Ingenieurbüro Frank Blasek - Beratender Ingenieur
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Project: 1035-11 WIMO WIMO-Alumast 10,42m	**Position:** 1-q0,39-90kmh Alumast Al 6063 T5 (F18)	Page: 1

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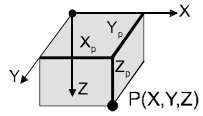
STRUCTURE

Cartesian



NODES

Node No	Coordinates-System	Ref Nodes	Node Coordinates X [m]	Y [m]	Z [m]
1	Cartesian Gelagert	-	0.000	0.000	0.000
2	Cartesian	-	0.000	0.000	-2.575
3	Cartesian	-	0.000	0.000	-4.575
4	Cartesian	-	0.000	0.000	-6.550
5	Cartesian	-	0.000	0.000	-8.500
6	Cartesian	-	0.000	0.000	-10.420
7	Cartesian Gelagert	-	0.000	0.000	-1.600

MATERIALS

Mat No	Material Description	E Modulus [kN/cm²]	Shear Mod [kN/cm²]	Spec Weight [kN/cm³]	Coeff Therm [1/°C]
1	Aluminium	7.000E+03	2.700E+03	2.700E-05	2.400E-05

Rohr 160/5 Rohr 140/5

SECTIONS

Sec No	Mat No	Section Description	I_T A	I_2 A_2	I_3 [cm⁴] A_3 [cm²]
1	1	Rohr 160/5	1463.88 24.347	731.94	731.94
2	1	Rohr 140/5	967.51 21.206	483.76	483.76
3	1	Rohr 118/4	466.01 14.326	233.01	233.01
4	1	Rohr 98/4	261.41	130.70	130.70

Rohr 118/4

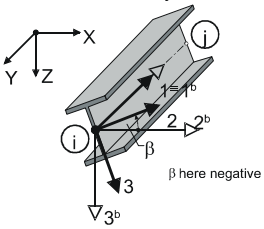
Rohr 98/4

Rohr 82/4

SECTIONS

Sec No	Mat No	Section Description	I_T A	I_2 A_2	I_3 [cm⁴] A_3 [cm²]
4			11.812	130.70	130.70
5	1	Rohr 82/4	149.48 9.802	74.74	74.74

Local Element Axis System



ELEMENTS

Elem No	Elem Type	Nodes Begin	Nodes End	Beta [°]	Section Begin	Section End	Hinge Begin	Hinge End	Part No	Length [m]	Elem Location
1	Beam	1	7	0.00	1	1	-	-	-	1.600	VERT
2	Beam	2	3	0.00	2	2	-	-	-	2.000	VERT
3	Beam	3	4	0.00	3	3	-	-	-	1.975	VERT
4	Beam	4	5	0.00	4	4	-	-	-	1.950	VERT
5	Beam	5	6	0.00	5	5	-	-	-	1.920	VERT
6	Beam	7	2	0.00	1	1	-	-	-	0.975	VERT

SUPPORTS

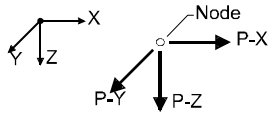
Support No	Supported Nodes	Rotation [°] Alpha	Rotation [°] Beta	Fixed Support/Support Spring [kN/m] [kNm/rad] in X	in Y	in Z	ar X	ar Y	ar Z
1	1	0.0	0.0	Yes	Yes	Yes	No	No	Yes
2	7	0.0	0.0	Yes	Yes	No	No	No	No

LOADS

GENERAL DATA

LC No	LC Description	Factor	Combination Type	Dead Weight
1	Vollast 90 km/h 0,39 kN/qm	1.00	Variable	1.00

Global Nodal Force

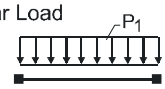


NODAL FORCES

LC 1

No	Loaded Nodes	Nodal Forces P_X [N]	P_Y [N]	P_Z [N]
1	6	460.000	0.000	0.000

1- Linear Load

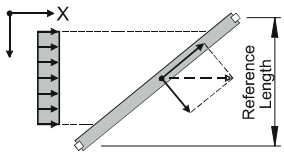


ELEMENT LOADS

LC 1

No	Loaded Elements	Load type	Load Direction	Parameters [N, Nm, m, °C, N/m, Nm/m] P_1
1	2	1	X	61.000
2	5	1	X	36.000
3	4	1	X	43.000
4	3	1	X	52.000
5	1,6	1	X	70.000

X - Global in X-direction



LOAD GROUPS

LG No	LG Description	Factor	Coefficient γ_M	Load Cases in LG
1	Vollast	1.00	1.10	1.50*LC1

