Punktlasten + Lastermittlung

Statische Berechnung zur Ermittlung der Hängepunktlasten

planer

Punktlasten

Rig	Handle	Number	Static Load Stress	Dynamic Load Stress	Support	Static Force [kN]	Static Utilization [%]	Dynamic Force [kN]	Dynamic Utilization [%]	Max Valid Force [kN]	Height [m]
1	E8B	E8B	OK	OK	D8 500kg 18m	-2.248	44.96	-2.697	53.95	5.000	0
1	E8E	E8E	OK	OK	D8 500kg 18m	-2.335	46.71	-2.803	56.05	5.000	0
1	E88	102	OK	OK	D8 500kg 18m	-1.680	33.61	-2.017	40.33	5.000	0
1	E89	101	OK	OK	D8 500kg 18m	-0.805	16.11	-0.966	19.33	5.000	0
1	E8C	E8C	OK	OK	D8 500kg 18m	-1.599	31.99	-1.919	38.38	5.000	0
1	E8D	E8D	OK	OK	D8 500kg 18m	-0.117	2.33	-0.140	2.80	5.000	0
2	EB1	EB1	OK	OK	Deadhang 1000	-2.630	26.30	-3.156	31.56	10.000	2
2	EB0	EB0	OK	OK	Deadhang 1000	-2.478	24.78	-2.974	29.74	10.000	2
					SUM Σ	**-13.893**	**x 1.20 =**	**-16.672**			

Auflagerlasten	3.300
Einzellasten	3.276
Preriglasten	4.583
Streckenlasten	2.734
SUM Σ	**13.893**

DELTA Δ	**0.000**

Punktlasten mit Lastanteilen nach Gewerken

Rig	Handle	Number	Support	Static Force [kN]	Light [%]	Audio [%]	Video [%]	Media Accessories [%]	Truss [%]	Rigging [%]	Motor [%]	Point [%]	Rig Accessories [%]	SUM [%]
1	E8B	E8B	D8 500kg 18m	-2.248	22.11	-2.98	-1.34	0.00	23.27	34.48	24.47	0.00	0.00	100.00
1	E8E	E8E	D8 500kg 18m	-2.335	17.50	0.00	0.34	0.00	22.78	35.83	23.55	0.00	0.00	100.00
1	E88	102	D8 500kg 18m	-1.680	25.55	9.90	5.39	0.00	24.29	2.14	32.73	0.00	0.00	100.00
1	E89	101	D8 500kg 18m	-0.805	-24.95	43.53	27.42	0.00	26.75	-41.05	68.29	0.00	0.00	100.00
1	E8C	E8C	D8 500kg 18m	-1.599	27.81	0.01	6.40	0.00	28.87	2.51	34.39	0.00	0.00	100.00
1	E8D	E8D	D8 500kg 18m	-0.117	-105.33	-0.23	-18.42	0.00	58.89	-306.53	471.63	0.00	0.00	100.00
2	EB1	EB1	Deadhang 100	-2.630	0.00	0.00	0.00	0.00	9.97	0.00	90.03	0.00	0.00	100.00
2	EB0	EB0	Deadhang 100	-2.478	0.00	0.00	0.00	0.00	10.60	0.00	89.40	0.00	0.00	100.00

Traversenbemessung

Anzeige der maximalen Belastung pro Traversenstrecke
mit Sicherheitskonzept nach EUROCODE

