

SOLAR PV GROUND MOUNT STRUCTURAL CALCULATIONS



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LOCATION

CONNECTICUT

PRINT PACKAGE NUMBER:

250583

REVISION:

A

ON:

06/19/2025

DESIGN CRITERIA:

A-FRAME

6.6 ft Top of Pier (7.1 ft TTH)

SeaOak_Madison_Array_GFC_CHSM66M-DG-F-BH_8.5ft-7.5ft-
6.5ft_05_19_2025 .pdf



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ASCE 7-16

Allowable Stress Design (ASD)

A-FRAME

TRACKER FOUNDATION



REPORT: APA SOLAR
REVIEW: THE JDI GROUP

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Part Dimensions & **Materials Used**

Parts List (Motor Pier)

Note.- Only the graphically selected elements are listed below

Profile	Length [in]	N° of pieces
A-FRAME TUBE 2.375 X 0...	19.50	2
W 6X9	36.00	1
W 6X9	59.70	1
Total N° of pieces		4

List of Materials (Motor Pier)

Note.- Only the graphically selected members and shells are listed

Members:

Profile	Material	Uweight [Lb/ft]	Length [in]	Weight [Lb]
A-FRAME TUBE 2.375 X 0.109	APA - A500 GR55	2.47E+00	39.000	8.031
W 6X9	A992 GR50	9.06E+00	95.700	72.273
Total weight [Lb]				80.304

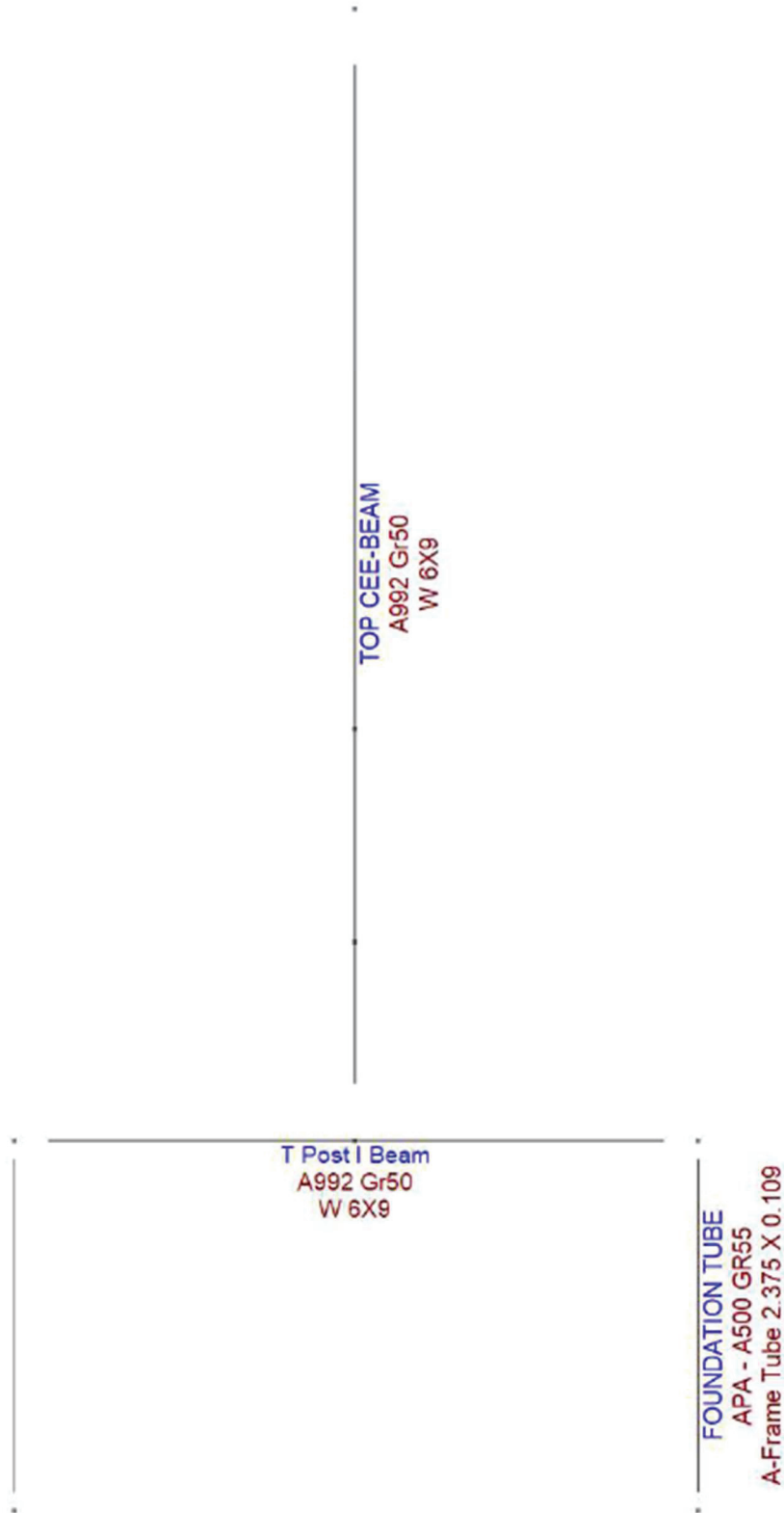


Figure 1: - Member Length, Material, & Section - Motor Pier

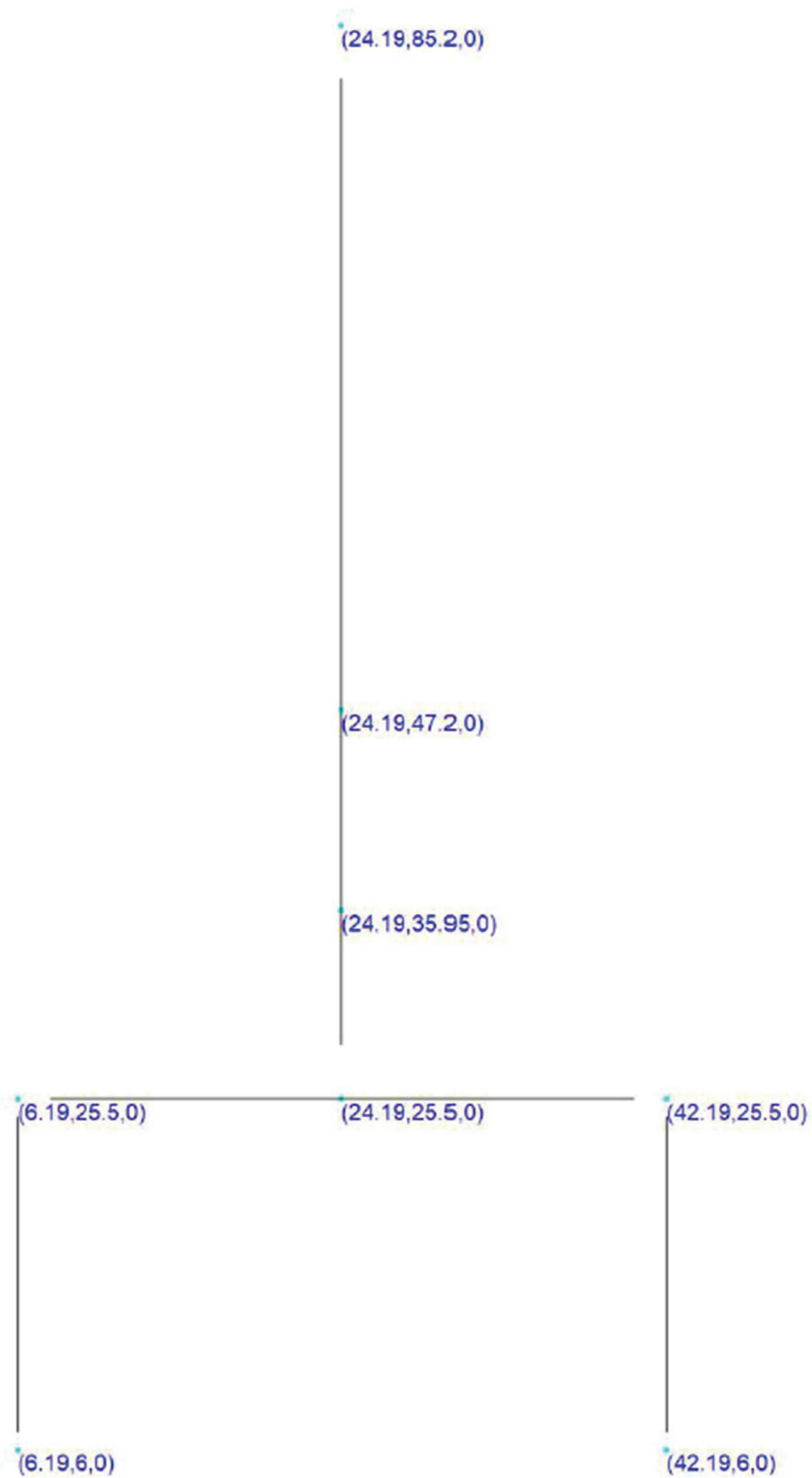


Figure 2: - Node X,Y,Z Coordinate - Motor Pier

Parts List (ARRAY PIER)

Note.- Only the graphically selected elements are listed below

Profile	Length [in]	N° of pieces
0.625X0.109 DOUBLE_C	16.05	1
A-FRAME TUBE 2.375 X 0...	19.55	2
A-FRAME TUBE 2.375 X 0...	48.48	2
APA 1 X 1.63 CBRACING	42.38	1
Total N° of pieces		6

List of Materials (ARRAY PIER)

Note.- Only the graphically selected members and shells are listed

Members:

Profile	Material	Uweight [Lb/ft]	Length [in]	Weight [Lb]
0.625X0.109 DOUBLE_C	APA - A653 SS 80-1	7.50E+00	16.046	10.032
A-FRAME TUBE 2.375 X 0.109	APA - A500 GR55	2.47E+00	39.094	8.050
A-FRAME TUBE 2.375 X 0.154	APA - A500 GR60	3.43E+00	96.967	27.701
APA 1 X 1.63 CBRACING	APA - A572 GR50	7.45E-01	42.380	2.631
Total weight [Lb]				48.414

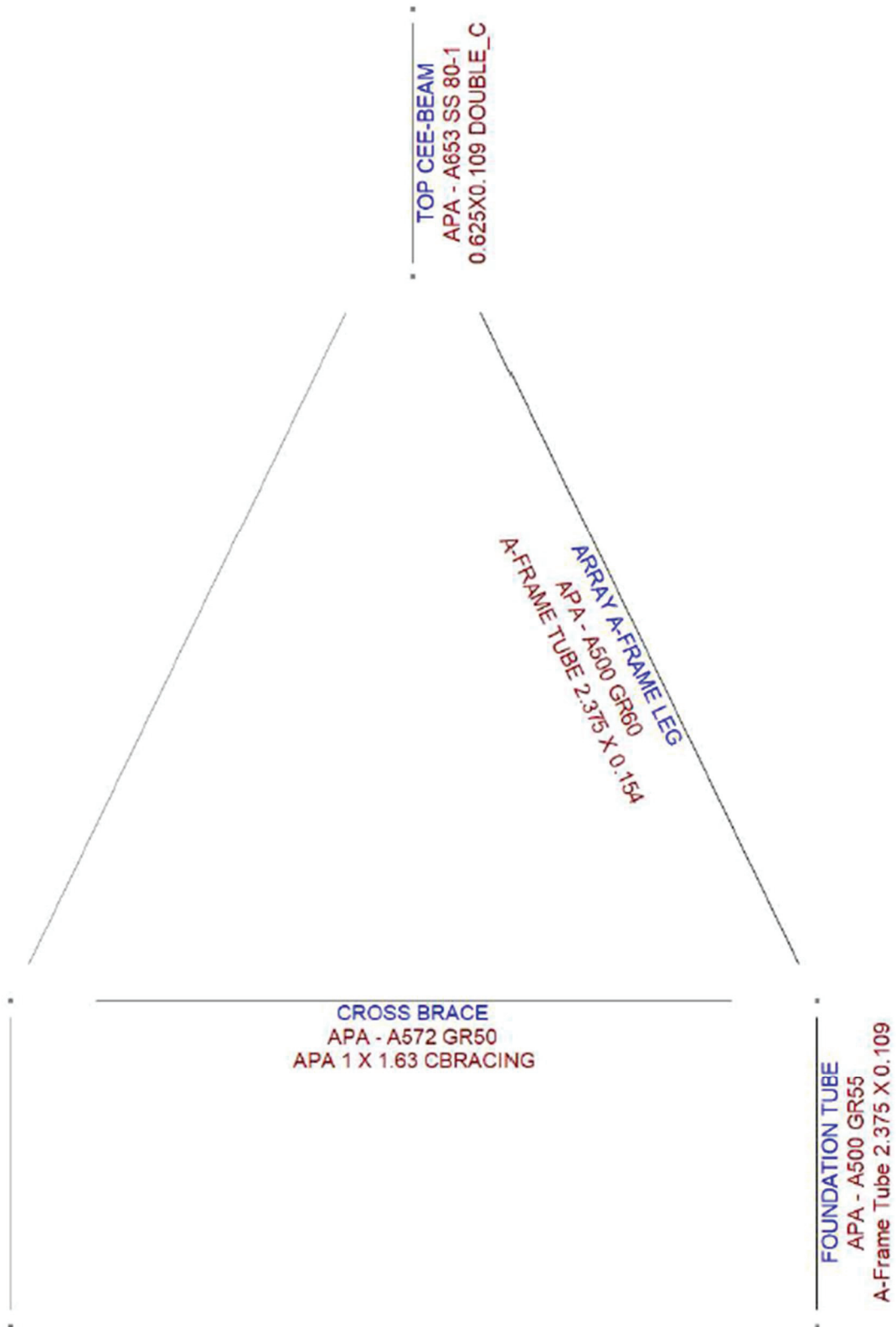


Figure 3: - Member Length, Material, & Section - Array Pier

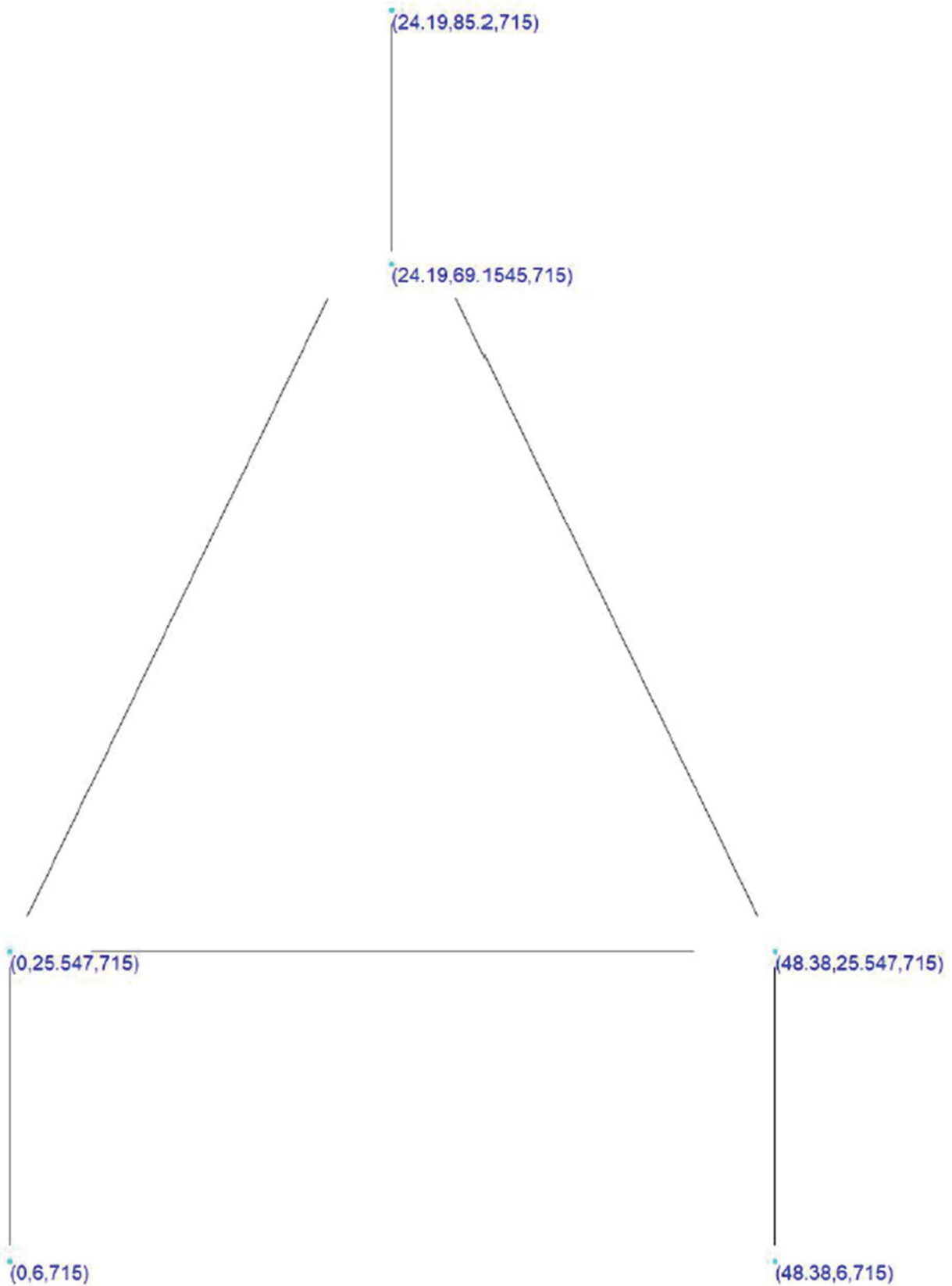


Figure 4: - Node X,Y,Z Coordinate - Array Pier

Parts List (DAMPER PIER)

Note.- Only the graphically selected elements are listed below

Profile	Length [in]	N° of pieces
0.625X0.109 DOUBLE_C	16.05	1
A-FRAME TUBE 2.375 X 0...	19.55	2
A-FRAME TUBE 2.375 X 0...	48.48	2
A-FRAME TUBE 2.875 X 0...	24.41	1
APA 1 X 1.63 CBRACING	42.38	1
Total N° of pieces		7

List of Materials (DAMPER PIER)

Note.- Only the graphically selected members and shells are listed

Members:

Profile	Material	Uweight [Lb/ft]	Length [in]	Weight [Lb]
0.625X0.109 DOUBLE_C	APA - A653 SS 80-1	7.50E+00	16.046	10.032
A-FRAME TUBE 2.375 X 0.109	APA - A500 GR55	2.47E+00	39.094	8.050
A-FRAME TUBE 2.375 X 0.218	APA - A500 GR55	4.73E+00	96.967	38.189
A-FRAME TUBE 2.875 X 0.130	APA - A500 GR50 - GRC	3.57E+00	24.413	7.262
APA 1 X 1.63 CBRACING	APA - A572 GR50	7.45E-01	42.380	2.631
Total weight [Lb]				66.164

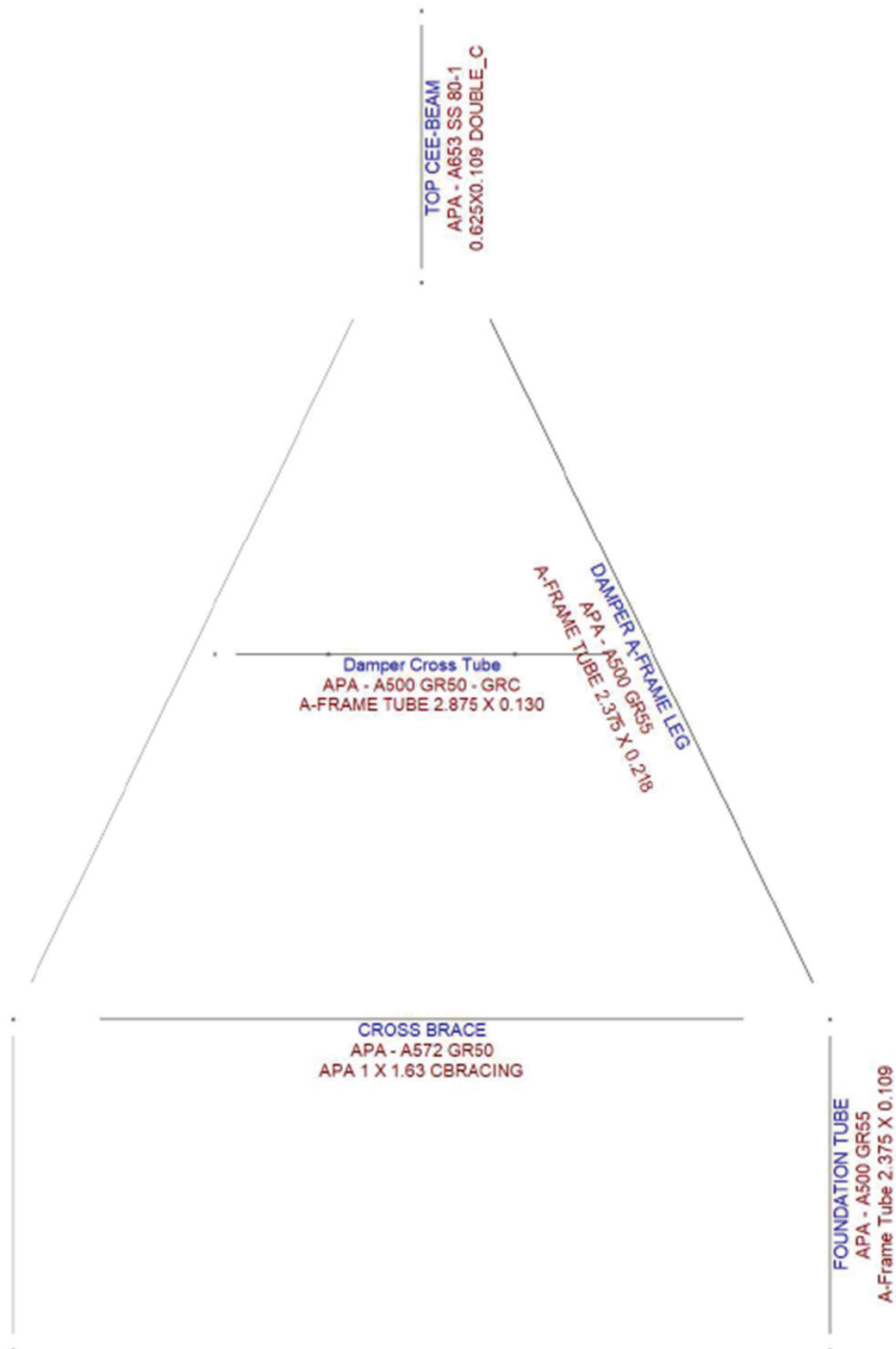


Figure 5: - Member Length, Material, & Section - Damper Pier

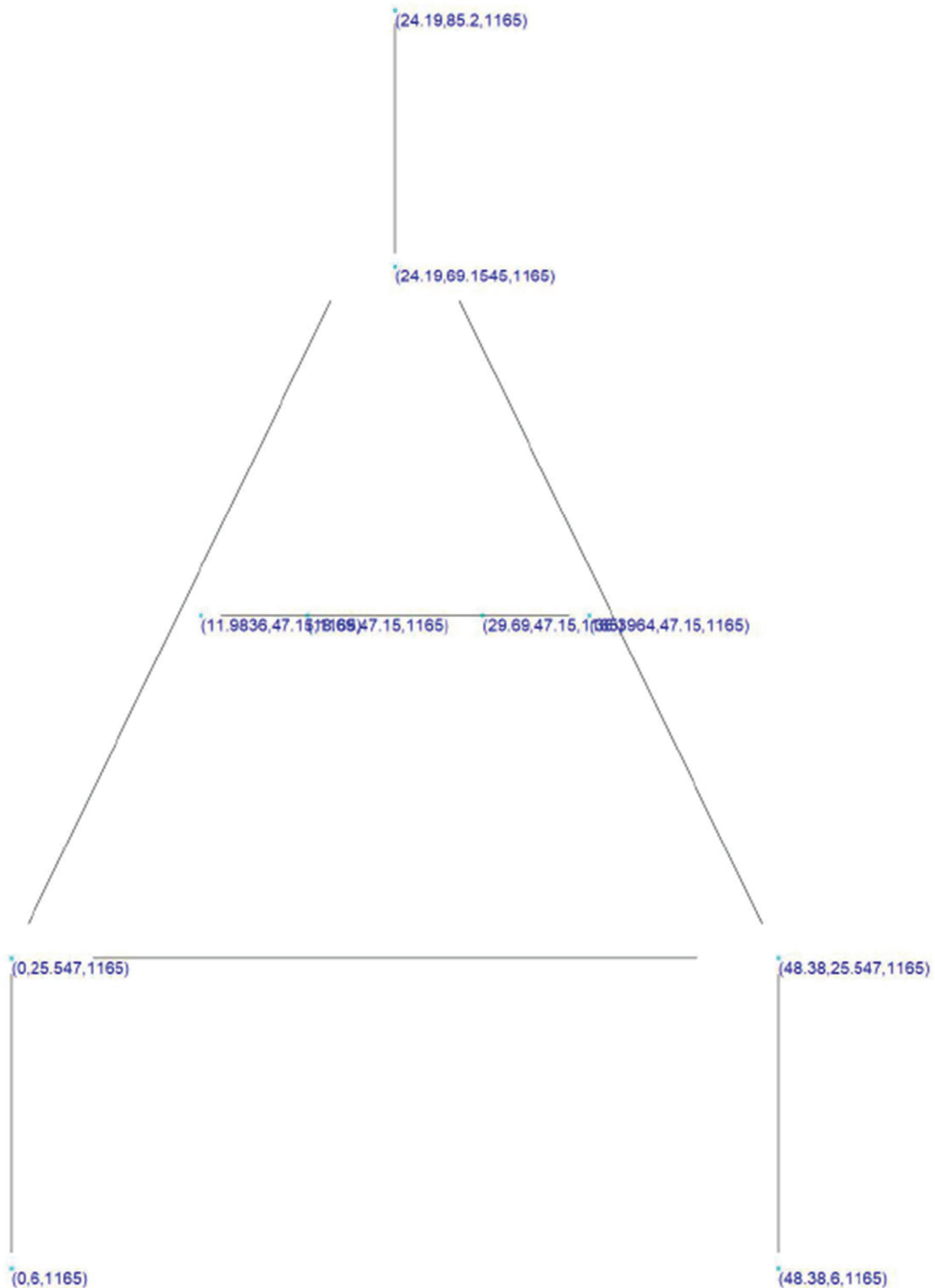


Figure 6: - Node X,Y,Z Coordinate - Damper Pier

Parts List (Cables)

