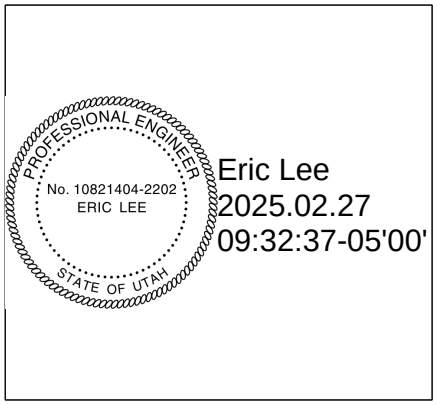
CALCULATIONS FOR:

POLIGON REK 45X84
STANDING SEAM OVER STAINED TONGUE AND GROOVE
2021 INTERNATIONAL BUILDING CODE



PREPARED UNDER THE CONTROL AND SUPERVISION OF THE DESIGN PROFESSIONAL ABOVE. THE SEAL APPLIES ONLY TO BUILDING COMPONENTS DETAILED WITHIN THESE CALCULATIONS AND SUPPLIED BY PORTER CORP AS WELL AS THE FOUNDATION DESIGN, IF APPLICABLE.

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DESIGN CRITERIA

GENERAL

Building Code:	See Cover Sheet	Roof Slope (°):	18.43		*4:12 Pitch*
Design Code:	ASCE 7-16				
Risk Category:	II	Equivalent Roof Height:	15.00	ft	

DEAD LOAD

Weight of Roofing System	6.0	psf	
Frame Dead Load	Frame Self-Weight		*(See RISA Analysis Report)*

LIVE LOAD

Roof Live Load, L_r	20.0	psf	*ASCE 7 Table 4-1*

SNOW LOAD

Ground Snow Load, p_g	31.0	psf	
Importance Factor, I (Snow Loads)	1.00		*ASCE 7 Table 1.5-2*
Slope Factor, C_s	1.0		*ASCE 7 Figure 7.4-1*
Thermal Factor, C_t	1.2		*ASCE 7 Table 7.3-2*
Exposure Factor, C_e	1.0		*ASCE 7 Table 7.3-1*
Flat Roof Snow Load, p_f	26.0	psf	*ASCE 7 Section 7.3*
Leeward Unbalanced Snow Load	26.0	psf	*ASCE 7 Section 7.6.1*
Drift Surcharge Load, p_d	0.0	psf	*ASCE 7 Section 7.7*
Width of Snow Drift, w	0.0	ft	*ASCE 7 Section 7.7*
Sliding Snow Load	0.0	psf	*ASCE 7 Section 7.9*

WIND LOAD

Basic Wind Speed, V	V_{ult}	105	mph	V_{asd}	81	mph	*ASCE 7 Section 26.5*
Exposure Category		C		V_T		mph	*ASCE 7 Section 26.7*
Ground Elevation Factor, Ke		1.00					*ASCE 7 Table 26.9-1*
Gust Effect Factor, G		0.85					*ASCE 7 Section 26.11.1*
Velocity Pressure Exposure Coefficient, K_z		0.85					*ASCE 7 Table 26.10-1*
Wind Directionality Factor, K_d		0.85		K_{zT}	0.80		*ASCE 7 Table 26.6-1*
Topographic Factor, K_{zt}		1.00					*ASCE 7 Section 26.8.2*
Velocity Pressure, q_z		20.39	psf	q_{zT}	0.00	psf	*ASCE 7 Section 26.10.2*

Main Wind-Force Resisting System *ASCE 7 Section 27.3*

Open Building, Clear Wind Flow (Cn from ASCE 7 Fig. 27.3-4 - 27.3-7)

	Roof	
Load Case	A	B
γ = 0		
Windward Cp =	1.10	0.01
p (psf):	19.07	0.15
γ = 180		
Leeward Cp=	-0.17	-0.96
p (psf):	-2.96	-16.68
γ = 90		
Sideward Cp=	-0.80	0.80
p (psf):	-13.87	13.87

Component and Cladding Elements *ASCE 7 Section 30.7.2*

Open Building, Clear Wind Flow (Cn from ASCE 7 Fig. 30.7-1 - 30.7-3)

	Wind Direction	*Toward Roof*	*Away From Roof*
Zone 3	Cn:	2.29	-2.11
	p (psf):	39.72	-36.55
Zone 2	Cn:	1.77	-1.63
	p (psf):	30.66	-28.28
Zone 1	Cn:	1.15	-1.05
	p (psf):	19.86	-18.27

SEISMIC LOAD

Analysis Procedure	Equivalent Lateral Force Procedure		*ASCE 7 Section 12.8*
Seismic Site Class	D		*ASCE 7 Section 11.4.2*
Basic Seismic Force Resisting System	Steel Ordinary Cantilever Column Systems		*ASCE 7 Table 12.2-1*
Short Spectral Response Parameter, S_s	1.39		
1-Sec Spectral Response Parameter, S_1	0.52		
Seismic Design Category	D		*ASCE 7 Section 11.6*
Importance Factor, I	1.00		*ASCE 7 Table 11.5-1*
Response Modification Coefficient, R	1.25		*ASCE 7 Table 12.2-1*
Redundancy Factor, ρ	1.30		*ASCE 7 Table 12.2-1*
Overstrength Factor, Ω_o	1.25		*ASCE 7 Table 12.2-1*
Design Short Spectral Response Parameter, S_{DS}	0.93		*ASCE 7 Section 11.4.4*
1-Sec Design Spectral Response Parameter, S_{D1}	0.92		*ASCE 7 Section 11.4.4*
Seismic Response Coefficient, C_s	0.74		*ASCE 7 Section 12.8.1.1*
Effective Seismic Weight, W	6.00	psf	*ASCE 7 Section 12.7.2*
Seismic Base Shear, V	4.45	psf	*ASCE 7 Section 12.8.1*
Seismic Load, E	5.79	psf	*ASCE 7 Section 12.4*
Seismic Load with Overstrength Factor, E_m	5.57	psf	*ASCE 7 Section 12.4*

STRUCTURAL ENGINEERING NOTES

GENERAL NOTES

Loads applied to the structure may be greater than required for the project location.

Actual structure dimensions may be smaller than shown in this document.

The engineering seal for the structure designed in these calculations is only valid if Porter Corp fabricates the steel components. Fabricating the steel components elsewhere voids the engineering provided by Porter Corp.

Porter Corp is responsible only for the structural design of the Steel Structure (and foundation design if applicaple) it sells to the Builder. Porter Corp or their engineer is not the Design Professional or Engineer of Record for the Construction Project. Porter Corp is not responsible for the design of any components or materials not sold by it or their interface and connection with the Steel Structure.

STRUCTURAL ANALYSIS NOTES

RISA-3D structural analysis software was used to model the 3-D space frame.

To reduce the amount of computer printout, the analysis results only show each member's controlling load case.

Unless noted otherwise in the ‘RISA Analysis Report’, the roof deck was not utilized in the structural analysis to provide lateral support to the members.

From the analysis, all member deflections and structural drift are within allowable limits.

STRUCTURAL DESIGN NOTES

End plates were designed by applying beam end forced to the edges of the plate and calculating the resulting prying moment at the edge of the bolt holes. In determining the prying moment it was assumed that the area of the plate between bolts was fixed.

Light gage members were designed in accordance with the latest edition of the AISC specifications and the AISI Cold-Formed Steel Design Manual.

STRUCTURAL CONNECTION NOTES

Bolt threads were assumed to not be excluded from the connections.

LOAD COMBINATIONS

Key

Abbreviation	Description
DL	Dead Load
Lr	Roof Live Load
S	Snow Load
Su	Unbalanced Snow Load
Ssliding	Sliding Snow
Sdrift	Snow Drift
Wx	Wind Load (X-Direction)
Wz	Wind Load (Z-Direction)
Wx (Min.)	16 psf Minimum Wind Load (X-Direction)
Wz (Min.)	16 psf Minimum Wind Load (Z-Direction)
Ex	Seismic Load (X-Direction)
Ez	Seismic Load (Z-Direction)
Emx	Seismic Load (X-Direction) with Overstrength Factor
Emz	Seismic Load (Z-Direction) with Overstrength Factor
Ev	Vertical Seismic Load Effect
LC	Load Case

Service (Unfactored)

Number	Description
1	SERVICE D
2	SERVICE Lr
3	SERVICE S
4	SERVICE Su
5	SERVICE Ssliding
6	SERVICE Sdrift
7	SERVICE Wx (LC A)
8	SERVICE Wx (LC B)
9	SERVICE Wz (LC A)
10	SERVICE Wz (LC B)
11	SERVICE Ex
12	SERVICE Ez
13	SERVICE Ev

Allowable Stress Design (Factored)

Number	Description
17	D
18	D + Lr
19	D + S
20	D + Su
21	D+Ssliding
22	D+Sdrift
23	D + 0.6Wx (LC A)
24	D + 0.6Wx (LC B)
25	D + 0.6Wz (LC A)
26	D + 0.6Wz (LC B)
27	D + (0.6Wx (Min.))
28	D + (0.6Wz (Min.))
29	D+0.6(0.75Wx(LC A)+0.75Wz(LC A))
30	D+0.6(0.75Wx(LC B)+0.75Wz(LC B))
31	D+0.6(0.75Wx(Min.)+0.75Wz(Min.))
32	D + 0.75(0.6Wx (LC A)) + 0.75Lr
33	D + 0.75(0.6Wx (LC B)) + 0.75Lr
34	D + 0.75(0.6Wz (LC A)) + 0.75Lr
35	D + 0.75(0.6Wz (LC B)) + 0.75Lr
36	D + 0.75(0.6Wx (Min.)) + 0.75Lr
37	D + 0.75(0.6Wz (Min.)) + 0.75Lr
38	D+0.75(0.6(0.75Wx(LC A)+0.75Wz(LC A))) + 0.75Lr
39	D+0.75(0.6(0.75Wx(LC B)+0.75Wz(LC B)) + 0.75Lr
40	D+ 0.75(0.6(0.75Wx(Min.)+0.75Wz(Min.))) + 0.75Lr
41	D + 0.75(0.6Wx (LC A)) + 0.75S
42	D + 0.75(0.6Wx (LC B)) + 0.75S
43	D + 0.75(0.6Wz (LC A)) + 0.75S
44	D + 0.75(0.6Wz (LC B)) + 0.75S
45	D + 0.75(0.6Wx (Min.)) + 0.75S
46	D + 0.75(0.6Wz (Min.)) + 0.75S
47	D+0.75(0.6(0.75Wx(LC A)+0.75Wz(LC A))) + 0.75S
48	D+0.75(0.6(0.75Wx(LC B)+0.75Wz(LC B)) + 0.75S
49	D+ 0.75(0.6(0.75Wx(Min.)+0.75Wz(Min.))) + 0.75S
50	0.6D + 0.6Wx (LC A)
51	0.6D + 0.6Wx (LC B)
52	0.6D + 0.6Wz (LC A)
53	0.6D + 0.6Wz (LC B)
54	0.6D + (0.6Wx (Min.))
55	0.6D + (0.6Wz (Min.))
56	0.6D+0.6(0.75Wx(LC A)+0.75Wz(LC A))
57	0.6D+0.6(0.75Wx(LC B)+0.75Wz(LC B))
58	0.6D+0.6(0.75Wx(Min.)+0.75Wz(Min.))
59	1.0D+0.7Ev+0.7Ehx
60	1.0D+0.525Ev+0.525Ehx+0.75S
61	0.6D-0.7Ev+0.7Ehx
62	1.0D+0.7Ev+0.7Ehz
63	1.0D+0.525Ev+0.525Ehz+0.75S
64	0.6D-0.7Ev+0.7Ehz
65	1.0D+0.7Ev+0.7Ehx+0.21Ehz
66	1.0D+0.525Ev+0.525Ehx+0.1575Ehz+0.75S
67	0.6D-0.7Ev+0.7Ehx+0.21Ehz
68	1.0D+0.7Ev+0.7Ehz+0.21Ehx
69	1.0D+0.525Ev+0.525Ehz+0.1575Ehx+0.75S
70	0.6D-0.7Ev+0.7Ehz+0.21Ehx

Notes:

1. Load combinations are effective in all states that have adopted IBC as a base code.
2. See "RISA Analysis Report" for the load combinations that are not listed above.

LOAD COMBINATIONS

Strength Design (Factored)

Number	Description
92	1.4D
93	1.2D + 0.5Lr
94	1.2D + 0.5S
95	1.2D + 1.6Lr + 0.5Wx (LC A)
96	1.2D + 1.6Lr + 0.5Wx (LC B)
97	1.2D + 1.6Lr + 0.5Wz (LC A)
98	1.2D + 1.6Lr + 0.5Wz (LC B)
99	1.2D + 1.6Lr + 0.5Wx (Min.)
100	1.2D + 1.6Lr + 0.5Wz (Min.)
101	1.2D + 1.6Lr + 0.5(0.75Wx (LC A)+0.75Wz (LC A))
102	1.2D + 1.6Lr + 0.5(0.75Wx (LC B)+0.75Wz (LC B))
103	1.2D + 1.6Lr + 0.5(0.75Wx (Min.)+0.75Wz (Min.))
104	1.2D + 1.6S + 0.5Wx (LC A)
105	1.2D + 1.6S + 0.5Wx (LC B)
106	1.2D + 1.6S + 0.5Wz (LC A)
107	1.2D + 1.6S + 0.5Wz (LC B)
108	1.2D + 1.6S + 0.5Wx (Min.)
109	1.2D + 1.6S + 0.5Wz (Min.)
110	1.2D + 1.6S + 0.5(0.75Wx (LC A)+0.75Wz (LC A))
111	1.2D + 1.6S + 0.5(0.75Wx (LC B)+0.75Wz (LC B))
112	1.2D + 1.6S + 0.5(0.75Wx (Min.)+0.75Wz (Min.))
113	1.2D + 1.6Su + 0.5Wx (LC A)
114	1.2D + 1.6Su + 0.5Wx (LC B)
115	1.2D + 1.6Su + 0.5Wz (LC A)
116	1.2D + 1.6Su + 0.5Wz (LC B)
117	1.2D + 1.6Su + 0.5Wx (Min.)
118	1.2D + 1.6Su + 0.5Wz (Min.)
119	1.2D + 1.6Su + 0.5(0.75Wx (LC A)+0.75Wz (LC A))
120	1.2D + 1.6Su + 0.5(0.75Wx (LC B)+0.75Wz (LC B))
121	1.2D + 1.6Su + 0.5(0.75Wx (Min.)+0.75Wz (Min.))
122	1.2D + 1.6Ssliding + 0.5Wx (LC A)
123	1.2D + 1.6Ssliding + 0.5Wx (LC B)
124	1.2D + 1.6Ssliding + 0.5Wz (LC A)
125	1.2D + 1.6Ssliding + 0.5Wz (LC B)
126	1.2D + 1.6Ssliding + 0.5Wx (Min.)
127	1.2D + 1.6Ssliding + 0.5Wz (Min.)
128	1.2D + 1.6Ssliding + 0.5(0.75Wx (LC A)+0.75Wz (LC A))
129	1.2D + 1.6Ssliding + 0.5(0.75Wx (LC B)+0.75Wz (LC B))
130	1.2D + 1.6Ssliding + 0.5(0.75Wx (Min.)+0.75Wz (Min.))
131	1.2D + 1.6Sdrift + 0.5Wx (LC A)
132	1.2D + 1.6Sdrift + 0.5Wx (LC B)
133	1.2D + 1.6Sdrift + 0.5Wz (LC A)
134	1.2D + 1.6Sdrift + 0.5Wz (LC B)
135	1.2D + 1.6Sdrift + 0.5Wx (Min.)
136	1.2D + 1.6Sdrift + 0.5Wz (Min.)
137	1.2D + 1.6Sdrift + 0.5(0.75Wx (LC A)+0.75Wz (LC A))
138	1.2D + 1.6Sdrift + 0.5(0.75Wx (LC B)+0.75Wz (LC B))
139	1.2D + 1.6Sdrift + 0.5(0.75Wx (Min.)+0.75Wz (Min.))
140	1.2D + 1.0Wx (LC A) + 0.5Lr
141	1.2D + 1.0Wx (LC B) + 0.5Lr
142	1.2D + 1.0Wz (LC A) + 0.5Lr
143	1.2D + 1.0Wz (LC B) + 0.5Lr
144	1.2D + 1.0Wx (Min.) + 0.5Lr
145	1.2D + 1.0Wz (Min.) + 0.5Lr
146	1.2D + 1.0(0.75Wx (LC A)+0.75Wz (LC A)) + 0.5Lr
147	1.2D + 1.0(0.75Wx (LC B)+0.75Wz (LC B)) + 0.5Lr
148	1.2D + 1.0(0.75Wx (Min.)+0.75Wz (Min.)) + 0.5Lr
149	1.2D + 1.0Wx (LC A) + 0.5S
150	1.2D + 1.0Wx (LC B) + 0.5S
151	1.2D + 1.0Wz (LC A) + 0.5S
152	1.2D + 1.0Wz (LC B) + 0.5S
153	1.2D + 1.0Wx (Min.) + 0.5S
154	1.2D + 1.0Wz (Min.) + 0.5S
155	1.2D + 1.0(0.75Wx (LC A)+0.75Wz (LC A)) + 0.5S
156	1.2D + 1.0(0.75Wx (LC B)+0.75Wz (LC B)) + 0.5S
157	1.2D + 1.0(0.75Wx (Min.)+0.75Wz (Min.)) + 0.5S
158	0.9D + 1.0Wx (LC A)
159	0.9D + 1.0Wx (LC B)
160	0.9D + 1.0Wz (LC A)
161	0.9D + 1.0Wz (LC B)
162	0.9D + 1.0Wx (Min.)
163	0.9D + 1.0Wz (Min.)
164	0.9D + 1.0(0.75Wx (LC A)+0.75Wz (LC A))
165	0.9D + 1.0(0.75Wx (LC B)+0.75Wz (LC B))
166	0.9D + 1.0(0.75Wx (Min.)+0.75Wz (Min.))
167	1.2D+Ev+Ehx+0.2S
168	0.9D-Ev+Ehx
169	1.2D+Ev+Ehz+0.2S
170	0.9D-Ev+Ehz
171	1.2D+Ev+Ehx+0.3Ehz+0.2S
172	0.9D-Ev+Ehx+0.3Ehz
173	1.2D+Ev+Ehz+0.3Ehx+0.2S
174	0.9D-Ev+Ehz+0.3Ehx

Notes:

1. Load combinations are effective in all states that have adopted IBC as a base code.
2. See "RISA Analysis Report" for the load combinations that are not listed above.