#	Load Stress	Max Utilization [%]	Manufacturer	Name	Handle	Length [mm]	Bending moment [kNm]	Bending resistance [kNm]	Bending Utilization [%]	Shear force [kN]	Shear resistance [kN]	Shear Utilization [%]	Height [mm]
1	OK	9.46	EUROTRUSS	FD34	6A1	2605.000	-1.621	17.140	9.46	-1.123	16.850	6.66	120
2	OK	9.46	EUROTRUSS	FD34	6A2	2605.000	1.622	17.140	9.46	1.078	16.850	6.40	120
3	OK	1.35	EUROTRUSS	FD34	3460	2315.000	0.174	17.140	1.02	0.228	16.850	1.35	120
4	OK	8.61	EUROTRUSS	FD34	340F	2315.000	-1.351	17.140	7.88	-1.451	16.850	8.61	120
5	OK	4.31	EUROTRUSS	FD34	73E	2605.000	-0.739	17.140	4.31	-0.416	16.850	2.47	120
6	OK	8.34	EUROTRUSS	FD34	3410	2315.000	1.344	17.140	7.84	-1.406	16.850	8.34	120
7	OK	4.31	EUROTRUSS	FD34	73F	2605.000	0.738	17.140	4.31	0.450	16.850	2.67	120
8	OK	5.14	EUROTRUSS	FD34	A87	4605.000	-0.615	17.140	3.59	0.866	16.850	5.14	120
9	OK	5.81	EUROTRUSS	FD34	A89	4605.000	-0.687	17.140	4.01	0.979	16.850	5.81	120
10	OK	7.66	EUROTRUSS	FD34	AEA	5210.000	-1.313	17.140	7.66	0.919	16.850	5.45	120
11	OK	9.20	EUROTRUSS	FD33	C66	6000.000	0.683	7.422	9.20	-0.511	14.600	3.50	120
12	OK	12.73	DIN EN 10220	RO48,3x2,0	CBA	3000.000	0.075	0.590	12.73	0.200	14.580	1.37	120
13	OK	12.06	DIN EN 10220	RO48,3x2,0	CE3	1000.000	0.071	0.590	12.06	0.104	14.580	0.71	120
14	OK	17.10	EUROTRUSS	FD44	E5B	7000.000	2.434	24.996	9.74	3.518	20.571	17.10	2175

Verwendete Einzellasten

Rig	Load Name	Load Category	Single Load [kN]	Quantity	Total Load [kN]
1	SGM P-10	Media	0.209	3	0.627
1	Clay Paky Sharpy	Media	0.160	4	0.640
1	ETC Source4 26° 575W	Media	0.063	3	0.189
1	Nexo GEO-S 4fach Array	Media	0.450	1	0.450
1	Christie LX 100	Media	0.370	1	0.370
1	Gewicht 25kg	Rigging	0.250	4	1.000
1	D8 500kg 18m Kette	Rigging	0.550	6	3.300
	SUM			**Σ 22**	**Σ 6.576**
2	SUB-RIG-D8 500kg 18m Kette	Rigging	2.248	1	2.248
2	SUB-RIG-D8 500kg 18m Kette	Rigging	2.335	1	2.335
2	DeadHang	Rigging	0.000	2	0.000
	SUM			**Σ 4**	**Σ 4.583**
	TOTAL Single Load			Σ 24	Σ 6.576
2	TOTAL Single Load + Sub-Rig			Σ 26	Σ 11.159

Verwendete Streckenlasten

Rig	Line Load Name	Line Load Category	Length [m]	Self Weight [kN/m]	Total load [kN]
	Eigengewicht				
1	DIN EN 10220 RO48,3x2,0	Rigging	4.00	0.008	0.032
1	EUROTRUSS FD33	Rigging	6.00	0.045	0.270
1	EUROTRUSS FD34	Rigging	31.78	0.060	1.907
	SUM		**Σ 41.78**		**Σ 2.209**
	Eigengewicht				
2	EUROTRUSS FD44	Rigging	7.00	0.075	0.525
	SUM		**Σ 7.00**		**Σ 0.525**
2	**TOTAL**		**Σ 48.79**		**Σ 2.734**

Verwendete Faktoren

Automatische Faktoren	
Streckenlast für Rigginglasten [kN/m]	0.00
Streckenlast-Faktor für Medienlasten	0.00

mit Sicherheitskonzept nach EUROCODE	
Medientechnik	1.50
Rigging	1.35

Faktoren für Punktlasten	
Statisch	1.00
Dynamisch	1.20

Globale Lastunsicherheitsfaktoren	
Licht	1.00
Audio	1.00
Video	1.00
Einzelgewichte	1.00
Hängepunkte	1.00
Motoren	1.00
Traversen	1.00