Note.- Only the graphically selected elements are listed below

Profile	Length [in]	N° of pieces
CABLE BRACE - 5/32	236.64	4
Total N° of pieces		4

List of Materials (Cables)

Note.- Only the graphically selected members and shells are listed

Members:

Profile	Material	Uweight [Lb/ft]	Length [in]	Weight [Lb]
CABLE BRACE - 5/32	APA - A36 - CABLES	2.62E-01	946.563	20.667
Total weight [Lb]				20.667

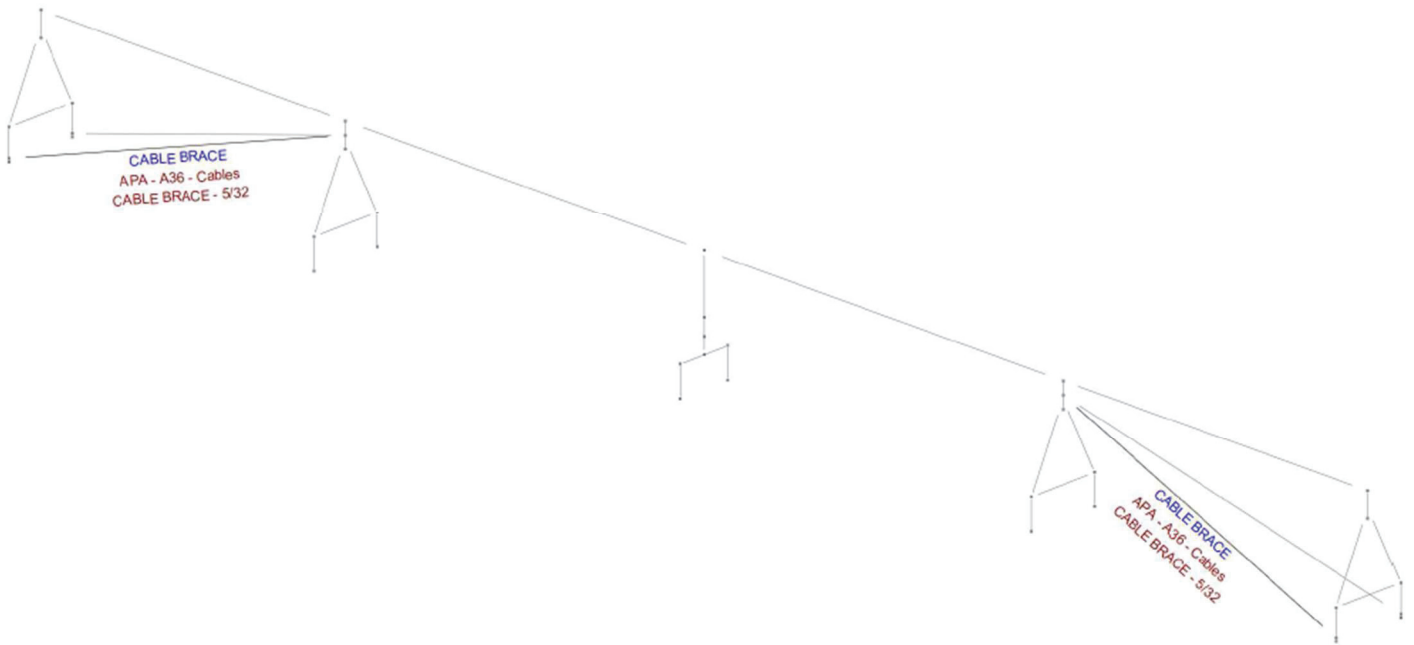


Figure 7: - Member Length, Material, & Section - Cables

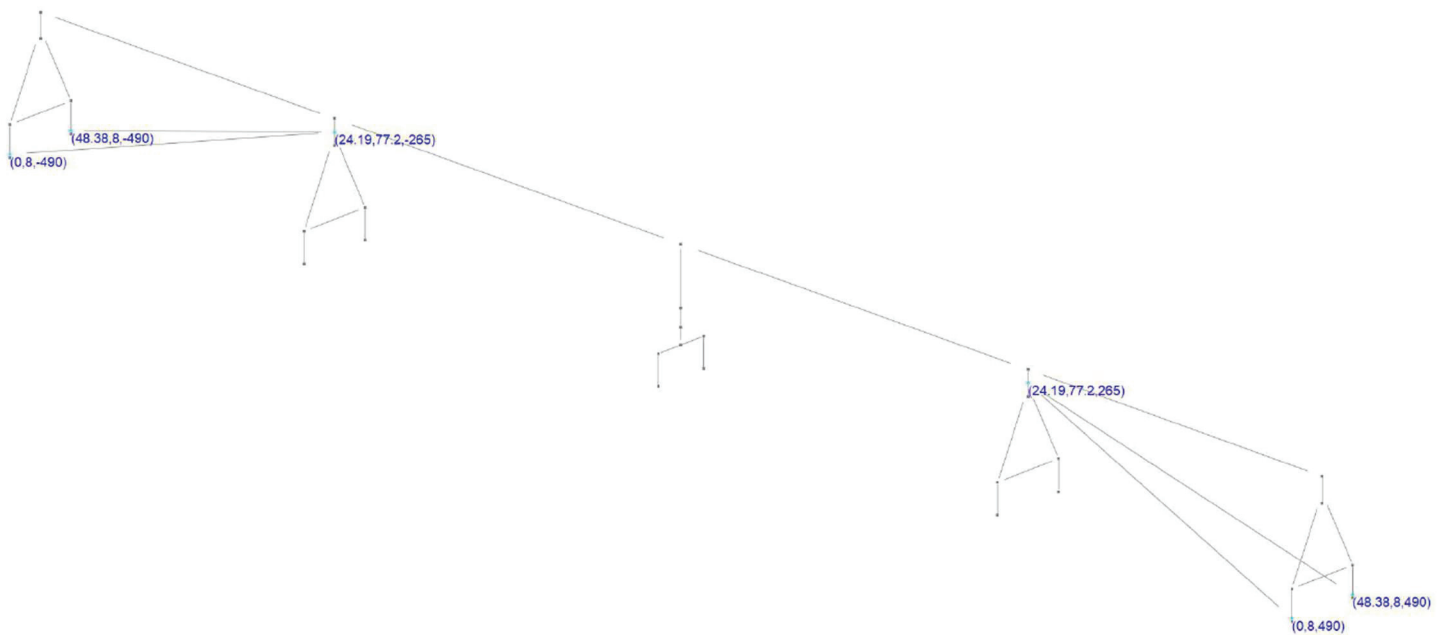
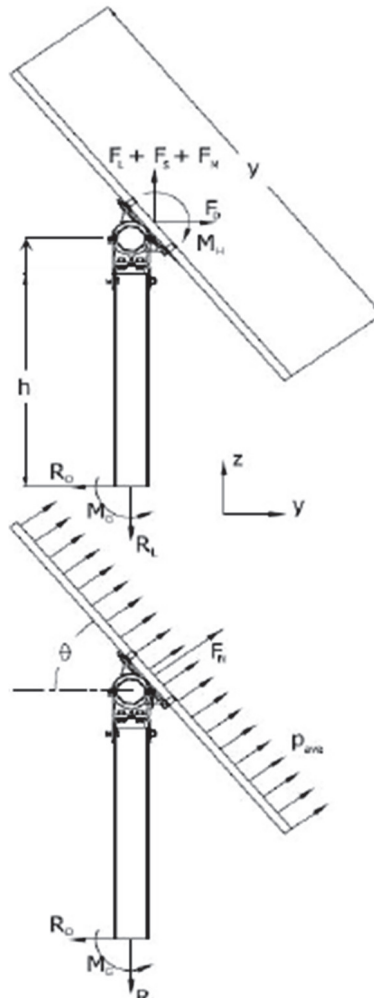


Figure 8: - Node X,Y,Z Coordinate - Cables

Load Calculations

Loading Diagram



****See customer GFC Report(s) for more details regarding formulas and calculations of above loadings****

Load data - with ASD Combos (for reactions)

GLOSSARY

Comb : Indicates if load condition is a load combination

Load conditions

Condition	Description	Comb.	Category
DL	DEAD WEIGHT	No	DL
WLX	WIND + Y	No	WIND
WLZ	WIND - Y	No	WIND
SL	SNOW VERTICLE DOWN	No	SNOW
TL	DLZ	No	DL
EL	SEISMIC LOAD	No	EARTH
DAMP	DAMPER LOAD	No	DL
D1	DL+DAMP	Yes	
D2	DL+SL+DAMP	Yes	
D3	DL+0.6WLX+DAMP	Yes	
D4	DL-0.6WLX+DAMP	Yes	
D5	DL+0.6WLZ+DAMP	Yes	
D6	DL-0.6WLZ+DAMP	Yes	
D7	DL+0.45WLX+0.75SL+DAMP	Yes	
D8	DL-0.45WLX+0.75SL+DAMP	Yes	
D9	DL+0.45WLZ+0.75SL+DAMP	Yes	
D10	DL-0.45WLZ+0.75SL+DAMP	Yes	
D11	0.6DL+0.6WLX+DAMP	Yes	
D12	0.6DL-0.6WLX+DAMP	Yes	
D13	0.6DL+0.6WLZ+DAMP	Yes	
D14	0.6DL-0.6WLZ+DAMP	Yes	
D15	DL+0.7EL+DAMP	Yes	
D16	DL-0.7EL+DAMP	Yes	
D17	DL+0.75SL+0.525EL+DAMP	Yes	
D18	DL+0.75SL-0.525EL+DAMP	Yes	
D19	0.6DL+0.7EL+DAMP	Yes	
D20	0.6DL-0.7EL+DAMP	Yes	
D21	DL+TL+DAMP	Yes	
D22	DL+SL+TL+DAMP	Yes	
D23	DL+0.6WLX+TL+DAMP	Yes	
D24	DL-0.6WLX+TL+DAMP	Yes	
D25	DL+0.6WLZ+TL+DAMP	Yes	
D26	DL-0.6WLZ+TL+DAMP	Yes	
D27	DL+0.45WLX+0.75SL+TL+DAMP	Yes	
D28	DL-0.45WLX+0.75SL+TL+DAMP	Yes	
D29	DL+0.45WLZ+0.75SL+TL+DAMP	Yes	
D30	DL-0.45WLZ+0.75SL+TL+DAMP	Yes	
D31	0.6DL+0.6WLX+0.6TL+DAMP	Yes	
D32	0.6DL-0.6WLX+0.6TL+DAMP	Yes	
D33	0.6DL+0.6WLZ+0.6TL+DAMP	Yes	
D34	0.6DL-0.6WLZ+0.6TL+DAMP	Yes	
D35	DL+TL+0.7EL+DAMP	Yes	
D36	DL+TL-0.7EL+DAMP	Yes	
D37	DL+0.75SL+TL+0.525EL+DAMP	Yes	
D38	DL+0.75SL+TL-0.525EL+DAMP	Yes	
D39	0.6DL+0.6TL+0.7EL+DAMP	Yes	
D40	0.6DL+0.6TL-0.7EL+DAMP	Yes	

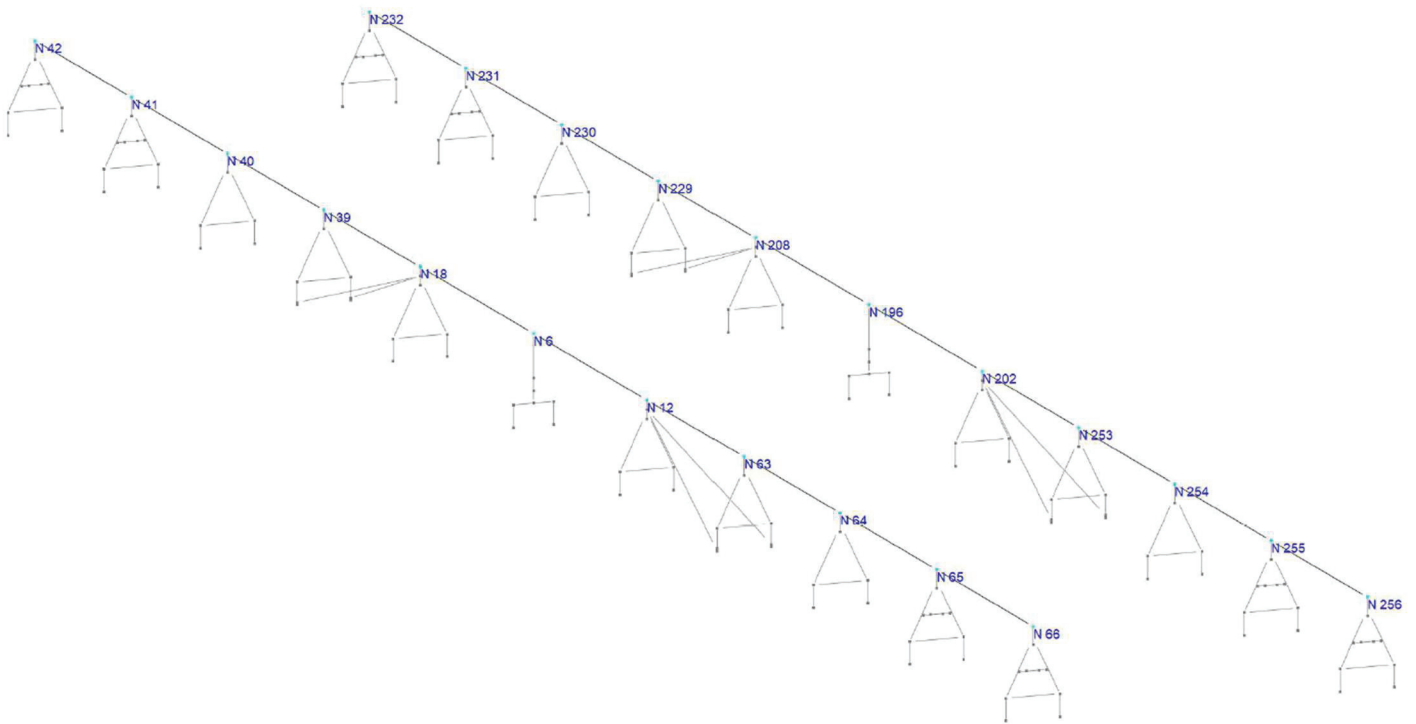


Figure 9: - Nodes With Loading Applied

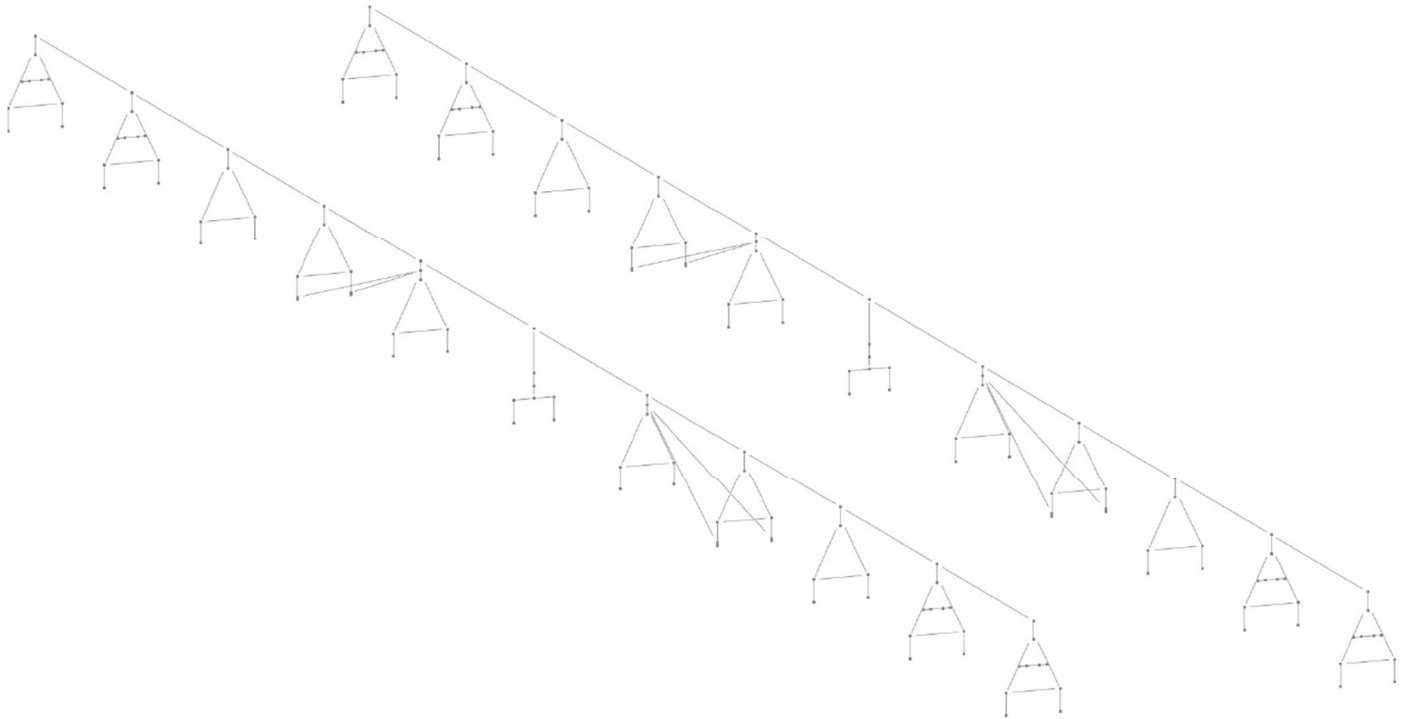


Figure 10: - Full Row Setup

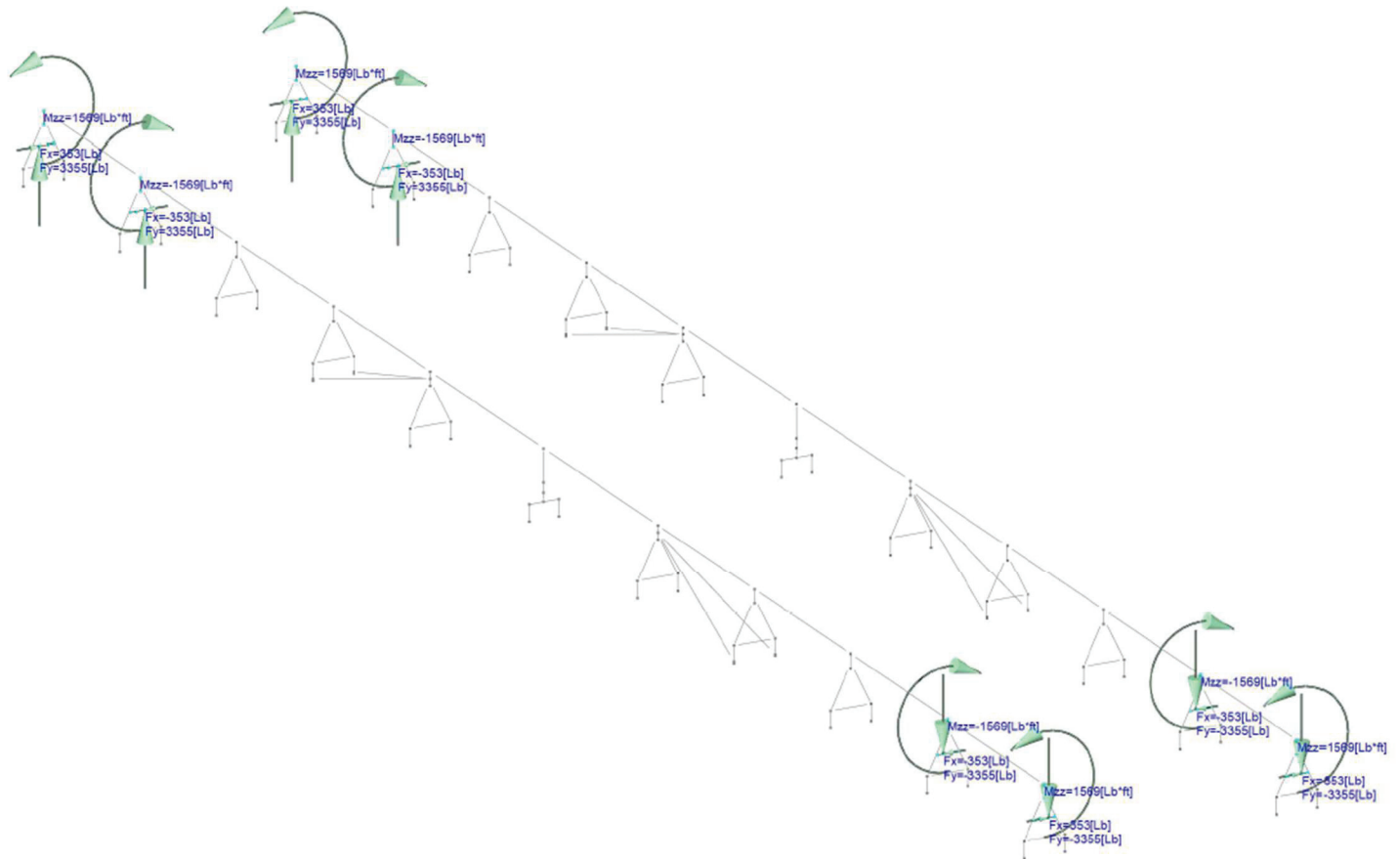


Figure 11: - Damper loading

Load on Nodes

Condition	Node	FX [Lb]	FY [Lb]	FZ [Lb]	MX [Lb*ft]	MY [Lb*ft]	MZ [Lb*ft]
DL	6	0.00	-460.00	0.00	0.00	0.00	0.00
	12	0.00	-460.00	0.00	0.00	0.00	0.00
	18	0.00	-460.00	0.00	0.00	0.00	0.00
	39	0.00	-460.00	0.00	0.00	0.00	0.00
	40	0.00	-460.00	0.00	0.00	0.00	0.00
	41	0.00	-460.00	0.00	0.00	0.00	0.00
	42	0.00	-460.00	0.00	0.00	0.00	0.00
	63	0.00	-460.00	0.00	0.00	0.00	0.00
	64	0.00	-460.00	0.00	0.00	0.00	0.00
	65	0.00	-460.00	0.00	0.00	0.00	0.00
	66	0.00	-460.00	0.00	0.00	0.00	0.00
	196	0.00	-530.00	0.00	0.00	0.00	0.00
	202	0.00	-530.00	0.00	0.00	0.00	0.00
	208	0.00	-530.00	0.00	0.00	0.00	0.00
	229	0.00	-530.00	0.00	0.00	0.00	0.00
	230	0.00	-530.00	0.00	0.00	0.00	0.00
	231	0.00	-530.00	0.00	0.00	0.00	0.00
	232	0.00	-530.00	0.00	0.00	0.00	0.00
	253	0.00	-530.00	0.00	0.00	0.00	0.00
	254	0.00	-530.00	0.00	0.00	0.00	0.00
	255	0.00	-530.00	0.00	0.00	0.00	0.00
	256	0.00	-530.00	0.00	0.00	0.00	0.00
WLX	6	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	12	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	18	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	39	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	40	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	41	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	42	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	63	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	64	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	65	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	66	3290.00	2680.00	0.00	0.00	0.00	-3907.9271
	196	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	202	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	208	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	229	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	230	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	231	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	232	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	253	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	254	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	255	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
	256	2920.00	2370.00	0.00	0.00	0.00	-3702.2467
WLZ	6	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	12	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	18	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	39	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	40	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	41	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	42	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	63	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	64	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	65	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	66	3290.00	-2580.00	0.00	0.00	0.00	-3907.9271
	196	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467

