.002 < 1.000 ..... O.K
V_Edz/Vz_Rd = 0.091 < 1.000 ..... O.K

1. Design Information

Design Code : Eurocode3:05
Unit System : kN, mm
Member No : 348
Material : Q345 (No:1)
(Fy = 0.34500, Es = 210.000)
Section Name : 40x40x2.5 (No:1)
(Built-up Section).
Member Length : 857.143



Depth	40.0000	Web Thick	2.50000
Flg Width	40.0000	Top F Thick	2.50000
Web Center	37.5000	Bot.F Thick	2.50000
Area	375.000	Asz	200.000
Qyb	528.125	Qzb	528.125
Iyy	88281.2	Izz	88281.3
Ybar	20.0000	Zbar	20.0000
Wely	4414.06	Welz	4414.06
ry	15.3433	rz	15.3433

2. Member Forces

Axial Force Fxx = -4.1681 (LCB: 1, POS:J)
Bending Moments My = 1406.93, Mz = -47.029
End Moments Myi = -983.36, Myj = 1406.93 (for Lb)
Myi = -983.36, Myj = 1406.93 (for Ly)
Mzi = 19.3986, Mzj = -47.029 (for Lz)
Shear Forces Fyy = 0.07750 (LCB: 1, POS:I)
Fzz = -2.7887 (LCB: 1, POS:I)

3. Design Parameters

Unbraced Lengths Ly = 857.143, Lz = 857.143, Lb = 857.143
Effective Length Factors Ky = 1.00, Kz = 1.00
Equivalent Uniform Moment Factors Cmy = 0.85, Cmz = 0.85, CmLT = 1.00

4. Checking Results

Slenderness Ratio
KL/r = 195.5 < 200.0 (Memb:291, LCB: 2)..... O.K
Axial Resistance
N_Ed/MIN[Nc_Rd, Nb_Rd] = 4.168/117.614 = 0.035 < 1.000 ..... O.K
Bending Resistance
M_Edy/M_Rdy = 1406.93/1656.39 = 0.849 < 1.000 ..... O.K
M_Edz/M_Rdz = 47.03/1656.39 = 0.028 < 1.000 ..... O.K
Combined Resistance
RNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
Rmax1 = (M_Edy/Mny_Rd)^Alpha + (M_Edz/Mnz_Rd)^Beta
Room = N_Ed/(A*fy/Gamma_M0), Rbend = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc_LT1 = N_Ed/(Xiy*A*fy/Gamma_M1)
Rb_LT1 = (kyy*M_Edy)/(Xi_LT*Wply*fy/Gamma_M1) + (kyz*Msdz)/(Wplz*fy/Gamma_M1)
Rc_LT2 = N_Ed/(Xiz*A*fy/Gamma_M1)
Rb_LT2 = (Kzy*M_Edy)/(Xi_LT*Wply*fy/Gamma_M1) + (Kzz*Msdz)/(Wplz*fy/Gamma_M1)
Rmax = MAX[RNRd, Rmax1, (Room+Rbend), MAX(Rc_LT1+Rb_LT1, Rc_LT2+Rb_LT2)] = 0.913 < 1.000 .. O.K
Shear Resistance
V_Edy/Vy_Rd = 0.002 < 1.000 ..... O.K
V_Edz/Vz_Rd = 0.077 < 1.000 ..... O.K

The maximum value of the tensile force in the cables is equal to 23,55 kN (with wind in +X direction) and it is shown in the following picture.

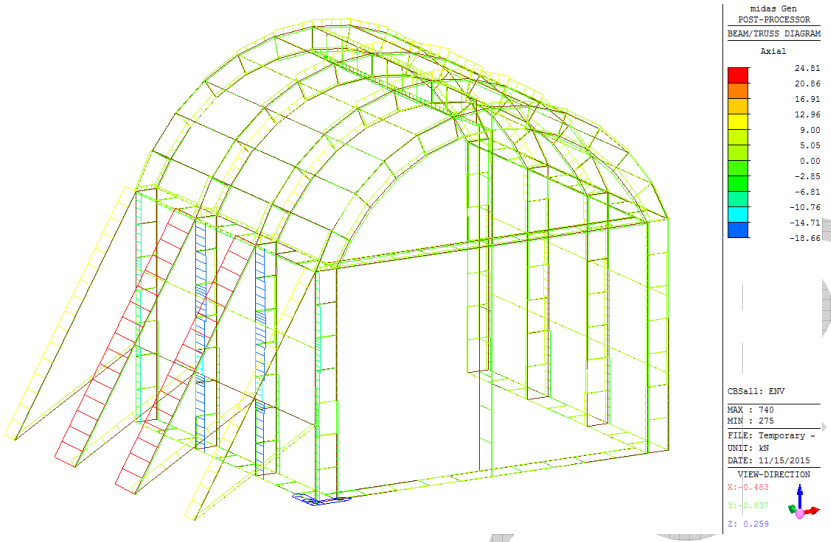


Figure 7-8 Envelope of the Axial force (Wind in +X)

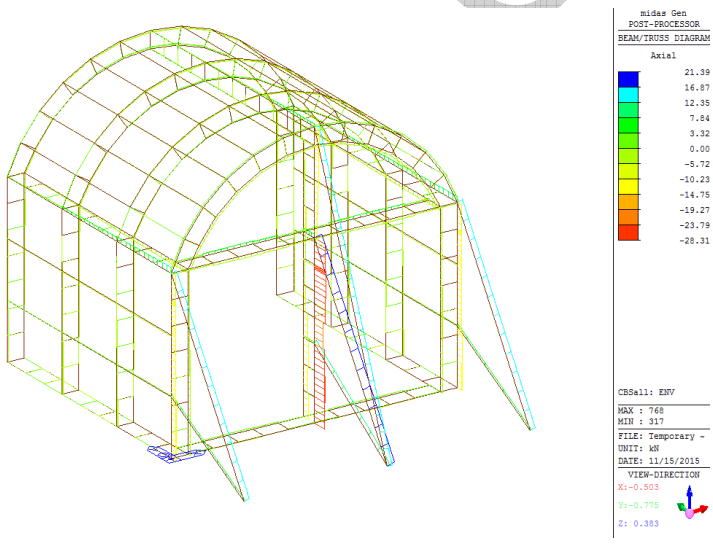


Figure 7-9 Envelope of the Axial force (Wind in+Y)

The following is the check of the ropes according to §9.1.1 of EN 13782:2005:

$$F_{Ed} = 24\ kN \leq R_d = \frac{R_{min}}{\gamma_M} = \frac{119}{2} = 59{,}5\ kN \qquad PASSED$$

where R_{min} is the minimum breaking load certified by the manufacture, and $\gamma_M = 2{,}0$.

7.2.3 Ground Anchorages

The ground anchorages of the load bearing structure of Port-Frejus consist of anchor bolts M20 Class 4.6. The following table shows the check of the anchor bolts, considering a concrete C20/25.

The maximum action on the worst anchor bolt are equal to 23,9 kN for Shear Action and equal to 34,3 kN for Tensile Action.

The minimum required anchorage length of the anchor bolts is 485 mm.

ANCHOR BOLTS DESIGN AND CHECK

Anchor Bolt

Material			Cl. 4.6	
Diameter	ϕ	=	20	mm
Tensile Yield Strength	f_{yk}	=	240	MPa
Tensile Ultimate Strength	f_{tk}	=	400	MPa
Partial safety factor	γ_{M2}	=	1,25	-

Concrete

Class			C20/25	
Characteristic compression strength	f_{ck}	=	20	MPa
Mean value tension strength	f_{ctm}	=	2,21	MPa
Characteristic tension strength	$f_{ctk0,0,5}$	=	1,55	MPa
Partial safety factor	γ_c	=	1,50	-
Bond ultimate strength	f_{bd}	=	2,32	MPa

Action

Maximum Tensile Force	$F_{t,Sd}$	=	34,3	kN
Maximum Shear Force	$F_{V,Sd}$	=	23,9	kN

Check

Tensile Strength Anchor Bolt	$F_{t,Rd}$	=	70,56	kN
Minimum Anchorage Length	$l_{b,min}$	=	484	mm

7.2.4 Overturning, Sliding and Lifting Check

According to §7.2 of EN 13782:2005, the following chapters show the checks against overturning sliding and lifting of the load bearing structure.

The safety factor against overturning sliding and lifting are taken according to §6.8.

7.2.4.1 Overturning Check

Since the spiral strands are provided against wind load, no overturning can occur.