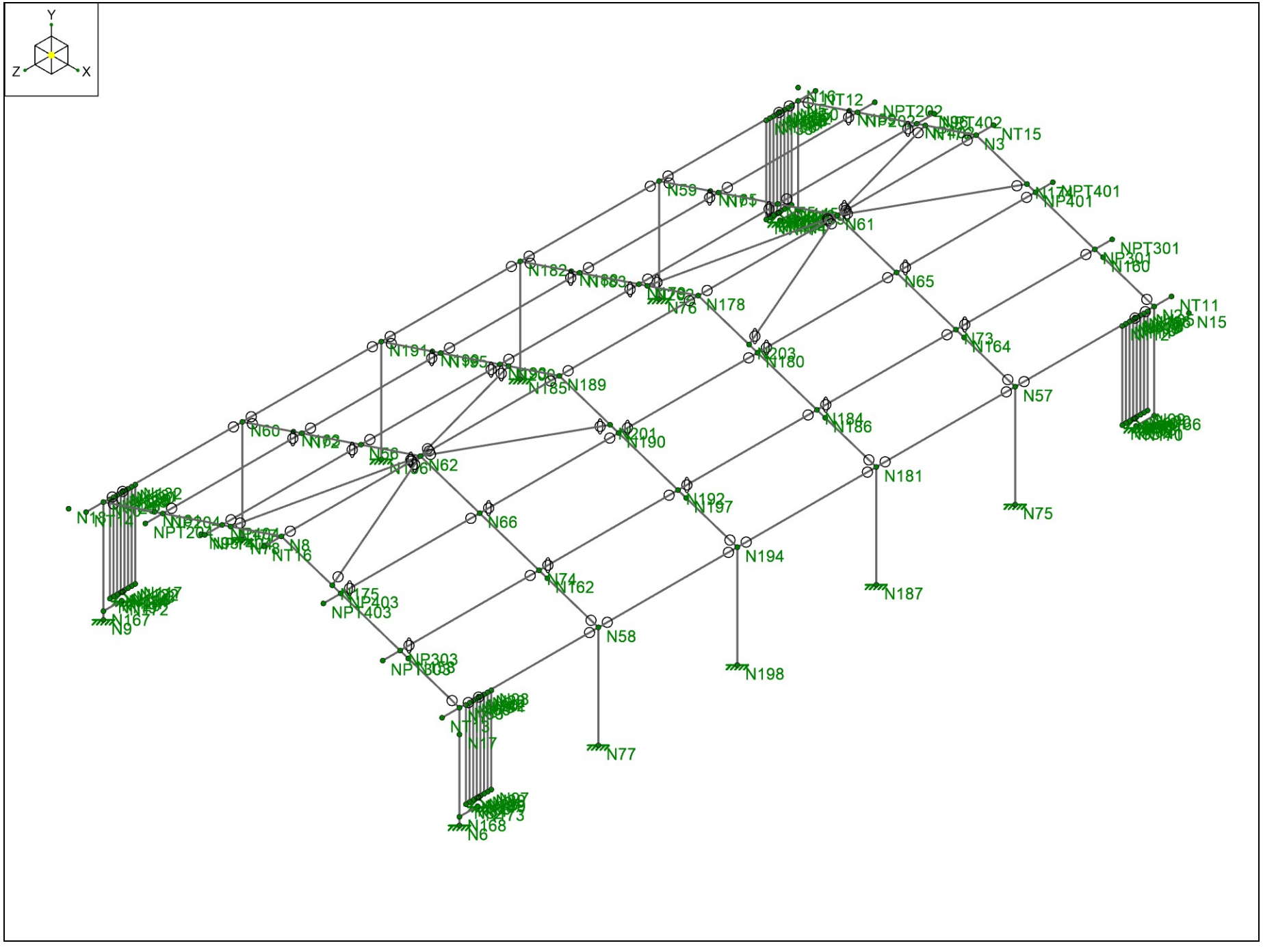
MATERIALS

Column	HSS14x14x3/8
Truss	HSS20x8x3/8
Tension	HSS6x6x3/16
Ridge	HSS8x4x3/16
Purlin	HSS8x6x3/16
Purlin Tail	HSS8x6x3/16
Tension Tail	HSS6x6x3/16
Ridge Tail	HSS8x4x3/16
Vert Ornamentation	HSS4x2x1/8
Brace	HSS5x5x3/8
Compression Tube	HSS16x12x3/8

HSS Sections:	ASTM A500 Gr. C
Pipe Sections:	ASTM A53 Gr. B
RMT Sections:	ASTM A519
Channel & Angle Sections:	ASTM A36
Connection Plates:	ASTM A36
Connections Bolts	ASTM A325
Welding Process:	Gas Metal Arc Welding
Welding Electrode:	E70xx

RISA MODEL VIEWS

Joint Labels
Member Labels
Member Shapes
Member Lengths
Member Local Axis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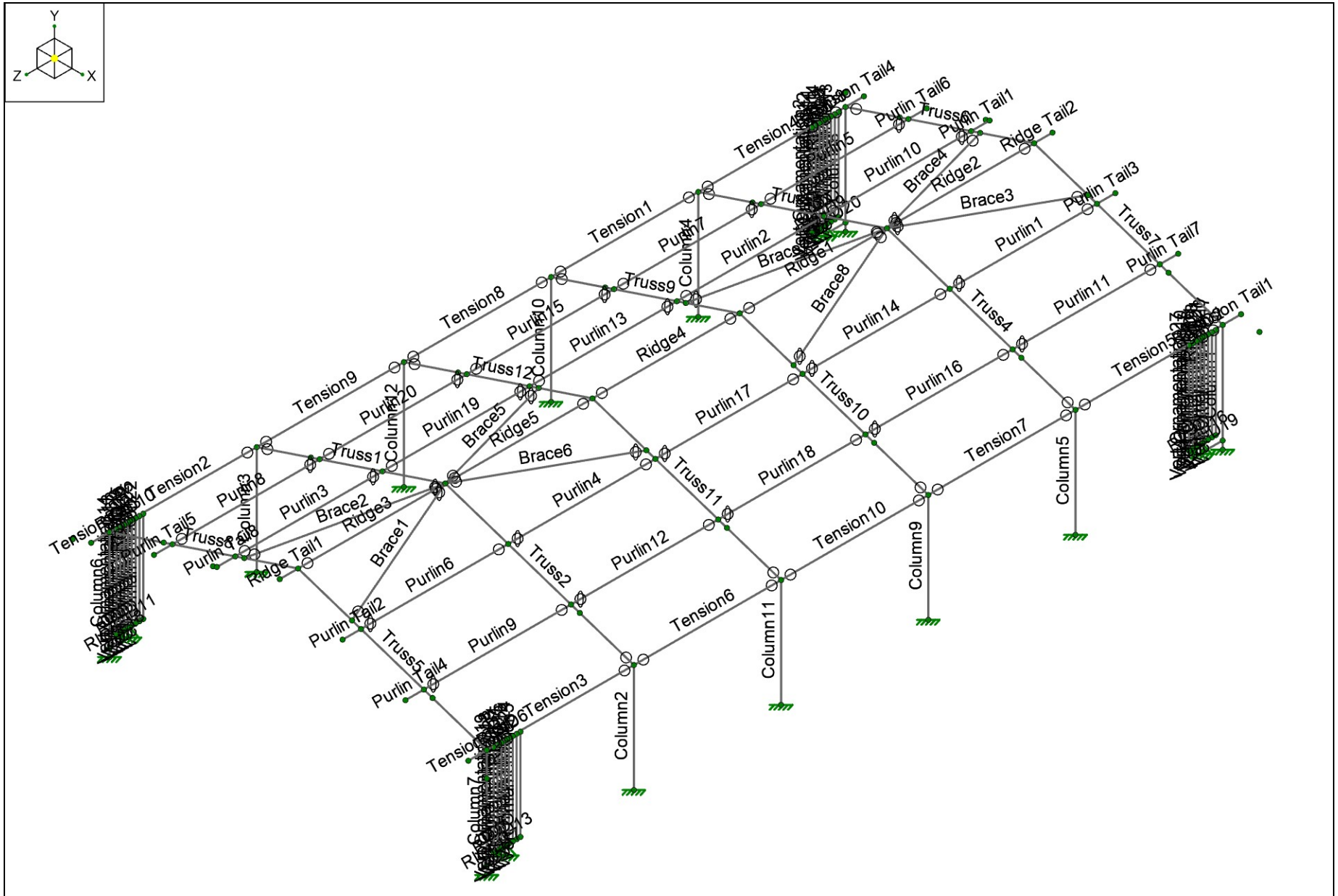
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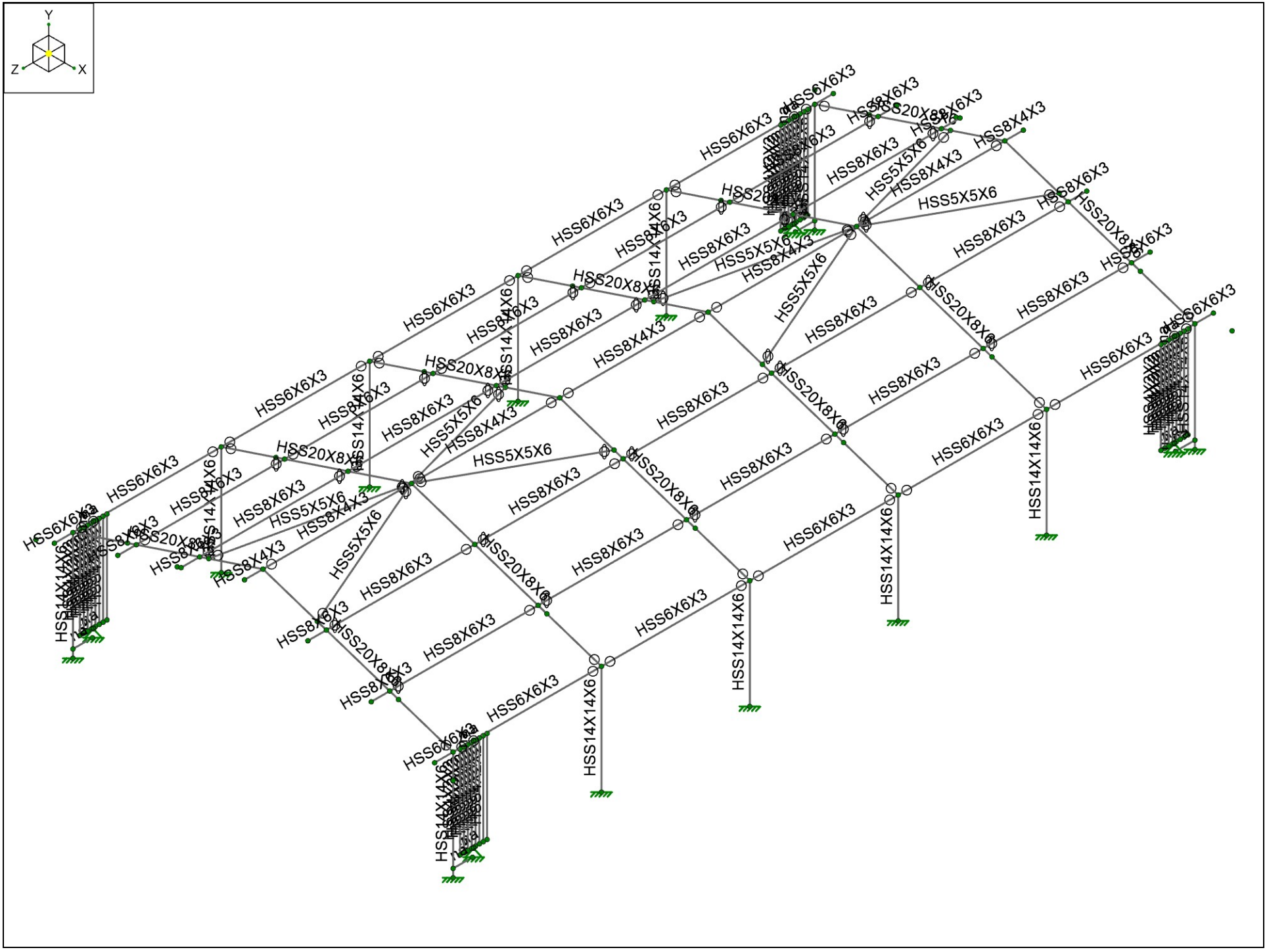
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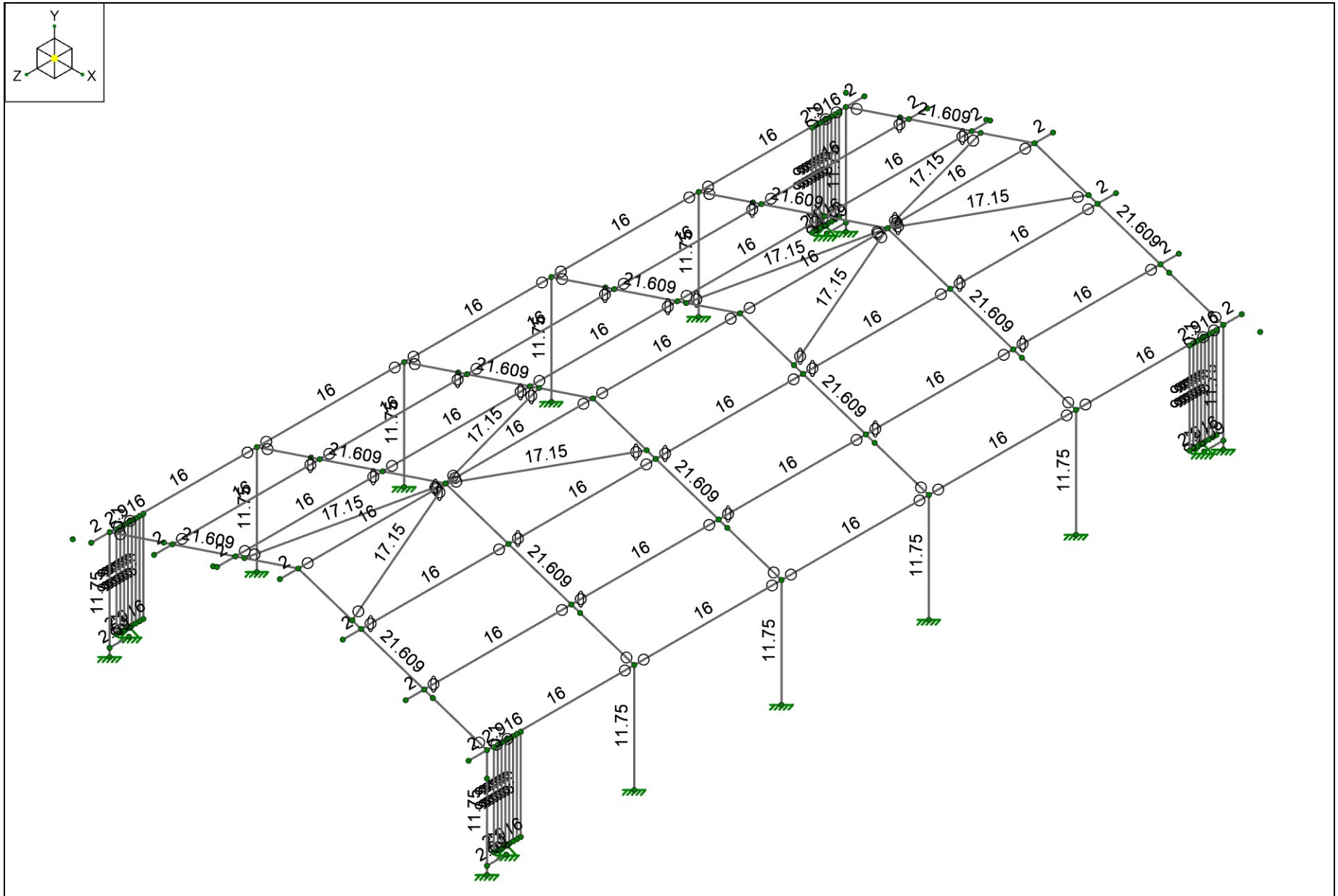
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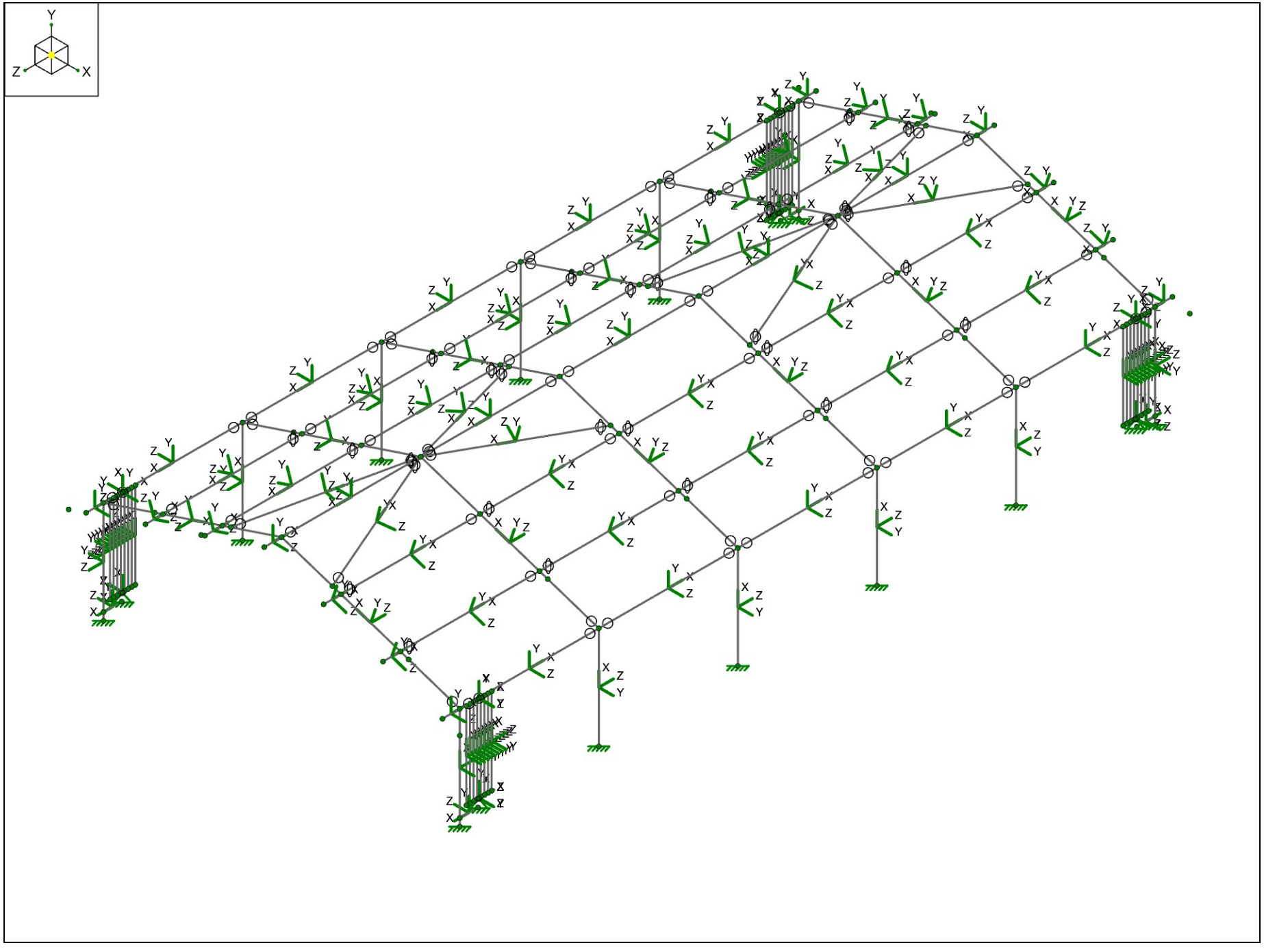
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FOUNDATION REACTIONS

FOUNDATIONS BY OTHERS

NOTE: SEE ATTACHED SERVICE LOAD (UNFACTORED) COLUMN BASE REACTIONS.
ANCHORAGE DESIGNED WITH THE FOLLOWING ASSUMPTIONS. CONTACT POLIGON IF THESE MINIMUM REQUIREMENTS ARE NOT MET.