	202	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	208	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	229	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	230	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	231	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	232	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	253	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	254	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	255	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
	256	2920.00	-2260.00	0.00	0.00	0.00	-3702.2467
SL	6	0.00	-1470.00	0.00	0.00	0.00	0.00
	12	0.00	-1470.00	0.00	0.00	0.00	0.00
	18	0.00	-1470.00	0.00	0.00	0.00	0.00
	39	0.00	-1470.00	0.00	0.00	0.00	0.00
	40	0.00	-1470.00	0.00	0.00	0.00	0.00
	41	0.00	-1470.00	0.00	0.00	0.00	0.00
	42	0.00	-1470.00	0.00	0.00	0.00	0.00
	63	0.00	-1470.00	0.00	0.00	0.00	0.00
	64	0.00	-1470.00	0.00	0.00	0.00	0.00
	65	0.00	-1470.00	0.00	0.00	0.00	0.00
	66	0.00	-1470.00	0.00	0.00	0.00	0.00
	196	0.00	-2070.00	0.00	0.00	0.00	0.00
	202	0.00	-2070.00	0.00	0.00	0.00	0.00
	208	0.00	-2070.00	0.00	0.00	0.00	0.00
	229	0.00	-2070.00	0.00	0.00	0.00	0.00
	230	0.00	-2070.00	0.00	0.00	0.00	0.00
	231	0.00	-2070.00	0.00	0.00	0.00	0.00
	232	0.00	-2070.00	0.00	0.00	0.00	0.00
	253	0.00	-2070.00	0.00	0.00	0.00	0.00
	254	0.00	-2070.00	0.00	0.00	0.00	0.00
	255	0.00	-2070.00	0.00	0.00	0.00	0.00
	256	0.00	-2070.00	0.00	0.00	0.00	0.00
TL	6	0.00	0.00	160.00	0.00	0.00	0.00
	12	0.00	0.00	160.00	0.00	0.00	0.00
	18	0.00	0.00	160.00	0.00	0.00	0.00
	196	0.00	0.00	160.00	0.00	0.00	0.00
	202	0.00	0.00	160.00	0.00	0.00	0.00
	208	0.00	0.00	160.00	0.00	0.00	0.00
EL	6	0.00	0.00	250.00	0.00	0.00	0.00
	12	0.00	0.00	250.00	0.00	0.00	0.00
	18	0.00	0.00	250.00	0.00	0.00	0.00
	196	0.00	0.00	250.00	0.00	0.00	0.00
	202	0.00	0.00	250.00	0.00	0.00	0.00
	208	0.00	0.00	250.00	0.00	0.00	0.00
DA	41	0.00	0.00	0.00	0.00	0.00	-1569.00
	42	0.00	0.00	0.00	0.00	0.00	1569.00
	65	0.00	0.00	0.00	0.00	0.00	-1569.00
	66	0.00	0.00	0.00	0.00	0.00	1569.00
	83	-353.00	-3355.00	0.00	0.00	0.00	0.00
	85	353.00	3355.00	0.00	0.00	0.00	0.00
	97	353.00	-3355.00	0.00	0.00	0.00	0.00
	99	-353.00	3355.00	0.00	0.00	0.00	0.00
	231	0.00	0.00	0.00	0.00	0.00	-1569.00
	232	0.00	0.00	0.00	0.00	0.00	1569.00
	255	0.00	0.00	0.00	0.00	0.00	-1569.00
	256	0.00	0.00	0.00	0.00	0.00	1569.00
	263	-353.00	-3355.00	0.00	0.00	0.00	0.00
	265	353.00	3355.00	0.00	0.00	0.00	0.00
	277	353.00	-3355.00	0.00	0.00	0.00	0.00
	279	-353.00	3355.00	0.00	0.00	0.00	0.00

Reactions & Displacements

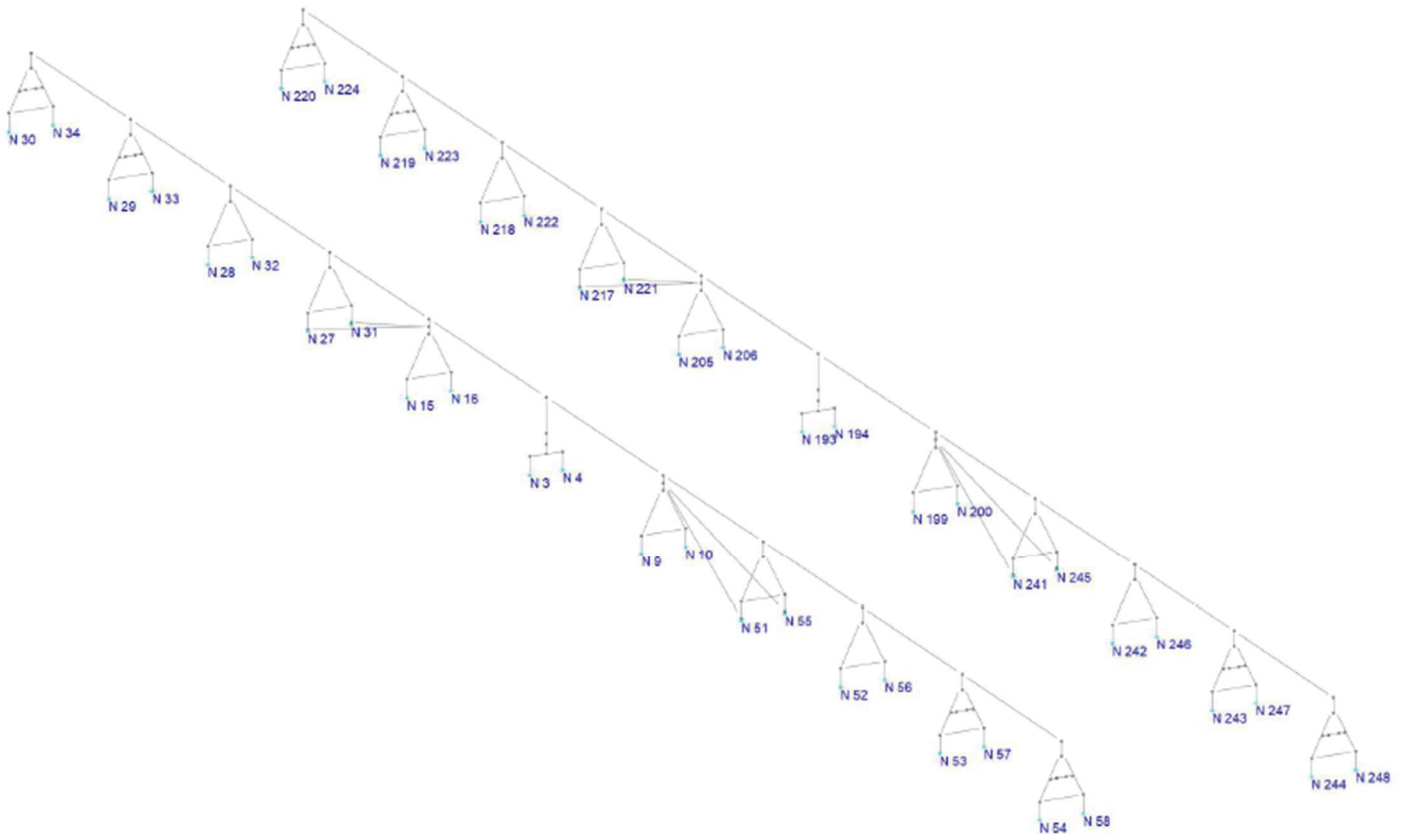


Figure 12: - Nodes With Reactions

Analysis - Reaction Envelope - ASD

Reactions



Direction of positive forces and moments

Max Uplift:	5936 lbs	(D11)
Max Down Load:	6310 lbs	(D24)
Max Lateral:	1238 lbs	(D24)

Node	Forces						Moments					
	Fx	lc		Fy	lc		Fz	lc		Mx	lc	
	[Lb]			[Lb]			[Lb]			[Lb*ft]		
3	Max	1021.374	D24	5498.560	D24		12.867	D16		22.08594	D16	
	Min	-998.066	D11	-5125.844	D11		-24.581	D35		-42.19027	D35	
4	Max	996.301	D14	5468.177	D25		12.867	D16		22.08594	D16	
	Min	-1019.402	D25	-5096.256	D14		-24.581	D35		-42.19026	D35	
9	Max	1033.820	D24	4539.726	D4		0.105	D18		13.27729	D16	
	Min	-1025.852	D31	-4170.314	D31		-21.254	D35		-66.16297	D35	
10	Max	1024.915	D34	4510.468	D5		0.106	D18		13.27914	D16	
	Min	-1033.417	D25	-4139.563	D34		-21.253	D35		-66.16112	D35	
15	Max	1030.684	D4	4584.117	D24		11.171	D16		34.73393	D16	
	Min	-1021.402	D11	-4148.647	D11		-0.305	D29		-25.17102	D35	
16	Max	1020.483	D14	4554.856	D25		11.170	D16		34.73208	D16	
	Min	-1030.266	D5	-4117.984	D14		-0.312	D28		-25.17287	D35	
27	Max	1000.443	D4	4444.399	D4		-0.001	D16		-0.00388	D1	
	Min	-1020.639	D23	-4141.740	D31		-456.936	D35		-76.14683	D35	
28	Max	1009.581	D24	4471.574	D24		0.025	D26		0.05885	D26	
	Min	-1004.159	D31	-4110.282	D11		-0.012	D25		-0.02904	D25	
29	Max	1158.446	D4	2955.271	D4		0.007	D4		0.01365	D4	
	Min	-870.313	D31	-5618.622	D31		-0.011	D5		-0.02088	D5	
30	Max	801.674	D24	2630.069	D24		-0.016	D5		-0.03009	D5	
	Min	-1224.022	D11	-5935.092	D11		-0.025	D4		-0.04667	D4	
31	Max	1021.054	D26	4411.368	D5		0.002	D16		0.00369	D1	
	Min	-998.683	D5	-4114.754	D34		-456.905	D35		-76.13470	D35	
32	Max	1000.661	D34	4449.433	D25		0.012	D25		0.02904	D25	
	Min	-1011.740	D25	-4072.424	D14		-0.025	D26		-0.05885	D26	
33	Max	1225.594	D34	2601.889	D5		0.011	D5		0.02088	D5	
	Min	-801.308	D5	-5912.002	D34		-0.007	D4		-0.01365	D4	
34	Max	868.837	D14	2917.995	D25		0.025	D4		0.04667	D4	
	Min	-1155.002	D25	-5587.166	D14		0.016	D5		0.03009	D5	
51	Max	1000.436	D24	4446.161	D24		238.669	D20		39.77507	D20	

	Min	-999.446	D11	-4098.887	D11	-0.051	D25	-0.13135	D31	0.00000	D1	-768.37080	D4
52	Max	1009.543	D4	4470.765	D4	0.012	D11	0.02891	D11	0.00000	D1	772.61533	D11
	Min	-1004.144	D11	-4110.084	D31	-0.025	D14	-0.05872	D14	0.00000	D1	-777.46003	D4
53	Max	1237.916	D24	6309.910	D24	0.011	D23	0.02090	D23	0.00000	D1	471.21804	D31
	Min	-790.850	D31	-2263.965	D11	-0.007	D34	-0.01367	D34	0.00000	D1	-1102.19630	D24
54	Max	881.155	D4	5985.176	D4	0.025	D26	0.04668	D26	0.00000	D1	1017.27820	D11
	Min	-1144.539	D11	-2579.943	D31	0.016	D25	0.03008	D25	0.00000	D1	-553.15258	D4
55	Max	999.834	D14	4413.132	D25	238.638	D20	39.76295	D20	0.00000	D1	766.65808	D5
	Min	-998.677	D5	-4071.821	D14	-0.054	D24	-0.13890	D34	0.00000	D1	-761.29652	D14
56	Max	1000.647	D14	4448.624	D5	0.025	D14	0.05872	D14	0.00000	D1	779.66036	D5
	Min	-1011.702	D5	-4072.226	D34	-0.012	D11	-0.02891	D11	0.00000	D1	-769.16713	D14
57	Max	1146.131	D34	5956.529	D25	0.007	D34	0.01367	D34	0.00000	D1	552.94340	D25
	Min	-880.778	D25	-2557.345	D14	-0.011	D23	-0.02090	D23	0.00000	D1	-1018.97850	D34
58	Max	789.354	D14	6273.103	D5	-0.016	D25	-0.03008	D25	0.00000	D1	1099.01640	D5
	Min	-1234.483	D5	-2232.017	D34	-0.025	D26	-0.04668	D26	0.00000	D1	-469.92193	D14
193	Max	909.842	D24	4984.294	D24	12.879	D16	22.10704	D16	0.00000	D1	722.75469	D11
	Min	-883.055	D11	-4555.749	D11	-24.593	D35	-42.21137	D35	0.00000	D1	-736.79863	D24
194	Max	881.102	D14	4950.912	D25	12.879	D16	22.10704	D16	0.00000	D1	735.63801	D25
	Min	-907.683	D25	-4523.162	D14	-24.593	D35	-42.21137	D35	0.00000	D1	-721.76467	D14
199	Max	919.097	D24	4129.713	D4	0.178	D18	13.31083	D16	0.00000	D1	690.71494	D31
	Min	-909.879	D31	-3704.505	D31	-21.271	D35	-66.21037	D35	0.00000	D1	-699.29047	D24
200	Max	908.876	D34	4097.455	D5	0.178	D18	13.31269	D16	0.00000	D1	698.87052	D25
	Min	-918.628	D25	-3670.753	D34	-21.270	D35	-66.20852	D35	0.00000	D1	-689.76176	D34
205	Max	916.379	D4	4176.823	D24	11.188	D16	34.78133	D16	0.00000	D1	686.37193	D11
	Min	-905.996	D11	-3685.646	D11	-0.349	D29	-25.20456	D35	0.00000	D1	-696.18519	D4
206	Max	905.012	D14	4144.562	D25	11.187	D16	34.77948	D16	0.00000	D1	695.74611	D5
	Min	-915.892	D5	-3651.991	D14	-0.356	D28	-25.20641	D35	0.00000	D1	-685.44011	D14
217	Max	889.195	D4	4044.384	D4	-0.001	D16	-0.00390	D1	0.00000	D1	662.63727	D31
	Min	-906.780	D23	-3682.628	D31	-456.897	D35	-76.14032	D35	0.00000	D1	-669.42915	D4
218	Max	897.166	D24	4068.210	D24	0.023	D26	0.05476	D26	0.00000	D1	671.35263	D31
	Min	-890.495	D11	-3650.950	D11	-0.011	D23	-0.02495	D23	0.00000	D1	-677.38394	D24
219	Max	1045.569	D4	2551.417	D4	0.007	D4	0.01222	D4	0.00000	D1	444.03612	D31
	Min	-755.703	D31	-5158.763	D31	-0.011	D5	-0.01945	D5	0.00000	D1	-929.77371	D4
220	Max	688.917	D24	2226.549	D24	-0.017	D5	-0.03078	D5	0.00000	D1	990.23099	D11
	Min	-1109.532	D11	-5475.574	D11	-0.025	D4	-0.04598	D4	0.00000	D1	-380.83909	D24
221	Max	907.128	D26	4008.353	D5	0.002	D16	0.00367	D1	0.00000	D1	667.65405	D5
	Min	-887.369	D5	-3652.642	D34	-456.866	D35	-76.12820	D35	0.00000	D1	-663.03897	D34
222	Max	886.931	D14	4043.069	D25	0.011	D23	0.02495	D23	0.00000	D1	679.52179	D25
	Min	-899.258	D25	-3610.093	D14	-0.023	D26	-0.05476	D26	0.00000	D1	-667.84208	D34
223	Max	1110.891	D34	2195.035	D5	0.011	D5	0.01945	D5	0.00000	D1	380.44615	D5
	Min	-688.338	D5	-5449.143	D34	-0.007	D4	-0.01222	D4	0.00000	D1	-991.72192	D34

224	Max	754.254	D14	2511.476	D25	0.025	D4	0.04598	D4	0.00000	D1	926.62826	D25
	Min	-1042.152	D25	-5124.648	D14	0.017	D5	0.03078	D5	0.00000	D1	-442.80014	D14
241	Max	889.193	D24	4046.054	D24	238.646	D20	39.77117	D20	0.00000	D1	660.57166	D11
	Min	-885.894	D11	-3639.631	D11	-0.046	D25	-0.11913	D31	0.00000	D1	-669.42333	D4
242	Max	897.130	D4	4067.387	D4	0.011	D11	0.02484	D11	0.00000	D1	671.34052	D11
	Min	-890.483	D11	-3650.734	D31	-0.023	D14	-0.05465	D14	0.00000	D1	-677.34935	D4
243	Max	1125.038	D24	5906.050	D24	0.011	D33	0.01947	D33	0.00000	D1	370.72238	D31
	Min	-676.239	D31	-1804.099	D11	-0.007	D26	-0.01224	D26	0.00000	D1	-1003.09370	D24
244	Max	768.398	D4	5581.656	D4	0.025	D24	0.04599	D24	0.00000	D1	916.90035	D11
	Min	-1030.049	D11	-2120.425	D31	0.017	D33	0.03077	D33	0.00000	D1	-454.16767	D4
245	Max	886.212	D14	4010.025	D25	238.615	D20	39.75905	D20	0.00000	D1	667.64823	D5
	Min	-887.366	D25	-3609.558	D14	-0.049	D24	-0.12668	D34	0.00000	D1	-660.96904	D14
246	Max	886.918	D14	4042.247	D5	0.023	D14	0.05465	D14	0.00000	D1	679.48729	D5
	Min	-899.222	D5	-3609.877	D34	-0.011	D11	-0.02484	D11	0.00000	D1	-667.82992	D14
247	Max	1031.427	D34	5549.668	D25	0.007	D26	0.01224	D24	0.00000	D1	453.76611	D25
	Min	-767.807	D25	-2094.478	D14	-0.011	D33	-0.01947	D33	0.00000	D1	-918.40817	D34
248	Max	674.771	D14	5866.583	D5	-0.017	D33	-0.03077	D33	0.00000	D1	999.95685	D5
	Min	-1121.633	D5	-1769.499	D34	-0.025	D24	-0.04599	D24	0.00000	D1	-369.46950	D14

Analysis – Displacement Envelope

Reactions

Node		Translation						Rotation					
		X	lc	Y	lc	Z	lc	Rx	lc	Ry	lc	Rz	lc
		[in]		[in]		[in]		[Rad]		[Rad]		[Rad]	
196	Max	0.484	D5	0.004	D11	0.067	D35	0.00013	D35	0.00000	D33	0.01103	D4
	Min	-0.484	D4	-0.012	D28	-0.035	D16	-0.00007	D16	0.00000	D34	-0.01103	D5
202	Max	0.180	D31	0.002	D31	0.068	D35	0.00023	D35	0.00087	D34	0.01288	D14
	Min	-0.180	D26	-0.007	D8	-0.034	D16	-0.00050	D16	-0.00087	D33	-0.01288	D11
208	Max	0.179	D5	0.002	D11	0.065	D35	0.00095	D35	0.00087	D5	0.01289	D26
	Min	-0.179	D4	-0.007	D28	-0.036	D16	-0.00012	D20	-0.00087	D4	-0.01289	D25
229	Max	0.175	D33	0.002	D31	0.005	D35	0.00003	D20	0.00025	D32	0.01276	D4
	Min	-0.176	D32	-0.007	D8	0.000	D1	-0.00026	D35	-0.00023	D23	-0.01275	D5
230	Max	0.177	D25	0.002	D11	0.000	D1	0.00008	D35	0.00008	D23	0.01279	D32
	Min	-0.177	D32	-0.007	D28	0.000	D1	0.00000	D20	-0.00018	D32	-0.01280	D25
231	Max	0.163	D5	0.006	D31	0.000	D1	0.00002	D18	0.00008	D5	0.00582	D4
	Min	-0.138	D4	-0.002	D8	0.000	D1	-0.00001	D35	-0.00005	D4	-0.01477	D5
232	Max	0.138	D25	0.006	D11	0.000	D1	0.00000	D35	0.00019	D4	0.01477	D26
	Min	-0.163	D26	-0.002	D28	0.000	D1	-0.00001	D18	0.00013	D5	-0.00582	D25
253	Max	0.175	D11	0.002	D11	0.000	D1	0.00013	D16	0.00023	D11	0.01276	D32
	Min	-0.176	D14	-0.007	D28	-0.003	D20	-0.00006	D35	-0.00025	D14	-0.01275	D31
254	Max	0.177	D11	0.002	D31	0.000	D1	0.00003	D35	0.00017	D14	0.01279	D14
	Min	-0.177	D14	-0.007	D8	0.000	D1	-0.00002	D16	-0.00008	D11	-0.01280	D11
255	Max	0.163	D23	-0.002	D11	0.000	D1	0.00002	D20	0.00005	D34	0.00582	D24
	Min	-0.138	D24	-0.010	D28	0.000	D1	0.00001	D37	-0.00008	D23	-0.01477	D23
256	Max	0.138	D11	-0.002	D31	0.000	D1	0.00000	D37	-0.00013	D33	0.01477	D14
	Min	-0.163	D14	-0.010	D8	0.000	D1	-0.00001	D20	-0.00019	D32	-0.00582	D11
6	Max	0.538	D5	0.005	D11	0.067	D35	0.00013	D35	0.00000	D23	0.01217	D4
	Min	-0.538	D4	-0.011	D28	-0.035	D16	-0.00007	D16	0.00000	D34	-0.01217	D5
12	Max	0.199	D23	0.003	D31	0.068	D35	0.00023	D35	0.00097	D24	0.01386	D14
	Min	-0.198	D32	-0.006	D8	-0.034	D16	-0.00050	D16	-0.00097	D23	-0.01386	D11
18	Max	0.198	D5	0.003	D11	0.065	D35	0.00095	D35	0.00097	D5	0.01387	D32
	Min	-0.198	D4	-0.006	D28	-0.036	D16	-0.00012	D20	-0.00097	D4	-0.01387	D31
39	Max	0.194	D25	0.003	D31	0.005	D35	0.00003	D20	0.00028	D34	0.01372	D4
	Min	-0.194	D26	-0.006	D8	0.000	D1	-0.00026	D35	-0.00026	D25	-0.01371	D5
40	Max	0.196	D31	0.003	D11	0.000	D1	0.00008	D35	0.00009	D25	0.01376	D32
	Min	-0.195	D32	-0.006	D28	0.000	D1	0.00000	D20	-0.00019	D24	-0.01377	D31
41	Max	0.179	D5	0.006	D31	0.000	D1	0.00002	D18	0.00009	D5	0.00660	D4
	Min	-0.154	D4	-0.001	D8	0.000	D1	-0.00001	D35	-0.00006	D4	-0.01554	D5
42	Max	0.154	D31	0.006	D11	0.000	D1	0.00000	D35	0.00019	D4	0.01554	D26
	Min	-0.179	D26	-0.001	D28	0.000	D1	-0.00001	D18	0.00012	D5	-0.00659	D31

