STRUCTURAL ANALYSIS

PROJECT

Aerial Trapeze Truss Tripod

CLIENT

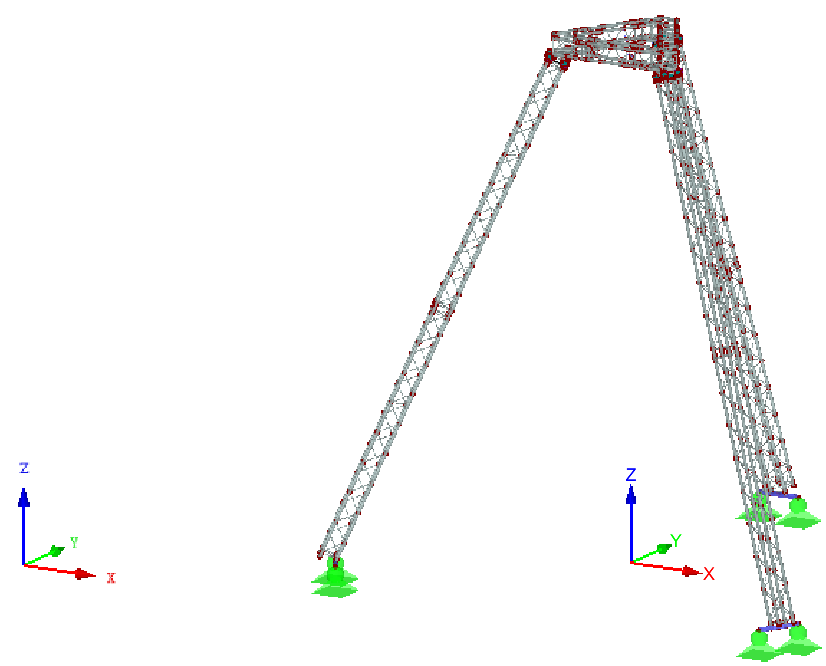
SOL'AIR

Sylvia Idelberger
Amsterdam

CREATED BY

ir. Roy Schilderman

Isometric



MODEL - GENERAL DATA

General	Model name	:	Driepoot-v14
	Project name	:	2016-driepoot
	Type of model	:	3D
	Positive direction of global axis Z	:	Upward
	Classification of load cases and combinations	:	According to Standard: EN 1990 National Annex: NEN - Netherlands

FE MESH SETTINGS

General	Target length of finite elements	l_{FE}	:	15.0 mm
	Maximum distance between a node and a line to integrate it into the line	ε	:	0.5 mm
	Maximum number of mesh nodes (in thousands)		:	500
Members	Number of divisions of members with cable, elastic foundation, taper, or plastic characteristic		:	10
	☒ Activate member divisions for large deformation or post-critical analysis			
	☒ Use division for members with node lying on them			
Surfaces	Maximum ratio of FE rectangle diagonals	Δ_D	:	1.8
	Maximum out-of-plane inclination of two finite elements	α	:	0.50 °
	Shape direction of finite elements		:	Triangles and quadrangles ☒ Same squares where possible

CALCULATION BASE

The top section of the tripod is a one-off special product by Prolyte Netherlands. It consists of 60 deg corners with 0m75 straight parts, welded on aluminum plates to attatch the H30V legs.

In the calculation a worst case slinging is applied to analyze the strenght of the top section. Normally the 3 point bridle should be attached to the upper chords of the corner sections.

In this report the following is taken into consideration:

- horizontal wind load without weight of the acrobats
- horizontal swing simultaneously with wind force for +Y (CO7) and -Y (CO8) direction
- the strength of the aluminum surfaces is analysed
- the strenght of all the members is analysed with RF_STEEL, taking the yield strenght of the aluminum in the HAZ
- in an spreadsheet a calcultion is done to analyse the lifting and sliding of the construction

The EN 13814 Fairground and amusement park machinery and Structures - safety is used as a base:
- maximum allowable wind speed in service: 15 m/s
- combined wind pressure till 8m: 0.2 kN/m^2
- combined c-index: 1.2
- partial safety facror: 1.2

This results in following member loads:
- 48/3 tubes: 0.01152 kN/m
- 30/3 tubes: 0.0072 kN/m
- 18/2 tubes: 0.00432 kN/m
- 16/2 tubes: 0.00384 kN/m

CONCLUSIONS

The construction is strong enought to withstand wind an dynamic acrobatics.

Considering a friction coefficient of 0,6: at full wind speed in -Y direction the construction is not heavy enough to withstand the wind. A ballast of minimum 222 kg should be applied at the leg in the direction of the wind, to prevent sliding.
The construction might also be pinned to the ground.

To prevent overturning a ballast of 50 kg should be applied in the leg in the +Y direction (wind direction where it comes FROM)

1.3 MATERIALS

Matl. No.	Modulus E [N/mm²]	Modulus G [N/mm²]	Poisson's Ratio ν [-]	Spec. Weight γ [kN/m³]	Coeff. of Th. Exp. α [1/°C]	Partial Factor γ_M [-]	Material Model
1	Aluminium EN-AW 6082 T6/T651 | EN 1999-1-1:2007						
	70000.0	27000.0	0.296	27.00	2.30E-05	1.00	Isotropic Linear Elastic
2	HDT1200M 1.0965 | EN 10346:2009-03						
	210000.0	80769.2	0.300	78.50	1.20E-05	1.00	Isotropic Linear Elastic
3	Steel S 235 JR | EN 10025-2:2004-11						
	210000.0	80769.2	0.300	78.50	1.20E-05	1.00	Isotropic Linear Elastic
4	grade 8 steel for bolts and pins						
	21000.0	10500.0	0.000	0.30	7.85E+01	1.00	Isotropic Linear Elastic

1.5 SOLIDS

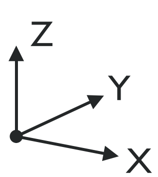
Solid No.	Solid Type	Boundary Surfaces No.	Matl. No.	Volume V [mm³]	Weight W [kg]
1	Material	4,98,7	4	7115.5	0.00
2	Material	36,51,14	4	7115.4	0.00
3	Material	20,110,31	4	7115.5	0.00
4	Material	60,29,32	4	7115.6	0.00
5	Material	111,47,33	4	7115.2	0.00
6	Material	58,61,34	4	7115.1	0.00
7	Material	75,52,120	4	7115.1	0.00
8	Material	59,76,116	4	7115.1	0.00
9	Material	77,50,80	4	7114.7	0.00
10	Material	78,86,89	4	7114.8	0.00
11	Material	55,95,113	4	7114.7	0.00
12	Material	62,105,102	4	7114.7	0.00

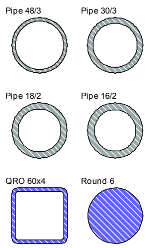
1.6 OPENINGS

Opening No.	Boundary Lines No.	In Surface No.	Area A [mm²]	Comment
1	444,443	88	200.1	
2	436,435	45	200.1	
3	428,1188	24	200.1	
4	327,326	45	200.1	
6	377,376	15	200.1	
7	336,335	6	200.1	
8	320,319	39	200.1	
9	282,281	3	200.1	
10	267,266	11	200.1	
11	386,385	13	200.1	
12	1308,369	66	200.1	
13	1253,1252	38	200.1	
14	1244,1243	114	200.1	
15	1234,1233	65	200.1	
16	370,1348	114	200.1	
17	1291,1290	109	200.1	
18	1185,1184	109	200.1	
19	1356,1355	124	200.1	
20	1340,1339	37	200.1	
21	1298,1297	122	200.1	
22	1282,1281	72	200.1	
23	1193,1192	103	200.1	
24	1176,1175	81	200.1	
25	588,587	85	200.1	
26	611,610	41	200.1	
27	1259,730	71	200.1	
28	630,629	41	200.1	
29	919,918	69	200.1	
30	901,900	69	200.1	
31	597,596	118	200.1	
32	889,739	28	200.1	
33	888,887	90	200.1	
34	740,1028	115	200.1	
35	879,878	22	200.1	
36	427,1019	123	200.1	
37	274,273	15	200.1	

1.7 NODAL SUPPORTS

Support No.	Nodes No.	Sequen.	Rotation [°] about X	Rotation [°] about Y	Rotation [°] about Z	Column in Z	Support Conditions $u_{X'}$	$u_{Y'}$	$u_{Z'}$	$\varphi_{X'}$	$\varphi_{Y'}$	$\varphi_{Z'}$
1	3,19,396, 792,1168, 1184	XYZ	0.00	0.00	0.00	☐	☒	☒	☒	☐	☐	☒





1.13 CROSS-SECTIONS

Section No.	Matl. No.	J [cm⁴] / A [cm²]	I_y [cm⁴] / A_y [cm²]	I_z [cm⁴] / A_z [cm²]	Principal Axes α [°]	Rotation α' [°]	Overall Dimensions [mm] Width b	Height h
1	Pipe 48/3							
	1	21.57	10.78	10.78	0.00	0.00	48.0	48.0
		4.24	2.11	2.11				
2	Pipe 30/3							
	1	4.69	2.35	2.35	0.00	0.00	30.0	30.0
		2.54	1.27	1.27				
3	Pipe 18/2							
	1	0.65	0.33	0.33	0.00	0.00	18.0	18.0
		1.01	0.50	0.50				
4	Pipe 16/2							
	1	0.44	0.22	0.22	0.00	0.00	16.0	16.0
		0.88	0.44	0.44				
5	QRO 60x4 | EN 10210-2:2006							
	3	72.50	45.40	45.40	0.00	0.00	60.0	60.0
		8.79	3.78	3.78				
6	Round 6							
	2	0.01	0.01	0.01	0.00	0.00	6.0	6.0
		0.28	0.24	0.24				

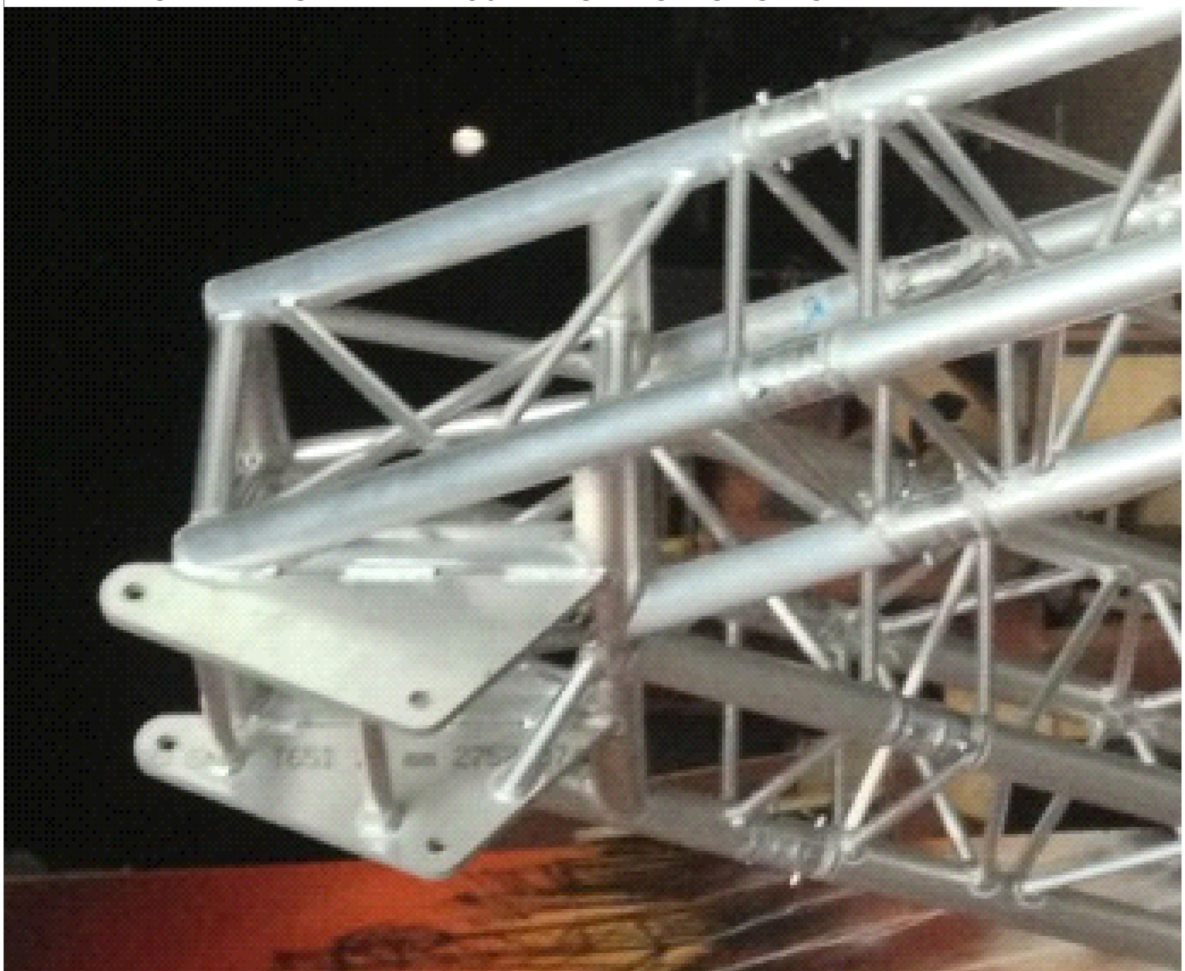
1.22 INTERSECTIONS

Inters. No.	1st Surface No.	2nd Surface No.	Line No. Generated by Intersect.	Comment
2	56	88	429	
3	24	56	414	
4	6	10	413	
5	10	39	259	
6	3	5	269	
7	5	11	258	
8	13	54	371	
9	54	66	359	
10	38	99	1261	
11	65	99	1248	
12	121	124	1363	
13	37	121	1353	
14	44	122	1311	
15	44	72	1295	
16	43	103	1205	
17	43	81	1190	
18	19	85	590	
19	19	71	733	
20	17	118	599	
21	17	28	742	
22	23	90	890	
23	23	115	1031	
24	22	87	881	
25	87	123	1022	