7.2.4.2 Sliding Check

Sliding is prevented through the spiral strands. It is checked that the horizontal load component due to wind load H_k, multiplied by 1,2 according to the above table, is less than the horizontal design value of the anchor $F_{v,Rd}$. The maximum sliding action acting on the worst anchor bolt is equal to 18,8 kN.

$$H_k \cdot \gamma = 18{,}8\ kN \leq F_{v,Rd} = 47{,}0\ kN \qquad PASSED!$$

7.2.4.3 Lifting Check

Lifintg is prevented through the spiral strands. It is checked that the vertical load component due to wind load H_k, multiplied by 1,2 according to the above table, is less than the vertical design value of the anchor $F_{T,Rd}$. The maximum lifting action acting on the worst anchor bolt is equal to 26,7 kN.

$$H_k \cdot \gamma = 26{,}7\ kN \leq F_{T,Rd} = 70{,}6\ kN \qquad PASSED!$$

7.3 Design of Joints

In the following table it is checked the worst combination of actions on the joints. We considered 2M16 Class 8.8 with e_1=30mm and p_1=40mm.

1.1 Geometry Input

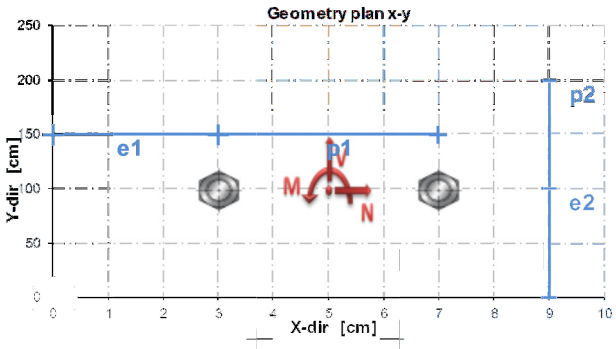
Bolt Material		8.8	
Diameter	M	16	mm
Resistance Section		Threaded	
N° of resistance sections		2	
N° Bolts X- dir	$n_{b,x}$ =	2	
N° Bolts Y- dir	$n_{b,y}$ =	1	
Distance	e_1 =	30	mm
Distance	e_2 =	1000	mm
Distance	p_1 =	40	mm
Distance	p_2 =	1000	mm

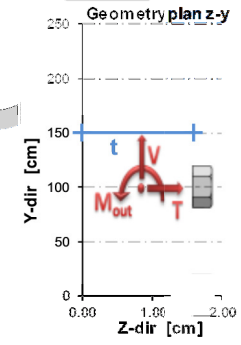
1.2 Force Input

Normal Force	N =	18	kN
Shear Force	V =	4.24	kN
Bending moment	M =	1.4	kNm
Tensile Force	T =	18	kN
Moment out of plan	M_{out} =	0	kNm

1.3 Plate Input

Steel thickness	t =	16	mm





2. Bolt Check

Bolts Number	n_b =	2		
Bolt yeld strenght	f_{yb} =	640	N/mm²	
Bolt ultimate strenght	f_{tb} =	800	N/mm²	
Shear resistance section	Area =	157	mm²	
Safety Factor	γ_{M2} =	1.25		
Max Shear Force	$F_{v,Ed}$ =	19.10	kN	
MaxTensileForce	$F_{t,Ed}$ =	9.00	kN	
Shear Resistance	$F_{v,Rd}$ =	60.29	kN	
Tensile Resistance	$F_{t,Rd}$ =	115.78	kN	

Shear ratio	0.317							
Tensile ratio	0.078							
Shear-tensile check:	$\frac{F_{V,Ed}}{F_{V,Rd}} + \frac{F_{t,Ed}}{1,4\,F_{t,Rd}}$ =	0.3168	+	0.0555	=	0.3723	≤ 1	PASSED
Tensile check:	$\frac{F_{t,Ed}}{F_{t,Rd}}$ =	0.0777	≤ 1					PASSED

8 Load Bearing Structure Picture

In what follows, a picture of the load bearing structure is shown.

Figure 8-1 Envelope of the Axial force (Wind in+Y)

9 Calculation Report

< Control Data >

*** CONTROL DATA

Panel Zone Effect : Do not Calculate
Unit System : KN, MM
Definition of Frame
- X Direction of Frame : Unbraced I Sway
- Y Direction of Frame : Unbraced I Sway
- Design Type : 3-D

Design Code
- Steel : Eurocode3:05
- Concrete : Eurocode2:04
- SRC : SSRC79

< Static Loadcase >

*** LOAD CASE DATA

NO	NAME	TYPE	SELF WEIGHT FACTOR X	Y	Z	DESCRIPTION
1	Dead Load	D	0.000	0.000	-1.000	
2	Wind Load (+X)	W	0.000	0.000	0.000	
3	Live Load	L	0.000	0.000	0.000	
4	Tent cover	D	0.000	0.000	0.000	
5	Wind Load (+Y)	W	0.000	0.000	0.000	

< Node >

*** NODE DATA

NO	X	Y	Z	TEMPERATURE
2	0	0	0	0
4	600	0	0	0
5	1500	0	0	0
6	2400	0	0	0
7	3300	0	0	0
8	4200	0	0	0
9	5100	0	0	0
10	6000	0	0	0

11	6900	0	0	0
12	7800	0	0	0
13	8700	0	0	0
14	9600	0	0	0
16	1.02e+004	0	0	0
19	600	600	0	0
20	1500	600	0	0
21	2400	600	0	0
22	3300	600	0	0
23	4200	600	0	0
24	5100	600	0	0
25	6000	600	0	0
26	6900	600	0	0
27	7800	600	0	0
28	8700	600	0	0
29	9600	600	0	0
30	0	1000	0	0
31	600	1000	0	0
32	9600	1000	0	0
33	1.02e+004	1000	0	0
34	0	2000	0	0
35	600	2000	0	0
36	9600	2000	0	0
37	1.02e+004	2000	0	0
39	0	3000	0	0
41	600	3000	0	0
42	9600	3000	0	0
44	1.02e+004	3000	0	0
46	0	4000	0	0
47	600	4000	0	0
48	9600	4000	0	0
49	1.02e+004	4000	0	0
50	0	5000	0	0
51	600	5000	0	0
52	9600	5000	0	0
53	1.02e+004	5000	0	0
55	0	6000	0	0
57	600	6000	0	0
58	9600	6000	0	0
60	1.02e+004	6000	0	0
62	0	7000	0	0

63	600	7000	0	0
64	9600	7000	0	0
65	1.02e+004	7000	0	0
66	0	8000	0	0
67	600	8000	0	0
68	9600	8000	0	0
69	1.02e+004	8000	0	0
83	0	9000	0	0
85	600	9000	0	0
95	9600	9000	0	0
97	1.02e+004	9000	0	0
99	0	0	857.1	0
100	600	0	857.1	0
101	5100	0	857.1	0
102	9600	0	857.1	0
103	1.02e+004	0	857.1	0
104	5100	600	857.1	0
105	0	3000	857.1	0
106	600	3000	857.1	0
107	9600	3000	857.1	0
108	1.02e+004	3000	857.1	0
109	0	6000	857.1	0
110	600	6000	857.1	0
111	9600	6000	857.1	0
112	1.02e+004	6000	857.1	0
114	0	9000	857.1	0
115	600	9000	857.1	0
117	9600	9000	857.1	0
118	1.02e+004	9000	857.1	0
119	0	0	1714	0
120	600	0	1714	0
121	5100	0	1714	0
122	9600	0	1714	0
123	1.02e+004	0	1714	0
124	5100	600	1714	0
125	0	3000	1714	0
126	600	3000	1714	0
127	9600	3000	1714	0
128	1.02e+004	3000	1714	0
129	0	6000	1714	0
130	600	6000	1714	0

131	9600	6000	1714	0
132	1.02e+004	6000	1714	0
134	0	9000	1714	0
135	600	9000	1714	0
137	9600	9000	1714	0
138	1.02e+004	9000	1714	0
139	0	0	2000	0
140	1.02e+004	0	2000	0
141	0	3000	2000	0
142	1.02e+004	3000	2000	0
143	0	6000	2000	0
144	1.02e+004	6000	2000	0
145	0	9000	2000	0
146	1.02e+004	9000	2000	0
147	0	0	2571	0
148	600	0	2571	0
149	5100	0	2571	0
150	9600	0	2571	0
151	1.02e+004	0	2571	0
152	5100	600	2571	0
153	0	3000	2571	0
154	600	3000	2571	0
155	9600	3000	2571	0
156	1.02e+004	3000	2571	0
157	0	6000	2571	0
158	600	6000	2571	0
159	9600	6000	2571	0
160	1.02e+004	6000	2571	0
162	0	9000	2571	0
163	600	9000	2571	0
165	9600	9000	2571	0
166	1.02e+004	9000	2571	0
167	0	0	3429	0
168	600	0	3429	0
169	5100	0	3429	0
170	9600	0	3429	0
171	1.02e+004	0	3429	0
172	5100	600	3429	0
173	0	3000	3429	0
174	600	3000	3429	0
175	9600	3000	3429	0