63	Max	0.194	D11	0.003	D11	0.000	D1	0.00013	D16	0.00026	D11	0.01372	D34
	Min	-0.194	D14	-0.006	D28	-0.003	D20	-0.00006	D35	-0.00028	D14	-0.01372	D25
64	Max	0.196	D11	0.003	D31	0.000	D1	0.00003	D35	0.00019	D14	0.01376	D14
	Min	-0.195	D14	-0.006	D8	0.000	D1	-0.00002	D16	-0.00009	D11	-0.01377	D11
65	Max	0.179	D33	-0.002	D11	0.000	D1	0.00002	D20	0.00006	D34	0.00660	D32
	Min	-0.154	D32	-0.009	D28	0.000	D1	0.00001	D37	-0.00009	D23	-0.01554	D33
66	Max	0.154	D11	-0.002	D31	0.000	D1	0.00000	D37	-0.00012	D31	0.01554	D14
	Min	-0.179	D14	-0.009	D8	0.000	D1	-0.00001	D20	-0.00019	D34	-0.00659	D11

Code Check

(ASCE 7-16, ASD)

Steel Code Check - SUMMARY

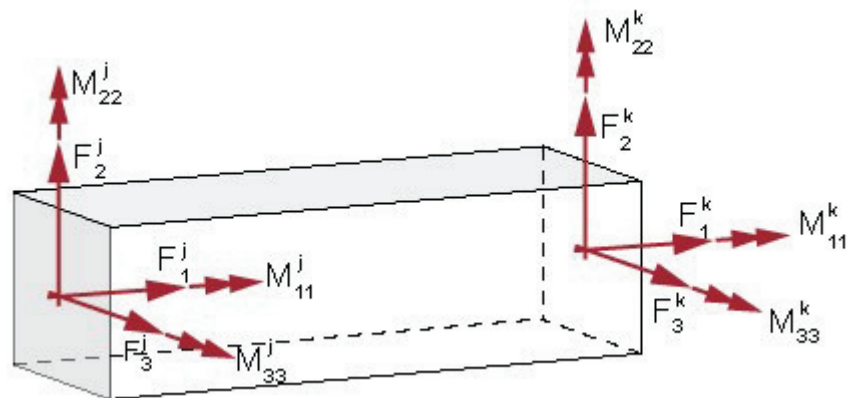
Report: Summary - Group by description

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
ARRAY A-FRAME LEG	A-FRAME TUBE 2.375 X 0....	9	D24 at 100.00%	0.91	OK	
CABLE BRACE	CABLE BRACE - 5/32	80	D35 at 0.00%	0.29	OK	
CROSS BRACE	APA 1 X 1.63 CBRACING	87	D11 at 0.00%	0.63	OK	Eq. H1.2-1
DAMPER A-FRAME LEG	A-FRAME TUBE 2.375 X 0....	39	D24 at 100.00%	0.97	OK	
Damper Cross Tube	A-FRAME TUBE 2.875 X 0....	93	D11 at 72.53%	0.61	OK	
FOUNDATION TUBE	A-Frame Tube 2.375 X 0.109	59	D24 at 100.00%	0.96	OK	
T Post I Beam	W 6X9	96	D24 at 50.00%	0.49	OK	
TOP CEE-BEAM	W 6X9	1	D24 at 0.00%	0.90	OK	

Analysis – Forces At Ends

Forces at member ends

Notes:- F1: Axial forces
F2: Shear force in 2
F3: Shear force in 3
M11: Torsional moment
M22: Bending moments 2
M33: Bending moments 3



Sign convention with positive values

CONDITION: D1=L1

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	254.64875	1.56597	-0.02523	-0.00417	0.01234	3.49248
9	NK: 11	-254.64875	-1.56597	0.02523	0.00417	0.08959	2.83445
80	NJ: 95	0.00000	-0.00001	0.00001	0.00000	-0.00005	-0.00007
80	NK: 80	0.00000	0.00001	-0.00001	0.00000	-0.00006	-0.00010
87	NJ: 22	693.30773	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-693.30773	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1839.67152	110.08799	-0.01999	-0.00356	0.00308	-37.41877
39	NK: 38	-740.03669	-368.81827	0.02036	0.01669	0.05045	708.31855

93	NJ: 87	526.58379	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-879.58379	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2068.94742	-224.95466	-0.00197	0.00000	-0.00041	-49.80077
59	NK: 53	-2068.94742	224.95466	0.00197	0.00000	0.00362	-316.63162
96	NJ: 2	14.27819	229.71692	0.01126	0.00058	0.00000	15.74857
96	NK: 1	-14.38084	230.11187	0.01126	0.00058	0.00000	-15.83028
1	NJ: 67	459.82879	-0.10266	-0.02252	0.00000	0.00117	-0.51071
1	NK: 6	-459.82879	0.10266	0.02252	0.00000	0.11086	0.00000

CONDITION: D2=DL+SL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	1069.54559	6.70385	-0.12272	-0.00854	0.03628	14.92038
9	NK: 11	-1069.54559	-6.70385	0.12272	0.00854	0.45954	12.16503
80	NJ: 95	0.00001	-0.00004	0.00002	0.00000	-0.00013	-0.00034
80	NK: 80	-0.00001	0.00004	-0.00002	0.00000	-0.00020	-0.00044
87	NJ: 22	375.50913	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-375.50913	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1029.75694	125.02381	-0.01999	-0.00356	0.00308	-18.64798
39	NK: 38	-1560.56440	-361.91306	0.02036	0.01669	0.05045	705.36445
93	NJ: 87	502.29971	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-855.29971	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2803.96924	-247.70263	-0.00197	0.00000	-0.00041	-68.57232
59	NK: 53	-2803.96924	247.70263	0.00197	0.00000	0.00362	-334.91462
96	NJ: 2	60.07033	964.44337	0.01126	0.00058	0.00000	66.20608
96	NK: 1	-60.17298	964.83831	0.01126	0.00058	0.00000	-66.28779
1	NJ: 67	1929.28168	-0.10266	-0.02252	0.00000	0.00117	-0.51071
1	NK: 6	-1929.28168	0.10266	0.02252	0.00000	0.11086	0.00000

CONDITION: D3=DL+0.6WLX+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-4206.36103	-625.68828	-1.63872	-0.05030	0.42780	-873.05191
9	NK: 11	4206.36103	625.68828	1.63872	0.05030	6.19309	-1654.90069
80	NJ: 95	-81.73153	0.00234	-0.00554	0.00000	0.07302	0.02940
80	NK: 80	81.73153	-0.00234	0.00554	0.00000	0.03620	0.01665
87	NJ: 22	1040.93698	0.00000	-0.00072	0.00000	0.00128	0.00000
87	NK: 26	-1040.93698	0.00000	0.00072	0.00000	0.00128	0.00000
39	NJ: 22	-6244.14667	-519.15007	-0.01567	-0.00279	0.00241	-900.87132
39	NK: 38	3676.04778	236.52861	0.01597	0.01309	0.03956	-921.81575

93	NJ: 87	553.14923	-0.00020	-921.64405	-0.01682	0.00000	-0.00021
93	NK: 91	-906.14923	0.00020	-2433.35595	0.01682	0.00000	-0.00021
59	NJ: 45	-2171.96233	788.00178	-0.01137	0.00000	-0.00235	814.66116
59	NK: 53	2171.96233	-788.00178	0.01137	0.00000	0.02088	468.92808
96	NJ: 2	920.95916	3888.66417	0.00790	0.00022	0.00000	720.89400
96	NK: 1	992.33609	-5033.89385	0.00790	0.00022	0.00000	799.54292
1	NJ: 67	-1145.22968	1913.29525	-0.01581	0.00000	0.00044	11863.40010
1	NK: 6	1145.22968	-1913.29525	0.01581	0.00000	0.07821	-2344.75625

CONDITION: **D4=DL-0.6WLX+DA**

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	4741.62904	629.08367	-1.69383	-0.15299	0.50356	880.77418
9	NK: 11	-4741.62904	-629.08367	1.69383	0.15299	6.33996	1660.89674
80	NJ: 95	0.00010	-0.00212	0.00556	0.00000	-0.07321	-0.02664
80	NK: 80	-0.00010	0.00212	-0.00556	0.00000	-0.03635	-0.01520
87	NJ: 22	345.67215	0.00000	-0.00112	0.00001	0.00198	0.00000
87	NK: 26	-345.67215	0.00000	0.00112	-0.00001	0.00198	0.00000
39	NJ: 22	2564.81936	739.32630	-0.02431	-0.00433	0.00374	826.03407
39	NK: 38	-5156.13712	-974.16497	0.02476	0.02029	0.06135	2338.45271
93	NJ: 87	500.02128	0.00013	-921.64405	0.01100	0.00000	0.00014
93	NK: 91	-853.02128	-0.00013	-2433.35595	-0.01100	0.00000	0.00014
59	NJ: 45	6309.77134	-1237.90925	0.00744	0.00000	0.00154	-914.26103
59	NK: 53	-6309.77134	1237.90925	-0.00744	0.00000	-0.01365	-1102.18998
96	NJ: 2	-892.28292	-3427.16264	0.00790	0.00022	0.00000	-689.26116
96	NK: 1	-1021.24132	5496.27636	0.00790	0.00022	0.00000	-831.35803
1	NJ: 67	2069.11372	-1913.52423	-0.01581	0.00000	0.00044	-11864.53932
1	NK: 6	-2069.11372	1913.52423	0.01581	0.00000	0.07821	2344.75625

CONDITION: **D5=DL+0.6WLZ+DA**

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-2461.41114	-614.78415	-1.49754	-0.03850	0.38159	-848.94674
9	NK: 11	2461.41114	614.78415	1.49754	0.03850	5.66887	-1634.95018
80	NJ: 95	-66.02579	0.00224	-0.00551	0.00000	0.07285	0.02850
80	NK: 80	66.02579	-0.00224	0.00551	0.00000	0.03586	0.01573
87	NJ: 22	358.64351	0.00000	-0.00072	0.00000	0.00128	0.00000
87	NK: 26	-358.64351	0.00000	0.00072	0.00000	0.00128	0.00000
39	NJ: 22	-4505.31096	-487.08377	-0.01567	-0.00279	0.00241	-860.57154
39	NK: 38	1914.42638	251.35363	0.01596	0.01308	0.03955	-928.15793

93	NJ: 87	501.01247	-0.00020	-921.64405	-0.01682	0.00000	-0.00021
93	NK: 91	-854.01247	0.00020	-2433.35595	0.01682	0.00000	-0.00021
59	NJ: 45	-593.90850	739.16386	-0.01138	0.00000	-0.00235	774.36012
59	NK: 53	593.90850	-739.16386	0.01138	0.00000	0.02088	429.67621
96	NJ: 2	1019.26965	5465.89632	0.00790	0.00022	0.00000	829.21696
96	NK: 1	894.04880	-3456.75094	0.00790	0.00022	0.00000	691.23843
1	NJ: 67	2009.14538	1913.31844	-0.01581	0.00000	0.00044	11863.51550
1	NK: 6	-2009.14538	-1913.31844	0.01581	0.00000	0.07821	-2344.75625

CONDITION: **D6=DL-0.6WLZ+DA**

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	2992.60349	617.95846	-1.83500	-0.16479	0.54976	855.88079
9	NK: 11	-2992.60349	-617.95846	1.83500	0.16479	6.86413	1640.84119
80	NJ: 95	0.00009	-0.00203	0.00554	0.00000	-0.07309	-0.02576
80	NK: 80	-0.00009	0.00203	-0.00554	0.00000	-0.03609	-0.01433
87	NJ: 22	1027.96562	0.00000	-0.00112	0.00001	0.00198	0.00000
87	NK: 26	-1027.96562	0.00000	0.00112	-0.00001	0.00198	0.00000
39	NJ: 22	825.98446	707.26009	-0.02430	-0.00433	0.00374	785.73446
39	NK: 38	-3394.51653	-988.99008	0.02476	0.02029	0.06135	2344.79507
93	NJ: 87	552.15803	0.00013	-921.64405	0.01099	0.00000	0.00014
93	NK: 91	-905.15803	-0.00013	-2433.35595	-0.01099	0.00000	0.00014
59	NJ: 45	4731.71269	-1189.06960	0.00743	0.00000	0.00154	-873.95885
59	NK: 53	-4731.71269	1189.06960	-0.00743	0.00000	-0.01364	-1062.93643
96	NJ: 2	-990.57021	-5004.30555	0.00790	0.00022	0.00000	-797.56565
96	NK: 1	-922.93083	3919.04421	0.00790	0.00022	0.00000	-723.03507
1	NJ: 67	-1085.26135	-1913.50104	-0.01581	0.00000	0.00044	-11864.42392
1	NK: 6	1085.26135	1913.50104	0.01581	0.00000	0.07821	2344.75625

CONDITION: **D7=DL+0.45WLX+0.75SL+DA**

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-2481.70421	-465.07014	-1.17240	-0.03338	0.30307	-645.51069
9	NK: 11	2481.70421	465.07014	1.17240	0.03338	4.43376	-1233.50048
80	NJ: 95	-55.24599	0.00172	-0.00414	0.00000	0.05469	0.02171
80	NK: 80	55.24599	-0.00172	0.00414	0.00000	0.02702	0.01213
87	NJ: 22	715.68097	0.00000	-0.00077	0.00000	0.00136	0.00000
87	NK: 26	-715.68097	0.00000	0.00077	0.00000	0.00136	0.00000
39	NJ: 22	-4535.59245	-350.63869	-0.01675	-0.00298	0.00258	-670.93007
39	NK: 38	1956.63141	90.37078	0.01706	0.01399	0.04228	-516.49771

93	NJ: 87	528.29469	-0.00016	-921.64405	-0.01334	0.00000	-0.00016
93	NK: 91	-881.29469	0.00016	-2433.35595	0.01334	0.00000	-0.00016
59	NJ: 45	-560.46584	517.70192	-0.00902	0.00000	-0.00186	584.46714
59	NK: 53	560.46584	-517.70192	0.00902	0.00000	0.01656	258.82614
96	NJ: 2	728.63208	3524.90258	0.00790	0.00022	0.00000	582.44838
96	NK: 1	706.32263	-3166.95160	0.00790	0.00022	0.00000	557.86601
1	NJ: 67	357.95098	1434.95471	-0.01581	0.00000	0.00044	8897.46689
1	NK: 6	-357.95098	-1434.95471	0.01581	0.00000	0.07821	-1758.56719

CONDITION: **D8=DL-0.45WLX+0.75SL+DA**

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	4230.86027	476.09415	-1.21359	-0.11039	0.35986	670.16308
9	NK: 11	-4230.86027	-476.09415	1.21359	0.11039	4.54337	1253.38812
80	NJ: 95	0.00008	-0.00163	0.00418	0.00000	-0.05496	-0.02031
80	NK: 80	-0.00008	0.00163	-0.00418	0.00000	-0.02737	-0.01174
87	NJ: 22	194.23235	0.00000	-0.00107	0.00001	0.00189	0.00000
87	NK: 26	-194.23235	0.00000	0.00107	-0.00001	0.00189	0.00000
39	NJ: 22	2071.13175	593.21856	-0.02323	-0.00414	0.00358	624.24890
39	NK: 38	-4667.50696	-817.64938	0.02366	0.01939	0.05863	1928.70356
93	NJ: 87	488.44872	0.00009	-921.64405	0.00752	0.00000	0.00009
93	NK: 91	-841.44872	-0.00009	-2433.35595	-0.00752	0.00000	0.00009
59	NJ: 45	5800.83628	-1001.73202	0.00509	0.00000	0.00105	-712.22494
59	NK: 53	-5800.83628	1001.73202	-0.00509	0.00000	-0.00934	-919.51305
96	NJ: 2	-631.30843	-1962.00205	0.00790	0.00022	0.00000	-475.17512
96	NK: 1	-803.86937	4730.71039	0.00790	0.00022	0.00000	-665.31682
1	NJ: 67	2768.70834	-1435.17779	-0.01581	0.00000	0.00044	-8898.57671
1	NK: 6	-2768.70834	1435.17779	0.01581	0.00000	0.07821	1758.56719

CONDITION: **D9=DL+0.45WLZ+0.75SL+DA**

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-1172.99179	-456.89204	-1.06652	-0.02453	0.26842	-627.43181
9	NK: 11	1172.99179	456.89204	1.06652	0.02453	4.04060	-1218.53759
80	NJ: 95	-43.46668	0.00165	-0.00412	0.00000	0.05456	0.02104
80	NK: 80	43.46668	-0.00165	0.00412	0.00000	0.02676	0.01145
87	NJ: 22	203.96087	0.00000	-0.00077	0.00000	0.00136	0.00000
87	NK: 26	-203.96087	0.00000	0.00077	0.00000	0.00136	0.00000
39	NJ: 22	-3231.46567	-326.58896	-0.01675	-0.00298	0.00258	-640.70523
39	NK: 38	635.41536	101.48954	0.01706	0.01399	0.04228	-521.25435

93	NJ: 87	489.19212	-0.00016	-921.64405	-0.01335	0.00000	-0.00016
93	NK: 91	-842.19212	0.00016	-2433.35595	0.01335	0.00000	-0.00016
59	NJ: 45	623.07453	481.07347	-0.00903	0.00000	-0.00186	554.24136
59	NK: 53	-623.07453	-481.07347	0.00903	0.00000	0.01657	229.38724
96	NJ: 2	802.36495	4707.82670	0.00790	0.00022	0.00000	663.69059
96	NK: 1	632.60716	-1984.09442	0.00790	0.00022	0.00000	476.63764
1	NJ: 67	2723.73228	1434.97211	-0.01581	0.00000	0.00044	8897.55344
1	NK: 6	-2723.73228	-1434.97211	0.01581	0.00000	0.07821	-1758.56719

CONDITION: D10=DL-0.45WLZ+0.75SL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	2919.09111	467.75024	-1.31947	-0.11924	0.39451	651.49304
9	NK: 11	-2919.09111	-467.75024	1.31947	0.11924	4.93649	1238.34646
80	NJ: 95	0.00007	-0.00156	0.00416	0.00000	-0.05487	-0.01966
80	NK: 80	-0.00007	0.00156	-0.00416	0.00000	-0.02717	-0.01108
87	NJ: 22	705.95246	0.00000	-0.00107	0.00001	0.00189	0.00000
87	NK: 26	-705.95246	0.00000	0.00107	-0.00001	0.00189	0.00000
39	NJ: 22	767.00558	569.16890	-0.02323	-0.00414	0.00358	594.02420
39	NK: 38	-3346.29152	-828.76820	0.02366	0.01939	0.05862	1933.46033
93	NJ: 87	527.55129	0.00009	-921.64405	0.00752	0.00000	0.00009
93	NK: 91	-880.55129	-0.00009	-2433.35595	-0.00752	0.00000	0.00009
59	NJ: 45	4617.29229	-965.10228	0.00508	0.00000	0.00105	-681.99830
59	NK: 53	-4617.29229	965.10228	-0.00508	0.00000	-0.00933	-890.07289
96	NJ: 2	-705.02390	-3144.85923	0.00790	0.00022	0.00000	-556.40349
96	NK: 1	-730.13650	3547.78627	0.00790	0.00022	0.00000	-584.07460
1	NJ: 67	402.92704	-1435.16040	-0.01581	0.00000	0.00044	-8898.49016
1	NK: 6	-402.92704	1435.16040	0.01581	0.00000	0.07821	1758.56719

CONDITION: D11=0.6DL+0.6WLX+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-4308.09449	-626.32401	-1.64695	-0.05099	0.43049	-874.45728
9	NK: 11	4308.09449	626.32401	1.64695	0.05099	6.22365	-1656.06384
80	NJ: 95	-82.64720	0.00234	-0.00554	0.00000	0.07304	0.02945
80	NK: 80	82.64720	-0.00234	0.00554	0.00000	0.03622	0.01670
87	NJ: 22	1080.71581	0.00000	-0.00072	0.00000	0.00128	0.00000
87	NK: 26	-1080.71581	0.00000	0.00072	0.00000	0.00128	0.00000
39	NJ: 22	-6345.52365	-521.01959	-0.01567	-0.00279	0.00241	-903.22087
39	NK: 38	3778.75321	235.66429	0.01597	0.01309	0.03956	-921.44599

93	NJ: 87	556.18889	-0.00020	-921.64405	-0.01682	0.00000	-0.00021
93	NK: 91	-909.18889	0.00020	-2433.35595	0.01682	0.00000	-0.00021
59	NJ: 45	-2263.96547	790.84912	-0.01137	0.00000	-0.00235	817.01078
59	NK: 53	2263.96547	-790.84912	0.01137	0.00000	0.02088	471.21653
96	NJ: 2	915.22749	3796.70893	0.00790	0.00022	0.00000	714.57860
96	NK: 1	998.06640	-5125.84388	0.00790	0.00022	0.00000	805.85725
1	NJ: 67	-1329.13495	1913.29389	-0.01581	0.00000	0.00044	11863.39337
1	NK: 6	1329.13495	-1913.29389	0.01581	0.00000	0.07821	-2344.75625

CONDITION: D12=0.6DL-0.6WLX+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	4639.65797	628.43506	-1.70206	-0.15368	0.50625	879.32286
9	NK: 11	-4639.65797	-628.43506	1.70206	0.15368	6.37052	1659.72747
80	NJ: 95	0.00010	-0.00212	0.00555	0.00000	-0.07320	-0.02658
80	NK: 80	-0.00010	0.00212	-0.00555	0.00000	-0.03634	-0.01515
87	NJ: 22	385.45098	0.00000	-0.00112	0.00001	0.00198	0.00000
87	NK: 26	-385.45098	0.00000	0.00112	-0.00001	0.00198	0.00000
39	NJ: 22	2463.44242	737.45679	-0.02431	-0.00433	0.00374	823.68453
39	NK: 38	-5053.43174	-975.02930	0.02476	0.02029	0.06135	2338.82248
93	NJ: 87	503.06094	0.00013	-921.64405	0.01099	0.00000	0.00014
93	NK: 91	-856.06094	-0.00013	-2433.35595	-0.01099	0.00000	0.00014
59	NJ: 45	6217.76792	-1235.06181	0.00744	0.00000	0.00154	-911.91134
59	NK: 53	-6217.76792	1235.06181	-0.00744	0.00000	-0.01365	-1099.90143
96	NJ: 2	-898.01323	-3519.11267	0.00790	0.00022	0.00000	-695.57549
96	NK: 1	-1015.50965	5404.32113	0.00790	0.00022	0.00000	-825.04262
1	NJ: 67	1885.20846	-1913.52288	-0.01581	0.00000	0.00044	-11864.53259
1	NK: 6	-1885.20846	1913.52288	0.01581	0.00000	0.07821	2344.75625

CONDITION: D13=0.6DL+0.6WLZ+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-2563.14459	-615.41988	-1.50577	-0.03919	0.38428	-850.35211
9	NK: 11	2563.14459	615.41988	1.50577	0.03919	5.69944	-1636.11332
80	NJ: 95	-66.94146	0.00225	-0.00551	0.00000	0.07286	0.02856
80	NK: 80	66.94146	-0.00225	0.00551	0.00000	0.03588	0.01578
87	NJ: 22	398.42234	0.00000	-0.00072	0.00000	0.00128	0.00000
87	NK: 26	-398.42234	0.00000	0.00072	0.00000	0.00128	0.00000
39	NJ: 22	-4606.68795	-488.95329	-0.01567	-0.00279	0.00241	-862.92108
39	NK: 38	2017.13181	250.48931	0.01596	0.01308	0.03955	-927.78817

93	NJ: 87	504.05213	-0.00020	-921.64405	-0.01682	0.00000	-0.00021
93	NK: 91	-857.05213	0.00020	-2433.35595	0.01682	0.00000	-0.00021
59	NJ: 45	-685.91164	742.01119	-0.01138	0.00000	-0.00235	776.70974
59	NK: 53	685.91164	-742.01119	0.01138	0.00000	0.02088	431.96466
96	NJ: 2	1013.53798	5373.94109	0.00790	0.00022	0.00000	822.90155
96	NK: 1	899.77911	-3548.70097	0.00790	0.00022	0.00000	697.55276
1	NJ: 67	1825.24012	1913.31709	-0.01581	0.00000	0.00044	11863.50877
1	NK: 6	-1825.24012	-1913.31709	0.01581	0.00000	0.07821	-2344.75625