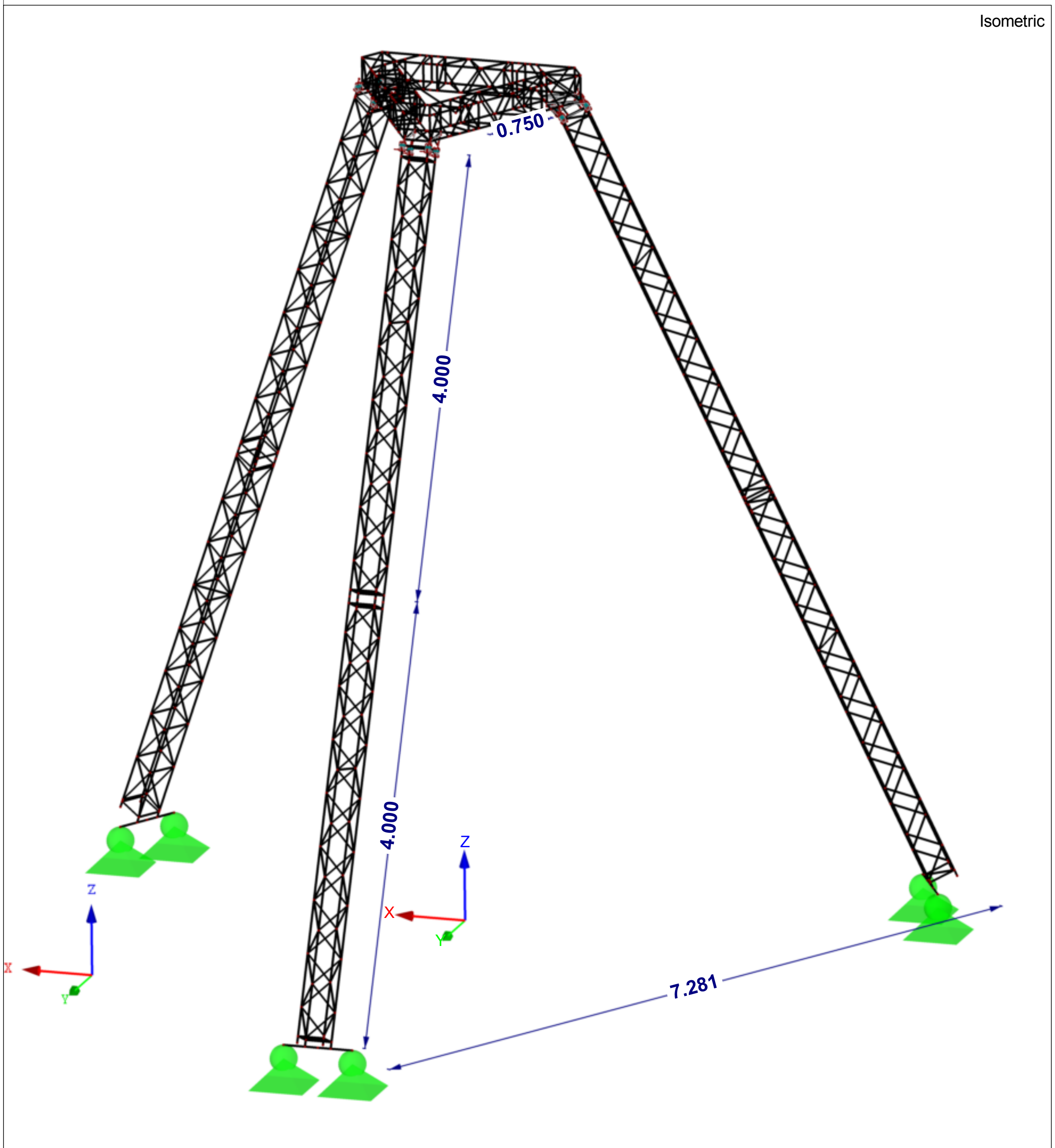
1.23 FE MESH REFINEMENTS

Refinem. No.	FE Mesh Refinement applied to	Nodes No.	Number Divisions	Sphere Radius [mm]	Target FE-Length [mm] Inner	Outer	Comment
1	Solids	1-12		5.0			
2	Surfaces	40,68, 127-135, 148-150		10.0			
3	Surfaces	3,6,11,13, 15,22,24, 28,37-39, 41,45,65, 66,69,71, 72,81,85, 88,90,103, 109,114, 115,118, 122-124		15.0			

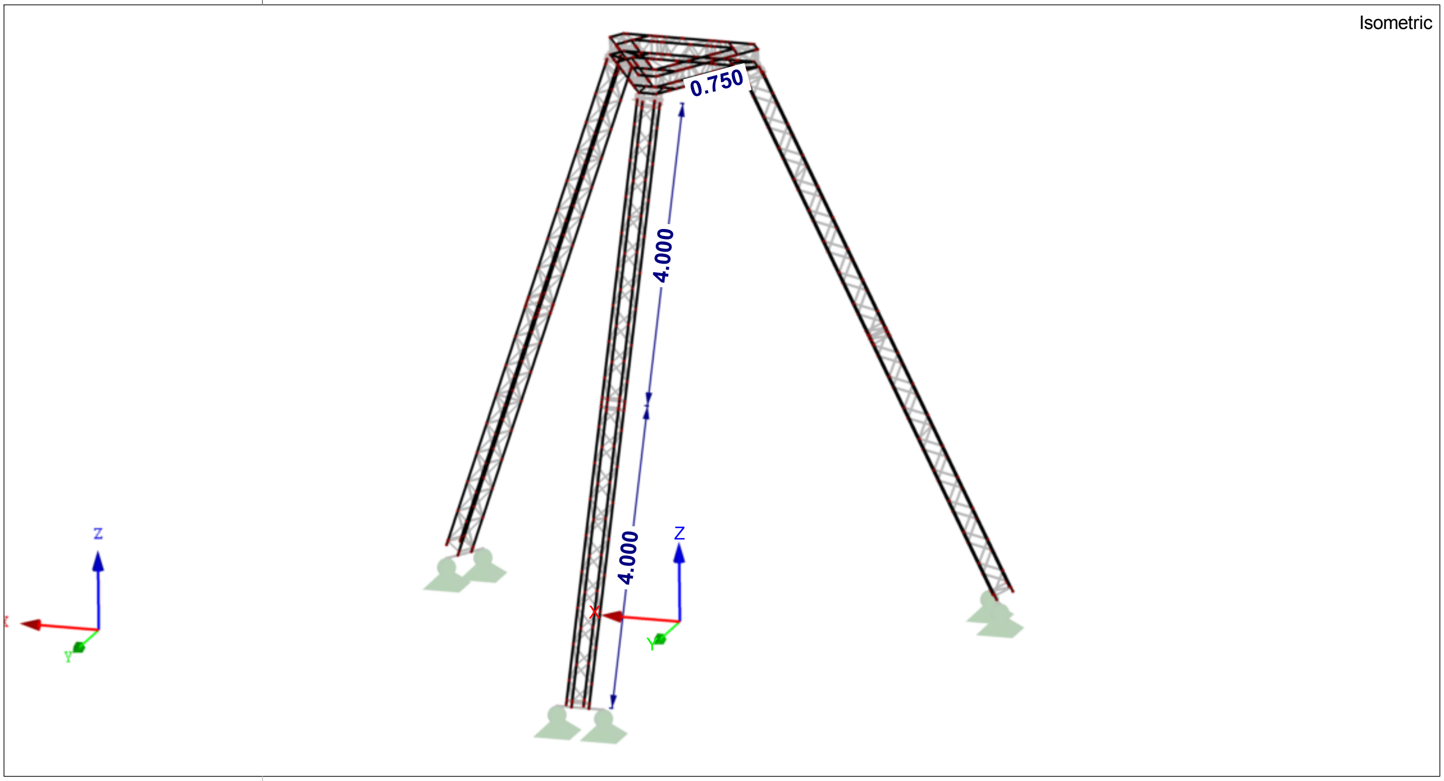
DETAIL OF ATTACHMENT H30V LEG - TOP SECTION



