

Date: 09st November 2023

Revision – R1

DESIGN CALCULATION REPORT

FOR ARCHWAY STRUCTURE AT AIRSHOW GALA DINNER ATLANTIS

FOR AL LAITH

Submitted By



SECD Technical Services LLC

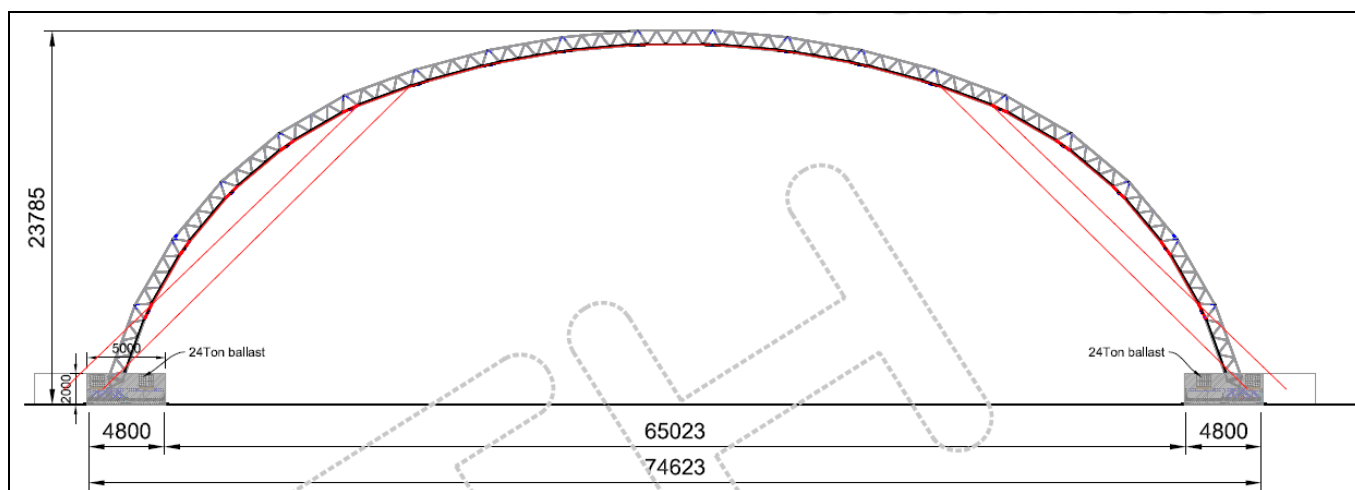
Park Avenue Tower

Suite 1302, Silicon Oasis, Dubai

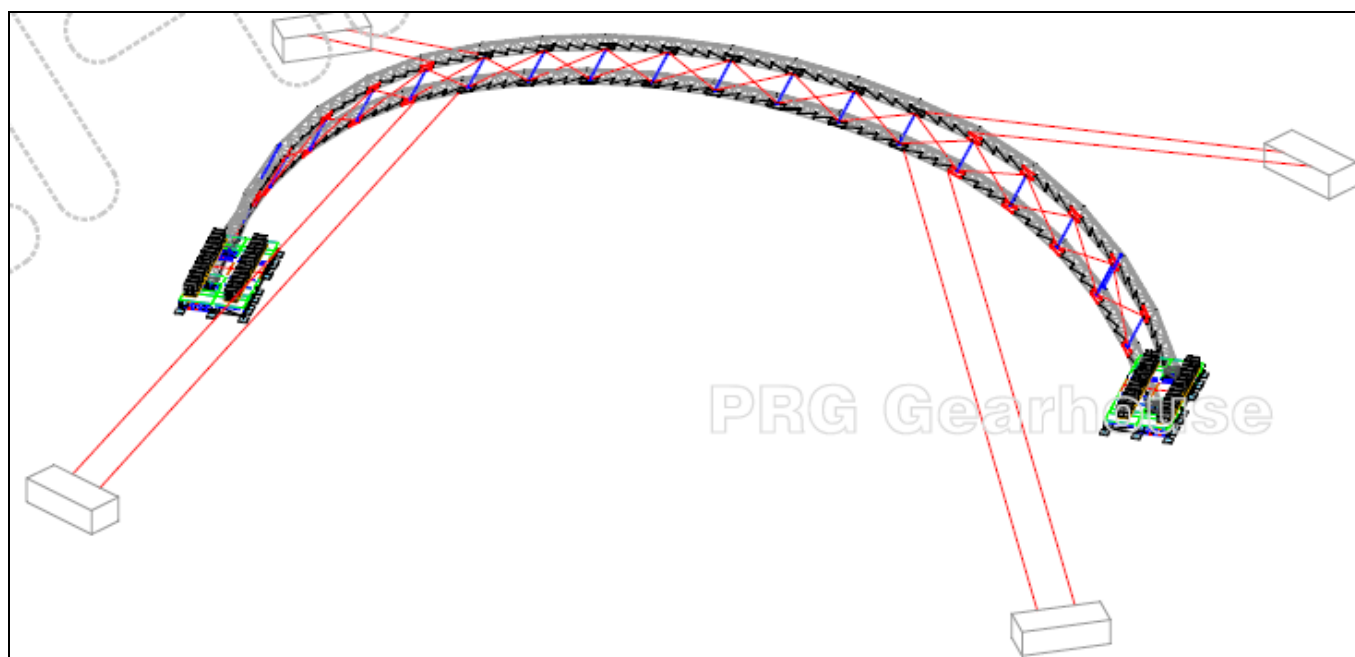
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Proposed space truss Archway (Elevation View)



Proposed space truss Archway (3D view)

2. MATERIALS

Sr. No.	Member	Remarks	Grade (N/mm ²)
1	CHS 60.3 x 5.0	Top & Bottom Main Chords	S355
2	CHS 42.4 x 4.0	Top & Bottom Horizontal straight members	S355
3	CHS 42.4 x 4.0	Top diagonal braces /Bottom diagonal Brace	S355
4	CHS 42.4 x 4.0	Front & Back side diagonal Braces member	S355
6	CHS 114.3 x 3.2	Purlins	S355
5	10 Dia. Rod	Cross Braces & Guy cable	S460
6	RHS 60x40x5	Standard	S355
7	RHS 60x40x5	Ledger	S355
8	RHS 120x60x5	Ledder beam Top bottom member	S355
9	RHS 60x40x5	Ledder beam Brace member	S355
10	RHS 120x60x5	Platorm supporting members	S355

3. CODES CONSIDERED

Following codes are referred for analysis and design of Archway structure.

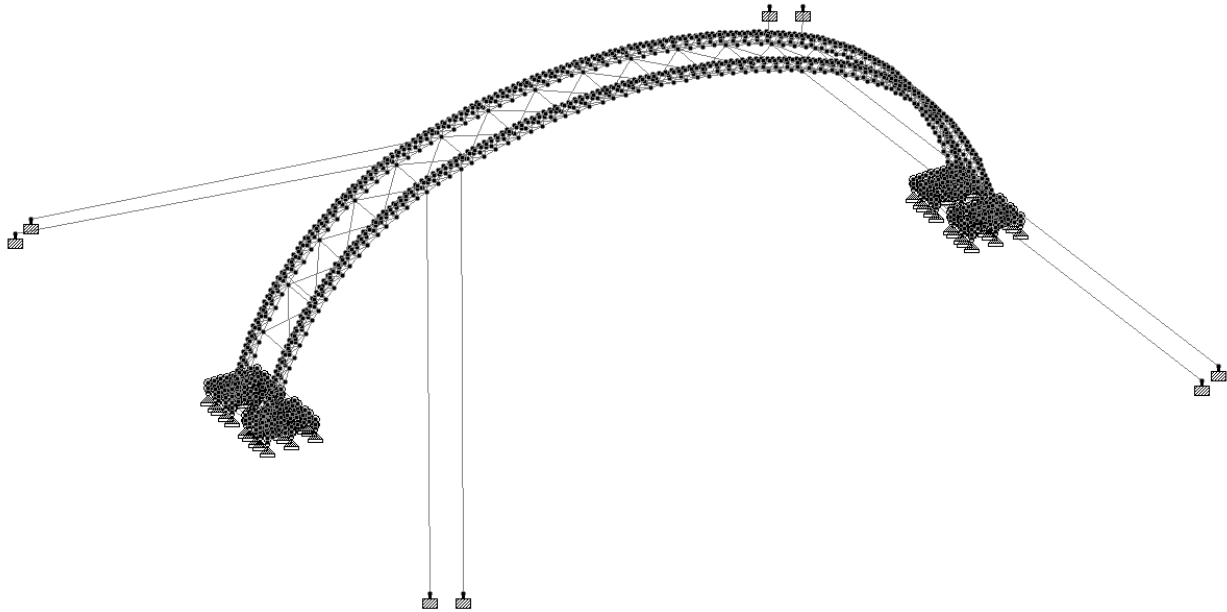
- BS EN 1990 Euro code Basis of Structural Design
- BS EN 1991 Euro code 1 Actions on Structures
- BS EN 1993 Euro code 3 Design of Steel Structures
- BS EN 12811-1:2003 Temporary works equipment - Part 1: Scaffolds Performance Requirements and general design
- BS 5950-1:2000, Structural use of steelwork in building
- Temporary Demountable Structures, Guidance on procurement, design & use

4. ASSUMPTION

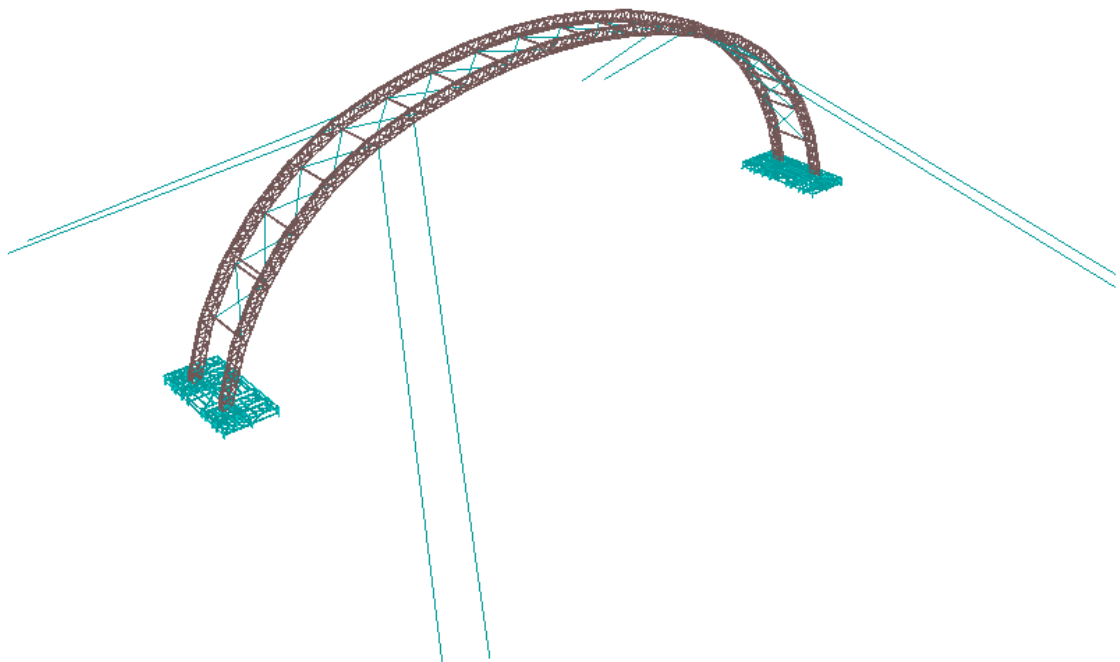
- Cross plan Bracings between the two space arches are act as tension member and connected at junction of node.

5. MODELING OF SPACE TRUSS ARCHWAY

Refer below images showing normal & render 3D view of Archway structure modeled in STAAD Pro software.

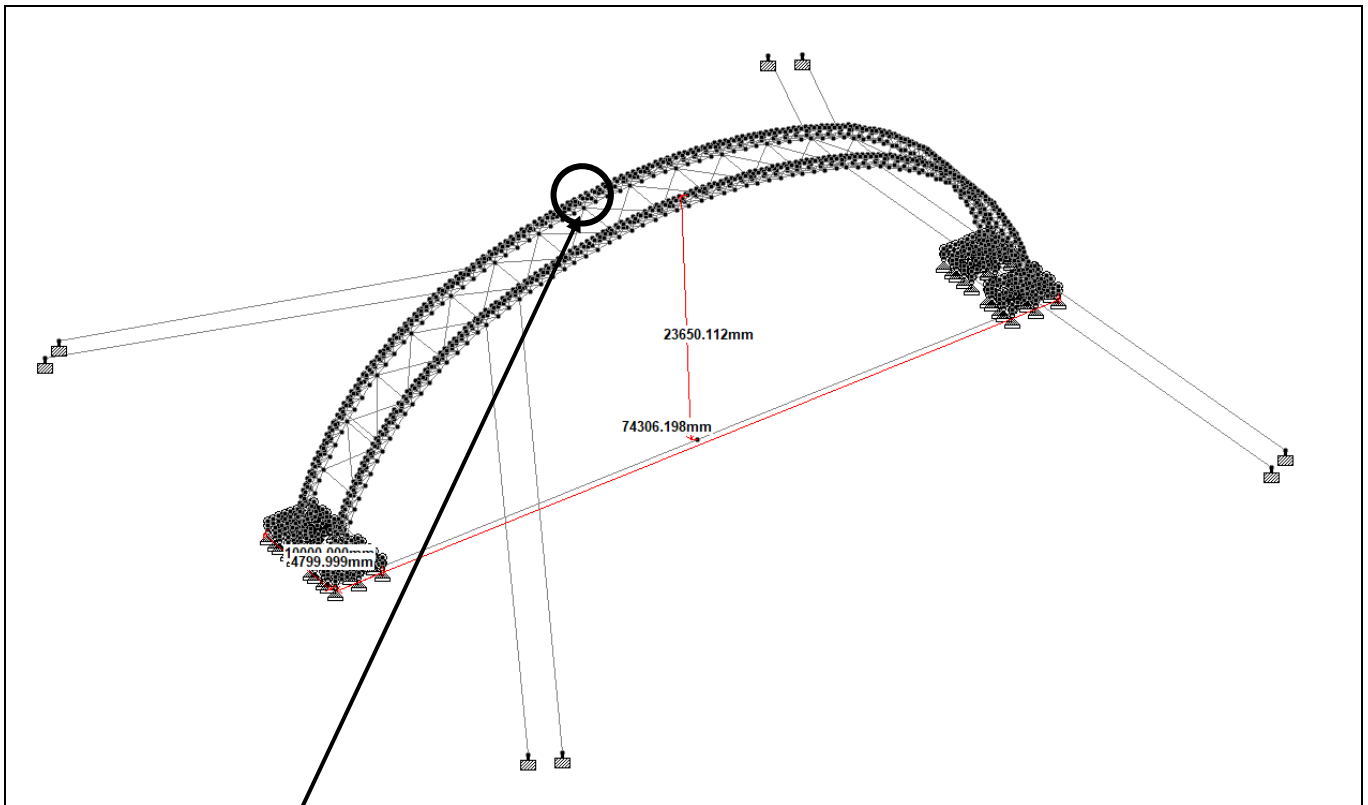


3D view of STAAD Pro model

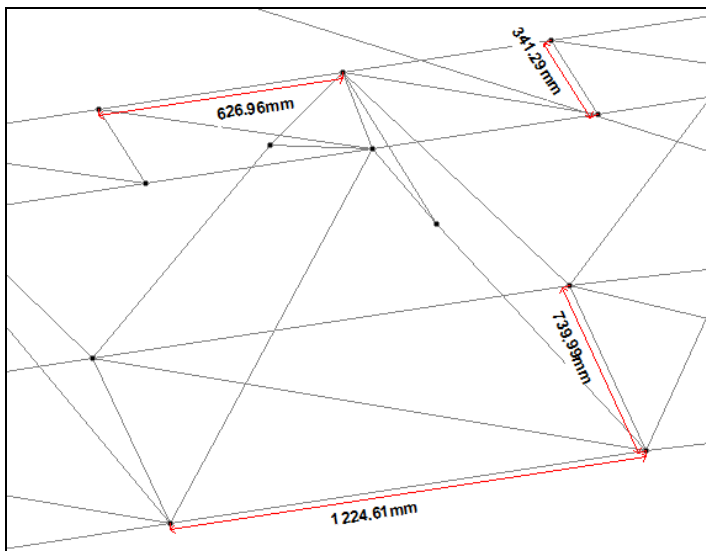


3D render view of from STAAD Pro

5.1. Geometry Data



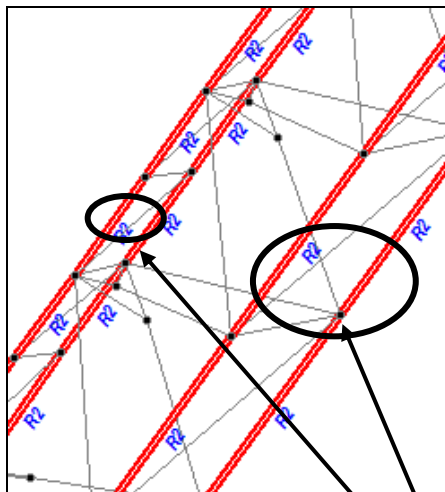
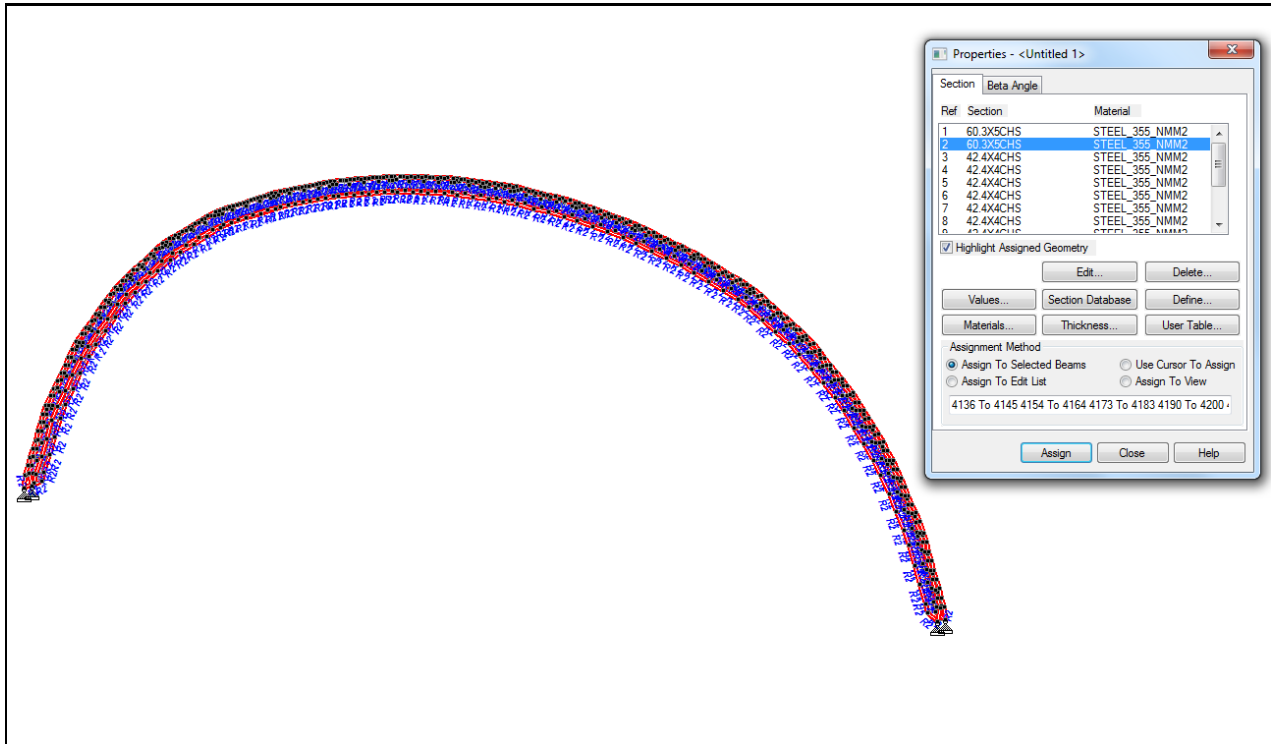
Dimensions



ZOOM VIEW

5.2. Member Properties

1. CHS 60.3 x 5.0 - Top & Bottom Main Chords



Top & Bottom Main
chord members

ZOOM VIEW

Geometry Property Loading

Beam no. = 5800. Section: 60.3X5CHS

Length = 1175.21

60.300

5.000

bf = 60.300

Physical Properties (Unit: mm)