CONDITION: D14=0.6DL-0.6WLZ+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	2890.63242	617.30984	-1.84323	-0.16547	0.55245	854.42946
9	NK: 11	-2890.63242	-617.30984	1.84323	0.16547	6.89469	1639.67192
80	NJ: 95	0.00009	-0.00203	0.00554	0.00000	-0.07308	-0.02571
80	NK: 80	-0.00009	0.00203	-0.00554	0.00000	-0.03608	-0.01428
87	NJ: 22	1067.74445	0.00000	-0.00112	0.00001	0.00198	0.00000
87	NK: 26	-1067.74445	0.00000	0.00112	-0.00001	0.00198	0.00000
39	NJ: 22	724.60752	705.39057	-0.02430	-0.00433	0.00374	783.38493
39	NK: 38	-3291.81114	-989.85441	0.02476	0.02029	0.06135	2345.16484
93	NJ: 87	555.19769	0.00013	-921.64405	0.01099	0.00000	0.00014
93	NK: 91	-908.19769	-0.00013	-2433.35595	-0.01099	0.00000	0.00014
59	NJ: 45	4639.70927	-1186.22216	0.00743	0.00000	0.00154	-871.60917
59	NK: 53	-4639.70927	1186.22216	-0.00743	0.00000	-0.01364	-1060.64789
96	NJ: 2	-996.30052	-5096.25559	0.00790	0.00022	0.00000	-803.87998
96	NK: 1	-917.19917	3827.08897	0.00790	0.00022	0.00000	-716.71967
1	NJ: 67	-1269.16661	-1913.49969	-0.01581	0.00000	0.00044	-11864.41719
1	NK: 6	1269.16661	1913.49969	0.01581	0.00000	0.07821	2344.75625

CONDITION: D15=DL+0.7EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	255.36758	1.57050	-11.15261	-6.43697	15.25960	3.50256
9	NK: 11	-255.36758	-1.57050	11.15261	6.43697	29.80001	2.84268
80	NJ: 95	-250.92994	0.00101	0.00000	0.00000	-0.00013	0.01336
80	NK: 80	250.92994	-0.00101	0.00000	0.00000	0.00008	0.00660
87	NJ: 22	693.27920	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-693.27920	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1839.59882	110.08933	-0.01999	-0.00356	0.00308	-37.41708
39	NK: 38	-740.11035	-368.81765	0.02036	0.01669	0.05045	708.31829

93	NJ: 87	526.58060	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-879.58060	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2069.04412	-224.95765	-0.00197	0.00000	-0.00041	-49.80324
59	NK: 53	-2069.04412	224.95765	0.00197	0.00000	0.00362	-316.63403
96	NJ: 2	14.50236	233.31394	12.88273	1.17775	0.00000	15.99559
96	NK: 1	-14.60504	233.70898	12.88273	1.17775	0.00000	-16.07732
1	NJ: 67	467.02292	-0.10268	-25.76547	0.00000	2.35550	-0.51082
1	NK: 6	-467.02292	0.10268	25.76547	0.00000	125.82770	0.00000

CONDITION: D16=DL-0.7EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	335.27247	2.07448	-0.08858	5.75545	-12.12563	4.62381
9	NK: 11	-335.27247	-2.07448	0.08858	-5.75545	12.48353	3.75765
80	NJ: 95	0.00031	-0.00025	0.00004	0.00000	-0.00035	-0.00363
80	NK: 80	-0.00031	0.00025	-0.00004	0.00000	-0.00043	-0.00128
87	NJ: 22	693.31468	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-693.31468	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1839.68924	110.08766	-0.01999	-0.00356	0.00308	-37.41918
39	NK: 38	-740.01875	-368.81842	0.02036	0.01669	0.05045	708.31862
93	NJ: 87	526.59692	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-879.59692	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2068.55024	-224.94237	-0.00197	0.00000	-0.00041	-49.79063
59	NK: 53	-2068.55024	224.94237	0.00197	0.00000	0.00362	-316.62174
96	NJ: 2	14.50234	233.31362	-12.86686	-1.17730	0.00000	15.99557
96	NK: 1	-14.60502	233.70865	-12.86686	-1.17730	0.00000	-16.07729
1	NJ: 67	467.02228	-0.10268	25.73371	0.00000	-2.35459	-0.51082
1	NK: 6	-467.02228	0.10268	-25.73371	0.00000	-125.67062	0.00000

CONDITION: D17=DL+0.75SL+0.525EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	866.39126	5.42297	-8.66132	-4.95505	11.75799	12.07139
9	NK: 11	-866.39126	-5.42297	8.66132	4.95505	23.23611	9.83890
80	NJ: 95	-187.48842	0.00074	0.00001	0.00000	-0.00016	0.00983
80	NK: 80	187.48842	-0.00074	-0.00001	0.00000	-0.00005	0.00468
87	NJ: 22	454.93733	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-454.93733	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1232.18092	121.29086	-0.01999	-0.00356	0.00308	-23.33941
39	NK: 38	-1355.48785	-363.63889	0.02036	0.01669	0.05045	706.10278

93	NJ: 87	508.36828	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-861.36828	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2620.28790	-242.01793	-0.00197	0.00000	-0.00041	-63.88133
59	NK: 53	-2620.28790	242.01793	0.00197	0.00000	0.00362	-330.34571
96	NJ: 2	48.78979	783.44929	9.87582	0.90624	0.00000	53.77627
96	NK: 1	-48.89246	783.84432	9.87582	0.90624	0.00000	-53.85799
1	NJ: 67	1567.29362	-0.10268	-19.75164	0.00000	1.81248	-0.51082
1	NK: 6	-1567.29362	0.10268	19.75164	0.00000	96.45191	0.00000

CONDITION: D18=DL+0.75SL-0.525EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	926.02625	5.79915	0.10535	4.43818	-9.37666	12.90839
9	NK: 11	-926.02625	-5.79915	-0.10535	-4.43818	8.95104	10.52179
80	NJ: 95	0.00024	-0.00022	0.00004	0.00000	-0.00033	-0.00301
80	NK: 80	-0.00024	0.00022	-0.00004	0.00000	-0.00045	-0.00126
87	NJ: 22	454.96411	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-454.96411	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1232.24916	121.28960	-0.01999	-0.00356	0.00308	-23.34099
39	NK: 38	-1355.41871	-363.63948	0.02036	0.01669	0.05045	706.10303
93	NJ: 87	508.38060	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-861.38060	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2619.91516	-242.00639	-0.00197	0.00000	-0.00041	-63.87181
59	NK: 53	-2619.91516	242.00639	0.00197	0.00000	0.00362	-330.33644
96	NJ: 2	48.78977	783.44897	-9.85994	-0.90579	0.00000	53.77624
96	NK: 1	-48.89244	783.84400	-9.85994	-0.90579	0.00000	-53.85797
1	NJ: 67	1567.29297	-0.10268	19.71988	0.00000	-1.81157	-0.51082
1	NK: 6	-1567.29297	0.10268	-19.71988	0.00000	-96.29483	0.00000

CONDITION: D19=0.6DL+0.7EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	153.36222	0.92736	-11.10742	-6.41776	15.21226	2.07206
9	NK: 11	-153.36222	-0.92736	11.10742	6.41776	29.66476	1.67471
80	NJ: 95	-251.03807	0.00102	0.00000	0.00000	-0.00012	0.01338
80	NK: 80	251.03807	-0.00102	0.00000	0.00000	0.00010	0.00664
87	NJ: 22	733.05808	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-733.05808	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1940.97590	108.21981	-0.01999	-0.00356	0.00308	-39.76663
39	NK: 38	-637.40482	-369.68198	0.02036	0.01669	0.05045	708.68805

93	NJ: 87	529.62025	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-882.62025	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	1977.04114	-222.11028	-0.00197	0.00000	-0.00041	-47.45360
59	NK: 53	-1977.04114	222.11028	0.00197	0.00000	0.00362	-314.34554
96	NJ: 2	8.77065	141.34974	12.85073	1.17429	0.00000	9.67993
96	NK: 1	-8.87333	141.74477	12.85073	1.17429	0.00000	-9.76165
1	NJ: 67	283.09450	-0.10268	-25.70145	0.00000	2.34858	-0.51082
1	NK: 6	-283.09450	0.10268	25.70145	0.00000	125.51615	0.00000

CONDITION: D20=0.6DL-0.7EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	233.31150	1.43162	-0.11420	5.73705	-12.08294	3.19394
9	NK: 11	-233.31150	-1.43162	0.11420	-5.73705	12.54432	2.59019
80	NJ: 95	0.00031	-0.00024	0.00004	0.00000	-0.00034	-0.00359
80	NK: 80	-0.00031	0.00024	-0.00004	0.00000	-0.00041	-0.00123
87	NJ: 22	733.09354	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-733.09354	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1941.06626	108.21815	-0.01999	-0.00356	0.00308	-39.76872
39	NK: 38	-637.31329	-369.68275	0.02036	0.01669	0.05045	708.68838
93	NJ: 87	529.63655	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-882.63655	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	1976.54763	-222.09501	-0.00197	0.00000	-0.00041	-47.44099
59	NK: 53	-1976.54763	222.09501	0.00197	0.00000	0.00362	-314.33326
96	NJ: 2	8.77063	141.34941	-12.83485	-1.17384	0.00000	9.67991
96	NK: 1	-8.87331	141.74445	-12.83485	-1.17384	0.00000	-9.76163
1	NJ: 67	283.09386	-0.10268	25.66970	0.00000	-2.34768	-0.51082
1	NK: 6	-283.09386	0.10268	-25.66970	0.00000	-125.35907	0.00000

CONDITION: D21=DL+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	255.30693	1.57011	-10.20561	-5.88942	13.96180	3.50171
9	NK: 11	-255.30693	-1.57011	10.20561	5.88942	27.27168	2.84198
80	NJ: 95	-229.40071	0.00092	0.00000	0.00000	-0.00012	0.01221
80	NK: 80	229.40071	-0.00092	0.00000	0.00000	0.00007	0.00603
87	NJ: 22	693.28165	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-693.28165	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1839.60505	110.08921	-0.01999	-0.00356	0.00308	-37.41723
39	NK: 38	-740.10404	-368.81771	0.02036	0.01669	0.05045	708.31831

93	NJ: 87	526.58087	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-879.58087	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2069.03588	-224.95740	-0.00197	0.00000	-0.00041	-49.80303
59	NK: 53	-2069.03588	224.95740	0.00197	0.00000	0.00362	-316.63382
96	NJ: 2	14.48313	233.00531	11.78604	1.07756	0.00000	15.97440
96	NK: 1	-14.58581	233.40034	11.78604	1.07756	0.00000	-16.05612
1	NJ: 67	466.40564	-0.10268	-23.57208	0.00000	2.15512	-0.51082
1	NK: 6	-466.40564	0.10268	23.57208	0.00000	115.11596	0.00000

CONDITION: D22=DL+SL+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	1070.24105	6.70824	-10.56666	-6.04289	14.33999	14.93013
9	NK: 11	-1070.24105	-6.70824	10.56666	6.04289	28.35224	12.17299
80	NJ: 95	-228.53681	0.00090	0.00001	0.00000	-0.00019	0.01198
80	NK: 80	228.53681	-0.00090	-0.00001	0.00000	-0.00006	0.00570
87	NJ: 22	375.48298	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-375.48298	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1029.69030	125.02504	-0.01999	-0.00356	0.00308	-18.64643
39	NK: 38	-1560.63191	-361.91249	0.02036	0.01669	0.05045	705.36421
93	NJ: 87	502.29672	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-855.29672	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2804.05962	-247.70542	-0.00197	0.00000	-0.00041	-68.57463
59	NK: 53	-2804.05962	247.70542	0.00197	0.00000	0.00362	-334.91686
96	NJ: 2	60.27450	967.71936	12.04174	1.10517	0.00000	66.43106
96	NK: 1	-60.37717	968.11440	12.04174	1.10517	0.00000	-66.51278
1	NJ: 67	1935.83376	-0.10268	-24.08349	0.00000	2.21035	-0.51082
1	NK: 6	-1935.83376	0.10268	24.08349	0.00000	117.60500	0.00000

CONDITION: D23=DL+0.6WLX+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-4229.66321	-626.35085	-9.71077	-5.66410	13.48652	-875.29507
9	NK: 11	4229.66321	626.35085	9.71077	5.66410	25.74765	-1655.33450
80	NJ: 95	-313.50392	0.00315	-0.00556	0.00000	0.07315	0.04009
80	NK: 80	313.50392	-0.00315	0.00556	0.00000	0.03655	0.02198
87	NJ: 22	1040.91448	0.00000	-0.00072	0.00000	0.00128	0.00000
87	NK: 26	-1040.91448	0.00000	0.00072	0.00000	0.00128	0.00000
39	NJ: 22	-6244.09130	-519.14923	-0.01568	-0.00279	0.00241	-900.87044
39	NK: 38	3675.99166	236.52932	0.01597	0.01309	0.03957	-921.81639

93	NJ: 87	553.14476	-0.00020	-921.64405	-0.01684	0.00000	-0.00021
93	NK: 91	-906.14476	0.00020	-2433.35595	0.01684	0.00000	-0.00021
59	NJ: 45	-2171.83844	788.00168	-0.01139	0.00000	-0.00235	814.66039
59	NK: 53	2171.83844	-788.00168	0.01139	0.00000	0.02090	468.92867
96	NJ: 2	921.09087	3890.79049	11.50572	1.04737	0.00000	721.03946
96	NK: 1	992.20224	-5031.75927	11.50693	1.04733	0.00000	799.39576
1	NJ: 67	-1140.96878	1913.29310	-23.01266	-0.00181	2.09470	11863.38943
1	NK: 6	1140.96878	-1913.29310	23.01266	0.00181	112.39326	-2344.75625

CONDITION: D24=DL-0.6WLX+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	4740.27706	629.49108	-10.70046	-6.11474	14.43707	882.29848
9	NK: 11	-4740.27706	-629.49108	10.70046	6.11474	28.79571	1661.01847
80	NJ: 95	-145.29750	-0.00130	0.00557	0.00000	-0.07339	-0.01568
80	NK: 80	145.29750	0.00130	-0.00557	0.00000	-0.03642	-0.00993
87	NJ: 22	345.64882	0.00000	-0.00112	0.00001	0.00198	0.00000
87	NK: 26	-345.64882	0.00000	0.00112	-0.00001	0.00198	0.00000
39	NJ: 22	2564.88121	739.32766	-0.02430	-0.00433	0.00374	826.03598
39	NK: 38	-5156.19975	-974.16473	0.02475	0.02029	0.06133	2338.45301
93	NJ: 87	500.01699	0.00013	-921.64405	0.01101	0.00000	0.00014
93	NK: 91	-853.01699	-0.00013	-2433.35595	-0.01101	0.00000	0.00014
59	NJ: 45	6309.91019	-1237.91647	0.00745	0.00000	0.00154	-914.26645
59	NK: 53	-6309.91019	1237.91647	-0.00745	0.00000	-0.01367	-1102.19632
96	NJ: 2	-892.12461	-3424.77988	12.06635	1.10775	0.00000	-689.09067
96	NK: 1	-1021.37385	5498.55995	12.06514	1.10778	0.00000	-831.50800
1	NJ: 67	2073.78007	-1913.49846	-24.13150	0.00181	2.21553	-11864.41107
1	NK: 6	-2073.78007	1913.49846	24.13150	-0.00181	117.83866	2344.75625

CONDITION: D25=DL+0.6WLZ+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-2480.04954	-615.31962	-10.48593	-5.99360	14.29849	-850.75895
9	NK: 11	2480.04954	615.31962	10.48593	5.99360	28.06754	-1635.30141
80	NJ: 95	-311.64918	0.00309	-0.00554	0.00000	0.07301	0.03961
80	NK: 80	311.64918	-0.00309	0.00554	0.00000	0.03627	0.02127
87	NJ: 22	358.62019	0.00000	-0.00072	0.00000	0.00128	0.00000
87	NK: 26	-358.62019	0.00000	0.00072	0.00000	0.00128	0.00000
39	NJ: 22	-4505.25392	-487.08293	-0.01568	-0.00279	0.00241	-860.57069
39	NK: 38	1914.36857	251.35439	0.01597	0.01309	0.03957	-928.15867

93	NJ: 87	501.00818	-0.00020	-921.64405	-0.01684	0.00000	-0.00021
93	NK: 91	-854.00818	0.00020	-2433.35595	0.01684	0.00000	-0.00021
59	NJ: 45	-593.78745	739.16305	-0.01139	0.00000	-0.00235	774.35892
59	NK: 53	593.78745	-739.16305	0.01139	0.00000	0.02090	429.67610
96	NJ: 2	1019.40213	5468.17659	12.05471	1.10666	0.00000	829.36682
96	NK: 1	893.89097	-3454.37317	12.05592	1.10662	0.00000	691.06840
1	NJ: 67	2013.80341	1913.29310	-24.11062	-0.00181	2.21328	11863.38943
1	NK: 6	-2013.80341	-1913.29310	24.11062	0.00181	117.73707	-2344.75625

CONDITION: D26=DL-0.6WLZ+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	2990.66339	618.45985	-9.92529	-5.78524	13.62510	857.76237
9	NK: 11	-2990.66339	-618.45985	9.92529	5.78524	26.47581	1640.98537
80	NJ: 95	-147.15224	-0.00124	0.00555	0.00000	-0.07325	-0.01520
80	NK: 80	147.15224	0.00124	-0.00555	0.00000	-0.03613	-0.00922
87	NJ: 22	1027.94310	0.00000	-0.00112	0.00001	0.00198	0.00000
87	NK: 26	-1027.94310	0.00000	0.00112	-0.00001	0.00198	0.00000
39	NJ: 22	826.04383	707.26136	-0.02430	-0.00433	0.00374	785.73623
39	NK: 38	-3394.57665	-988.98981	0.02475	0.02029	0.06133	2344.79529
93	NJ: 87	552.15357	0.00013	-921.64405	0.01101	0.00000	0.00014
93	NK: 91	-905.15357	-0.00013	-2433.35595	-0.01101	0.00000	0.00014
59	NJ: 45	4731.85921	-1189.07784	0.00745	0.00000	0.00154	-873.96498
59	NK: 53	-4731.85921	1189.07784	-0.00745	0.00000	-0.01367	-1062.94374
96	NJ: 2	-990.43588	-5002.16598	11.51737	1.04846	0.00000	-797.41803
96	NK: 1	-923.06258	3921.17385	11.51616	1.04849	0.00000	-723.18064
1	NJ: 67	-1080.99213	-1913.49846	-23.03353	0.00181	2.09696	-11864.41107
1	NK: 6	1080.99213	1913.49846	23.03353	-0.00181	112.49486	2344.75625

CONDITION: D27=DL+0.45WLX+0.75SL+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-2497.22008	-465.51702	-10.10527	-5.83553	13.88899	-647.02456
9	NK: 11	2497.22008	465.51702	10.10527	5.83553	26.93907	-1233.79213
80	NJ: 95	-291.83019	0.00257	-0.00416	0.00000	0.05478	0.03295
80	NK: 80	291.83019	-0.00257	0.00416	0.00000	0.02733	0.01775
87	NJ: 22	715.65727	0.00000	-0.00077	0.00000	0.00136	0.00000
87	NK: 26	-715.65727	0.00000	0.00077	0.00000	0.00136	0.00000
39	NJ: 22	-4535.53367	-350.63775	-0.01676	-0.00299	0.00258	-670.92904
39	NK: 38	1956.57184	90.37147	0.01707	0.01399	0.04229	-516.49829

93	NJ: 87	528.29067	-0.00016	-921.64405	-0.01336	0.00000	-0.00016
93	NK: 91	-881.29067	0.00016	-2433.35595	0.01336	0.00000	-0.00016
59	NJ: 45	-560.35205	517.70089	-0.00903	0.00000	-0.00187	584.46584
59	NK: 53	560.35205	-517.70089	0.00903	0.00000	0.01658	258.82577
96	NJ: 2	728.78246	3527.37974	11.76758	1.07563	0.00000	582.61569
96	NK: 1	706.16170	-3164.43383	11.76849	1.07560	0.00000	557.69029
1	NJ: 67	362.94591	1434.94416	-23.53607	-0.00136	2.15123	8897.41437
1	NK: 6	-362.94591	-1434.94416	23.53607	0.00136	114.94072	-1758.56719

CONDITION: D28=DL-0.45WLX+0.75SL+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	4230.23512	476.36443	-10.84753	-6.17351	14.60190	671.17060
9	NK: 11	-4230.23512	-476.36443	10.84753	6.17351	29.22512	1253.47260
80	NJ: 95	-165.67538	-0.00076	0.00418	0.00000	-0.05513	-0.00888
80	NK: 80	165.67538	0.00076	-0.00418	0.00000	-0.02739	-0.00619
87	NJ: 22	194.20802	0.00000	-0.00107	0.00001	0.00189	0.00000
87	NK: 26	-194.20802	0.00000	0.00107	-0.00001	0.00189	0.00000
39	NJ: 22	2071.19571	593.21992	-0.02322	-0.00414	0.00357	624.25077
39	NK: 38	-4667.57173	-817.64906	0.02366	0.01939	0.05861	1928.70376
93	NJ: 87	488.44485	0.00009	-921.64405	0.00753	0.00000	0.00009
93	NK: 91	-841.44485	-0.00009	-2433.35595	-0.00753	0.00000	0.00009
59	NJ: 45	5800.95942	-1001.73772	0.00509	0.00000	0.00105	-712.22929
59	NK: 53	-5800.95942	1001.73772	-0.00509	0.00000	-0.00935	-919.51797
96	NJ: 2	-631.12915	-1959.29804	12.18805	1.12091	0.00000	-474.98191
96	NK: 1	-804.02036	4733.30559	12.18715	1.12094	0.00000	-665.48752
1	NJ: 67	2774.00755	-1435.14951	-24.37520	0.00136	2.24185	-8898.43601
1	NK: 6	-2774.00755	1435.14951	24.37520	-0.00136	119.02477	1758.56719

CONDITION: D29=DL+0.45WLZ+0.75SL+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-1185.00983	-457.24360	-10.68664	-6.08266	14.49796	-628.62247
9	NK: 11	1185.00983	457.24360	10.68664	6.08266	28.67899	-1218.76731
80	NJ: 95	-290.43914	0.00253	-0.00415	0.00000	0.05467	0.03259
80	NK: 80	290.43914	-0.00253	0.00415	0.00000	0.02712	0.01721
87	NJ: 22	203.93655	0.00000	-0.00077	0.00000	0.00136	0.00000
87	NK: 26	-203.93655	0.00000	0.00077	0.00000	0.00136	0.00000
39	NJ: 22	-3231.40564	-326.58803	-0.01676	-0.00299	0.00258	-640.70423
39	NK: 38	635.35451	101.49028	0.01707	0.01399	0.04229	-521.25500

93	NJ: 87	489.18824	-0.00016	-921.64405	-0.01336	0.00000	-0.00016
93	NK: 91	-842.18824	0.00016	-2433.35595	0.01336	0.00000	-0.00016
59	NJ: 45	623.18619	481.07192	-0.00903	0.00000	-0.00187	554.23973
59	NK: 53	-623.18619	-481.07192	0.00903	0.00000	0.01658	229.38634
96	NJ: 2	802.51591	4710.41931	12.17932	1.12009	0.00000	663.86121
96	NK: 1	632.42825	-1981.39425	12.18022	1.12007	0.00000	476.44477
1	NJ: 67	2729.02506	1434.94416	-24.35954	-0.00136	2.24016	8897.41437
1	NK: 6	-2729.02506	-1434.94416	24.35954	0.00136	118.94857	-1758.56719

CONDITION: D30=DL-0.45WLZ+0.75SL+TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	2918.02487	468.09101	-10.26616	-5.92639	13.99293	652.76852
9	NK: 11	-2918.02487	-468.09101	10.26616	5.92639	27.48520	1238.44778
80	NJ: 95	-167.06643	-0.00072	0.00417	0.00000	-0.05502	-0.00852
80	NK: 80	167.06643	0.00072	-0.00417	0.00000	-0.02718	-0.00566
87	NJ: 22	705.92874	0.00000	-0.00107	0.00001	0.00189	0.00000
87	NK: 26	-705.92874	0.00000	0.00107	-0.00001	0.00189	0.00000
39	NJ: 22	767.06767	569.17019	-0.02322	-0.00414	0.00357	594.02596
39	NK: 38	-3346.35440	-828.76787	0.02366	0.01939	0.05861	1933.46047
93	NJ: 87	527.54728	0.00009	-921.64405	0.00753	0.00000	0.00009
93	NK: 91	-880.54728	-0.00009	-2433.35595	-0.00753	0.00000	0.00009
59	NJ: 45	4617.42119	-965.10875	0.00509	0.00000	0.00105	-682.00319
59	NK: 53	-4617.42119	965.10875	-0.00509	0.00000	-0.00935	-890.07854
96	NJ: 2	-704.86260	-3142.33761	11.77631	1.07645	0.00000	-556.22743
96	NK: 1	-730.28691	3550.26602	11.77541	1.07647	0.00000	-584.24200
1	NJ: 67	407.92840	-1435.14951	-23.55172	0.00136	2.15292	-8898.43601
1	NK: 6	-407.92840	1435.14951	23.55172	-0.00136	115.01691	1758.56719