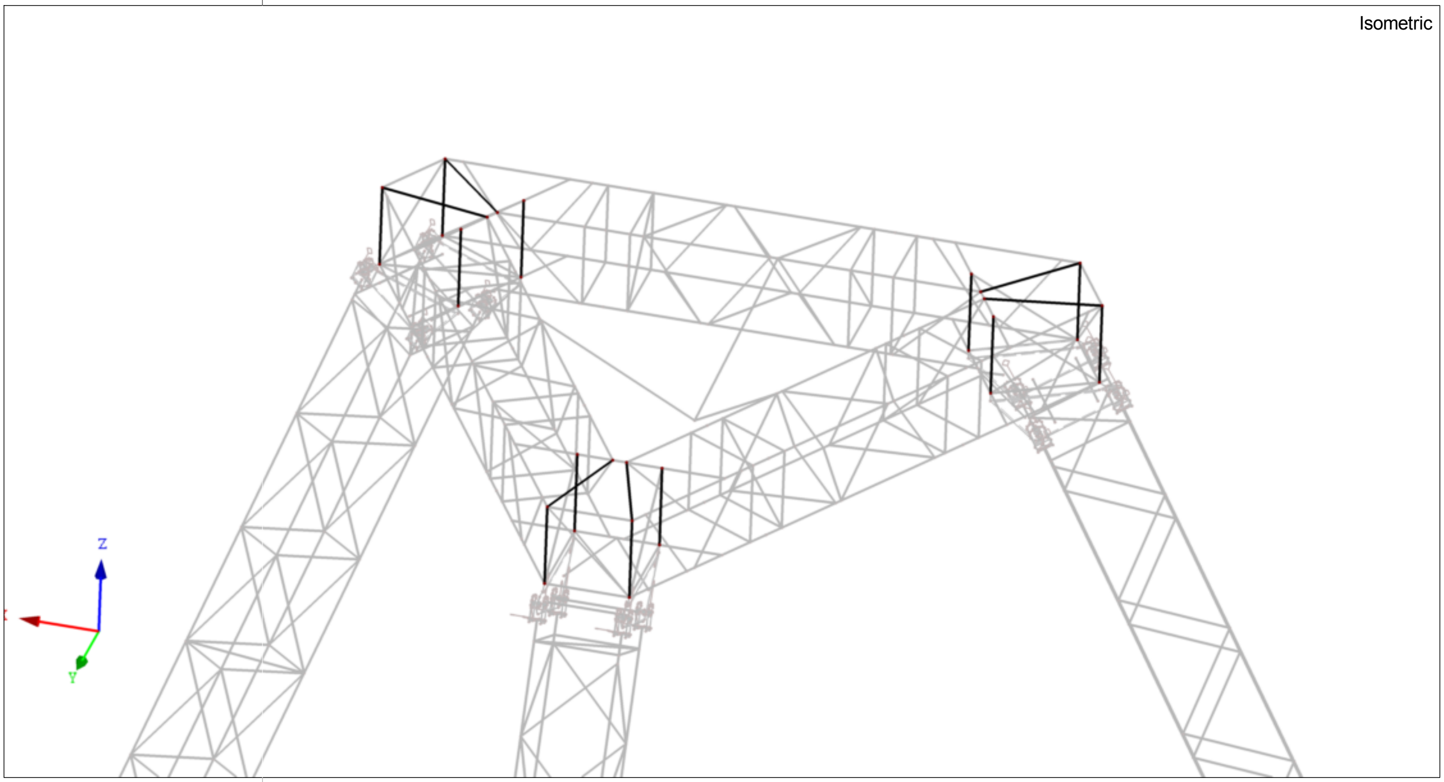
MODEL WITH SIZES



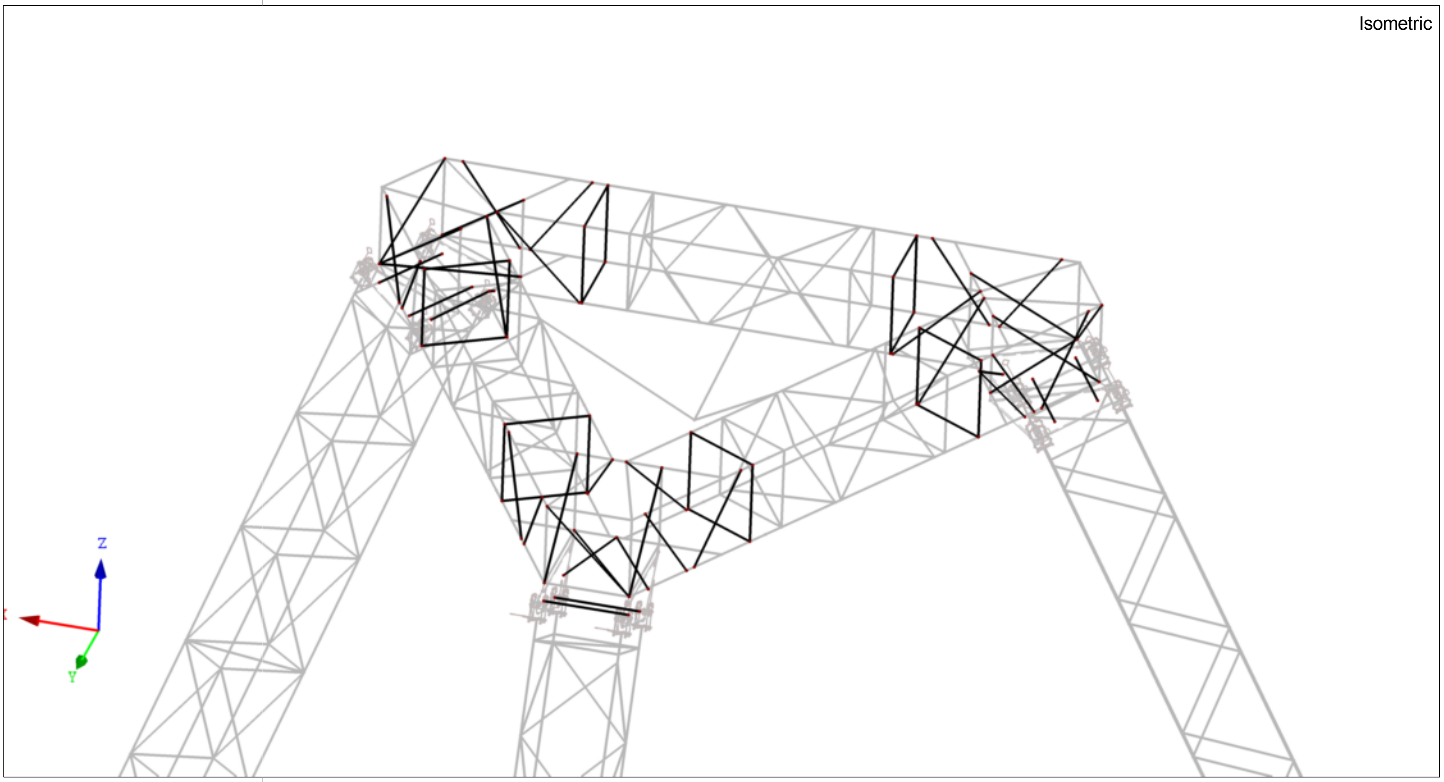
MODEL - TUBES 48 X 3



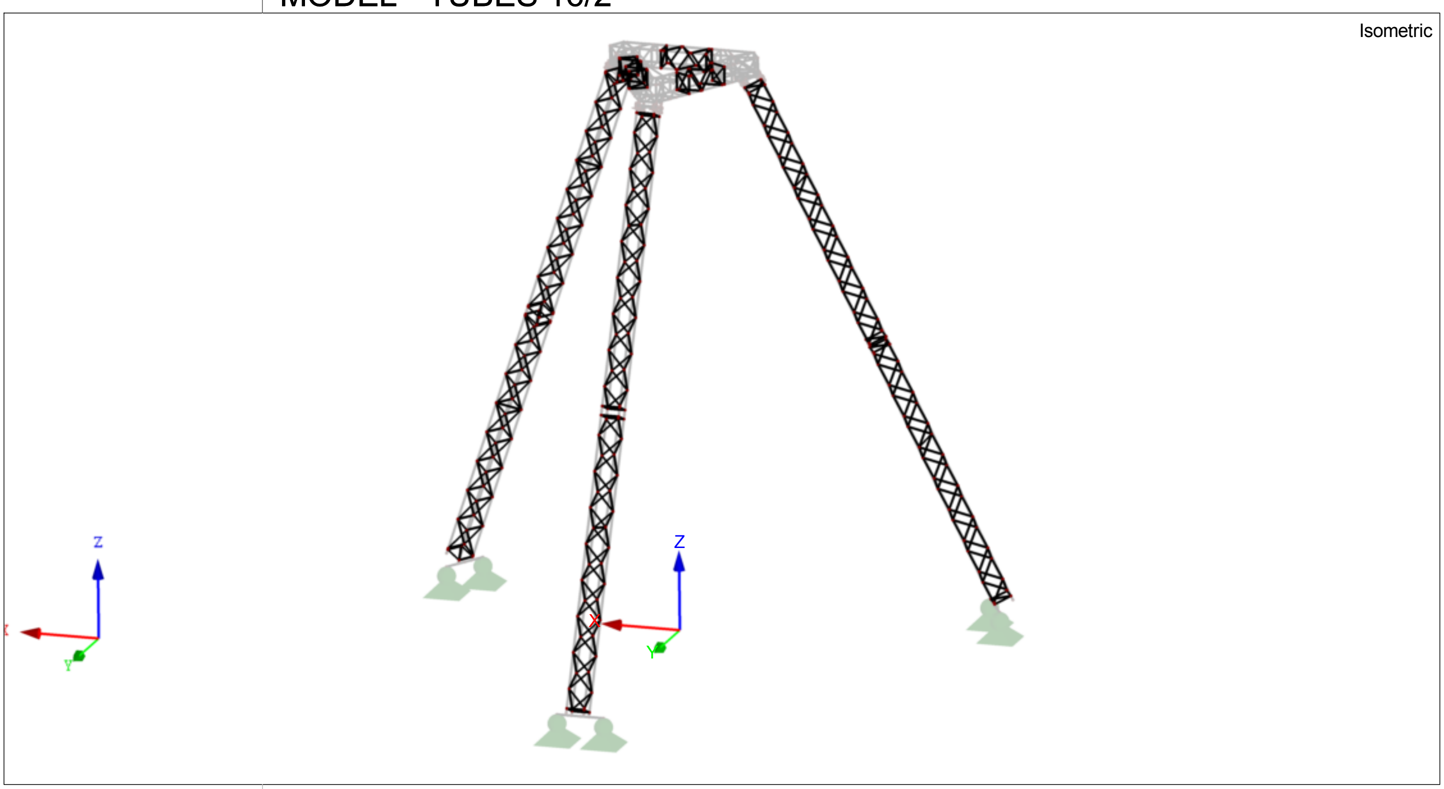
MODEL - TUBES 30/3



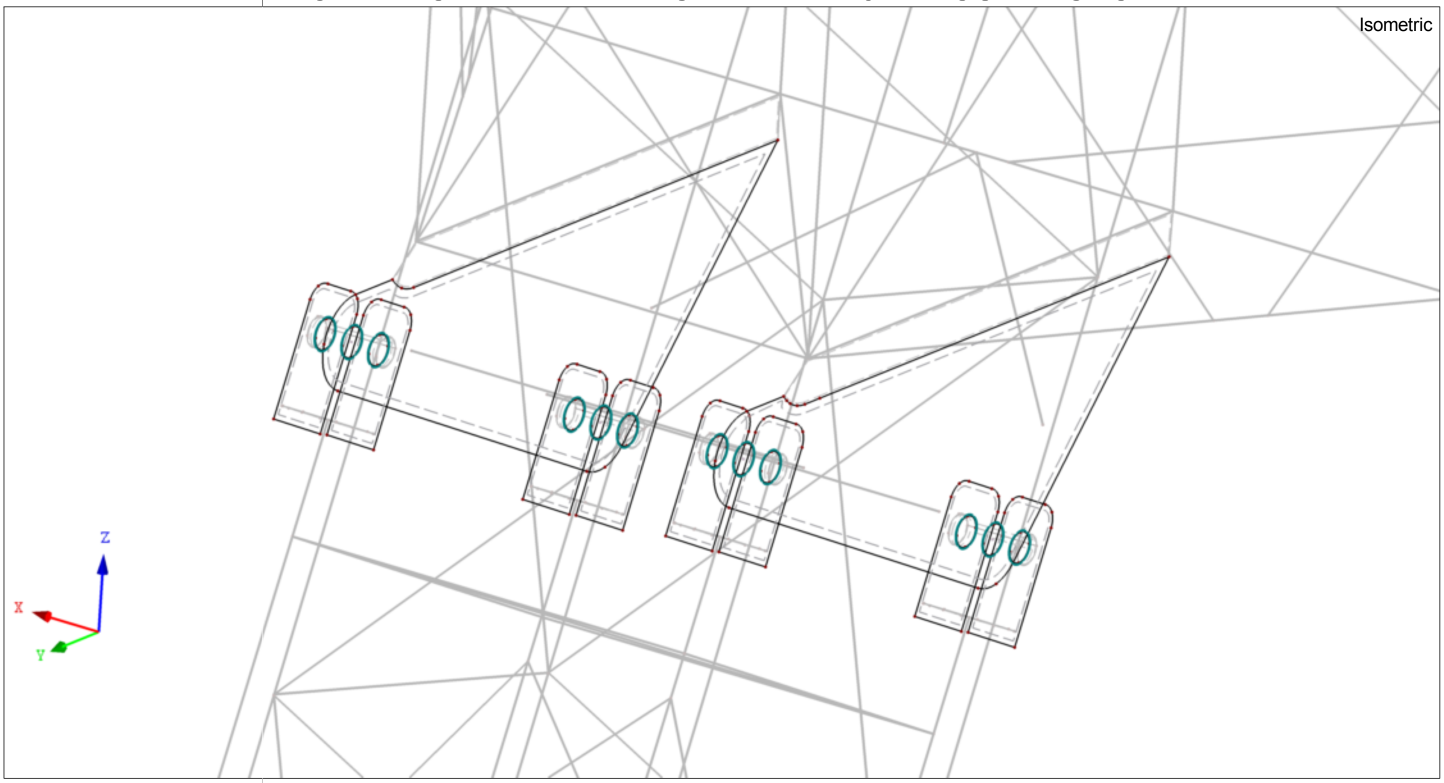
MODEL - TUBES 18/2



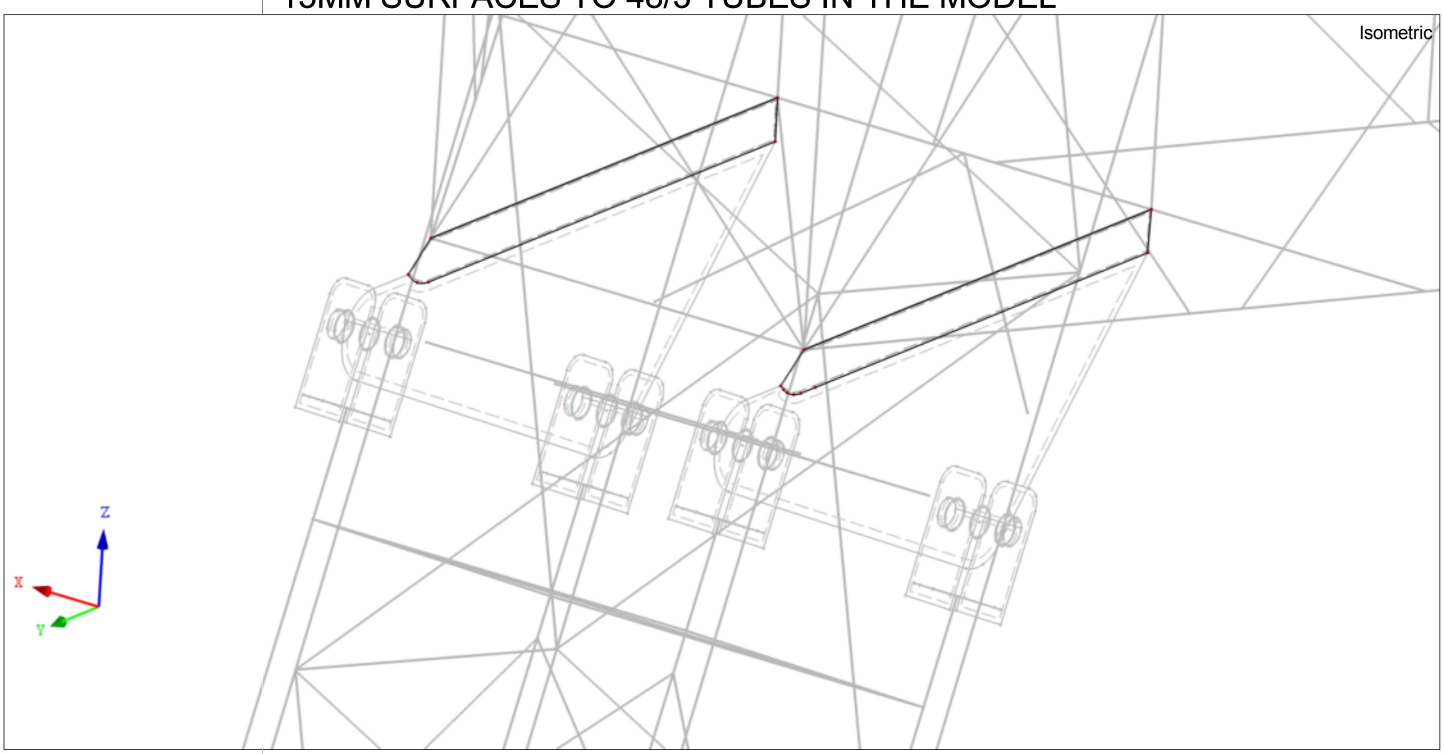
MODEL - TUBES 16/2



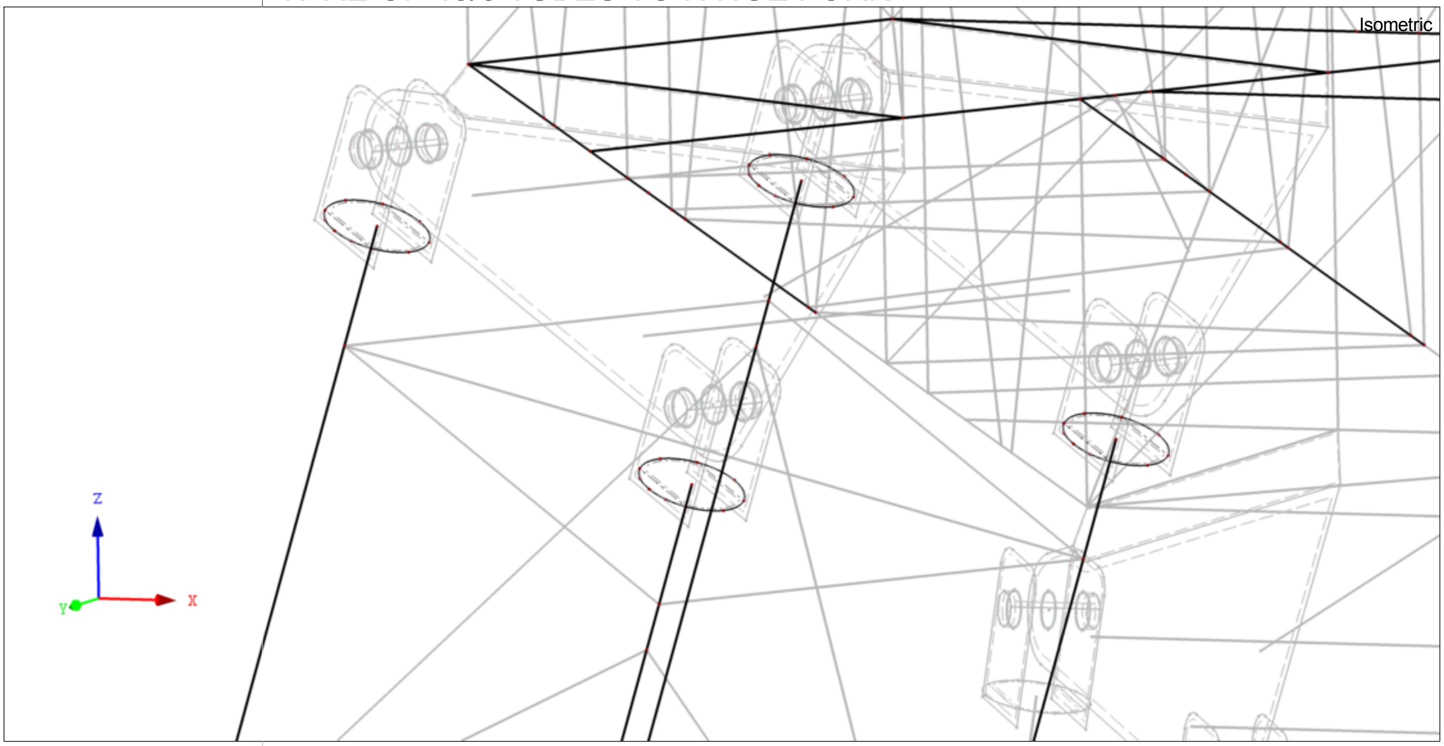
MODEL - SWIVEL ATTATCHMENT - 15 MM SURFACES



MODEL - SWIVEL ATTATCHMENT - 15 MM SURFACES TO CONNECT 15MM SURFACES TO 48/3 TUBES IN THE MODEL



MODEL - SWIVEL ATTATCHMENT - 10 MM SURFACES - TO CONNECT WIRE OF 48/3 TUBES TO HINGE FORK



2.1 LOAD CASES

Load Case	Load Case Description	EN 1990 | NEN Action Category	Active	Self-Weight - Factor in Direction X	Y	Z
LC1	Self-weight	Permanent	☒	0.000	0.000	-1.000
LC2	Imposed load - 1 acrobat	Imposed - Category A: domestic, residential areas	☐			
LC3	Imposed load - 1 acrobat horizontal +Y swingin	Imposed - Category A: domestic, residential areas	☐			
LC4	Imposed load - 1 acrobat horizontal -Y swingin	Imposed - Category A: domestic, residential areas	☐			
LC5	Imposed load - multiple acrobats	Imposed - Category A: domestic, residential areas	☐			
LC6	Imposed load - multiple acrobats +Y swining	Imposed - Category A: domestic, residential areas	☐			
LC7	Wind in +Y	Wind	☐			
LC8	Wind in -Y	Wind	☐			