176	1.02e+004	3000	3429	0
177	0	6000	3429	0
178	600	6000	3429	0
179	9600	6000	3429	0
180	1.02e+004	6000	3429	0
182	0	9000	3429	0
183	600	9000	3429	0
185	9600	9000	3429	0
186	1.02e+004	9000	3429	0
187	0	0	4000	0
188	1.02e+004	0	4000	0
189	0	3000	4000	0
190	1.02e+004	3000	4000	0
191	0	6000	4000	0
192	1.02e+004	6000	4000	0
193	0	9000	4000	0
194	1.02e+004	9000	4000	0
195	0	0	4286	0
196	600	0	4286	0
197	5100	0	4286	0
198	9600	0	4286	0
199	1.02e+004	0	4286	0
200	5100	600	4286	0
201	0	3000	4286	0
202	600	3000	4286	0
203	9600	3000	4286	0
204	1.02e+004	3000	4286	0
205	0	6000	4286	0
206	600	6000	4286	0
207	9600	6000	4286	0
208	1.02e+004	6000	4286	0
210	0	9000	4286	0
211	600	9000	4286	0
213	9600	9000	4286	0
214	1.02e+004	9000	4286	0
215	0	0	5143	0
216	600	0	5143	0
217	5100	0	5143	0
218	9600	0	5143	0
219	1.02e+004	0	5143	0
220	5100	600	5143	0

221	0	3000	5143	0
222	600	3000	5143	0
223	9600	3000	5143	0
224	1.02e+004	3000	5143	0
225	0	6000	5143	0
226	600	6000	5143	0
227	9600	6000	5143	0
228	1.02e+004	6000	5143	0
230	0	9000	5143	0
231	600	9000	5143	0
233	9600	9000	5143	0
234	1.02e+004	9000	5143	0
235	0	0	6000	0
236	600	0	6000	0
237	1500	0	6000	0
238	2400	0	6000	0
239	3300	0	6000	0
240	4200	0	6000	0
241	5100	0	6000	0
242	6000	0	6000	0
243	6900	0	6000	0
244	7800	0	6000	0
245	8700	0	6000	0
246	9600	0	6000	0
247	1.02e+004	0	6000	0
248	600	600	6000	0
249	1500	600	6000	0
250	2400	600	6000	0
251	3300	600	6000	0
252	4200	600	6000	0
253	5100	600	6000	0
254	6000	600	6000	0
255	6900	600	6000	0
256	7800	600	6000	0
257	8700	600	6000	0
258	9600	600	6000	0
259	0	1000	6000	0
260	600	1000	6000	0
261	9600	1000	6000	0
262	1.02e+004	1000	6000	0
263	0	2000	6000	0

264	600	2000	6000	0
265	9600	2000	6000	0
266	1.02e+004	2000	6000	0
267	0	3000	6000	0
268	600	3000	6000	0
269	9600	3000	6000	0
270	1.02e+004	3000	6000	0
271	0	4000	6000	0
272	600	4000	6000	0
273	9600	4000	6000	0
274	1.02e+004	4000	6000	0
275	0	5000	6000	0
276	600	5000	6000	0
277	9600	5000	6000	0
278	1.02e+004	5000	6000	0
279	0	6000	6000	0
280	600	6000	6000	0
281	9600	6000	6000	0
282	1.02e+004	6000	6000	0
283	0	7000	6000	0
284	600	7000	6000	0
285	9600	7000	6000	0
286	1.02e+004	7000	6000	0
287	0	8000	6000	0
288	600	8000	6000	0
289	9600	8000	6000	0
290	1.02e+004	8000	6000	0
291	600	8400	6000	0
301	9600	8400	6000	0
302	0	9000	6000	0
303	600	9000	6000	0
313	9600	9000	6000	0
314	1.02e+004	9000	6000	0
315	988.1	0	6688	0
316	9212	0	6688	0
317	988.1	3000	6688	0
318	9212	3000	6688	0
319	988.1	6000	6688	0
320	9212	6000	6688	0
321	988.1	9000	6688	0
322	9212	9000	6688	0

323	5100	0	6857	0
324	5100	600	6857	0
327	475.4	0	7000	0
328	9725	0	7000	0
329	475.4	3000	7000	0
330	9725	3000	7000	0
331	475.4	6000	7000	0
332	9725	6000	7000	0
333	475.4	9000	7000	0
334	9725	9000	7000	0
335	1583	0	7472	0
336	8617	0	7472	0
337	1583	3000	7472	0
338	8617	3000	7472	0
339	1583	6000	7472	0
340	8617	6000	7472	0
341	1583	9000	7472	0
342	8617	9000	7472	0
343	5100	0	7714	0
344	5100	600	7714	0
347	1144	0	7882	0
348	9056	0	7882	0
349	1144	3000	7882	0
350	9056	3000	7882	0
351	1144	6000	7882	0
352	9056	6000	7882	0
353	1144	9000	7882	0
354	9056	9000	7882	0
355	2325	0	8119	0
356	7875	0	8119	0
357	2325	3000	8119	0
358	7875	3000	8119	0
359	2325	6000	8119	0
360	7875	6000	8119	0
361	2325	9000	8119	0
362	7875	9000	8119	0
363	5100	0	8571	0
364	5100	600	8571	0
367	3183	0	8602	0
368	7017	0	8602	0
369	3183	3000	8602	0

370	7017	3000	8602	0
371	3183	6000	8602	0
372	7017	6000	8602	0
373	3183	9000	8602	0
374	7017	9000	8602	0
375	1979	0	8609	0
376	8221	0	8609	0
377	1979	3000	8609	0
378	8221	3000	8609	0
379	1979	6000	8609	0
380	8221	6000	8609	0
381	1979	9000	8609	0
382	8221	9000	8609	0
383	4121	0	8899	0
384	6079	0	8899	0
385	4121	3000	8899	0
386	6079	3000	8899	0
387	4121	6000	8899	0
388	6079	6000	8899	0
389	4121	9000	8899	0
390	6079	9000	8899	0
391	5100	0	9000	0
392	5100	600	9000	0
393	5100	750	9000	0
394	5100	1500	9000	0
395	5100	2250	9000	0
396	5100	3000	9000	0
397	5100	3750	9000	0
398	5100	4500	9000	0
399	5100	5250	9000	0
400	5100	6000	9000	0
401	5100	6750	9000	0
402	5100	7500	9000	0
403	5100	8250	9000	0
404	5100	8400	9000	0
405	5100	9000	9000	0
406	2944	0	9152	0
407	7256	0	9152	0
408	2944	3000	9152	0
409	7256	3000	9152	0
410	2944	6000	9152	0

411	7256	6000	9152	0
412	2944	9000	9152	0
413	7256	9000	9152	0
414	3999	0	9487	0
415	6201	0	9487	0
416	3999	3000	9487	0
417	6201	3000	9487	0
418	3999	6000	9487	0
419	6201	6000	9487	0
420	3999	9000	9487	0
421	6201	9000	9487	0
422	5100	0	9600	0
423	5100	750	9600	0
424	5100	1500	9600	0
425	5100	2250	9600	0
426	5100	3000	9600	0
427	5100	3750	9600	0
428	5100	4500	9600	0
429	5100	5250	9600	0
430	5100	6000	9600	0
431	5100	6750	9600	0
432	5100	7500	9600	0
433	5100	8250	9600	0
434	5100	9000	9600	0
435	0	-4000	0	0
436	5100	-4000	0	0
437	1.02e+004	-4000	0	0
439	5100	0	4000	0
441	0	0	5000	0
442	600	0	5000	0
443	5100	0	5000	0
444	1.02e+004	0	5000	0
445	9600	0	5000	0
446	-3500	0	0	0
447	-3500	3000	0	0
448	-3500	6000	0	0
449	-3500	9000	0	0
450	1.37e+004	9000	0	0
451	1.37e+004	6000	0	0
452	1.37e+004	3000	0	0
453	1.37e+004	0	0	0