Ax	869	Ix	669532
Ay	521.4	Iy	335000
Az	521.4	Iz	335000
D	60.3	W	60.3

Assign/Change Property

Material Properties

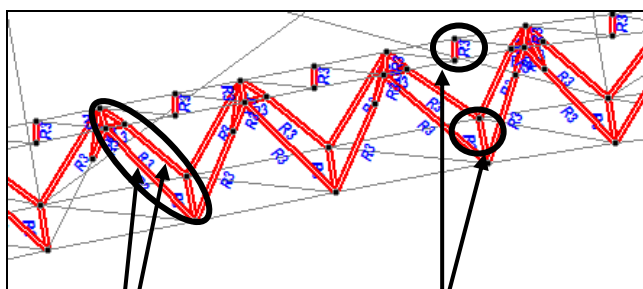
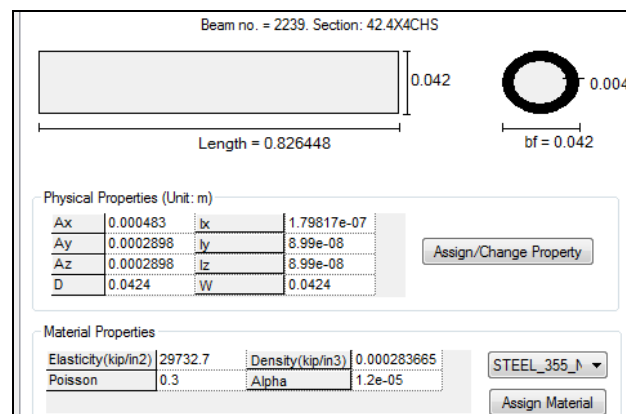
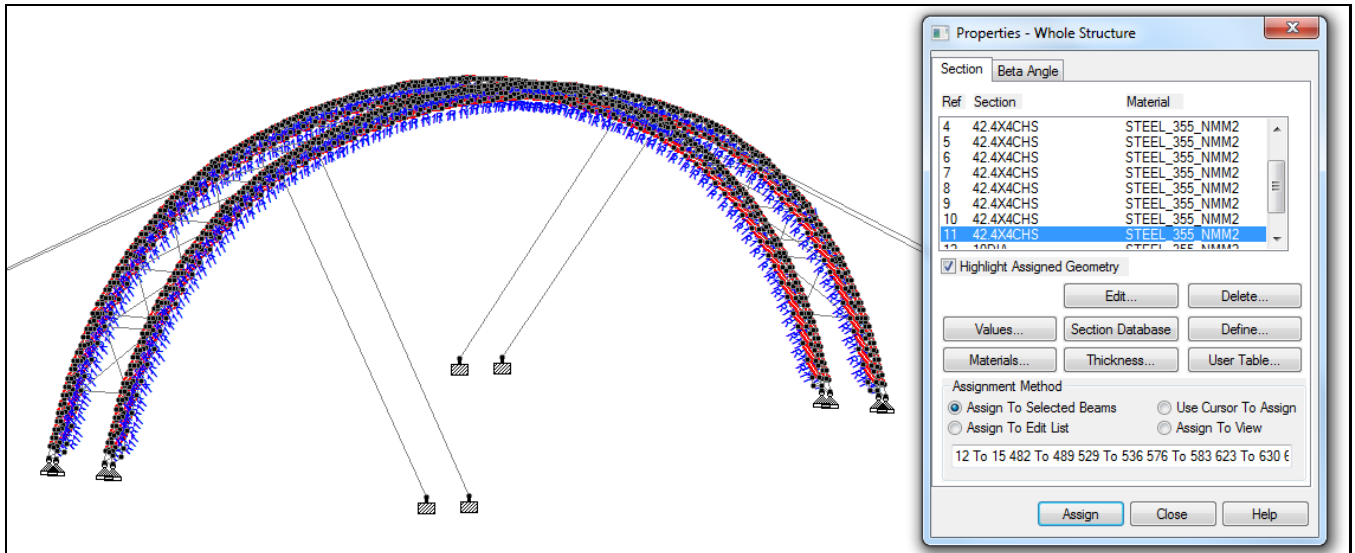
Elasticity(kip/in ²)	29732.7	Density(kip/in ³)	0.000283665
Poisson	0.3	Alpha	1.2e-05

STEEL_355_N

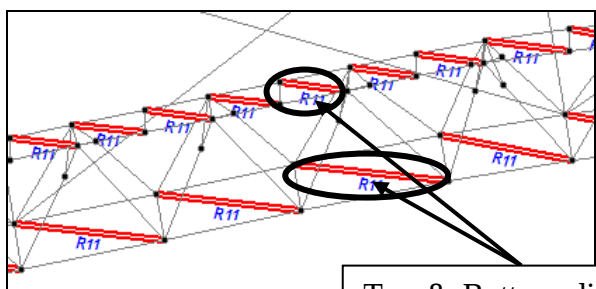
Assign Material

2. CHS 42.4 x 4.0 :

- Top & Bottom Horizontal straight members
- Top & Bottom diagonal Brace members
- Front & Back side diagonal Braces member



Top & Bottom Horizontal straight members



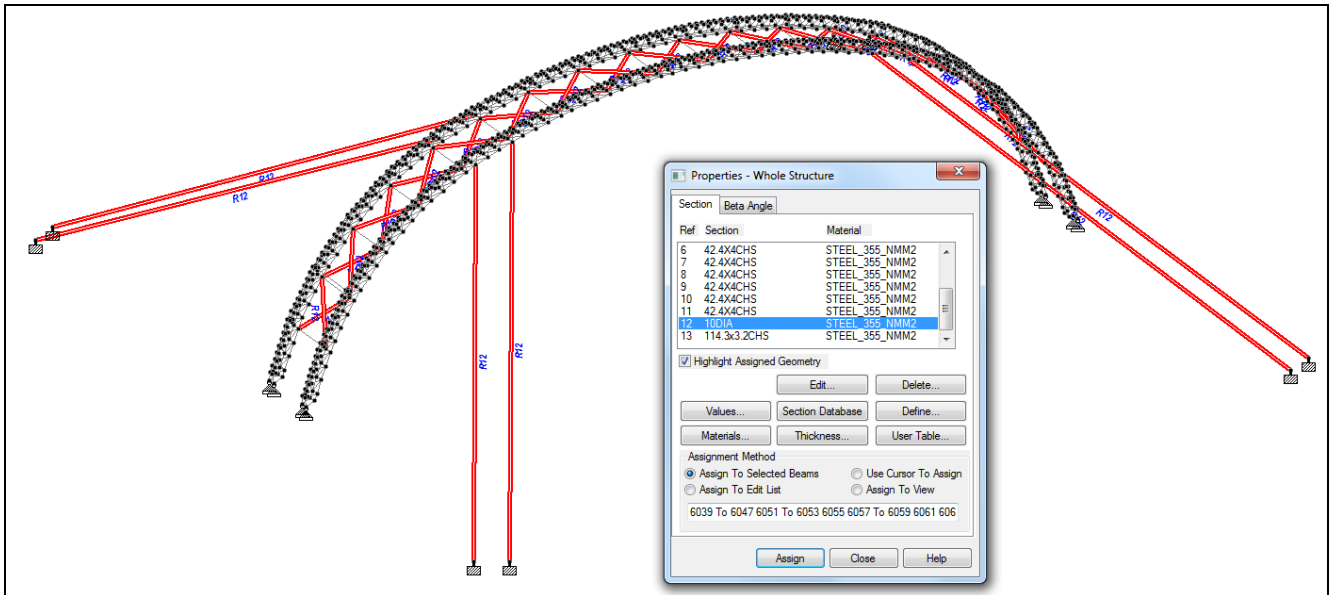
Top & Bottom diagonal Brace members

Front & Back side diagonal Braces members

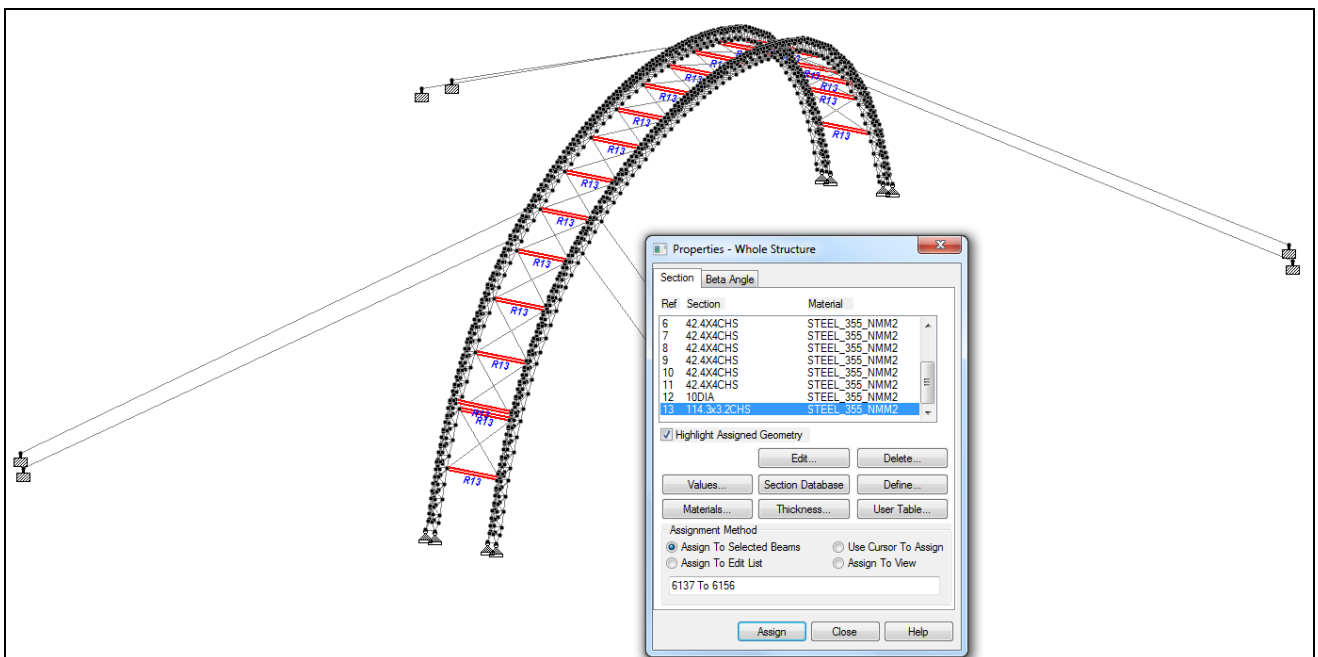
ZOOM VIEW

3. 10 mm diameter Rod :

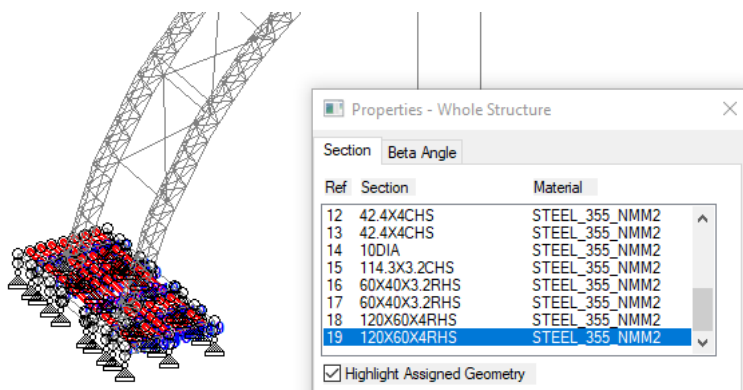
- Cross bracings
- Guy cable



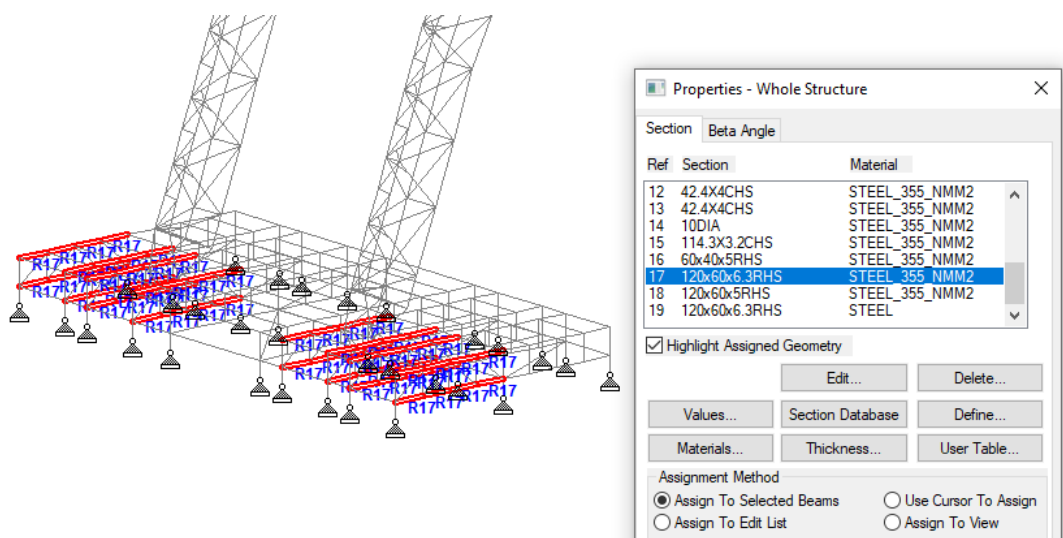
4. CHS 114.3 x 3.2 mm : Purlins



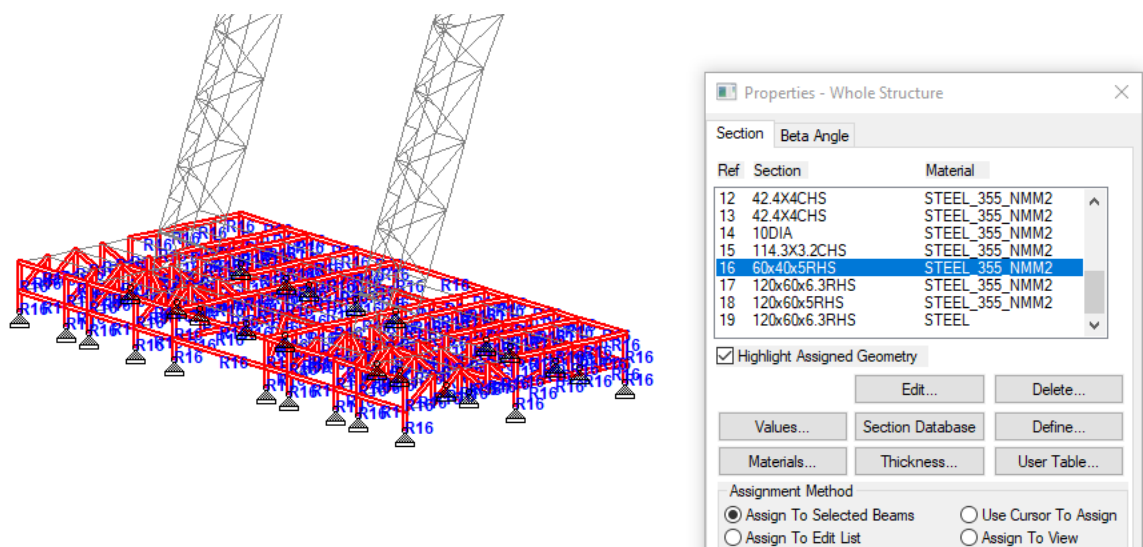
5. RHS 120X60X4 mm : Platform supporting members



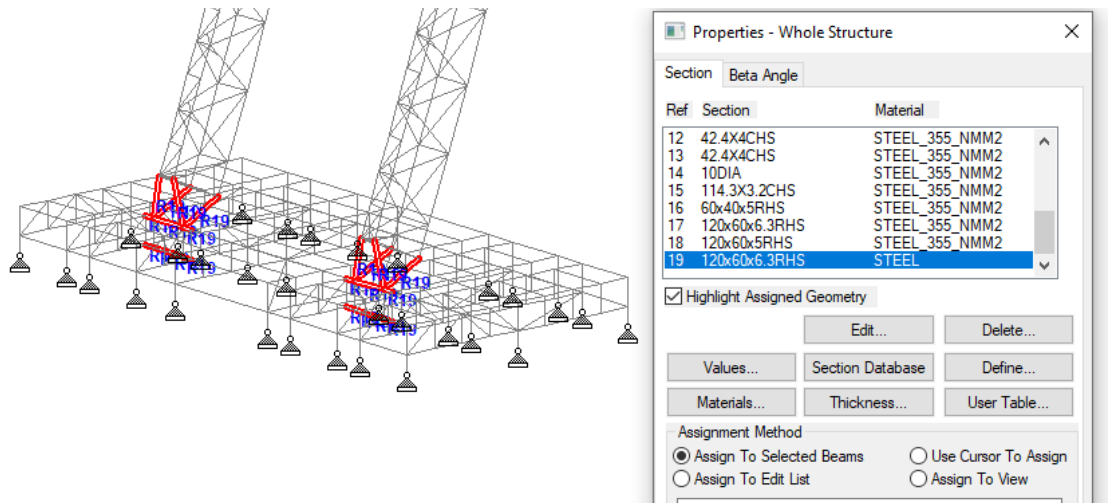
6. RHS 120X60X6.3 mm : Platform supporting Ledder beam horizontal members



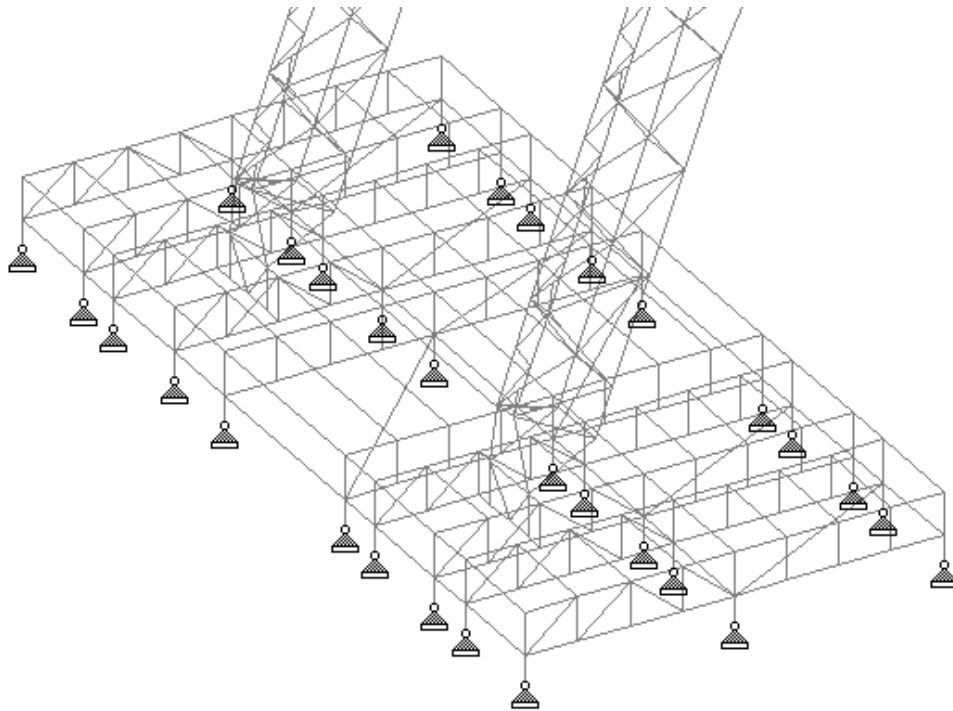
7. RHS 60X40X5mm : Platform supporting standard & ledger and brace members



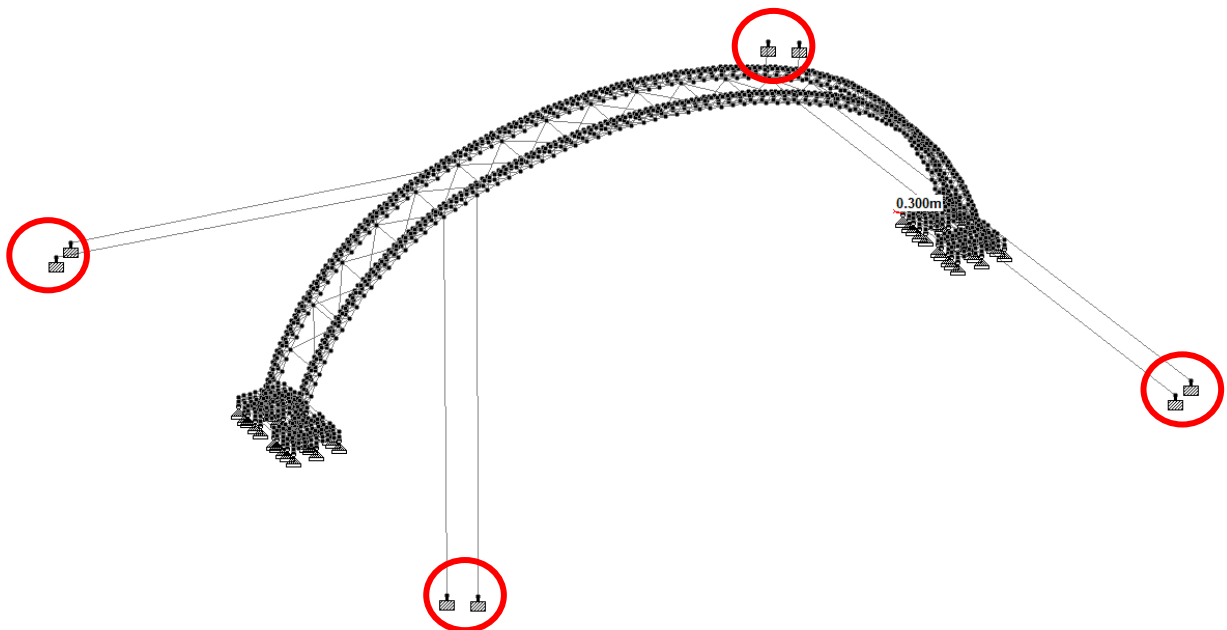
8. RHS 120X60X6 mm : Platform connection to truss