2.1.1 LOAD CASES - CALCULATION PARAMETERS

Load Case	Load Case Description	Calculation Parameters	
LC1	Self-weight	Method of analysis	: ◉ Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: ◉ Newton-Raphson
		Activate stiffness factors of:	: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
LC2	Imposed load - 1 acrobat	Method of analysis	: ◉ Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: ◉ Newton-Raphson
		Activate stiffness factors of:	: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
LC3	Imposed load - 1 acrobat horizontal +Y swingin	Method of analysis	: ◉ Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: ◉ Newton-Raphson
		Activate stiffness factors of:	: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
LC4	Imposed load - 1 acrobat horizontal -Y swingin	Method of analysis	: ◉ Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: ◉ Newton-Raphson
		Activate stiffness factors of:	: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
LC5	Imposed load - multiple acrobats	Method of analysis	: ◉ Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: ◉ Newton-Raphson
		Activate stiffness factors of:	: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
LC6	Imposed load - multiple acrobats +Y swining	Method of analysis	: ◉ Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: ◉ Newton-Raphson
		Activate stiffness factors of:	: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
LC7	Wind in +Y	Method of analysis	: ◉ Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: ◉ Newton-Raphson
		Activate stiffness factors of:	: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
LC8	Wind in -Y	Method of analysis	: ◉ Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: ◉ Newton-Raphson
		Activate stiffness factors of:	: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)

2.5 LOAD COMBINATIONS

Load Combin.	DS	Load Combination Description	No.	Factor	Load Case	
CO1		Characteristic Values	1	1.00	LC1	Self-weight
CO2		Design Internal Forces - 1 acrobat - +Y swing	1	1.35	LC1	Self-weight
			2	4.00	LC2	Imposed load - 1 acrobat
			3	4.00	LC3	Imposed load - 1 acrobat horizontal +Y swingin
CO3		Design Internal Forces - 1 acrobat -Y swing	1	1.35	LC1	Self-weight
			2	4.00	LC2	Imposed load - 1 acrobat
			3	4.00	LC4	Imposed load - 1 acrobat horizontal -Y swingin
CO4		Design Internal Forces - multiple acrobats	1	1.35	LC1	Self-weight
			2	2.00	LC2	Imposed load - 1 acrobat
			3	2.00	LC3	Imposed load - 1 acrobat horizontal +Y swingin
CO5		internal forces - wind +Y	1	1.35	LC1	Self-weight
			2	1.20	LC7	Wind in +Y
CO6		internal forces - wind -Y	1	1.35	LC1	Self-weight
			2	1.20	LC8	Wind in -Y
CO7		Design Internal Forces - 1 acrobat + wind +Y	1	1.35	LC1	Self-weight
			2	4.00	LC2	Imposed load - 1 acrobat
			3	4.00	LC3	Imposed load - 1 acrobat horizontal +Y swingin
			4	1.20	LC7	Wind in +Y
CO8		Design Internal Forces - 1 acrobat + wind -Y	1	1.35	LC1	Self-weight
			2	4.00	LC2	Imposed load - 1 acrobat
			3	4.00	LC4	Imposed load - 1 acrobat horizontal -Y swingin
			4	1.20	LC8	Wind in -Y

2.5.2 LOAD COMBINATIONS - CALCULATION PARAMETERS

Load Combin.	Description	Calculation Parameters		
CO1	Characteristic Values	Method of analysis	: ◉	Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: ◉	Picard
		Options	: ☒	Refer internal forces to deformed system for:
				☒ Normal forces N
				☒ Shear forces V_y and V_z
				☒ Moments M_y, M_z and M_T
		Activate stiffness factors of:	: ☒	Materials (partial factor γM)
			: ☒	Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒	Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
CO2	Design Internal Forces - 1 acrobat - +Y swing	Method of analysis	: ◉	Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: ◉	Picard
		Options	: ☒	Refer internal forces to deformed system for:
				☒ Normal forces N
				☒ Shear forces V_y and V_z
				☒ Moments M_y, M_z and M_T
		Activate stiffness factors of:	: ☒	Materials (partial factor γM)
			: ☒	Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒	Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
CO3	Design Internal Forces - 1 acrobat -Y swing	Method of analysis	: ◉	Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: ◉	Picard
		Options	: ☒	Refer internal forces to deformed system for:
				☒ Normal forces N
				☒ Shear forces V_y and V_z
				☒ Moments M_y, M_z and M_T
		Activate stiffness factors of:	: ☒	Materials (partial factor γM)
			: ☒	Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒	Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
CO4	Design Internal Forces - multiple acrobats	Method of analysis	: ◉	Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: ◉	Picard
		Options	: ☒	Refer internal forces to deformed system for:
				☒ Normal forces N
				☒ Shear forces V_y and V_z
				☒ Moments M_y, M_z and M_T
		Activate stiffness factors of:	: ☒	Materials (partial factor γM)
			: ☒	Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒	Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
CO5	internal forces - wind +Y	Method of analysis	: ◉	Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: ◉	Picard
		Options	: ☒	Refer internal forces to deformed system for:
				☒ Normal forces N
				☒ Shear forces V_y and V_z
				☒ Moments M_y, M_z and M_T
		Activate stiffness factors of:	: ☒	Materials (partial factor γM)

2.5.2 LOAD COMBINATIONS - CALCULATION PARAMETERS

Load Combin.	Description	Calculation Parameters	
			: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
CO6	internal forces - wind -Y	Method of analysis	: ⦿ Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: ⦿ Picard
		Options	: ☒ Refer internal forces to deformed system for: ☒ Normal forces N; ☒ Shear forces V_y and V_z; ☒ Moments M_y, M_z and M_T
		Activate stiffness factors of:	: ☒ Materials (partial factor γM)
			: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
CO7	Design Internal Forces - 1 acrobat + wind +Y	Method of analysis	: ⦿ Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: ⦿ Picard
		Options	: ☒ Consider favorable effects due to tension
			: ☒ Refer internal forces to deformed system for: ☒ Normal forces N; ☒ Shear forces V_y and V_z; ☒ Moments M_y, M_z and M_T
		Activate stiffness factors of:	: ☒ Materials (partial factor γM)
			: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)
CO8	Design Internal Forces - 1 acrobat + wind -Y	Method of analysis	: ⦿ Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: ⦿ Picard
		Options	: ☒ Consider favorable effects due to tension
			: ☒ Refer internal forces to deformed system for: ☒ Normal forces N; ☒ Shear forces V_y and V_z; ☒ Moments M_y, M_z and M_T
		Activate stiffness factors of:	: ☒ Materials (partial factor γM)
			: ☒ Cross-sections (factor for J, I_y, I_z, A, A_y, A_z)
			: ☒ Members (factor for GJ, EI_y, EI_z, EA, GA_y, GA_z)

2.7 RESULT COMBINATIONS

Result Combin.	Description	Loading
RC1	Design Internal Forces	CO1 or to CO8

LC2
Imposed load - 1 acrobat

3.1 NODAL LOADS - BY COMPONENTS - COORDINATE SYSTEM

LC2: Imposed load - 1 acrobat

No.	On Nodes No.	Coordinate System	Force [kN] P_X	P_Y	P_Z	Moment [kNm] M_X	M_Y	M_Z
1	594	0 | Global XYZ	0.00000	0.00000	-0.80000	0.00000	0.00000	0.00000

LC3
Imposed load - 1 acrobat horizontal +Y swingin

3.1 NODAL LOADS - BY COMPONENTS - COORDINATE SYSTEM

LC3

No.	On Nodes No.	Coordinate System	Force [kN] P_X	P_Y	P_Z	Moment [kNm] M_X	M_Y	M_Z
1	594	0 | Global XYZ	0.00000	0.16000	0.00000	0.00000	0.00000	0.00000

LC4
Imposed load - 1 acrobat horizontal -Y swingin

3.1 NODAL LOADS - BY COMPONENTS - COORDINATE SYSTEM

LC4

No.	On Nodes No.	Coordinate System	Force [kN] P_X	P_Y	P_Z	Moment [kNm] M_X	M_Y	M_Z
1	594	0 | Global XYZ	0.00000	-0.16000	0.00000	0.00000	0.00000	0.00000

LC5
Imposed load - multiple acrobats

3.1 NODAL LOADS - BY COMPONENTS COORDINATE SYSTEM

LC5: Imposed load - multiple acrobats

No.	On Nodes No.	Coordinate System	Force [kN] P_X	P_Y	P_Z	Moment [kNm] M_X	M_Y	M_Z
1	594	0 | Global XYZ	0.00000	0.00000	-2.40000	0.00000	0.00000	0.00000

LC6
Imposed load - multiple acrobats +Y swining

3.1 NODAL LOADS - BY COMPONENTS - COORDINATE SYSTEM

LC6

No.	On Nodes No.	Coordinate System	Force [kN] P_X	P_Y	P_Z	Moment [kNm] M_X	M_Y	M_Z
1	594	0 | Global XYZ	0.00000	-0.48000	0.00000	0.00000	0.00000	0.00000

LC7
Wind in +Y

3.2 MEMBER LOADS

LC7: Wind in +Y

No.	Reference to	On Members No.	Load Type	Load Distribution	Load Direction	Reference Length	Load Parameters Symbol	Value	Unit
1	Members		Force	Uniform	YP	Projected Length	p	0.01152	kN/m
	1,2,5,8,11-13,15,22-24,28,30,32,33,38,39,42,43,46,47,52,53,56,57,60,61,66,67,70,71,74,75,80,81,84,86,89,90,95,96, 99,100,103,104,109,110,112,114,117-119,121,125,127,130-132,134,138,139,143,145-147,150,152,156,158-160,163,165,167, 168,173,174,177,178,181,182,187,188,191,192,195,196,201,202,205,206,209,210,215,216,219,221,224,225,230,231,234, 235,238,239,244,245,247,249,252-254,260,262,264-268,270,275-277,280,281,284,285,290,292-294,296,298,300-303,308-311, 313,315-318,321,322,324-326,328,333-338,342,344-346,349-352,354-356,358,361,362,364,369,371-378,381,382,385-388,390, 391,397-399,403,404,406,408,411,412,414-418,424,425,427-429,432,433,437,438,442-444,446,448,449,451,453,454,456,458, 459,461,463,464,466,468,469,471,473,474,476,477,479-481,483,485,487,489-492,494,496,497,499,501,502,504,506,507, 509,511,512,514,516,517,519,521,522,524,525,527,528,531-539,541,542,552,559,561,640,641,643,645-649,653-655,659, 660,662,663,665,666,668,670,671,673,675,676,678,680,681,683,685,686,688,690,691,693,695-698,700,702,704,706-708, 710,711,713,714,716,718,719,721,723,724,726,728,729,731,733,734,736,738,739,741,743-745,748-751,753-755,761-764, 767-770,772,775,777,779,780,789-797,801,802,805-812,814,819,820,822,825,827-829,831-835,838,841,842,845-850,855,856, 858-860,862,865-868,870,872-875,878,881-883,885,886,889-891,893,898-900,902,905,907,908,912,914,916-919,922,925,927, 930,932,933,935,938,941,942,945,948,949,952,955,956,959,962,964,967,970,971,974,977,978,981,984,985,988,991,992, 995,998,999,1002,1005,1006,1009,1012,1013,1016,1019,1021,1022,1024,1026,1028,1029,1031,1036-1038,1040,1042,1047, 1049,1051-1053,1058,1060,1061,1063,1065,1067,1068,1070,1073,1076,1077,1080,1083,1084,1087,1090,1091,1094,1097,1099, 1102,1105,1106,1109,1112,1113,1116,1119,1120,1123,1126,1127,1130,1133,1134,1137,1140,1141,1144,1147,1148,1151, 1154,1157,1158,1160,1163,1165,1170-1172,1176,1179,1181,1182 druck und zug; Z 2,4 kN/m² -> 0.048 m^2/m +Y								
2	Members		Force	Uniform	YP	Projected Length	p	0.00720	kN/m
	258,278,286,297,307,329,434,440,543,642,650,657,854,876,887,897,906,924								
3	Members		Force	Uniform	YP	Projected Length	p	0.00432	kN/m
	269,271,272,282,287,288,291,299,304-306,314,319,320,327,339,341,343,365,368,384,405,409,410,426,431,436,540,544, 553,555,558,560,639,644,652,752,760,773,774,778,799,815,818,839,840,844,857,863,864,869,877,879,880,884,892,895, 896,903,911,913,915								
4	Members		Force	Uniform	YP	Projected Length	p	0.00384	kN/m
	3,4,6,9,10,14,16,18-21,25,26,29,31,34-37,40,41,44,45,48-51,54,55,58,59,62-65,68,69,72,73,76-79,82,83,85,87,88,91-94, 97,98,101,102,105-108,111,113,115,116,120,122-124,126,128,129,133,135-137,140-142,144,148,149,151,153-155,157,161, 162,164,166,169-172,175,176,179,180,183-186,189,190,193,194,197-200,203,204,207,208,211-214,217,218,220,222,223, 226-229,232,233,236,237,240-243,246,248,250,251,255-257,259,261,263,273,274,279,283,289,312,323,330-332,340,347,348, 353,357,359,360,363,370,379,380,383,392,394,396,400-402,407,419-423,439,441,445,447,450,452,455,457,460,462,465, 467,470,472,475,478,482,484,486,488,493,495,498,500,503,505,508,510,513,515,518,520,523,526,529,530,548-551,554, 556,557,562-632,634-637,656,658,661,664,667,669,672,674,677,679,682,684,687,689,692,694,699,701,703,705,709,712, 715,717,720,722,725,727,730,732,735,737,740,742,746,747,756-759,766,776,781,783,785-788,800,803,804,813,821,823, 824,826,830,836,837,843,851-853,861,871,894,901,904,909,910,920,921,923,926,928,929,931,934,936,937,939,940,943, 944,946,947,950,951,953,954,957,958,960,961,963,965,966,968,969,972,973,975,976,979,980,982,983,986,987,989,990, 993,994,996,997,1000,1001,1003,1004,1007,1008,1010,1011,1014,1015,1017,1018,1020,1023,1025,1027,1030,1032-1035, 1039,1041,1043-1046,1048,1050,1054-1057,1059,1062,1064,1066,1069,1071,1072,1074,1075,1078,1079,1081,1082,1085,1086, 1088,1089,1092,1093,1095,1096,1098,1100,1101,1103,1104,1107,1108,1110,1111,1114,1115,1117,1118,1121,1122,1124, 1125,1128,1129,1131,1132,1135,1136,1138,1139,1142,1143,1145,1146,1149,1150,1152,1153,1156,1159,1161,1162,1164, 1166,1168,1169,1173,1174,1177,1178,1180								