< Boundary >

** SUPPORT / SPECIFIED DISPLACEMENT

NODE	SUPPORT	SPECIFIED DISPLACEMENT					
	DDDRRR	Dx	Dy	Dz	Rx	Ry	Rz
2	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	011000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
16	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24	011000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
39	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
41	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
42	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
44	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
55	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
57	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
58	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
60	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
83	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
85	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
95	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
97	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
435	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
436	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
437	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
446	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
447	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
448	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
449	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
450	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
451	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
452	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
453	111000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

< Beam >

*** BEAM MEMBER DATA

NO	NODAL CONNECTIVITY	BEAM END RELEASE	MATERIAL	SECTION	LENGTH

	I	J	I	J			
1	2	4	–	–	Q345	40x40x2.5	600
3	5	4	–	–	Q345	40x40x2.5	900
4	6	5	–	–	Q345	40x40x2.5	900
5	7	6	–	–	Q345	40x40x2.5	900
6	8	7	–	–	Q345	40x40x2.5	900
7	9	8	–	–	Q345	40x40x2.5	900
8	9	10	–	–	Q345	40x40x2.5	900
9	10	11	–	–	Q345	40x40x2.5	900
10	11	12	–	–	Q345	40x40x2.5	900
11	12	13	–	–	Q345	40x40x2.5	900
12	13	14	–	–	Q345	40x40x2.5	900
13	16	14	–	–	Q345	40x40x2.5	600
16	4	19	–	–	Q345	40x40x2.5	600
17	5	20	–	–	Q345	40x40x2.5	600
18	6	21	–	–	Q345	40x40x2.5	600
19	7	22	–	–	Q345	40x40x2.5	600
20	8	23	–	–	Q345	40x40x2.5	600
21	10	25	–	–	Q345	40x40x2.5	600
22	11	26	–	–	Q345	40x40x2.5	600
23	12	27	–	–	Q345	40x40x2.5	600
24	13	28	–	–	Q345	40x40x2.5	600
25	14	29	–	–	Q345	40x40x2.5	600
27	2	30	–	–	Q345	40x40x2.5	1000
28	16	33	–	–	Q345	40x40x2.5	1000
29	20	19	–	–	Q345	40x40x2.5	900
30	21	20	–	–	Q345	40x40x2.5	900
31	22	21	–	–	Q345	40x40x2.5	900
32	23	22	–	–	Q345	40x40x2.5	900
33	24	23	–	–	Q345	40x40x2.5	900
34	24	25	–	–	Q345	40x40x2.5	900
35	25	26	–	–	Q345	40x40x2.5	900
36	26	27	–	–	Q345	40x40x2.5	900
37	27	28	–	–	Q345	40x40x2.5	900
38	28	29	–	–	Q345	40x40x2.5	900
39	19	31	–	–	Q345	40x40x2.5	400
40	29	32	–	–	Q345	40x40x2.5	400
41	30	31	–	–	Q345	40x40x2.5	600
42	33	32	–	–	Q345	40x40x2.5	600
43	30	34	–	–	Q345	40x40x2.5	1000

44	31	35	–	–	Q345	40x40x2.5	1000
45	32	36	–	–	Q345	40x40x2.5	1000
46	33	37	–	–	Q345	40x40x2.5	1000
47	34	35	–	–	Q345	40x40x2.5	600
48	37	36	–	–	Q345	40x40x2.5	600
49	34	39	–	–	Q345	40x40x2.5	1000
50	35	41	–	–	Q345	40x40x2.5	1000
51	36	42	–	–	Q345	40x40x2.5	1000
52	37	44	–	–	Q345	40x40x2.5	1000
53	39	41	–	–	Q345	40x40x2.5	600
55	44	42	–	–	Q345	40x40x2.5	600
57	39	46	–	–	Q345	40x40x2.5	1000
58	41	47	–	–	Q345	40x40x2.5	1000
59	42	48	–	–	Q345	40x40x2.5	1000
60	44	49	–	–	Q345	40x40x2.5	1000
61	46	47	–	–	Q345	40x40x2.5	600
62	49	48	–	–	Q345	40x40x2.5	600
63	46	50	–	–	Q345	40x40x2.5	1000
64	47	51	–	–	Q345	40x40x2.5	1000
65	48	52	–	–	Q345	40x40x2.5	1000
66	49	53	–	–	Q345	40x40x2.5	1000
67	50	51	–	–	Q345	40x40x2.5	600
68	53	52	–	–	Q345	40x40x2.5	600
69	50	55	–	–	Q345	40x40x2.5	1000
70	51	57	–	–	Q345	40x40x2.5	1000
71	52	58	–	–	Q345	40x40x2.5	1000
72	53	60	–	–	Q345	40x40x2.5	1000
73	55	57	–	–	Q345	40x40x2.5	600
75	60	58	–	–	Q345	40x40x2.5	600
77	55	62	–	–	Q345	40x40x2.5	1000
78	57	63	–	–	Q345	40x40x2.5	1000
79	58	64	–	–	Q345	40x40x2.5	1000
80	60	65	–	–	Q345	40x40x2.5	1000
81	62	63	–	–	Q345	40x40x2.5	600
82	65	64	–	–	Q345	40x40x2.5	600
83	62	66	–	–	Q345	40x40x2.5	1000
84	63	67	–	–	Q345	40x40x2.5	1000
85	64	68	–	–	Q345	40x40x2.5	1000
86	65	69	–	–	Q345	40x40x2.5	1000
87	66	67	–	–	Q345	40x40x2.5	600
88	69	68	–	–	Q345	40x40x2.5	600

89	67	85	–	–	Q345	40x40x2.5	1000
90	68	95	–	–	Q345	40x40x2.5	1000
101	66	83	–	–	Q345	40x40x2.5	1000
102	69	97	–	–	Q345	40x40x2.5	1000
115	83	85	–	–	Q345	40x40x2.5	600
127	97	95	–	–	Q345	40x40x2.5	600
129	2	99	–	–	Q345	40x40x2.5	857.1
130	4	100	–	–	Q345	40x40x2.5	857.1
131	9	101	–	–	Q345	40x40x2.5	857.1
132	14	102	–	–	Q345	40x40x2.5	857.1
133	16	103	–	–	Q345	40x40x2.5	857.1
134	24	104	–	–	Q345	40x40x2.5	857.1
135	39	105	–	–	Q345	40x40x2.5	857.1
136	41	106	–	–	Q345	40x40x2.5	857.1
137	42	107	–	–	Q345	40x40x2.5	857.1
138	44	108	–	–	Q345	40x40x2.5	857.1
139	55	109	–	–	Q345	40x40x2.5	857.1
140	57	110	–	–	Q345	40x40x2.5	857.1
141	58	111	–	–	Q345	40x40x2.5	857.1
142	60	112	–	–	Q345	40x40x2.5	857.1
144	83	114	–	–	Q345	40x40x2.5	857.1
145	85	115	–	–	Q345	40x40x2.5	857.1
147	95	117	–	–	Q345	40x40x2.5	857.1
148	97	118	–	–	Q345	40x40x2.5	857.1
149	99	100	–	–	Q345	40x40x2.5	600
150	103	102	–	–	Q345	40x40x2.5	600
151	101	104	–	–	Q345	40x40x2.5	600
152	105	106	–	–	Q345	40x40x2.5	600
153	108	107	–	–	Q345	40x40x2.5	600
154	109	110	–	–	Q345	40x40x2.5	600
155	112	111	–	–	Q345	40x40x2.5	600
157	114	115	–	–	Q345	40x40x2.5	600
158	118	117	–	–	Q345	40x40x2.5	600
159	99	119	–	–	Q345	40x40x2.5	857.1
160	100	120	–	–	Q345	40x40x2.5	857.1
161	101	121	–	–	Q345	40x40x2.5	857.1
162	102	122	–	–	Q345	40x40x2.5	857.1
163	103	123	–	–	Q345	40x40x2.5	857.1
164	104	124	–	–	Q345	40x40x2.5	857.1
165	105	125	–	–	Q345	40x40x2.5	857.1
166	106	126	–	–	Q345	40x40x2.5	857.1

