

Date:

18-07-16

Model: Driepoot-v14

# STRUCTURAL ANALYSIS

Project: 2016-driepoot

PROJECT	Aerial Trapeze Truss Tripod
CLIENT	SOL'AIR Sylvia Idelberger Amsterdam
CREATED BY	ir. Roy Schilderman



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MODEL

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#### 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	:	According to Standard: EN 1990
	combinations		National Annex: NEN - Netherlands

### FE MESH SETTINGS

	General	Target length of finite elements	I FE	:	15.0 mm
		Maximum distance between a node and a line to integrate it into the line	а	:	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	ΔD	:	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



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# 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 strength 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<sup>2</sup>
- 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)



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# ■ 1.3 MATERIALS

Matl.	Modulus	Modulus	Poisson's Ratio	Spec. Weight	Coeff. of Th. Exp.	Partial Factor	Material
No.	E [N/mm <sup>2</sup> ]	G [N/mm <sup>2</sup> ]	v [-]	γ [kN/m³]	α [1/°C]	γм [-]	Model
1	Aluminium EN-AW	6082 T6/T651   EN 1	999-1-1:2007				
	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 bo	Its and pins					
	21000.0	10500.0	0.000	0.30	7.85E+01	1.00	Isotropic Linear Elastic

# 1.5 SOLIDS

Solid			Matl.	Volume	Weight
No.	Solid Type	Boundary Surfaces No.	No.	V [mm <sup>3</sup> ]	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		In Surface	Area	
No.	Boundary Lines No.	No.	A [mm <sup>2</sup> ]	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				Rotation [°]		Column			Support C	Conditions		
No.	Nodes No.	Sequen.	about X	about Y	about Z	in Z	u <sub>X'</sub>	u <sub>Y'</sub>	u <sub>Z'</sub>	φx	φr	φz
1	3,19,396, 792,1168, 1184	XYZ	0.00	0.00	0.00		$\boxtimes$					





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## ■ 1.13 CROSS-SECTIONS

Section	Matl.	J [cm <sup>4</sup> ]	I <sub>y</sub> [cm <sup>4</sup> ]	I <sub>z</sub> [cm <sup>4</sup> ]	Principal Axes	Rotation	Overall Dime	ensions [mm]
No.	No.	A [cm <sup>2</sup> ]	A <sub>y</sub> [cm <sup>2</sup> ]	A <sub>z</sub> [cm <sup>2</sup> ]	α [°]	α' [°]	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					i.	
	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.	1st Surface	2nd Surface	Line No.	
No.	No.	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.	FE Mesh Refinement	Nodes	Number	Sphere	Target FE-L	_ength [mm]	
No.	applied to	No.	Divisions	Radius [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			



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# DETAIL OF ATTACHMENT H30V LEG - TOP SECTION





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MODEL WITH SIZES







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MODEL - TUBES 16/2







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





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### 2.1 LOAD CASES

Load	Load Case	EN 1990   NEN		Self-Weight - F	actor in Directio	on
Case	Description	Action Category	Active	х	Y I	Z
LC1	Self-weight	Permanent	$\boxtimes$	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

Luau	Luad Case			
Case	Description		Calculatio	on Parameters
LC1	Self-weight	Method of analysis	: •	Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: 0	Newton-Raphson
		Activate stiffness factors of:	: 🖂	Cross-sections (factor for J, I <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🛛	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
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 <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🛛	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
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 <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🛛	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
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 <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🛛	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
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 <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🛛	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
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 <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🛛	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
LC7	Wind in +Y	Method of analysis	: •	Geometrically linear analysis
		Method for solving system of nonlinear algebraic equations	: •	Newton-Raphson
		Activate stiffness factors of:	$\simeq$	Cross-sections (factor for J, I <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🛛	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
LC8	Wind in -Y	Method of analysis	: •	Geometrically linear analysis
		Method for solving system of		Newton-Raphson
		nonlinear algebraic equations	_	
		Activate stiffness factors of:	: 🛛	Cross-sections (factor for J, I <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🖂	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )



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# ■ 2.5 LOAD COMBINATIONS

Load		Load Combination				
Combin.	DS	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	LU3	The swingin
			4	1 20	1.07	Wind in +Y
CO8		Design Internal Forces - 1 acrobat + wind -Y	1	1.35	LC1	Self-weight
2.50			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

Loau				
Combin.	Description	1	Calculati	on Parameters
CO1	Characteristic Values	Method of analysis	: •	Second order analysis (P-Delta)
		Method for solving system of		Picard
		nonlinear algebraic equations		
		Options	· 🖂	Refer internal forces to deformed system for:
				Normal forces N
				Shear forces V. and V.
				Moments M M and M-
		Activate stiffness factors of:	· 121	Materials (partial factor M)
		Activate stimless factors of.	. 🖾	Cross sections (factor for $                                     $
			. 🖂	Cross-sections (factor for $O \downarrow F \downarrow F \downarrow F A O A O A)$
			: 🛛	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
CO2	Design Internal Forces - 1 acrobat - +Y swing	Method of analysis	: •	Second order analysis (P-Delta)
	-	Method for solving system of		Picard
		nonlinear algebraic equations		
		Options	: 🖂	Refer internal forces to deformed system for:
				Normal forces N
				Shear forces V <sub>v</sub> and V <sub>z</sub>
				Moments My, M <sub>z</sub> and M <sub>T</sub>
		Activate stiffness factors of	· 🖂	Materials (partial factor vM)
			. 🖂	Cross-sections (factor for 1 1 1 A A A )
				Mombers (factor for $C \downarrow E \downarrow E \downarrow E \downarrow C \land C \land$ )
<u> </u>	Design Internal Foreca, 1 acrohot	Mathed of analysis	. 0	Second order analysis (P. Dolta)
003	-Y swing			Second order analysis (P-Deita)
		Method for solving system of	: •	Picard
		nonlinear algebraic equations		
		Options	: 🖂	Refer internal forces to deformed system for:
				Normal forces N
				Shear forces V <sub>y</sub> and V <sub>z</sub>
				Moments M <sub>y</sub> , M <sub>z</sub> and M <sub>T</sub>
		Activate stiffness factors of:	: 🖂	Materials (partial factor yM)
			: 🖂	Cross-sections (factor for J, Iv, Iz, A, Av, Az)
			: 🖂	Members (factor for GJ, Ely, Elz, EA, GAy, GAz)
CO4	Design Internal Forces - multiple	Method of analysis	· .	Second order analysis (P-Delta)
001	acrobats	incured of analysis		
		Method for solving system of	: •	Picard
		nonlinear algebraic equations		
		Options	: 🛛	Refer internal forces to deformed system for:
				Normal forces N
				Shear forces V <sub>v</sub> and V <sub>z</sub>
				Moments M., M. and M.
		Activate stiffness factors of	· 🖂	Materials (partial factor M)
			. 🖸	Cross-sections (factor for $      \Delta \Delta \Delta$ )
			· 🖸	Members (factor for G   E  E  EA GA GA )
CO5	internal forces wind +V	Mothed of applysis	. 🖂	Second order analysis (P. Dolta)
005	Internal IUICes - WITU TT	Method for solving system of		Dicard
		nonlinear algebraic equations		Filiaiu
		Options	. 174	Poter internal forces to deformed system for:
		Options	. 🖂	
				Shear lorces Vy and Vz
				Moments M <sub>y</sub> , M <sub>z</sub> and M <sub>T</sub>
		Activate stiffness factors of:	: 🖂	Materials (partial factor γM)