2ND ORDER ANALYSIS DATA

LG-No	Factor Ny	Number Iterations	Eps-Convergence Existing	Wanted	Ny-fold Results	Tension Force Effect
LG1	1.000	2	.00E+00	0.01	Yes	No

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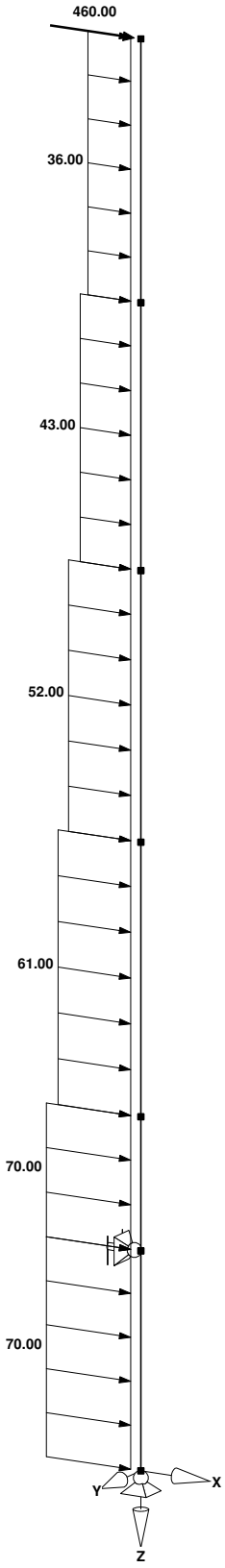
GRAPHIC

LOADS

LC 1 - Vollast 90 km/h 0,39 kN/qm
[N], [N/m]

Isometric



INTERNAL FORCES BY ELEMENT

Elem No	LC/LG No	Node No	x [m]	Forces [kN] N	V_2	V_3	Moments [kNm] T	M_2	M_3
1	LC1	1	.00	-.47	.00	-3.56	.00	.00	.00
		7	1.60	-.37	.00	-3.67	.00	-5.78	.00
	LG1	1	.00	-.71	.00	-5.46	.00	.00	.00
		7	1.60	-.55	.00	-5.61	.00	-8.86	.00
2	LC1	2	.00	-.30	.00	.84	.00	-4.93	.00
		3	2.00	-.19	.00	.72	.00	-3.38	.00
	LG1	2	.00	-.46	.00	1.27	.00	-7.57	.00
		3	2.00	-.28	.00	1.09	.00	-5.20	.00
3	LC1	3	.00	-.19	.00	.72	.00	-3.38	.00
		4	1.98	-.11	.00	.61	.00	-2.06	.00
	LG1	3	.00	-.28	.00	1.09	.00	-5.20	.00
		4	1.98	-.17	.00	.94	.00	-3.17	.00
4	LC1	4	.00	-.11	.00	.61	.00	-2.06	.00
		5	1.95	-.05	.00	.53	.00	-.95	.00
	LG1	4	.00	-.17	.00	.94	.00	-3.17	.00
		5	1.95	-.08	.00	.81	.00	-1.45	.00
5	LC1	5	.00	-.05	.00	.53	.00	-.95	.00
		6	1.92	.00	.00	.46	.00	.00	.00
	LG1	5	.00	-.08	.00	.81	.00	-1.45	.00
		6	1.92	.00	.00	.69	.00	.00	.00
6	LC1	7	.00	-.37	.00	.91	.00	-5.78	.00
		2	.98	-.30	.00	.84	.00	-4.93	.00
	LG1	7	.00	-.55	.00	1.36	.00	-8.86	.00
		2	.98	-.46	.00	1.27	.00	-7.57	.00

SUPPORT FORCES AND SUPPORT MOMENTS

Node No	LC/LG No	Support Forces [kN] P_X	P_Y	P_Z	Support Moments [kNm] M_X	M_Y	M_Z
1	LC1	-3.556	.000	.473	.000	.000	.000
	LG1	-5.452	.000	.710	.000	.000	.000
7	LC1	4.573	.000	.000	.000	.000	.000
	LG1	6.979	.000	.000	.000	.000	.000
ΣForces	LC1	1.018	.000	.473			
ΣLoads		1.018	.000	.473			
ΣForces	LG1	1.527	.000	.710			
ΣLoads		1.527	.000	.710			