5.3. Support condition



Pin support condition at base of supporting structure



Fixed support condition

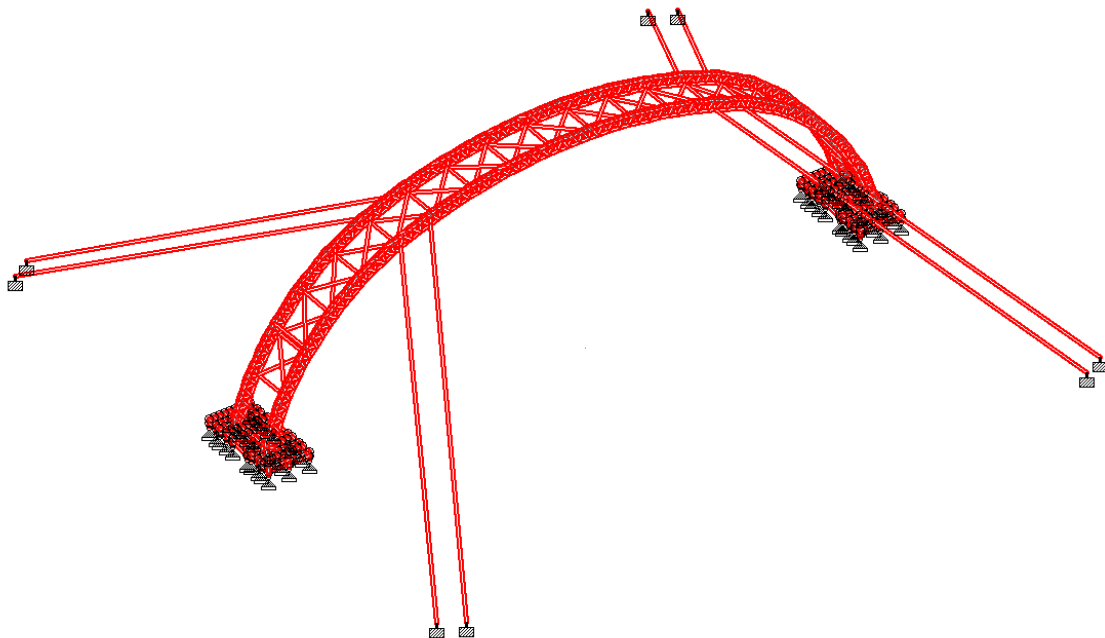
6. LOAD CASES

Load cases:

1. DL: Dead Load
2. LL: Live load
3. Wind in X-direction WLX
4. Wind in Z-direction WLZ
5. Wind in X-direction WL(-X)
6. Wind in Z-direction WL(-Z)
7. Temperature load

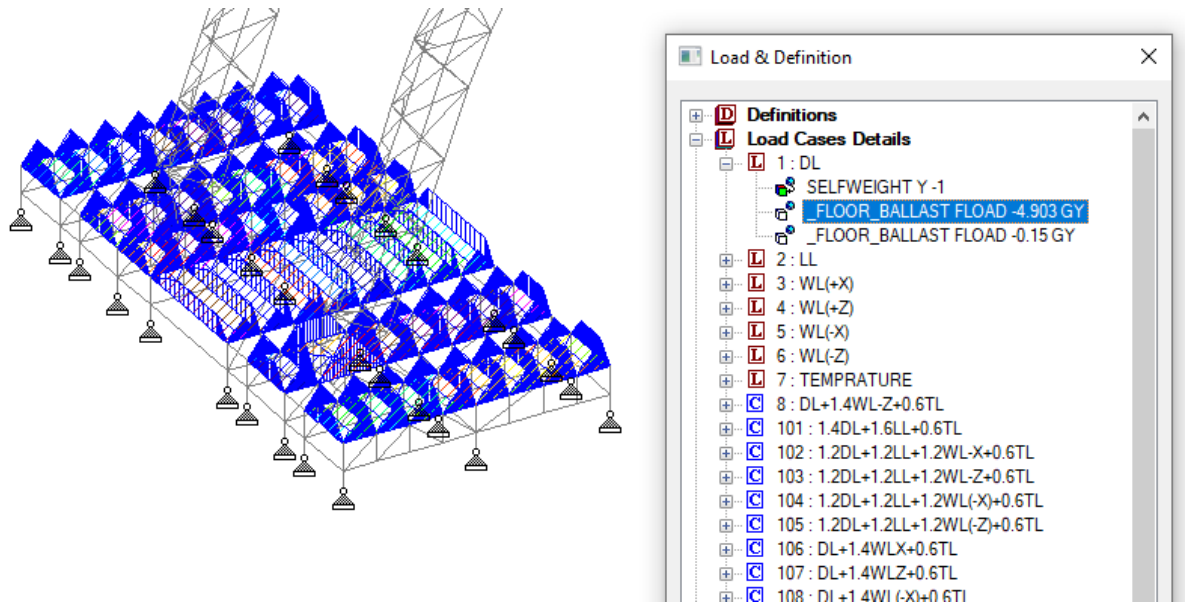
6.1. DL: Dead Load

1. Self weight

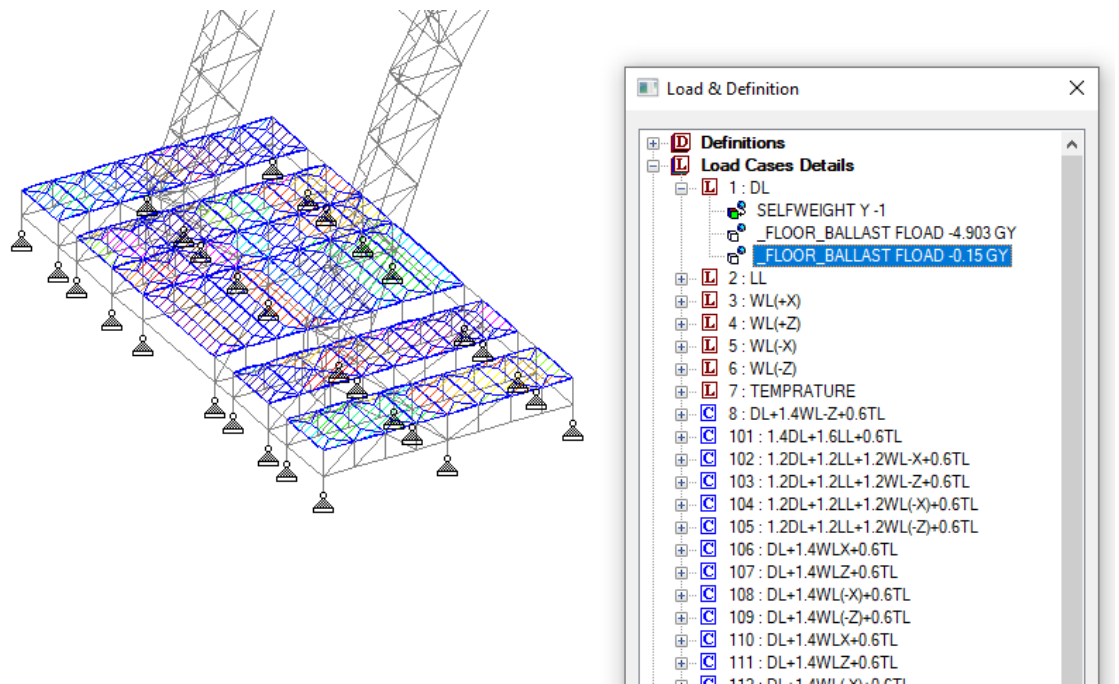


Definitions
Load Cases Details
1 : DL
SELFWEIGHT Y -1
2 : LL
3 : WL-X
4 : WL-Z
101 : 1.4DL+1.6LL
102 : 1.2DL+1.2LL+1.2WL-X
103 : 1.2DL+1.2LL+1.2WL-Z
104 : DL+1.4WL-X
105 : DL+1.4WL-Z
201 : DL+LL
202 : DL+0.8LL+0.8WL-X
203 : DL+0.8LL+0.8WL-Z
204 : DL+WLX
205 : DL+WLZ
Load Envelopes

2. Total Ballast load of 24 T has been applied as 4.98 kN/m² on full base structure.



3. Total 25 mm Ply selfweight of 0.15 KN/m² has been applied on full base structure

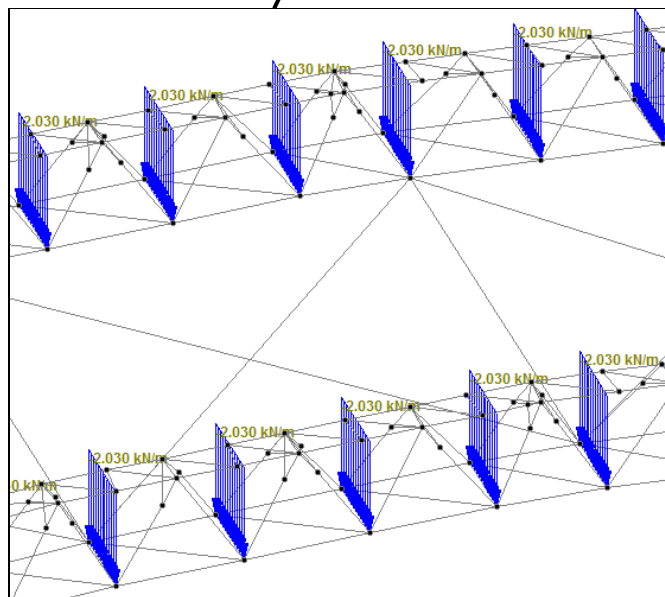
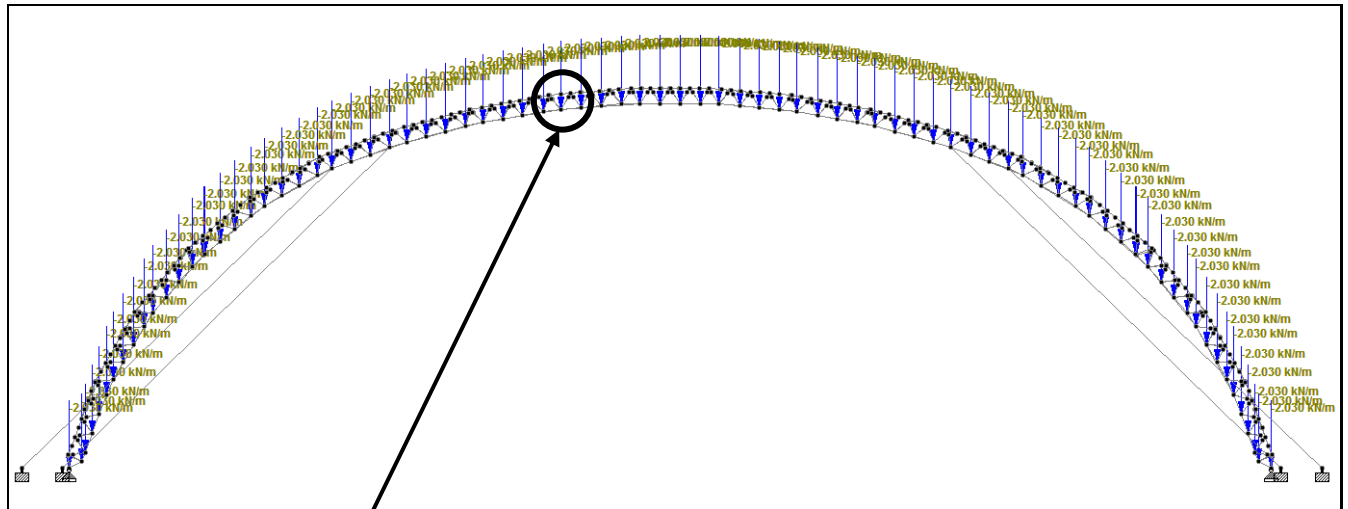


6.2. LL: Live Load

Live loads are applied in Archway structure.

Load from light fittings considered = 150 kg/ boom segments

Load on each bottom boom member = $(1.5\text{ kN} / 0.74 \text{ m span of bottom of boom})$
 $= 2.03 \text{ kN/m}$



D	Definitions
L	Load Cases Details
L	1 : DL
L	2 : LL
	UNI GY -2.03 kN/m
L	3 : WL-X
L	4 : WL-Z
C	101 : 1.4DL+1.6LL
C	102 : 1.2DL+1.2LL+1.2WL-X
C	103 : 1.2DL+1.2LL+1.2WL-Z
C	104 : DL+1.4WL-X
C	105 : DL+1.4WL-Z
C	201 : DL+LL
C	202 : DL+0.8LL+0.8WL-X
C	203 : DL+0.8LL+0.8WL-Z
C	204 : DL+WLX
C	205 : DL+W LZ
L	Load Envelopes

Arch way truss Enlarged view for Live Load

6.3. Wind Load

Wind loading for 25m/s acting to Archway Structure has been considered with following Calculations:-

Effective Wind speed = 25 m/s

As per “Temporary Demountable Structures, Section 8, Wind Loading”,

$$\begin{aligned}\text{Design Velocity Pressure } q &= (0.613 \times V_e^2) / 1000 \\ &= (0.613 \times 25^2) / 1000 \\ &= 0.383 \text{ kN/m}^2\end{aligned}$$

Force coefficient C_f of 1.2 for circular section = $0.383 \times 1.2 = 0.46 \text{ kN/m}^2$

$x = 0.6 \text{ \& } 1.2 \text{ m}$

$h = 0.96 \text{ m}$

Ratio $x/h = 0.625 \text{ and } 1.25$

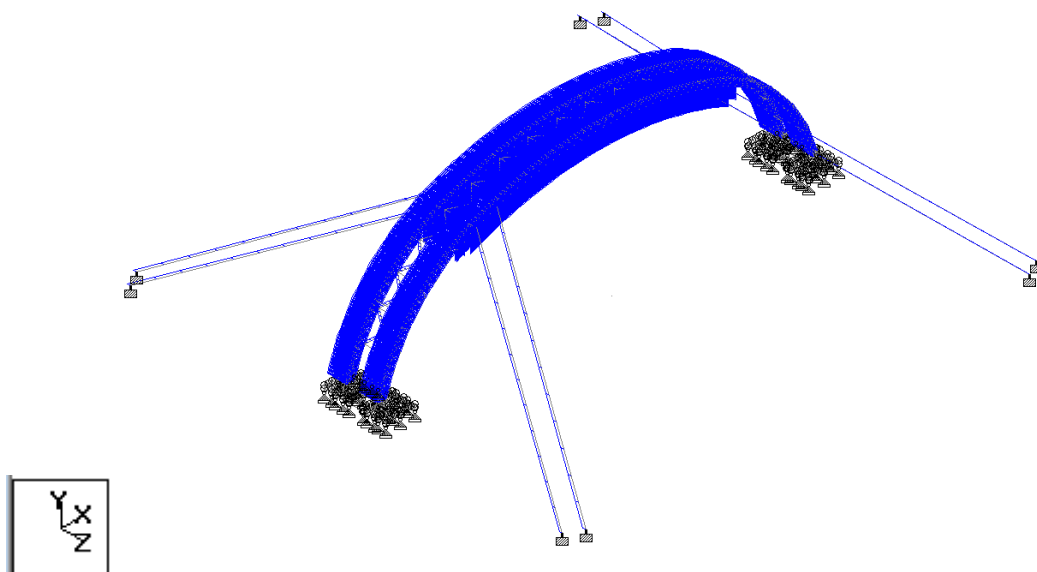
As per BS EN 1991-1-4:2005, Fig. 7.20,

For $x/h = 0.625 \text{ and } 1.25 \text{ \& } \phi = 1$,

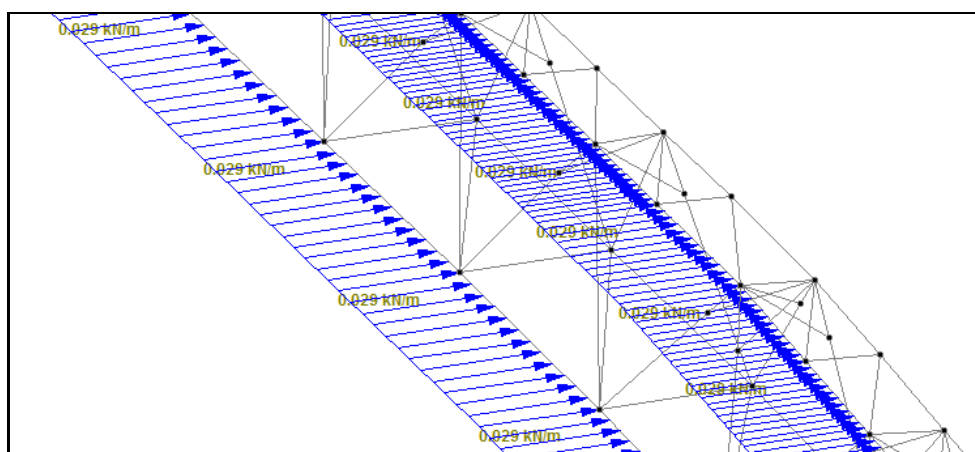
Shelter factor $\Psi_s = 0.3$ which is multiplied with wind pressure and applied to sheltered side Members (Members rear to wind facing side)

6.3.1. **Wind load in Z-direction**

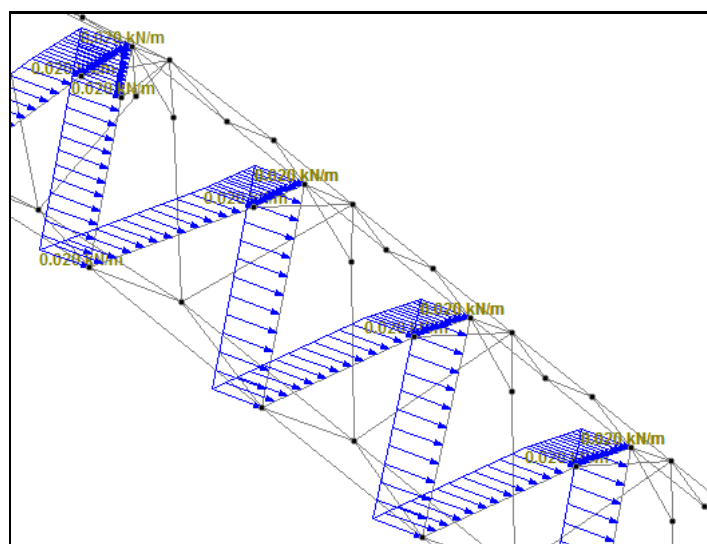
- Wind applied to Front Boom member = $0.46 \times 0.0635 = 0.02921 \text{ kN/m}$
- Wind applied to Rear Boom member = $0.46 \times 0.0635 \times 0.3 = 0.008763 \text{ kN/m}$
- Wind applied to Front Side diagonal member = $0.46 \times 0.0433 = 0.0199 \text{ kN/m}$
- Wind applied to Rear Side diagonal member = $0.46 \times 0.0433 \times 0.3 = 0.00597 \text{ kN/m}$
- Wind applied to bracings and guy Wires & Cross bracings = $0.383 \times 1.2 \times 0.01 = 0.0046 \text{ kN/m}$
- Upward wind load in Y direction = $0.46 \times 0.0433 = 0.0199 \text{ kN/m}$



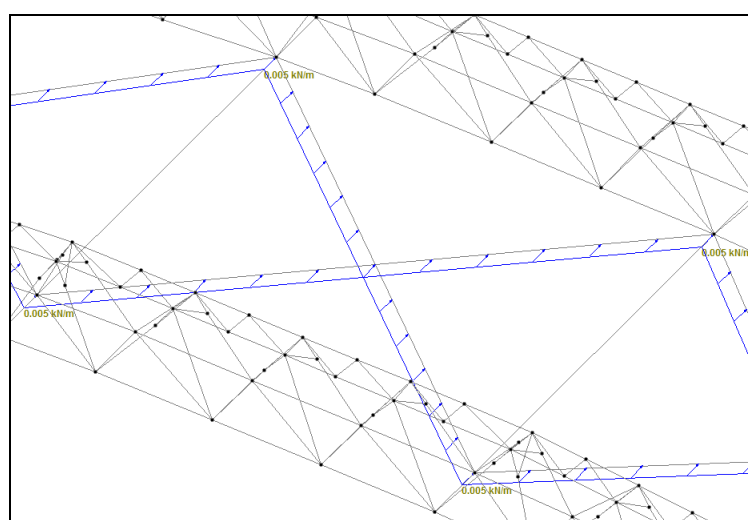
Wind load on Space Arch structure in +Z direction