1) CONCRETE COMPRESSIVE STRENGTH (F'C) = 4500 PSI MINIMUM
2) SEE ANCHOR CALCULATIONS FOR QUANTITY AND DIAMETER
3) MINIMUM ANCHORAGE EDGE DISTANCE = SEE ANCHOR CALCULATIONS
4) CAST-IN-PLACE ANCHORS ARE ASTM F-1554 Gr.55 S1
5) MINIMUM ANCHORAGE EMBEDMENT = 20 IN
6) POST-INSTALLED ANCHORS ARE NOT AN AVAILABLE OPTION

SERVICE LOAD COLUMN BASE REACTION SUMMARY

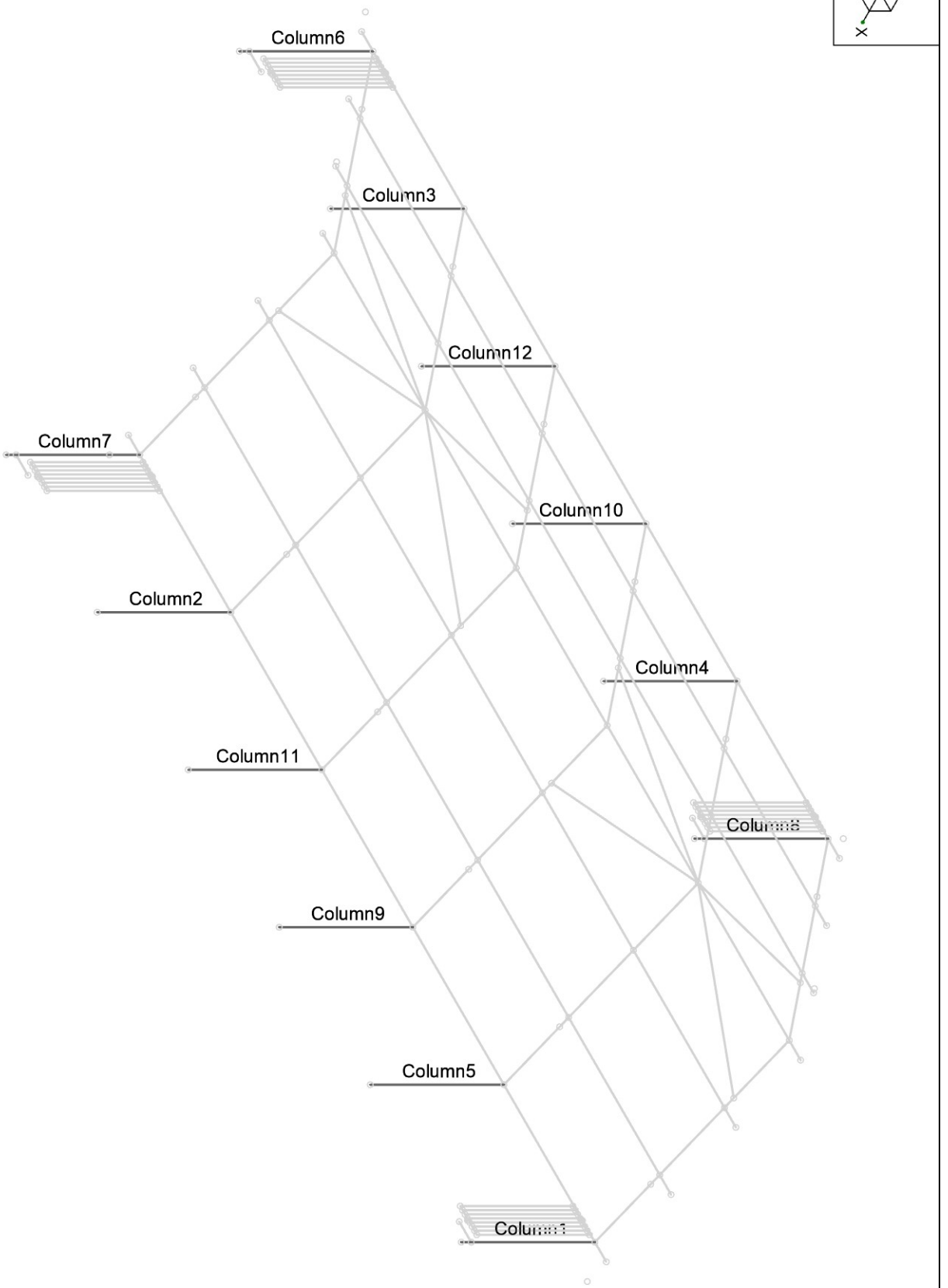
Refer to RISA model views for column local axis
Wind values are based on Vasd and should be factored accordingly for LRFD analysis
Negative axial values represent uplift

Service Loads (Unfactored)

LC	Member Label	Sec	Axial [k]	y Shear [k]	z Shear [k]	Torque [k-in]	y-y Moment [k-in]	z-z Moment [k-in]	LC Description
1	Column1	1	4.654	-1.957	0.004	0.386	-0.542	-277.280	SERVICE D
1	Column2	1	5.585	-2.332	0.019	-0.704	-0.564	-328.436	SERVICE D
1	Column3	1	5.585	-2.332	-0.019	0.704	0.564	-328.437	SERVICE D
1	Column4	1	5.585	-2.332	0.019	-0.704	-0.565	-328.436	SERVICE D
1	Column5	1	5.585	-2.332	-0.019	0.704	0.564	-328.436	SERVICE D
1	Column6	1	4.654	-1.957	0.004	0.386	-0.542	-277.279	SERVICE D
1	Column7	1	4.654	-1.957	-0.004	-0.386	0.542	-277.276	SERVICE D
1	Column8	1	4.654	-1.957	-0.004	-0.386	0.542	-277.279	SERVICE D
1	Column9	1	5.716	-2.405	-0.001	0.060	-0.067	-339.016	SERVICE D
1	Column10	1	5.716	-2.405	0.001	-0.060	0.067	-339.017	SERVICE D
1	Column11	1	5.716	-2.405	0.001	-0.060	0.067	-339.018	SERVICE D
1	Column12	1	5.716	-2.405	-0.001	0.060	-0.067	-339.019	SERVICE D
2	Column1	1	4.840	-2.334	0.013	0.561	-0.937	-331.202	SERVICE Lr
2	Column2	1	6.817	-3.018	0.043	-1.601	-1.231	-424.834	SERVICE Lr
2	Column3	1	6.827	-3.078	-0.048	1.654	1.765	-433.335	SERVICE Lr
2	Column4	1	6.854	-3.054	0.043	-1.574	-1.374	-430.011	SERVICE Lr
2	Column5	1	6.827	-3.056	-0.047	1.609	1.834	-430.278	SERVICE Lr
2	Column6	1	4.832	-2.363	0.012	0.623	-0.976	-335.309	SERVICE Lr
2	Column7	1	4.850	-2.244	-0.018	-0.552	1.603	-318.601	SERVICE Lr
2	Column8	1	5.007	-2.316	-0.017	-0.529	1.444	-328.819	SERVICE Lr
2	Column9	1	7.233	-3.335	-0.013	0.414	0.588	-469.871	SERVICE Lr
2	Column10	1	7.239	-3.354	0.009	-0.379	-0.150	-472.523	SERVICE Lr
2	Column11	1	7.233	-3.335	0.009	-0.400	-0.017	-469.776	SERVICE Lr
2	Column12	1	7.241	-3.357	-0.013	0.449	0.491	-472.964	SERVICE Lr
3	Column1	1	6.298	-3.029	0.021	0.720	-1.785	-430.322	SERVICE S
3	Column2	1	8.888	-3.987	0.058	-2.083	-1.911	-561.318	SERVICE S
3	Column3	1	8.888	-3.987	-0.058	2.083	1.911	-561.321	SERVICE S
3	Column4	1	8.888	-3.987	0.058	-2.083	-1.912	-561.320	SERVICE S
3	Column5	1	8.888	-3.987	-0.058	2.083	1.912	-561.320	SERVICE S
3	Column6	1	6.298	-3.029	0.021	0.720	-1.785	-430.316	SERVICE S
3	Column7	1	6.298	-3.028	-0.021	-0.720	1.785	-430.312	SERVICE S
3	Column8	1	6.298	-3.029	-0.021	-0.720	1.785	-430.321	SERVICE S
3	Column9	1	9.422	-4.367	-0.014	0.530	0.370	-615.209	SERVICE S
3	Column10	1	9.422	-4.367	0.014	-0.530	-0.370	-615.209	SERVICE S
3	Column11	1	9.422	-4.367	0.014	-0.530	-0.370	-615.217	SERVICE S
3	Column12	1	9.422	-4.367	-0.014	0.530	0.370	-615.218	SERVICE S
4	Column1	1	3.615	-2.507	-0.015	1.147	-0.190	-355.490	SERVICE Su
4	Column2	1	4.950	-3.293	0.047	-1.713	-1.426	-463.720	SERVICE Su
4	Column3	1	8.414	-3.305	-0.048	1.719	1.658	-465.268	SERVICE Su
4	Column4	1	8.413	-3.304	0.048	-1.725	-1.640	-465.231	SERVICE Su
4	Column5	1	4.949	-3.293	-0.047	1.719	1.407	-463.684	SERVICE Su
4	Column6	1	5.983	-2.510	0.032	0.278	-2.026	-356.504	SERVICE Su
4	Column7	1	3.617	-2.509	0.015	-1.141	0.172	-355.824	SERVICE Su
4	Column8	1	5.979	-2.507	-0.032	-0.284	2.044	-356.164	SERVICE Su
4	Column9	1	5.270	-3.607	-0.011	0.435	0.237	-508.129	SERVICE Su
4	Column10	1	9.000	-3.616	0.011	-0.436	-0.313	-509.444	SERVICE Su
4	Column11	1	5.270	-3.606	0.011	-0.429	-0.256	-507.915	SERVICE Su
4	Column12	1	8.995	-3.615	-0.012	0.431	0.331	-509.229	SERVICE Su
5	Column1	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column2	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column4	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column5	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column6	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column7	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column8	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column9	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column10	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column11	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	Column12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
6	Column1	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column2	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column4	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column5	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column6	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column7	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column8	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column9	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column10	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column11	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	Column12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
7	Column1	1	1.871	0.122	0.021	-0.687	-0.850	17.082	SERVICE Wx (LC A)
7	Column2	1	2.819	0.046	0.012	-0.383	-0.572	6.513	SERVICE Wx (LC A)
7	Column3	1	0.491	-1.379	-0.007	0.312	0.110	-194.264	SERVICE Wx (LC A)
7	Column4	1	0.491	-1.379	0.007	-0.312	-0.110	-194.263	SERVICE Wx (LC A)
7	Column5	1	2.819	0.046	-0.012	0.383	0.572	6.513	SERVICE Wx (LC A)
7	Column6	1	0.453	-1.142	-0.008	0.351	0.050	-161.428	SERVICE Wx (LC A)

Service Loads (Unfactored)

LC	Member Label	Sec	Axial [k]	y Shear [k]	z Shear [k]	Torque [k-in]	y-y Moment [k-in]	z-z Moment [k-in]	LC Description
7	Column7	1	1.871	0.122	-0.021	0.686	0.850	17.086	SERVICE Wx (LC A)
7	Column8	1	0.454	-1.142	0.008	-0.351	-0.050	-161.428	SERVICE Wx (LC A)
7	Column9	1	2.961	0.008	-0.003	0.109	0.159	1.188	SERVICE Wx (LC A)
7	Column10	1	0.535	-1.468	0.001	-0.063	0.028	-206.898	SERVICE Wx (LC A)
7	Column11	1	2.961	0.008	0.003	-0.109	-0.159	1.184	SERVICE Wx (LC A)
7	Column12	1	0.536	-1.468	-0.001	0.063	-0.028	-206.899	SERVICE Wx (LC A)
8	Column1	1	-0.652	1.006	0.004	-0.221	0.068	142.035	SERVICE Wx (LC B)
8	Column2	1	-0.810	1.226	-0.008	0.327	0.172	172.690	SERVICE Wx (LC B)
8	Column3	1	-2.588	0.138	0.012	-0.382	-0.525	19.401	SERVICE Wx (LC B)
8	Column4	1	-2.588	0.138	-0.012	0.382	0.525	19.401	SERVICE Wx (LC B)
8	Column5	1	-0.810	1.226	0.008	-0.327	-0.173	172.690	SERVICE Wx (LC B)
8	Column6	1	-1.734	0.040	-0.018	0.572	0.757	5.751	SERVICE Wx (LC B)
8	Column7	1	-0.652	1.006	-0.004	0.221	-0.069	142.033	SERVICE Wx (LC B)
8	Column8	1	-1.734	0.040	0.018	-0.572	-0.757	5.754	SERVICE Wx (LC B)
8	Column9	1	-0.869	1.310	0.001	-0.070	0.005	184.625	SERVICE Wx (LC B)
8	Column10	1	-2.722	0.183	-0.003	0.105	0.138	25.751	SERVICE Wx (LC B)
8	Column11	1	-0.869	1.310	-0.001	0.070	-0.005	184.626	SERVICE Wx (LC B)
8	Column12	1	-2.721	0.183	0.003	-0.105	-0.138	25.754	SERVICE Wx (LC B)
9	Column1	1	-1.833	0.736	-0.652	1.393	76.601	104.190	SERVICE Wz (LC A)
9	Column2	1	-2.850	1.143	-0.658	1.793	76.302	160.878	SERVICE Wz (LC A)
9	Column3	1	-2.850	1.143	0.658	-1.793	-76.302	160.878	SERVICE Wz (LC A)
9	Column4	1	-2.850	1.142	0.624	-0.607	-75.131	160.800	SERVICE Wz (LC A)
9	Column5	1	-2.850	1.142	-0.624	0.607	75.131	160.800	SERVICE Wz (LC A)
9	Column6	1	-2.170	1.017	0.630	-0.802	-75.220	143.360	SERVICE Wz (LC A)
9	Column7	1	-2.170	1.017	-0.630	0.802	75.220	143.359	SERVICE Wz (LC A)
9	Column8	1	-1.833	0.736	0.652	-1.393	-76.601	104.190	SERVICE Wz (LC A)
9	Column9	1	-3.180	1.394	-0.632	0.945	75.279	195.731	SERVICE Wz (LC A)
9	Column10	1	-3.180	1.394	0.632	-0.945	-75.279	195.731	SERVICE Wz (LC A)
9	Column11	1	-2.842	1.107	-0.640	1.236	75.501	156.525	SERVICE Wz (LC A)
9	Column12	1	-2.842	1.107	0.640	-1.236	-75.501	156.525	SERVICE Wz (LC A)
10	Column1	1	2.003	-0.880	0.006	-0.278	-0.108	-124.637	SERVICE Wz (LC B)
10	Column2	1	2.850	-1.150	0.012	-0.591	-0.010	-161.956	SERVICE Wz (LC B)
10	Column3	1	2.850	-1.150	-0.012	0.591	0.010	-161.957	SERVICE Wz (LC B)
10	Column4	1	2.850	-1.150	0.022	-0.609	-1.167	-161.957	SERVICE Wz (LC B)
10	Column5	1	2.850	-1.150	-0.022	0.609	1.167	-161.957	SERVICE Wz (LC B)
10	Column6	1	2.000	-0.878	0.016	-0.295	-1.267	-124.328	SERVICE Wz (LC B)
10	Column7	1	2.000	-0.878	-0.016	0.295	1.267	-124.327	SERVICE Wz (LC B)
10	Column8	1	2.003	-0.880	-0.006	0.278	0.108	-124.637	SERVICE Wz (LC B)
10	Column9	1	3.010	-1.259	-0.009	0.156	0.689	-177.321	SERVICE Wz (LC B)
10	Column10	1	3.010	-1.259	0.009	-0.156	-0.689	-177.321	SERVICE Wz (LC B)
10	Column11	1	3.012	-1.261	-0.001	-0.140	0.463	-177.632	SERVICE Wz (LC B)
10	Column12	1	3.012	-1.261	0.001	0.140	-0.463	-177.632	SERVICE Wz (LC B)
11	Column1	1	-1.190	7.400	-0.019	-1.868	1.563	988.731	SERVICE Ex
11	Column2	1	-1.075	8.005	0.013	-0.249	-1.104	1073.413	SERVICE Ex
11	Column3	1	1.075	-8.008	0.013	-0.249	-1.109	-1073.750	SERVICE Ex
11	Column4	1	1.075	-8.008	-0.013	0.248	1.108	-1073.748	SERVICE Ex
11	Column5	1	-1.075	8.005	-0.013	0.249	1.103	1073.412	SERVICE Ex
11	Column6	1	1.189	-7.390	0.019	1.869	-1.570	-988.943	SERVICE Ex
11	Column7	1	-1.189	7.400	0.019	1.868	-1.565	988.742	SERVICE Ex
11	Column8	1	1.189	-7.390	-0.019	-1.869	1.569	-988.928	SERVICE Ex
11	Column9	1	-1.081	8.168	-0.006	0.148	0.471	1096.671	SERVICE Ex
11	Column10	1	1.082	-8.170	-0.006	0.148	0.473	-1096.995	SERVICE Ex
11	Column11	1	-1.082	8.168	0.006	-0.148	-0.472	1096.661	SERVICE Ex
11	Column12	1	1.082	-8.170	0.007	-0.148	-0.474	-1096.985	SERVICE Ex
12	Column1	1	2.497	-2.091	-7.821	14.611	1005.832	-292.250	SERVICE Ez
12	Column2	1	0.018	-0.011	-7.888	16.001	1009.529	-1.497	SERVICE Ez
12	Column3	1	0.018	-0.011	7.888	-16.001	-1009.529	-1.495	SERVICE Ez
12	Column4	1	0.001	0.004	7.884	-15.994	-1009.016	0.516	SERVICE Ez
12	Column5	1	0.001	0.004	-7.884	15.994	1009.016	0.516	SERVICE Ez
12	Column6	1	-2.504	2.096	7.852	-14.569	-1007.080	291.913	SERVICE Ez
12	Column7	1	-2.504	2.096	-7.852	14.569	1007.080	291.910	SERVICE Ez
12	Column8	1	2.497	-2.091	7.821	-14.611	-1005.831	-292.251	SERVICE Ez
12	Column9	1	-2.498	2.131	-7.847	14.552	1008.054	291.405	SERVICE Ez
12	Column10	1	-2.498	2.131	7.847	-14.552	-1008.054	291.406	SERVICE Ez
12	Column11	1	2.486	-2.131	-7.847	14.581	1008.044	-291.409	SERVICE Ez
12	Column12	1	2.486	-2.131	7.847	-14.581	-1008.044	-291.409	SERVICE Ez
13	Column1	1	0.918	-0.389	0.001	0.076	-0.117	-54.945	SERVICE Ev
13	Column2	1	1.113	-0.465	0.004	-0.147	-0.120	-65.473	SERVICE Ev
13	Column3	1	1.113	-0.465	-0.004	0.147	0.120	-65.473	SERVICE Ev
13	Column4	1	1.113	-0.465	0.004	-0.147	-0.120	-65.473	SERVICE Ev
13	Column5	1	1.113	-0.465	-0.004	0.147	0.120	-65.473	SERVICE Ev
13	Column6	1	0.918	-0.389	0.001	0.076	-0.117	-54.944	SERVICE Ev
13	Column7	1	0.918	-0.389	-0.001	-0.076	0.117	-54.944	SERVICE Ev
13	Column8	1	0.918	-0.389	-0.001	-0.076	0.117	-54.945	SERVICE Ev
13	Column9	1	1.142	-0.481	0.000	0.015	-0.009	-67.858	SERVICE Ev
13	Column10	1	1.142	-0.481	0.000	-0.015	0.009	-67.858	SERVICE Ev
13	Column11	1	1.142	-0.481	0.000	-0.015	0.009	-67.859	SERVICE Ev
13	Column12	1	1.142	-0.481	0.000	0.015	-0.010	-67.859	SERVICE Ev