Globale Streckenlasten [kg/m]	
Licht	0.00
Audio	0.00
Video	0.00
Rigging	0.00

Sonstige Faktoren	
Maßstab der Zeichnung	mm
Erdbeschleunigung g [m/s2]	10.00

Verwendete Materialien

#	Name	Material Type	Elastic Modulus [N/mm^2]	Poisson Ratio [-]	Shear Modulus [N/mm^2]	Specific Weight [N/mm^3]	Tensile Strength [N/mm^2]	Tensile Strength Haz [N/mm^2]	Tensile Yield [N/mm^2]	Tensile Yield Haz [N/mm^2]
1	EN-AW 6082 T6	AluminumAlloy	70000	0,296	27000	2,7E-05	290	185	250	125
2	EN-AW 6060 T66	AluminumAlloy	70000	0,296	27000	2,7E-05	195	110	150	65

Verwendete Traversen-Typen

#	Manufacturer	Name	Width [mm]	Height [mm]	Min Length [mm]	Self Weight [kg/m]	Truss Type	Main Chord Diameter [mm]	Main Chord Wall Thickness [mm]	Diagonals Diameter [mm]	Diagonals Wall Thickness [mm]	Cross Section Area [mm^2]	Material
1	EUROTRUSS	FD33	290	258	250	4.50	ThreePoi	50	2	20	2	904,8	EN-AW 6082
2	EUROTRUSS	FD44	400	400	250	7.50	FourPoint	50	2	25	2	1206,4	EN-AW 6082
3	EUROTRUSS	FD34	290	290	250	6.00	FourPoint	50	2	20	2	1206,4	EN-AW 6082

Verwendete Pipe-Typen

#	Type	Name	Width [mm]	Height [mm]	Min Length [mm]	Self Weight [kg/m]	Pipe Type	Wall Thickness [mm]	Cross Section Area [mm^2]	Material
1	DIN EN 10220	RO48,3x2,0	48,3	48,3	0	0.80	Round	2	291	EN-AW 6060 T66

Verwendete Vergleichsstäbe

Truss	Handle	Name	Dead Weight per Meter [kg/m]	Length [m]	Dead Weight [kg]	Uncertainty Factor	Factored Weight [kg]	Height Dwg [mm]	Height Model [mm]	Corner @Start	Corner @End	Has Line Load	Start X,Y
1	C66	Eurotruss FD33	4.50	6.00	27.00	1.00	27.00	290	394	None	None	Yes	7993.953,205
2	CBA	Alupipe Alupipe	0.80	3.00	2.40	1.00	2.40	290	290	None	None	Yes	180.270,4755
3	CE3	Alupipe Alupipe	0.80	1.00	0.80	1.00	0.80	290	290	None	None	Yes	5564.743,101
4	E5B	Eurotruss FD44	7.50	7.00	52.50	1.00	52.50	2000	2175	None	None	Yes	1687.358,65.
5	6A1	Eurotruss FD34	6.00	2.60	15.63	1.00	15.63	0	120	Standard	Standard	Yes	600.000,3505
6	6A2	Eurotruss FD34	6.00	2.60	15.63	1.00	15.63	0	120	Standard	Standard	Yes	600.000,900.
7	3460	Eurotruss FD34	6.00	2.32	13.89	1.00	13.89	0	120	Standard	Standard	Yes	2915.000,350
8	340F	Eurotruss FD34	6.00	2.32	13.89	1.00	13.89	0	120	Standard	Standard	Yes	2915.000,611
9	73E	Eurotruss FD34	6.00	2.60	15.63	1.00	15.63	0	120	Standard	Standard	Yes	2915.000,611
10	73F	Eurotruss FD34	6.00	2.60	15.63	1.00	15.63	0	120	Standard	Standard	Yes	2915.000,900
11	3410	Eurotruss FD34	6.00	2.32	13.89	1.00	13.89	0	120	Standard	Standard	Yes	2915.000,900
12	A87	Eurotruss FD34	6.00	4.61	27.63	1.00	27.63	-0	120	Standard	Standard	Yes	7520.000,611
13	AEA	Eurotruss FD34	6.00	5.21	31.26	1.00	31.26	0	120	Standard	Standard	Yes	7520.000,900
14	A89	Eurotruss FD34	6.00	4.61	27.63	1.00	27.63	0	120	Standard	Standard	Yes	7520.000,900
14		**TOTAL**		**Σ 48.79**	**Σ 273.41**		**Σ 273.41**						