LC8
Wind in -Y

3.2 MEMBER LOADS

LC8: Wind in -Y

No.	Reference to	On Members No.	Load Type	Load Distribution	Load Direction	Reference Length	Load Parameters Symbol	Value	Unit
1	Members		Force	Uniform	YP	Projected Length	p	-0.01152	kN/m
	1,2,5,8,11-13,15,22-24,28,30,32,33,38,39,42,43,46,47,52,53,56,57,60,61,66,67,70,71,74,75,80,81,84,86,89,90,95,96, 99,100,103,104,109,110,112,114,117-119,121,125,127,130-132,134,138,139,143,145-147,150,152,156,158-160,163,165,167, 168,173,174,177,178,181,182,187,188,191,192,195,196,201,202,205,206,209,210,215,216,219,221,224,225,230,231,234, 235,238,239,244,245,247,249,252-254,260,262,264-268,270,275-277,280,281,284,285,290,292-294,296,298,300-303,308-311, 313,315-318,321,322,324-326,328,333-338,342,344-346,349-352,354-356,358,361,362,364,369,371-378,381,382,385-388,390, 391,397-399,403,404,406,408,411,412,414-418,424,425,427-429,432,433,437,438,442-444,446,448,449,451,453,454,456,458, 459,461,463,464,466,468,469,471,473,474,476,477,479-481,483,485,487,489-492,494,496,497,499,501,502,504,506,507, 509,511,512,514,516,517,519,521,522,524,525,527,528,531-539,541,542,559,561,640,641,643,645-649,653-655,659,660, 662,663,665,666,668,670,671,673,675,676,678,680,681,683,685,686,688,690,691,693,695-698,700,702,704,706-708,710,7								

3.2 MEMBER LOADS

LC8: Wind in -Y

	Reference	On Members	Load	Load	Load	Reference	Load Parameters		
No.	to	No.	Type	Distribution	Direction	Length	Symbol	Value	Unit
	711,713,714,716,718,719,721,723,724,726,728,729,731,733,734,736,738,739,741,743-745,748-751,753-755,761-764,767-770, 772,775,777,779,780,789-797,801,802,805-812,814,819,820,822,825,827-829,831-835,838,841,842,845-850,855,856,858-860, 862,865-868,870,872-875,878,881-883,885,886,889-891,893,898-900,902,905,907,908,912,914,916-919,922,925,927,930,932, 933,935,938,941,942,945,948,949,952,955,956,959,962,964,967,970,971,974,977,978,981,984,985,988,991,992,995,998, 999,1002,1005,1006,1009,1012,1013,1016,1019,1021,1022,1024,1026,1028,1029,1031,1036-1038,1040,1042,1047,1049, 1051-1053,1058,1060,1061,1063,1065,1067,1068,1070,1073,1076,1077,1080,1083,1084,1087,1090,1091,1094,1097,1099,1102, 1105,1106,1109,1112,1113,1116,1119,1120,1123,1126,1127,1130,1133,1134,1137,1140,1141,1144,1147,1148,1151,1154, 1157,1158,1160,1163,1165,1170-1172,1176,1179,1181,1182								
2	Members		Force	Uniform	YP	Projected Length	p	-0.00720	kN/m
	258,278,286,297,307,329,434,440,543,642,650,657,854,876,887,897,906,924								
3	Members		Force	Uniform	YP	Projected Length	p	-0.00432	kN/m
	269,271,272,282,287,288,291,299,304-306,314,319,320,327,339,341,343,365,368,384,405,409,410,426,431,436,540,544, 553,555,558,560,639,644,652,752,760,773,774,778,799,815,818,839,840,844,857,863,864,869,877,879,880,884,892,895, 896,903,911,913,915								
4	Members		Force	Uniform	YP	Projected Length	p	-0.00384	kN/m
	3,4,6,9,10,14,16,18-21,25,26,29,31,34-37,40,41,44,45,48-51,54,55,58,59,62-65,68,69,72,73,76-79,82,83,85,87,88,91-94, 97,98,101,102,105-108,111,113,115,116,120,122-124,126,128,129,133,135-137,140-142,144,148,149,151,153-155,157,161, 162,164,166,169-172,175,176,179,180,183-186,189,190,193,194,197-200,203,204,207,208,211-214,217,218,220,222,223, 226-229,232,233,236,237,240-243,246,248,250,251,255-257,259,261,263,273,274,279,283,289,312,323,330-332,340,347,348, 353,357,359,360,363,370,379,380,383,392,394,396,400-402,407,419-423,439,441,445,447,450,452,455,457,460,462,465, 467,470,472,475,478,482,484,486,488,493,495,498,500,503,505,508,510,513,515,518,520,523,526,529,530,548-551,554, 556,557,562-632,634-637,656,658,661,664,667,669,672,674,677,679,682,684,687,689,692,694,699,701,703,705,709,712, 715,717,720,722,725,727,730,732,735,737,740,742,746,747,756-759,766,776,781,783,785-788,800,803,804,813,821,823, 824,826,830,836,837,843,851-853,861,871,894,901,904,909,910,920,921,923,926,928,929,931,934,936,937,939,940,943, 944,946,947,950,951,953,954,957,958,960,961,963,965,966,968,969,972,973,975,976,979,980,982,983,986,987,989,990, 993,994,996,997,1000,1001,1003,1004,1007,1008,1010,1011,1014,1015,1017,1018,1020,1023,1025,1027,1030,1032-1035, 1039,1041,1043-1046,1048,1050,1054-1057,1059,1062,1064,1066,1069,1071,1072,1074,1075,1078,1079,1081,1082,1085,1086, 1088,1089,1092,1093,1095,1096,1098,1100,1101,1103,1104,1107,1108,1110,1111,1114,1115,1117,1118,1121,1122,1124, 1125,1128,1129,1131,1132,1135,1136,1138,1139,1142,1143,1145,1146,1149,1150,1152,1153,1156,1159,1161,1162,1164, 1166,1168,1169,1173,1174,1177,1178,1180								

■ 4.0 RESULTS - SUMMARY

	Description	Value	Unit	Comment
	LC1 - Self-weight			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	0.00	kN	
	Sum of support reactions in Y	0.00	kN	
	Sum of loads in Z	-2.13	kN	
	Sum of support reactions in Z	-2.13	kN	Deviation 0.00%
	Resultant of reactions about X	-0.00007	kNm	At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm)
	Resultant of reactions about Y	0.00000	kNm	At center of gravity of model
	Resultant of reactions about Z	0.00000	kNm	At center of gravity of model
	Max. displacement in X	0.4	mm	Member No. 117, x: 46.7 mm
	Max. displacement in Y	-0.4	mm	Member No. 708, x: 40.0 mm
	Max. displacement in Z	-0.2	mm	Member No. 1035, x: 225.7 mm
	Max. vector displacement	0.5	mm	Member No. 701, x: 143.4 mm
	Max. rotation about X	0.3	mrad	FE Node No. 1253 (X: 751.7, Y: -559.2, Z: 7382.5 mm)
	Max. rotation about Y	0.3	mrad	Member No. 7, x: 200.0 mm
	Max. rotation about Z	-0.1	mrad	FE Node No. 1680 (X: -754.4, Y: -566.3, Z: 7367.7 mm)
	Method of analysis	Linear		Geometrically linear analysis
	Reduction of stiffness			Cross-sections, Members, Surfaces
	Number of load increments	1		
	Number of iterations	1		
	LC2 - Imposed load - 1 acrobat			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	0.00	kN	
	Sum of support reactions in Y	0.00	kN	
	Sum of loads in Z	-0.80	kN	
	Sum of support reactions in Z	-0.80	kN	Deviation 0.00%
	Resultant of reactions about X	0.00000	kNm	At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm)
	Resultant of reactions about Y	0.00000	kNm	At center of gravity of model
	Resultant of reactions about Z	0.00000	kNm	At center of gravity of model
	Max. displacement in X	0.1	mm	Member No. 1049, x: 130.9 mm
	Max. displacement in Y	0.1	mm	Member No. 714, x: 480.0 mm
	Max. displacement in Z	-0.3	mm	Member No. 765, x: 0.0 mm
	Max. vector displacement	0.3	mm	Member No. 765, x: 0.0 mm
	Max. rotation about X	-0.6	mrad	Member No. 545, x: 315.0 mm
	Max. rotation about Y	-0.6	mrad	Member No. 765, x: 315.0 mm
	Max. rotation about Z	0.3	mrad	Member No. 382, x: 46.7 mm
	Method of analysis	Linear		Geometrically linear analysis
	Reduction of stiffness			Cross-sections, Members, Surfaces
	Number of load increments	1		
	Number of iterations	1		
	LC3 - Imposed load - 1 acrobat horizontal +Y swingin			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	0.16	kN	
	Sum of support reactions in Y	0.16	kN	Deviation 0.00%
	Sum of loads in Z	0.00	kN	
	Sum of support reactions in Z	0.00	kN	
	Resultant of reactions about X	-0.47377	kNm	At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm)
	Resultant of reactions about Y	0.00000	kNm	At center of gravity of model
	Resultant of reactions about Z	0.00000	kNm	At center of gravity of model
	Max. displacement in X	0.1	mm	Member No. 124, x: 338.5 mm
	Max. displacement in Y	0.7	mm	Member No. 765, x: 0.0 mm
	Max. displacement in Z	0.3	mm	Member No. 678, x: 425.5 mm
	Max. vector displacement	0.7	mm	Member No. 461, x: 265.9 mm
	Max. rotation about X	0.4	mrad	Member No. 430, x: 52.5 mm
	Max. rotation about Y	0.2	mrad	FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)
	Max. rotation about Z	0.2	mrad	FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)
	Method of analysis	Linear		Geometrically linear analysis
	Reduction of stiffness			Cross-sections, Members, Surfaces
	Number of load increments	1		
	Number of iterations	1		
	LC4 - Imposed load - 1 acrobat horizontal -Y swingin			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	-0.16	kN	
	Sum of support reactions in Y	-0.16	kN	Deviation 0.00%
	Sum of loads in Z	0.00	kN	
	Sum of support reactions in Z	0.00	kN	
	Resultant of reactions about X	0.47377	kNm	At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm)
	Resultant of reactions about Y	0.00000	kNm	At center of gravity of model
	Resultant of reactions about Z	0.00000	kNm	At center of gravity of model
	Max. displacement in X	-0.1	mm	Member No. 124, x: 338.5 mm
	Max. displacement in Y	-0.7	mm	Member No. 765, x: 0.0 mm
	Max. displacement in Z	-0.3	mm	Member No. 678, x: 425.5 mm
	Max. vector displacement	0.7	mm	Member No. 461, x: 265.9 mm
	Max. rotation about X	-0.4	mrad	Member No. 430, x: 52.5 mm
	Max. rotation about Y	-0.2	mrad	FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)
	Max. rotation about Z	-0.2	mrad	FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)
	Method of analysis	Linear		Geometrically linear analysis

4.0 RESULTS - SUMMARY

	Description	Value	Unit	Comment
	Reduction of stiffness			Cross-sections, Members, Surfaces
	Number of load increments	1		
	Number of iterations	1		
	LC5 - Imposed load - multiple acrobats			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	0.00	kN	
	Sum of support reactions in Y	0.00	kN	
	Sum of loads in Z	-2.40	kN	
	Sum of support reactions in Z	-2.40	kN	Deviation 0.00%
	Resultant of reactions about X	0.00000	kNm	At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm)
	Resultant of reactions about Y	0.00000	kNm	At center of gravity of model
	Resultant of reactions about Z	0.00000	kNm	At center of gravity of model
	Max. displacement in X	0.3	mm	Member No. 1049, x: 157.1 mm
	Max. displacement in Y	0.3	mm	Member No. 714, x: 480.0 mm
	Max. displacement in Z	-1.0	mm	Member No. 765, x: 0.0 mm
	Max. vector displacement	1.0	mm	Member No. 765, x: 0.0 mm
	Max. rotation about X	-1.7	mrad	Member No. 545, x: 315.0 mm
	Max. rotation about Y	-1.7	mrad	Member No. 765, x: 315.0 mm
	Max. rotation about Z	0.9	mrad	Member No. 382, x: 46.7 mm
	Method of analysis	Linear		Geometrically linear analysis
	Reduction of stiffness			Cross-sections, Members, Surfaces
	Number of load increments	1		
	Number of iterations	1		
	LC6 - Imposed load - multiple acrobats +Y swining			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	-0.48	kN	
	Sum of support reactions in Y	-0.48	kN	Deviation 0.00%
	Sum of loads in Z	0.00	kN	
	Sum of support reactions in Z	0.00	kN	
	Resultant of reactions about X	1.42131	kNm	At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm)
	Resultant of reactions about Y	0.00000	kNm	At center of gravity of model
	Resultant of reactions about Z	0.00000	kNm	At center of gravity of model
	Max. displacement in X	-0.3	mm	Member No. 115, x: 338.5 mm
	Max. displacement in Y	-2.0	mm	Member No. 765, x: 0.0 mm
	Max. displacement in Z	-0.8	mm	Member No. 678, x: 425.5 mm
	Max. vector displacement	2.1	mm	Member No. 461, x: 265.9 mm
	Max. rotation about X	-1.2	mrad	Member No. 430, x: 52.5 mm
	Max. rotation about Y	-0.7	mrad	FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)
	Max. rotation about Z	-0.5	mrad	FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)
	Method of analysis	Linear		Geometrically linear analysis
	Reduction of stiffness			Cross-sections, Members, Surfaces
	Number of load increments	1		
	Number of iterations	1		
	LC7 - Wind in +Y			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	1.86	kN	
	Sum of support reactions in Y	1.86	kN	Deviation 0.00%
	Sum of loads in Z	0.00	kN	
	Sum of support reactions in Z	0.00	kN	
	Resultant of reactions about X	0.07378	kNm	At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm)
	Resultant of reactions about Y	0.00000	kNm	At center of gravity of model
	Resultant of reactions about Z	-0.00305	kNm	At center of gravity of model
	Max. displacement in X	0.9	mm	Member No. 104, x: 159.6 mm
	Max. displacement in Y	6.4	mm	Member No. 686, x: 160.0 mm
	Max. displacement in Z	2.5	mm	Member No. 583, x: 84.5 mm
	Max. vector displacement	6.8	mm	Member No. 686, x: 213.4 mm
	Max. rotation about X	-2.3	mrad	Member No. 744, x: 13.4 mm
	Max. rotation about Y	1.4	mrad	FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)
	Max. rotation about Z	1.0	mrad	FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)
	Method of analysis	Linear		Geometrically linear analysis
	Reduction of stiffness			Cross-sections, Members, Surfaces
	Number of load increments	1		
	Number of iterations	1		
	LC8 - Wind in -Y			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	-1.86	kN	
	Sum of support reactions in Y	-1.86	kN	Deviation 0.00%
	Sum of loads in Z	0.00	kN	
	Sum of support reactions in Z	0.00	kN	
	Resultant of reactions about X	-0.07524	kNm	At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm)
	Resultant of reactions about Y	0.00000	kNm	At center of gravity of model
	Resultant of reactions about Z	0.00305	kNm	At center of gravity of model
	Max. displacement in X	-0.9	mm	Member No. 104, x: 159.6 mm
	Max. displacement in Y	-6.3	mm	Member No. 686, x: 160.0 mm
	Max. displacement in Z	-2.5	mm	Member No. 583, x: 84.5 mm
	Max. vector displacement	6.8	mm	Member No. 686, x: 213.4 mm
	Max. rotation about X	2.3	mrad	Member No. 744, x: 13.4 mm
	Max. rotation about Y	-1.4	mrad	FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)