CONDITION: D31=0.6DL+0.6WLX+0.6TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-4331.92737	-626.99562	-5.62504	-3.30867	7.90190	-876.72919
9	NK: 11	4331.92737	626.99562	5.62504	3.30867	14.82482	-1656.50543
80	NJ: 95	-221.75400	0.00278	-0.00556	0.00000	0.07319	0.03522
80	NK: 80	221.75400	-0.00278	0.00556	0.00000	0.03652	0.01957
87	NJ: 22	1080.70378	0.00000	-0.00072	0.00000	0.00128	0.00000
87	NK: 26	-1080.70378	0.00000	0.00072	0.00000	0.00128	0.00000
39	NJ: 22	-6345.49496	-521.01924	-0.01568	-0.00279	0.00241	-903.22059
39	NK: 38	3778.72411	235.66476	0.01597	0.01309	0.03957	-921.44652

93	NJ: 87	556.18557	-0.00020	-921.64405	-0.01684	0.00000	-0.00021
93	NK: 91	-909.18557	0.00020	-2433.35595	0.01684	0.00000	-0.00021
59	NJ: 45	-2263.87656	790.85014	-0.01139	0.00000	-0.00235	817.01093
59	NK: 53	2263.87656	-790.85014	0.01139	0.00000	0.02090	471.21804
96	NJ: 2	915.27708	3797.50943	6.79448	0.61643	0.00000	714.63336
96	NK: 1	998.01602	-5125.04034	6.79569	0.61640	0.00000	805.80186
1	NJ: 67	-1327.53091	1913.29310	-13.59018	-0.00181	1.23284	11863.38943
1	NK: 6	1327.53091	-1913.29310	13.59018	0.00181	66.37829	-2344.75625

CONDITION: D32=0.6DL-0.6WLX+0.6TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	4638.01289	628.84631	-6.61473	-3.75932	8.85245	880.86436
9	NK: 11	-4638.01289	-628.84631	6.61473	3.75932	17.87288	1659.84754
80	NJ: 95	-53.54758	-0.00167	0.00557	0.00000	-0.07336	-0.02056
80	NK: 80	53.54758	0.00167	-0.00557	0.00000	-0.03645	-0.01234
87	NJ: 22	385.43812	0.00000	-0.00112	0.00001	0.00198	0.00000
87	NK: 26	-385.43812	0.00000	0.00112	-0.00001	0.00198	0.00000
39	NJ: 22	2463.47755	737.45765	-0.02430	-0.00433	0.00374	823.68582
39	NK: 38	-5053.46730	-975.02928	0.02475	0.02029	0.06133	2338.82287
93	NJ: 87	503.05780	0.00013	-921.64405	0.01101	0.00000	0.00014
93	NK: 91	-856.05780	-0.00013	-2433.35595	-0.01101	0.00000	0.00014
59	NJ: 45	6217.87207	-1235.06801	0.00745	0.00000	0.00154	-911.91591
59	NK: 53	-6217.87207	1235.06801	-0.00745	0.00000	-0.01367	-1099.90695
96	NJ: 2	-897.93839	-3518.06094	7.35511	0.67682	0.00000	-695.49677
96	NK: 1	-1015.56006	5405.27888	7.35390	0.67685	0.00000	-825.10190
1	NJ: 67	1887.21794	-1913.49846	-14.70902	0.00181	1.35367	-11864.41107
1	NK: 6	-1887.21794	1913.49846	14.70902	-0.00181	71.82369	2344.75625

CONDITION: D33=0.6DL+0.6WLZ+0.6TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	-2582.31370	-615.96439	-6.40020	-3.63817	8.71386	-852.19308
9	NK: 11	2582.31370	615.96439	6.40020	3.63817	17.14471	-1636.47233
80	NJ: 95	-219.89926	0.00272	-0.00554	0.00000	0.07304	0.03473
80	NK: 80	219.89926	-0.00272	0.00554	0.00000	0.03623	0.01887
87	NJ: 22	398.40950	0.00000	-0.00072	0.00000	0.00128	0.00000
87	NK: 26	-398.40950	0.00000	0.00072	0.00000	0.00128	0.00000
39	NJ: 22	-4606.65758	-488.95294	-0.01568	-0.00279	0.00241	-862.92085
39	NK: 38	2017.10102	250.48984	0.01597	0.01309	0.03957	-927.78880

93	NJ: 87	504.04899	-0.00020	-921.64405	-0.01684	0.00000	-0.00021
93	NK: 91	-857.04899	0.00020	-2433.35595	0.01684	0.00000	-0.00021
59	NJ: 45	-685.82558	742.01151	-0.01139	0.00000	-0.00235	776.70946
59	NK: 53	685.82558	-742.01151	0.01139	0.00000	0.02090	431.96546
96	NJ: 2	1013.58835	5374.89552	7.34347	0.67572	0.00000	822.96072
96	NK: 1	899.70475	-3547.65424	7.34468	0.67569	0.00000	697.47450
1	NJ: 67	1827.24129	1913.29310	-14.68814	-0.00181	1.35141	11863.38943
1	NK: 6	-1827.24129	-1913.29310	14.68814	0.00181	71.72210	-2344.75625

CONDITION: D34=0.6DL-0.6WLZ+0.6TL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	2888.39923	617.81508	-5.83957	-3.42982	8.04048	856.32825
9	NK: 11	-2888.39923	-617.81508	5.83957	3.42982	15.55298	1639.81445
80	NJ: 95	-55.40232	-0.00161	0.00555	0.00000	-0.07321	-0.02008
80	NK: 80	55.40232	0.00161	-0.00555	0.00000	-0.03617	-0.01163
87	NJ: 22	1067.73241	0.00000	-0.00112	0.00001	0.00198	0.00000
87	NK: 26	-1067.73241	0.00000	0.00112	-0.00001	0.00198	0.00000
39	NJ: 22	724.64017	705.39135	-0.02430	-0.00433	0.00374	783.38608
39	NK: 38	-3291.84420	-989.85436	0.02475	0.02029	0.06133	2345.16515
93	NJ: 87	555.19438	0.00013	-921.64405	0.01101	0.00000	0.00014
93	NK: 91	-908.19438	-0.00013	-2433.35595	-0.01101	0.00000	0.00014
59	NJ: 45	4639.82109	-1186.22938	0.00745	0.00000	0.00154	-871.61444
59	NK: 53	-4639.82109	1186.22938	-0.00745	0.00000	-0.01367	-1060.65438
96	NJ: 2	-996.24966	-5095.44704	6.80613	0.61753	0.00000	-803.82413
96	NK: 1	-917.24880	3827.89279	6.80492	0.61756	0.00000	-716.77454
1	NJ: 67	-1267.55425	-1913.49846	-13.61105	0.00181	1.23509	-11864.41107
1	NK: 6	1267.55425	1913.49846	13.61105	-0.00181	66.47989	2344.75625

CONDITION: D35=DL+TL+0.7EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	256.01459	1.57458	-21.25394	-12.27750	29.10280	3.51163
9	NK: 11	-256.01459	-1.57458	21.25394	12.27750	56.76896	2.85009
80	NJ: 95	-480.57507	0.00194	0.00000	0.00000	-0.00020	0.02562
80	NK: 80	480.57507	-0.00194	0.00000	0.00000	0.00021	0.01272
87	NJ: 22	693.25314	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-693.25314	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1839.53239	110.09055	-0.01999	-0.00356	0.00308	-37.41555
39	NK: 38	-740.17765	-368.81709	0.02036	0.01669	0.05045	708.31805

93	NJ: 87	526.57770	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-879.57770	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2069.13199	-224.96037	-0.00197	0.00000	-0.00041	-49.80548
59	NK: 53	-2069.13199	224.96037	0.00197	0.00000	0.00362	-316.63621
96	NJ: 2	14.70755	236.60608	24.58082	2.24644	0.00000	16.22168
96	NK: 1	-14.81023	237.00112	24.58082	2.24644	0.00000	-16.30340
1	NJ: 67	473.60720	-0.10268	-49.16163	0.00000	4.49288	-0.51082
1	NK: 6	-473.60720	0.10268	49.16163	0.00000	240.08625	0.00000

CONDITION: D36=DL+TL-0.7EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	261.46828	1.60915	0.05937	0.53464	-1.13682	3.58880
9	NK: 11	-261.46828	-1.60915	-0.05937	-0.53464	0.89697	2.91259
80	NJ: 95	0.00003	-0.00003	0.00001	0.00000	-0.00008	-0.00040
80	NK: 80	-0.00003	0.00003	-0.00001	0.00000	-0.00010	-0.00021
87	NJ: 22	693.30837	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-693.30837	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1839.67315	110.08796	-0.01999	-0.00356	0.00308	-37.41881
39	NK: 38	-740.03505	-368.81829	0.02036	0.01669	0.05045	708.31856
93	NJ: 87	526.58493	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-879.58493	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2068.91311	-224.95360	-0.00197	0.00000	-0.00041	-49.79989
59	NK: 53	-2068.91311	224.95360	0.00197	0.00000	0.00362	-316.63077
96	NJ: 2	14.29716	230.02148	-1.16877	-0.10861	0.00000	15.76948
96	NK: 1	-14.39984	230.41651	-1.16877	-0.10861	0.00000	-15.85121
1	NJ: 67	460.43800	-0.10268	2.33755	0.00000	-0.21721	-0.51082
1	NK: 6	-460.43800	0.10268	-2.33755	0.00000	-11.41208	0.00000

CONDITION: D37=DL+0.75SL+TL+0.525EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	867.03827	5.42705	-18.76265	-10.79558	25.60120	12.08046
9	NK: 11	-867.03827	-5.42705	18.76265	10.79558	50.20505	9.84631
80	NJ: 95	-417.13356	0.00167	0.00001	0.00000	-0.00023	0.02210
80	NK: 80	417.13356	-0.00167	-0.00001	0.00000	0.00007	0.01080
87	NJ: 22	454.91126	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-454.91126	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1232.11449	121.29209	-0.01999	-0.00356	0.00308	-23.33787
39	NK: 38	-1355.55515	-363.63833	0.02036	0.01669	0.05045	706.10254

93	NJ: 87	508.36538	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-861.36538	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2620.37577	-242.02065	-0.00197	0.00000	-0.00041	-63.88357
59	NK: 53	-2620.37577	242.02065	0.00197	0.00000	0.00362	-330.34790
96	NJ: 2	48.99497	786.74143	21.57390	1.97493	0.00000	54.00235
96	NK: 1	-49.09765	787.13646	21.57390	1.97493	0.00000	-54.08408
1	NJ: 67	1573.87790	-0.10268	-43.14780	0.00000	3.94986	-0.51082
1	NK: 6	-1573.87790	0.10268	43.14780	0.00000	210.71045	0.00000

CONDITION: D38=DL+0.75SL+TL-0.525EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	865.97677	5.42036	-2.19015	-1.21346	2.88969	12.06558
9	NK: 11	-865.97677	-5.42036	2.19015	1.21346	5.95914	9.83416
80	NJ: 95	-40.37201	0.00014	0.00001	0.00000	-0.00011	0.00198
80	NK: 80	40.37201	-0.00014	-0.00001	0.00000	-0.00014	0.00075
87	NJ: 22	454.95403	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-454.95403	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1232.22348	121.29008	-0.01999	-0.00356	0.00308	-23.34040
39	NK: 38	-1355.44474	-363.63926	0.02036	0.01669	0.05045	706.10293
93	NJ: 87	508.37014	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-861.37014	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	2620.23160	-242.01619	-0.00197	0.00000	-0.00041	-63.87989
59	NK: 53	-2620.23160	242.01619	0.00197	0.00000	0.00362	-330.34431
96	NJ: 2	48.65834	781.34027	2.38173	0.22161	0.00000	53.63143
96	NK: 1	-48.76102	781.73530	2.38173	0.22161	0.00000	-53.71315
1	NJ: 67	1563.07556	-0.10268	-4.76347	0.00000	0.44322	-0.51082
1	NK: 6	-1563.07556	0.10268	4.76347	0.00000	23.25503	0.00000

CONDITION: D39=0.6DL+0.6TL+0.7EL+DA

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	153.75043	0.92980	-17.16821	-9.92208	23.51818	2.07751
9	NK: 11	-153.75043	-0.92980	17.16821	9.92208	45.84613	1.67916
80	NJ: 95	-388.82516	0.00158	0.00000	0.00000	-0.00016	0.02074
80	NK: 80	388.82516	-0.00158	0.00000	0.00000	0.00017	0.01032
87	NJ: 22	733.04244	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-733.04244	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1940.93604	108.22055	-0.01999	-0.00356	0.00308	-39.76570
39	NK: 38	-637.44520	-369.68164	0.02036	0.01669	0.05045	708.68791

93	NJ: 87	529.61851	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-882.61851	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	1977.09387	-222.11191	-0.00197	0.00000	-0.00041	-47.45494
59	NK: 53	-1977.09387	222.11191	0.00197	0.00000	0.00362	-314.34685
96	NJ: 2	8.89376	143.32502	19.86958	1.81551	0.00000	9.81558
96	NK: 1	-8.99644	143.72005	19.86958	1.81551	0.00000	-9.89731
1	NJ: 67	287.04507	-0.10268	-39.73915	0.00000	3.63101	-0.51082
1	NK: 6	-287.04507	0.10268	39.73915	0.00000	194.07128	0.00000

CONDITION: **D40=0.6DL+0.6TL-0.7EL+DA**

Member	End	F1 [Lb]	F2 [Lb]	F3 [Lb]	M11 [Lb*ft]	M22 [Lb*ft]	M33 [Lb*ft]
9	NJ: 7	189.02899	1.15242	-0.02543	2.60456	-5.48965	2.57293
9	NK: 11	-189.02899	-1.15242	0.02543	-2.60456	5.59239	2.08316
80	NJ: 95	0.00014	-0.00011	0.00002	0.00000	-0.00018	-0.00165
80	NK: 80	-0.00014	0.00011	-0.00002	0.00000	-0.00021	-0.00059
87	NJ: 22	733.08975	0.00000	-0.00092	0.00001	0.00163	0.00000
87	NK: 26	-733.08975	0.00000	0.00092	-0.00001	0.00163	0.00000
39	NJ: 22	-1941.05660	108.21832	-0.01999	-0.00356	0.00308	-39.76850
39	NK: 38	-637.32307	-369.68267	0.02036	0.01669	0.05045	708.68835
93	NJ: 87	529.62936	-0.00004	-921.64405	-0.00291	0.00000	-0.00004
93	NK: 91	-882.62936	0.00004	-2433.35595	0.00291	0.00000	-0.00004
59	NJ: 45	1976.76535	-222.10174	-0.00197	0.00000	-0.00041	-47.44655
59	NK: 53	-1976.76535	222.10174	0.00197	0.00000	0.00362	-314.33868
96	NJ: 2	8.64752	139.37413	-5.81600	-0.53263	0.00000	9.54425
96	NK: 1	-8.75020	139.76916	-5.81600	-0.53263	0.00000	-9.62598
1	NJ: 67	279.14329	-0.10268	11.63200	0.00000	-1.06525	-0.51082
1	NK: 6	-279.14329	0.10268	-11.63200	0.00000	-56.80395	0.00000

Steel Code Check Concise Report

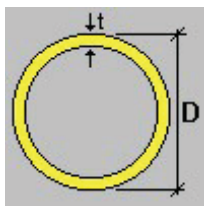
AISC 360-2016 ASD (Hot-rolled)

Member : 9 (ARRAY A-FRAME LEG) - OK

Section information

Section name: A-FRAME TUBE 2.375 X 0.154 (US)

Dimensions



D = 2.375 [in] Diameter
T = 0.143 [in] Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	1.014	
Moment of Inertia (local axes) (I)	[in4]	0.630	0.630
Moment of Inertia (principal axes) (I')	[in4]	0.630	0.630
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	0.788	0.788
Radius of gyration (principal axes) (r')	[in]	0.788	0.788
Saint-Venant torsion constant. (J)	[in4]	1.228	
Section warping constant. (Cw)	[in6]	2.01E-04	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.521	0.521
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.521	0.521
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.521	0.521
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.521	0.521
Plastic section modulus (local axis) (Z)	[in3]	0.719	0.719
Plastic section modulus (principal axis) (Z')	[in3]	0.719	0.719
Polar radius of gyration. (ro)	[in]	1.114	
Area for shear (Aw)	[in2]	0.653	0.653
Torsional constant. (C)	[in3]	1.116	

Material : APA - A500 GR60

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	60000.00
Tensile strength (Fu):	[Lb/in2]	62000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.115385E07

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[in]	48.48

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
48.48	48.48

Laterally unbraced length

Major axis(L33)	Length [in]		Major axis(K33)	Effective length factor		Torsional axis(Kt)
	Minor axis(L22)	Torsional axis(Lt)		Minor axis(K22)	Torsional axis(Kt)	
48.48	48.48	48.48	1.20	1.00	1.00	

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Non sway
Minor axis frame type	Non sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.12	Reference	:	Cl.D2
Capacity	:	36423.01 [Lb]	Ctrl Eq.	:	D31 at 0.00%
Demand	:	4331.93 [Lb]			

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	36423.01	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.21	Reference	:	Cl.E3
Capacity	:	22577.50 [Lb]	Ctrl Eq.	:	D4 at 0.00%
Demand	:	4741.63 [Lb]			

Intermediate results	Unit	Value	Reference
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Section classification

Factored flexural buckling strength($P_n/3\Omega$): [Lb] 22577.50 Cl.E3

Compression in the minor axis 22

Ratio	:	0.18		
Capacity	:	26130.02 [Lb]	Reference	: Cl.E3
Demand	:	4741.63 [Lb]	Ctrl Eq.	: D4 at 0.00%

Intermediate results

Unit	Value	Reference
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Section classification

Factored flexural buckling strength($P_n/2\Omega$): [Lb] 26130.02 Cl.E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.77		
Capacity	:	2151.38 [Lb*ft]	Reference	: Cl.F8.1
Demand	:	1661.02 [Lb*ft]	Ctrl Eq.	: D24 at 100.00%

Intermediate results

Unit	Value	Reference
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Section classification

Factored yielding strength(M_n/Ω): [Lb*ft] 2151.38 Cl.F8.1

Bending about minor axis, M22

Ratio	:	0.03		
Capacity	:	2151.38 [Lb*ft]	Reference	: Cl.F8.1
Demand	:	-56.77 [Lb*ft]	Ctrl Eq.	: D35 at 100.00%

Intermediate results

Unit	Value	Reference
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Section classification

Factored yielding strength about a geometric axis(M_n/Ω): [Lb*ft] 2151.38 Cl.F8.1

Shear Design

Shear in major axis 33

Ratio	:	0.00		
Capacity	:	10926.90 [Lb]	Reference	: Cl.G1
Demand	:	21.25 [Lb]	Ctrl Eq.	: D35 at 0.00%

Intermediate results

Unit	Value	Reference
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Factored shear capacity(V_n/Ω): [Lb] 10926.90 Cl.G1

Shear in minor axis 22

Ratio	:	0.06	Reference	:	Cl.G1
Capacity	:	10926.90 [Lb]	Ctrl Eq.	:	D24 at 0.00%
Demand	:	629.49 [Lb]			

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	10926.90	Cl.G1

Torsion Design

Torsion

Ratio	:	0.01	Reference	:	Cl.H3.1
Capacity	:	2004.56 [Lb*ft]	Ctrl Eq.	:	D35 at 0.00%
Demand	:	12.28 [Lb*ft]			

Intermediate results	Unit	Value	Reference
Factored torsion capacity(T_n/Ω):	[Lb*ft]	2004.56	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.91	Reference	:	Eq.H1-1a
Ctrl Eq.	:	D24 at 100.00%			

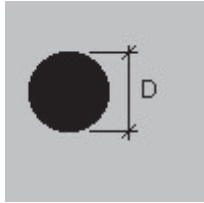
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.91	Eq.H1-1a

Member : 80 (CABLE BRACE) - OK

Section information

Section name: CABLE BRACE - 5/32 (US)

Dimensions



D = 0.313 [in] Diameter

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.077	
Moment of Inertia (local axes) (I)	[in4]	4.71E-04	4.71E-04
Moment of Inertia (principal axes) (I')	[in4]	4.71E-04	4.71E-04
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	0.078	0.078
Radius of gyration (principal axes) (r')	[in]	0.078	0.078
Saint-Venant torsion constant. (J)	[in4]	9.75E-04	
Section warping constant. (Cw)	[in6]	0.000	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.003	0.003
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.003	0.003
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.003	0.003
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.003	0.003
Plastic section modulus (local axis) (Z)	[in3]	0.005	0.005
Plastic section modulus (principal axis) (Z')	[in3]	0.005	0.005
Polar radius of gyration. (ro)	[in]	0.111	
Area for shear (Aw)	[in2]	0.077	0.077
Torsional constant. (C)	[in3]	0.009	

Material : APA - A36 - Cables

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	36000.00
Tensile strength (Fu):	[Lb/in2]	58000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.150794E07

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[in]	236.64

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
236.64	236.64

Laterally unbraced length

Length [in]			Effective length factor		
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
236.64	236.64	236.64	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.29		
Capacity	:	1657.25 [Lb]	Reference	: Cl.D2
Demand	:	480.58 [Lb]	Ctrl Eq.	: D35 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	1657.25	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.00		
Capacity	:	1.26 [Lb]	Reference	: Cl.E3
Demand	:	0.00 [Lb]	Ctrl Eq.	: D16 at 0.00%

Intermediate results	Unit	Value	Reference
Factored flexural buckling strength(P_{n33}/Ω):	[Lb]	1.26	Cl.E3

Compression in the minor axis 22

Ratio	:	0.00		
Capacity	:	1.26 [Lb]	Reference	: Cl.E3
Demand	:	0.00 [Lb]	Ctrl Eq.	: D16 at 0.00%

Intermediate results	Unit	Value	Reference
Factored flexural buckling strength(P_{n22}/Ω):	[Lb]	1.26	Cl.E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.00		
Capacity	:	8.45 [Lb*ft]	Reference	: Cl.F11.1

Demand : -0.04 [Lb*ft]

Ctrl Eq. : D23 at 0.00%

Intermediate results

Unit	Value	Reference
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Factored yielding strength(M_n/Ω):

[Lb*ft]	8.45	Cl.F11.1
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Bending about minor axis, M22

Ratio : 0.01
Capacity : 8.45 [Lb*ft]
Demand : -0.07 [Lb*ft]

Reference : Cl.F11.1
Ctrl Eq. : D24 at 0.00%

Intermediate results

Unit	Value	Reference
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Factored yielding strength about a geometric axis(M_n/Ω):

[Lb*ft]	8.45	Cl.F11.1
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Shear Design

Shear in major axis 33

Ratio : 0.00
Capacity : 994.35 [Lb]
Demand : 0.01 [Lb]

Reference : Cl.G1
Ctrl Eq. : D24 at 0.00%

Intermediate results

Unit	Value	Reference
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Factored shear capacity(V_n/Ω):

[Lb]	994.35	Cl.G1
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Shear in minor axis 22

Ratio : 0.00
Capacity : 994.35 [Lb]
Demand : 0.00 [Lb]

Reference : Cl.G1
Ctrl Eq. : D23 at 0.00%

Intermediate results

Unit	Value	Reference
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Factored shear capacity(V_n/Ω):

[Lb]	994.35	Cl.G1
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Combined Actions Design

Combined flexure and axial

Ratio : 0.29
Ctrl Eq. : D35 at 0.00%

Reference : Eq.H1-1a

Intermediate results

Unit	Value	Reference
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Interaction of flexure and axial force:

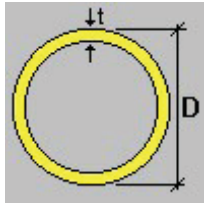
--	0.29	Eq.H1-1a
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Member : 39 (DAMPER A-FRAME LEG) - OK