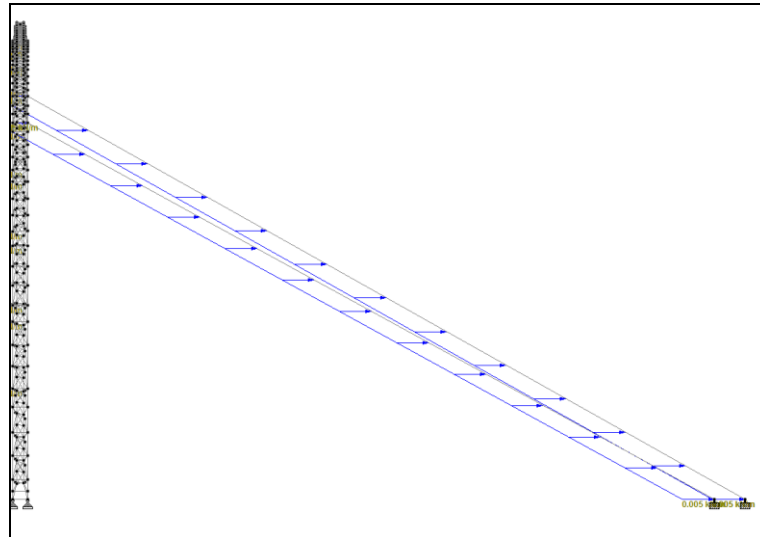
Wind applied to Top & bottom main cord member in +Z direction



Wind applied to front side diagonal members in +Z direction



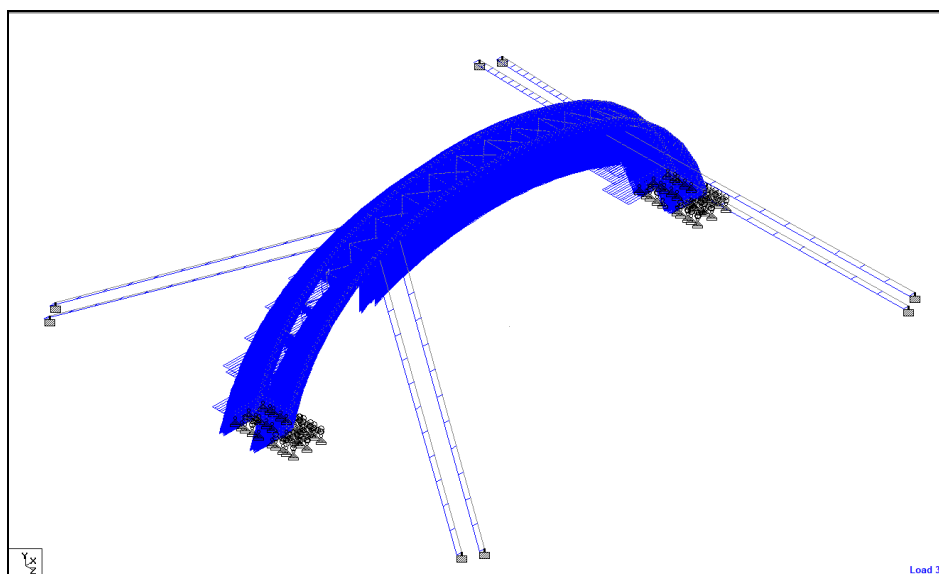
Wind applied to cross bracings in +Z direction



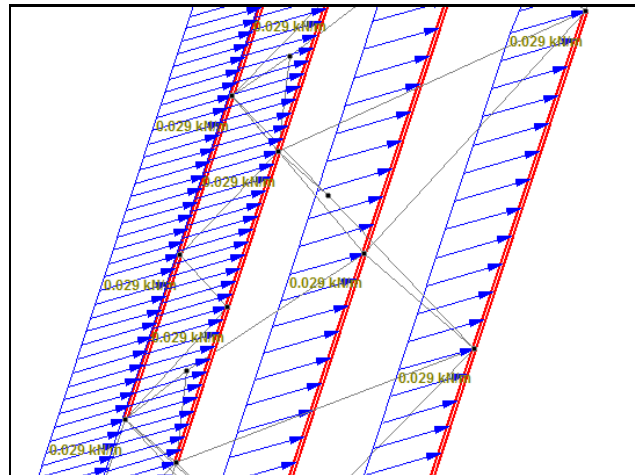
Wind applied to Guy cable in +Z direction

6.3.2. Wind load in X-direction

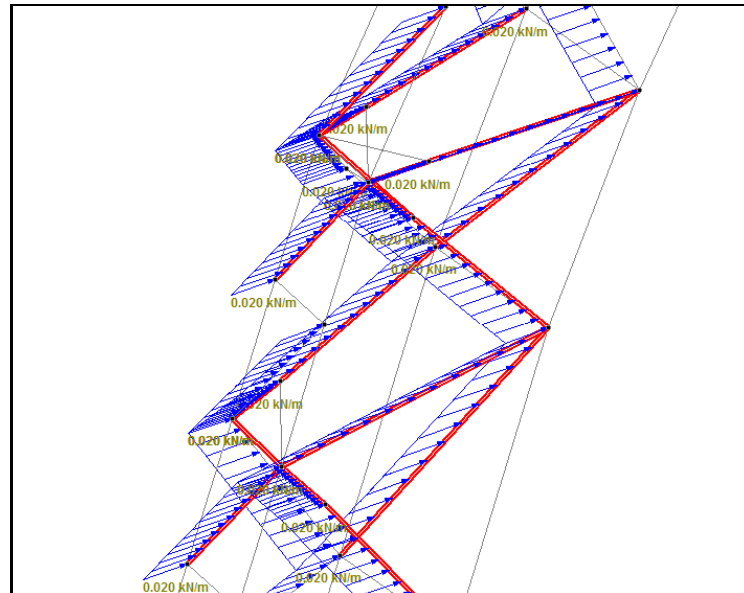
- Wind applied to Main Boom members:
 - boom Members = $0.46 * 0.0635$ = 0.02921 kN/m
- Wind applied to Top & Bottom Diagonal, Top & Bottom Cross (Horiz) stright members:
 - diagonal Members = $0.46 * 0.0433$ = 0.0199 kN/m
- Wind applied to Purlins:
 - Front Purlin Members = $0.46 * 0.1143$ = 0.05257 kN/m
- Wind applied to bracings and guy Wires = $0.383 * 1.2 * 0.01$ = 0.0046 kN/m
- Upward wind load in Y direction = $0.46 * 0.0433$ = 0.0199 kN/m



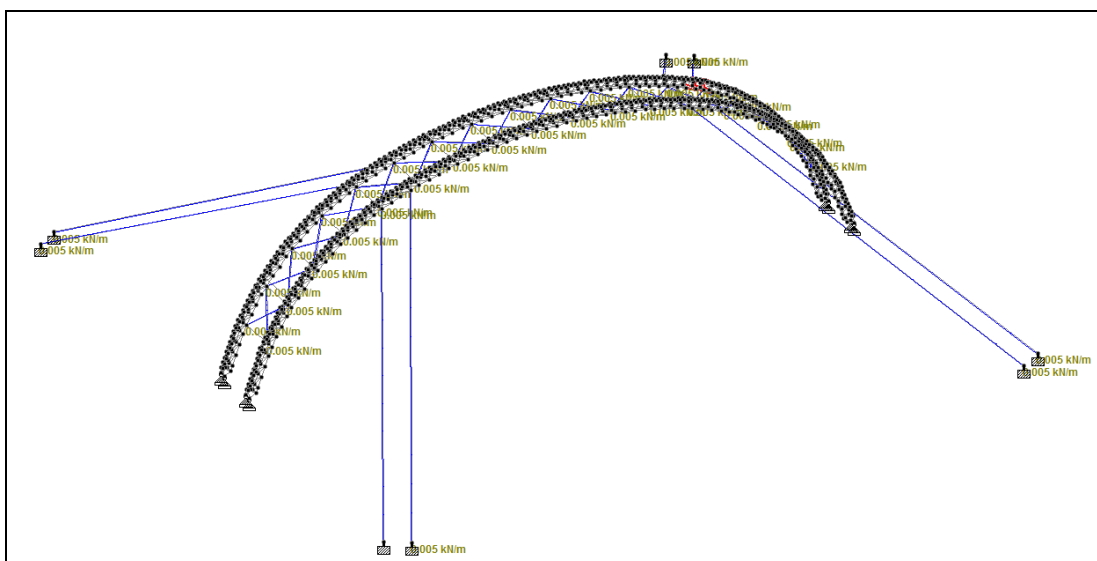
Wind load on Space Arch structure in +X direction



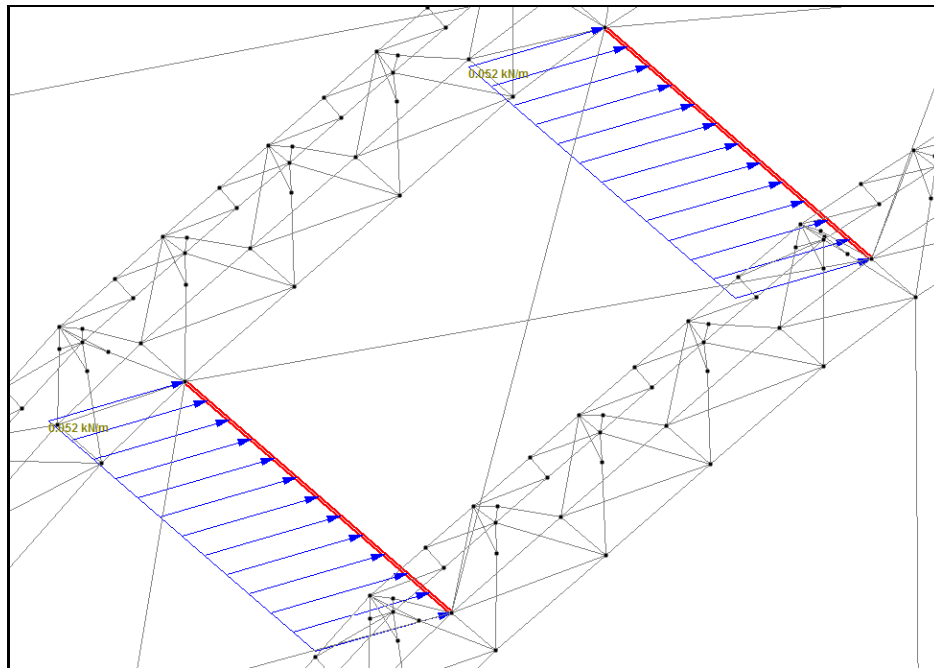
Wind applied to front in Top & bottom main cord member in +x direction



Wind applied front of Top, Bottom & side diagonal brace +x direction

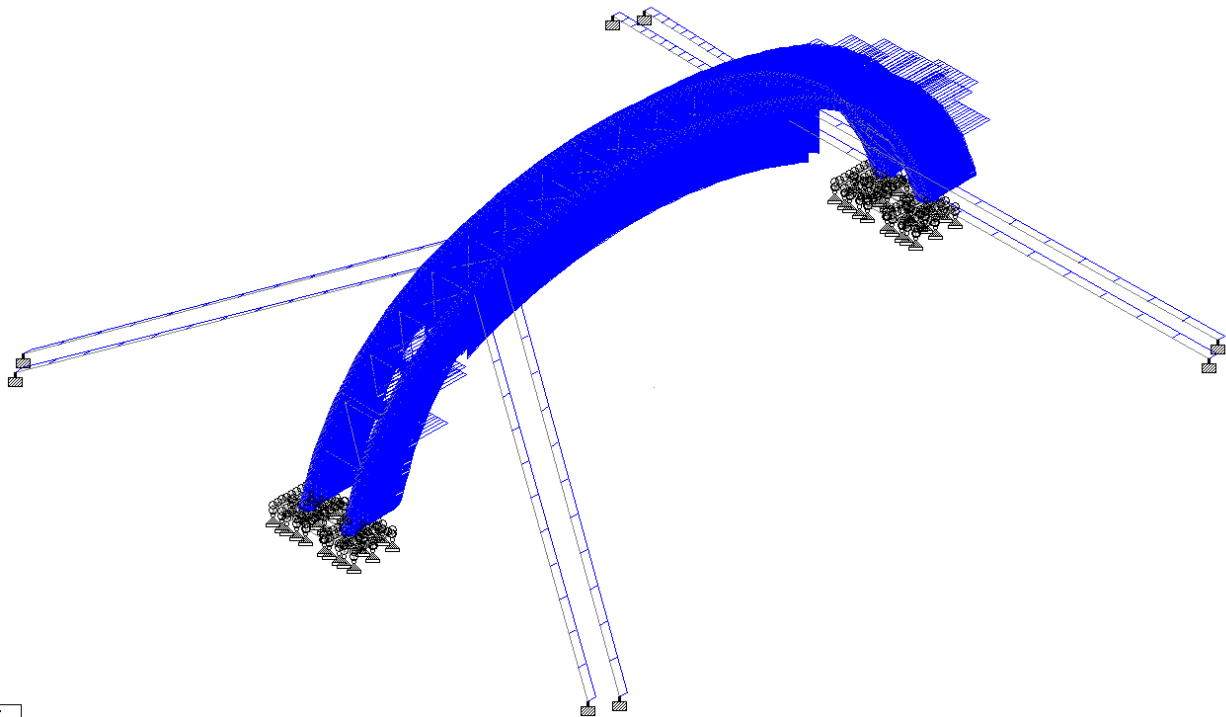


Wind applied to Guy cable & cross bracings in +x direction



Wind applied to Purlins in +x direction

6.3.3. Wind load in -X direction



Wind load on Space Arch structure in -X direction

7. LOAD COMBINATIONS

Design load combinations:

Design load combinations (ULS: Ultimate limit state):

- 101 : $1.4DL + 1.6LL + 0.6TL$
- 102 : $1.2DL + 1.2LL + 1.2WL-X + 0.6TL$
- 103 : $1.2DL + 1.2LL + 1.2WL-Z + 0.6TL$
- 104 : $1.2DL + 1.2LL + 1.2WL(-X) + 0.6TL$
- 105 : $1.2DL + 1.2LL + 1.2WL(-Z) + 0.6TL$
- 106 : $DL + 1.4WLX + 0.6TL$
- 107 : $DL + 1.4WLZ + 0.6TL$
- 108 : $DL + 1.4WL(-X) + 0.6TL$
- 109 : $DL + 1.4WL(-Z) + 0.6TL$
- 110 : $DL + 1.4WLX + 0.6TL$
- 111 : $DL + 1.4WLZ + 0.6TL$
- 112 : $DL + 1.4WL(-X) + 0.6TL$

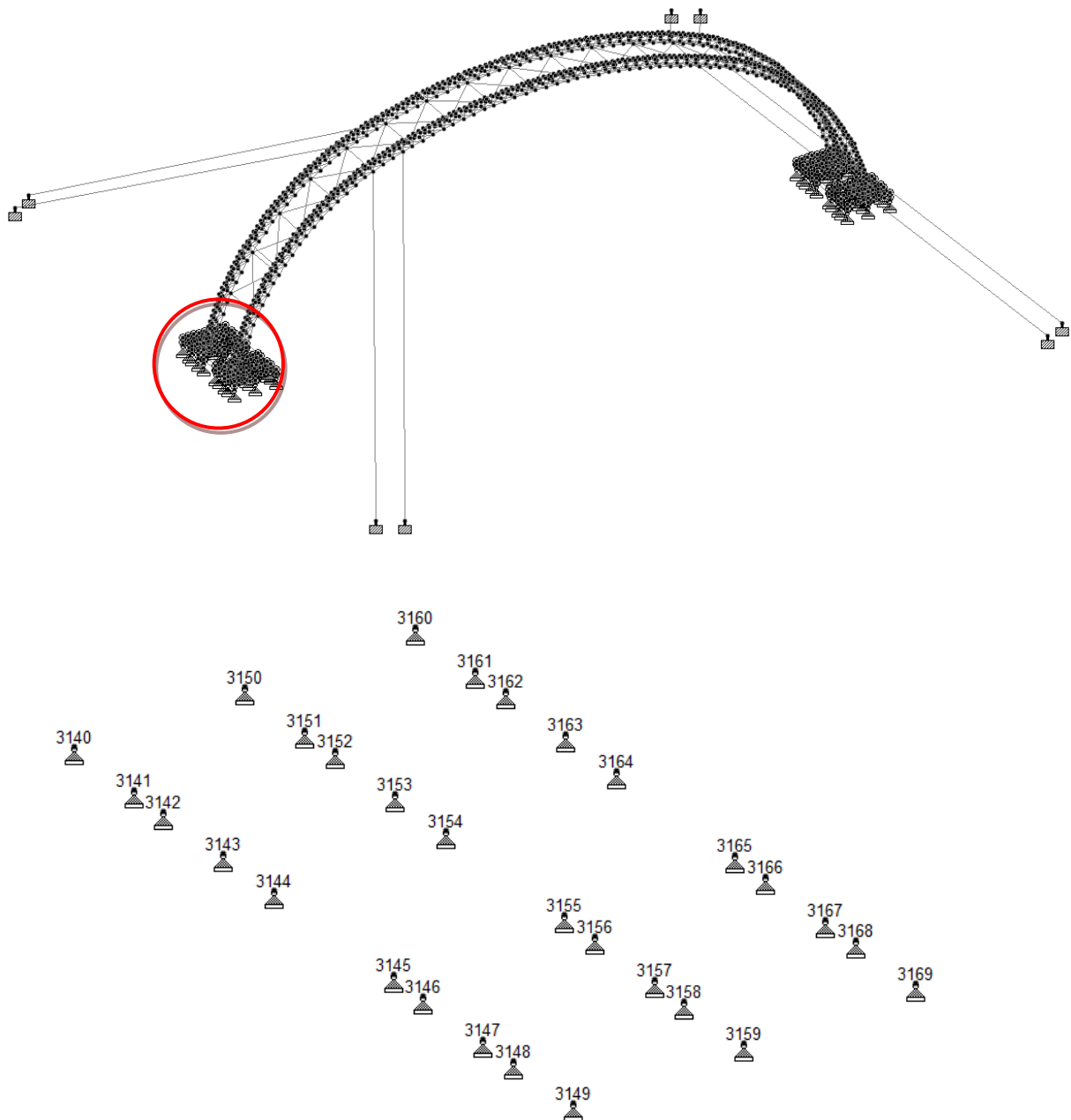
Serviceability load combinations (SLS: Serviceability Limit State):

- 201 : $DL + LL$
- 202 : $DL + 0.8LL + 0.8WLX$
- 203 : $DL + 0.8LL + 0.8WLZ$
- 204 : $DL + 0.8LL + 0.8WL(-X)$
- 205 : $DL + 0.8LL + 0.8WL(-Z)$
- 206 : $DL + WLX$
- 207 : $DL + WLZ$
- 208 : $DL + WL(-X)$
- 209 : $DL + WL(-Z)$

8. ANALYSIS RESULTS

8.1. Support Reaction

Refer below Image showing Node Number of Supports at space arch supporting structure



ULS support reactions for Space Arch supporting member:

Support of marked frame with maximum reactions for Ultimate strength combinations is shown below

Node	L/C	Force-X kN	Force-Y kN	Force-Z kN	Moment-X kN-m	Moment-Y kN-m	Moment-Z kN-m
3140	101	3.997	7.607	-0.054	0	0	0
	102	2.667	6.224	-0.023	0	0	0
	103	2.79	6.317	-0.161	0	0	0
	104	3.526	6.567	-0.056	0	0	0
	105	3.119	6.357	0.086	0	0	0
	106	0.434	4.502	0.013	0	0	0
	107	0.578	4.611	-0.149	0	0	0
	108	1.437	4.903	-0.027	0	0	0
	109	0.961	4.657	0.14	0	0	0
	110	0.434	4.502	0.013	0	0	0
	111	0.578	4.611	-0.149	0	0	0
	112	1.437	4.903	-0.027	0	0	0
3141	101	4.778	10.057	-0.144	0	0	0
	102	3.21	7.867	-0.084	0	0	0
	103	3.281	7.877	-0.222	0	0	0
	104	4.194	8.687	-0.135	0	0	0
	105	3.783	8.395	0.014	0	0	0
	106	0.541	4.707	0.004	0	0	0
	107	0.624	4.719	-0.157	0	0	0
	108	1.688	5.664	-0.056	0	0	0
	109	1.209	5.323	0.118	0	0	0
	110	0.541	4.707	0.004	0	0	0
	111	0.624	4.719	-0.157	0	0	0
	112	1.688	5.664	-0.056	0	0	0
3142	101	14.088	55.659	0.824	0	0	0
	102	9.494	39.649	0.647	0	0	0
	103	9.51	36.662	0.227	0	0	0
	104	12.258	47.605	0.64	0	0	0
	105	11.239	47.794	1.022	0	0	0
	106	1.411	10.33	0.195	0	0	0
	107	1.429	6.845	-0.295	0	0	0
	108	4.635	19.612	0.186	0	0	0
	109	3.447	19.832	0.632	0	0	0
	110	1.411	10.33	0.195	0	0	0
	111	1.429	6.845	-0.295	0	0	0
	112	4.635	19.612	0.186	0	0	0
3143	101	13.429	60.406	-0.974	0	0	0
	102	9.026	42.726	-0.68	0	0	0
	103	9.591	47.147	-1.043	0	0	0
	104	11.707	52.383	-0.812	0	0	0
	105	10.116	44.507	-0.391	0	0	0
	106	1.287	11.863	-0.097	0	0	0