■ 4.0 RESULTS - SUMMARY

	Description	Value	Unit	Comment
	Max. rotation about Z	-1.0	mrad	FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)
	Method of analysis	Linear		Geometrically linear analysis
	Reduction of stiffness			Cross-sections, Members, Surfaces
	Number of load increments	1		
	Number of iterations	1		
	CO1 - Characteristic Values			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	0.00	kN	
	Sum of support reactions in Y	0.00	kN	
	Sum of loads in Z	-2.13	kN	
	Sum of support reactions in Z	-2.13	kN	Deviation 0.00%
	Resultant of reactions about X	0.0	kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm)
	Resultant of reactions about Y	0.0	kNm	At center of gravity of model
	Resultant of reactions about Z	0.0	kNm	At center of gravity of model
	Max. displacement in X	0.4	mm	Member No. 117, x: 46.7 mm
	Max. displacement in Y	-0.4	mm	Member No. 708, x: 46.7 mm
	Max. displacement in Z	-0.2	mm	Member No. 1035, x: 225.7 mm
	Max. vector displacement	0.5	mm	Member No. 701, x: 143.4 mm
	Max. rotation about X	0.3	mrad	FE Node No. 1253 (X: 751.7, Y: -559.2, Z: 7382.5 mm)
	Max. rotation about Y	0.3	mrad	Member No. 7, x: 200.0 mm
	Max. rotation about Z	-0.1	mrad	FE Node No. 1680 (X: -754.4, Y: -566.3, Z: 7367.7 mm)
	Method of analysis	2nd Order		Second order analysis (Nonlinear, Timoshenko)
	Internal forces referred to deformed system for...	☒		N, V_y, V_z, M_y, M_z, M_T
	Reduction of stiffness			Materials, Cross-sections, Members, Surfaces
	Consider favorable effects of tensile forces	☐		
	Divide results by CO factor	☐		
	Number of load increments	1		
	Number of iterations	3		
	CO2 - Design Internal Forces - 1 acrobat - +Y swing			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	0.64	kN	
	Sum of support reactions in Y	0.64	kN	Deviation 0.00%
	Sum of loads in Z	-6.08	kN	
	Sum of support reactions in Z	-6.08	kN	Deviation 0.00%
	Resultant of reactions about X	-1.9	kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm)
	Resultant of reactions about Y	0.0	kNm	At center of gravity of model
	Resultant of reactions about Z	0.0	kNm	At center of gravity of model
	Max. displacement in X	0.5	mm	Member No. 119, x: 319.1 mm
	Max. displacement in Y	2.8	mm	Member No. 649, x: 50.9 mm
	Max. displacement in Z	-1.5	mm	Member No. 545, x: 105.0 mm
	Max. vector displacement	3.1	mm	Member No. 765, x: 0.0 mm
	Max. rotation about X	3.0	mrad	Member No. 430, x: 262.5 mm
	Max. rotation about Y	-2.2	mrad	Member No. 765, x: 315.0 mm
	Max. rotation about Z	1.6	mrad	Member No. 372, x: 46.7 mm
	Method of analysis	2nd Order		Second order analysis (Nonlinear, Timoshenko)
	Internal forces referred to deformed system for...	☒		N, V_y, V_z, M_y, M_z, M_T
	Reduction of stiffness			Materials, Cross-sections, Members, Surfaces
	Consider favorable effects of tensile forces	☐		
	Divide results by CO factor	☐		
	Number of load increments	1		
	Number of iterations	3		
	CO3 - Design Internal Forces - 1 acrobat -Y swing			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	-0.64	kN	
	Sum of support reactions in Y	-0.64	kN	Deviation 0.00%
	Sum of loads in Z	-6.08	kN	
	Sum of support reactions in Z	-6.08	kN	Deviation 0.00%
	Resultant of reactions about X	1.9	kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm)
	Resultant of reactions about Y	0.0	kNm	At center of gravity of model
	Resultant of reactions about Z	0.0	kNm	At center of gravity of model
	Max. displacement in X	0.4	mm	Member No. 352, x: 177.8 mm
	Max. displacement in Y	-2.7	mm	Member No. 458, x: 319.1 mm
	Max. displacement in Z	-1.4	mm	Member No. 430, x: 52.5 mm
	Max. vector displacement	3.0	mm	Member No. 765, x: 0.0 mm
	Max. rotation about X	-3.4	mrad	Member No. 545, x: 262.5 mm
	Max. rotation about Y	-2.5	mrad	Member No. 765, x: 315.0 mm
	Max. rotation about Z	1.5	mrad	Member No. 382, x: 46.7 mm
	Method of analysis	2nd Order		Second order analysis (Nonlinear, Timoshenko)
	Internal forces referred to deformed system for...	☒		N, V_y, V_z, M_y, M_z, M_T
	Reduction of stiffness			Materials, Cross-sections, Members, Surfaces
	Consider favorable effects of tensile forces	☐		
	Divide results by CO factor	☐		
	Number of load increments	1		
	Number of iterations	3		
	CO4 - Design Internal Forces - multiple acrobats			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	0.32	kN	
	Sum of support reactions in Y	0.32	kN	Deviation 0.00%
	Sum of loads in Z	-4.48	kN	
	Sum of support reactions in Z	-4.48	kN	Deviation 0.00%

■ 4.0 RESULTS - SUMMARY

Description	Value	Unit	Comment
Resultant of reactions about X	-1.0	kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm)
Resultant of reactions about Y	0.0	kNm	At center of gravity of model
Resultant of reactions about Z	0.0	kNm	At center of gravity of model
Max. displacement in X	0.5	mm	Member No. 119, x: 425.5 mm
Max. displacement in Y	1.4	mm	Member No. 649, x: 50.9 mm
Max. displacement in Z	-0.8	mm	Member No. 545, x: 105.0 mm
Max. vector displacement	1.5	mm	Member No. 765, x: 0.0 mm
Max. rotation about X	1.5	mrad	Member No. 430, x: 315.0 mm
Max. rotation about Y	-1.2	mrad	Member No. 765, x: 315.0 mm
Max. rotation about Z	0.8	mrad	Member No. 372, x: 46.7 mm
Method of analysis	2nd Order		Second order analysis (Nonlinear, Timoshenko)
Internal forces referred to deformed system for...	☒		N, V_y, V_z, M_y, M_z, M_T
Reduction of stiffness			Materials, Cross-sections, Members, Surfaces
Consider favorable effects of tensile forces	☐		
Divide results by CO factor	☐		
Number of load increments	1		
Number of iterations	3		
CO5 - internal forces - wind +Y			
Sum of loads in X	0.00	kN	
Sum of support reactions in X	0.00	kN	
Sum of loads in Y	2.24	kN	
Sum of support reactions in Y	2.24	kN	Deviation 0.00%
Sum of loads in Z	-2.88	kN	
Sum of support reactions in Z	-2.88	kN	Deviation 0.00%
Resultant of reactions about X	0.0	kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm)
Resultant of reactions about Y	0.0	kNm	At center of gravity of model
Resultant of reactions about Z	0.0	kNm	At center of gravity of model
Max. displacement in X	1.6	mm	Member No. 115, x: 338.5 mm
Max. displacement in Y	7.3	mm	Member No. 686, x: 373.4 mm
Max. displacement in Z	2.7	mm	Member No. 581, x: 84.6 mm
Max. vector displacement	7.8	mm	Member No. 686, x: 426.7 mm
Max. rotation about X	2.6	mrad	FE Node No. 2228 (X: 862.5, Y: -367.1, Z: 7382.5 mm)
Max. rotation about Y	2.0	mrad	FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)
Max. rotation about Z	1.1	mrad	FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)
Method of analysis	2nd Order		Second order analysis (Nonlinear, Timoshenko)
Internal forces referred to deformed system for...	☒		N, V_y, V_z, M_y, M_z, M_T
Reduction of stiffness			Materials, Cross-sections, Members, Surfaces
Consider favorable effects of tensile forces	☐		
Divide results by CO factor	☐		
Number of load increments	1		
Number of iterations	3		
CO6 - internal forces - wind -Y			
Sum of loads in X	0.00	kN	
Sum of support reactions in X	0.00	kN	
Sum of loads in Y	-2.24	kN	
Sum of support reactions in Y	-2.24	kN	Deviation 0.00%
Sum of loads in Z	-2.88	kN	
Sum of support reactions in Z	-2.88	kN	Deviation 0.00%
Resultant of reactions about X	-0.1	kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm)
Resultant of reactions about Y	0.0	kNm	At center of gravity of model
Resultant of reactions about Z	0.0	kNm	At center of gravity of model
Max. displacement in X	-0.7	mm	Member No. 75, x: 425.5 mm
Max. displacement in Y	-8.2	mm	Member No. 471, x: 212.7 mm
Max. displacement in Z	-3.3	mm	Member No. 583, x: 56.3 mm
Max. vector displacement	8.8	mm	FE Node No. 691 (X: 119.7, Y: 2274.2, Z: 4951.4 mm)
Max. rotation about X	3.1	mrad	Member No. 744, x: 13.4 mm
Max. rotation about Y	-1.4	mrad	FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)
Max. rotation about Z	-1.3	mrad	FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)
Method of analysis	2nd Order		Second order analysis (Nonlinear, Timoshenko)
Internal forces referred to deformed system for...	☒		N, V_y, V_z, M_y, M_z, M_T
Reduction of stiffness			Materials, Cross-sections, Members, Surfaces
Consider favorable effects of tensile forces	☐		
Divide results by CO factor	☐		
Number of load increments	1		
Number of iterations	4		
CO7 - Design Internal Forces - 1 acrobat + wind +Y			
Sum of loads in X	0.00	kN	
Sum of support reactions in X	0.00	kN	
Sum of loads in Y	2.88	kN	
Sum of support reactions in Y	2.88	kN	Deviation 0.00%
Sum of loads in Z	-6.08	kN	
Sum of support reactions in Z	-6.08	kN	Deviation 0.00%
Resultant of reactions about X	-1.9	kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm)
Resultant of reactions about Y	0.0	kNm	At center of gravity of model
Resultant of reactions about Z	0.0	kNm	At center of gravity of model
Max. displacement in X	1.6	mm	Member No. 104, x: 372.3 mm
Max. displacement in Y	10.3	mm	Member No. 686, x: 373.4 mm
Max. displacement in Z	3.8	mm	Member No. 581, x: 56.4 mm
Max. vector displacement	10.9	mm	Member No. 686, x: 426.7 mm
Max. rotation about X	5.0	mrad	Member No. 430, x: 315.0 mm
Max. rotation about Y	3.3	mrad	FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)
Max. rotation about Z	1.7	mrad	Member No. 372, x: 46.7 mm
Method of analysis	2nd Order		Second order analysis (Nonlinear, Timoshenko)
Internal forces referred to deformed system for...	☒		N, V_y, V_z, M_y, M_z, M_T
Reduction of stiffness			Materials, Cross-sections, Members, Surfaces

■ 4.0 RESULTS - SUMMARY

	Description	Value	Unit	Comment
	Consider favorable effects of tensile forces	☒		
	Divide results by CO factor	☐		
	Number of load increments	1		
	Number of iterations	4		
	CO8 - Design Internal Forces - 1 acrobat + wind -Y			
	Sum of loads in X	0.00	kN	
	Sum of support reactions in X	0.00	kN	
	Sum of loads in Y	-2.88	kN	
	Sum of support reactions in Y	-2.88	kN	Deviation 0.00%
	Sum of loads in Z	-6.08	kN	
	Sum of support reactions in Z	-6.08	kN	Deviation 0.00%
	Resultant of reactions about X	1.9	kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm)
	Resultant of reactions about Y	0.0	kNm	At center of gravity of model
	Resultant of reactions about Z	0.0	kNm	At center of gravity of model
	Max. displacement in X	-1.5	mm	Member No. 104, x: 53.2 mm
	Max. displacement in Y	-10.3	mm	Member No. 465, x: 225.7 mm
	Max. displacement in Z	-4.2	mm	Member No. 581, x: 84.6 mm
	Max. vector displacement	11.1	mm	Member No. 466, x: 106.4 mm
	Max. rotation about X	-5.3	mrad	Member No. 545, x: 262.5 mm
	Max. rotation about Y	2.5	mrad	FE Node No. 2808 (X: -868.7, Y: -356.4, Z: 7382.5 mm)
	Max. rotation about Z	-2.2	mrad	FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)
	Method of analysis	2nd Order		Second order analysis (Nonlinear, Timoshenko)
	Internal forces referred to deformed system for...	☒		N, V_y, V_z, M_y, M_z, M_T
	Reduction of stiffness			Materials, Cross-sections, Members, Surfaces
	Consider favorable effects of tensile forces	☒		
	Divide results by CO factor	☐		
	Number of load increments	1		
	Number of iterations	3		
	Summary			
	Max. displacement in X	1.6	mm	CO5, Member No. 115, x: 338.5 mm
	Max. displacement in Y	-10.3	mm	CO8, Member No. 465, x: 225.7 mm
	Max. displacement in Z	-4.2	mm	CO8, Member No. 581, x: 84.6 mm
	Max. vector displacement	11.1	mm	CO8, Member No. 466, x: 106.4 mm
	Max. rotation about X	-5.3	mrad	CO8, Member No. 545, x: 262.5 mm
	Max. rotation about Y	3.3	mrad	CO7, FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)
	Max. rotation about Z	-2.2	mrad	CO8, FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm)