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# 2.5.2 LOAD COMBINATIONS - CALCULATION PARAMETERS

Combin	Description		Coloulatio	n Parametera
Combin.	Description		Calculatio	ni Parameters
			: 🖂	Cross-sections (factor for J, I <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🖂	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
CO6	internal forces - wind -Y	Method of analysis	: •	Second order analysis (P-Delta)
		Method for solving system of	: •	Picard
		nonlinear algebraic equations		
		Options	: 🖂	Refer internal forces to deformed system for:
				Normal forces N
				Shear forces V <sub>y</sub> and V <sub>z</sub>
				Moments M <sub>y</sub> , M <sub>z</sub> and M <sub>T</sub>
		Activate stiffness factors of:	: 🖂	Materials (partial factor <sub>y</sub> M)
			: 🖂	Cross-sections (factor for J, I <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🖂	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
C07	Design Internal Forces - 1 acrobat + wind +Y	Method of analysis	: •	Second order analysis (P-Delta)
		Method for solving system of nonlinear algebraic equations	: •	Picard
ĺ		Options	: 🖂	Consider favorable effects due to tension
			: 🖂	Refer internal forces to deformed system for:
				Normal forces N
				Shear forces V <sub>y</sub> and V <sub>z</sub>
				Moments M <sub>y</sub> , M <sub>z</sub> and M <sub>T</sub>
		Activate stiffness factors of:	: 🖂	Materials (partial factor γM)
			$\simeq$	Cross-sections (factor for J, I <sub>v</sub> , I <sub>z</sub> , A, A <sub>v</sub> , A <sub>z</sub> )
			$\simeq$	Members (factor for GJ, El <sub>y</sub> , El <sub>z</sub> , EA, GA <sub>y</sub> , GA <sub>z</sub> )
CO8	Design Internal Forces - 1 acrobat	Method of analysis	: •	Second order analysis (P-Delta)
	+ wind -Y			
[		Method for solving system of	: •	Picard
		nonlinear algebraic equations		
		Options	: 🖂	Consider favorable effects due to tension
			: 🖂	Refer internal forces to deformed system for:
				Normal forces N
				Shear forces V <sub>y</sub> and V <sub>z</sub>
				Moments M <sub>y</sub> , M <sub>z</sub> and M <sub>T</sub>
		Activate stiffness factors of:	: 🖂	Materials (partial factor γM)
			: 🖂	Cross-sections (factor for J, I <sub>y</sub> , I <sub>z</sub> , A, A <sub>y</sub> , A <sub>z</sub> )
			: 🖂	Members (factor for GJ, $EI_y$ , $EI_z$ , EA, GA <sub>y</sub> , GA <sub>z</sub> )

# 2.7 RESULT COMBINATIONS

Result Combin.

Description RC1 Design Internal Forces

CO1 or to CO8

# 3.1 NODAL LOADS - BY COMPONENTS

- CC	ORDINATE		LC2: Imp	osed load	- 1 acrobat			
	On Nodes	Coordinate	Force [kN]			Moment [kNm]		
No.	No.	System	P <sub>X</sub>	Py	Pz	M <sub>X</sub>	M <sub>Y</sub>	Mz
1	594	0   Global XYZ	0.00000	0.00000	-0.80000	0.00000	0.00000	0.00000

Loading

### 3.1 NODAL LOADS - BY COMPONENTS - COORDINATE SYSTEM

- CO	- COORDINATE SYSTEM LC3								
	On Nodes	Coordinate	Force [kN]			Moment [kNm]			
No.	No.	System	P <sub>X</sub>	PY	Pz	M <sub>X</sub>	M <sub>Y</sub>	Mz	
1	594	0   Global XYZ	0.00000	0.16000	0.00000	0.00000	0.00000	0.00000	

#### 3.1 NODAL LOADS - BY COMPONENTS - COORDINATE SYSTEM

- CC	COORDINATE SYSTEM LC							LC4
	On Nodes	Coordinate	Force [kN]			Moment [kNm]		
No.	No.	System	Px	P <sub>Y</sub>	Pz	M <sub>X</sub>	M <sub>Y</sub>	Mz
1	594	0   Global XYZ	0.00000	-0.16000	0.00000	0.00000	0.00000	0.00000

LC2 Imposed load - 1 acrobat

Imposed load - 1 acrobat horizontal +Y swingin

LC3

LC4 Imposed load - 1 acrobat horizontal -Y swingin



Tweede Jacob van Campenstraat 22

Page: 15/28 Sheet: 1

LOADS

1073 XT AMSTERDAM

Project: 2016-driepoot

Model: Driepoot-v14

Date:

18-07-16

### ■ 3.1 NODAL LOADS - BY COMPONENTS

COO	ORDINATE S	LC5:	Imposed lo	ad - multip	le acrobats			
	On Nodes	Coordinate	Force [kN]			Moment [kNm]		
No.	No.	System	Px	PY	Pz	M <sub>X</sub>	M <sub>Y</sub>	Mz
1	594	0   Global XYZ	0.00000	0.00000	-2.40000	0.00000	0.00000	0.00000

#### 3.1 NODAL LOADS - BY COMPONENTS

	On Nodes	Coordinate	Force [kN]			Moment [kNm]		
No.	No.	System	Px	P <sub>Y</sub>	Pz	Mx	MY	Mz
1	594	0   Global XYZ	0.00000	-0.48000	0.00000	0.00000	0.00000	0.00000