167	107	127	–	–	Q345	40x40x2.5	857.1
168	108	128	–	–	Q345	40x40x2.5	857.1
169	109	129	–	–	Q345	40x40x2.5	857.1
170	110	130	–	–	Q345	40x40x2.5	857.1
171	111	131	–	–	Q345	40x40x2.5	857.1
172	112	132	–	–	Q345	40x40x2.5	857.1
174	114	134	–	–	Q345	40x40x2.5	857.1
175	115	135	–	–	Q345	40x40x2.5	857.1
177	117	137	–	–	Q345	40x40x2.5	857.1
178	118	138	–	–	Q345	40x40x2.5	857.1
179	119	120	–	–	Q345	40x40x2.5	600
180	123	122	–	–	Q345	40x40x2.5	600
181	121	124	–	–	Q345	40x40x2.5	600
182	125	126	–	–	Q345	40x40x2.5	600
183	128	127	–	–	Q345	40x40x2.5	600
184	129	130	–	–	Q345	40x40x2.5	600
185	132	131	–	–	Q345	40x40x2.5	600
187	134	135	–	–	Q345	40x40x2.5	600
188	138	137	–	–	Q345	40x40x2.5	600
189	119	139	–	–	Q345	40x40x2.5	285.7
190	123	140	–	–	Q345	40x40x2.5	285.7
191	125	141	–	–	Q345	40x40x2.5	285.7
192	128	142	–	–	Q345	40x40x2.5	285.7
193	129	143	–	–	Q345	40x40x2.5	285.7
194	132	144	–	–	Q345	40x40x2.5	285.7
195	134	145	–	–	Q345	40x40x2.5	285.7
196	138	146	–	–	Q345	40x40x2.5	285.7
197	139	141	–	–	Q345	40x40x2.5	3000
198	140	142	–	–	Q345	40x40x2.5	3000
199	141	143	–	–	Q345	40x40x2.5	3000
200	142	144	–	–	Q345	40x40x2.5	3000
201	143	145	–	–	Q345	40x40x2.5	3000
202	144	146	–	–	Q345	40x40x2.5	3000
203	120	148	–	–	Q345	40x40x2.5	857.1
204	121	149	–	–	Q345	40x40x2.5	857.1
205	122	150	–	–	Q345	40x40x2.5	857.1
206	124	152	–	–	Q345	40x40x2.5	857.1
207	126	154	–	–	Q345	40x40x2.5	857.1
208	127	155	–	–	Q345	40x40x2.5	857.1
209	130	158	–	–	Q345	40x40x2.5	857.1
210	131	159	–	–	Q345	40x40x2.5	857.1

212	135	163	–	–	Q345	40x40x2.5	857.1
214	137	165	–	–	Q345	40x40x2.5	857.1
215	139	147	–	–	Q345	40x40x2.5	571.4
216	140	151	–	–	Q345	40x40x2.5	571.4
217	141	153	–	–	Q345	40x40x2.5	571.4
218	142	156	–	–	Q345	40x40x2.5	571.4
219	143	157	–	–	Q345	40x40x2.5	571.4
220	144	160	–	–	Q345	40x40x2.5	571.4
221	145	162	–	–	Q345	40x40x2.5	571.4
222	146	166	–	–	Q345	40x40x2.5	571.4
223	147	148	–	–	Q345	40x40x2.5	600
224	151	150	–	–	Q345	40x40x2.5	600
225	149	152	–	–	Q345	40x40x2.5	600
226	153	154	–	–	Q345	40x40x2.5	600
227	156	155	–	–	Q345	40x40x2.5	600
228	157	158	–	–	Q345	40x40x2.5	600
229	160	159	–	–	Q345	40x40x2.5	600
231	162	163	–	–	Q345	40x40x2.5	600
232	166	165	–	–	Q345	40x40x2.5	600
234	147	167	–	–	Q345	40x40x2.5	857.1
235	148	168	–	–	Q345	40x40x2.5	857.1
236	149	169	–	–	Q345	40x40x2.5	857.1
237	150	170	–	–	Q345	40x40x2.5	857.1
238	151	171	–	–	Q345	40x40x2.5	857.1
240	152	172	–	–	Q345	40x40x2.5	857.1
242	153	173	–	–	Q345	40x40x2.5	857.1
243	154	174	–	–	Q345	40x40x2.5	857.1
244	155	175	–	–	Q345	40x40x2.5	857.1
245	156	176	–	–	Q345	40x40x2.5	857.1
248	157	177	–	–	Q345	40x40x2.5	857.1
249	158	178	–	–	Q345	40x40x2.5	857.1
250	159	179	–	–	Q345	40x40x2.5	857.1
251	160	180	–	–	Q345	40x40x2.5	857.1
255	162	182	–	–	Q345	40x40x2.5	857.1
256	163	183	–	–	Q345	40x40x2.5	857.1
258	165	185	–	–	Q345	40x40x2.5	857.1
259	166	186	–	–	Q345	40x40x2.5	857.1
261	167	168	–	–	Q345	40x40x2.5	600
262	171	170	–	–	Q345	40x40x2.5	600
263	169	172	–	–	Q345	40x40x2.5	600
264	173	174	–	–	Q345	40x40x2.5	600

265	176	175	–	–	Q345	40x40x2.5	600
266	177	178	–	–	Q345	40x40x2.5	600
267	180	179	–	–	Q345	40x40x2.5	600
269	182	183	–	–	Q345	40x40x2.5	600
270	186	185	–	–	Q345	40x40x2.5	600
271	167	187	–	–	Q345	40x40x2.5	571.4
272	171	188	–	–	Q345	40x40x2.5	571.4
273	173	189	–	–	Q345	40x40x2.5	571.4
274	176	190	–	–	Q345	40x40x2.5	571.4
275	177	191	–	–	Q345	40x40x2.5	571.4
276	180	192	–	–	Q345	40x40x2.5	571.4
277	182	193	–	–	Q345	40x40x2.5	571.4
278	186	194	–	–	Q345	40x40x2.5	571.4
279	168	196	–	–	Q345	40x40x2.5	857.1
280	169	197	–	–	Q345	40x40x2.5	857.1
281	170	198	–	–	Q345	40x40x2.5	857.1
282	172	200	–	–	Q345	40x40x2.5	857.1
283	174	202	–	–	Q345	40x40x2.5	857.1
284	175	203	–	–	Q345	40x40x2.5	857.1
285	178	206	–	–	Q345	40x40x2.5	857.1
286	179	207	–	–	Q345	40x40x2.5	857.1
288	183	211	–	–	Q345	40x40x2.5	857.1
290	185	213	–	–	Q345	40x40x2.5	857.1
291	187	189	–	–	Q345	40x40x2.5	3000
292	188	190	–	–	Q345	40x40x2.5	3000
293	189	191	–	–	Q345	40x40x2.5	3000
294	190	192	–	–	Q345	40x40x2.5	3000
295	191	193	–	–	Q345	40x40x2.5	3000
296	192	194	–	–	Q345	40x40x2.5	3000
297	187	195	–	–	Q345	40x40x2.5	285.7
298	188	199	–	–	Q345	40x40x2.5	285.7
299	189	201	–	–	Q345	40x40x2.5	285.7
300	190	204	–	–	Q345	40x40x2.5	285.7
301	191	205	–	–	Q345	40x40x2.5	285.7
302	192	208	–	–	Q345	40x40x2.5	285.7
303	193	210	–	–	Q345	40x40x2.5	285.7
304	194	214	–	–	Q345	40x40x2.5	285.7
305	195	196	–	–	Q345	40x40x2.5	600
306	199	198	–	–	Q345	40x40x2.5	600
307	197	200	–	–	Q345	40x40x2.5	600
308	201	202	–	–	Q345	40x40x2.5	600