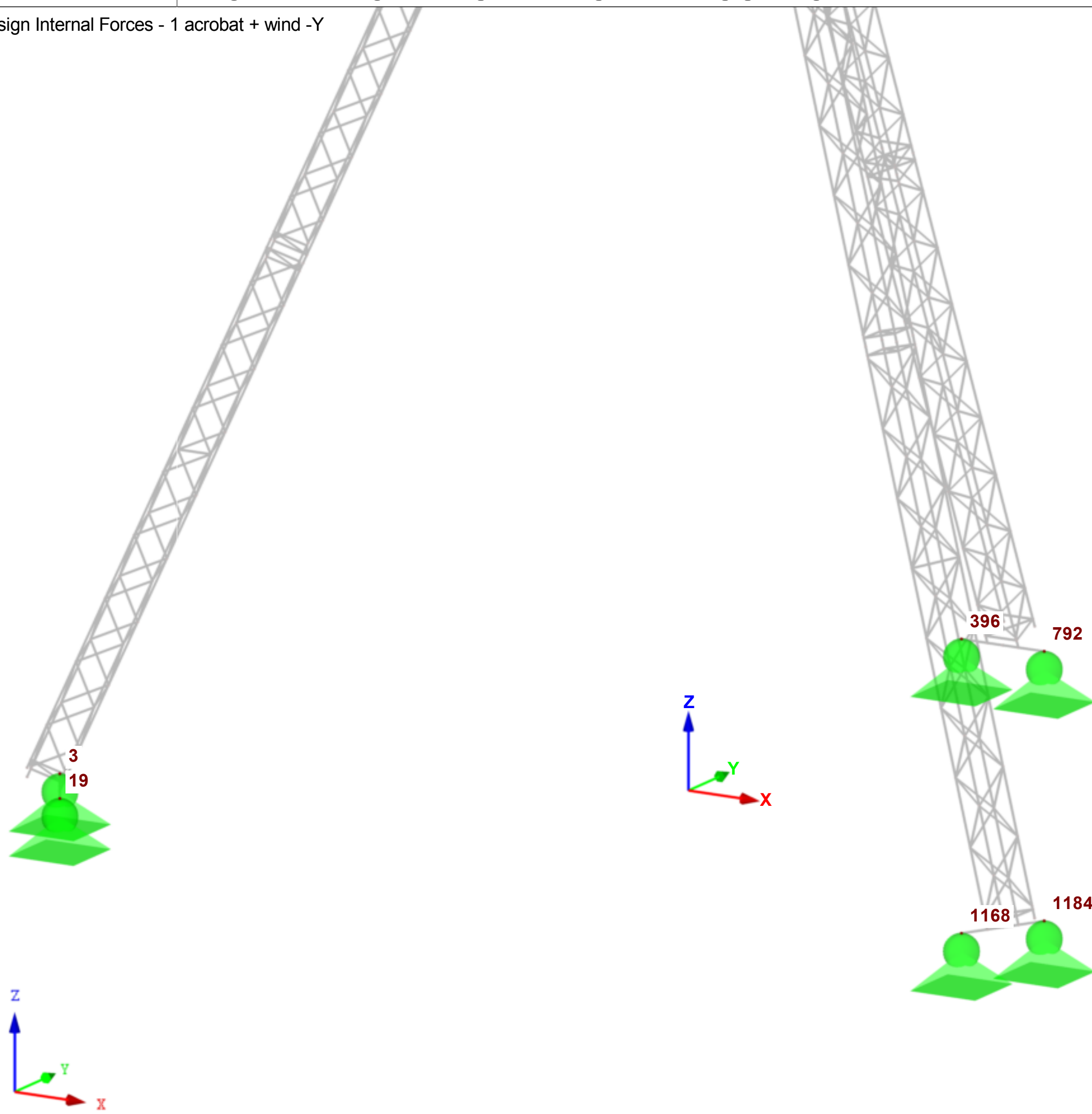
	Other Settings	Number of 1D finite elements	:	1318
		Number of 2D finite elements	:	3937
		Number of 3D finite elements	:	8065
		Number of FE mesh nodes	:	5050
		Number of equations	:	30300
		Max. number of iterations	:	20
		Number of divisions for member results	:	10
		Division of cable/foundation/tapered members	:	10
		Number of member divisions for searching maximum values	:	10
		Subdivisions of FE mesh for graphical results	:	0
		Percentage of iterations according to Picard method in combination with Newton-Raphson method	:	5 %

	Options	☒ Activate shear stiffness of members (Ay, Az)	
		☒ Activate member divisions for large deformation or post-critical analysis	
		☒ Activate entered stiffness modifications	
		☐ Ignore rotational degrees of freedom	
		☒ Check of critical forces of members	
		☐ Nonsymmetric direct solver if demanded by nonlinear model	
		Method for the system of equations	◉ Direct ○ Iteration
		Plate bending theory	◉ Mindlin ○ Kirchhoff
		Solver version	○ 32-bit ◉ 64-bit
	Precision and Tolerance	☐ Change default setting	

MODEL - NODE NUMBERS WITH SUPPORT

CO8: Design Internal Forces - 1 acrobat + wind -Y

Isometric



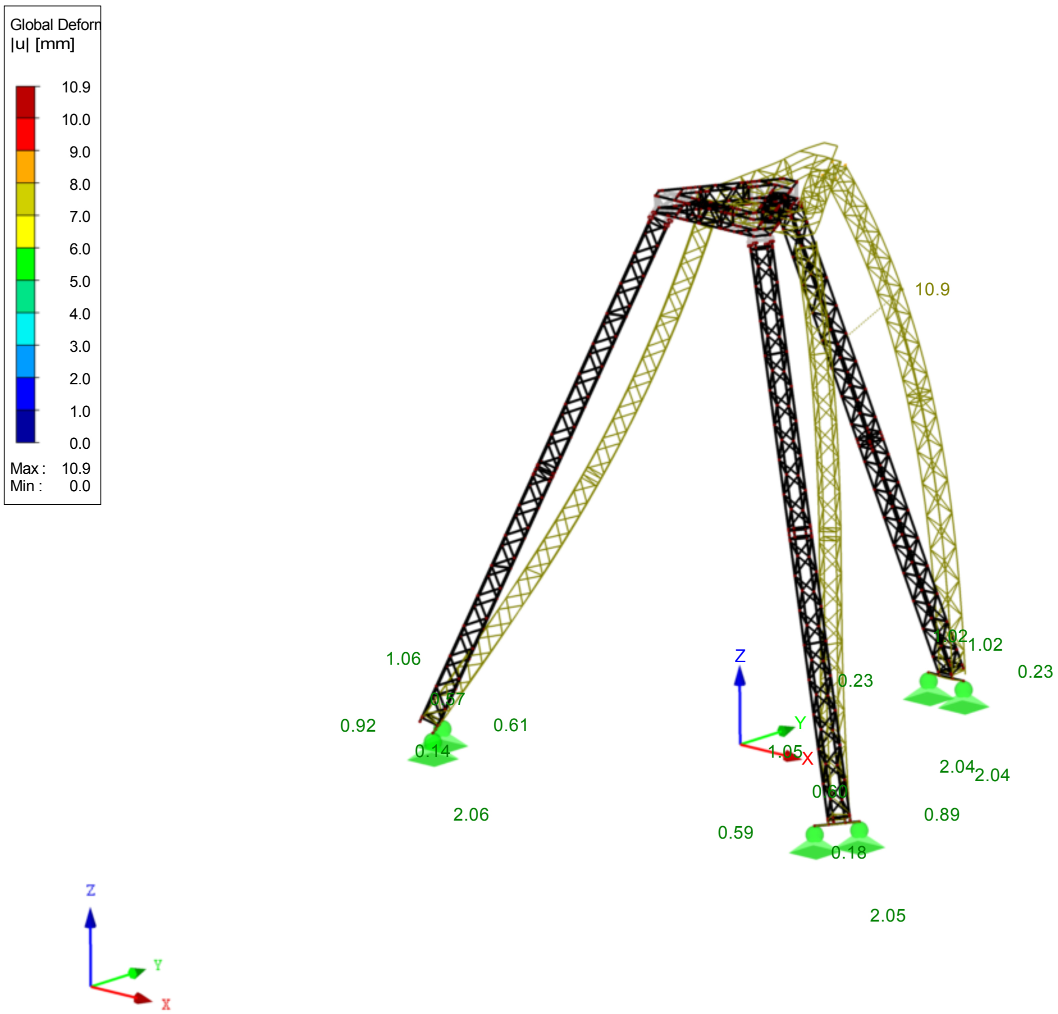
■ 4.1 NODES - SUPPORT FORCES

Node		Support Forces [kN]			Support Moments [kNm]			
No.	LC/CO	$P_{X'}$	$P_{Y'}$	$P_{Z'}$	$M_{X'}$	$M_{Y'}$	$M_{Z'}$	Comment
3	CO1	-0.10	-0.01	-0.36	0.00	0.00	-0.01	
	CO2	-0.46	-0.11	-1.15	0.00	0.00	-0.05	
	CO3	-0.28	-0.06	-0.88	0.00	0.00	-0.04	
	CO4	-0.30	-0.07	-0.81	0.00	0.00	-0.03	
	CO5	-0.60	-0.05	-1.40	0.00	0.00	-0.04	
	CO6	0.32	0.01	0.44	0.00	0.00	0.01	
	CO7	-0.92	-0.14	-2.06	0.00	0.00	-0.07	
	CO8	0.17	-0.03	0.03	0.00	0.00	-0.02	
19	CO1	-0.06	-0.08	-0.35	0.00	0.00	0.01	
	CO2	-0.05	-0.10	-0.53	0.00	0.00	0.02	
	CO3	-0.46	-0.45	-1.49	0.00	0.00	0.07	
	CO4	-0.07	-0.11	-0.50	0.00	0.00	0.02	
	CO5	0.58	0.56	1.12	0.00	0.00	-0.08	
	CO6	-0.75	-0.77	-2.07	0.00	0.00	0.11	
	CO7	0.61	0.57	1.06	0.00	0.00	-0.07	
	CO8	-1.12	-1.11	-3.08	0.00	0.00	0.16	
396	CO1	-0.04	0.09	-0.35	0.00	0.00	0.01	
	CO2	-0.15	0.53	-1.36	0.00	0.00	0.07	
	CO3	-0.07	0.18	-0.66	0.00	0.00	0.02	
	CO4	-0.10	0.33	-0.92	0.00	0.00	0.04	
	CO5	-0.13	0.61	-1.16	0.00	0.00	0.08	
	CO6	0.03	-0.36	0.20	0.00	0.00	-0.05	
	CO7	-0.23	1.02	-2.04	0.00	0.00	0.13	
	CO8	0.01	-0.30	0.02	0.00	0.00	-0.04	
792	CO1	0.04	0.10	-0.36	0.00	0.00	-0.01	
	CO2	0.15	0.54	-1.36	0.00	0.00	-0.07	
	CO3	0.07	0.19	-0.67	0.00	0.00	-0.02	
	CO4	0.10	0.33	-0.92	0.00	0.00	-0.04	
	CO5	0.13	0.61	-1.16	0.00	0.00	-0.08	
	CO6	-0.03	-0.35	0.19	0.00	0.00	0.05	
	CO7	0.23	1.02	-2.04	0.00	0.00	-0.13	
	CO8	0.00	-0.30	0.01	0.00	0.00	0.04	
1168	CO1	0.06	-0.08	-0.36	0.00	0.00	-0.01	
	CO2	0.06	-0.10	-0.53	0.00	0.00	-0.02	
	CO3	0.46	-0.46	-1.50	0.00	0.00	-0.07	
	CO4	0.07	-0.10	-0.51	0.00	0.00	-0.02	
	CO5	-0.56	0.59	1.11	0.00	0.00	0.07	
	CO6	0.73	-0.81	-2.07	0.00	0.00	-0.11	
	CO7	-0.59	0.60	1.05	0.00	0.00	0.07	
	CO8	1.10	-1.15	-3.08	0.00	0.00	-0.16	
1184	CO1	0.10	-0.01	-0.35	0.00	0.00	0.01	
	CO2	0.45	-0.12	-1.14	0.00	0.00	0.05	
	CO3	0.29	-0.05	-0.88	0.00	0.00	0.04	
	CO4	0.29	-0.07	-0.81	0.00	0.00	0.03	
	CO5	0.58	-0.08	-1.39	0.00	0.00	0.04	
	CO6	-0.31	0.04	0.44	0.00	0.00	-0.01	
	CO7	0.89	-0.18	-2.05	0.00	0.00	0.08	
	CO8	-0.15	0.01	0.03	0.00	0.00	0.02	

GLOBAL DEFORMATIONS U, SUPPORT REACTIONS - ACROBAT AND WIND IN +Y

CO7: Design Internal Forces - 1 acrobat + wind +Y
Global Deformations u
Support Reactions[kN]

Isometric

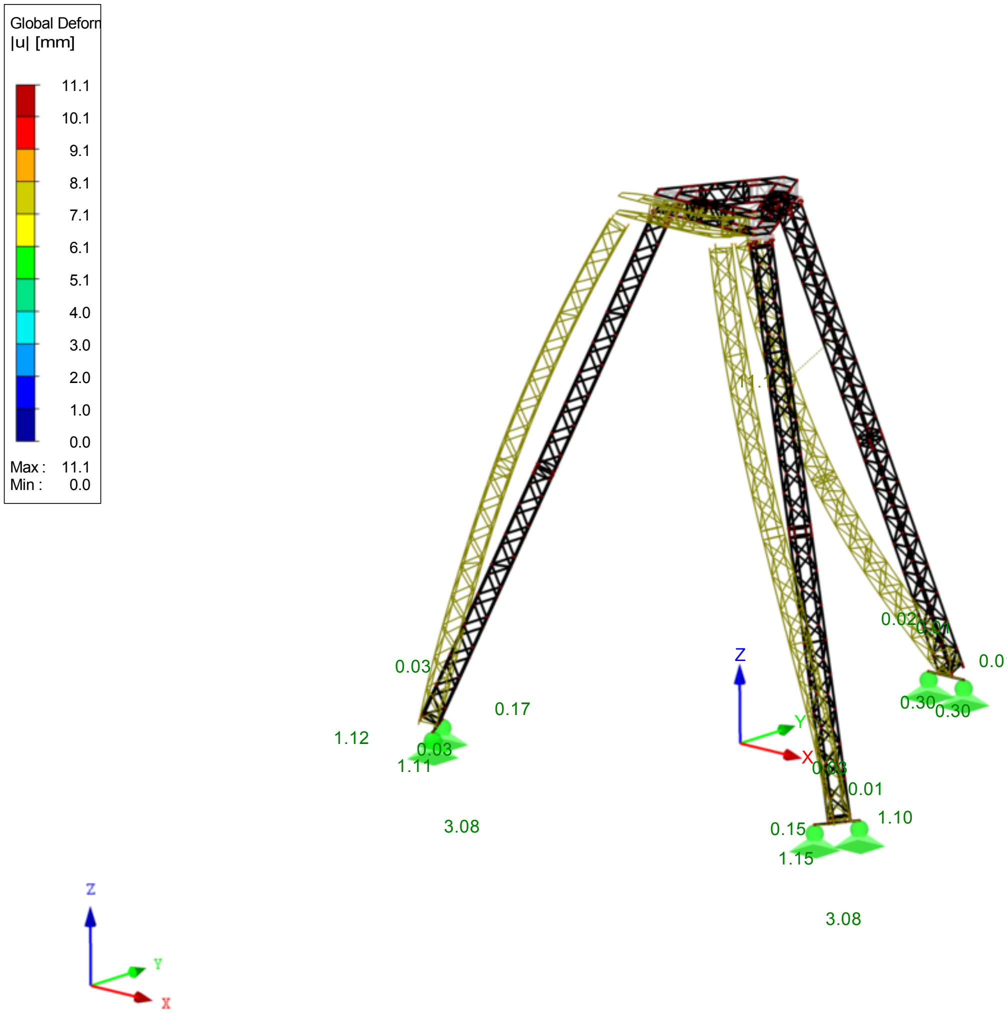


Max P-Z': 1.06, Min P-Z': -2.06 kN
Max P-Y': 1.02, Min P-Y': -0.18 kN
Max P-X': 0.89, Min P-X': -0.92 kN
Max u: 10.9, Min u: 0.0 mm
Factor of deformations: 110.00