### ■ 3.2 MEMBER LOADS

3.2 ľ	ИЕМВЕР	R LOADS						LC7: Wir	nd in +Y
	Reference	On Members	Load	Load	Load	Reference		Load Parameters	
No.	to	No.	Туре	Distribution	Direction	Length	Symbol	Value	Unit
1	Members		Force	Uniform	YP	Projected Length	р	0.01152	kN/m
	1,2,5,8,11-13,15	,22-24,28,30,32,33	3,38,39,42,43,46,47,	52,53,56,57,60,61,66	,67,70,71,74,7	5,80,81,84,86,89,90	,95,96,	107	
	168.173.174.177	178.181.182.187	188.191.192.195.19	6.201.202.205.206.2	9,143,145-147 09.210.215.216	6.219.221.224.225.2	230.231.234	107,	
	235,238,239,244	,245,247,249,252	-254,260,262,264-26	68,270,275-277,280,2	81,284,285,29	0,292-294,296,298,	300-303,30	8-311,	
	313,315-318,321	322,324-326,328 404 406 408 411	,333-338,342,344-3 412 414-418 424 4	46,349-352,354-356,3 25 427-429 432 433 4	358,361,362,36	4,369,371-378,381, 4 446 448 449 451	382,385-38 453 454 456	8,390, 3,458	
	459,461,463,464	,466,468,469,471	473,474,476,477,47	<b>2</b> 9-481,483,485,487,4	89-492,494,49	6,497,499,501,502,5	504,506,507	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	509,511,512,514	,516,517,519,521	522,524,525,527,52	8,531-539,541,542,5	52,559,561,64	0,641,643,645-649,6	653-655,659	9,	
	660,662,663,665	,666,668,670,671	673,675,676,678,68	30,681,683,685,686,6 29 731 733 734 736 7	88,690,691,693 38 739 741 741	3,695-698,700,702,7 3-745 748-751 753-	/04,706-708 755 761-76/	5, 1	
	767-770,772,775	5,777,779,780,789	-797,801,802,805-8	12,814,819,820,822,8	25,827-829,83	1-835,838,841,842,	845-850,85	, 5,856,	
	858-860,862,865	5-868,870,872-875	,878,881-883,885,8	86,889-891,893,898-9	900,902,905,90	7,908,912,914,916-	919,922,92	5,927,	
	930,932,933,935	938,941,942,945	948,949,952,955,95	06,959,962,964,967,9 19 1021 1022 1024 1	70,971,974,97	7,978,981,984,985,9 9 1031 1036-1038 1	040 1042 1	, 047	
	1049,1051-1053	,1058,1060,1061,1	063,1065,1067,106	8,1070,1073,1076,10	77,1080,1083,	1084,1087,1090,109	91,1094,109	07,1099,	
	1102,1105,1106	1109,1112,1113,1	116,1119,1120,112	3,1126,1127,1130,11	33,1134,1137,1	1140,1141,1144,114	7,1148,115	1,	
	druck und zug: 7	2 4 kN/m <sup>2</sup> -> 0 04	170-1172,1170,117 8 m^2/m +Y	9,1101,1102					
2	Members		Force	Uniform	YP	Projected	р	0.00720	kN/m
	250 270 206 207	207 220 424 440	E42 642 650 657 95		24	Length			
3	Members	,507,528,454,440,	Force	Uniform	YP	Projected	р	0.00432	kN/m
	269.271.272.282	287.288.291.299	304-306.314.319.32	20.327.339.341.343.3	65.368.384.40	Length	  36.540.544	I I	
	553,555,558,560	,639,644,652,752	760,773,774,778,79	99,815,818,839,840,8	44,857,863,864	4,869,877,879,880,8	84,892,895	, ,	
4	Members	,	Force	Uniform	YP	Projected	р	0.00384	kN/m
						Length			
	3,4,6,9,10,14,16, 97 98 101 102 1	,18-21,25,26,29,31 05-108 111 113 11	,34-37,40,41,44,45, 5 116 120 122-124	48-51,54,55,58,59,62	-65,68,69,72,7 -137 140-142 1	3,76-79,82,83,85,87 144 148 149 151 15	′,88,91-94, 3-155 157 1	61	
	162,164,166,169	-172,175,176,179	,180,183-186,189,19	90,193,194,197-200,2	03,204,207,20	8,211-214,217,218,	220,222,22	3,	
	226-229,232,233	3,236,237,240-243	,246,248,250,251,2	55-257,259,261,263,2	73,274,279,28	3,289,312,323,330-	332,340,34	7,348,	
	467.470.472.475	.478.482.484.486	,383,392,394,396,40 .488.493.495.498.50	0.503.505.508.510.5	13.515.518.52	7,450,452,455,457,4 ).523.526.529.530.5	460,462,460 548-551.554	),	
	556,557,562-632	2,634-637,656,658	,661,664,667,669,67	72,674,677,679,682,6	84,687,689,69	2,694,699,701,703,7	705,709,712	, ,	
	715,717,720,722	2,725,727,730,732	735,737,740,742,74	6,747,756-759,766,7	76,781,783,78	5-788,800,803,804,8	313,821,823	3,	
	944,946,947,950	,951,953,954,957	,958,960,961,963,96	5,966,968,969,972,9	73,975,976,979	9,980,982,983,986,9	939,940,940 987,989,990	's  ,	
	993,994,996,997	,1000,1001,1003,	1004,1007,1008,101	0,1011,1014,1015,10	17,1018,1020,	1023,1025,1027,10	30,1032-10	35,	
	1039,1041,1043	-1046,1048,1050,1 1093 1095 1096 1	054-1057,1059,106	2,1064,1066,1069,10 3 1104 1107 1108 11	10,1072,1074, 10 1111 1114 1	1075,1078,1079,108 1115 1117 1118 112	31,1082,108 21 1122 112	35,1086, 4	
	1125,1128,1129	1131,1132,1135,1	136,1138,1139,114	2,1143,1145,1146,11	49,1150,1152,	1153,1156,1159,116	51,1162,116	4,	
	1166,1168,1169	1173,1174,1177,1	178,1180						