309	204	203	–	–	Q345	40x40x2.5	600
310	205	206	–	–	Q345	40x40x2.5	600
311	208	207	–	–	Q345	40x40x2.5	600
313	210	211	–	–	Q345	40x40x2.5	600
314	214	213	–	–	Q345	40x40x2.5	600
315	195	441	–	–	Q345	40x40x2.5	714.3
316	196	442	–	–	Q345	40x40x2.5	714.3
317	197	443	–	–	Q345	40x40x2.5	714.3
318	198	445	–	–	Q345	40x40x2.5	714.3
319	199	444	–	–	Q345	40x40x2.5	714.3
320	200	220	–	–	Q345	40x40x2.5	857.1
321	201	221	–	–	Q345	40x40x2.5	857.1
322	202	222	–	–	Q345	40x40x2.5	857.1
323	203	223	–	–	Q345	40x40x2.5	857.1
324	204	224	–	–	Q345	40x40x2.5	857.1
325	205	225	–	–	Q345	40x40x2.5	857.1
326	206	226	–	–	Q345	40x40x2.5	857.1
327	207	227	–	–	Q345	40x40x2.5	857.1
328	208	228	–	–	Q345	40x40x2.5	857.1
330	210	230	–	–	Q345	40x40x2.5	857.1
331	211	231	–	–	Q345	40x40x2.5	857.1
333	213	233	–	–	Q345	40x40x2.5	857.1
334	214	234	–	–	Q345	40x40x2.5	857.1
335	215	216	–	–	Q345	40x40x2.5	600
336	219	218	–	–	Q345	40x40x2.5	600
337	217	220	–	–	Q345	40x40x2.5	600
338	221	222	–	–	Q345	40x40x2.5	600
339	224	223	–	–	Q345	40x40x2.5	600
340	225	226	–	–	Q345	40x40x2.5	600
341	228	227	–	–	Q345	40x40x2.5	600
343	230	231	–	–	Q345	40x40x2.5	600
344	234	233	–	–	Q345	40x40x2.5	600
345	215	235	–	–	Q345	40x40x2.5	857.1
346	216	236	–	–	Q345	40x40x2.5	857.1
347	217	241	–	–	Q345	40x40x2.5	857.1
348	218	246	–	–	Q345	40x40x2.5	857.1
349	219	247	–	–	Q345	40x40x2.5	857.1
350	220	253	–	–	Q345	40x40x2.5	857.1
351	221	267	–	–	Q345	40x40x2.5	857.1
352	222	268	–	–	Q345	40x40x2.5	857.1
353	223	269	–	–	Q345	40x40x2.5	857.1

354	224	270	–	–	Q345	40x40x2.5	857.1
355	225	279	–	–	Q345	40x40x2.5	857.1
356	226	280	–	–	Q345	40x40x2.5	857.1
357	227	281	–	–	Q345	40x40x2.5	857.1
358	228	282	–	–	Q345	40x40x2.5	857.1
360	230	302	–	–	Q345	40x40x2.5	857.1
361	231	303	–	–	Q345	40x40x2.5	857.1
363	233	313	–	–	Q345	40x40x2.5	857.1
364	234	314	–	–	Q345	40x40x2.5	857.1
365	235	236	–	–	Q345	40x40x2.5	600
366	237	236	–	–	Q345	40x40x2.5	900
367	238	237	–	–	Q345	40x40x2.5	900
368	239	238	–	–	Q345	40x40x2.5	900
369	240	239	–	–	Q345	40x40x2.5	900
370	241	240	–	–	Q345	40x40x2.5	900
371	241	242	–	–	Q345	40x40x2.5	900
372	242	243	–	–	Q345	40x40x2.5	900
373	243	244	–	–	Q345	40x40x2.5	900
374	244	245	–	–	Q345	40x40x2.5	900
375	245	246	–	–	Q345	40x40x2.5	900
376	247	246	–	–	Q345	40x40x2.5	600
377	236	248	–	–	Q345	40x40x2.5	600
378	237	249	–	–	Q345	40x40x2.5	600
379	238	250	–	–	Q345	40x40x2.5	600
380	239	251	–	–	Q345	40x40x2.5	600
381	240	252	–	–	Q345	40x40x2.5	600
382	241	253	–	–	Q345	40x40x2.5	600
383	242	254	–	–	Q345	40x40x2.5	600
384	243	255	–	–	Q345	40x40x2.5	600
385	244	256	–	–	Q345	40x40x2.5	600
386	245	257	–	–	Q345	40x40x2.5	600
387	246	258	–	–	Q345	40x40x2.5	600
388	235	259	–	–	Q345	40x40x2.5	1000
389	247	262	–	–	Q345	40x40x2.5	1000
390	249	248	–	–	Q345	40x40x2.5	900
391	250	249	–	–	Q345	40x40x2.5	900
392	251	250	–	–	Q345	40x40x2.5	900
393	252	251	–	–	Q345	40x40x2.5	900
394	253	252	–	–	Q345	40x40x2.5	900
395	253	254	–	–	Q345	40x40x2.5	900
396	254	255	–	–	Q345	40x40x2.5	900

397	255	256	–	–	Q345	40x40x2.5	900
398	256	257	–	–	Q345	40x40x2.5	900
399	257	258	–	–	Q345	40x40x2.5	900
400	248	260	–	–	Q345	40x40x2.5	400
401	258	261	–	–	Q345	40x40x2.5	400
402	259	260	–	–	Q345	40x40x2.5	600
403	262	261	–	–	Q345	40x40x2.5	600
404	259	263	–	–	Q345	40x40x2.5	1000
405	260	264	–	–	Q345	40x40x2.5	1000
406	261	265	–	–	Q345	40x40x2.5	1000
407	262	266	–	–	Q345	40x40x2.5	1000
408	263	264	–	–	Q345	40x40x2.5	600
409	266	265	–	–	Q345	40x40x2.5	600
410	263	267	–	–	Q345	40x40x2.5	1000
411	264	268	–	–	Q345	40x40x2.5	1000
412	265	269	–	–	Q345	40x40x2.5	1000
413	266	270	–	–	Q345	40x40x2.5	1000
414	267	268	–	–	Q345	40x40x2.5	600
415	270	269	–	–	Q345	40x40x2.5	600
416	267	271	–	–	Q345	40x40x2.5	1000
417	268	272	–	–	Q345	40x40x2.5	1000
418	269	273	–	–	Q345	40x40x2.5	1000
419	270	274	–	–	Q345	40x40x2.5	1000
420	271	272	–	–	Q345	40x40x2.5	600
421	274	273	–	–	Q345	40x40x2.5	600
422	271	275	–	–	Q345	40x40x2.5	1000
423	272	276	–	–	Q345	40x40x2.5	1000
424	273	277	–	–	Q345	40x40x2.5	1000
425	274	278	–	–	Q345	40x40x2.5	1000
426	275	276	–	–	Q345	40x40x2.5	600
427	278	277	–	–	Q345	40x40x2.5	600
428	275	279	–	–	Q345	40x40x2.5	1000
429	276	280	–	–	Q345	40x40x2.5	1000
430	277	281	–	–	Q345	40x40x2.5	1000
431	278	282	–	–	Q345	40x40x2.5	1000
432	279	280	–	–	Q345	40x40x2.5	600
433	282	281	–	–	Q345	40x40x2.5	600
434	279	283	–	–	Q345	40x40x2.5	1000
435	280	284	–	–	Q345	40x40x2.5	1000
436	281	285	–	–	Q345	40x40x2.5	1000
437	282	286	–	–	Q345	40x40x2.5	1000

438	283	284	–	–	Q345	40x40x2.5	600
439	286	285	–	–	Q345	40x40x2.5	600
440	283	287	–	–	Q345	40x40x2.5	1000
441	284	288	–	–	Q345	40x40x2.5	1000
442	285	289	–	–	Q345	40x40x2.5	1000
443	286	290	–	–	Q345	40x40x2.5	1000
444	287	288	–	–	Q345	40x40x2.5	600
445	290	289	–	–	Q345	40x40x2.5	600
446	288	291	–	–	Q345	40x40x2.5	400
447	289	301	–	–	Q345	40x40x2.5	400
458	287	302	–	–	Q345	40x40x2.5	1000
459	290	314	–	–	Q345	40x40x2.5	1000
460	291	303	–	–	Q345	40x40x2.5	600
470	301	313	–	–	Q345	40x40x2.5	600
471	302	303	–	–	Q345	40x40x2.5	600
482	314	313	–	–	Q345	40x40x2.5	600
483	236	315	–	–	Q345	40x40x2.5	789.9
484	246	316	–	–	Q345	40x40x2.5	789.9
485	268	317	–	–	Q345	40x40x2.5	789.9
486	269	318	–	–	Q345	40x40x2.5	789.9
487	280	319	–	–	Q345	40x40x2.5	789.9
488	281	320	–	–	Q345	40x40x2.5	789.9
489	303	321	–	–	Q345	40x40x2.5	789.9
490	313	322	–	–	Q345	40x40x2.5	789.9
491	241	323	–	–	Q345	40x40x2.5	857.1
492	253	324	–	–	Q345	40x40x2.5	857.1
495	235	327	–	–	Q345	40x40x2.5	1107
496	247	328	–	–	Q345	40x40x2.5	1107
497	267	329	–	–	Q345	40x40x2.5	1107
498	270	330	–	–	Q345	40x40x2.5	1107
499	279	331	–	–	Q345	40x40x2.5	1107
500	282	332	–	–	Q345	40x40x2.5	1107
501	302	333	–	–	Q345	40x40x2.5	1107
502	314	334	–	–	Q345	40x40x2.5	1107
503	315	327	–	–	Q345	40x40x2.5	600
504	316	328	–	–	Q345	40x40x2.5	600
505	317	329	–	–	Q345	40x40x2.5	600
506	318	330	–	–	Q345	40x40x2.5	600
507	319	331	–	–	Q345	40x40x2.5	600
508	320	332	–	–	Q345	40x40x2.5	600
509	321	333	–	–	Q345	40x40x2.5	600