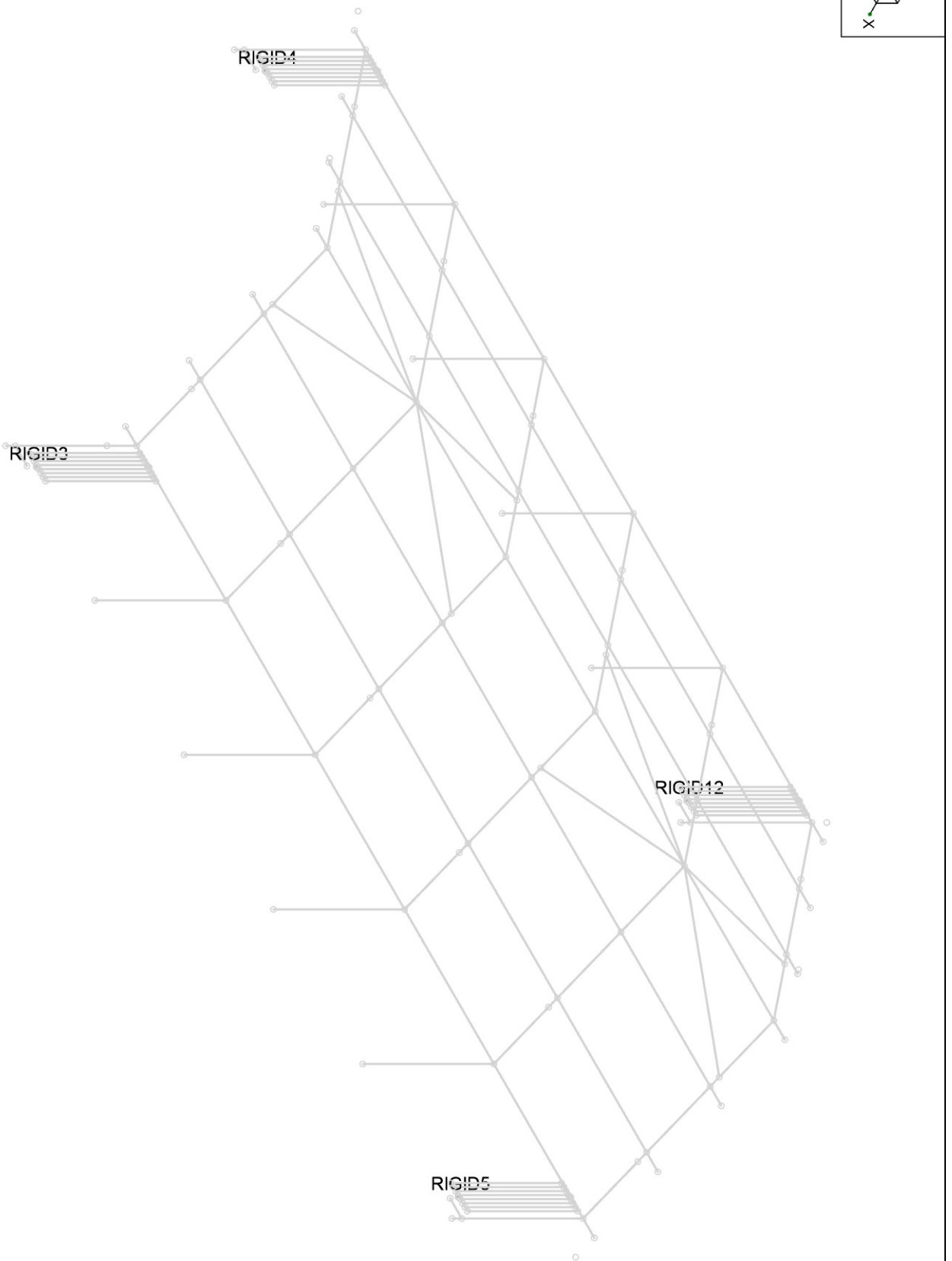

Z
Y
X
Column6
Column3
Column12
Column7
Column10
Column2
Column4
Column11
Column9
Column5

SERVICE LOAD LATILLA BASE REACTION SUMMARY

Refer to RISA model views for column local axis
Wind values are based on Vasd and should be factored accordingly for LRFD analysis
Negative axial values represent uplift

Service Loads (Unfactored)

LC	Member Label	Sec	Axial [k]	y Shear [k]	z Shear [k]	Torque [k-in]	y-y Moment [k-in]	z-z Moment [k-in]	LC Description
1	RIGID3	1	0.377	0.000	0.000	0.000	0.000	0.000	SERVICE D
1	RIGID4	1	0.377	0.000	0.000	0.000	0.000	0.000	SERVICE D
1	RIGID5	1	0.377	0.000	0.000	0.000	0.000	0.000	SERVICE D
1	RIGID12	1	0.377	0.000	0.000	0.000	0.000	0.000	SERVICE D
2	RIGID3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Lr
2	RIGID4	1	0.200	0.000	0.029	0.000	0.000	0.000	SERVICE Lr
2	RIGID5	1	0.200	0.000	0.029	0.000	0.000	0.000	SERVICE Lr
2	RIGID12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Lr
3	RIGID3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE S
3	RIGID4	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE S
3	RIGID5	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE S
3	RIGID12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE S
4	RIGID3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Su
4	RIGID4	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Su
4	RIGID5	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Su
4	RIGID12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Su
5	RIGID3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	RIGID4	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	RIGID5	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
5	RIGID12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Ssliding
6	RIGID3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	RIGID4	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	RIGID5	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
6	RIGID12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Sdrift
7	RIGID3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Wx (LC A)
7	RIGID4	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Wx (LC A)
7	RIGID5	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Wx (LC A)
7	RIGID12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Wx (LC A)
8	RIGID3	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Wx (LC B)
8	RIGID4	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Wx (LC B)
8	RIGID5	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Wx (LC B)
8	RIGID12	1	0.000	0.000	0.000	0.000	0.000	0.000	SERVICE Wx (LC B)
9	RIGID3	1	0.000	0.000	-0.151	0.000	0.000	0.000	SERVICE Wz (LC A)
9	RIGID4	1	0.000	0.000	0.151	0.000	0.000	0.000	SERVICE Wz (LC A)
9	RIGID5	1	0.000	0.000	-0.151	0.000	0.000	0.000	SERVICE Wz (LC A)
9	RIGID12	1	0.000	0.000	0.151	0.000	0.000	0.000	SERVICE Wz (LC A)
10	RIGID3	1	0.000	0.000	-0.001	0.000	0.000	0.000	SERVICE Wz (LC B)
10	RIGID4	1	0.000	0.000	0.001	0.000	0.000	0.000	SERVICE Wz (LC B)
10	RIGID5	1	0.000	0.000	-0.001	0.000	0.000	0.000	SERVICE Wz (LC B)
10	RIGID12	1	0.000	0.000	0.001	0.000	0.000	0.000	SERVICE Wz (LC B)
11	RIGID3	1	0.000	0.182	0.000	0.000	0.000	0.000	SERVICE Ex
11	RIGID4	1	0.000	-0.182	0.000	0.000	0.000	0.000	SERVICE Ex
11	RIGID5	1	0.000	0.182	0.000	0.000	0.000	0.000	SERVICE Ex
11	RIGID12	1	0.000	-0.182	0.000	0.000	0.000	0.000	SERVICE Ex
12	RIGID3	1	0.000	0.000	-0.182	0.000	0.000	0.000	SERVICE Ez
12	RIGID4	1	0.000	0.000	0.182	0.000	0.000	0.000	SERVICE Ez
12	RIGID5	1	0.000	0.000	-0.182	0.000	0.000	0.000	SERVICE Ez
12	RIGID12	1	0.000	0.000	0.182	0.000	0.000	0.000	SERVICE Ez
13	RIGID3	1	0.070	0.000	0.000	0.000	0.000	0.000	SERVICE Ev
13	RIGID4	1	0.070	0.000	0.000	0.000	0.000	0.000	SERVICE Ev
13	RIGID5	1	0.070	0.000	0.000	0.000	0.000	0.000	SERVICE Ev
13	RIGID12	1	0.070	0.000	0.000	0.000	0.000	0.000	SERVICE Ev


Z
Y
X
RIGID4
RIGID3
RIGID12
RIGID5

CONNECTION DESIGN

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Specifier's comments:

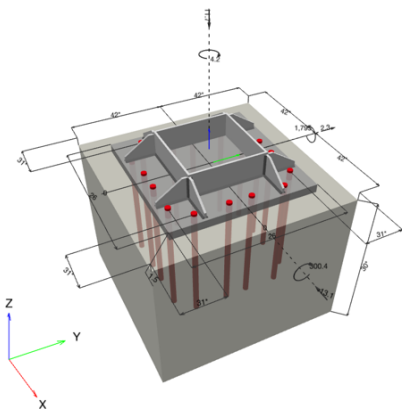
1 Anchor Design

1.1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 55 1**
Item number:	not available
Specification text:	∅ 1 in Heavy Hex Head ASTM F 1554 GR. 55 with 20 in nominal embedment depth per Technical data , cast in place installation per MPII
Effective embedment depth:	h_{ef} = 20.000 in.
Material:	ASTM F 1554
Evaluation Service Report:	Hilti Technical Data
Issued I Valid:	- | -
Proof:	Design Method ACI 318-19 / CIP
Shear edge breakout verification:	Row closest to edge (Case 3 only from ACI 318-19 Fig. R.17.7.2.1b)
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 1.500 in.
Anchor plate[CBFEM] :	l_x x l_y x t = 26.000 in. x 26.000 in. x 1.500 in.;
Profile:	Square HSS (AISC), HSS14X14X.375; (L x W x T) = 14.000 in. x 14.000 in. x 0.375 in.
Base material:	cracked concrete, Custom, f_c' = 4,500 psi; h = 30.000 in.
Reinforcement:	tension: not present, shear: not present; edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.10.5.3 (d)) Shear load: yes (17.10.6.3 (c))

[CBFEM] - The anchor calculation is based on a component-based Finite Element Method (CBFEM)

Geometry [in.] & Loading [kip, in.kip]



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1.1.1 Load combination and design results

Case	Description	Forces [kip] / Moments [in.kip]	Seismic	Max. Util. Anchor [%]
1	1.2D+Ev+Ehz+0.3Ehx+0.2S	N = -12.700; V_x = -8.900; V_y = 7.900; M_x = -1,010.400000; M_y = -1,234.200000; M_z = -14.300000;	yes	66
2	1.2D+Ev+Ehx+0.3Ehz+0.2S	N = -11.700; V_x = -13.100; V_y = 2.300; M_x = -300.400000; M_y = -1,795.000000; M_z = -4.200000;	yes	81
3	1.2D+Ev+Ehz+0.3Ehx+0.2S	N = -10.700; V_x = -7.700; V_y = 7.800; M_x = -1,006.200000; M_y = -1,076.300000; M_z = -15.700000;	yes	61
4	1.2D+Ev+Ehx+0.3Ehz+0.2S	N = -10.600; V_x = -12.100; V_y = 2.300; M_x = -300.300000; M_y = -1,656.400000; M_z = -3.500000;	yes	75
5	1.2D+Ev+Ehx+0.3Ehz+0.2S	N = -10.600; V_x = -12.100; V_y = 2.400; M_x = -300.400000; M_y = -1,655.600000; M_z = -5.800000;	yes	75
6	1.2D+Ev+Ehx+0.3Ehz+0.2S	N = -10.200; V_x = -11.800; V_y = 2.300; M_x = -299.400000; M_y = -1,615.900000; M_z = -4.300000;	yes	73
7	1.2D+Ev+Ehz+0.3Ehx+0.2S	N = -9.900; V_x = -6.500; V_y = 7.900; M_x = -1,011.000000; M_y = -900.400000; M_z = -14.600000;	yes	56
8	1.2D+Ev+Ehz+0.3Ehx+0.2S	N = -9.900; V_x = -6.500; V_y = 7.900; M_x = -1,012.200000; M_y = -897.900000; M_z = -17.200000;	yes	56
9	0.9D-Ev+Ehz+0.3Ehx	N = -6.800; V_x = -6.300; V_y = 7.800; M_x = -1,006.600000; M_y = -861.300000; M_z = -14.400000;	yes	56
10	1.2D+Ev+Ehz+0.2S	N = -12.400; V_x = -6.500; V_y = -7.900; M_x = 1,014.800000; M_y = -904.400000; M_z = 14.400000;	yes	56
11	1.2D+Ev+Ehx+0.2S	N = -10.900; V_x = -12.500; V_y = 0.000; M_x = 0.500000; M_y = -1,705.500000; M_z = 0.000000;	yes	76
12	1.2D+Ev+Ehx+0.2S	N = -10.600; V_x = -12.100; V_y = 0.000; M_x = 0.100000; M_y = -1,655.900000; M_z = 1.200000;	yes	74
13	1.2D+Ev+Ehx+0.3Ehz+0.2S	N = -9.700; V_x = -11.400; V_y = 2.300; M_x = -296.600000; M_y = -1,561.000000; M_z = -6.800000;	yes	71
14	0.9D-Ev+Ehx+0.3Ehz	N = -5.800; V_x = -10.500; V_y = 2.300; M_x = -299.400000; M_y = -1,424.100000; M_z = -4.300000;	yes	66
15	1.2D+Ev+Ehx+0.2S	N = -8.900; V_x = -10.800; V_y = 0.000; M_x = -2.700000; M_y = -1,471.600000; M_z = 2.600000;	yes	66
16	1.2D+Ev+Ehx+0.3Ehz+0.2S	N = -8.200; V_x = -10.100; V_y = 2.300; M_x = -302.200000; M_y = -1,382.200000; M_z = -1.700000;	yes	64
17	0.9D-Ev+Ehx+0.3Ehz	N = -5.000; V_x = -9.700; V_y = 2.300; M_x = -300.000000; M_y = -1,306.800000; M_z = -4.400000;	yes	61