#### ■ 3.2 MEMBER LOADS

LC8: Wind in -	Y
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	Reference	On Members	Load	Load	Load	Reference		Load Parameters	5
No.	to	No.	Туре	Distribution	Direction	Length	Symbol	Value	Unit
1	Members		Force	Uniform	YP	Projected Length	р	-0.01152	kN/m
	1,2,5,8,11-13,15, 99,100,103,104, 168,173,174,177 235,238,239,244 313,315-318,321 391,397-399,403 459,461,463,464 509,511,512,514 662,663,665,666	22-24,28,30,32,33 109,110,112,114,1 ,178,181,182,187, ,245,247,249,252- ,322,324-326,328 ,404,406,408,411, ,466,468,469,471, ,516,517,519,521, ,668,670,671,673	5,38,39,42,43,46,47, 17-119,121,125,127 188,191,192,195,112 188,191,192,195,112 254,260,262,264-26 ,333-338,342,344-34 412,414-418,424,42 473,474,476,477,47 522,524,525,527,52 675,676,678,680,68	52,53,56,57,60,61,66 7,130-132,134,138,13 86,201,202,205,206,2 88,270,275-277,280,2 46,349-352,354-356,5 25,427-429,432,433,4 9-481,483,485,487,4 28,531-539,541,542,5 11,683,685,686,688,6	,67,70,71,74,73 9,143,145-147, 09,210,215,216 81,284,285,290 358,361,362,36 37,438,442-44 89-492,494,490 59,561,640,64 90,691,693,695	5,80,81,84,86,89,90 ,150,152,156,158-11 5,219,221,224,225,2 0,292-294,296,298, 4,369,371-378,381, 4,446,448,449,451, 6,497,499,501,502,5 1,643,645-649,653-6 5-698,700,702,704.7	,95,96, 60,163,165, 230,231,234 300-303,304 382,385-38 453,454,456 504,506,507 655,659,660 706-708,710	167, ,	

Imposed load - multiple acrobats

LC5

LC6 Imposed load - multiple acrobats +Y swining

LC7 Wind in +Y

LC8 Wind in -Y



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LOADS

Project         2016-driepoot         Date:         18-07-1           3.2 MEMBER LOADS         LCast         LCB: Wind in           No.         to         No.         Type         Distribution         Direction         Length         Symbol         Value         Unit           7712,777,777,777,777,777,777         No.         Type         Distribution         Direction         Length         Symbol         Value         Unit           772,777,777,777,777         No.787,777,777         No.208,205,212,814,819,820,226,225,827-829,234,335,338,841,842,84-850,885,866,869-860,862,866,898,807,897,297,971,974,977,978,918,948,988,989,999,988,989,999,988,989,999,988,989,999,988,989,999,908,989,999,908,989,999,908,989,999,908,999,900,21013,1016,1012,1102,1102,1102,1102,1102,1102
3.2 MEMBER LOADS         Load         Load         Load         Reference         On Members         Load         Load         Load         Reference         Load         Load         Parameters         Unit           10         1         111,713,714,716,718,719,721,723,724,726,726,728,729,731,733,734,738,739,731,741,748,746,748,751,753,775,761,764,764,777.         1111,713,714,716,718,719,721,723,724,726,726,728,124,419 180,202,228,522,729,203,131,733,734,736,738,739,741,743,745,745,746,746,751,753,775,761,764,764,777.         1105         1105         1105,757,777,779,709,709,709,797,795,767,814,746,746,746,751,753,755,761,764,764,777.         1105         1105,757,777,779,709,709,719,749,777,769,891,855,869,869,869,869,899,899,91,992,995,998,999,1002,1005,1006,1003,1004,1013,015,1013,112,112,112,1113,1113,113,113,114,114,114,114,114,1
Reference         On Members         Load         Load         Load         Reference         Load         Plant           No.         to         No.         Type         Distribution         Direction         Length         Symbol         Value         Unit           711.713.714.716.718,719.721.723,724.726,728,729.731,733,734.736,738,739,741.743-745,748.751,753-755.761.764,767-770,772,775.777.779.780.789.787.851,838,841.842,845.850,855,856,858.858.860,858-860,868.898-818.838,888.868.898-818.938,838.938.909.922,925,227,922,925,292,2955,930,932,939,933,935,938,941,942,945,948,049,952,955,956,959,962,964,967,970,971,974,977,978,981,984,985,988,991,992,995,998,999,1002,1005,1006,1006,1006,1019,1021,1022,1102,11028,11028,1028,1028,10
No.         10         No.         19pe         Distribution         Lergin         Symbol         Value         Unit           71.1713.174.716.1718.719.721.723.724.726.728.729.731.733.734.736.738.739.741.743-745.748.751.755.755.755.755.755.755.755.755.755
2       Members       Force       Uniform       YP       Projected       p       -0.00720       kN/m         3       258.278,286,297,307,329,434,440,543,642,650,657,854,876,887,897,906,924       Projected       p       -0.00432       kN/m         269.271,272,282,287,288,291,299,304-306,314,319,320,327,339,341,343,365,368,384,405,409,410,426,431,436,540,544,553,555,558,560,639,644,652,752,760,773,774,778,79,981,818,839,840,844,857,863,864,869,877,879,880,884,892,895,896,909,3011,913,915       Projected       p       -0.00384       kN/m         3,4,6,9,10,14,16,18-21,25,26,29,31,34-37,40,41,44,45,48-51,54,55,58,59,62-65,68,69,72,73,76-79,82,83,85,87,88,91-94,97,98,80,101,102,105-108,111,113,115,116,120,122-124,126,128,129,133,135-137,140-142,144,148,149,151,153,155,157,161,162,162,122,124,124,148,149,151,153,155,157,161,162,164,166,169-172,175,176,179,180,183-186,189,190,193,194,197-200,203,204,207,208,211-214,217,218,220,222,223,223,236,237,240-243,246,248,250,251,255-257,259,261,263,273,274,274,245,457,457,460,462,465,467,470,472,475,478,442,448,448,488,493,495,498,500,503,505,508,510,513,515,518,520,523,526,529,530,548-551,554,556,557,562-632,634-637,656,658,661,664,667,669,672,674,677,678,1783,783,786-788,800,803,804,481,821,823,82,84,863,833,834,84,901,904,909,910,920,921,923,926,928,929,931,934,936,937,939,940,943,944,445,455,454,474,464,485,485,484,480,488,493,495,498,500,503,505,508,510,513,515,518,520,523,526,529,530,548-551,554,556,557,562-632,634-637,656,658,661,664,667,669,672,677,678,1783,783,785-788,800,803,804,813,821,823,82,842,863,803,836,837,843,851-853,861,871,894,901,904,909,910,920,921,923,926,928,929,931,934,936,937,939,940,943,944,946,947,950,951,953,954,957,958,960,961,963,965,966,968,969,972,973,975,9769,979,980,903,984,946,937,959
3       Wembers       Force       Uniform       YP       Projected       p       -0.00432       kN/m         269,271,272,282,287,288,291,299,304-306,314,319,320,327,339,341,343,365,368,384,405,409,410,426,431,436,540,544,553,555,58,560,639,644,652,752,760,773,774,778,799,815,818,839,840,844,857,863,864,869,877,879,880,884,892,895,896,903,911,913,915       Projected       p       -0.00384       kN/m         4       Members       Force       Uniform       YP       Projected       p       -0.00384       kN/m         97,98,101,191,913,915       Force       Uniform       YP       Projected       p       -0.00384       kN/m         97,98,101,102,105-108,111,113,115,116,120,122-124,126,128,129,133,135-137,140-142,144,148,149,151,153,155,157,161,161,162,164,166,169-172,175,176,179,180,183-186,189,190,193,194,197-200,203,204,207,208,211-214,217,218,220,222,223,226,229,232,233,236,237,240-243,246,248,250,251,255-257,259,261,263,273,274,279,283,289,312,323,30-332,340,347,348,353,357,359,360,363,374,246,48,50,493,964,00-402,407,419-423,454,447,450,154,454,457,460,462,465,465,467,470,472,475,478,484,486,488,493,495,498,500,503,505,508,510,513,515,518,520,523,526,529,530,548-551,554,467,470,472,475,478,482,484,486,488,493,495,498,500,503,505,508,510,513,515,518,520,523,526,529,530,548-551,554,467,470,472,2475,477,364,737,736,737,737,472,746,742,746,747,766,758,748,784,7856,788,080,803,808,083,804,813,821,823,824,826,830,836,837,843,851-853,861,871,894,901,904,909,910,920,921,923,926,928,929,931,934,936,937,939,940,943,944,494,947,950,951,953,954,950,958,960,961,963,965,966,986,986,987,989,990,193,994,986,997,1000,1001,1003,1004,1007,1008,1010,1014,1017,1
4         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         Projected         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, 97,88,101,102,105-108,111,113,115,116,120,122-124,126,128,129,133,135-137,140-142,144,148,149,151,153-155,157,161, 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, 467,470,472,475,478,482,484,486,488,493,495,498,500,503,505,508,610,513,515,518,520,523,526,529,530,548-551,554, 556,557,562-632,634-637,665,686,661,666,667,669,72,674,677,578,786,786,786,786,786,786,786,786,786,7
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, 226-229,232,236,237,240-243,246,248,250,251,255-257,259,261,263,273,274,279,283,289,312,233,330-332,340,347,348, 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, 467,470,472,475,478,482,484,486,488,493,495,498,500,503,505,500,510,513,515,518,520,523,526,529,530,548-551,554, 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, 993,994,996,997,1000,1001,1003,1004,1007,1008,1001,111,1161,1017,1018,1020,1023,1025,1027,1030,1032-1035, 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, 1125,1128,1129,1131,1132,1132,1132,1142,1143,1145,1146,1149,1150,1152,1153,1156,1159,1161,1162,1164, 1166,1168,1169,1173,1174,1177,1178,1180
1166,1168,1169,1173,1174,1177,1178,1180