Section information

Section name: A-FRAME TUBE 2.375 X 0.218 (US)

Dimensions



D	=	2.375	[in]	Diameter
T	=	0.203	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	1.398	
Moment of Inertia (local axes) (I)	[in4]	0.824	0.824
Moment of Inertia (principal axes) (I')	[in4]	0.824	0.824
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	0.768	0.768
Radius of gyration (principal axes) (r')	[in]	0.768	0.768
Saint-Venant torsion constant. (J)	[in4]	1.606	
Section warping constant. (Cw)	[in6]	5.27E-04	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.682	0.682
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.682	0.682
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.682	0.682
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.682	0.682
Plastic section modulus (local axis) (Z)	[in3]	0.965	0.965
Plastic section modulus (principal axis) (Z')	[in3]	0.965	0.965
Polar radius of gyration. (ro)	[in]	1.086	
Area for shear (Aw)	[in2]	0.900	0.900
Torsional constant. (C)	[in3]	1.498	

Material : APA - A500 GR55

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	55000.00
Tensile strength (Fu):	[Lb/in2]	62000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.115385E07

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[in]	48.48

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
48.48	48.48

Laterally unbraced length

Major axis(L33)	Length [in]		Major axis(K33)	Effective length factor	
	Minor axis(L22)	Torsional axis(Lt)		Minor axis(K22)	Torsional axis(Kt)
48.48	48.48	48.48	1.20	1.00	1.00

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Non sway
Minor axis frame type	Non sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.14	Reference	:	Cl.D2
Capacity	:	46028.90 [Lb]	Ctrl Eq.	:	D11 at 0.00%
Demand	:	6345.52 [Lb]			

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	46028.90	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.18	Reference	:	Cl.E3
Capacity	:	29010.25 [Lb]	Ctrl Eq.	:	D24 at 49.54%
Demand	:	5156.20 [Lb]			

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_n33/Ω):	[Lb]	29010.25	Cl.E3

Compression in the minor axis 22

Ratio	:	0.15	Reference	:	Cl.E3
Capacity	:	33404.81 [Lb]	Ctrl Eq.	:	D24 at 49.54%
Demand	:	5156.20 [Lb]			

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored flexural buckling strength($P_n/2\Omega$):	[Lb]	33404.81	Cl.E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.89		
Capacity	:	2647.76 [Lb*ft]	Reference	: Cl.F8.1
Demand	:	2345.17 [Lb*ft]	Ctrl Eq.	: D34 at 100.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored yielding strength($M_n/2\Omega$):	[Lb*ft]	2647.76	Cl.F8.1

Bending about minor axis, M22

Ratio	:	0.00		
Capacity	:	2647.76 [Lb*ft]	Reference	: Cl.F8.1
Demand	:	-0.06 [Lb*ft]	Ctrl Eq.	: D4 at 100.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored yielding strength about a geometric axis($M_n/2\Omega$):	[Lb*ft]	2647.76	Cl.F8.1

Shear Design

Shear in major axis 33

Ratio	:	0.00		
Capacity	:	13808.67 [Lb]	Reference	: Cl.G1
Demand	:	0.02 [Lb]	Ctrl Eq.	: D4 at 49.54%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored shear capacity($V_n/2\Omega$):	[Lb]	13808.67	Cl.G1

Shear in minor axis 22

Ratio	:	0.07		
Capacity	:	13808.67 [Lb]	Reference	: Cl.G1
Demand	:	989.85 [Lb]	Ctrl Eq.	: D14 at 49.54%

Intermediate results	Unit	Value	Reference
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Factored shear capacity(V_n/Ω): [Lb] 13808.67 Cl.G1

Torsion Design

Torsion

Ratio : 0.00
Capacity : 2467.07 [Lb*ft]
Demand : 0.02 [Lb*ft]
Reference : Cl.H3.1
Ctrl Eq. : D4 at 49.54%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(T_n/Ω):	[Lb*ft]	2467.07	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio : 0.97
Ctrl Eq. : D24 at 100.00%
Reference : Eq.H1-1b

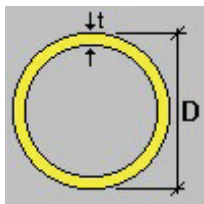
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.97	Eq.H1-1b

Member : 93 (Damper Cross Tube) - OK

Section information

Section name: A-FRAME TUBE 2.875 X 0.130 (US)

Dimensions



D = 2.875 [in] Diameter
T = 0.121 [in] Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (A_g)	[in ²]	1.056	
Moment of Inertia (local axes) (I)	[in ⁴]	0.997	0.997
Moment of Inertia (principal axes) (I')	[in ⁴]	0.997	0.997
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000

Radius of gyration (local axes) (r)	[in]	0.972	0.972
Radius of gyration (principal axes) (r')	[in]	0.972	0.972
Saint-Venant torsion constant. (J)	[in4]	1.946	
Section warping constant. (Cw)	[in6]	2.27E-04	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.681	0.681
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.681	0.681
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.681	0.681
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.681	0.681
Plastic section modulus (local axis) (Z)	[in3]	0.923	0.923
Plastic section modulus (principal axis) (Z')	[in3]	0.923	0.923
Polar radius of gyration. (ro)	[in]	1.374	
Area for shear (Aw)	[in2]	0.680	0.680
Torsional constant. (C)	[in3]	1.433	

Material : APA - A500 GR50 - GRC

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	50000.00
Tensile strength (Fu):	[Lb/in2]	62000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.115385E07

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[in]	24.41

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
24.41	24.41

Laterally unbraced length

Major axis(L33)	Length [in]		Major axis(K33)	Effective length factor		Torsional axis(Kt)
	Minor axis(L22)	Torsional axis(Lt)		Minor axis(K22)		
24.41	24.41	24.41	1.0	1.0		1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.00		
Capacity	:	31606.30 [Lb]	Reference	: Cl.D2
Demand	:	0.00 [Lb]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	31606.30	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.03		
Capacity	:	30181.01 [Lb]	Reference	: Cl.E3
Demand	:	909.19 [Lb]	Ctrl Eq.	: D11 at 72.53%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_{n33}/Ω):	[Lb]	30181.01	Cl.E3

Compression in the minor axis 22

Ratio	:	0.03		
Capacity	:	30181.01 [Lb]	Reference	: Cl.E3
Demand	:	909.19 [Lb]	Ctrl Eq.	: D11 at 72.53%

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_{n22}/Ω):	[Lb]	30181.01	Cl.E3

Flexural Design

Bending about major axis, M33

Ratio	:	0.00		
Capacity	:	2302.88 [Lb*ft]	Reference	: Cl.F8.1
Demand	:	0.00 [Lb*ft]	Ctrl Eq.	: D25 at 0.00%

Intermediate results	Unit	Value	Reference
Section classification			
Factored yielding strength(M_n/Ω):	[Lb*ft]	2302.88	Cl.F8.1

Bending about minor axis, M22

Ratio	:	0.59		
Capacity	:	2302.88 [Lb*ft]	Reference	: Cl.F8.1

Demand : -1359.90 [Lb*ft]

Ctrl Eq. : D25 at 72.53%

Intermediate results	Unit	Value	Reference
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Section classification

Factored yielding strength about a geometric axis(M_n/Ω):	[Lb*ft]	2302.88	Cl.F8.1
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Shear Design

Shear in major axis 33

Ratio	:	0.26		
Capacity	:	9481.89 [Lb]	Reference	: Cl.G1
Demand	:	2433.36 [Lb]	Ctrl Eq.	: D6 at 72.53%

Intermediate results	Unit	Value	Reference
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Factored shear capacity(V_n/Ω):	[Lb]	9481.89	Cl.G1
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Shear in minor axis 22

Ratio	:	0.00		
Capacity	:	9481.89 [Lb]	Reference	: Cl.G1
Demand	:	0.00 [Lb]	Ctrl Eq.	: D25 at 0.00%

Intermediate results	Unit	Value	Reference
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Factored shear capacity(V_n/Ω):	[Lb]	9481.89	Cl.G1
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Torsion Design

Torsion

Ratio	:	0.00		
Capacity	:	2145.72 [Lb*ft]	Reference	: Cl.H3.1
Demand	:	0.02 [Lb*ft]	Ctrl Eq.	: D23 at 0.00%

Intermediate results	Unit	Value	Reference
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Factored torsion capacity(T_n/Ω):	[Lb*ft]	2145.72	Cl.H3.1
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Combined Actions Design

Combined flexure and axial

Ratio	:	0.61		
Ctrl Eq.	:	D11 at 72.53%	Reference	: Eq.H1-1b

Intermediate results	Unit	Value	Reference
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Interaction of flexure and axial force:

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0.61

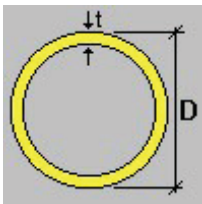
Eq.H1-1b

Member : 59 (FOUNDATION TUBE) - OK

Section information

Section name: A-Frame Tube 2.375 X 0.109 (US)

Dimensions



D = 2.375 [in] Diameter
T = 0.101 [in] Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	0.731	
Moment of Inertia (local axes) (I)	[in4]	0.470	0.470
Moment of Inertia (principal axes) (I')	[in4]	0.470	0.470
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	0.802	0.802
Radius of gyration (principal axes) (r')	[in]	0.802	0.802
Saint-Venant torsion constant. (J)	[in4]	0.918	
Section warping constant. (Cw)	[in6]	7.53E-05	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.389	0.389
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.389	0.389
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.389	0.389
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.389	0.389
Plastic section modulus (local axis) (Z)	[in3]	0.527	0.527
Plastic section modulus (principal axis) (Z')	[in3]	0.527	0.527
Polar radius of gyration. (ro)	[in]	1.135	
Area for shear (Aw)	[in2]	0.471	0.471
Torsional constant. (C)	[in3]	0.819	

Material : APA - A500 GR55

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	55000.00
Tensile strength (Fu):	[Lb/in2]	62000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.115385E07

Design Criteria

Description	Unit	Value
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Length for tension slenderness ratio (L) [in] 19.55

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
19.55	19.55

Laterally unbraced length

Major axis(L33)	Length [in]		Torsional axis(Lt)	Major axis(K33)	Effective length factor		Torsional axis(Kt)
	Minor axis(L22)				Minor axis(K22)		
19.55	19.55		19.55	1.20	1.00		1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Non sway
Minor axis frame type	Non sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.09	Reference	:	Cl.D2
Capacity	:	24065.53 [Lb]	Ctrl Eq.	:	D11 at 0.00%
Demand	:	2263.97 [Lb]			

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	24065.53	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.28	Reference	:	Cl.E3
Capacity	:	22466.53 [Lb]	Ctrl Eq.	:	D24 at 0.00%
Demand	:	6309.91 [Lb]			

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength($P_n/33/\Omega$):	[Lb]	22466.53	Cl.E3

Compression in the minor axis 22

Ratio : 0.28
Capacity : 22943.50 [Lb]
Demand : 6309.91 [Lb]

Reference : Cl.E3
Ctrl Eq. : D24 at 0.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored flexural buckling strength($P_n/2\Omega$):	[Lb]	22943.50	Cl.E3

Flexural Design

Bending about major axis, M33

Ratio : 0.76
Capacity : 1447.57 [Lb*ft]
Demand : -1102.20 [Lb*ft]

Reference : Cl.F8.1
Ctrl Eq. : D24 at 100.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored yielding strength($M_n/2\Omega$):	[Lb*ft]	1447.57	Cl.F8.1

Bending about minor axis, M22

Ratio : 0.00
Capacity : 1447.57 [Lb*ft]
Demand : -0.02 [Lb*ft]

Reference : Cl.F8.1
Ctrl Eq. : D23 at 100.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored yielding strength about a geometric axis($M_n/2\Omega$):	[Lb*ft]	1447.57	Cl.F8.1

Shear Design

Shear in major axis 33

Ratio : 0.00
Capacity : 7219.66 [Lb]
Demand : 0.01 [Lb]

Reference : Cl.G1
Ctrl Eq. : D23 at 0.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored shear capacity($V_n/2\Omega$):	[Lb]	7219.66	Cl.G1

Shear in minor axis 22

Ratio : 0.17
Capacity : 7219.66 [Lb]
Demand : 1237.92 [Lb]

Reference : Cl.G1
Ctrl Eq. : D24 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	7219.66	Cl.G1

Torsion Design

Torsion

Ratio	:	0.00		
Capacity	:	1348.78 [Lb*ft]	Reference	: Cl.H3.1
Demand	:	0.00 [Lb*ft]	Ctrl Eq.	: D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored torsion capacity(T_n/Ω):	[Lb*ft]	1348.78	Cl.H3.1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.96		
Ctrl Eq.	:	D24 at 100.00%	Reference	: Eq.H1-1a

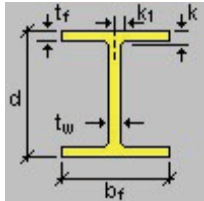
Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.96	Eq.H1-1a

Member : 96 (T Post I Beam) - OK

Section information

Section name: W 6X9 (US)

Dimensions



bf	=	3.940	[in]	Width
d	=	5.900	[in]	Depth
k	=	0.465	[in]	Distance k
k1	=	0.500	[in]	Distance k1
tf	=	0.215	[in]	Flange thickness
tw	=	0.170	[in]	Web thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	2.680	
Moment of Inertia (local axes) (I)	[in4]	16.400	2.200
Moment of Inertia (principal axes) (I')	[in4]	16.400	2.200
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	2.474	0.906
Radius of gyration (principal axes) (r')	[in]	2.474	0.906
Saint-Venant torsion constant. (J)	[in4]	0.041	
Section warping constant. (Cw)	[in6]	17.700	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	5.560	1.110
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	5.560	1.110
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	5.560	1.110
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	5.560	1.110
Plastic section modulus (local axis) (Z)	[in3]	6.230	1.720
Plastic section modulus (principal axis) (Z')	[in3]	6.230	1.720
Polar radius of gyration. (ro)	[in]	2.634	
Area for shear (Aw)	[in2]	1.690	1.000
Torsional constant. (C)	[in3]	0.165	

Material : A992 Gr50

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	50000.00
Tensile strength (Fu):	[Lb/in2]	65000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.115385E07

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[in]	36.00

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
36.00	36.00

Laterally unbraced length

Length [in]		Effective length factor			
Major axis(L33)	Minor axis(L22)	Torsional axis(Lt)	Major axis(K33)	Minor axis(K22)	Torsional axis(Kt)
36.00	36.00	36.00	1.0	1.0	1.0

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Sway
Minor axis frame type	Sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.01	Reference	:	Cl.D2
Capacity	:	80239.52 [Lb]	Ctrl Eq.	:	D11 at 50.00%
Demand	:	998.07 [Lb]			

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	80239.52	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.01	Reference	:	Cl.E3
Capacity	:	79006.57 [Lb]	Ctrl Eq.	:	D24 at 50.00%
Demand	:	1021.37 [Lb]			

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_{n33}/Ω):	[Lb]	79006.57	Cl.E3

Compression in the minor axis 22

Ratio	:	0.01	Reference	:	Cl.E3
Capacity	:	71491.69 [Lb]	Ctrl Eq.	:	D24 at 50.00%
Demand	:	1021.37 [Lb]			

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_{n22}/Ω):	[Lb]	71491.69	Cl.E3
Factored torsional or flexural-torsional buckling strength(P_{n11}/Ω):	[Lb]	73387.47	Cl.E4

Flexural Design

Bending about major axis, M33

Ratio	:	0.48	Reference	:	Cl.F3.1
Capacity	:	15539.54 [Lb*ft]	Ctrl Eq.	:	D24 at 50.00%
Demand	:	7416.28 [Lb*ft]			

Intermediate results	Unit	Value	Reference
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Section classification

Factored compression flange local buckling strength(M_n/Ω): [Lb*ft] 15539.54 Cl.F3.1

Bending about minor axis, M22

Ratio	:	0.01		
Capacity	:	4289.66 [Lb*ft]	Reference	: Cl.F6.2
Demand	:	36.87 [Lb*ft]	Ctrl Eq.	: D35 at 50.00%

Intermediate results	Unit	Value	Reference
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Section classification

Factored yielding strength about a geometric axis(M_n/Ω):	[Lb*ft]	4291.42	Cl.F6.1
Factored compression flange local buckling strength about a geometric ...	[Lb*ft]	4289.66	Cl.F6.2

Shear Design

Shear in major axis 33

Ratio	:	0.00		
Capacity	:	30434.73 [Lb]	Reference	: Cl.G1
Demand	:	24.58 [Lb]	Ctrl Eq.	: D35 at 50.00%

Intermediate results	Unit	Value	Reference
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Factored shear capacity(V_n/Ω): [Lb] 30434.73 Cl.G1

Shear in minor axis 22

Ratio	:	0.27		
Capacity	:	20000.00 [Lb]	Reference	: Cl.G1
Demand	:	5498.56 [Lb]	Ctrl Eq.	: D24 at 50.00%

Intermediate results	Unit	Value	Reference
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Factored shear capacity(V_n/Ω): [Lb] 20000.00 Cl.G1

Combined Actions Design

Combined flexure and axial

Ratio	:	0.49		
Ctrl Eq.	:	D24 at 50.00%	Reference	: Eq.H1-1b

Intermediate results	Unit	Value	Reference
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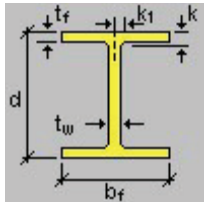
Interaction of flexure and axial force: -- 0.49 Eq.H1-1b

Member : 1 (TOP CEE-BEAM) - OK

Section information

Section name: W 6X9 (US)

Dimensions



bf	=	3.940	[in]	Width
d	=	5.900	[in]	Depth
k	=	0.465	[in]	Distance k
k1	=	0.500	[in]	Distance k1
tf	=	0.215	[in]	Flange thickness
tw	=	0.170	[in]	Web thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (Ag)	[in2]	2.680	
Moment of Inertia (local axes) (I)	[in4]	16.400	2.200
Moment of Inertia (principal axes) (I')	[in4]	16.400	2.200
Bending constant for moments (principal axis) (J')	[in]	0.000	0.000
Radius of gyration (local axes) (r)	[in]	2.474	0.906
Radius of gyration (principal axes) (r')	[in]	2.474	0.906
Saint-Venant torsion constant. (J)	[in4]	0.041	
Section warping constant. (Cw)	[in6]	17.700	
Distance from centroid to shear center (principal axis) (xo,yo)	[in]	0.000	0.000
Top elastic section modulus of the section (local axis) (Ssup)	[in3]	5.560	1.110
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	5.560	1.110
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	5.560	1.110
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	5.560	1.110
Plastic section modulus (local axis) (Z)	[in3]	6.230	1.720
Plastic section modulus (principal axis) (Z')	[in3]	6.230	1.720
Polar radius of gyration. (ro)	[in]	2.634	
Area for shear (Aw)	[in2]	1.690	1.000
Torsional constant. (C)	[in3]	0.165	

Material : A992 Gr50

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	50000.00
Tensile strength (Fu):	[Lb/in2]	65000.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.115385E07

Design Criteria

Description	Unit	Value
Length for tension slenderness ratio (L)	[in]	59.70

Distance between member lateral bracing points

Length (Lb) [in]	
Top	Bottom
59.70	59.70

Laterally unbraced length

Major axis(L33)	Length [in]		Major axis(K33)	Effective length factor		Torsional axis(Kt)
	Minor axis(L22)	Torsional axis(Lt)		Minor axis(K22)	Torsional axis(Kt)	
59.70	59.70	59.70	1.20	2.10		1.00

Additional assumptions

Continuous lateral torsional restraint	No
Tension field action	No
Continuous flexural torsional restraint	No
Effective length factor value type	None
Major axis frame type	Non sway
Minor axis frame type	Non sway

Design Checks

Axial Tension Design

Axial tension

Ratio	:	0.02	Reference	:	Cl.D2
Capacity	:	80239.52 [Lb]	Ctrl Eq.	:	D11 at 0.00%
Demand	:	1329.13 [Lb]			

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	80239.52	Cl.D2

Axial Compression Design

Compression in the major axis 33

Ratio	:	0.04	Reference	:	Cl.E3
Capacity	:	75466.84 [Lb]	Ctrl Eq.	:	D28 at 0.00%
Demand	:	2774.01 [Lb]			

Intermediate results	Unit	Value	Reference
Section classification			
Factored flexural buckling strength(P_{n33}/Ω):	[Lb]	75466.84	Cl.E3

Compression in the minor axis 22

Ratio	:	0.13
-------	---	------

Capacity : 21038.57 [Lb]
Demand : 2774.01 [Lb]

Reference : Cl.E3
Ctrl Eq. : D28 at 0.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored flexural buckling strength($P_n/2\Omega$):	[Lb]	21038.57	Cl.E3
Factored torsional or flexural-torsional buckling strength($P_n/11\Omega$):	[Lb]	65183.75	Cl.E4

Flexural Design

Bending about major axis, M33

Ratio : 0.85
Capacity : 13962.95 [Lb*ft]
Demand : 11864.54 [Lb*ft]

Reference : Cl.F2.2
Ctrl Eq. : D4 at 0.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored lateral-torsional buckling strength($M_n/2\Omega$):	[Lb*ft]	13962.95	Cl.F2.2
Factored compression flange local buckling strength($M_n/2\Omega$):	[Lb*ft]	15539.54	Cl.F3.1

Bending about minor axis, M22

Ratio : 0.06
Capacity : 4289.66 [Lb*ft]
Demand : -240.09 [Lb*ft]

Reference : Cl.F6.2
Ctrl Eq. : D35 at 100.00%

Intermediate results	Unit	Value	Reference
<u>Section classification</u>			
Factored yielding strength about a geometric axis($M_n/2\Omega$):	[Lb*ft]	4291.42	Cl.F6.1
Factored compression flange local buckling strength about a geometric ...	[Lb*ft]	4289.66	Cl.F6.2

Shear Design

Shear in major axis 33

Ratio : 0.00
Capacity : 30434.73 [Lb]
Demand : 49.16 [Lb]

Reference : Cl.G1
Ctrl Eq. : D35 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity($V_n/2\Omega$):	[Lb]	30434.73	Cl.G1

Shear in minor axis 22

Ratio : 0.10
Capacity : 20000.00 [Lb]

Reference : Cl.G1

Demand : 1913.52 [Lb]

Ctrl Eq. : D4 at 17.50%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	20000.00	Cl.G1

Combined Actions Design

Combined flexure and axial

Ratio : 0.90
Ctrl Eq. : D24 at 0.00% Reference : Eq.H1-1b

Intermediate results	Unit	Value	Reference
Interaction of flexure and axial force:	--	0.90	Eq.H1-1b

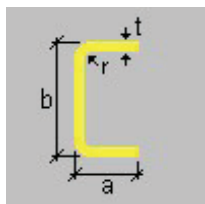
AISI 2016 ASD (Cold-formed)

Member : 87 (CROSS BRACE) - OK

Section information

Section name: APA 1 X 1.63 CBRACING (US)

Dimensions



a	=	1.000	[in]	Flange width
b	=	1.630	[in]	Depth
r	=	0.060	[in]	Inside bend radius
t	=	0.064	[in]	Thickness

Properties	Unit	Major axis	Minor axis
Gross area of the section. (A_g)	[in ²]	0.219	
Moment of Inertia (local axes) (I)	[in ⁴]	0.093	0.022
Moment of Inertia (principal axes) (I')	[in ⁴]	0.093	0.022
Bending constant for moments (principal axis) (J')	[in]	0.000	1.053
Radius of gyration (local axes) (r)	[in]	0.652	0.319
Radius of gyration (principal axes) (r')	[in]	0.652	0.319
Saint-Venant torsion constant. (J)	[in ⁴]	3.06E-04	
Section warping constant. (C_w)	[in ⁶]	0.010	
Distance from centroid to shear center (principal axis) (x_o, y_o)	[in]	-0.681	0.000

Top elastic section modulus of the section (local axis) (Ssup)	[in3]	0.114	0.032
Bottom elastic section modulus of the section (local axis) (Sinf)	[in3]	0.114	0.072
Top elastic section modulus of the section (principal axis) (S'sup)	[in3]	0.114	0.032
Bottom elastic section modulus of the section (principal axis) (S'inf)	[in3]	0.114	0.072
Plastic section modulus (local axis) (Z)	[in3]	0.132	0.058
Plastic section modulus (principal axis) (Z')	[in3]	0.132	0.058
Polar radius of gyration. (ro)	[in]	0.995	
Area for shear (Aw)	[in2]	0.124	0.100
Torsional constant. (C)	[in3]	0.005	