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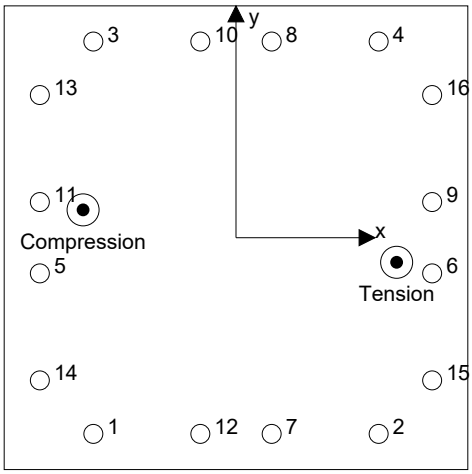
Case	Description	Forces [kip] / Moments [in.kip]	Seismic	Max. Util. Anchor [%]
18	0.9D-Ev+Ehx+0.3Ehz	N = -5.000; V_x = -9.700; V_y = 2.300; M_x = -298.500000; M_y = -1,306.100000; M_z = -4.900000;	yes	61
19	0.9D-Ev+Ehx	N = -5.100; V_x = -9.900; V_y = 0.000; M_x = 0.500000; M_y = -1,336.800000; M_z = 0.100000;	yes	61
20	0.9D-Ev+Ehx	N = -5.000; V_x = -9.700; V_y = 0.000; M_x = -0.700000; M_y = -1,306.400000; M_z = 0.200000;	yes	60

1.2 Load case/Resulting anchor forces

Controlling load case: 2 1.2D+Ev+Ehx+0.3Ehz+0.2S



Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	-0.001	0.759	-0.758	0.043
2	15.128	0.939	-0.866	0.363
3	-0.002	0.826	-0.765	0.312
4	10.420	0.789	-0.786	-0.069
5	-0.002	0.830	-0.822	0.114
6	16.215	0.889	-0.876	0.149
7	9.353	0.775	-0.746	0.210
8	4.304	0.702	-0.697	0.077
9	14.590	0.860	-0.857	0.065
10	-0.001	0.710	-0.692	0.161
11	-0.002	0.845	-0.828	0.170
12	0.096	0.732	-0.718	0.141
13	-0.002	0.936	-0.890	0.290
14	-0.002	0.860	-0.860	0.031
15	17.080	1.049	-1.009	0.283
16	13.661	0.930	-0.929	-0.041

Resulting tension force in (x/y)=(9.009/-1.378): 100.836 [kip]
Resulting compression force in (x/y)=(-8.575/1.561): 113.493 [kip]

Anchor forces are calculated based on a component-based Finite Element Method (CBFEM)

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1.3 Tension load

	Load N_{ua} [kip]	Capacity ϕ N_n [kip]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	17.080	34.087	51	OK
Pullout Strength*	17.080	28.369	61	OK
Concrete Breakout Failure**	100.847	126.020	81	OK
Concrete Side-Face Blowout, direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (anchors in tension)

1.3.1 Steel Strength

$N_{sa} = A_{se,N} f_{uta}$ ACI 318-19 Eq. (17.6.1.2)
$\phi N_{sa} \geq N_{ua}$ ACI 318-19 Table 17.5.2

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.61	75,000

Calculations

N_{sa} [kip]
45.450

Results

N_{sa} [kip]	ϕ_{steel}	ϕN_{sa} [kip]	N_{ua} [kip]
45.450	0.750	34.087	17.080

1.3.2 Pullout Strength

$N_{pN} = \psi_{c,p} N_p$ ACI 318-19 Eq. (17.6.3.1)
$N_p = 8 A_{brg} f'_c$ ACI 318-19 Eq. (17.6.3.2.2a)
$\phi N_{pN} \geq N_{ua}$ ACI 318-19 Table 17.5.2

Variables

$\psi_{c,p}$	A_{brg} [in.^{2}]	λ_a	f'_c [psi]
1.000	1.50	1.000	4,500

Calculations

N_p [kip]
54.036

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	ϕN_{pn} [kip]	N_{ua} [kip]
54.036	0.700	0.750	1.000	28.369	17.080

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1.3.3 Concrete Breakout Failure

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N}\ \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ — ACI 318-19 Eq. (17.6.2.1b)

$\phi\ N_{cbg} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ — ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e'_N}{3\ h_{ef}}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.3.1)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = 16\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{5/3}$ — ACI 318-19 Eq. (17.6.2.2.3)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
20.000	2.120	0.156	31.000	1.000

c_{ac} [in.]	k_c	λ_a	f'_c [psi]
-	16	1.000	4,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
5,880.00	3,600.00	0.934	0.995	1.000	1.000	158.165

Results

N_{cbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{cbg}$ [kip]	N_{ua} [kip]
240.038	0.700	0.750	1.000	126.020	100.847

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1.4 Shear load

	Load V_{ua} [kip]	Capacity ϕ V_n [kip]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	1.049	17.725	6	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	13.300	406.408	4	OK
Concrete edge failure in direction x-**	13.320	52.733	26	OK

* highest loaded anchor **anchor group (relevant anchors)

1.4.1 Steel Strength

$V_{sa} = 0.6\ A_{se,V}\ f_{uta}$ ACI 318-19 Eq. (17.7.1.2b)
$\phi\ V_{steel} \geq V_{ua}$ ACI 318-19 Table 17.5.2

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]
0.61	75,000

Calculations

V_{sa} [kip]
27.270

Results

V_{sa} [kip]	ϕ_{steel}	$\phi\ V_{sa,eq}$ [kip]	V_{ua} [kip]
27.270	0.650	17.725	1.049

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1.4.2 Pryout Strength

$V_{cpg} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \right]$ ACI 318-19 Eq. (17.7.3.1b)

$\phi V_{cpg} \geq V_{ua}$ ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9 h_{ef}^2$ ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2 e'_N}{3 h_{ef}}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.3.1)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = 16 \lambda_a \sqrt{f'_c} h_{ef}^{5/3}$ ACI 318-19 Eq. (17.6.2.2.3)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
2	20.000	0.055	0.311	31.000

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
1.000	-	16	1.000	4,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
6,688.00	3,600.00	0.998	0.990	1.000	1.000	158.165

Results

V_{cpg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	ϕV_{cpg} [kip]	V_{ua} [kip]
580.583	0.700	1.000	1.000	406.408	13.300

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1.4.3 Concrete edge failure in direction x-

$V_{cbg} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ec,V} \psi_{ed,V} \psi_{c,V} \psi_{h,V} \psi_{parallel,V} V_b$ ACI 318-19 Eq. (17.7.2.1b)

$\phi V_{cbg} \geq V_{ua}$ ACI 318-19 Table 17.5.2

A_{Vc} see ACI 318-19, Section 17.7.2.1, Fig. R 17.7.2.1(b)*

$A_{Vc0} = 4.5 c_{a1}^2$ ACI 318-19 Eq. (17.7.2.1.3)

$\psi_{ec,V} = \left(\frac{1}{1 + \frac{e'_v}{1.5c_{a1}}}\right) \leq 1.0$ ACI 318-19 Eq. (17.7.2.3.1)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ ACI 318-19 Eq. (17.7.2.4.1b)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ ACI 318-19 Eq. (17.7.2.6.1)

$V_b = 9 \lambda_a \sqrt{f'_c} c_{a1}^{1.5}$ ACI 318-19 Eq. (17.7.2.2.1b)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\psi_{c,V}$	h_a [in.]
22.667	34.000	0.120	1.000	30.000

l_e [in.]	λ_a	d_a [in.]	f'_c [psi]	$\psi_{parallel,V}$
8.000	1.000	1.000	4,500	1.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [kip]
2,520.00	2,312.00	0.996	1.000	1.065	65.152

Results

V_{cbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	ϕV_{cbg} [kip]	V_{ua} [kip]
75.333	0.700	1.000	1.000	52.733	13.320

*Anchor row defined by: Anchor 5, 11, 13, 14; Case 3 controls

1.5 Combined tension and shear loads, per ACI 318-19 section 17.8

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.800	0.253	5/3	80	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

1.6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates as per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- The equations presented in this report are based on imperial units. When inputs are displayed in metric units, the user should be aware that the equations remain in their imperial format.
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- Attention! In case of compressive anchor forces a buckling check as well as the proof of the local load transfer into and within the base material (incl. punching) has to be done separately.
- "An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-19, Chapter 17, Section 17.10.5.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.10.5.3 (b), Section 17.10.5.3 (c), or Section 17.10.5.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.10.6.3 (a), Section 17.10.6.3 (b), or Section 17.10.6.3 (c)."
- Section 17.10.5.3 (b) / Section 17.10.6.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.10.5.3 (c) / Section 17.10.6.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.10.5.3 (d) / Section 17.10.6.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- The anchor design methods in PROFIS Engineering require rigid anchor plates, as per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means that the anchor plate should be sufficiently rigid to prevent load re-distribution to the anchors due to elastic/plastic displacements. The user accepts that the anchor plate is considered close to rigid by engineering judgment."

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1.7 Installation data

Profile: Square HSS (AISC), HSS14X14X.375; (L x W x T) = 14.000 in. x 14.000 in. x 0.375 in.

Hole diameter in the fixture: d_f = 1.062 in.

Plate thickness (input): 1.500 in.

Anchor type and diameter: Heavy Hex Head ASTM F 1554 GR. 55 1

Item number: not available

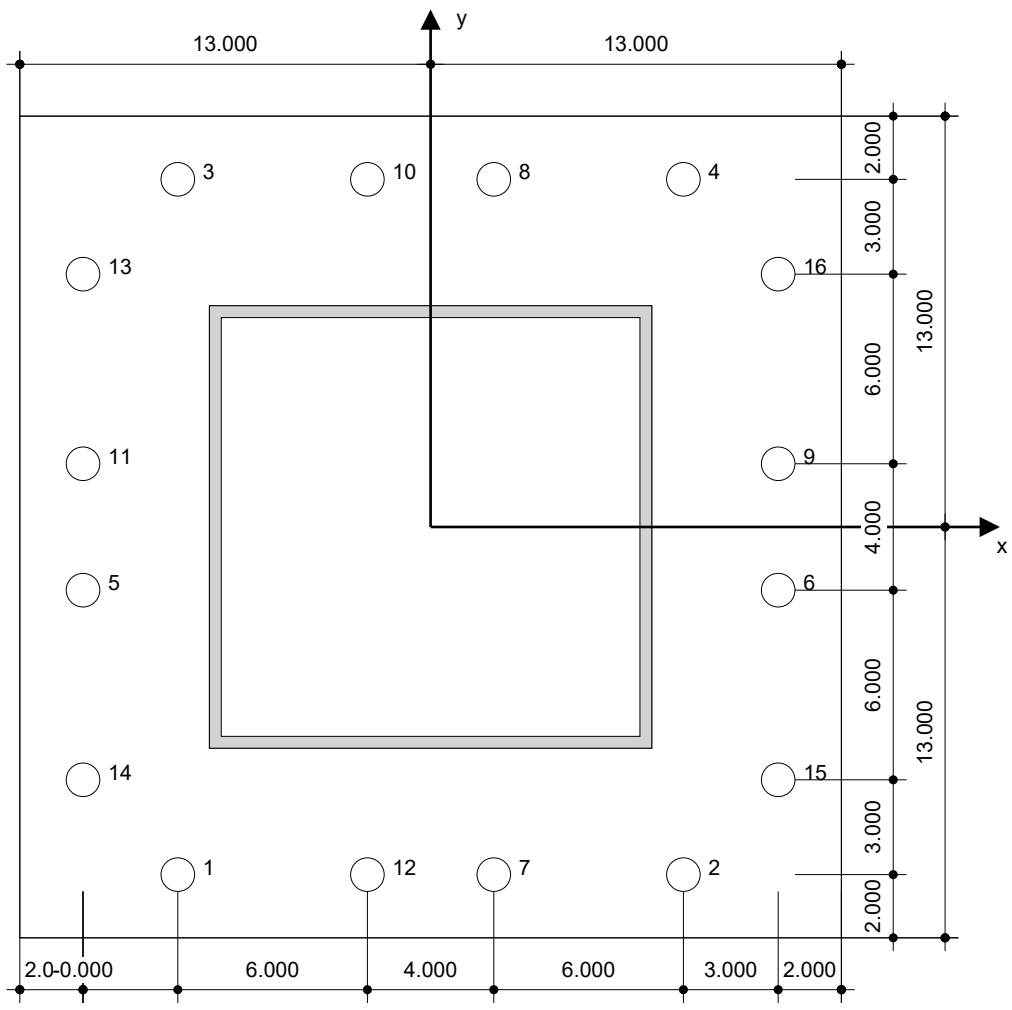
Maximum installation torque: -

Hole diameter in the base material: - in.

Hole depth in the base material: 20.000 in.

Minimum thickness of the base material: 21.172 in.

⌀ 1 in Heavy Hex Head ASTM F 1554 GR. 55 with 20 in nominal embedment depth per Technical data , cast in place installation per MPII



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Coordinates Anchor [in.]

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-8.000	-11.000	34.000	50.000	31.000	53.000
2	8.000	-11.000	50.000	34.000	31.000	53.000
3	-8.000	11.000	34.000	50.000	53.000	31.000
4	8.000	11.000	50.000	34.000	53.000	31.000
5	-11.000	-2.000	31.000	53.000	40.000	44.000
6	11.000	-2.000	53.000	31.000	40.000	44.000
7	2.000	-11.000	44.000	40.000	31.000	53.000
8	2.000	11.000	44.000	40.000	53.000	31.000
9	11.000	2.000	53.000	31.000	44.000	40.000
10	-2.000	11.000	40.000	44.000	53.000	31.000
11	-11.000	2.000	31.000	53.000	44.000	40.000
12	-2.000	-11.000	40.000	44.000	31.000	53.000
13	-11.000	8.000	31.000	53.000	50.000	34.000
14	-11.000	-8.000	31.000	53.000	34.000	50.000
15	11.000	-8.000	53.000	31.000	34.000	50.000
16	11.000	8.000	53.000	31.000	50.000	34.000

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2 Anchor plate design

2.1 Input data

Anchor plate:	Shape: Rectangular l_x x l_y x t = 26.000 in x 26.000 in x 1.500 in Calculation: CBFEM Material: ASTM A36; F_y = 36,000 psi; ε_{lim} = 5.00%
Anchor type and size:	Heavy Hex Head ASTM F 1554 GR. 55 1, h_{ef} = 20.000 in
Anchor stiffness:	The anchor is modeled considering stiffness values determined from load displacement curves tested in an independent laboratory. Please note that no simple replacement of the anchor is possible as the anchor stiffness has a major impact on the load distribution results.
Design method:	AISC and LRFD-based design using component-based FEM
Seismic loads (cat. C, D, E or F):	Tension load: Yes (17.10.5.3 (d)) Shear load: Yes (17.10.6.3 (c))
Stand-off installation:	e_b = 0.000 in (No stand-off); t = 1.500 in
Profile:	HSS14X14X.375; (L x W x T x FT) = 14.000 in x 14.000 in x 0.375 in x - Material: ASTM A500 Gr.C Rect; F_y = 50,000 psi; ε_{lim} = 5.00% Eccentricity x: 0.000 in Eccentricity y: 0.000 in
Base material:	Cracked concrete; Custom; $f_{c,cyl}$ = 4,500 psi; h = 30.000 in; E = 3,823,676 psi; G = 1,662,468 psi; v = 0.15; D = 145.00 lb/ft³
Welds (profile to anchor plate):	Type of redistribution: Plastic Material: E70xx
Stiffeners:	Geometry: Chamfered; size = l_x x l_y x t = 4.000 in x 5.500 in x 0.375 in Material: ASTM A36; F_y = 36,000 psi; ε_{lim} = 5.00%
Welds (stiffeners to profile/anchor plate):	Type of redistribution: Plastic Material: E70xx
Mesh size:	Number of elements on edge: 8 Min. size of element: 0.394 in Max. size of element: 1.969 in

2.2 Summary

	Description	Profile		Stiffeners		Anchor plate			Welds [%]	Concrete [%]
		σ_{Ed} [psi]	ε_{Pl} [%]	σ_{Ed} [psi]	ε_{Pl} [%]	σ_{Ed} [psi]	ε_{Pl} [%]	Hole bearing [%]		
1	1.2D+Ev+Ehz+0.3Ehx+0.2S	33,245	0.00	34,756	0.10	11,158	0.00	1	77	9
2	1.2D+Ev+Ehx+0.3Ehz+0.2S	32,938	0.00	33,324	0.06	13,165	0.00	1	77	9
3	1.2D+Ev+Ehz+0.3Ehx+0.2S	30,905	0.00	33,943	0.08	10,254	0.00	1	76	8
4	1.2D+Ev+Ehx+0.3Ehz+0.2S	30,754	0.00	32,520	0.05	12,116	0.00	1	77	8
5	1.2D+Ev+Ehx+0.3Ehz+0.2S	30,731	0.00	32,512	0.05	12,110	0.00	1	77	8
6	1.2D+Ev+Ehx+0.3Ehz+0.2S	30,102	0.00	32,282	0.04	11,815	0.00	1	76	8
7	1.2D+Ev+Ehz	28,277	0.00	33,087	0.06	9,316	0.00	1	76	7

	+0.3Ehx+0.2 S									
8	1.2D+Ev+Ehz +0.3Ehx+0.2 S	28,238	0.00	33,079	0.06	9,310	0.00	1	76	7
9	0.9D-Ev+Ehz +0.3Ehx	27,908	0.00	33,007	0.06	9,232	0.00	1	76	7
10	1.2D+Ev+Ehz +0.2S	28,140	0.00	33,012	0.06	9,232	0.00	1	76	7
11	1.2D+Ev+Ehx +0.2S	27,640	0.00	31,481	0.02	12,432	0.00	1	76	8
12	1.2D+Ev+Ehx +0.2S	26,846	0.00	30,993	0.02	12,056	0.00	1	76	8
13	1.2D+Ev+Ehx +0.3Ehz+0.2 S	29,183	0.00	31,948	0.04	11,406	0.00	1	76	8
14	0.9D-Ev+Ehx +0.3Ehz	27,319	0.00	31,334	0.03	10,501	0.00	1	76	7
15	1.2D+Ev+Ehx +0.2S	23,998	0.00	27,765	0.01	10,689	0.00	1	76	7
16	1.2D+Ev+Ehx +0.3Ehz+0.2 S	26,445	0.00	31,055	0.02	10,084	0.00	1	76	7
17	0.9D-Ev+Ehx +0.3Ehz	25,453	0.00	30,518	0.02	9,633	0.00	1	76	7
18	0.9D-Ev+Ehx +0.3Ehz	25,418	0.00	30,494	0.02	9,627	0.00	1	76	7
19	0.9D-Ev+Ehx	22,064	0.00	25,933	0.00	9,805	0.00	1	76	6
20	0.9D-Ev+Ehx	21,565	0.00	25,448	0.00	9,574	0.00	1	76	6

2.3 Anchor plate classification

Results below are displayed for the decisive load combinations: 1.2D+Ev+Ehx+0.3Ehz+0.2S

Anchor tension forces	Equivalent rigid anchor plate (CBFEM)	Component-based Finite Element Method (CBFEM) anchor plate design
Anchor 1	-0.001 kip	-0.001 kip
Anchor 2	13.975 kip	15.128 kip
Anchor 3	-0.002 kip	-0.002 kip
Anchor 4	9.059 kip	10.420 kip
Anchor 5	-0.002 kip	-0.002 kip
Anchor 6	15.990 kip	16.215 kip
Anchor 7	5.922 kip	9.353 kip
Anchor 8	1.007 kip	4.304 kip
Anchor 9	15.097 kip	14.590 kip
Anchor 10	-0.001 kip	-0.001 kip
Anchor 11	-0.002 kip	-0.002 kip
Anchor 12	0.554 kip	0.096 kip
Anchor 13	-0.002 kip	-0.002 kip
Anchor 14	-0.002 kip	-0.002 kip
Anchor 15	17.331 kip	17.080 kip
Anchor 16	13.756 kip	13.661 kip

User accepted to consider the selected anchor plate as rigid by his/her engineering judgement. This means the anchor design guidelines can be applied.