	107	1.946	17.02	-0.52	0	0	0
	108	4.415	23.129	-0.25	0	0	0
	109	2.559	13.941	0.24	0	0	0
	110	1.287	11.863	-0.097	0	0	0
	111	1.946	17.02	-0.52	0	0	0
	112	4.415	23.129	-0.25	0	0	0
3144	101	2.998	15.621	-0.073	0	0	0
	102	1.915	13.354	-0.04	0	0	0
	103	2.102	13.38	-0.159	0	0	0
	104	2.685	13.418	-0.068	0	0	0
	105	2.238	13.388	0.052	0	0	0
	106	0.125	11.102	0.005	0	0	0
	107	0.343	11.133	-0.134	0	0	0
	108	1.024	11.177	-0.029	0	0	0
	109	0.502	11.142	0.112	0	0	0
	110	0.125	11.102	0.005	0	0	0
	111	0.343	11.133	-0.134	0	0	0
	112	1.024	11.177	-0.029	0	0	0
3145	101	1.808	10.748	-0.058	0	0	0
	102	1.191	9.293	-0.033	0	0	0
	103	1.154	8.806	-0.042	0	0	0
	104	1.587	9.212	-0.051	0	0	0
	105	1.482	9.735	-0.044	0	0	0
	106	0.121	7.956	0.007	0	0	0
	107	0.077	7.387	-0.005	0	0	0
	108	0.582	7.86	-0.015	0	0	0
	109	0.46	8.47	-0.006	0	0	0
	110	0.121	7.956	0.007	0	0	0
	111	0.077	7.387	-0.005	0	0	0
	112	0.582	7.86	-0.015	0	0	0
3146	101	15.848	57.86	0.416	0	0	0
	102	10.491	40.541	0.336	0	0	0
	103	11.108	40.325	0.023	0	0	0
	104	13.863	49.627	0.309	0	0	0
	105	11.99	46.638	0.597	0	0	0
	106	1.235	9.383	0.096	0	0	0
	107	1.955	9.131	-0.27	0	0	0
	108	5.169	19.983	0.065	0	0	0
	109	2.983	16.496	0.4	0	0	0
	110	1.235	9.383	0.096	0	0	0
	111	1.955	9.131	-0.27	0	0	0
	112	5.169	19.983	0.065	0	0	0
3147	101	13.668	52.9	-0.944	0	0	0
	102	9.072	36.758	-0.655	0	0	0
	103	10.123	42.747	-1.022	0	0	0
	104	11.981	46.109	-0.791	0	0	0
	105	9.787	36.654	-0.368	0	0	0
	106	1.141	8.776	-0.098	0	0	0

	107	2.366	15.764	-0.527	0	0	0
	108	4.534	19.686	-0.256	0	0	0
	109	1.975	8.655	0.237	0	0	0
	110	1.141	8.776	-0.098	0	0	0
	111	2.366	15.764	-0.527	0	0	0
	112	4.534	19.686	-0.256	0	0	0
3148	101	4.895	10.01	-0.015	0	0	0
	102	3.231	7.795	0.004	0	0	0
	103	3.601	8.685	-0.096	0	0	0
	104	4.324	8.706	-0.024	0	0	0
	105	3.544	7.469	0.076	0	0	0
	106	0.436	4.699	0.016	0	0	0
	107	0.867	5.737	-0.101	0	0	0
	108	1.711	5.762	-0.017	0	0	0
	109	0.8	4.319	0.1	0	0	0
	110	0.436	4.699	0.016	0	0	0
	111	0.867	5.737	-0.101	0	0	0
	112	1.711	5.762	-0.017	0	0	0
3149	101	2.403	7.291	-0.096	0	0	0
	102	1.605	6.039	-0.049	0	0	0
	103	1.75	6.065	-0.233	0	0	0
	104	2.112	6.263	-0.097	0	0	0
	105	1.767	6.15	0.095	0	0	0
	106	0.253	4.512	0.009	0	0	0
	107	0.422	4.542	-0.206	0	0	0
	108	0.844	4.774	-0.047	0	0	0
	109	0.441	4.642	0.178	0	0	0
	110	0.253	4.512	0.009	0	0	0
	111	0.422	4.542	-0.206	0	0	0
	112	0.844	4.774	-0.047	0	0	0
3150	101	2.59	10.39	0.165	0	0	0
	102	1.669	9.202	0.114	0	0	0
	103	1.754	9.109	0.033	0	0	0
	104	2.291	8.859	0.145	0	0	0
	105	2	9.069	0.209	0	0	0
	106	0.088	8.353	0.022	0	0	0
	107	0.187	8.244	-0.073	0	0	0
	108	0.813	7.952	0.058	0	0	0
	109	0.473	8.198	0.132	0	0	0
	110	0.088	8.353	0.022	0	0	0
	111	0.187	8.244	-0.073	0	0	0
	112	0.813	7.952	0.058	0	0	0
3151	101	2.403	8.206	0.174	0	0	0
	102	1.504	7.786	0.121	0	0	0
	103	1.541	7.776	0.036	0	0	0
	104	2.115	6.966	0.152	0	0	0
	105	1.862	7.258	0.219	0	0	0
	106	-0.107	8.337	0.023	0	0	0

	107	-0.063	8.325	-0.076	0	0	0
	108	0.606	7.38	0.06	0	0	0
	109	0.311	7.721	0.139	0	0	0
	110	-0.107	8.337	0.023	0	0	0
	111	-0.063	8.325	-0.076	0	0	0
	112	0.606	7.38	0.06	0	0	0
3152	101	7.107	33.218	1.172	0	0	0
	102	4.268	31.122	0.882	0	0	0
	103	4.649	22.833	0.481	0	0	0
	104	6.421	22.751	0.94	0	0	0
	105	5.368	30.595	1.279	0	0	0
	106	-0.496	18.116	0.225	0	0	0
	107	-0.052	8.446	-0.243	0	0	0
	108	2.015	8.35	0.293	0	0	0
	109	0.787	17.501	0.688	0	0	0
	110	-0.496	18.116	0.225	0	0	0
	111	-0.052	8.446	-0.243	0	0	0
	112	2.015	8.35	0.293	0	0	0
3153	101	7.029	38.732	-0.863	0	0	0
	102	4.422	35.362	-0.614	0	0	0
	103	4.737	34.029	-0.952	0	0	0
	104	6.292	28.414	-0.704	0	0	0
	105	5.355	29.173	-0.319	0	0	0
	106	0.057	22.621	-0.092	0	0	0
	107	0.424	21.066	-0.486	0	0	0
	108	2.238	14.515	-0.197	0	0	0
	109	1.145	15.401	0.252	0	0	0
	110	0.057	22.621	-0.092	0	0	0
	111	0.424	21.066	-0.486	0	0	0
	112	2.238	14.515	-0.197	0	0	0
3154	101	2.993	31.159	-0.002	0	0	0
	102	1.9	26.743	0.01	0	0	0
	103	2.097	26.717	-0.12	0	0	0
	104	2.683	26.68	-0.01	0	0	0
	105	2.22	26.708	0.12	0	0	0
	106	0.09	22.308	0.015	0	0	0
	107	0.321	22.278	-0.137	0	0	0
	108	1.004	22.235	-0.008	0	0	0
	109	0.464	22.268	0.143	0	0	0
	110	0.09	22.308	0.015	0	0	0
	111	0.321	22.278	-0.137	0	0	0
	112	1.004	22.235	-0.008	0	0	0
3155	101	1.105	21.136	-0.038	0	0	0
	102	0.743	18.238	-0.017	0	0	0
	103	0.692	17.779	-0.045	0	0	0
	104	0.962	18.159	-0.038	0	0	0
	105	0.925	18.645	-0.004	0	0	0
	106	0.091	15.597	0.012	0	0	0

	107	0.033	15.061	-0.019	0	0	0
	108	0.348	15.504	-0.012	0	0	0
	109	0.304	16.071	0.028	0	0	0
	110	0.091	15.597	0.012	0	0	0
	111	0.033	15.061	-0.019	0	0	0
	112	0.348	15.504	-0.012	0	0	0
3156	101	9.72	30.083	0.655	0	0	0
	102	6.16	28.746	0.502	0	0	0
	103	6.879	22.174	0.216	0	0	0
	104	8.724	19.929	0.507	0	0	0
	105	7.149	26.465	0.758	0	0	0
	106	0.364	17.214	0.116	0	0	0
	107	1.203	9.546	-0.217	0	0	0
	108	3.356	6.927	0.122	0	0	0
	109	1.518	14.553	0.415	0	0	0
	110	0.364	17.214	0.116	0	0	0
	111	1.203	9.546	-0.217	0	0	0
	112	3.356	6.927	0.122	0	0	0
3157	101	8.059	32.699	-1.067	0	0	0
	102	5.125	29.445	-0.742	0	0	0
	103	5.705	29.113	-1.07	0	0	0
	104	7.226	23.481	-0.891	0	0	0
	105	5.919	22.906	-0.496	0	0	0
	106	0.328	16.526	-0.113	0	0	0
	107	1.005	16.138	-0.495	0	0	0
	108	2.78	9.567	-0.287	0	0	0
	109	1.255	8.897	0.174	0	0	0
	110	0.328	16.526	-0.113	0	0	0
	111	1.005	16.138	-0.495	0	0	0
	112	2.78	9.567	-0.287	0	0	0
3158	101	2.999	8.544	-0.146	0	0	0
	102	1.949	8.005	-0.091	0	0	0
	103	2.188	8.293	-0.118	0	0	0
	104	2.647	7.218	-0.13	0	0	0
	105	2.142	7.246	-0.095	0	0	0
	106	0.15	8.27	-0.006	0	0	0
	107	0.429	8.606	-0.037	0	0	0
	108	0.965	7.352	-0.051	0	0	0
	109	0.375	7.384	-0.01	0	0	0
	110	0.15	8.27	-0.006	0	0	0
	111	0.429	8.606	-0.037	0	0	0
	112	0.965	7.352	-0.051	0	0	0
3159	101	2.163	10.832	-0.195	0	0	0
	102	1.411	9.495	-0.123	0	0	0
	103	1.555	9.469	-0.276	0	0	0
	104	1.903	9.271	-0.172	0	0	0
	105	1.562	9.384	-0.008	0	0	0
	106	0.113	8.433	-0.011	0	0	0

	107	0.282	8.403	-0.19	0	0	0
	108	0.688	8.172	-0.069	0	0	0
	109	0.29	8.303	0.123	0	0	0
	110	0.113	8.433	-0.011	0	0	0
	111	0.282	8.403	-0.19	0	0	0
	112	0.688	8.172	-0.069	0	0	0
3160	101	2.94	5.867	-0.069	0	0	0
	102	1.925	5.028	-0.051	0	0	0
	103	2.003	5.028	-0.161	0	0	0
	104	2.595	5.028	-0.056	0	0	0
	105	2.297	5.028	0.058	0	0	0
	106	0.197	4.19	-0.022	0	0	0
	107	0.287	4.19	-0.151	0	0	0
	108	0.978	4.19	-0.028	0	0	0
	109	0.631	4.19	0.105	0	0	0
	110	0.197	4.19	-0.022	0	0	0
	111	0.287	4.19	-0.151	0	0	0
	112	0.978	4.19	-0.028	0	0	0
3161	101	2.774	5.796	0.006	0	0	0
	102	1.867	4.968	-0.001	0	0	0
	103	1.908	4.968	-0.115	0	0	0
	104	2.434	4.968	0.009	0	0	0
	105	2.196	4.968	0.122	0	0	0
	106	0.324	4.14	-0.016	0	0	0
	107	0.373	4.14	-0.149	0	0	0
	108	0.986	4.14	-0.004	0	0	0
	109	0.708	4.14	0.127	0	0	0
	110	0.324	4.14	-0.016	0	0	0
	111	0.373	4.14	-0.149	0	0	0
	112	0.986	4.14	-0.004	0	0	0
3162	101	8.726	6.012	0.069	0	0	0
	102	5.844	5.092	0.043	0	0	0
	103	6.244	5.119	-0.083	0	0	0
	104	7.768	5.171	0.062	0	0	0
	105	6.749	5.122	0.183	0	0	0
	106	1.213	4.126	-0.009	0	0	0
	107	1.68	4.157	-0.156	0	0	0
	108	3.458	4.218	0.014	0	0	0
	109	2.268	4.161	0.155	0	0	0
	110	1.213	4.126	-0.009	0	0	0
	111	1.68	4.157	-0.156	0	0	0
	112	3.458	4.218	0.014	0	0	0
3163	101	5.543	10.414	0.122	0	0	0
	102	3.553	8.935	0.074	0	0	0
	103	3.818	8.931	-0.051	0	0	0
	104	4.952	8.924	0.114	0	0	0
	105	4.224	8.93	0.226	0	0	0
	106	0.258	7.461	-0.01	0	0	0

	107	0.567	7.457	-0.155	0	0	0
	108	1.891	7.448	0.037	0	0	0
	109	1.041	7.455	0.168	0	0	0
	110	0.258	7.461	-0.01	0	0	0
	111	0.567	7.457	-0.155	0	0	0
	112	1.891	7.448	0.037	0	0	0
3164	101	3.088	15.74	0.155	0	0	0
	102	1.975	13.492	0.097	0	0	0
	103	2.158	13.492	-0.026	0	0	0
	104	2.761	13.491	0.14	0	0	0
	105	2.318	13.492	0.248	0	0	0
	106	0.137	11.247	-0.004	0	0	0
	107	0.35	11.246	-0.147	0	0	0
	108	1.054	11.246	0.046	0	0	0
	109	0.537	11.247	0.172	0	0	0
	110	0.137	11.247	-0.004	0	0	0
	111	0.35	11.246	-0.147	0	0	0
	112	1.054	11.246	0.046	0	0	0
3165	101	1.541	11.119	0.228	0	0	0
	102	1.015	9.524	0.144	0	0	0
	103	1.006	9.211	0.096	0	0	0
	104	1.356	9.532	0.204	0	0	0
	105	1.239	9.833	0.234	0	0	0
	106	0.105	7.905	0.004	0	0	0
	107	0.095	7.541	-0.053	0	0	0
	108	0.503	7.914	0.073	0	0	0
	109	0.366	8.266	0.108	0	0	0
	110	0.105	7.905	0.004	0	0	0
	111	0.095	7.541	-0.053	0	0	0
	112	0.503	7.914	0.073	0	0	0
3166	101	7.936	5.879	0.273	0	0	0
	102	5.032	5.046	0.176	0	0	0
	103	5.688	5.357	0.118	0	0	0
	104	7.128	5.037	0.242	0	0	0
	105	5.761	4.736	0.279	0	0	0
	106	0.302	4.237	0.01	0	0	0
	107	1.068	4.6	-0.058	0	0	0
	108	2.748	4.227	0.087	0	0	0
	109	1.153	3.876	0.13	0	0	0
	110	0.302	4.237	0.01	0	0	0
	111	1.068	4.6	-0.058	0	0	0
	112	2.748	4.227	0.087	0	0	0
3167	101	7.036	5.842	0.251	0	0	0
	102	4.48	5.004	0.158	0	0	0
	103	4.995	4.691	0.103	0	0	0
	104	6.304	5.007	0.226	0	0	0
	105	5.156	5.312	0.259	0	0	0
	106	0.293	4.146	0.002	0	0	0

	107	0.894	3.781	-0.062	0	0	0
	108	2.422	4.15	0.081	0	0	0
	109	1.081	4.505	0.12	0	0	0
	110	0.293	4.146	0.002	0	0	0
	111	0.894	3.781	-0.062	0	0	0
	112	2.422	4.15	0.081	0	0	0
3168	101	2.375	5.877	0.291	0	0	0
	102	1.536	5.041	0.185	0	0	0
	103	1.716	5.355	0.141	0	0	0
	104	2.1	5.038	0.259	0	0	0
	105	1.709	4.733	0.28	0	0	0
	106	0.106	4.225	0.008	0	0	0
	107	0.317	4.591	-0.045	0	0	0
	108	0.765	4.221	0.094	0	0	0
	109	0.309	3.865	0.118	0	0	0
	110	0.106	4.225	0.008	0	0	0
	111	0.317	4.591	-0.045	0	0	0
	112	0.765	4.221	0.094	0	0	0
3169	101	1.948	5.74	0.294	0	0	0
	102	1.269	4.92	0.189	0	0	0
	103	1.399	4.92	0.056	0	0	0
	104	1.716	4.92	0.262	0	0	0
	105	1.408	4.92	0.369	0	0	0
	106	0.1	4.1	0.008	0	0	0
	107	0.252	4.1	-0.148	0	0	0
	108	0.622	4.1	0.093	0	0	0
	109	0.262	4.1	0.218	0	0	0
	110	0.1	4.1	0.008	0	0	0
	111	0.252	4.1	-0.148	0	0	0
	112	0.622	4.1	0.093	0	0	0

SLS support reactions combinations for Space Arch supporting member:

Support of marked frame with maximum reactions for serviceability combinations is shown below

Node	L/C	Force-X kN	Force-Y kN	Force-Z kN	Moment-X kN-m	Moment-Y kN-m	Moment-Z kN-m
3140	201	2.615	5.341	-0.035	0	0	0
	202	1.968	5.09	-0.018	0	0	0
	203	2.051	5.152	-0.11	0	0	0
	204	2.541	5.319	-0.04	0	0	0
	205	2.269	5.179	0.055	0	0	0
	206	0.584	4.561	0.006	0	0	0
	207	0.687	4.639	-0.11	0	0	0
	208	1.3	4.847	-0.022	0	0	0
	209	0.961	4.672	0.096	0	0	0
3141	201	3.125	6.933	-0.094	0	0	0
	202	2.367	6.284	-0.062	0	0	0
	203	2.414	6.291	-0.154	0	0	0
	204	3.022	6.831	-0.097	0	0	0
	205	2.748	6.636	0.003	0	0	0
	206	0.713	4.85	-0.006	0	0	0
	207	0.772	4.859	-0.121	0	0	0
	208	1.533	5.534	-0.049	0	0	0
	209	1.19	5.29	0.076	0	0	0
3142	201	9.182	36.451	0.553	0	0	0
	202	6.945	29.218	0.486	0	0	0
	203	6.955	27.227	0.206	0	0	0
	204	8.787	34.522	0.481	0	0	0
	205	8.108	34.648	0.736	0	0	0
	206	1.895	11.447	0.213	0	0	0
	207	1.908	8.957	-0.137	0	0	0
	208	4.198	18.076	0.207	0	0	0
	209	3.349	18.234	0.525	0	0	0
3143	201	8.78	40.104	-0.646	0	0	0
	202	6.634	32.2	-0.507	0	0	0
	203	7.01	35.147	-0.749	0	0	0
	204	8.421	38.638	-0.595	0	0	0
	205	7.36	33.387	-0.315	0	0	0
	206	1.797	13.751	-0.142	0	0	0
	207	2.268	17.435	-0.444	0	0	0
	208	4.032	21.798	-0.251	0	0	0
	209	2.706	15.235	0.099	0	0	0
3144	201	1.951	11.155	-0.047	0	0	0
	202	1.4	11.13	-0.029	0	0	0
	203	1.524	11.147	-0.108	0	0	0
	204	1.913	11.172	-0.048	0	0	0
	205	1.615	11.152	0.032	0	0	0
	206	0.266	11.112	0	0	0	0