Material : APA - A572 GR50

Properties	Unit	Value
Yield stress (Fy):	[Lb/in2]	50000.00
Tensile strength (Fu):	[Lb/in2]	65300.00
Elasticity Modulus (E):	[Lb/in2]	2.9E07
Shear modulus for steel (G):	[Lb/in2]	1.150794E07

Design Criteria

Description	Unit	Major axis	Minor axis
Additional hypotheses			
Full lateral restraints		No	
Continuous flexural torsional restraint		No	
Local axis design		No	
Region between inflection points adjacent to support		No	
Span type		Simple	
Fastened to support		Unfastened	
Local shear		No	
Braced for sidesway in major axis		Yes	
Braced for sidesway in minor axis		Yes	
Loading condition		EOF	
Flange support condition		Fastened	

Member lateral unbraced lengths

Length (Lb) [in]		Restraint arrangement		Rotation restraint	
Top	Bottom	Top	Bottom	Top	Bottom
42.38	42.38	FF	FF	None	None

Compression member unbraced lengths

Length (L) [in]		Effective length factor (ke)			
Major axis	Minor axis	Major axis	Minor axis		
42.38	42.38	42.38	0.00	0.00	1.0

Design Checks

Axial Tension Design

Axial tension

Ratio : 0.00
Capacity : 6544.97 [Lb]
Demand : 0.00 [Lb]

Reference : Sec. D2
Ctrl Eq. : D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial tension capacity(P_n/Ω):	[Lb]	6544.97	Sec. D2
Factored axial tensile fracture capacity(P_n/Ω):	[Lb]	7137.35	Sec. D3

Shear Design

Shear in major axis 33

Ratio : 0.00
Capacity : 2102.40 [Lb]
Demand : 0.00 [Lb]

Reference : Sec. G2
Ctrl Eq. : D4 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	2102.40	Sec. G2

Shear in minor axis 22

Ratio : 0.00
Capacity : 1658.40 [Lb]
Demand : 0.00 [Lb]

Reference : Sec. G2
Ctrl Eq. : D1 at 0.00%

Intermediate results	Unit	Value	Reference
Factored shear capacity(V_n/Ω):	[Lb]	1658.40	Sec. G2

Axial Compression Design

Axial compression

Ratio : 0.63
Capacity : 1725.38 [Lb]
Demand : 1080.72 [Lb]

Reference : Sec. E2
Ctrl Eq. : D11 at 0.00%

Intermediate results	Unit	Value	Reference
Factored axial compression capacity(P_n/Ω):	[Lb]	1725.38	Sec. E2
Factored local buckling strength(P_n/Ω):	[Lb]	1725.38	Sec. E3

Flexural Design

Bending about major axis. M33

Ratio : 0.00
Capacity : 191.42 [Lb*ft]
Demand : 0.00 [Lb*ft]

Reference : Sec. F3
Ctrl Eq. : D1 at 0.00%

Intermediate results

	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	284.47	Sec. F2
Factored lateral-torsional buckling strength(M_n/Ω):	[Lb*ft]	198.05	Sec. F2
Factored local buckling strength(M_n/Ω):	[Lb*ft]	191.42	Sec. F3

Bending about the minor axis 22

Ratio : 0.00
Capacity : 71.28 [Lb*ft]
Demand : 0.00 [Lb*ft]

Reference : Sec. F2
Ctrl Eq. : D4 at 0.00%

Intermediate results

	Unit	Value	Reference
Factored section moment capacity(M_n/Ω):	[Lb*ft]	79.99	Sec. F2
Factored lateral-torsional buckling strength(M_n/Ω):	[Lb*ft]	71.28	Sec. F2
Factored local buckling strength(M_n/Ω):	[Lb*ft]	71.28	Sec. F3

Web Crippling Design

Web crippling

Ratio : 0.00
Capacity : 239.97 [Lb]
Demand : 0.00 [Lb]

Reference : Sec. G5
Ctrl Eq. : D1 at 0.00%

Intermediate results

	Unit	Value	Reference
Factored web crippling capacity(P_n/Ω):	[Lb]	239.97	Sec. G5

Combined Actions Design

Combined bending and web crippling interaction

Ratio : 0.00
Ctrl Eq. : D1 at 0.00%

Reference : Sec. H3

Intermediate results

	Unit	Value	Reference
--	------	-------	-----------

Combined bending and shear interaction

Ratio : 0.00
Ctrl Eq. : D4 at 0.00%

Reference : Sec. H2

Intermediate results	Unit	Value	Reference
Combined bending and shear interaction (x-x):	--	0.00	
Combined bending and shear interaction(y-y):	--	0.00	Sec. H2

Combined bending and tension interaction

Ratio	:	0.00	
Ctrl Eq.	:	D4 at 0.00%	Reference : Eq. H1.1-2

Intermediate results	Unit	Value	Reference
Combined tensile axial and bending (flexure with tension yielding):	--	0.00	Eq. H1.1-1
Combined tensile axial and bending (flexure with buckling):	--	0.00	Eq. H1.1-2

Combined bending and compression interaction

Ratio	:	0.63	
Ctrl Eq.	:	D11 at 0.00%	Reference : Eq. H1.2-1

Intermediate results	Unit	Value	Reference
Combined bending and compression interaction:	--	0.63	Eq. H1.2-1

APPENDIX 1

LOAD INPUTS

Top Of Pile Loading Document Provided: SeaOak_Madison_Array_GFC_CHSM66M-DG-F-BH_8.5ft-7.5ft-6.5ft_05_19_2025.pdf

Provided to APA By: SEA OAK CAPITAL

Date Received: 6/5/2025

**DTHZ v3 CHSM66M-DG-F-BH655-56 -C Ground Force Analysis, 13 INT(BB) / 15 EXT (BB)Columns
52° Range of Motion – Category I - Low Risk – ASCE_7-16-SM****PROJECT INFORMATION:**

Project Name: Madison
Client: Sea Oak Capital
Location: Madison/CT
Size: 2.3 MWDC

DESIGN REQUIREMENTS:

Building Code: ASCE_7-16-SM
Wind Speed (mph): 115
Ground Snow (psf): 30
Seismic Sds: 0.220
Terrain/Exposure: C
Building Category: I - Low Risk
Topographic Factor: 1
Directional Factor: 0.85
Elevation (ft): 86

MECHANICAL DESIGN:

Module dimensions 2384 x 1303 x 35 mm , Module weight = 83.78 lbs
Row: 56 module row with 28N/28S split for interior and exterior rows.
Foundations: 13 columns interior and 15 columns exterior
Bearings: High Load Bearings on both interior and exterior
Range of Motion: +/-52°
Center Structure Gap: 30" with 12" bracket and 10" hanger, 6" for construction tolerance
GCR=52.14%,
Max height of tracker = 8.50'

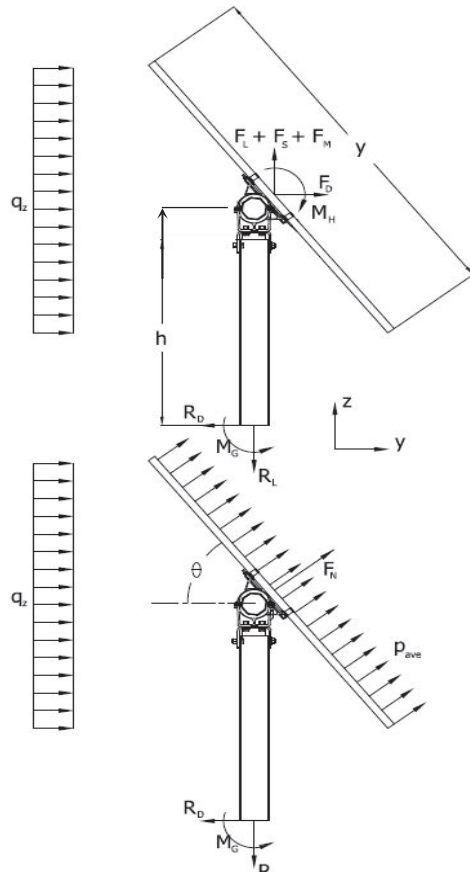
DESIGN BASIS:

Max +/- 5 degree motor block angle N/S in horizontal plane
Max +/- 4 degree N/S torque tube slope

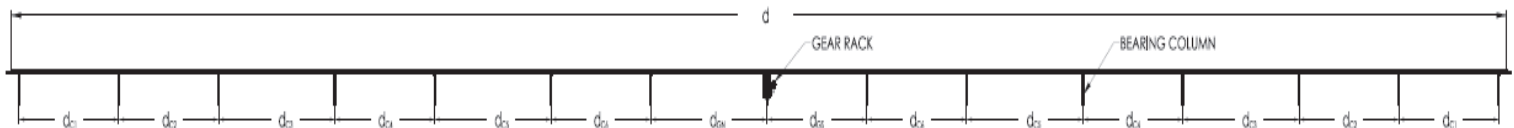
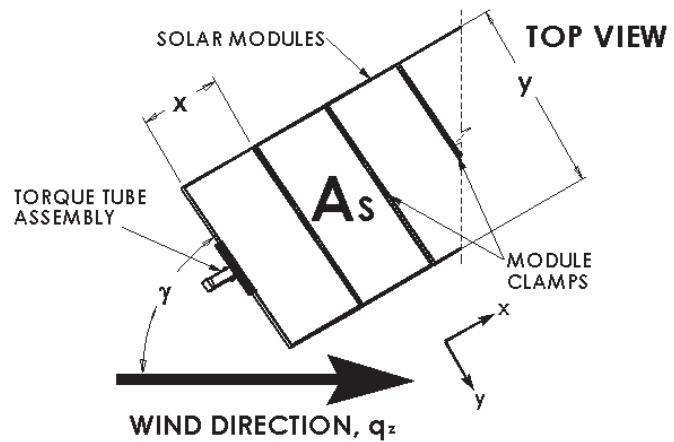
STOWING:

Passive wind stow @ 52°
Night Snow Mode

Symbols Conventions and Terminology



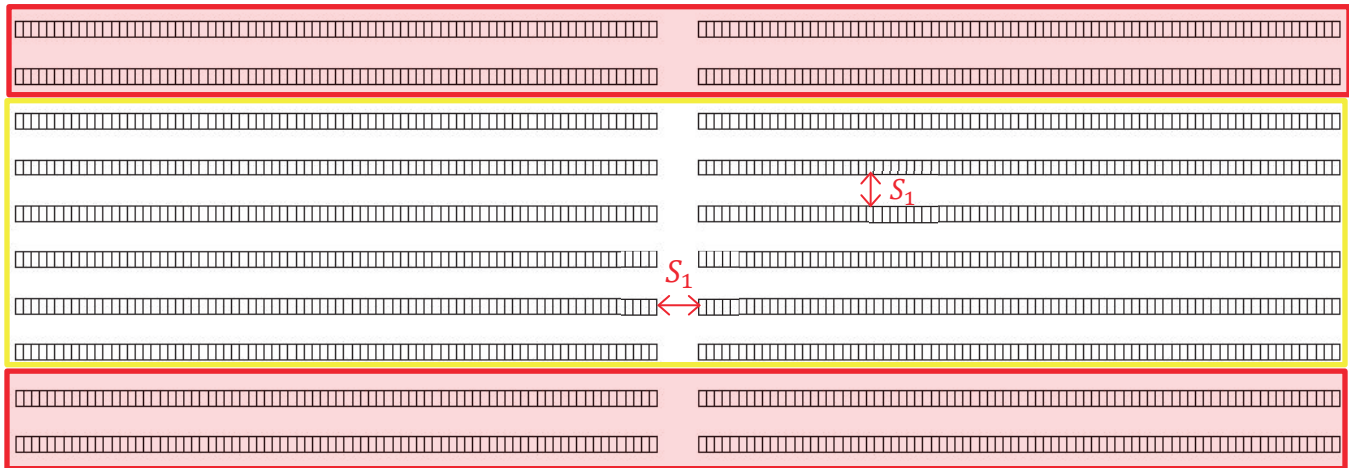
General Tracker Dimensions:	
d , Tracker Length	242.00'
x , Module Width	51.30" = 4.28'
y , Module Length	93.86" = 7.82'
X , Module Assembly Width	51.87" = 4.32'
Y , Module Assembly Length	93.86" = 7.82'
n , Total Number of Modules	56
h , Column Height	102" = 8.50'
Max. open area	$3.84 \times 7.82' = 30.03'$; GCR=0.521



The diagram is for demonstrational purposes only. For actual individual column spacing dimensions, refer to the assembly drawing

Other Symbols	
A_s , Module Surface Tributary Area for Column	d_c or d_G , Column Spacing
M_H , Hinge Moment due to wind loading	F_D , Drag Force due to wind loading
M_G , Total Ground Moment Reaction	F_L , Lift Force due to wind loading
R_D , Ground Drag Reaction	F_S , Lift Force due to snow loading
R_L , Ground Lift Reaction	q_z , Dynamic Velocity Pressure of wind
θ , Tracker Angle from y-axis	γ , Yaw Angle of Wind from the y-axis

The figure below demonstrates that the entire site consists of two types of rows to optimize the structural design according to the loading contribution from RWDI wind loading report for Array Technologies, Inc.



- = Exterior Columns
- = Interior Columns

$$S_1 \leq 2 \times \text{Row Spacing}$$

Foundations are optimized for material costs since higher loads exist on the edges of the array. The controlling case from each designation in the field shall be used for all column designs. It is assumed that each column absorbs half of the load of the adjacent spans. Exterior columns are defined as any portion of the field where the max open area of 30.03' is exceeded in any direction.

Interior Column Spacing (from end, in inches)			
		North of Gear Rack	South of Gear Rack
Bearing Column Spacing 1	d_{c1}	207	207
Bearing Column Spacing 2	d_{c2}	207	207
Bearing Column Spacing 3	d_{c3}	207	207
Bearing Column Spacing 4	d_{c4}	259	259
Bearing Column Spacing 5	d_{c5}	259	259
Gear Rack North Spacing	d_{gn}	292	NA
Gear Rack South Spacing	d_{gs}	NA	292

Exterior Column Spacing (from end, in inches)			
		North of Gear Rack	South of Gear Rack
Bearing Column Spacing 1	d_{c1}	207	207
Bearing Column Spacing 2	d_{c2}	207	207
Bearing Column Spacing 3	d_{c3}	207	207
Bearing Column Spacing 4	d_{c4}	207	207
Bearing Column Spacing 5	d_{c5}	207	207
Bearing Column Spacing 6	d_{c6}	207	207
Gear Rack North Spacing	d_{gn}	188	NA
Gear Rack South Spacing	d_{gs}	NA	188

The **wind loads** are 115 mph 3 second gust, exposure C, evaluated using a combination of ASCE code and results obtained from RWDI wind loading testing done on the DuraTrack HZ system. All maxima were found at $\gamma = 0^\circ$. To properly determine design forces, a dynamic/velocity pressure, q_z , was determined to be:

$$q_z = 0.00256K_zK_{zt}K_dV^2K_e = 0.00256(0.85)(1.00)(0.85)(115)^2(1.00) = 24.46 \text{ PSF}$$

Design wind loads and moments are determined using the following equations. Diagrams showing how these loads are applied can be seen on page 1. GC_D , GC_L , and GC_M refer to the coefficients of drag and lift, and moment respectively. These coefficients were experimentally determined from RWDI wind loading tests, and the maxima recorded are conservatively assumed to be applied to each section simultaneously.

$$GC_D = C_H GC_P \sin \theta, \quad GC_L = C_H GC_P \cos \theta, \quad GC_T = C_H GC_M$$

C_H – Height correction factor, θ is the tilt angle.

$$F_D = q_z GC_D A_S, \quad F_L = q_z GC_L A_S, \quad M_H = q_z GC_T A_S y$$

There are two types of columns in this assembly: interior and exterior columns. At the design wind speed all columns will become fixed at the axis of rotation and set at the trackers designed range of motion, 52 degrees. This condition controls the design of the tracker and creates additional moment at the top of the columns. The resultant forces and moments are due to the wind pressure on the frontal area of the modules supported by one column. The ground forces at the pile head (depth = 0) are found as follows.

Interior Row Columns – Max Unfactored Forces

Wind Horizontal Drag, When $\theta = 52^\circ$

$$GC_D = C_H GC_P \sin \theta = (1.04)(1.08) = 1.12$$

$$A_S = \bar{a}_b y = (165'' \div 12)(7.82') = 107.53 \text{ ft}^2$$

$$R_D = F_D = q_z GC_D A_S = (24.46 \text{ PSF})(1.12)(107.53 \text{ ft}^2) = 2.95 \text{ kips}$$

Wind Vertical Up, When $\theta = 52^\circ$

$$GC_L = C_H GC_P \cos \theta = (1.04)(0.88) = 0.92,$$

$$R_L = F_L = q_z GC_L A_S = (24.46 \text{ PSF})(0.92)(107.53 \text{ ft}^2) = 2.42 \text{ kips}$$

Wind Vertical Down, When $\theta = 52^\circ$

$$GC_L = C_H GC_P \cos \theta = (1.04)(-0.84) = -0.87$$

$$R_L = F_L = q_z GC_L A_S = (24.46 \text{ PSF})(-0.87)(107.53 \text{ ft}^2) = -2.29 \text{ kips}$$

Snow Vertical Down, When $\theta = 0^\circ$

The ground snow load is 30.00 PSF.

Thus, $p_S = 10.89 \text{ PSF}$

$$F_S = p_S A_S = (10.89 \text{ PSF})(190.29 \text{ ft}^2) = -2.07 \text{ kips}$$

Ground-line Moments, When $\theta = 52^\circ$

$$M_G = F_D h + q_z GC_M A_S y = (2.95 \text{ k})(8.50') + (24.46 \text{ PSF})(0.18)(107.53 \text{ ft}^2)(7.82') = 28.78 \text{ k-ft}$$

The estimated dead weight on each column = -0.53 kips.

Exterior Row Columns – Max Unfactored Forces

Wind Horizontal Drag, When $\theta = 52^\circ$

$$GC_D = C_H GC_P \sin \theta = (1.04)(1.22) = 1.27$$

$$A_S = \bar{a}_b Y = (165'' \div 12)(7.82') = 107.53 \text{ ft}^2$$

$$R_D = F_D = q_z GC_D A_S = (24.46 \text{ PSF})(1.27)(107.53 \text{ ft}^2) = 3.34 \text{ kips}$$

Wind Vertical Up, When $\theta = 52^\circ$

$$GC_L = C_H GC_P \cos \theta = (1.04)(0.99) = 1.03$$

$$R_L = F_L = q_z GC_L A_S = (24.46 \text{ PSF})(1.03)(107.53 \text{ ft}^2) = 2.71 \text{ kips}$$

Wind Vertical Down, When $\theta = 52^\circ$

$$GC_L = C_H GC_P \cos \theta = (1.04)(-0.95) = -0.99$$

$$R_L = F_L = q_z GC_L A_S = (24.46 \text{ PSF})(-0.99)(107.53 \text{ ft}^2) = -2.60 \text{ kips}$$

Snow Vertical Down, When $\theta = 0^\circ$

The ground snow load of 30.00 PSF.

Thus, $p_S = 10.89 \text{ PSF}$

$$F_S = p_S A_S = (10.89 \text{ PSF})(134.90 \text{ ft}^2) = -1.47 \text{ kips}$$

Ground-line Moments, When $\theta = 52^\circ$

$$M_G = F_D h + q_z GC_M A_S y = (3.34 \text{ k})(8.50') + (24.46 \text{ PSF})(0.19)(107.53 \text{ ft}^2)(7.82') = 32.30 \text{ k-ft}$$

The estimated dead weight on each column = -0.46 kips.

Snow Load Note: The snow load is the maximum of $0.7(C_e)(C_t)(I)(p_g)$ and either $p_g(I)$, if the ground snow (p_g) is greater than 20psf, or $20(I)$, if the ground snow is less than 20psf.

Max. Ground Force Summary Table

Loading Type	HEIGHT = 8.50'		HEIGHT = 7.50'		HEIGHT = 6.50'	
	Interior Column	Exterior Column	Interior Column	Exterior Column	Interior Column	Exterior Column
R_D (drag), kips	2.95	3.34	2.92	3.29	2.89	3.26
R_L (wind vertical up), kips	2.42	2.71	2.37	2.68	2.37	2.66
R_L (wind vertical down), kips	-2.29	-2.60	-2.26	-2.58	-2.24	-2.55
R_L (snow vertical down), kips	-2.07	-1.47	-2.07	-1.47	-2.07	-1.47
M_G (ground-line), k-ft	28.78	32.30	25.60	28.58	22.49	25.10
Estimated Dead-weight, kips	-0.53	-0.46	-0.53	-0.46	-0.53	-0.46

Note: Design forces summarized in the table are from ATI tracker components ONLY. Foundation engineer must include any additional component design forces that customer may attach to the array that are not ATI supplied. Example: CAB, cable trays etc.

The above loads are applied at each column. Interpolation of the forces is allowed for heights between 6.50' and 8.50'. Heights outside of these values will require an updated or additional ground force document from ATI.

ASCE 7 recommends the following **interaction equations** for **LRFD** design:

$$1. 1.2D + 1.6S + 0.5W \quad 2. 1.2D + 1.0W + 0.5S \quad 3. 0.9D + 1.0W \quad 4. 1.2D + 1.0E$$

ASCE 7 recommends the following **interaction equations** for **ASD** design:

$$1) 1.0D + 0.6W \quad 2) 1.0D + 0.6(0.75)W + 0.75S \quad 3) 0.6D + 0.6W$$

$$4) 1.0D + 1.0S \quad 5) 1.0D + 0.7E \quad 6) 1.0D + (0.75)(0.7)E + 0.75S$$

Note: the acceptable elastic deflections at the top of the column in E-W direction are approximately 3"~4" and are 3"~4" in N-S direction.

N-S Loading Due to Tracker Weight

N-S wind loading is negligible, and N-S loads on the tracker are mostly due to the weight of tracker and seismic loading. Seismic loading is described next on this document. N-S loading due to tracker weight is $W \sin(\text{N-S slope in degrees})$ where W is the weight of tracker and N-S slope is assumed maximum as 4 degrees. For higher slopes, Array should be notified as loads may be affected.

N-S load due to tracker weight = $6919 \text{ lbs} \times \sin(4^\circ) = 0.48 \text{ kips}$.

N-S loads due to tracker weight is equally shared by gear rack column and seismic columns as described in seismic loading in the following section.

Seismic Loading – North / South Direction (Weak-Axis)

According to ASCE code, Considering tracker as an inverted pendulum. The equivalent lateral force is as follows:

$V_s = C_s W$, $C_s = \frac{S_{DS}}{(\frac{R}{I_e})}$, Where $R=2.0$, for an inverted pendulum and

$I_e = 1.0$ for occupancy Category I - Low Risk in accordance with ASCE code.

$S_{DS} = 0.22g$ and $C_s = \frac{0.22g}{2.0} = 0.11g$

The effective seismic weight of one row, $W = 6919 \text{ lbs}$ excluding all the columns.

The total lateral seismic force acting on the array, in any horizontal direction, is:

$$V_s = (0.11g) \left(\frac{6919 \text{ lb}}{g} \right) = 0.76 \text{ k}$$

The gear rack center structure and the seismic columns with the set screw bearing housings restrains the tracker in N/S direction and share the loads equally. The moment on the north south seismic resisting system is as follows:

Seismic Shear Per Column:



$$V_{per\ column} = \frac{1}{3} [V_s] = \frac{1}{3} [0.76k] = 0.25 \text{ kips}$$

(Note: Seismic shear can be distributed to additional columns to lower shear per column)

$$M_{sc} = \frac{1}{3} [V_s] \times h$$

$$M_{sc} = \frac{1}{3} [0.76k](8.50') \times 12 \text{ in/ft} = 25.88 \text{ k-in}$$

Seismic Loading – East / West Direction (Strong-Axis)

In the east-west direction, the load is equally shared among all columns.

$$V_s = \frac{0.76 \text{ k}}{13} = 0.06 \text{ kips per column}$$

$$M_s = 0.06 \text{ k} (8.50') \times 12 \text{ in/ft} = 6.12 \text{ k-in}$$

When comparing the seismic load in the east-west direction to the wind load, the seismic load is substantially lower and can be deemed negligible. For more detailed information on structural loading, please contact Rebecca Troske.