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2.4 Profile/Stiffeners/Plate

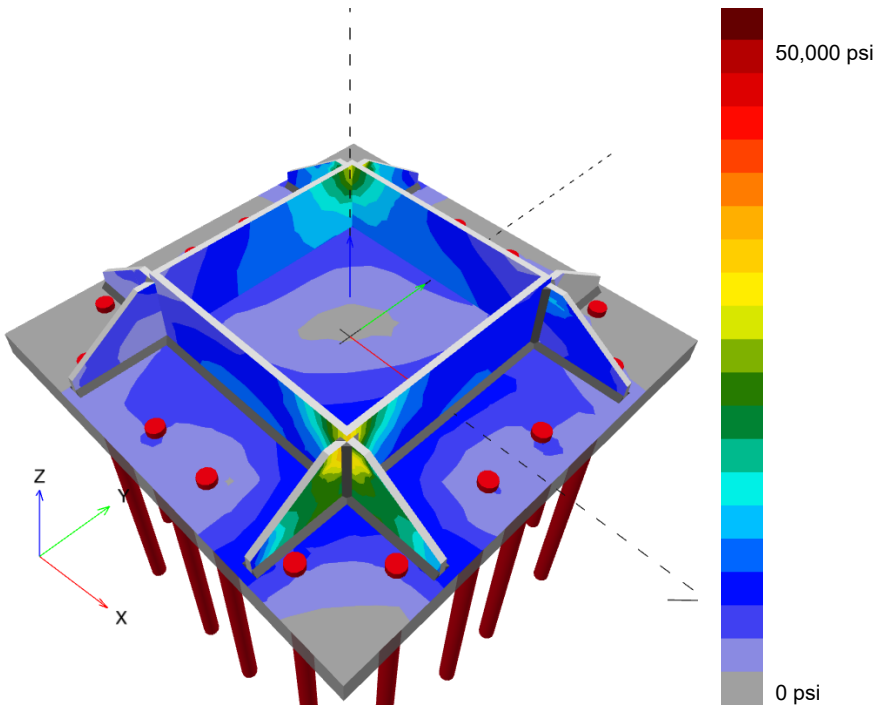
Profile and stiffeners are verified at the level of the steel to concrete connection. The connection design does not replace the steel design for critical cross sections, which should be performed outside of PROFIS Engineering.

2.4.1 Equivalent stress and plastic strain

Part	Load combination	Material	f_y [psi]	ε_{lim} [%]	σ_{Ed} [psi]	ε_{Pl} [%]	Status
Plate	1.2D+Ev+Ehx+0.3 Ehz+0.2S	ASTM A36	36,000	5.00	13,165	0.00	OK
Profile	1.2D+Ev+Ehx+0.3 Ehz+0.2S	ASTM A500 Gr.C Rect	50,000	5.00	31,192	0.00	OK
Profile	1.2D+Ev+Ehx+0.3 Ehz+0.2S	ASTM A500 Gr.C Rect	50,000	5.00	33,245	0.00	OK
Profile	1.2D+Ev+Ehx+0.3 Ehz+0.2S	ASTM A500 Gr.C Rect	50,000	5.00	30,581	0.00	OK
Profile	1.2D+Ev+Ehx+0.3 Ehz+0.2S	ASTM A500 Gr.C Rect	50,000	5.00	28,113	0.00	OK
Stiffener	1.2D+Ev+Ehx+0.3 Ehz+0.2S	ASTM A36	36,000	5.00	34,756	0.10	OK

2.4.1.1 Equivalent stress

Results below are displayed for the decisive load combination: 1 - 1.2D+Ev+Ehz+0.3Ehx+0.2S



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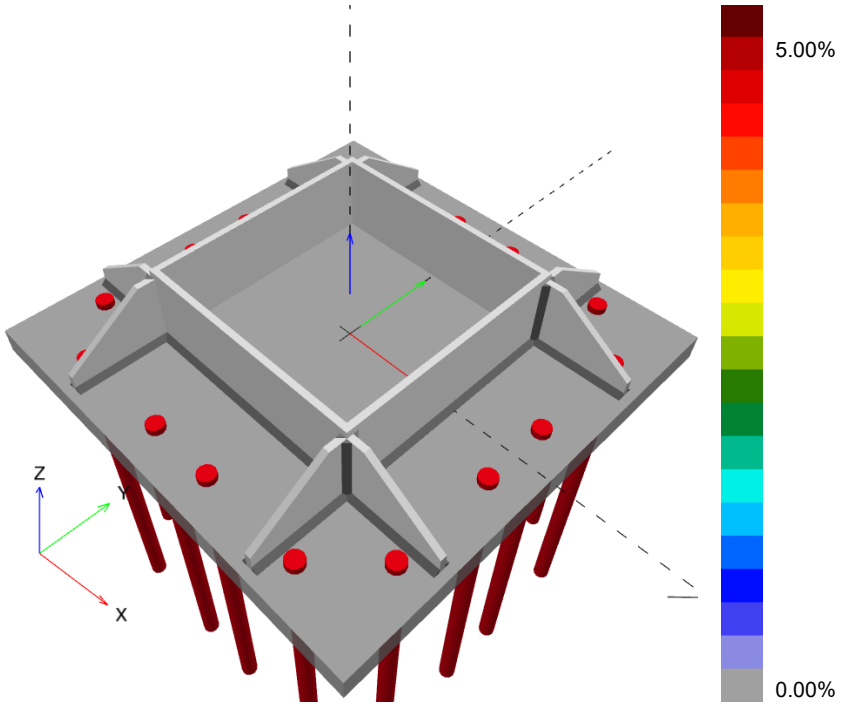
2.4.1.2 Plastic strain

Results below are displayed for the decisive load combination: 1 - 1.2D+Ev+Ehz+0.3Ehx+0.2S



2.4.2 Plate hole bearing resistance, AISC 360-16 Section J3

Decisive load combination: 2 - 1.2D+Ev+Ehx+0.3Ehz+0.2S

Equations

$R_n = \min(1.2\, l_c\, t\, F_u\, ,\ 2.4\, d\, t\, F_u)$ (AISC 360-16 J3-6a, c)

$\Phi R_n = 0.75\, R_n$

$V \le \Phi R_n$

Variables

	l_c [in]	t [in]	F_u [psi]	d [in]	R_n [kip]
Anchor 1	4.938	1.500	58,000	1.000	208.800
Anchor 2	4.635	1.500	58,000	1.000	208.800
Anchor 3	22.152	1.500	58,000	1.000	208.800
Anchor 4	4.488	1.500	58,000	1.000	208.800
Anchor 5	23.699	1.500	58,000	1.000	208.800
Anchor 6	1.497	1.500	58,000	1.000	156.320
Anchor 7	6.842	1.500	58,000	1.000	208.800
Anchor 8	4.938	1.500	58,000	1.000	208.800
Anchor 9	1.474	1.500	58,000	1.000	153.937
Anchor 10	2.938	1.500	58,000	1.000	208.800

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	l_c [in]	t [in]	F_u [psi]	d [in]	R_n [kip]
Anchor 11	21.298	1.500	58,000	1.000	208.800
Anchor 12	2.938	1.500	58,000	1.000	208.800
Anchor 13	24.708	1.500	58,000	1.000	208.800
Anchor 14	20.938	1.500	58,000	1.000	208.800
Anchor 15	1.546	1.500	58,000	1.000	161.414
Anchor 16	1.471	1.500	58,000	1.000	153.542

Results

	V [kip]	ΦR_n [kip]	Utilization [%]	Status
Anchor 1	0.759	156.600	1	OK
Anchor 2	0.939	156.600	1	OK
Anchor 3	0.827	156.600	1	OK
Anchor 4	0.789	156.600	1	OK
Anchor 5	0.830	156.600	1	OK
Anchor 6	0.889	117.240	1	OK
Anchor 7	0.775	156.600	1	OK
Anchor 8	0.702	156.600	1	OK
Anchor 9	0.860	115.453	1	OK
Anchor 10	0.710	156.600	1	OK
Anchor 11	0.845	156.600	1	OK
Anchor 12	0.732	156.600	1	OK
Anchor 13	0.936	156.600	1	OK
Anchor 14	0.860	156.600	1	OK
Anchor 15	1.048	121.061	1	OK
Anchor 16	0.930	115.157	1	OK

2.5 Welds

Profiles are modeled without taking the corner radius into account. Special rules for welding (e.g. for cold-formed profiles ...) are not taken into account by the software.

2.5.1 Anchor plate to profile

Decisive load combination: 1 - 1.2D+Ev+Ehz+0.3Ehx+0.2S

Equations

$F_{nw} = 0.6\, F_{EXX}\, (1.0 + 0.5\sin^{1.5}\Theta)$

$\Phi R_n = \Phi\, F_{nw}\, A_w$

$\text{Utilization} = \dfrac{F_n}{\Phi\, R_n}$

Variables

Edge	X_u	T_h [in]	L_s [in]	L [in]	L_c [in]	F_{EXX} [psi]	Θ [°]	A_w [in²]
Member 1-tfl 1	E70xx	◢0.220	0.311	13.965	1.552	70,000	76.2	0.34
Member 1-bfl 1	E70xx	0.220◣	0.311	13.965	1.552	70,000	53.9	0.34
Member 1-w 1	E70xx	◢0.220	0.311	13.219	1.652	70,000	35.6	0.36
Member 1-w 2	E70xx	0.220◣	0.311	13.219	1.652	70,000	65.8	0.36

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Results

Edge	F_n [kip]	ΦR_n [kip]	Utilization [%]	Status
Member 1-tfl 1	7.470	15.898	47	OK
Member 1-bfl 1	5.094	14.661	35	OK
Member 1-w 1	5.046	13.997	37	OK
Member 1-w 2	7.039	16.439	43	OK

2.5.2 Stiffeners to profile/anchor plate

Decisive load combination: 1 - 1.2D+Ev+Ehz+0.3Ehx+0.2S

Equations

$F_{nw} = 0.6\, F_{EXX}\, (1.0 + 0.5\sin^{1.5}\Theta)$

$\Phi R_n = \Phi\, F_{nw}\, A_w$

$\text{Utilization} = \frac{F_n}{\Phi\, R_n}$

Variables

Edge	X_u	T_h [in]	L_s [in]	L [in]	L_c [in]	F_{EXX} [psi]	Θ [°]	A_w [in²]
Stiffenera	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	61.6	0.15
Stiffenera 1	E70xx	◢0.220◣	0.311	5.469	0.684	70,000	10.2	0.15
Stiffenerb	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	77.0	0.15
Stiffenerb 1	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	64.8	0.15
Stiffenerc	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	65.2	0.15
Stiffenerc 1	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	58.4	0.15
Stiffenerd	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	84.3	0.15
Stiffenerd 1	E70xx	◢0.220◣	0.311	5.469	0.684	70,000	48.8	0.15
Stiffenere (Anchor plate)	E70xx	◢0.220◣	0.311	5.469	0.684	70,000	30.4	0.15
Stiffenere (Anchor plate) 1	E70xx	◢0.220◣	0.311	5.469	0.684	70,000	20.5	0.15
Stiffenerf (Anchor plate)	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	49.7	0.15
Stiffenerf (Anchor plate) 1	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	56.3	0.15
Stiffenerg (Anchor plate)	E70xx	◢0.220◣	0.311	5.469	0.684	70,000	15.4	0.15
Stiffenerg (Anchor plate) 1	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	59.3	0.15
Stiffenerh (Anchor plate)	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	39.8	0.15
Stiffenerh (Anchor plate) 1	E70xx	◢0.220◣	0.311	5.484	0.686	70,000	39.0	0.15
Stiffenere (Member 1-bfl 1)	E70xx	◢0.220◣	0.311	3.988	0.665	70,000	42.9	0.15
Stiffenere (Member 1-bfl 1) 1	E70xx	◢0.220◣	0.311	3.988	0.665	70,000	49.0	0.15

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Edge	X_u	T_h [in]	L_s [in]	L [in]	L_c [in]	F_{EXX} [psi]	Θ [°]	A_w [in²]
Stiffenerf (Member 1-tfl 1)	E70xx	◢0.220◣	0.311	3.988	0.665	70,000	39.6	0.15
Stiffenerf (Member 1-tfl 1) 1	E70xx	◢0.220◣	0.311	3.988	0.665	70,000	62.9	0.15
Stiffenerg (Member 1-bfl 1)	E70xx	◢0.220◣	0.311	3.988	0.665	70,000	46.3	0.15
Stiffenerg (Member 1-bfl 1) 1	E70xx	◢0.220◣	0.311	3.988	0.665	70,000	50.8	0.15
Stiffenerh (Member 1-tfl 1)	E70xx	◢0.220◣	0.311	3.988	0.665	70,000	38.1	0.15
Stiffenerh (Member 1-tfl 1) 1	E70xx	◢0.220◣	0.311	3.988	0.665	70,000	43.0	0.15

Results

Edge	F_n [kip]	ΦR_n [kip]	Utilization [%]	Status
Stiffenera	0.806	6.711	13	OK
Stiffenera 1	1.046	4.915	22	OK
Stiffenerb	3.538	7.035	51	OK
Stiffenerb 1	3.371	6.796	50	OK
Stiffenerc	2.969	6.806	44	OK
Stiffenerc 1	3.644	6.618	56	OK
Stiffenerd	1.027	7.108	15	OK
Stiffenerd 1	0.808	6.282	13	OK
Stiffenere (Anchor plate)	2.591	5.590	47	OK
Stiffenere (Anchor plate) 1	2.664	5.228	51	OK
Stiffenerf (Anchor plate)	0.802	6.331	13	OK
Stiffenerf (Anchor plate) 1	0.750	6.555	12	OK
Stiffenerg (Anchor plate)	1.453	5.062	29	OK
Stiffenerg (Anchor plate) 1	1.140	6.643	18	OK
Stiffenerh (Anchor plate)	2.130	5.968	36	OK
Stiffenerh (Anchor plate) 1	1.782	5.937	31	OK
Stiffenere (Member 1-bfl 1)	4.495	5.899	77	OK
Stiffenere (Member 1-bfl 1) 1	4.646	6.117	76	OK
Stiffenerf (Member 1-tfl 1)	1.249	5.778	22	OK
Stiffenerf (Member 1-tfl 1) 1	0.984	6.541	16	OK
Stiffenerg (Member 1-bfl 1)	2.402	6.023	40	OK
Stiffenerg (Member 1-bfl 1) 1	2.230	6.178	37	OK
Stiffenerh (Member 1-tfl 1)	4.319	5.722	76	OK
Stiffenerh (Member 1-tfl 1) 1	4.446	5.903	76	OK

2.6 Concrete

Decisive load combination: 1 - 1.2D+Ev+Ehz+0.3Ehx+0.2S

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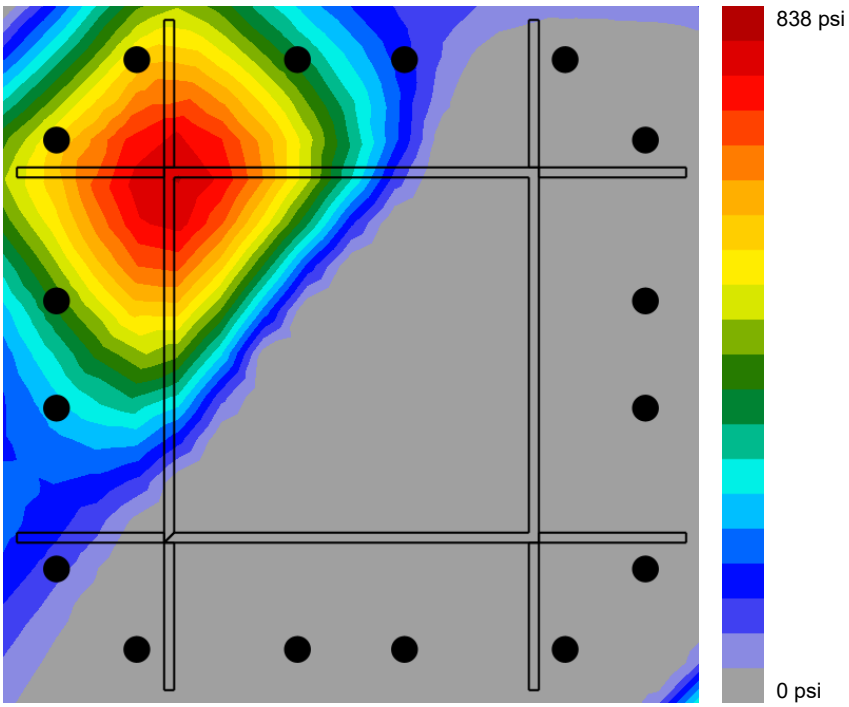
2.6.1 Compression in concrete under the anchor plate



2.6.2 Concrete block compressive strength resistance check, AISC 360-16 Section J8

Equations

$$F_p = \Phi f_{p,max}$$

$$f_{p,max} = 0.85 f_c' \sqrt{\left(\frac{A_2}{A_1}\right)} \le 1.7 f_c;\quad \sqrt{\left(\frac{A_2}{A_1}\right)} \le 2$$

$$\sigma = \frac{N}{A_1}$$

$$\text{Utilization} = \frac{\sigma}{F_p}$$

Variables

N [kip]	f_c' [psi]	Φ	A_1 [in²]	A_2 [in²]
93.673	4,500	0.65	233.87	5,337.18

Results

Load combination	F_p [psi]	σ [psi]	Utilization [%]	Status
1.2D+Ev+Ehz+0.3Ehx+0.2S	4,973	401	9	OK

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2.7 Symbol explanation

A_1	Loaded area of concrete
A_2	Supporting area
A_w	Effective area of weld critical element
d	Nominal diameter of the bolt
ε_{lim}	Limit plastic strain
ε_{Pl}	Plastic strain from CBFEM results
f_c	Concrete compressive strength
f_c'	Concrete compressive strength
F_{EXX}	Electrode classification number, i.e. minimum specified tensile strength
F_u	Specified minimum tensile strength of the connected material
F_n	Force in weld critical element
F_{nw}	Nominal stress of the weld material
F_p	Concrete block design bearing strength
$f_{p,max}$	Concrete block design bearing strength maximum
f_y	Yield strength
l_c	Clear distance, in the direction of the force, between the edge of the hole and the edge of the adjacent hole or edge of the material
L	Length of weld
L_c	Length of weld critical element
L_s	Leg size of weld
N	Resulting compression force
σ	Average stress in concrete
σ_{Ed}	Equivalent stress
Φ	Resistance factor
ΦR_n	Factored resistance
R_n	Resistance
t	Thickness of the anchor plate
Θ	Angle of loading measured from the weld longitudinal axis
T_h	Throat thickness of weld
V	Resultant of shear forces Vy, Vz in bolt.
X_u	Filler metal tensile strength

2.8 Warnings

- By using the CBFEM calculation functionality of PROFIS Engineering you may act outside the applicable design codes and your specified anchor plate may not behave rigid. Please, validate the results with a professional designer and/or structural engineer to ensure suitability and adequacy for your specific jurisdiction and project requirements.
- The anchor is modeled considering stiffness values determined from load displacement curves tested in an independent laboratory. Please note that no simple replacement of the anchor is possible as the anchor stiffness has a major impact on the load distribution results.