510	322	334	–	–	Q345	40x40x2.5	600
511	323	324	–	–	Q345	40x40x2.5	600
513	327	329	–	–	Q345	40x40x2.5	3000
514	328	330	–	–	Q345	40x40x2.5	3000
515	329	331	–	–	Q345	40x40x2.5	3000
516	330	332	–	–	Q345	40x40x2.5	3000
517	331	333	–	–	Q345	40x40x2.5	3000
518	332	334	–	–	Q345	40x40x2.5	3000
519	315	335	–	–	Q345	40x40x2.5	984.3
520	316	336	–	–	Q345	40x40x2.5	984.3
521	317	337	–	–	Q345	40x40x2.5	984.3
522	318	338	–	–	Q345	40x40x2.5	984.3
523	319	339	–	–	Q345	40x40x2.5	984.3
524	320	340	–	–	Q345	40x40x2.5	984.3
525	321	341	–	–	Q345	40x40x2.5	984.3
526	322	342	–	–	Q345	40x40x2.5	984.3
527	323	343	–	–	Q345	40x40x2.5	857.1
528	324	344	–	–	Q345	40x40x2.5	857.1
531	327	347	–	–	Q345	40x40x2.5	1107
532	328	348	–	–	Q345	40x40x2.5	1107
533	329	349	–	–	Q345	40x40x2.5	1107
534	330	350	–	–	Q345	40x40x2.5	1107
535	331	351	–	–	Q345	40x40x2.5	1107
536	332	352	–	–	Q345	40x40x2.5	1107
537	333	353	–	–	Q345	40x40x2.5	1107
538	334	354	–	–	Q345	40x40x2.5	1107
539	335	347	–	–	Q345	40x40x2.5	600
540	336	348	–	–	Q345	40x40x2.5	600
541	337	349	–	–	Q345	40x40x2.5	600
542	338	350	–	–	Q345	40x40x2.5	600
543	339	351	–	–	Q345	40x40x2.5	600
544	340	352	–	–	Q345	40x40x2.5	600
545	341	353	–	–	Q345	40x40x2.5	600
546	342	354	–	–	Q345	40x40x2.5	600
547	343	344	–	–	Q345	40x40x2.5	600
549	335	355	–	–	Q345	40x40x2.5	984.3
550	336	356	–	–	Q345	40x40x2.5	984.3
551	337	357	–	–	Q345	40x40x2.5	984.3
552	338	358	–	–	Q345	40x40x2.5	984.3
553	339	359	–	–	Q345	40x40x2.5	984.3
554	340	360	–	–	Q345	40x40x2.5	984.3

555	341	361	–	–	Q345	40x40x2.5	984.3
556	342	362	–	–	Q345	40x40x2.5	984.3
557	347	349	–	–	Q345	40x40x2.5	3000
558	348	350	–	–	Q345	40x40x2.5	3000
559	349	351	–	–	Q345	40x40x2.5	3000
560	350	352	–	–	Q345	40x40x2.5	3000
561	351	353	–	–	Q345	40x40x2.5	3000
562	352	354	–	–	Q345	40x40x2.5	3000
563	343	363	–	–	Q345	40x40x2.5	857.1
564	344	364	–	–	Q345	40x40x2.5	857.1
567	347	375	–	–	Q345	40x40x2.5	1107
568	348	376	–	–	Q345	40x40x2.5	1107
569	349	377	–	–	Q345	40x40x2.5	1107
570	350	378	–	–	Q345	40x40x2.5	1107
571	351	379	–	–	Q345	40x40x2.5	1107
572	352	380	–	–	Q345	40x40x2.5	1107
573	353	381	–	–	Q345	40x40x2.5	1107
574	354	382	–	–	Q345	40x40x2.5	1107
575	355	367	–	–	Q345	40x40x2.5	984.3
576	356	368	–	–	Q345	40x40x2.5	984.3
577	357	369	–	–	Q345	40x40x2.5	984.3
578	358	370	–	–	Q345	40x40x2.5	984.3
579	359	371	–	–	Q345	40x40x2.5	984.3
580	360	372	–	–	Q345	40x40x2.5	984.3
581	361	373	–	–	Q345	40x40x2.5	984.3
582	362	374	–	–	Q345	40x40x2.5	984.3
583	355	375	–	–	Q345	40x40x2.5	600
584	356	376	–	–	Q345	40x40x2.5	600
585	357	377	–	–	Q345	40x40x2.5	600
586	358	378	–	–	Q345	40x40x2.5	600
587	359	379	–	–	Q345	40x40x2.5	600
588	360	380	–	–	Q345	40x40x2.5	600
589	361	381	–	–	Q345	40x40x2.5	600
590	362	382	–	–	Q345	40x40x2.5	600
591	363	364	–	–	Q345	40x40x2.5	600
593	375	377	–	–	Q345	40x40x2.5	3000
594	376	378	–	–	Q345	40x40x2.5	3000
595	377	379	–	–	Q345	40x40x2.5	3000
596	378	380	–	–	Q345	40x40x2.5	3000
597	379	381	–	–	Q345	40x40x2.5	3000
598	380	382	–	–	Q345	40x40x2.5	3000

599	367	383	–	–	Q345	40x40x2.5	984.1
600	368	384	–	–	Q345	40x40x2.5	984.1
601	369	385	–	–	Q345	40x40x2.5	984.1
602	370	386	–	–	Q345	40x40x2.5	984.1
603	371	387	–	–	Q345	40x40x2.5	984.1
604	372	388	–	–	Q345	40x40x2.5	984.1
605	373	389	–	–	Q345	40x40x2.5	984.1
606	374	390	–	–	Q345	40x40x2.5	984.1
607	363	391	–	–	Q345	40x40x2.5	428.6
608	364	392	–	–	Q345	40x40x2.5	428.6
611	367	406	–	–	Q345	40x40x2.5	600
612	368	407	–	–	Q345	40x40x2.5	600
613	369	408	–	–	Q345	40x40x2.5	600
614	370	409	–	–	Q345	40x40x2.5	600
615	371	410	–	–	Q345	40x40x2.5	600
616	372	411	–	–	Q345	40x40x2.5	600
617	373	412	–	–	Q345	40x40x2.5	600
618	374	413	–	–	Q345	40x40x2.5	600
619	375	406	–	–	Q345	40x40x2.5	1107
620	376	407	–	–	Q345	40x40x2.5	1107
621	377	408	–	–	Q345	40x40x2.5	1107
622	378	409	–	–	Q345	40x40x2.5	1107
623	379	410	–	–	Q345	40x40x2.5	1107
624	380	411	–	–	Q345	40x40x2.5	1107
625	381	412	–	–	Q345	40x40x2.5	1107
626	382	413	–	–	Q345	40x40x2.5	1107
627	383	391	–	–	Q345	40x40x2.5	984.5
628	384	391	–	–	Q345	40x40x2.5	984.5
629	385	396	–	–	Q345	40x40x2.5	984.5
630	386	396	–	–	Q345	40x40x2.5	984.5
631	387	400	–	–	Q345	40x40x2.5	984.5
632	388	400	–	–	Q345	40x40x2.5	984.5
633	389	405	–	–	Q345	40x40x2.5	984.5
634	390	405	–	–	Q345	40x40x2.5	984.5
635	391	392	–	–	Q345	40x40x2.5	600
636	392	393	–	–	Q345	40x40x2.5	150
637	393	394	–	–	Q345	40x40x2.5	750
638	394	395	–	–	Q345	40x40x2.5	750
639	395	396	–	–	Q345	40x40x2.5	750
640	396	397	–	–	Q345	40x40x2.5	750
641	397	398	–	–	Q345	40x40x2.5	750