Tweede Jacob van Campenstraat 22 1073 XT AMSTERDAM

RESULTS

Project: 2016-driepoot

Model: Driepoot-v14

Description	Value	Unit	Comment
LC1 - Self-weight Sum of loads in X Sum of support reactions in X Sum of support reactions in Y Sum of loads in Z Sum of support reactions in Z Resultant of reactions about X Resultant of reactions about Y Resultant of reactions about Z Max. displacement in X Max. displacement in Z Max. votation about X Max. rotation about X Max. rotation about Z Method of analysis Reduction of stiffness Number of load increments Number of iterations	0.00 0.00 0.00 -2.13 -2.13 -0.00007 0.00000 0.00000 0.00000 0.4 -0.4 -0.4 -	kN kN kN kN kN kNm kNm mm mm mm mm mm mm mrad mrad mrad	Deviation 0.00% At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm) At center of gravity of model Member No. 117, x: 46.7 mm Member No. 1035, x: 240.0 mm Member No. 708, x: 40.0 mm Member No. 701, x: 143.4 mm FE Node No. 1253 (X: 751.7, Y: -559.2, Z: 7382.5 mm) Member No. 7, x: 200.0 mm FE Node No. 1860 (X: -754.4, Y: -566.3, Z: 7367.7 mm) Geometrically linear analysis Cross-sections, Members, Surfaces
LC2 - Imposed load - 1 acrobat Sum of loads in X Sum of loads in Y Sum of support reactions in X Sum of loads in Z Sum of support reactions in Z Resultant of reactions about X Resultant of reactions about Z Max. displacement in X Max. displacement in Z Max. votation about X Max. rotation about X Max. rotation about Z Method of analysis Reduction of stiffness Number of load increments Number of iterations	0.00 0.00 0.00 -0.80 -0.80 0.00000 0.00000 0.00000 0.00000 0.1 0.1	kN kN kN kN kN kNm kNm mm mm mm mm mm mm mrad mrad mrad	Deviation 0.00% At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm) At center of gravity of model Member No. 1049, x: 130.9 mm Member No. 764, x: 480.0 mm Member No. 765, x: 0.0 mm Member No. 765, x: 0.0 mm Member No. 765, x: 315.0 mm Member No. 342, x: 46.7 mm Geometrically linear analysis Cross-sections, Members, Surfaces
LC3 - Imposed load - 1 acrobat horizontal +Y swingin Sum of loads in X Sum of loads in X Sum of support reactions in X Sum of support reactions in Y Sum of support reactions in Z Sum of support reactions in Z Resultant of reactions about X Resultant of reactions about Y Resultant of reactions about Y Max. displacement in X Max. displacement in Y Max. displacement in Y Max. vector displacement Max. rotation about X Max. rotation about X Max. rotation about X Max. rotation about Z Method of analysis Reduction of stiffness Number of load increments Number of iterations	0.00 0.00 0.16 0.00 0.00 -0.47377 0.00000 0.100000 0.1 0.7 0.3 0.7 0.3 0.7 0.4 0.2 Linear 1	kN kN kN kN kN kNm kNm kNm mm mm mm mm mm mrad mrad mrad	Deviation 0.00% At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm) At center of gravity of model At center of gravity of model Member No. 124, x: 338.5 mm Member No. 765, x: 0.0 mm Member No. 678, x: 425.5 mm Member No. 461, x: 265.9 mm Member No. 430, x: 52.5 mm FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7382.5 mm) FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm) Geometrically linear analysis Cross-sections, Members, Surfaces
LC4 - Imposed load - 1 acrobat horizontal -Y swingin Sum of loads in X Sum of loads in X Sum of support reactions in X Sum of support reactions in Y Sum of loads in Z Sum of support reactions in Z Resultant of reactions about X Resultant of reactions about Y Resultant of reactions about Z Max. displacement in X Max. displacement in Z Max. votation about X Max. rotation about X Max. rotation about X Max. rotation about Z Max. rotation about Z Method of analysis	0.00 0.00 -0.16 0.00 0.00 0.000 0.47377 0.00000 0.00000 -0.1 -0.7 -0.3 0.7 -0.4 -0.2 -0.2 Linear	kN kN kN kN kN kNm kNm mm mm mm mm mm mm mrad mrad mrad	Deviation 0.00% At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm) At center of gravity of model Member No. 124, x: 338.5 mm Member No. 765, x: 0.0 mm Member No. 676, x: 425.5 mm Member No. 461, x: 265.9 mm Member No. 430, x: 52.5 mm FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm) FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm) Geometrically linear analysis