	207	0.422	11.134	-0.1	0	0	0
	208	0.908	11.165	-0.024	0	0	0
	209	0.535	11.141	0.077	0	0	0
3145	201	1.178	7.703	-0.036	0	0	0
	202	0.871	7.773	-0.022	0	0	0
	203	0.846	7.448	-0.029	0	0	0
	204	1.134	7.718	-0.035	0	0	0
	205	1.064	8.067	-0.03	0	0	0
	206	0.195	7.936	0.004	0	0	0
	207	0.164	7.531	-0.004	0	0	0
	208	0.525	7.869	-0.012	0	0	0
	209	0.437	8.304	-0.005	0	0	0
3146	201	10.346	38.193	0.28	0	0	0
	202	7.696	30.229	0.252	0	0	0
	203	8.107	30.084	0.043	0	0	0
	204	9.944	36.285	0.234	0	0	0
	205	8.695	34.293	0.425	0	0	0
	206	1.883	11.242	0.105	0	0	0
	207	2.397	11.061	-0.157	0	0	0
	208	4.693	18.813	0.082	0	0	0
	209	3.131	16.322	0.322	0	0	0
3147	201	8.896	34.608	-0.626	0	0	0
	202	6.626	27.115	-0.489	0	0	0
	203	7.326	31.108	-0.734	0	0	0
	204	8.565	33.349	-0.579	0	0	0
	205	7.103	27.045	-0.297	0	0	0
	206	1.649	10.094	-0.14	0	0	0
	207	2.525	15.085	-0.447	0	0	0
	208	4.073	17.887	-0.253	0	0	0
	209	2.245	10.008	0.099	0	0	0
3148	201	3.193	6.91	-0.008	0	0	0
	202	2.373	6.246	0.004	0	0	0
	203	2.619	6.839	-0.063	0	0	0
	204	3.101	6.853	-0.015	0	0	0
	205	2.581	6.029	0.052	0	0	0
	206	0.627	4.858	0.012	0	0	0
	207	0.935	5.6	-0.071	0	0	0
	208	1.538	5.617	-0.011	0	0	0
	209	0.887	4.587	0.073	0	0	0
3149	201	1.569	5.138	-0.061	0	0	0
	202	1.181	4.956	-0.035	0	0	0
	203	1.277	4.973	-0.158	0	0	0
	204	1.518	5.105	-0.067	0	0	0
	205	1.288	5.03	0.061	0	0	0
	206	0.34	4.552	0.002	0	0	0
	207	0.461	4.573	-0.151	0	0	0
	208	0.763	4.739	-0.038	0	0	0
	209	0.475	4.645	0.123	0	0	0

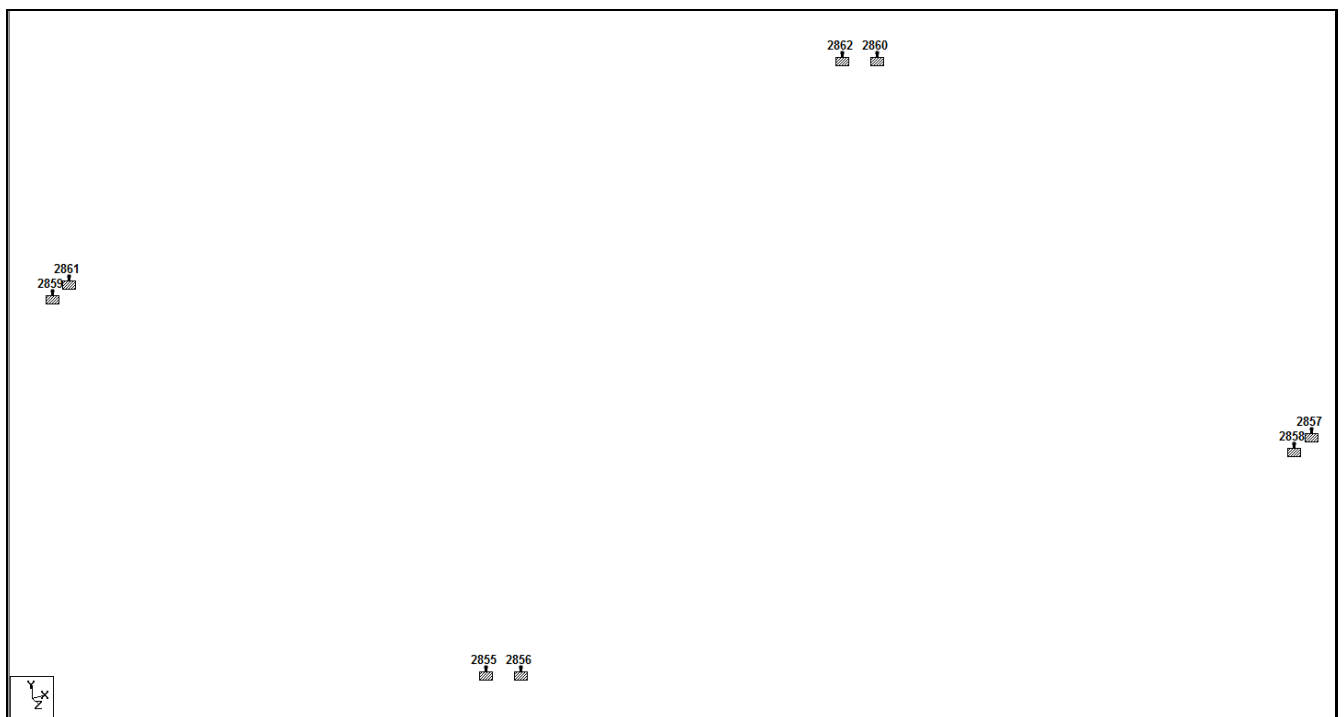
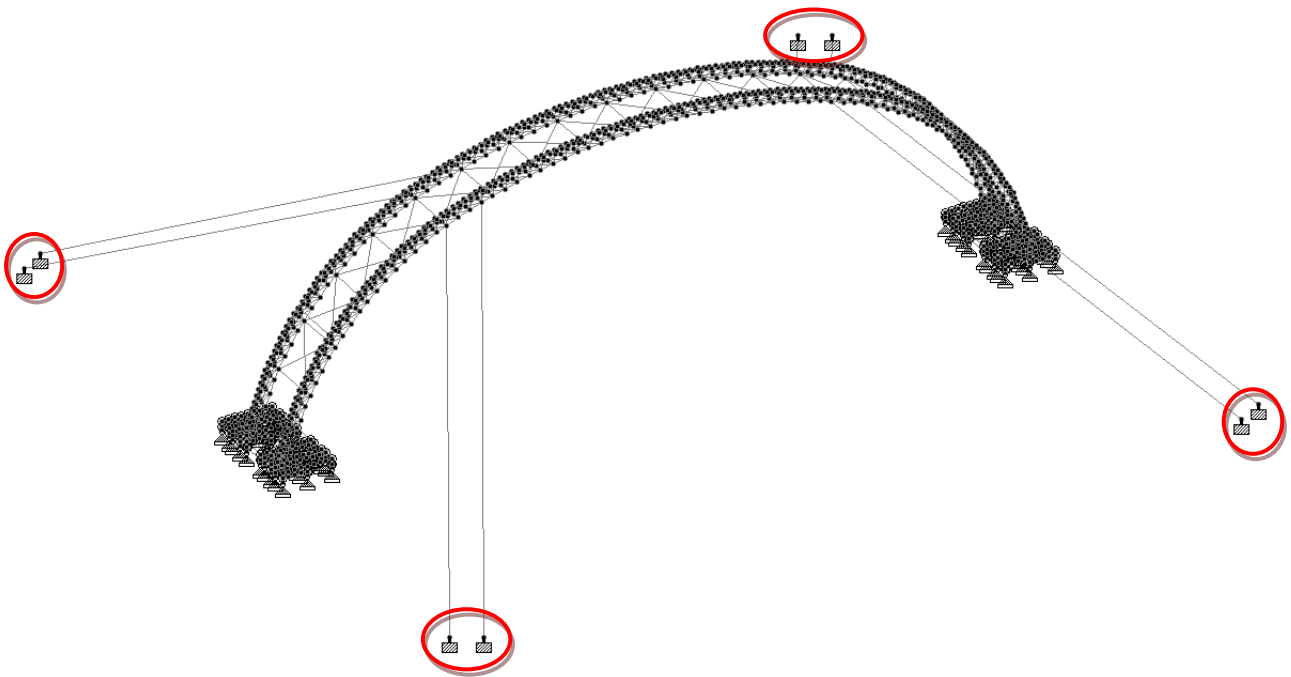
3150	201	1.675	7.514	0.108	0	0	0
	202	1.205	7.765	0.084	0	0	0
	203	1.261	7.702	0.03	0	0	0
	204	1.619	7.536	0.104	0	0	0
	205	1.425	7.676	0.147	0	0	0
	206	0.196	8.294	0.026	0	0	0
	207	0.267	8.216	-0.041	0	0	0
	208	0.714	8.008	0.052	0	0	0
	209	0.472	8.183	0.105	0	0	0
3151	201	1.533	6.112	0.113	0	0	0
	202	1.054	6.76	0.088	0	0	0
	203	1.079	6.753	0.031	0	0	0
	204	1.462	6.213	0.109	0	0	0
	205	1.293	6.408	0.154	0	0	0
	206	0	8.194	0.028	0	0	0
	207	0.031	8.185	-0.043	0	0	0
	208	0.509	7.51	0.054	0	0	0
	209	0.299	7.754	0.11	0	0	0
3152	201	4.544	22.358	0.785	0	0	0
	202	3.014	23.326	0.664	0	0	0
	203	3.268	17.8	0.396	0	0	0
	204	4.449	17.746	0.702	0	0	0
	205	3.747	22.975	0.928	0	0	0
	206	-0.11	16.639	0.263	0	0	0
	207	0.207	9.732	-0.072	0	0	0
	208	1.683	9.664	0.311	0	0	0
	209	0.806	16.2	0.593	0	0	0
3153	201	4.547	26.759	-0.579	0	0	0
	202	3.196	27.548	-0.464	0	0	0
	203	3.406	26.659	-0.689	0	0	0
	204	4.443	22.916	-0.524	0	0	0
	205	3.818	23.422	-0.267	0	0	0
	206	0.397	21.756	-0.137	0	0	0
	207	0.659	20.645	-0.419	0	0	0
	208	1.955	15.966	-0.212	0	0	0
	209	1.174	16.599	0.109	0	0	0
3154	201	1.944	22.259	-0.001	0	0	0
	202	1.384	22.284	0.007	0	0	0
	203	1.516	22.267	-0.079	0	0	0
	204	1.907	22.242	-0.006	0	0	0
	205	1.598	22.261	0.081	0	0	0
	206	0.233	22.298	0.012	0	0	0
	207	0.397	22.277	-0.097	0	0	0
	208	0.886	22.246	-0.005	0	0	0
	209	0.5	22.27	0.104	0	0	0
3155	201	0.721	15.143	-0.024	0	0	0
	202	0.543	15.255	-0.012	0	0	0
	203	0.509	14.949	-0.03	0	0	0

	204	0.689	15.202	-0.026	0	0	0
	205	0.664	15.526	-0.003	0	0	0
	206	0.133	15.567	0.008	0	0	0
	207	0.091	15.184	-0.014	0	0	0
	208	0.316	15.501	-0.009	0	0	0
	209	0.285	15.905	0.02	0	0	0
3156	201	6.323	20.587	0.443	0	0	0
	202	4.507	21.898	0.38	0	0	0
	203	4.986	17.517	0.189	0	0	0
	204	6.216	16.02	0.383	0	0	0
	205	5.166	20.377	0.551	0	0	0
	206	0.834	16.113	0.142	0	0	0
	207	1.433	10.637	-0.096	0	0	0
	208	2.971	8.766	0.146	0	0	0
	209	1.658	14.213	0.355	0	0	0
3157	201	5.239	21.988	-0.711	0	0	0
	202	3.745	22.149	-0.558	0	0	0
	203	4.132	21.927	-0.776	0	0	0
	204	5.146	18.173	-0.658	0	0	0
	205	4.275	17.79	-0.394	0	0	0
	206	0.707	15.43	-0.165	0	0	0
	207	1.191	15.153	-0.439	0	0	0
	208	2.458	10.459	-0.29	0	0	0
	209	1.369	9.981	0.04	0	0	0
3158	201	1.944	6.323	-0.096	0	0	0
	202	1.413	6.904	-0.068	0	0	0
	203	1.572	7.096	-0.085	0	0	0
	204	1.878	6.379	-0.093	0	0	0
	205	1.541	6.398	-0.07	0	0	0
	206	0.271	8.142	-0.014	0	0	0
	207	0.471	8.382	-0.036	0	0	0
	208	0.854	7.486	-0.046	0	0	0
	209	0.432	7.509	-0.017	0	0	0
3159	201	1.401	7.807	-0.127	0	0	0
	202	1.021	7.989	-0.091	0	0	0
	203	1.117	7.972	-0.193	0	0	0
	204	1.349	7.84	-0.124	0	0	0
	205	1.122	7.915	-0.014	0	0	0
	206	0.198	8.393	-0.021	0	0	0
	207	0.318	8.372	-0.149	0	0	0
	208	0.608	8.206	-0.062	0	0	0
	209	0.324	8.301	0.075	0	0	0
3160	201	1.911	4.19	-0.047	0	0	0
	202	1.404	4.19	-0.04	0	0	0
	203	1.455	4.19	-0.114	0	0	0
	204	1.85	4.19	-0.044	0	0	0
	205	1.652	4.19	0.032	0	0	0
	206	0.314	4.19	-0.024	0	0	0

	207	0.379	4.19	-0.116	0	0	0
	208	0.872	4.19	-0.029	0	0	0
	209	0.624	4.19	0.066	0	0	0
3161	201	1.815	4.14	0.002	0	0	0
	202	1.377	4.14	-0.004	0	0	0
	203	1.405	4.14	-0.08	0	0	0
	204	1.756	4.14	0.003	0	0	0
	205	1.597	4.14	0.078	0	0	0
	206	0.423	4.14	-0.016	0	0	0
	207	0.458	4.14	-0.111	0	0	0
	208	0.896	4.14	-0.007	0	0	0
	209	0.698	4.14	0.086	0	0	0
3162	201	5.757	4.28	0.043	0	0	0
	202	4.384	4.23	0.028	0	0	0
	203	4.65	4.248	-0.056	0	0	0
	204	5.666	4.283	0.041	0	0	0
	205	4.987	4.25	0.122	0	0	0
	206	1.564	4.14	-0.006	0	0	0
	207	1.897	4.163	-0.111	0	0	0
	208	3.167	4.206	0.01	0	0	0
	209	2.318	4.166	0.111	0	0	0
3163	201	3.606	7.441	0.077	0	0	0
	202	2.598	7.447	0.051	0	0	0
	203	2.774	7.445	-0.032	0	0	0
	204	3.531	7.44	0.077	0	0	0
	205	3.045	7.444	0.152	0	0	0
	206	0.513	7.459	-0.004	0	0	0
	207	0.734	7.456	-0.108	0	0	0
	208	1.679	7.449	0.029	0	0	0
	209	1.072	7.455	0.123	0	0	0
3164	201	2.01	11.243	0.099	0	0	0
	202	1.444	11.244	0.069	0	0	0
	203	1.566	11.244	-0.013	0	0	0
	204	1.969	11.243	0.098	0	0	0
	205	1.673	11.244	0.17	0	0	0
	206	0.281	11.247	0.003	0	0	0
	207	0.433	11.246	-0.099	0	0	0
	208	0.936	11.246	0.039	0	0	0
	209	0.566	11.247	0.129	0	0	0
3165	201	1.004	7.938	0.148	0	0	0
	202	0.742	7.931	0.105	0	0	0
	203	0.737	7.723	0.073	0	0	0
	204	0.97	7.936	0.145	0	0	0
	205	0.892	8.137	0.165	0	0	0
	206	0.169	7.906	0.015	0	0	0
	207	0.162	7.646	-0.025	0	0	0
	208	0.453	7.913	0.065	0	0	0
	209	0.355	8.164	0.09	0	0	0

3166	201	5.159	4.203	0.178	0	0	0
	202	3.676	4.21	0.129	0	0	0
	203	4.114	4.418	0.091	0	0	0
	204	5.074	4.205	0.173	0	0	0
	205	4.163	4.004	0.198	0	0	0
	206	0.679	4.236	0.024	0	0	0
	207	1.226	4.495	-0.025	0	0	0
	208	2.426	4.229	0.079	0	0	0
	209	1.287	3.978	0.109	0	0	0
3167	201	4.574	4.17	0.163	0	0	0
	202	3.273	4.165	0.115	0	0	0
	203	3.616	3.957	0.078	0	0	0
	204	4.489	4.168	0.16	0	0	0
	205	3.724	4.371	0.182	0	0	0
	206	0.621	4.146	0.015	0	0	0
	207	1.051	3.885	-0.031	0	0	0
	208	2.142	4.149	0.071	0	0	0
	209	1.185	4.403	0.099	0	0	0
3168	201	1.539	4.201	0.189	0	0	0
	202	1.113	4.205	0.135	0	0	0
	203	1.234	4.414	0.105	0	0	0
	204	1.49	4.203	0.185	0	0	0
	205	1.229	4	0.198	0	0	0
	206	0.205	4.225	0.022	0	0	0
	207	0.356	4.486	-0.015	0	0	0
	208	0.676	4.222	0.084	0	0	0
	209	0.35	3.968	0.101	0	0	0
3169	201	1.262	4.1	0.191	0	0	0
	202	0.918	4.1	0.138	0	0	0
	203	1.006	4.1	0.049	0	0	0
	204	1.217	4.1	0.186	0	0	0
	205	1.011	4.1	0.258	0	0	0
	206	0.177	4.1	0.022	0	0	0
	207	0.286	4.1	-0.089	0	0	0
	208	0.55	4.1	0.083	0	0	0
	209	0.293	4.1	0.172	0	0	0

Refer below Image showing Node Number of Supports at Guy wire



ULS support reactions for Guy cable supporting member:

Support of marked frame with maximum reactions for Ultimate strength combinations is shown below

Node	L/C	Force-X kN	Force-Y kN	Force-Z kN	Moment- X kN-m	Moment-Y kN-m	Moment-Z kN-m
2855	101	0	0.176	0	0	0	0
	102	-3.96	-3.553	6.753	0	0	0
	103	0	0.151	-0.115	0	0	0
	104	0.115	0.151	0	0	0	0
	105	-2.319	-2.082	4.072	0	0	0
	106	-4.62	-4.195	7.878	0	0	0
	107	0	0.126	-0.134	0	0	0
	108	0.134	0.126	0	0	0	0
	109	-2.705	-2.48	4.751	0	0	0
	110	-4.62	-4.195	7.878	0	0	0
	111	0	0.126	-0.134	0	0	0
	112	0.134	0.126	0	0	0	0
2856	101	0	0.185	0	0	0	0
	102	-3.928	-3.569	6.634	0	0	0
	103	0	0.159	-0.121	0	0	0
	104	0.121	0.159	0	0	0	0
	105	-2.542	-2.33	4.429	0	0	0
	106	-4.583	-4.216	7.74	0	0	0
	107	0	0.132	-0.141	0	0	0
	108	0.141	0.132	0	0	0	0
	109	-2.966	-2.771	5.167	0	0	0
	110	-4.583	-4.216	7.74	0	0	0
	111	0	0.132	-0.141	0	0	0
	112	0.141	0.132	0	0	0	0
2857	101	0	0.176	0	0	0	0
	102	-0.115	0.151	0	0	0	0
	103	0	0.151	-0.115	0	0	0
	104	4.092	-3.645	6.922	0	0	0
	105	2.295	-2.039	3.994	0	0	0
	106	-0.134	0.126	0	0	0	0
	107	0	0.126	-0.134	0	0	0
	108	4.774	-4.303	8.076	0	0	0
	109	2.677	-2.43	4.66	0	0	0
	110	-0.134	0.126	0	0	0	0
	111	0	0.126	-0.134	0	0	0
	112	4.774	-4.303	8.076	0	0	0
2858	101	0	0.185	0	0	0	0
	102	-0.121	0.159	0	0	0	0
	103	0	0.159	-0.121	0	0	0
	104	4.126	-3.728	6.919	0	0	0
	105	2.577	-2.343	4.452	0	0	0
	106	-0.141	0.132	0	0	0	0