GLOBAL NODE DEFORMATIONS

Node No	LC/LG No	Deformations [mm] u_X	u_Y	u_Z	Rotations [mrad] ϕ_X	ϕ_Y	ϕ_Z
1	LC1	.00000	.00000	.00000	.00000	2.98419	.00000
	LG1	.00000	.00000	.00000	.00000	5.03511	.00000
2	LC1	10.93456	.00000	.00587	.00000	-16.16858	.00000
	LG1	18.44837	.00000	.00969	.00000	-27.28771	.00000
3	LC1	69.20186	.00000	.00919	.00000	-40.56968	.00000
	LG1	1.169E+02	.00000	.01517	.00000	-68.59373	.00000
4	LC1	1.843E+02	.00000	.01217	.00000	-73.29008	.00000
	LG1	3.116E+02	.00000	.02008	.00000	-1.240E+02	.00000
5	LC1	3.620E+02	.00000	.01410	.00000	-1.051E+02	.00000
	LG1	6.125E+02	.00000	.02327	.00000	-1.779E+02	.00000
6	LC1	5.858E+02	.00000	.01481	.00000	-1.221E+02	.00000
	LG1	9.909E+02	.00000	.02444	.00000	-2.065E+02	.00000
7	LC1	.00000	.00000	.00395	.00000	-5.99170	.00000
	LG1	.00000	.00000	.00652	.00000	-10.10672	.00000
Maxi	LC1	5.858E+02	.00000	.01481	.00000	2.98419	.00000
Mini	LC1	.00000	.00000	.00000	.00000	-1.221E+02	.00000
Maxi	LG1	9.909E+02	.00000	.02444	.00000	5.03511	.00000
Mini	LG1	.00000	.00000	.00000	.00000	-2.065E+02	.00000

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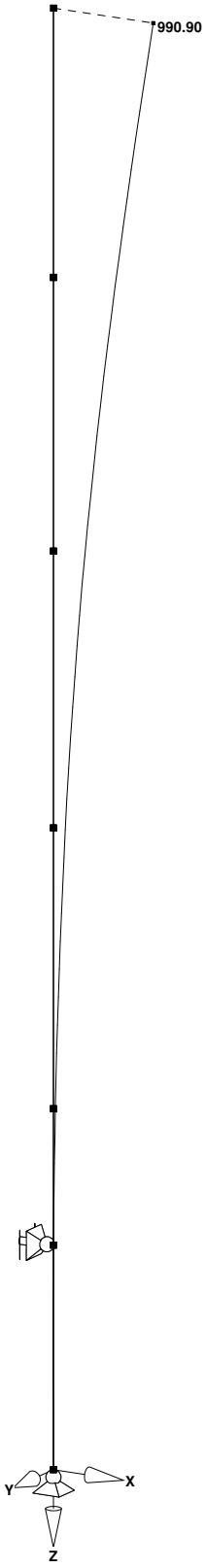
GRAPHIC

RESULTS

LG 1 - Vollast
Deformations

Isometric



Max u: 990.90 mm
Factor for Deformations: 0.8

STEEL1 - SPANNUNGSANALYSE

GENERAL DATA

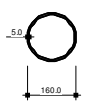
ELEMENTS TO DESIGN
All

LOAD CASES TO DESIGN
LG1 - Vollast

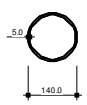
MATERIALS

Mat No	Material Description	Material Code, Criterion	Allowable Stresses [N/mm^2] Sigma	Tau	Sigma eq
1	Al 6063 T5 (F18)	DIN18800	132	76	132

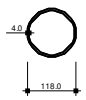
Rohr 160/5



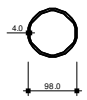
Rohr 140/5



Rohr 118/4



Rohr 98/4



Rohr 82/4

SECTIONS

Sec No	Mat No	Section Description Section Rotation	I-T [cm^4] A [cm^2]	I-2 [cm^4] Alpha pl y	I-3 [cm^4] Alpha pl z
1	1	Rohr 160/5	1463.88 24.35	731.94 1.00	731.94 1.00
2	1	Rohr 140/5	967.51 21.21	483.76 1.00	483.76 1.00
3	1	Rohr 118/4	466.01 14.33	233.01 1.00	233.01 1.00
4	1	Rohr 98/4	261.41 11.81	130.70 1.00	130.70 1.00
5	1	Rohr 82/4	149.48 9.80	74.74 1.00	74.74 1.00