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Design:	P20831	Date:	2/18/2025
Fastening point:			

3 Summary of results

Design of the anchor plate, anchors, welds and other elements are based on CBFEM (component based finite element method) and AISC.

	Load combination	Max. utilization	Status
Anchors	1.2D+Ev+Ehx+0.3Ehz+0.2S	81%	OK
Anchor plate	1.2D+Ev+Ehx+0.3Ehz+0.2S	37%	OK
Welds	1.2D+Ev+Ehz+0.3Ehx+0.2S	77%	OK
Stiffeners	1.2D+Ev+Ehz+0.3Ehx+0.2S	97%	OK
Concrete	1.2D+Ev+Ehz+0.3Ehx+0.2S	9%	OK
Profile	1.2D+Ev+Ehz+0.3Ehx+0.2S	67%	OK

Fastening meets the design criteria!

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4 Remarks; Your Cooperation Duties

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STRENGTH DESIGN COLUMN BASE REACTIONS

Strength Design Reactions (Factored)

							strong axis	
		N	Vx	Vy	Mz	Mx	My	Column*
LC	Load Combination Description	[k]	[k]	[k]	[in-kip]	[in-kip]	[in-kip]	
92	1.4D	-8.0	-3.4	0.0	0.1	-0.1	-475.8	Column9
93	1.2D + 0.5Lr	-10.5	-4.6	0.0	0.3	0.2	-646.3	Column12
94	1.2D + 0.5S	-11.6	-5.1	0.0	0.3	0.1	-717.7	Column9
95	1.2D + 1.6Lr + 0.5Wx (LC A)	-18.9	-9.6	0.0	0.9	0.7	-1355.7	Column12
96	1.2D + 1.6Lr + 0.5Wx (LC B)	-16.2	-8.2	0.0	0.7	0.6	-1153.7	Column12
97	1.2D + 1.6Lr + 0.5Wz (LC A)	-16.1	-7.4	0.5	-0.2	-63.0	-1043.1	Column12
98	1.2D + 1.6Lr + 0.5Wz (LC B)	-21.0	-9.5	0.0	0.9	0.3	-1333.9	Column12
99	1.2D + 1.6Lr + 0.5Wx (Min.)	-18.5	-8.8	0.0	0.8	0.7	-1236.0	Column12
100	1.2D + 1.6Lr + 0.5Wz (Min.)	-18.6	-8.5	0.4	0.0	-52.8	-1194.2	Column12
101	1.2D + 1.6Lr + 0.5(0.75Wx (LC A)+0.75Wz (LC A))	-17.0	-8.6	0.4	0.1	-47.5	-1208.4	Column12
102	1.2D + 1.6Lr + 0.5(0.75Wx (LC B)+0.75Wz (LC B))	-18.6	-9.1	0.0	0.8	0.3	-1276.7	Column12
103	1.2D + 1.6Lr + 0.5(0.75Wx (Min.)+0.75Wz (Min.))	-18.6	-8.8	0.3	0.2	-39.4	-1233.1	Column12
104	1.2D + 1.6S + 0.5Wx (LC A)	-22.4	-11.3	0.0	-1.0	-0.5	-1590.3	Column10
105	1.2D + 1.6S + 0.5Wx (LC B)	-19.7	-9.8	0.0	-0.9	-0.4	-1386.6	Column10
106	1.2D + 1.6S + 0.5Wz (LC A)	-19.6	-9.1	-0.5	0.1	63.3	-1275.7	Column11
107	1.2D + 1.6S + 0.5Wz (LC B)	-24.4	-11.1	0.0	1.1	1.1	-1568.8	Column9
108	1.2D + 1.6S + 0.5Wx (Min.)	-22.0	-10.4	0.0	-0.9	-0.5	-1469.9	Column10
109	1.2D + 1.6S + 0.5Wz (Min.)	-22.1	-10.1	-0.4	-0.2	53.1	-1428.2	Column11
110	1.2D + 1.6S + 0.5(0.75Wx (LC A)+0.75Wz (LC A))	-20.5	-10.2	0.4	0.2	-47.8	-1442.0	Column12
111	1.2D + 1.6S + 0.5(0.75Wx (LC B)+0.75Wz (LC B))	-22.1	-10.7	0.0	-1.0	-0.9	-1510.7	Column10
112	1.2D + 1.6S + 0.5(0.75Wx (Min.)+0.75Wz (Min.))	-22.1	-10.4	0.3	0.4	-39.7	-1467.2	Column12
113	1.2D + 1.6Su + 0.5Wx (LC A)	-21.7	-10.1	0.0	-0.9	-0.4	-1417.3	Column10
114	1.2D + 1.6Su + 0.5Wx (LC B)	-19.0	-8.6	0.0	-0.7	-0.3	-1214.5	Column10
115	1.2D + 1.6Su + 0.5Wz (LC A)	-12.9	-7.8	-0.5	0.3	63.3	-1098.9	Column11
116	1.2D + 1.6Su + 0.5Wz (LC B)	-17.8	-9.9	0.0	0.9	0.9	-1389.6	Column9
117	1.2D + 1.6Su + 0.5Wx (Min.)	-21.3	-9.2	0.0	-0.8	-0.4	-1297.2	Column10
118	1.2D + 1.6Su + 0.5Wz (Min.)	-15.4	-8.9	-0.4	0.0	53.1	-1249.9	Column11
119	1.2D + 1.6Su + 0.5(0.75Wx (LC A)+0.75Wz (LC A))	-19.8	-9.0	0.4	0.0	-47.7	-1269.1	Column12
120	1.2D + 1.6Su + 0.5(0.75Wx (LC B)+0.75Wz (LC B))	-21.4	-9.5	0.0	-0.8	-0.8	-1337.9	Column10
121	1.2D + 1.6Su + 0.5(0.75Wx (Min.)+0.75Wz (Min.))	-21.4	-9.2	0.3	0.2	-39.7	-1294.0	Column12
122	1.2D + 1.6Ssliding + 0.5Wx (LC A)	-7.3	-4.1	0.0	0.1	-0.1	-581.1	Column12
123	1.2D + 1.6Ssliding + 0.5Wx (LC B)	-4.6	-2.7	0.0	0.0	0.2	-384.5	Column10
124	1.2D + 1.6Ssliding + 0.5Wz (LC A)	-4.5	-2.0	-0.5	1.0	63.3	-275.0	Column11
125	1.2D + 1.6Ssliding + 0.5Wz (LC B)	-7.3	-3.1	0.0	0.2	-0.7	-438.3	Column1
126	1.2D + 1.6Ssliding + 0.5Wx (Min.)	-6.9	-3.3	0.0	-0.1	0.1	-463.6	Column10
127	1.2D + 1.6Ssliding + 0.5Wz (Min.)	-7.0	-3.0	-0.4	0.7	53.1	-421.6	Column11
128	1.2D + 1.6Ssliding + 0.5(0.75Wx (LC A)+0.75Wz (LC A))	-5.4	-3.1	0.4	-0.7	-47.9	-437.3	Column12
129	1.2D + 1.6Ssliding + 0.5(0.75Wx (LC B)+0.75Wz (LC B))	-7.1	-3.6	0.0	0.1	-0.5	-503.4	Column12
130	1.2D + 1.6Ssliding + 0.5(0.75Wx (Min.)+0.75Wz (Min.))	-7.0	-3.3	0.3	-0.5	-39.9	-460.3	Column12
131	1.2D + 1.6Sdrift + 0.5Wx (LC A)	-7.3	-4.1	0.0	0.1	-0.1	-581.1	Column12
132	1.2D + 1.6Sdrift + 0.5Wx (LC B)	-4.6	-2.7	0.0	0.0	0.2	-384.5	Column10
133	1.2D + 1.6Sdrift + 0.5Wz (LC A)	-4.5	-2.0	-0.5	1.0	63.3	-275.0	Column11
134	1.2D + 1.6Sdrift + 0.5Wz (LC B)	-7.3	-3.1	0.0	0.2	-0.7	-438.3	Column1
135	1.2D + 1.6Sdrift + 0.5Wx (Min.)	-6.9	-3.3	0.0	-0.1	0.1	-463.6	Column10
136	1.2D + 1.6Sdrift + 0.5Wz (Min.)	-7.0	-3.0	-0.4	0.7	53.1	-421.6	Column11
137	1.2D + 1.6Sdrift + 0.5(0.75Wx (LC A)+0.75Wz (LC A))	-5.4	-3.1	0.4	-0.7	-47.9	-437.3	Column12
138	1.2D + 1.6Sdrift + 0.5(0.75Wx (LC B)+0.75Wz (LC B))	-7.1	-3.6	0.0	0.1	-0.5	-503.4	Column12
139	1.2D + 1.6Sdrift + 0.5(0.75Wx (Min.)+0.75Wz (Min.))	-7.0	-3.3	0.3	-0.5	-39.9	-460.3	Column12
140	1.2D + 1.0Wx (LC A) + 0.5Lr	-11.4	-7.1	0.0	0.4	0.1	-996.2	Column12
141	1.2D + 1.0Wx (LC B) + 0.5Lr	-9.0	-2.4	0.0	0.2	0.2	-332.4	Column9
142	1.2D + 1.0Wz (LC A) + 0.5Lr	-5.7	-2.7	1.1	-1.8	-126.4	-379.8	Column12
143	1.2D + 1.0Wz (LC B) + 0.5Lr	-11.4	-5.0	0.0	-0.3	1.5	-711.6	Column8
144	1.2D + 1.0Wx (Min.) + 0.5Lr	-10.6	-5.4	0.0	-0.2	0.1	-759.1	Column10
145	1.2D + 1.0Wz (Min.) + 0.5Lr	-10.7	-4.8	0.9	-1.2	-106.2	-675.4	Column12
146	1.2D + 1.0(0.75Wx (LC A)+0.75Wz (LC A)) + 0.5Lr	-7.6	-5.0	0.8	-1.2	-94.8	-707.4	Column12
147	1.2D + 1.0(0.75Wx (LC B)+0.75Wz (LC B)) + 0.5Lr	-10.8	-5.9	0.0	0.3	-0.6	-837.7	Column12
148	1.2D + 1.0(0.75Wx (Min.)+0.75Wz (Min.)) + 0.5Lr	-10.8	-5.3	0.7	-0.9	-79.6	-752.9	Column12
149	1.2D + 1.0Wx (LC A) + 0.5S	-12.5	-7.6	0.0	-0.5	-0.1	-1068.2	Column10
150	1.2D + 1.0Wx (LC B) + 0.5S	-7.0	-4.8	0.0	-0.2	0.1	-670.3	Column10
151	1.2D + 1.0Wz (LC A) + 0.5S	-6.8	-3.2	-1.1	1.7	126.6	-450.6	Column11
152	1.2D + 1.0Wz (LC B) + 0.5S	-16.6	-7.3	0.0	0.6	1.3	-1022.6	Column9
153	1.2D + 1.0Wx (Min.) + 0.5S	-11.7	-5.9	0.0	-0.3	0.0	-830.9	Column10
154	1.2D + 1.0Wz (Min.) + 0.5S	-11.8	-5.3	-0.9	1.2	106.3	-747.0	Column11
155	1.2D + 1.0(0.75Wx (LC A)+0.75Wz (LC A)) + 0.5S	-7.0	-4.4	0.8	-3.0	-94.9	-621.1	Column8
156	1.2D + 1.0(0.75Wx (LC B)+0.75Wz (LC B)) + 0.5S	-11.9	-6.5	0.0	-0.4	-0.8	-909.1	Column10
157	1.2D + 1.0(0.75Wx (Min.)+0.75Wz (Min.)) + 0.5S	-11.8	-5.9	0.7	-0.8	-79.7	-824.6	Column12
158	0.9D + 1.0Wx (LC A)	-6.0	-4.6	0.0	-0.2	0.1	-652.4	Column10

Strength Design Reactions (Factored)

							strong axis	
		N	**Vx**	**Vy**	**Mz**	**Mx**	**My**	**Column***
159	0.9D + 1.0Wx (LC B)	-0.7	-1.9	0.0	0.0	-0.4	-261.6	Column3
160	0.9D + 1.0Wz (LC A)	-0.3	-0.2	-1.1	2.4	127.0	-24.8	Column2
161	0.9D + 1.0Wz (LC B)	-10.2	-4.3	0.0	0.3	1.1	-604.9	Column9
162	0.9D + 1.0Wx (Min.)	-4.3	-2.5	0.0	-0.2	0.8	-353.5	Column8
163	0.9D + 1.0Wz (Min.)	-5.4	-2.4	-0.9	1.5	106.1	-333.4	Column11
164	0.9D + 1.0(0.75Wx (LC A)+0.75Wz (LC A))	-2.3	-2.6	0.8	-1.4	-94.7	-366.6	Column12
165	0.9D + 1.0(0.75Wx (LC B)+0.75Wz (LC B))	-5.5	-3.5	0.0	0.1	-0.8	-495.1	Column12
166	0.9D + 1.0(0.75Wx (Min.)+0.75Wz (Min.))	-5.4	-2.9	0.7	-1.1	-79.5	-410.6	Column12
167	1.2D+Ev+Ehx+0.2S	-10.9	-12.5	0.0	0.0	0.5	-1705.5	Column10
168	0.9D-Ev+Ehx	-5.1	-9.9	0.0	0.1	0.5	-1336.8	Column10
169	1.2D+Ev+Ehz+0.2S	-12.4	-6.5	-7.9	14.4	1014.8	-904.4	Column11
170	0.9D-Ev+Ehz	-6.5	-3.8	-7.9	14.6	1010.8	-532.9	Column11
171	1.2D+Ev+Ehx+0.3Ehz+0.2S	-11.7	-13.1	2.3	-4.2	-300.4	-1795.0	Column12
172	0.9D-Ev+Ehx+0.3Ehz	-5.8	-10.5	2.3	-4.3	-299.4	-1424.1	Column12
173	1.2D+Ev+Ehz+0.3Ehx+0.2S	-12.7	-8.9	7.9	-14.3	-1010.4	-1234.2	Column12
174	0.9D-Ev+Ehz+0.3Ehx	-6.8	-6.3	7.8	-14.4	-1006.6	-861.3	Column12

*Columns identified are determined from expected peak anchor stress for the given load combination

TENSION MEMBER TO COLUMN

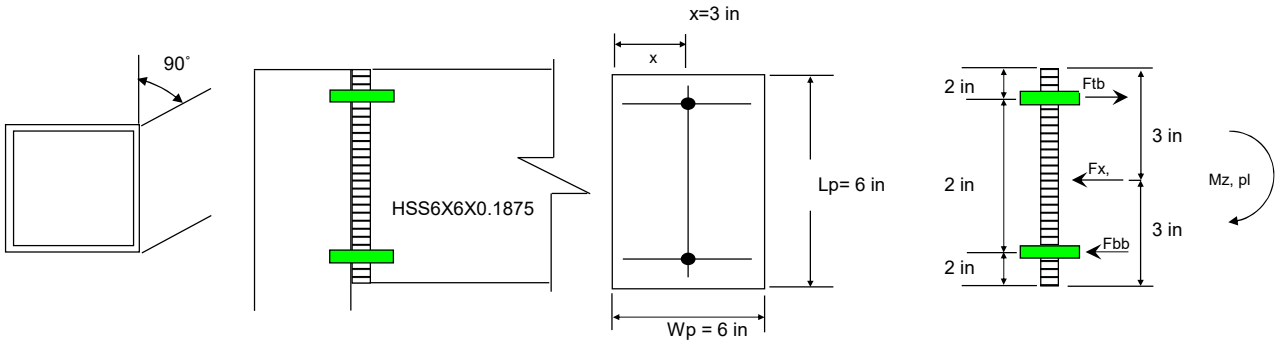
2 BOLTS - PRETENSIONED JOINT

Bolt Check: (2) 0.625" Diameter, A325 Bolts				Allowable		Actual	Load Combination / Member	
1	Shear	AISC (J3-1)	R_N/Ω	8.3 kip		7.4 kip	62 / Tension3	**OK**
2	Tension	AISC (J3-1)	R_N/Ω	13.8 kip		0.4 kip	70 / Tension6	**OK**
3	Bearing	AISC (J3-6b,d)	R_N/Ω	20.4 kip		7.4 kip	62 / Tension3	**OK**