	107	0	0.132	-0.141	0	0	0
	108	4.813	-4.403	8.072	0	0	0
	109	3.007	-2.786	5.195	0	0	0
	110	-0.141	0.132	0	0	0	0
	111	0	0.132	-0.141	0	0	0
	112	4.813	-4.403	8.072	0	0	0
2859	101	0	0.175	0	0	0	0
	102	-4.049	-3.64	-6.826	0	0	0
	103	-2.639	-2.392	-4.691	0	0	0
	104	0.114	0.15	0	0	0	0
	105	0	0.15	0	0	0	0
	106	-4.724	-4.296	-7.963	0	0	0
	107	-3.078	-2.84	-5.473	0	0	0
	108	0.133	0.125	0	0	0	0
	109	0	0.125	0	0	0	0
	110	-4.724	-4.296	-7.963	0	0	0
	111	-3.078	-2.84	-5.473	0	0	0
	112	0.133	0.125	0	0	0	0
2860	101	0	0.175	0	0	0	0
	102	-0.114	0.15	0	0	0	0
	103	2.507	-2.243	-4.424	0	0	0
	104	4.038	-3.596	-6.747	0	0	0
	105	0	0.15	0	0	0	0
	106	-0.133	0.125	0	0	0	0
	107	2.925	-2.667	-5.162	0	0	0
	108	4.711	-4.245	-7.871	0	0	0
	109	0	0.125	0	0	0	0
	110	-0.133	0.125	0	0	0	0
	111	2.925	-2.667	-5.162	0	0	0
	112	4.711	-4.245	-7.871	0	0	0
2861	101	0	0.184	0	0	0	0
	102	-4.061	-3.701	-6.787	0	0	0
	103	-3.022	-2.801	-5.324	0	0	0
	104	0.12	0.157	0	0	0	0
	105	0	0.157	0	0	0	0
	106	-4.738	-4.37	-7.918	0	0	0
	107	-3.526	-3.32	-6.211	0	0	0
	108	0.14	0.131	0	0	0	0
	109	0	0.131	0	0	0	0
	110	-4.738	-4.37	-7.918	0	0	0
	111	-3.526	-3.32	-6.211	0	0	0
	112	0.14	0.131	0	0	0	0
2862	101	0	0.184	0	0	0	0
	102	-0.12	0.158	0	0	0	0
	103	2.969	-2.725	-5.19	0	0	0
	104	4.093	-3.699	-6.784	0	0	0
	105	0	0.158	0	0	0	0
	106	-0.14	0.131	0	0	0	0

	107	3.464	-3.231	-6.055	0	0	0
	108	4.775	-4.368	-7.915	0	0	0
	109	0	0.131	0	0	0	0
	110	-0.14	0.131	0	0	0	0
	111	3.464	-3.231	-6.055	0	0	0
	112	4.775	-4.368	-7.915	0	0	0

SLS support reactions for Guy cable supporting member:

Support of marked frame with maximum reactions for serviceability combinations is shown below

Node	L/C	Force-X kN	Force-Y kN	Force-Z kN	Moment-X kN-m	Moment-Y kN-m	Moment-Z kN-m
2855	201	0	0.126	0	0	0	0
	202	-2.64	-2.343	4.502	0	0	0
	203	0	0.126	-0.077	0	0	0
	204	0.077	0.126	0	0	0	0
	205	-1.546	-1.363	2.715	0	0	0
	206	-3.3	-2.96	5.627	0	0	0
	207	0	0.126	-0.096	0	0	0
	208	0.096	0.126	0	0	0	0
	209	-1.932	-1.735	3.393	0	0	0
2856	201	0	0.132	0	0	0	0
	202	-2.619	-2.353	4.423	0	0	0
	203	0	0.132	-0.08	0	0	0
	204	0.08	0.132	0	0	0	0
	205	-1.695	-1.527	2.953	0	0	0
	206	-3.274	-2.974	5.528	0	0	0
	207	0	0.132	-0.101	0	0	0
	208	0.101	0.132	0	0	0	0
	209	-2.118	-1.942	3.691	0	0	0
2857	201	0	0.126	0	0	0	0
	202	-0.077	0.126	0	0	0	0
	203	0	0.126	-0.077	0	0	0
	204	2.728	-2.405	4.615	0	0	0
	205	1.53	-1.334	2.663	0	0	0
	206	-0.096	0.126	0	0	0	0
	207	0	0.126	-0.096	0	0	0
	208	3.41	-3.038	5.769	0	0	0
	209	1.912	-1.7	3.329	0	0	0
2858	201	0	0.132	0	0	0	0
	202	-0.081	0.132	0	0	0	0
	203	0	0.132	-0.081	0	0	0
	204	2.75	-2.459	4.613	0	0	0
	205	1.718	-1.535	2.968	0	0	0
	206	-0.101	0.132	0	0	0	0
	207	0	0.132	-0.101	0	0	0

	208	3.438	-3.107	5.766	0	0	0
	209	2.148	-1.952	3.71	0	0	0
2859	201	0	0.125	0	0	0	0
	202	-2.699	-2.402	-4.55	0	0	0
	203	-1.759	-1.569	-3.127	0	0	0
	204	0.076	0.125	0	0	0	0
	205	0	0.125	0	0	0	0
	206	-3.374	-3.033	-5.688	0	0	0
	207	-2.199	-1.993	-3.909	0	0	0
	208	0.095	0.125	0	0	0	0
	209	0	0.125	0	0	0	0
2860	201	0	0.125	0	0	0	0
	202	-0.076	0.125	0	0	0	0
	203	1.671	-1.47	-2.95	0	0	0
	204	2.692	-2.372	-4.498	0	0	0
	205	0	0.125	0	0	0	0
	206	-0.095	0.125	0	0	0	0
	207	2.089	-1.869	-3.687	0	0	0
	208	3.365	-2.997	-5.622	0	0	0
	209	0	0.125	0	0	0	0
2861	201	0	0.131	0	0	0	0
	202	-2.707	-2.441	-4.524	0	0	0
	203	-2.015	-1.841	-3.549	0	0	0
	204	0.08	0.131	0	0	0	0
	205	0	0.131	0	0	0	0
	206	-3.384	-3.084	-5.656	0	0	0
	207	-2.519	-2.334	-4.437	0	0	0
	208	0.1	0.131	0	0	0	0
	209	0	0.131	0	0	0	0
2862	201	0	0.131	0	0	0	0
	202	-0.08	0.131	0	0	0	0
	203	1.98	-1.79	-3.46	0	0	0
	204	2.729	-2.44	-4.523	0	0	0
	205	0	0.131	0	0	0	0
	206	-0.1	0.131	0	0	0	0
	207	2.474	-2.27	-4.325	0	0	0
	208	3.411	-3.082	-5.653	0	0	0
	209	0	0.131	0	0	0	0

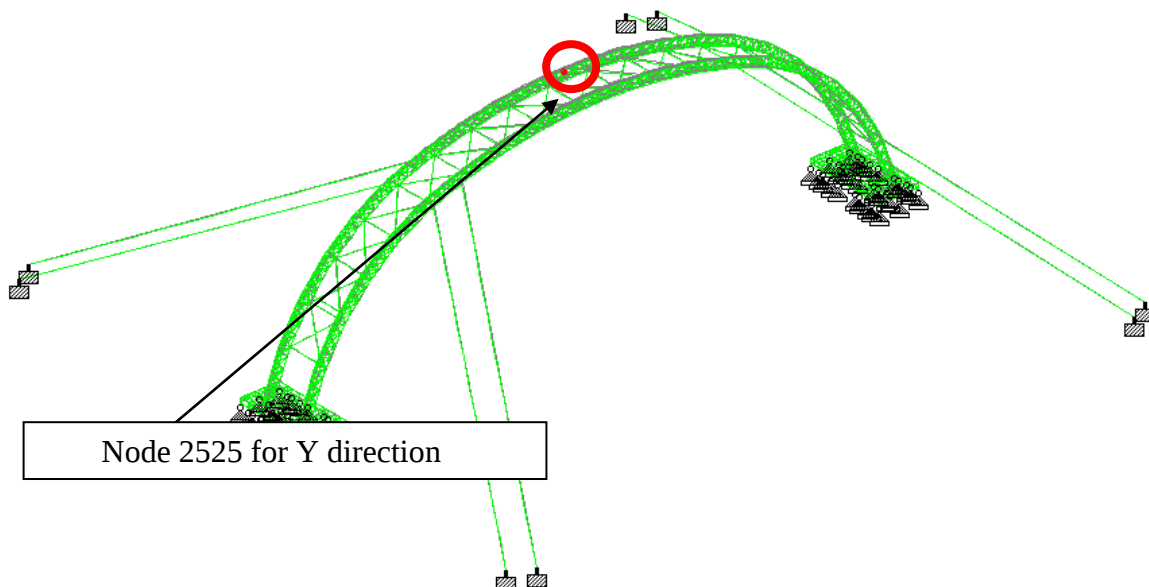
8.2. Deflection Check

Below table shows nodal displacement summary of Archway structure for SLS.

			Horizontal	Vertical	Horizontal	Resultant	Rotational		
	Node	L/C	X mm	Y mm	Z mm	mm	rX rad	rY rad	rZ rad
Max X	2827	202 DL+08LL	134.329	65.840	11.256	150.020	-0.002	0.003	0.001
Min X	1775	204 DL+0.8LL	-134.910	65.349	-8.481	150.143	-0.001	0.001	0.000
Max Y	1027	208 DL+W/L(-	-123.190	71.180	-5.234	142.372	0.003	-0.001	0.004
Min Y	2525	201 DL+LL	-0.048	-175.578	-9.244	175.821	0.002	-0.001	-0.000
Max Z	2037	207 DL+W/LZ	-0.972	-27.532	27.466	38.902	-0.009	0.001	0.001
Min Z	2340	205 DL+0.8LL	-5.611	-103.751	-41.075	111.727	0.007	0.005	-0.010
Max rX	2400	204 DL+0.8LL	-46.751	18.576	1.694	50.335	0.015	0.003	0.023
Min rX	2604	203 DL+0.8LL	17.353	-39.029	26.798	50.423	-0.013	0.000	0.010
Max rY	2731	202 DL+08LL	59.383	14.155	0.399	61.048	0.006	0.009	-0.007
Min rY	1946	205 DL+0.8LL	21.826	-32.851	-7.544	40.155	0.000	-0.009	0.013
Max rZ	2400	204 DL+0.8LL	-46.751	18.576	1.694	50.335	0.015	0.003	0.023
Min rZ	3652	207 DL+W/LZ	0.282	-15.177	0.218	15.181	0.001	-0.000	-0.019
Max Rst	2701	204 DL+0.8LL	-81.933	-158.467	-9.449	178.645	0.004	-0.002	0.000

Deflection summary from Serviceability Load Combinations

Vertical Deflection:-



Deflection diagram for DL + LL

Permissible Vertical deflection = Span /300
 = 71.91 m /300
 = 239.7 mm

Actual maximum Vertical deflection = 175.57 mm ≤ 239.7 mm (Hence, OK)

Horizontal Deflection:-

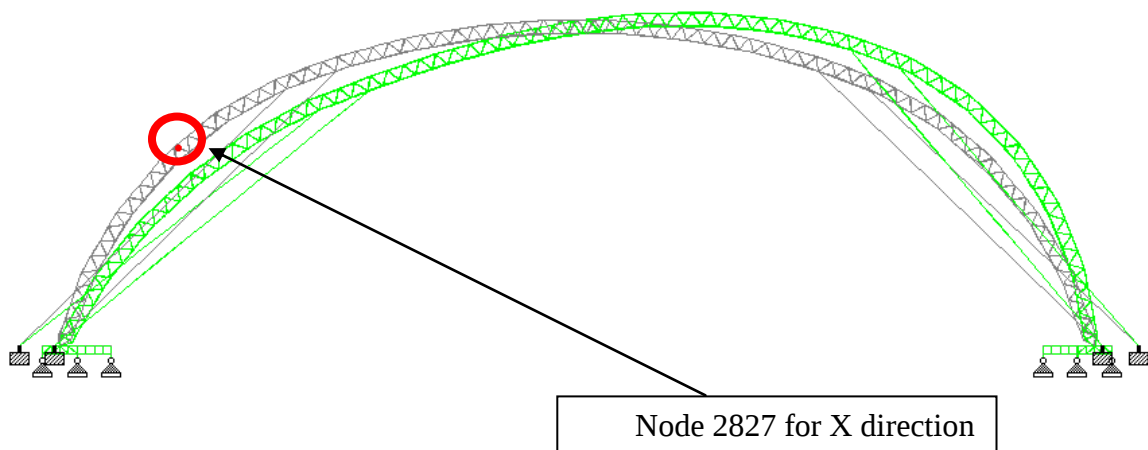
X Direction:

From above displacement summary, Deflection diagram for DL + 0.8LL+0.8WLX

Maximum horizontal displacement of structure in X direction = 134.32 mm

Permissible horizontal deflection in X
 = height / 100
 = 22.7m / 100
 = 227 mm

Actual maximum horizontal deflection = 134.32 mm $\leq$ 227 mm (Hence, OK)



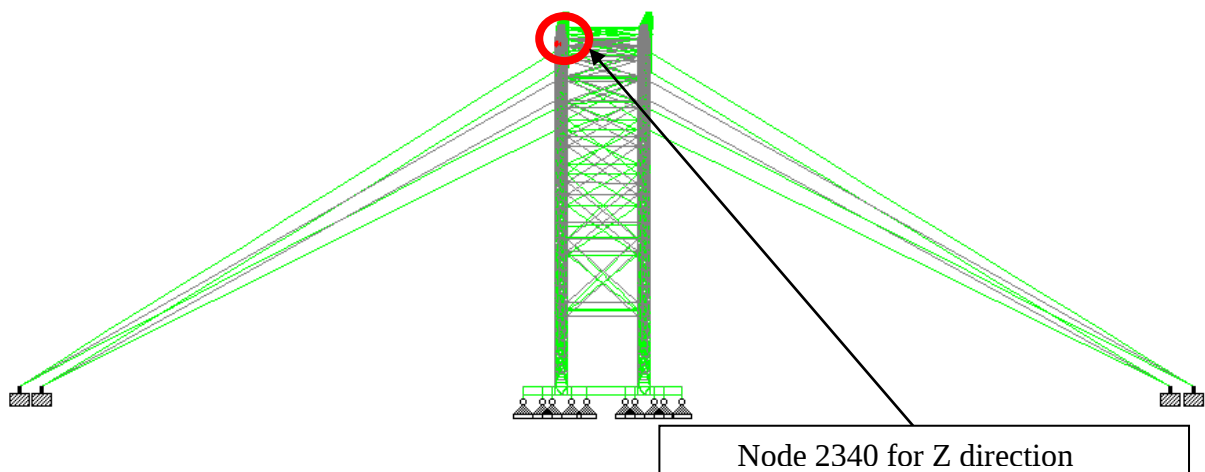
Z Direction:

From above displacement summary, Deflection diagram for DL+WLX

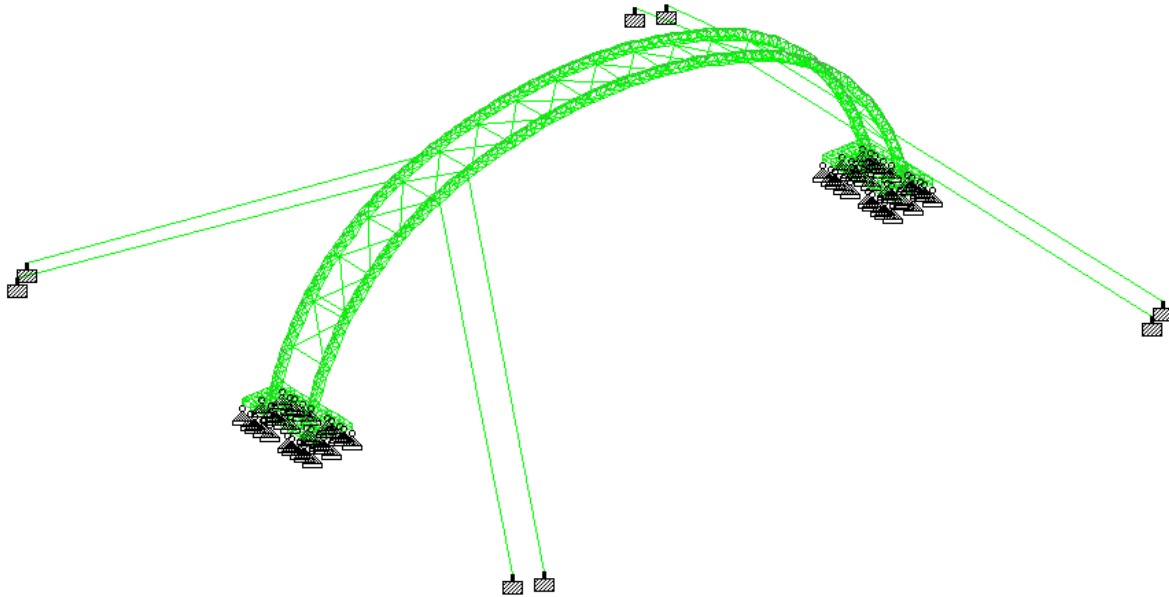
Maximum horizontal displacement of structure in Z direction = 41.07 mm

Permissible horizontal deflection in Z
 = height / 100
 = 22.7m / 100
 = 227 mm

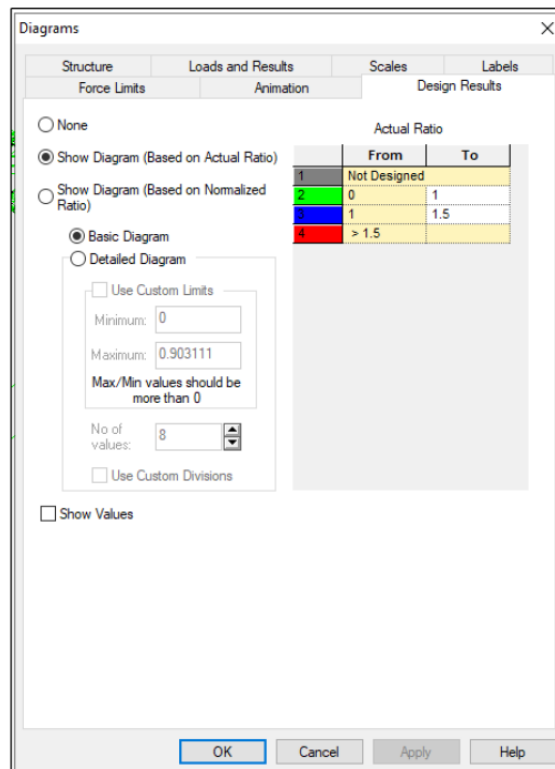
Actual maximum horizontal deflection = 41.07 mm $\leq$ 227 mm (Hence, OK)



8.3. Utility Check



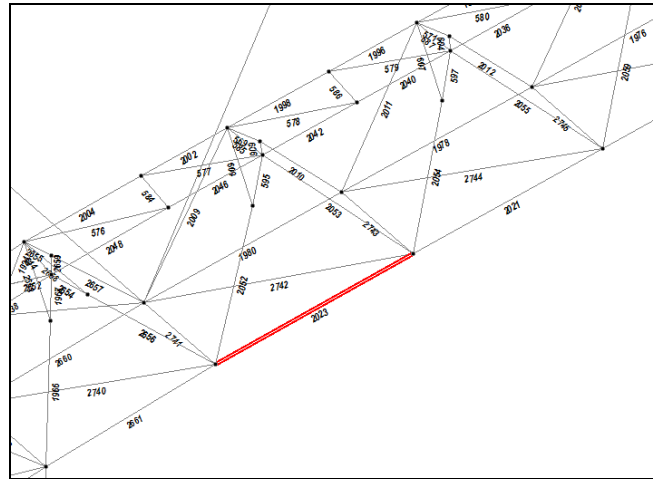
In StaadPro members with design capacity Ratio < 1 highlighted as green members & with design capacity ratio > 1 (overstressed) are highlighted in red. As shown above, all members are highlighted as green marked. Hence all members are passing in strength design.