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RESULTS

Project: 2016-driepoot

Model: Driepoot-v14

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Description	Value	Linit	Comment
 Reduction of stiffness	value	Unit	Cross-sections Members Surfaces
Number of load increments Number of iterations	1		
LC5 - Imposed load - multiple acrobats Sum of loads in X Sum of support reactions in X Sum of support reactions in Y Sum of loads in Z Sum of loads in Z Sum of support reactions in Z Resultant of reactions about X Resultant of reactions about Y Resultant of reactions about Z Max. displacement in X Max. displacement in Z Max. votation about X Max. rotation about X Max. rotation about Z Method of analysis Reduction of stiffness Number of Ideal increments Number of iterations	0.00 0.00 0.00 -2.40 -2.40 0.00000 0.00000 0.00000 0.00000 0.00000 0.3 0.3	kN kN kN kN kN kNm kNm mm mm mm mm mm mm mm mrad mrad	Deviation 0.00% At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm) At center of gravity of model Member No. 1049, x: 157.1 mm Member No. 714, x: 480.0 mm Member No. 765, x: 0.0 mm Member No. 765, x: 0.0 mm Member No. 765, x: 315.0 mm Member No. 342, x: 315.0 mm Member No. 382, x: 46.7 mm Geometrically linear analysis Cross-sections, Members, Surfaces
LC6 - Imposed load - multiple acrobats +Y swining Sum of loads in X Sum of support reactions in X Sum of support reactions in Y Sum of support reactions in Y Sum of support reactions in Z Resultant of reactions about X Resultant of reactions about Y Resultant of reactions about Z Max. displacement in X Max. displacement in Y Max. displacement in Y Max. cotor displacement Max. rotation about X Max. rotation about X Max. rotation about X Max. rotation about Y Max. rotation about Z Method of analysis Reduction of stiffness Number of load increments Number of iterations	0.00 0.00 -0.48 -0.48 0.00 0.000 1.42131 0.00000 0.00000 -0.3 -2.0 -0.8 2.1 -1.2 -0.7 -0.5 Linear 1	kN kN kN kN kNm kNm kNm mm kNm mm mm mm mm mm mm mm mrad mrad	Deviation 0.00% At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm) At center of gravity of model At center of gravity of model Member No. 115, x: 338.5 mm Member No. 765, x: 0.0 mm Member No. 676, x: 425.5 mm Member No. 430, x: 52.5 mm FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm) FE Node No. 2817 (X: -873.9, Y: -359.3, Z: 7367.7 mm) Geometrically linear analysis Cross-sections, Members, Surfaces
LC7 - Wind in +Y Sum of loads in X Sum of loads in X Sum of support reactions in X Sum of support reactions in Y Sum of loads in Z Sum of support reactions in Z Resultant of reactions about X Resultant of reactions about Y Resultant of reactions about Z Max. displacement in X Max. displacement in X Max. rotation about X Max. rotation about X Max. rotation about X Max. rotation about Z Method of analysis Reduction of stiffness Number of load increments Number of learations	0.00 0.00 1.86 0.00 0.00 0.07378 0.00000 -0.00305 0.9 6.4 2.5 6.8 -2.3 1.4 1.0 Linear 1	kN kN kN kN kN kNm kNm mm mm mm mm mm mrad mrad mrad	Deviation 0.00% At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm) At center of gravity of model At center of gravity of model Member No. 104, x: 159.6 mm Member No. 686, x: 160.0 mm Member No. 686, x: 213.4 mm Member No. 686, x: 213.4 mm FE Node No. 1834 (X: 113.6, Y: 930.5, Z: 7382.5 mm) FE Node No. 1834 (X: 113.6, Y: 930.5, Z: 7382.5 mm) FE Node No. 1834 (X: 113.6, Y: 930.5, Z: 7387.7 mm) Geometrically linear analysis Cross-sections, Members, Surfaces
LC8 - Wind in -Y Sum of loads in X Sum of loads in X Sum of support reactions in X Sum of support reactions in Y Sum of support reactions in Z Resultant of reactions about X Resultant of reactions about Y Resultant of reactions about Z Max. displacement in X Max. displacement in Z Max. vector displacement Max. rotation about X Max. rotation about Y	0.00 0.00 -1.86 -1.86 0.00 0.00 -0.07524 0.00000 0.00305 -0.9 -6.3 -2.5 6.8 2.3 -1.4	kN kN kN kN kN kNm kNm kNm mm mm mm mm mm mm mm mmad mrad	Deviation 0.00% At center of gravity of model (X:0.00141, Y:-0.00072, Z:4.489E+03 mm) At center of gravity of model At center of gravity of model Member No. 104, x: 159.6 mm Member No. 686, x: 159.6 mm Member No. 683, x: 84.5 mm Member No. 686, x: 213.4 mm Member No. 744, x: 13.4 mm FE Node No. 1384 (X: 113.6, Y: 930.5, Z: 7382.5 mm)