GLOBAL DEFORMATIONS U, SUPPORT REACTIONS - ACROBAT AND WIND IN -Y

CO8: Design Internal Forces - 1 acrobat + wind -Y
Global Deformations u
Support Reactions[kN]

Isometric



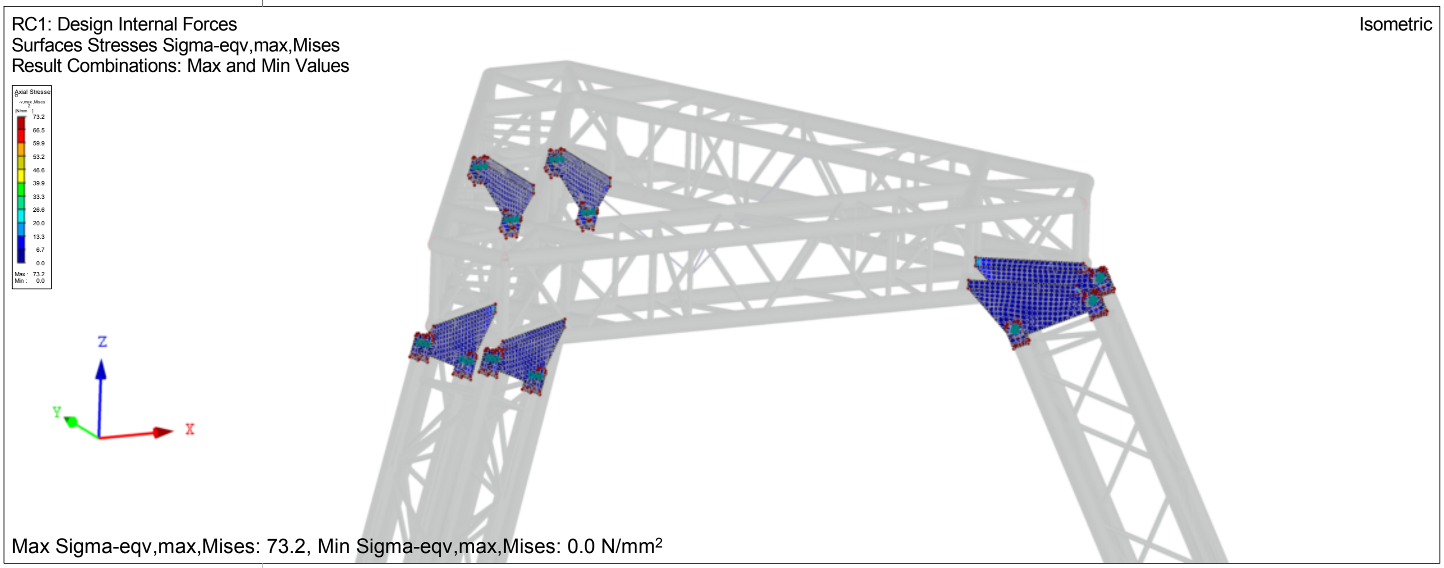
Max P-Z': 0.03, Min P-Z': -3.08 kN
Max P-Y': 0.01, Min P-Y': -1.15 kN
Max P-X': 1.10, Min P-X': -1.12 kN
Max u: 11.1, Min u: 0.0 mm
Factor of deformations: 100.00

■ 4.1 NODES - SUPPORT FORCES - RC1

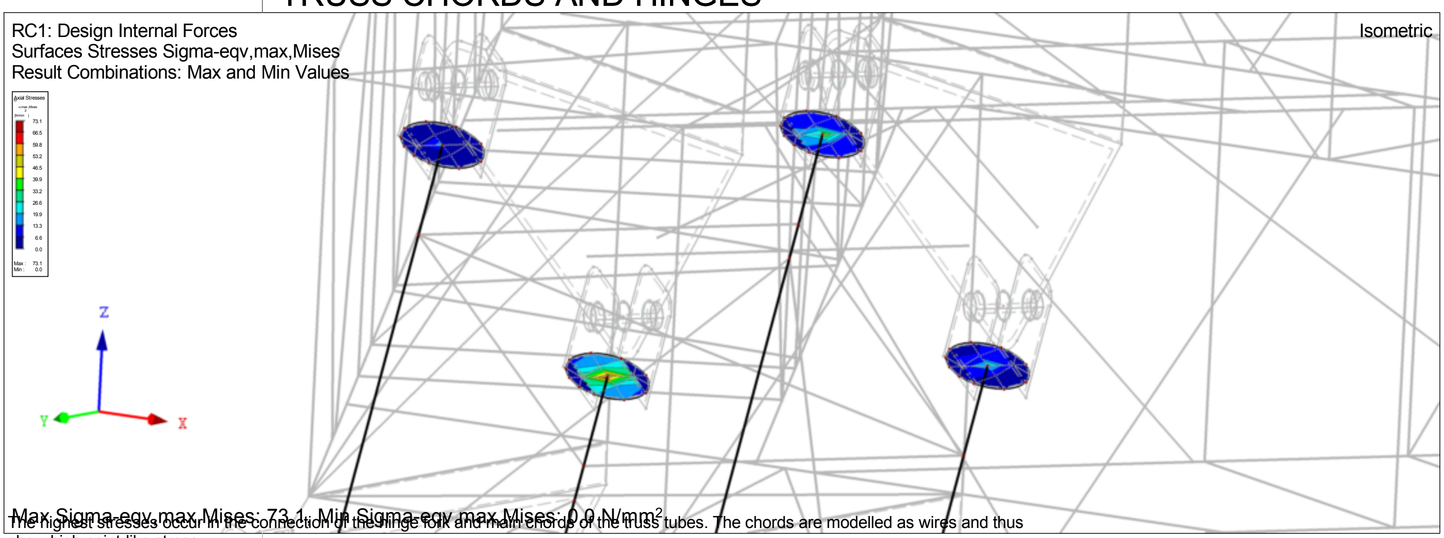
Result Combinations

Node			Support Forces [kN]			Support Moments [kNm]			
No.	RC		$P_{X'}$	$P_{Y'}$	$P_{Z'}$	$M_{X'}$	$M_{Y'}$	$M_{Z'}$	Comment
3	RC1	Max	0.32	0.01	0.44	0.00	0.00	0.01	
		Min	-0.92	-0.14	-2.06	0.00	0.00	-0.07	
19	RC1	Max	0.61	0.57	1.12	0.00	0.00	0.16	
		Min	-1.12	-1.11	-3.08	0.00	0.00	-0.08	
396	RC1	Max	0.03	1.02	0.20	0.00	0.00	0.13	
		Min	-0.23	-0.36	-2.04	0.00	0.00	-0.05	
792	RC1	Max	0.23	1.02	0.19	0.00	0.00	0.05	
		Min	-0.03	-0.35	-2.04	0.00	0.00	-0.13	
1168	RC1	Max	1.10	0.60	1.11	0.00	0.00	0.07	
		Min	-0.59	-1.15	-3.08	0.00	0.00	-0.16	
1184	RC1	Max	0.89	0.04	0.44	0.00	0.00	0.08	
		Min	-0.31	-0.18	-2.05	0.00	0.00	-0.01	

AXIAL STRESSES $\sigma_{eqv,Max,Mises}$ IN THE SURFACES CONNECTING THE TOPBLOCK AND THE LEGS



AXIAL STRESSES $\sigma_{eqv,Max,Mises}$ IN THE SURFACES CONNECTING THE TRUSS CHORDS AND HINGES



The highest stresses occur in the connection of the hinge fork and main chords of the truss tubes. The chords are modelled as wires and thus show high point-like stress.
It's more useful to analyse this connection in the RF_STEEL module: in fact the hinge is welded like a conical coupler all around the end of the tube: if stresses remain below HAZ numbers, the connection is sufficiently strong.

RF-STEEL Members
CA1
General stress analysis
of steel members

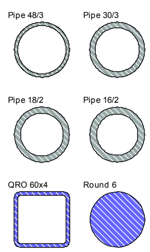
1.1.1 GENERAL DATA

Members to design:		All
Load combinations to design:	CO7	Design Internal Forces - 1 acrobat + wind +Y
	CO8	Design Internal Forces - 1 acrobat + wind -Y

In order to have a proper indication of failure, the yield values in the Heat Affected Zone are modelled

1.2 MATERIALS

Matl. No.	Material Description	Safety Factor γ_M [-]	Yield Strength f_{yk} [N/mm²]	Limit Stresses [N/mm²] Manually	Limit σ_x	Limit τ	Limit σ_{eqv}
1	Aluminium EN-AW 6082 T6/T651*	1.10	100.000	☐	90.909	52.486	90.909
2	HDT1200M 1.0965	1.00	900.000	☐	900.000	519.615	900.000
3	Steel S 235 JR	1.00	235.000	☐	235.000	135.677	235.000



1.3.1 CROSS-SECTIONS

Sect. No.	Matl. No.	Cross-section Description	I_t [cm⁴] / A [cm²]	I_y [cm⁴] / $\alpha_{pl,y}$	I_z [cm⁴] / $\alpha_{pl,z}$	Comment
1	1	Pipe 48/3	21.57	10.78	10.78	
			4.24	1.35	1.35	
2	1	Pipe 30/3	4.69	2.35	2.35	
			2.54	1.40	1.40	
3	1	Pipe 18/2	0.65	0.33	0.33	
			1.01	1.42	1.42	
4	1	Pipe 16/2	0.44	0.22	0.22	
			0.88	1.44	1.44	
5	3	QRO 60x4 | EN 10210-2:2006	72.50	45.40	45.40	
			8.79	1.21	1.21	
6	2	Round 6	0.01	0.01	0.01	
			0.28	1.70	1.70	

RF-STEEL Members
CA1
General stress analysis
of steel members

2.1 STRESSES BY CROSS-SECTION

Sect. No.	Member No.	Location x [mm]	S-Point No.	Load Case	Stress Type	Stress [N/mm²] Existing	Limit	Stress Ratio
1	**Pipe 48/3**							
	399	0.0	3	CO8	Sigma Total	-32.703	90.909	0.36
	317	38.9	10	CO7	Tau Total	-14.303	52.486	0.27
	399	0.0	3	CO8	Sigma-eqv	32.849	90.909	0.36
2	**Pipe 30/3**							
	876	0.0	35	CO8	Sigma Total	-20.724	90.909	0.23
	854	238.9	30	CO7	Tau Total	-1.762	52.486	0.03
	876	0.0	35	CO8	Sigma-eqv	20.732	90.909	0.23
3	**Pipe 18/2**							
	367	0.0	2	CO7	Sigma Total	28.081	90.909	0.31
	410	0.0	11	CO8	Tau Total	2.039	52.486	0.04
	367	0.0	2	CO7	Sigma-eqv	28.093	90.909	0.31
4	**Pipe 16/2**							
	363	0.0	25	CO8	Sigma Total	30.811	90.909	0.34
	353	143.4	36	CO8	Tau Total	-1.728	52.486	0.03
	363	0.0	25	CO8	Sigma-eqv	30.824	90.909	0.34
5	**QRO 60x4 | EN 10210-2:2006**							
	1155	0.0	1	CO8	Sigma Total	-47.696	235.000	0.20
	1155	200.0	4	CO8	Tau Total	8.526	135.677	0.06
	1155	0.0	1	CO8	Sigma-eqv	48.585	235.000	0.21
6	**Round 6**							
	545	0.0	10	CO7	Sigma Total	104.315	900.000	0.12
	545	0.0	37	CO7	Tau Total	0.354	519.615	0.00
	545	0.0	10	CO7	Sigma-eqv	104.317	900.000	0.12

CO5	**Wind in +Y direction**									
	Support Forces [kN]						*should be negat*	*orientation*	*fricion coeff*	*ballast*
									0,6	
Node	$P_{X'}$	$P_{Y'}$	$P_{Z'}$	$P_{X'}$ per leg	$P_{Y'}$ per leg	$P_{hor'}$ per leg	$P_{Z'}$ per leg		Ffrict : Phor	kg
3	-0,60	-0,05	-1,40	-0,02	0,51	0,510	**-0,28**	-X -Y leg	0,33	222
19	0,58	0,56	1,12							
396	-0,13	0,61	-1,16	0,00	1,22	1,220	**-2,32**	+Y leg	1,14	
792	0,13	0,61	-1,16							
1168	-0,56	0,59	1,11	0,02	0,51	0,510	**-0,28**	+X -Y leg	0,33	222
1184	0,58	-0,08	-1,39							
Σ Loads	*-0,00*	*2,24*	*-2,88*				*-2,88*			
CO6	**Wind in -Y direction**									
	Support Forces [kN]									
Node	$P_{X'}$	$P_{Y'}$	$P_{Z'}$	$P_{X'}$ per leg	$P_{Y'}$ per leg	$P_{hor'}$ per leg	$P_{Z'}$ per leg			
3	0,32	0,01	0,44	-0,43	-0,76	0,873	**-1,63**	-X -Y leg	1,12	
19	-0,75	-0,77	-2,07							
396	0,03	-0,36	0,20	0,00	-0,71	0,710	**0,39**	+Y leg	-0,33	112
792	-0,03	-0,35	0,19							
1168	0,73	-0,81	-2,07	0,42	-0,77	0,877	**-1,63**	+X -Y leg	1,12	
1184	-0,31	0,04	0,44							
Σ Loads	*-0,01*	*-2,24*	*-2,87*				*-2,87*			
CO7	**Wind and acrobat in +Y direction**									
	Support Forces [kN]									
Node	$P_{X'}$	$P_{Y'}$	$P_{Z'}$	$P_{X'}$ per leg	$P_{Y'}$ per leg	$P_{hor'}$ per leg	$P_{Z'}$ per leg			
3	-0,92	-0,14	-2,06	-0,31	0,43	0,530	**-1,00**	-X -Y leg	1,13	
19	0,61	0,57	1,06							
396	-0,23	1,02	-2,04	0,00	2,04	2,040	**-4,08**	+Y leg	1,20	
792	0,23	1,02	-2,04							
1168	-0,59	0,60	1,05	0,30	0,42	0,516	**-1,00**	+X -Y leg	1,16	
1184	0,89	-0,18	-2,05							
Σ Loads	*-0,01*	*2,89*	*-6,08*				*-6,08*			
CO8	**Wind and acrobat in -Y direction**									
	Support Forces [kN]									
Node	$P_{X'}$	$P_{Y'}$	$P_{Z'}$	$P_{X'}$ per leg	$P_{Y'}$ per leg	$P_{hor'}$ per leg	$P_{Z'}$ per leg			
3	0,17	-0,03	0,03	-0,95	-1,14	1,484	**-3,05**	-X -Y leg	1,23	
19	-1,12	-1,11	-3,08							
396	0,01	-0,30	0,02	0,01	-0,60	0,600	**0,03**	+Y leg	-0,03	162
792	0,00	-0,30	0,01							
1168	1,10	-1,15	-3,08	0,95	-1,14	1,484	**-3,05**	+X -Y leg	1,23	
1184	-0,15	0,01	0,03							
Σ Loads	*0,01*	*-2,88*	*-6,07*				*-6,07*			