MAX STRESSES BY SECTION

Stress Type	Elem No	x Loc [m]	S Point No	LC No	Stress [N/mm^2] existing	allowable	Stress Ratio
Section No 1 - Rohr 160/5							
Sigma Total	1	1.600	10	LG1	-97.06	132.00	0.74
Tau Total	1	1.600	1	LG1	-4.60	76.00	0.06
Sigma eq	1	1.600	10	LG1	97.06	132.00	0.74
Section No 2 - Rohr 140/5							
Sigma Total	2	0.000	10	LG1	-109.76	132.00	0.83
Tau Total	2	0.000	1	LG1	1.20	76.00	0.02
Sigma eq	2	0.000	10	LG1	109.76	132.00	0.83
Section No 3 - Rohr 118/4							
Sigma Total	3	0.000	10	LG1	-131.87	132.00	1.00
Tau Total	3	0.000	1	LG1	1.52	76.00	0.02
Sigma eq	3	0.000	10	LG1	131.87	132.00	1.00
Section No 4 - Rohr 98/4							
Sigma Total	4	0.000	10	LG1	-118.98	132.00	0.90
Tau Total	4	0.000	1	LG1	1.59	76.00	0.02
Sigma eq	4	0.000	10	LG1	118.98	132.00	0.90
Section No 5 - Rohr 82/4							
Sigma Total	5	0.000	10	LG1	-79.63	132.00	0.60
Tau Total	5	0.000	1	LG1	1.65	76.00	0.02
Sigma eq	5	0.000	10	LG1	79.63	132.00	0.60

MAX STRESSES BY ELEMENT

Stress Type	x Location [m]	S Point No	LC No	Stress [N/mm^2] existing	allowable	Stress Ratio
Element No 1: Section No 1 - Rohr 160/5						
Sigma Total	1.600	10	LG1	-97.06	132.00	0.74
Tau Total	1.600	1	LG1	-4.60	76.00	0.06
Sigma eq	1.600	10	LG1	97.06	132.00	0.74
Element No 2: Section No 2 - Rohr 140/5						
Sigma Total	0.000	10	LG1	-109.76	132.00	0.83
Tau Total	0.000	1	LG1	1.20	76.00	0.02
Sigma eq	0.000	10	LG1	109.76	132.00	0.83
Element No 3: Section No 3 - Rohr 118/4						
Sigma Total	0.000	10	LG1	-131.87	132.00	1.00
Tau Total	0.000	1	LG1	1.52	76.00	0.02
Sigma eq	0.000	10	LG1	131.87	132.00	1.00

MAX STRESSES BY ELEMENT

Stress Type	x Location [m]	S Point No	LC No	Stress [N/mm^2] existing	allowable	Stress Ratio
Element No 4: Section No 4 - Rohr 98/4						
Sigma Total	0.000	10	LG1	-118.98	132.00	0.90
Tau Total	0.000	1	LG1	1.59	76.00	0.02
Sigma eq	0.000	10	LG1	118.98	132.00	0.90
Element No 5: Section No 5 - Rohr 82/4						
Sigma Total	0.000	10	LG1	-79.63	132.00	0.60
Tau Total	0.000	1	LG1	1.65	76.00	0.02
Sigma eq	0.000	10	LG1	79.63	132.00	0.60
Element No 6: Section No 1 - Rohr 160/5						
Sigma Total	0.000	10	LG1	-97.06	132.00	0.74
Tau Total	0.000	1	LG1	1.11	76.00	0.01
Sigma eq	0.000	10	LG1	97.06	132.00	0.74

GOVERNING INTERNAL FORCES - [SIGMA EQ]

Elem No	x Location [m]	LC No	Forces [kN] N	V-2	V-3	Moments [kNm] M-T	M-2	M-3
1	1.600	LG1	-0.55	0.00	-5.61	0.00	-8.86	0.00
2	0.000	LG1	-0.46	0.00	1.27	0.00	-7.57	0.00
3	0.000	LG1	-0.28	0.00	1.09	0.00	-5.20	0.00
4	0.000	LG1	-0.17	0.00	0.94	0.00	-3.17	0.00
5	0.000	LG1	-0.08	0.00	0.81	0.00	-1.45	0.00
6	0.000	LG1	-0.55	0.00	1.36	0.00	-8.86	0.00

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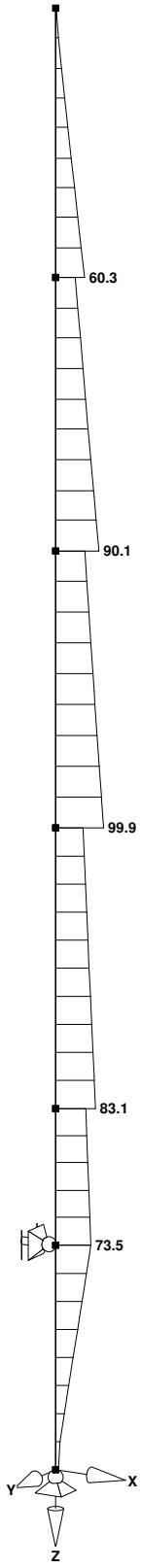
GRAPHIC

SPANNUNGSAUSNUTZUNG

STEEL1 - Spannungsanalyse
Sigma eq

Isometric



Max = 99.9%