642	398	399	–	–	Q345	40x40x2.5	750
643	399	400	–	–	Q345	40x40x2.5	750
644	400	401	–	–	Q345	40x40x2.5	750
645	401	402	–	–	Q345	40x40x2.5	750
646	402	403	–	–	Q345	40x40x2.5	750
647	403	404	–	–	Q345	40x40x2.5	150
648	404	405	–	–	Q345	40x40x2.5	600
649	406	408	–	–	Q345	40x40x2.5	3000
650	407	409	–	–	Q345	40x40x2.5	3000
651	408	410	–	–	Q345	40x40x2.5	3000
652	409	411	–	–	Q345	40x40x2.5	3000
653	410	412	–	–	Q345	40x40x2.5	3000
654	411	413	–	–	Q345	40x40x2.5	3000
655	383	414	–	–	Q345	40x40x2.5	600
656	384	415	–	–	Q345	40x40x2.5	600
657	385	416	–	–	Q345	40x40x2.5	600
658	386	417	–	–	Q345	40x40x2.5	600
659	387	418	–	–	Q345	40x40x2.5	600
660	388	419	–	–	Q345	40x40x2.5	600
661	389	420	–	–	Q345	40x40x2.5	600
662	390	421	–	–	Q345	40x40x2.5	600
663	391	422	–	–	Q345	40x40x2.5	600
664	423	393	–	–	Q345	40x40x2.5	600
665	424	394	–	–	Q345	40x40x2.5	600
666	425	395	–	–	Q345	40x40x2.5	600
667	426	396	–	–	Q345	40x40x2.5	600
668	427	397	–	–	Q345	40x40x2.5	600
669	428	398	–	–	Q345	40x40x2.5	600
670	429	399	–	–	Q345	40x40x2.5	600
671	430	400	–	–	Q345	40x40x2.5	600
672	431	401	–	–	Q345	40x40x2.5	600
673	432	402	–	–	Q345	40x40x2.5	600
674	433	403	–	–	Q345	40x40x2.5	600
675	434	405	–	–	Q345	40x40x2.5	600
676	406	414	–	–	Q345	40x40x2.5	1107
677	407	415	–	–	Q345	40x40x2.5	1107
678	408	416	–	–	Q345	40x40x2.5	1107
679	409	417	–	–	Q345	40x40x2.5	1107
680	410	418	–	–	Q345	40x40x2.5	1107
681	411	419	–	–	Q345	40x40x2.5	1107
682	412	420	–	–	Q345	40x40x2.5	1107

683	413	421	–	–	Q345	40x40x2.5	1107
684	414	416	–	–	Q345	40x40x2.5	3000
685	415	417	–	–	Q345	40x40x2.5	3000
686	416	418	–	–	Q345	40x40x2.5	3000
687	417	419	–	–	Q345	40x40x2.5	3000
688	418	420	–	–	Q345	40x40x2.5	3000
689	419	421	–	–	Q345	40x40x2.5	3000
690	414	422	–	–	Q345	40x40x2.5	1107
691	415	422	–	–	Q345	40x40x2.5	1107
692	416	426	–	–	Q345	40x40x2.5	1107
693	417	426	–	–	Q345	40x40x2.5	1107
694	418	430	–	–	Q345	40x40x2.5	1107
695	419	430	–	–	Q345	40x40x2.5	1107
696	420	434	–	–	Q345	40x40x2.5	1107
697	421	434	–	–	Q345	40x40x2.5	1107
698	422	423	–	–	Q345	40x40x2.5	750
699	423	424	–	–	Q345	40x40x2.5	750
700	424	425	–	–	Q345	40x40x2.5	750
701	425	426	–	–	Q345	40x40x2.5	750
702	426	427	–	–	Q345	40x40x2.5	750
703	427	428	–	–	Q345	40x40x2.5	750
704	428	429	–	–	Q345	40x40x2.5	750
705	429	430	–	–	Q345	40x40x2.5	750
706	430	431	–	–	Q345	40x40x2.5	750
707	431	432	–	–	Q345	40x40x2.5	750
708	432	433	–	–	Q345	40x40x2.5	750
709	433	434	–	–	Q345	40x40x2.5	750
750	441	442	–	–	Q345	Fake	600
752	442	443	–	–	Q345	Fake	4500
754	444	445	–	–	Q345	Fake	600
756	445	443	–	–	Q345	Fake	4500
760	441	215	–	–	Q345	40x40x2.5	142.9
761	442	216	–	–	Q345	40x40x2.5	142.9
762	443	217	–	–	Q345	40x40x2.5	142.9
763	444	219	–	–	Q345	40x40x2.5	142.9
764	445	218	–	–	Q345	40x40x2.5	142.9

< Truss >

*** TRUSS MEMBER DATA

NO	NODAL CONNECTIVITY		MATERIAL	SECTION	TENSION /	SECTION AREA	LENGTH

	I	J			COMPRESSION	I	J	
747	435	235	Q345 Fune 12 mm		N	113.1	-	7211
749	437	247	Q345 Fune 12 mm		N	113.1	-	7211
757	435	139	Q345 Fune 12 mm		N	113.1	-	4472
758	437	140	Q345 Fune 12 mm		N	113.1	-	4472
765	422	436	Q345 Fune 12 mm		N	113.1	-	1.04e+004
768	436	241	Q345 Fune 12 mm		N	113.1	-	7211
769	436	149	Q345 Fune 12 mm		N	113.1	-	4755
770	449	145	Q345 Fune 12 mm		N	113.1	-	4031
771	449	302	Q345 Fune 12 mm		N	113.1	-	6946
772	448	279	Q345 Fune 12 mm		N	113.1	-	6946
773	448	143	Q345 Fune 12 mm		N	113.1	-	4031
774	447	267	Q345 Fune 12 mm		N	113.1	-	6946
775	447	141	Q345 Fune 12 mm		N	113.1	-	4031
776	446	235	Q345 Fune 12 mm		N	113.1	-	6946
777	446	139	Q345 Fune 12 mm		N	113.1	-	4031
778	450	146	Q345 Fune 12 mm		N	113.1	-	4031
779	450	314	Q345 Fune 12 mm		N	113.1	-	6946
780	451	282	Q345 Fune 12 mm		N	113.1	-	6946
781	451	144	Q345 Fune 12 mm		N	113.1	-	4031
782	452	270	Q345 Fune 12 mm		N	113.1	-	6946
783	452	142	Q345 Fune 12 mm		N	113.1	-	4031
784	453	247	Q345 Fune 12 mm		N	113.1	-	6946
785	453	140	Q345 Fune 12 mm		N	113.1	-	4031

< Weight/Volume/Surface area of all member >

*** TOTAL WEIGHT / VOLUME / SURFACE AREA SUMMARY

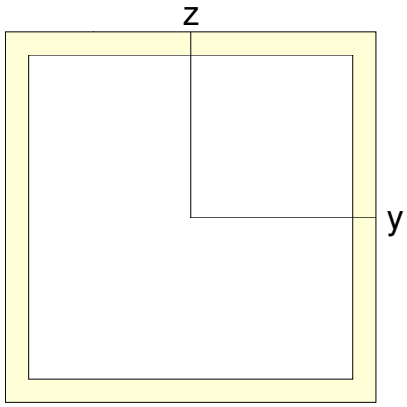
SECTION NO	SECION NAME	SURFACE AREA	VOLUMN	WEIGHT	FRAME NUMBER	TRUSS NUMBER
1	40x40x2.5	1.695e+008	2.119e+008	16.31	604	0
2	Fune 12 mm	5.035e+006	1.51e+007	1.163	0	23
3	Fake	634.5	0.03172	2.442e-009	4	0

< Self Weight >

[LOAD CASE : Dead Load]

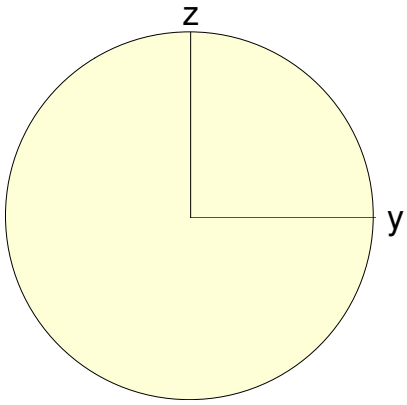
; X,0, Y,0, Z,-1

Tabella 1 1 : 40x40x2.5



A (mm ²)	Asy (mm ²)	Asz (mm ²)	z (+) (mm)	z (−) (mm)
375.000	200.000	200.000	20.000	20.000
Ixx (mm ⁴)	Iyy (mm ⁴)	Izz (mm ⁴)	y (+) (mm)	y (−) (mm)
131835.937	88281.250	88281.250	20.000	20.000

Tabella 2 2 : Fune 12 mm



A (mm ^{2})	Asy (mm ^{2})	Asz (mm ^{2})	z (+) (mm)	z (−) (mm)
113.097	101.788	101.788	6.000	6.000
Ixx (mm ^{4})	Iyy (mm ^{4})	Izz (mm ^{4})	y (+) (mm)	y (−) (mm)
2035.752	1017.876	1017.876	6.000	6.000