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RESULTS

Project: 2016-driepoot

Model: Driepoot-v14

Date: 18-07-16

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)
Reduction of stiffness	Linear		Geometrically linear analysis Cross-sections, Members, Surfaces
Number of load increments	1		
 CO1 - Characteristic Values	1		
Sum of loads in X	0.00	kN	
Sum of support reactions in X Sum of loads in Y	0.00	kN kN	
Sum of support reactions in Y	0.00	kN	
Sum of loads in Z	-2.13	kN 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
Max. displacement in X	0.0	mm	Member No. 117, x: 46.7 mm
Max. displacement in Y	-0.4	mm	Member No. 708, x: 46.7 mm
Max. vector displacement	-0.2	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 Max. rotation about Z	0.3	mrad	Member No. 7, x: 200.0 mm FE Node No. 1680, (X: -754.4, Y: -566.3, 7: 7367.7 mm)
Method of analysis	2nd Order	inida	Second order analysis (Nonlinear, Timoshenko)
Internal forces referred to deformed system for			N, Vy, Vz, My, Mz, MT
Consider favorable effects of tensile forces			Materials, Cross-sections, Members, Surraces
Divide results by CO factor			
Number of load increments 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 Sum of support reactions in Y	0.64	kN kN	Deviation 0.00%
Sum of loads in Z	-6.08	kN	
Sum of support reactions in Z	-6.08	kN kNm	Deviation 0.00%
Resultant of reactions about X	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 Max. displacement in Y	2.8	mm 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 Max. rotation about X	3.1	mm mrad	Member No. 765, x: 0.0 mm 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 Method of analysis	1.6 2nd Order	mrad	Member No. 372, x: 46.7 mm Second order analysis (Nonlinear, Timoshenko)
Internal forces referred to deformed system for			N, V <sub>y</sub> , V <sub>z</sub> , M <sub>y</sub> , M <sub>z</sub> , M <sub>T</sub>
Reduction of stiffness			Materials, Cross-sections, Members, Surfaces
Divide results by CO factor			
Number of load increments	1		
CO3 - Design Internal Forces - 1 acrobat -Y	3		
swing	0.00	1.81	
Sum of support reactions in X	0.00	kN	
Sum of loads in Y	-0.64	kN	
Sum of support reactions in Y Sum of loads in Z	-0.64	kN kN	Deviation 0.00%
Sum of support reactions in Z	-6.08	kN	Deviation 0.00%
Resultant of reactions about X Resultant of reactions about Y	1.9	KNM kNm	At center of gravity of model (X:0.0, Y:0.0, Z:4488.9 mm) At center of gravity of model
Resultant of reactions about Z	0.0	kNm	At center of gravity of model
Max. displacement in X Max. displacement in X	0.4	mm	Member No. 352, x: 177.8 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 Member No. 545, x: 262.5 mm
Max. rotation about X	-2.5	mrad	Member No. 765, x: 315.0 mm
Max. rotation about Z	1.5 2nd Order	mrad	Member No. 382, x: 46.7 mm
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 tavorable effects of tensile forces Divide results by CO factor			
Number of load increments	1		
 Number of iterations	3		
Sum of loads in X	0.00	kN	
Sum of support reactions in X	0.00	kN kN	
Sum of support reactions in Y	0.32	kN	Deviation 0.00%
Sum of loads in Z	-4.48	kN	Deviation 0.000/
Sum or support reactions in Z	-4.48	KIN	



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 5			
 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 2	8.0	mrad	Member No. 372, X: 46.7 mm
Method of analysis	2nd Order		Second order analysis (Nonlinear, Timosnenko)
Deduction of stiffness			N, Vy, Vz, Wiy, Wiz, Wit
Consider favorable offects of tancile 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	2.0	mrad	FE Node No. 2228 (X: 862.5, Y: -367.1, Z: 7382.5 mm)
Max. rotation about 7	2.0	mrad	F = NOUE NU. 1304 (A. 113.0, 1.930.3, Z. 7302.3 IIIII)
Max. Totation about Z	2nd Order	mau	Second order analysis (Nonlinear Timoshanko)
Internal forces referred to deformed system for	2id Older		
Peduction of stiffness			Materials Cross sections Members Surfaces
Consider favorable effects of tensile forces			Materials, Cross-sections, Members, Surfaces
Divide results by CO factor	i ii		
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	
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	KINITI	At center of gravity of model
Max. displacement in Y	-0.7	mm	Member No. 471 v: 212 7 mm
Max displacement in 7	-0.2	mm	Member No. 583, x: 56.3 mm
Max vector displacement	8.8	mm	EE 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 <sub>y</sub> , V <sub>z</sub> , M <sub>y</sub> , M <sub>z</sub> , M <sub>T</sub>
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		
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)
Method of analysis	1.7 2nd Order	inrad	Vienuer No. 372, X:40.7 mm
Internal forces referred to deformed system for			Second order analysis (Nonlinear, Thoshenko)
Deduction of stiffness	8		Naterials Cross sections Members Surfaces
	I	I	wateriais, 01055-Sections, weimbers, ourfaces



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 Description		Linit	Common	
 Description	Value	Unit	Commen	1
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	Deviation 0.00%	
Sum of loads in 7	-2.00	kN	Deviation 0.00%	
Sum of support reactions in 7	-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:4	488.9 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. vector displacement	-4.2	mm	Member No. 561, X. 64.0 IIIII Member No. 466, y: 106.4 mm	
Max rotation about X	-53	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, Timoshenk	(O)
Internal forces referred to deformed system for			N, V <sub>y</sub> , V <sub>z</sub> , M <sub>y</sub> , M <sub>z</sub> , M <sub>T</sub>	
Reduction of stiffness			Materials, Cross-sections, Members, Surfaces	3
Consider favorable effects of tensile forces				
Divide results by CO factor				
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	CO7 EE Node No. 1384 (Y: 113.6 Y: 930.5	7: 7382 5 mm)
Max rotation about 7	-22	mrad	CO8 FE Node No. 2817 (X: -873.9 Y: -359.)	3 7:7367 7 mm)
Other Settings	Number of 1D finite elements	S	······································	: 1318
-	Number of 2D finite elements	S		: 3937
	Number of 3D finite elements	S		: 8065
	Number of FE mesh nodes			: 5050
	Max number of iterations			. 30300
	Number of divisions for mem	ber results		: 10
	Division of cable/foundation/	tapered memb	bers	: 10
	Number of member divisions	for searching	maximum values	: 10
	Subdivisions of FE mesh for	graphical resu	ults	: 0
	vith Neuton Banhaan metho	ording to Pical	a method in combination	: 5%
	with Newton-Raphson metho	Ju -		
Options	Activate shear stiffness of	members (Ay,	Az)	
•	Activate member divisions	for large defo	rmation or post-critical analysis	
	Activate entered stiffness r	nodifications		
	Ignore rotational degrees of	reedom		
	Nonsymmetric direct solve	r if demanded	hy nonlinear model	
	Method for the system of equ	ations	Dire	ect
			Olter	ation
	Plate bending theory		• Min	ıdlin
			O Kiro	chhoff
	Solver version		0 32-	bit
			• 64-	Dit
Precision and Tolerance	Change default setting			
	y			





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RESULTS

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### ■ 4.1 NODES - SUPPORT FORCES