8.4. STAAD Output Member Design

Main cord member design

Sample member design for each individual member is shown as marked in image below:



Main cord member no. 2023

ALL UNITS ARE - KN MMS (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
=====					
2023 ST	60.3X5CHS	(EUROPEAN SECTIONS)			
		PASS	EC-6.2.3 (T)	0.127	104
		38.89 T	0.00	42.68	0.00

MATERIAL DATA

Grade of steel = S 355
 Modulus of elasticity = 205 kN/mm²
 Design Strength (py) = 355 N/mm²

SECTION PROPERTIES (units - cm)

Member Length = 122.43
 Gross Area = 8.69 Net Area = 8.69

	z-axis	y-axis
Moment of inertia :	33.500	33.500
Plastic modulus :	15.300	15.300
Elastic modulus :	11.111	11.111
Shear Area :	5.532	5.532
Radius of gyration :	1.963	1.963
Effective Length :	122.433	122.433

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005

Section Class : CLASS 1
 Squash Load : 308.50
 Axial force/Squash load : 0.126
 GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

	z-axis	y-axis
Slenderness ratio (KL/r) :	62.4	62.4
Compression Capacity :	242.6	242.6
Tension Capacity :	306.6	306.6
Moment Capacity :	5.4	5.4
Reduced Moment Capacity :	5.3	5.3
Shear Capacity :	113.4	113.4

BUCKLING CALCULATIONS (units - kN,m)

Lateral Torsional Buckling Moment MB = 5.4
 co-efficients C1 & K : C1 =1.000 K =1.0, Effective Length= 1.224
 Lateral Torsional Buckling Curve :

Compression buckling curves: z-z: Curve a y-y: Curve a

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005

Section Class : CLASS 1
 Squash Load : 308.50
 Axial force/Squash load : 0.140
 GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

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	z-axis	y-axis
Slenderness ratio (KL/r) :	62.4	62.4
Compression Capacity :	242.6	242.6
Tension Capacity :	306.6	306.6
Moment Capacity :	5.4	5.4
Reduced Moment Capacity :	5.2	5.2
Shear Capacity :	113.4	113.4

BUCKLING CALCULATIONS (units - kN,m)

Lateral Torsional Buckling Moment MB = 5.4
 co-efficients C1 & K : C1 =1.000 K =1.0, Effective Length= 1.224
 Lateral Torsional Buckling Curve :

Compression buckling curves: z-z: Curve a y-y: Curve a

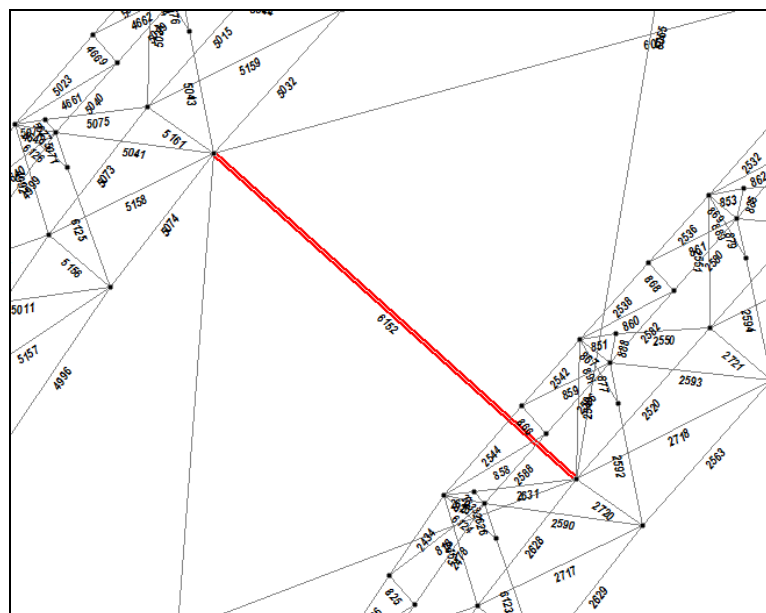
CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.142	106	-43.7	0.0	-0.0	0.0	0.0
EC-6.3.1.1	0.178	108	43.1	0.0	-0.0	0.0	0.0
EC-6.2.9.1	0.009	102	-39.6	0.0	-0.0	0.0	0.0
EC-6.3.3-661	0.184	108	43.1	0.0	-0.0	0.0	0.0
EC-6.3.3-662	0.184	108	43.1	0.0	-0.0	0.0	0.0

Torsion has not been considered in the design.

Purlin member design

Sample member design for each individual member is shown as marked in image below:



ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
=====					
6152 ST	114.3X3.2CHS(EUROPEAN SECTIONS)				
	PASS	EC-6.3.3-662	0.047	102	
	3.76 C	0.00	0.30	2.23	

MATERIAL DATA

Grade of steel = S 355
 Modulus of elasticity = 205 kN/mm2
 Design Strength (py) = 355 N/mm2

SECTION PROPERTIES (units - cm)

Member Length = 446.03
 Gross Area = 11.20 Net Area = 11.20

	z-axis	y-axis
Moment of inertia	172.000	172.000
Plastic modulus	39.500	39.500
Elastic modulus	30.096	30.096
Shear Area	7.130	7.130
Radius of gyration	3.919	3.919
Effective Length	446.029	446.029

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005

Section Class : CLASS 2
 Squash Load : 397.60
 Axial force/Squash load : 0.009
 GM0 : 1.00 GM1 : 1.00 GM2 : 1.25

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	z-axis	y-axis
Slenderness ratio (KL/r)	113.8	113.8
Compression Capacity	149.8	149.8
Tension Capacity	395.1	395.1
Moment Capacity	14.0	14.0
Reduced Moment Capacity	14.0	14.0
Shear Capacity	146.1	146.1

BUCKLING CALCULATIONS (units - kN,m)

Lateral Torsional Buckling Moment MB = 14.0
 co-efficients C1 & K : C1 =1.000 K =1.0, Effective Length= 4.460
 Lateral Torsional Buckling Curve :

Compression buckling curves: z-z: Curve a y-y: Curve a

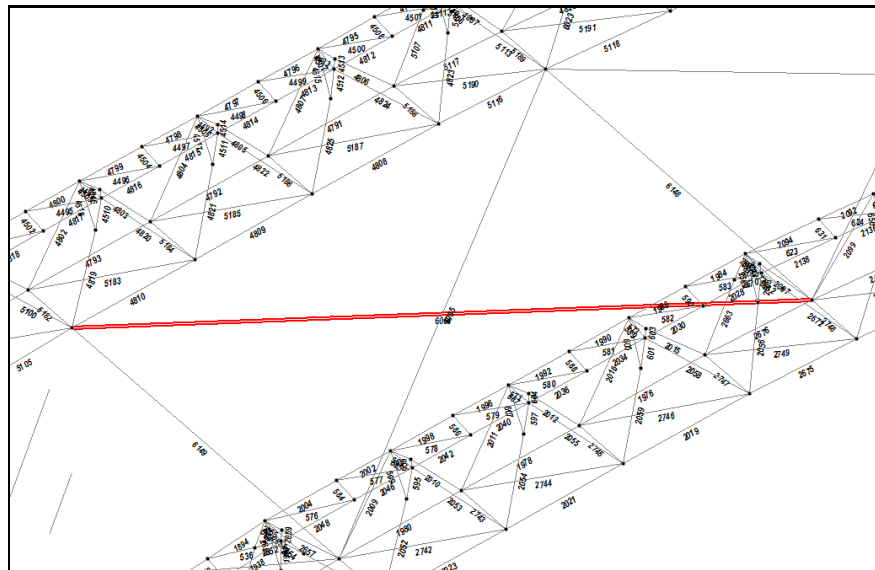
CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.3.1.1	0.026	106	3.9	0.2	0.2	0.0	0.0
EC-6.2.9.1	0.021	101	0.7	0.0	0.0	0.3	0.0
EC-6.3.3-661	0.046	102	3.8	0.0	0.0	0.3	0.0
EC-6.3.3-662	0.047	102	3.8	0.0	0.0	0.3	0.0
EC-6.2.6-(Z)	0.001	106	3.9	0.2	0.2	0.0	0.0
EC-6.2.6-(Y)	0.002	101	0.7	0.3	0.0	0.0	0.0

ADDITIONAL CLAUSE CHECKS FOR TORSION (units- kN,m):

Cross bracing member design

Sample member design for each individual member is shown as marked in image below:

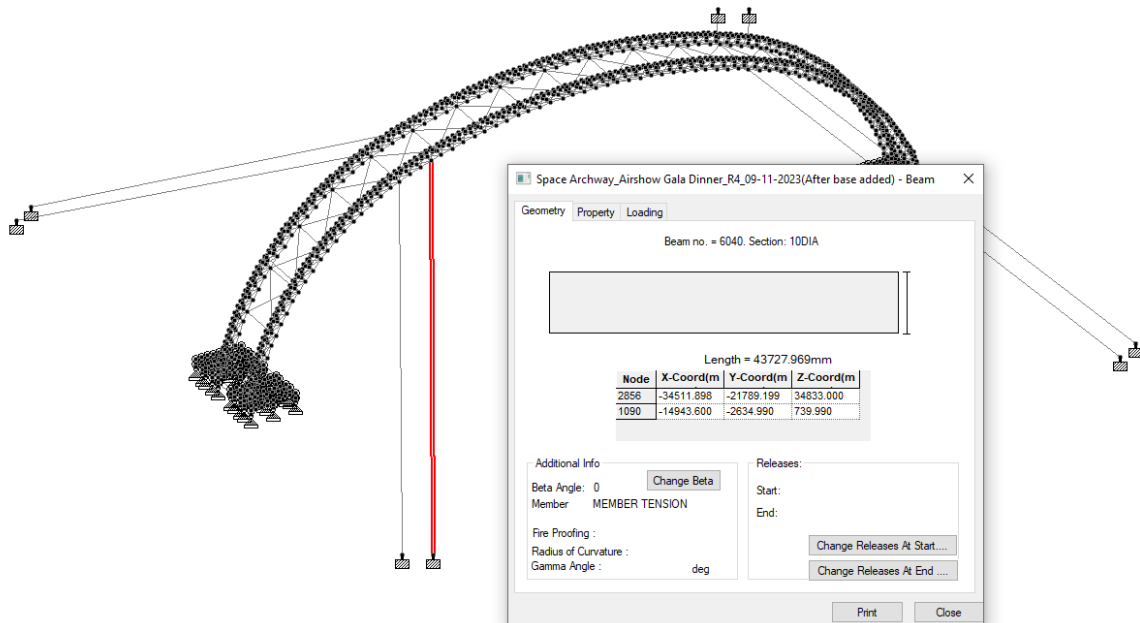


Cross bracing member no. 6064

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
=====					
6064 ST	100IA	(UPT: DESIGNED AS I-SECTION)			
		PASS	EC-6.2.3 (T)	0.168	107
		4.64 T	0.00	0.00	0.00
=====					
MATERIAL DATA					
Grade of steel		= S 355			
Modulus of elasticity		= 205 kN/mm2			
Design Strength (py)		= 355 N/mm2			
SECTION PROPERTIES (units - cm)					
Member Length =		649.37			
Gross Area =		0.78	Net Area =	0.78	
		z-axis		y-axis	
Moment of inertia		:	0.049	0.049	
Plastic modulus		:	0.167	0.167	
Elastic modulus		:	0.098	0.098	
Shear Area		:	0.668	0.668	
Radius of gyration		:	0.250	0.250	
Effective Length		:	649.373	649.373	
DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005					
Section Class		:	CLASS 1		
Squash Load		:	27.86		
Axial force/Squash load		:	0.167		
GM0 : 1.00		GM1 : 1.00	GM2 : 1.25		
		z-axis		y-axis	
Slenderness ratio (KL/r)		:	2598.6	2598.6	
Compression Capacity		:	0.0	0.0	
Tension Capacity		:	27.7	27.7	
Moment Capacity		:	0.1	0.1	
Reduced Moment Capacity		:	0.1	0.1	
Shear Capacity		:	13.7	13.7	
BUCKLING CALCULATIONS (units - kN,m)					
Lateral Torsional Buckling Moment		MB =		0.0	
co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length= 6.494					
Lateral Torsional Buckling Curve : CURVE b					
Elastic Critical Moment for LTB,		Mcr = 0.0			
Compression buckling curves:		z-z: Curve b		y-y: Curve c	
Critical Load For Torsional Buckling,		NcrT = 6183.0			
Critical Load For Torsional-Flexural Buckling,		NcrTF = 6183.0			

Guy cable member design

Sample member design for each individual member is shown as marked in image below:



Guy wire member no. 6040

ALL UNITS ARE - KN METE (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
6040 ST 100DIA	(UPT: DESIGNED AS I-SECTION)	PASS	EC-6.2.3 (T)	0.361	106
	9.99 T	0.00	0.00	0.00	0.00

MATERIAL DATA

Grade of steel	=	S 355
Modulus of elasticity	=	205 kN/mm ²
Design Strength (py)	=	355 N/mm ²

SECTION PROPERTIES (units - cm)

Member Length =	4372.80
Gross Area =	0.78
Net Area =	0.78

	z-axis	y-axis
Moment of inertia	: 0.049	0.049
Plastic modulus	: 0.167	0.167
Elastic modulus	: 0.098	0.098
Shear Area	: 0.668	0.668
Radius of gyration	: 0.250	0.250
Effective Length	: 4372.797	4372.797

DESIGN DATA (units - kN,m) EUROCODE NO.3 /2005

Section Class	:	CLASS 1
Squash Load	:	27.86
Axial force/Squash load	:	0.359
GM0 : 1.00	GM1 : 1.00	GM2 : 1.25

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	z-axis	y-axis
Slenderness ratio (KL/r)	: 17498.5	17498.5
Compression Capacity	: 0.0	0.0
Tension Capacity	: 27.7	27.7
Moment Capacity	: 0.1	0.1
Reduced Moment Capacity	: 0.0	0.1
Shear Capacity	: 13.7	13.7

BUCKLING CALCULATIONS (units - kN,m)

Lateral Torsional Buckling Moment MB = 0.0

co-efficients C1 & K : C1 =1.132 K =1.0, Effective Length=43.728

Lateral Torsional Buckling Curve : CURVE b

Elastic Critical Moment for LTB, Mcr = 0.0

Compression buckling curves: z-z: Curve b y-y: Curve c

Critical Load For Torsional Buckling, NcrT = 6183.0

Critical Load For Torsional-Flexural Buckling, NcrTF = 6183.0

CRITICAL LOADS FOR EACH CLAUSE CHECK (units- kN,m):

CLAUSE	RATIO	LOAD	FX	VY	VZ	MZ	MY
EC-6.2.3 (T)	0.361	106	-10.0	0.0	0.0	0.0	0.0

Torsion has not been considered in the design.

9. CONNECTION DESIGN

Typical Mechanical Properties*

Condition	Tensile N/mm ²	Yield N/mm ²	Elongation %	Izod KCV J	Hardness Brinell
R	700-850	525	17	28	201-255
S	775-925	585	15	50	223-277
T	850-1000	680	13	50	248-302

Shear Check:

Maximum axial force = 164 kN
 Maximum moment_Z = 0.446 kN.m
 Maximum moment_Y = 0.08 kN.m

Axial Force = 10 kN acting as shear

Design shear resistance of bolt = $F_{v,Rd} = \frac{\alpha_v \times f_{ub} \times A}{\gamma_{M2}}$ (As per EN 1993-1-8:2005, table 3.4)

Where,

$\alpha_v = 0.6$ (As per EN 1993-1-8:2005, table 3.4, considering 8.8 grade pin)

$f_{ub} = 800 \text{ N/mm}^2$ (As per EN 1993-1-8:2005, table 3.1, considering 8.8 grade pin)

$A = A_s = 452.39 \text{ mm}^2$

$\gamma_{M2} = 1.25$ (As per EN 1993-1-8:2005, NOTE below table 2.1)

$$F_{v,Rd} = \frac{0.6 \times 800 \times 452.39}{1.25}$$

$F_{v,Rd} = 173.71 \text{ kN} \geq 164 \text{ kN}$ (Hence, OK)

Check for bending stresses:

Moment in Z direction:

$M_{Ed} = 0.446 \text{ kNm}$

$$M_{e,Rd} = \text{Design bending resistance}$$

$$= \frac{W_{el,min} \times f_y}{\gamma_{M0}}$$

Where, $W_{el,min}$ = Minimum elastic section modulus = $(\pi \cdot d^3)/32 = 1357.16 \text{ mm}^3$

$$f_y = 680 \text{ N/mm}^2 \quad (\text{As per attached image of properties})$$

$$\gamma_{M0} = 1.0 \quad (\text{As per EN 1993-1-1:2005, Clause 6.1})$$

$$M_{z,Rd} = \frac{W_{el,min} \times f_y}{\gamma_{M0}} = \frac{1357.16 \times 680}{1.0} = 0.92 \times 10^6 \text{ N.mm} = 0.92 \text{ kN.m} \geq 0.446 \text{ kN.m} \quad (\text{Hence, OK})$$

Moment in Y direction:

$$M_{Ed} = 0.08 \text{ kNm}$$

$$M_{e,Rd} = \text{Design bending resistance}$$

$$= \frac{W_{el,min} \times f_y}{\gamma_{M0}}$$

Where, $W_{el,min}$ = Minimum elastic section modulus = $(\pi \cdot d^3)/32 = 1357.16 \text{ mm}^3$

$$f_y = 680 \text{ N/mm}^2 \quad (\text{As per attached image of properties})$$

$$\gamma_{M0} = 1.0 \quad (\text{As per EN 1993-1-1:2005, Clause 6.1})$$

$$M_{z,Rd} = \frac{W_{el,min} \times f_y}{\gamma_{M0}} = \frac{1357.16 \times 680}{1.0} = 0.92 \times 10^6 \text{ N.mm} = 0.92 \text{ kN.m} \geq 0.08 \text{ kN.m} \quad (\text{Hence, OK})$$

Check for combined biaxial bending stresses:

$$\frac{N_{Ed}}{N_{Rd}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} \leq 1$$

$$\therefore \frac{0.446}{0.92} + \frac{0.08}{0.92} = 0.571 \leq 1 \quad (\text{Hence, OK})$$

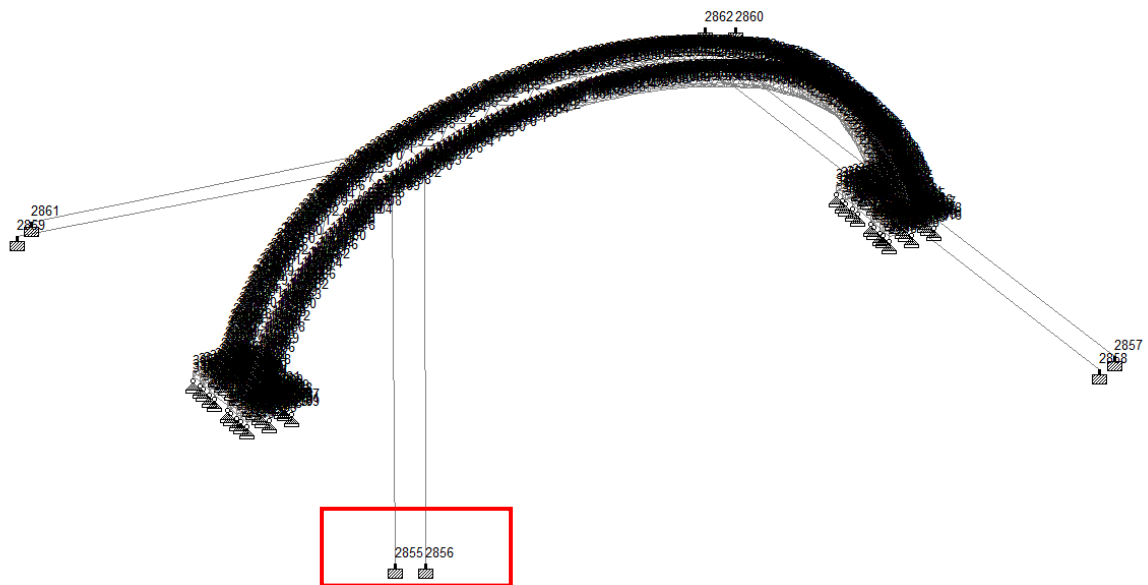
10. CONCLUSION

As per analysis results for the truss supporting structure, as per the support reactions there is no uplift force. Hence the provided ballast load of 24 Ton is sufficient for the structure.

As per the analysis results for the overall stability of Archway structure, it will require below mentioned Ballast load at base level for Guy pulley base supports.

Requirement of maximum ballast weight for Guy wire:

From support reaction summary the maximum tension is 6.617 kN for critical load combination no. 104 (DL+1.4 WLX) at node 2855 & 2856.



Node	L/C	Force-X kN	Force-Y kN	Force-Z kN	Moment-X kN-m	Moment-Y kN-m	Moment-Z kN-m
2855	101	0	0.176	0	0	0	0
	102	-3.96	-3.553	6.753	0	0	0
	103	0	0.151	-0.115	0	0	0
	104	0.115	0.151	0	0	0	0
	105	-2.319	-2.082	4.072	0	0	0
	106	-4.62	-4.195	7.878	0	0	0
	107	0	0.126	-0.134	0	0	0
	108	0.134	0.126	0	0	0	0
	109	-2.705	-2.48	4.751	0	0	0
	110	-4.62	-4.195	7.878	0	0	0
	111	0	0.126	-0.134	0	0	0
	112	0.134	0.126	0	0	0	0
2856	101	0	0.185	0	0	0	0
	102	-3.928	-3.569	6.634	0	0	0

	103	0	0.159	-0.121	0	0	0
	104	0.121	0.159	0	0	0	0
	105	-2.542	-2.33	4.429	0	0	0
	106	-4.583	-4.216	7.74	0	0	0
	107	0	0.132	-0.141	0	0	0
	108	0.141	0.132	0	0	0	0
	109	-2.966	-2.771	5.167	0	0	0
	110	-4.583	-4.216	7.74	0	0	0
	111	0	0.132	-0.141	0	0	0
	112	0.141	0.132	0	0	0	0

Required weight of ballast for uplift = 8.411 kN = 841 kg

Max. Horizontal sliding force Fx = 9.203 kN

Max. Horizontal sliding force Fz = 15.618 kN

Resultant sliding force = $\sqrt{(9.203)^2 + (15.618)^2}$

= 18.127 kN = 1812.7 kg

Required weight of ballast for sliding = Horizontal Force / Factor of safety against sliding

= 18.127 / 0.4

= 45.32 kN = 4532 kg

Total Ballast Weight required for stability of support = 841 + 4532

= 5373 kg

Provided Ballast having weight of 10 Ton (10000 kg) > required weight (Hence OK)