Node			Support Forces [kN		Su	pport Moments [kN	m]	
No.	LC/CO	P <sub>X'</sub>	P <sub>Y</sub>	P <sub>Z'</sub>	M <sub>X'</sub>	M <sub>Y'</sub>	M <sub>Z'</sub>	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	
	C07	-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	
	C07	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	
	C07	-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	
	007	0.23	1.02	-2.04	0.00	0.00	-0.13	
1100	001	0.00	-0.30	0.01	0.00	0.00	0.04	
1168		0.06	-0.08	-0.36	0.00	0.00	-0.01	
		0.00	-0.10	-0.55	0.00	0.00	-0.02	
	003	0.40	-0.40	-1.50	0.00	0.00	-0.07	
	004	0.07	-0.10	-0.51	0.00	0.00	-0.02	
	005	-0.50	0.59	1.11	0.00	0.00	0.07	
		0.73	-0.61	-2.07	0.00	0.00	-0.11	
	007	-0.59	0.00	1.05	0.00	0.00	0.07	
1184	C01	0.10	-1.15	-3.00	0.00	0.00	-0.10	
1104	001	0.10	-0.01	-0.33	0.00	0.00	0.01	
	002	0.45	-0.12	-1.14	0.00	0.00	0.05	
	CO4	0.29	-0.05	-0.00	0.00	0.00	0.04	
	004	0.29	-0.07	-0.01	0.00	0.00	0.03	
	005	_0.30	-0.08	-1.39	0.00	0.00	_0.04	
	C07	0.01	_0 18	-2.05	0.00	0.00	0.08	
	007	_0.15	-0.10	-2.03	0.00	0.00	0.00	
	000	5.15	5.01	5.00	5.00	5.00	0.02	



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RESULTS

Project: 2016-driepoot

Model: Driepoot-v14

18-07-16

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### 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 Global Deforn |u| [mm] 10.9 10.0 9.0 8.0 7.0 6.0 5.0 10.9 4.0 3.0 2.0 1.0 0.0 Max : Min : 10.9 0.0 02 1.06 0.23 23 0.92 0.61 2.042.04 2.06 0.89 0.59 2.05 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



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RESULTS

Project: 2016-driepoot

Model: Driepoot-v14

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RESULTS

Project: 2016-driepoot

Model: Driepoot-v14

# Result Combinations

Date: 18-07-16

■ 4.1 NODES - SUPPORT FORCES - RC1

Node			5	Support Forces [kN]	]	Su	pport Moments [kN		
No.	RC		P <sub>x</sub>	P <sub>Y'</sub>	Pz	M <sub>X'</sub>	M <sub>Y'</sub>	M <sub>Z'</sub>	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	



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RESULTS

Project: 2016-driepoot

Model: Driepoot-v14

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## AXIAL STRESSES σeqv, 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**



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.



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**RF-STEEL Members** 

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Limit Stresses [N/mm<sup>2</sup>]

Limit  $\tau$ 

52.486

519.615

135.677

 $\text{Limit } _{\sigma_x}$ 

90.909

900.000

235.000

Manually

Design Internal Forces - 1 acrobat + wind +Y

Design Internal Forces - 1 acrobat + wind -Y

Project: 2016-driepoot

1.1.1 GENERAL DATA

Load combinations to design:

Material

Description

Aluminium EN-AW 6082

HDT1200M 1.0965

Steel S 235 JR

Members to design:

1.2 MATERIALS

T6/T651\*

Matl

No

1

2 3

Model: Driepoot-v14

Yield Strength

f<sub>yk</sub> [N/mm<sup>2</sup>]

100.000

900.000

235.000

C07

CO8

1.10

1.00 1.00

Safety Factor

γм [-]

All

Date: 18-07-16

Limit  $\sigma_{eqv}$ 

90.909

900.000

235.000

**RF-STEEL Members** CA1 General stress analysis of steel members

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

Pipe 40/3	Mpe sus
Pipe 18/2	Pipe 16/2
QRO 60x4	Round 6

#### 1.3.1 CROSS-SECTIONS Sec

t.	Matl.	Cross-section	It [cm4]	I <sub>y</sub> [cm <sup>4</sup> ]	I <sub>z</sub> [cm <sup>4</sup> ]	
	No.	Description	A [cm <sup>2</sup> ]	α.pl,y	αpl,z	Comment
	1	Pipe 48/3	21.57	10.78	10.78	
			4.24	1.35	1.35	
	1	Pipe 30/3	4.69	2.35	2.35	
			2.54	1.40	1.40	
1	1	Pipe 18/2	0.65	0.33	0.33	
			1.01	1.42	1.42	
	1	Pipe 16/2	0.44	0.22	0.22	
			0.88	1.44	1.44	
	3	QRO 60x4   EN 10210-2:2006	72.50	45.40	45.40	
			8.79	1.21	1.21	
	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.	Member	Location	S-Point	Load		Stress [N/I	mm²]	Stress
No.	No.	x [mm]	No.	Case	Stress Type	Existing	Limit	Ratio
1	Pipe 48/3							
	399	0.0	3	CO8	Sigma Total	-32.703	90.909	0.36
	317	38.9	10	C07	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	C07	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 1	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	C07	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]					shc	ould be negat	orientation	fricion coeff	ballast
									0,6	
Node	P <sub>X'</sub>	P <sub>Y'</sub>	P <sub>z'</sub>	P <sub>x'</sub> per leg	P <sub>y'</sub> per leg	Phor' per leg	P <sub>Z'</sub> 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	0,01	0,01	0,010			0,00	
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		-,-			-0		
Σ Loads	-0,00	2,24	-2,88				-2,88			
CO6	Wind in -Y direction									
	Support Forces [kN]									
Node	P <sub>X'</sub>	P <sub>Y'</sub>	P <sub>z'</sub>	$P_{x'}$ per leg	P <sub>y'</sub> per leg	Phor' per leg	P <sub>z'</sub> 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	7 Wind and acrobat in +Y direction									
	Support Forces [kN]									
Node	P <sub>X'</sub>	P <sub>Y'</sub>	P <sub>Z'</sub>	$P_{x'}$ per leg	P <sub>y'</sub> per leg	Phor' 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 ac	robat in -Y di	irection							
	Support Forces [KN]						- ·			
Node	P <sub>X'</sub>	P <sub>Y'</sub>	P <sub>Z'</sub>	P <sub>x'</sub> per leg	P <sub>y'</sub> per leg	P <sub>hor</sub> per leg	P <sub>Z'</sub> 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
1100	0,00	-0,30	0,01							
1104	1,10	-1,15	-3,08	0,95	-1,14	1,484	-3,05	+X -Y leg	1,23	
1184 51 c = d =	-0,15	0,01	0,03				6.07			
2 LOGOS	0,01	-∠,ŏŏ	-0,07				-0,07			