End Plate Check: 0.375" Thick				Allowable		Actual	Load Combination / Member	
4	Shear Yielding	AISC (J4-3)	R_N/Ω	32.4 kip		1.6 kip	41 / Tension5	**OK**
5	Shear Rupture	AISC (J4-4)	R_N/Ω	30.2 kip		1.6 kip	41 / Tension5	**OK**
6	Weld Check *w = 0.1875"*	AISC (J2-3)	R_N/Ω	2.8 kip/in		0.2 kip/in	69 / Tension4	**OK**
7	Plate Thickness (t_P)		$\sqrt{\frac{4M_{PL}}{22W_P}}$	0.10 in		0.38 in	70 / Tension6	**OK**

Design Forces / Moments

Check	Load Combination	Member	Fx (Axial) [k]	Fy [k]	Fz [k]	Mx [k-in]	My [k-in]	Mz [k-in]
1	62	Tension3	-0.8	0.4	0.0	-14.9	0.0	0.0
2	70	Tension6	-0.8	0.2	0.2	11.7	0.0	0.0
3	62	Tension3	-0.8	0.4	0.0	-14.9	0.0	0.0
4	41	Tension5	0.0	1.6	0.1	0.9	0.0	0.0
5	41	Tension5	0.0	1.6	0.1	0.9	0.0	0.0
6	69	Tension4	0.4	1.3	-0.1	-13.4	0.0	0.0
7	70	Tension6	-0.8	0.2	0.2	11.7	0.0	0.0



Plan View | Connection Elevation | End Plate Elevation | End Plate Section

Member Height (in):	6	Number of Bolts:	2
Member Width (in):	6	Bolt Diameter (in):	0.625
Member Thickness (in):	0.188	End Plate Thickness (in):	0.375
End Plate Weld Size (in):	0.188	Flange Plate Thickness (in):	NONE

TRUSS TO COLUMN

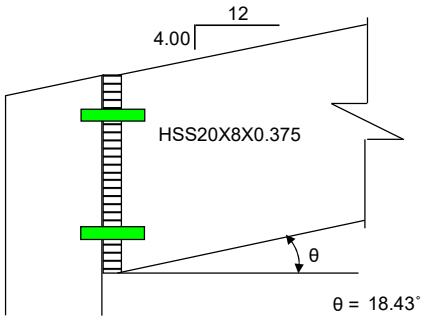
2 BOLTS - PRETENSIONED JOINT

Bolt Check: (2) 1" Diameter, A325 Bolts				Allowable		Actual		Load Combination / Member	
1	Shear		AISC (J3-1)	R_N/Ω	21.2 kip	14.6 kip		69 / Truss12	**OK**
2	Tension		AISC (J3-1)	R_N/Ω	35.3 kip	5.5 kip		70 / Truss4	**OK**
3	Bearing		AISC (J3-6b,d)	R_N/Ω	43.5 kip	14.6 kip		69 / Truss12	**OK**

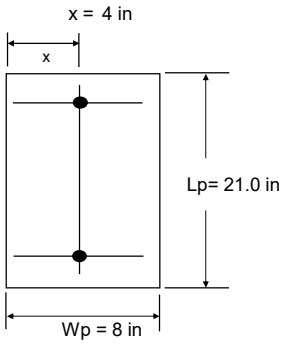
End Plate Check: 0.5" Thick				Allowable		Actual		Load Combination / Member	
4	Shear Yielding		AISC (J4-3)	R_N/Ω	151.8 kip	11.8 kip		69 / Truss12	**OK**
5	Shear Rupture		AISC (J4-4)	R_N/Ω	164.9 kip	11.8 kip		69 / Truss12	**OK**
6	Weld Check	*w = 0.25"*	AISC (J2-3)	R_N/Ω	3.7 kip/in	0.3 kip/in		69 / Truss12	**OK**
7	Plate Thickness (t_P)			$\sqrt{\frac{4M_{PL}}{22W_P}}$	0.41 in	0.50 in		70 / Truss4	**OK**

Design Forces / Moments

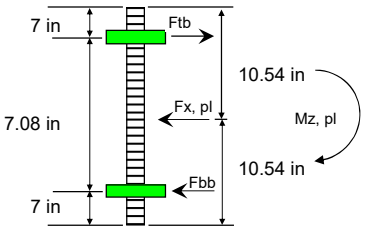
Check	Load Combination	Member	Fx (Axial) [k]	Fy [k]	Fz [k]	Mx [k-in]	My [k-in]	Mz [k-in]
1	69	Truss12	13.2	8.1	3.0	52.3	0.0	0.0
2	70	Truss4	-6.1	1.6	-3.9	-59.6	0.0	0.0
3	69	Truss12	13.2	8.1	3.0	52.3	0.0	0.0
4	69	Truss12	13.2	8.1	3.0	52.3	0.0	0.0
5	69	Truss12	13.2	8.1	3.0	52.3	0.0	0.0
6	69	Truss12	13.2	8.1	3.0	52.3	0.0	0.0
7	70	Truss4	-6.1	1.6	-3.9	-59.6	0.0	0.0



Connection Elevation



End Plate Elevation



End Plate Section

Member Height (in):	20	Number of Bolts:	2
Member Width (in):	8	Bolt Diameter (in):	1.000
Member Thickness (in):	0.375	End Plate Thickness (in):	0.500
End Plate Weld Size (in):	0.250	Flange Plate Thickness (in):	0.500
	UNIQUE WELD SIZE		

TRUSS TO COMPRESSION MEMBER

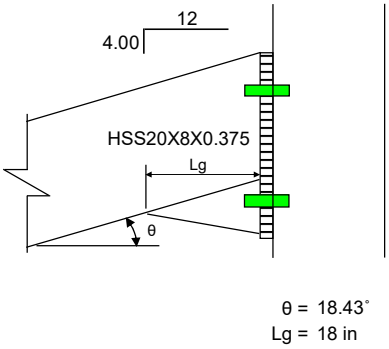
4 BOLTS - PRETENSIONED JOINT

Bolt Check: (4) 1" Diameter, A325 Bolts				Allowable		Actual		Load Combination / Member	
1	Shear		AISC (J3-1)	R_N/Ω	21.2 kip	2.0 kip		69 / Truss3	**OK**
2	Tension		AISC (J3-1)	R_N/Ω	35.3 kip	29.3 kip		63 / Truss12	**OK**
3	Bearing		AISC (J3-6b,d)	R_N/Ω	74.8 kip	2.0 kip		69 / Truss3	**OK**

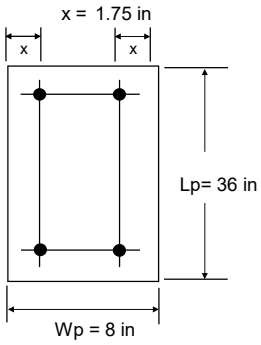
End Plate Check: 1" Thick				Allowable		Actual		Load Combination / Member	
4	Shear Yielding		AISC (J4-3)	R_N/Ω	115.2 kip	6.6 kip		62 / Truss7	**OK**
5	Shear Rupture		AISC (J4-4)	R_N/Ω	102.2 kip	6.6 kip		62 / Truss7	**OK**
6	Weld Check	*w = 0.25"*	AISC (J2-3)	R_N/Ω	3.7 kip/in	2.0 kip/in		63 / Truss12	**OK**
7	Plate Thickness (t_P)			$\sqrt{\frac{4M_{PL}}{22W_P}}$	0.72 in	1.00 in		63 / Truss12	**OK**

Design Forces / Moments

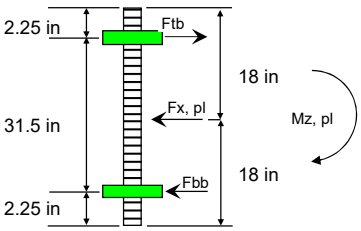
Check	Load Combination	Member	Fx (Axial) [k]	Fy [k]	Fz [k]	Mx [k-in]	My [k-in]	Mz [k-in]
1	69	Truss3	11.5	0.0	-3.6	46.3	139.3	-943.2
2	63	Truss12	4.1	-0.1	-5.0	52.2	147.6	-1086.6
3	69	Truss3	11.5	0.0	-3.6	46.3	139.3	-943.2
4	62	Truss7	-0.4	0.3	6.6	-65.0	-180.6	-511.7
5	62	Truss7	-0.4	0.3	6.6	-65.0	-180.6	-511.7
6	63	Truss12	4.1	-0.1	-5.0	52.2	147.6	-1086.6
7	63	Truss12	4.1	-0.1	-5.0	52.2	147.6	-1086.6



Connection Elevation



End Plate Elevation



End Plate Section

Member Height (in):	20	Number of Bolts:	4
Member Width (in):	8	Bolt Diameter (in):	1.000
Member Thickness (in):	0.375	End Plate Thickness (in):	1.000
End Plate Weld Size (in):	0.250	Flange Plate Thickness (in):	0.625
	UNIQUE WELD SIZE		

RIDGE BEAM TO COMPRESSION TUBE

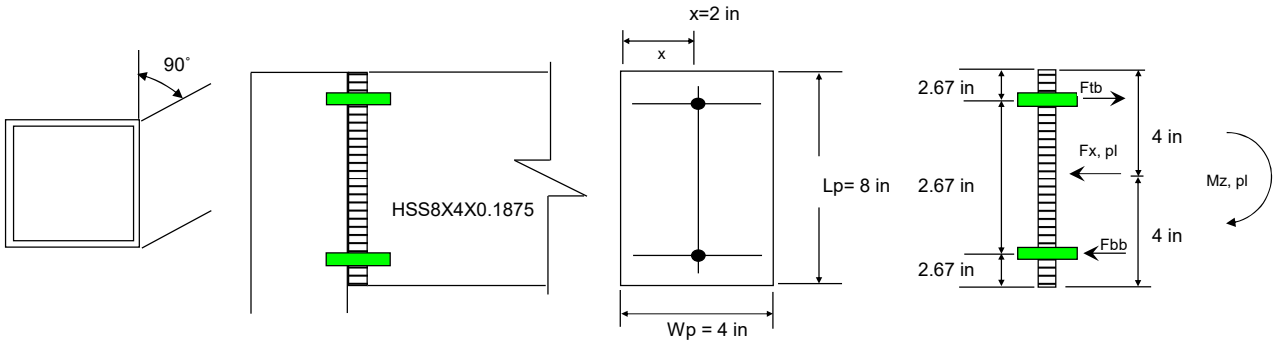
2 BOLTS - PRETENSIONED JOINT

Bolt Check: (2) 0.75" Diameter, A325 Bolts				**Allowable**		**Actual**		**Load Combination / Member**	
1	Shear		AISC (J3-1)	R_N/Ω	11.9 kip	1.9 kip		19 / Ridge4	**OK**
2	Tension		AISC (J3-1)	R_N/Ω	19.9 kip	10.3 kip		62 / Ridge2	**OK**
3	Bearing		AISC (J3-6b,d)	R_N/Ω	48.9 kip	1.9 kip		19 / Ridge4	**OK**

End Plate Check: 0.75" Thick				**Allowable**		**Actual**		**Load Combination / Member**	
4	Shear Yielding		AISC (J4-3)	R_N/Ω	86.4 kip	1.9 kip		19 / Ridge4	**OK**
5	Shear Rupture		AISC (J4-4)	R_N/Ω	83.2 kip	1.9 kip		19 / Ridge4	**OK**
6	Weld Check	*w = 0.1875"*	AISC (J2-3)	R_N/Ω	2.8 kip/in	0.9 kip/in		68 / Ridge2	**OK**
7	Plate Thickness (t_P)			$\sqrt{\frac{4M_{PL}}{22W_P}}$	0.63 in	0.75 in		62 / Ridge2	**OK**

Design Forces / Moments

Check	Load Combination	Member	Fx (Axial) [k]	Fy [k]	Fz [k]	Mx [k-in]	My [k-in]	Mz [k-in]
1	19	Ridge4	4.2	-1.9	0.0	0.0	0.0	0.0
2	62	Ridge2	-20.6	-0.2	0.0	0.0	0.0	0.0
3	19	Ridge4	4.2	-1.9	0.0	0.0	0.0	0.0
4	19	Ridge4	4.2	-1.9	0.0	0.0	0.0	0.0
5	19	Ridge4	4.2	-1.9	0.0	0.0	0.0	0.0
6	68	Ridge2	-20.6	-0.2	0.1	0.0	0.0	0.0
7	62	Ridge2	-20.6	-0.2	0.0	0.0	0.0	0.0



Plan View | Connection Elevation | End Plate Elevation | End Plate Section

Member Height (in):	8	Number of Bolts:	2
Member Width (in):	4	Bolt Diameter (in):	0.750
Member Thickness (in):	0.188	End Plate Thickness (in):	0.750
End Plate Weld Size (in):	0.188	Flange Plate Thickness (in):	0.750

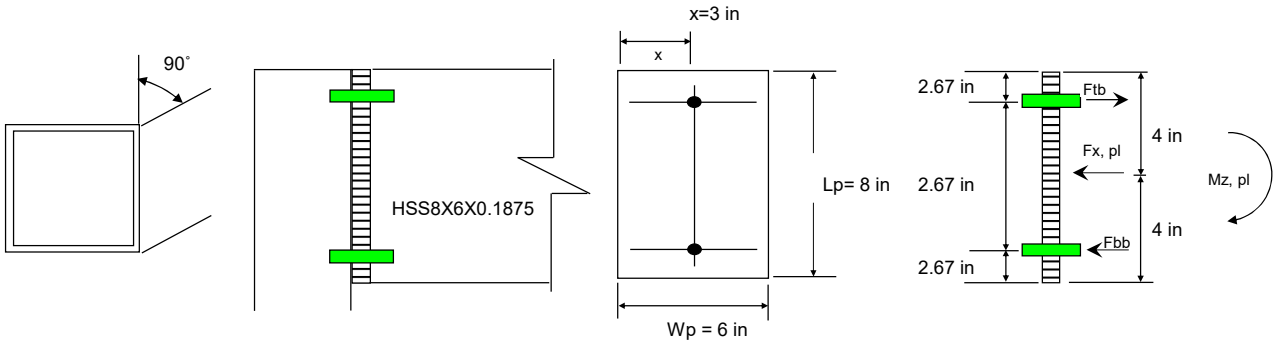
PURLIN CONNECTION

2 BOLTS - PRETENSIONED JOINT

Bolt Check: (2) 0.75" Diameter, A325 Bolts				Allowable		Actual		Load Combination / Member	
1	Shear		AISC (J3-1)	R_N/Ω	11.9 kip	2.4 kip		20 / Purlin10	**OK**
2	Tension		AISC (J3-1)	R_N/Ω	19.9 kip	5.8 kip		62 / Purlin1	**OK**
3	Bearing		AISC (J3-6b,d)	R_N/Ω	32.6 kip	2.4 kip		20 / Purlin10	**OK**

End Plate Check: 0.625" Thick				Allowable		Actual		Load Combination / Member	
4	Shear Yielding		AISC (J4-3)	R_N/Ω	72.0 kip	2.3 kip		20 / Purlin10	**OK**
5	Shear Rupture		AISC (J4-4)	R_N/Ω	69.3 kip	2.3 kip		20 / Purlin10	**OK**
6	Weld Check	*w = 0.1875"*	AISC (J2-3)	R_N/Ω	2.8 kip/in	0.4 kip/in		62 / Purlin1	**OK**
7	Plate Thickness (t_P)			$\sqrt{\frac{4M_{PL}}{22W_P}}$	0.42 in	0.63 in		62 / Purlin1	**OK**

Design Forces / Moments								
Check	Load Combination	Member	Fx (Axial) [k]	Fy [k]	Fz [k]	Mx [k-in]	My [k-in]	Mz [k-in]
1	20	Purlin10	0.2	2.3	-0.8	0.0	0.0	0.0
2	62	Purlin1	-11.6	0.5	-0.2	0.0	0.0	0.0
3	20	Purlin10	0.2	2.3	-0.8	0.0	0.0	0.0
4	20	Purlin10	0.2	2.3	-0.8	0.0	0.0	0.0
5	20	Purlin10	0.2	2.3	-0.8	0.0	0.0	0.0
6	62	Purlin1	-11.6	0.5	-0.2	0.0	0.0	0.0
7	62	Purlin1	-11.6	0.5	-0.2	0.0	0.0	0.0



Plan View | Connection Elevation | End Plate Elevation | End Plate Section

Member Height (in):	8	Number of Bolts:	2
Member Width (in):	6	Bolt Diameter (in):	0.750
Member Thickness (in):	0.188	End Plate Thickness (in):	0.625
End Plate Weld Size (in):	0.188	Flange Plate Thickness (in):	0.750

BRACE TO GABLE TRUSS

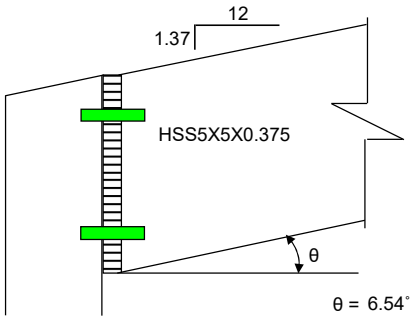
4 BOLTS - PRETENSIONED JOINT

Bolt Check: (4) 0.75" Diameter, A325 Bolts				Allowable		Actual	Load Combination / Member	
1	Shear		AISC (J3-1)	R_N/Ω	11.9 kip	2.6 kip	68 / Brace7	**OK**
2	Tension	*allowable per J3.7*	AISC (J3-2)	R_N/Ω	19.9 kip	6.7 kip	62 / Brace8	**OK**
3	Bearing		AISC (J3-6b,d)	R_N/Ω	23.8 kip	2.6 kip	68 / Brace7	**OK**

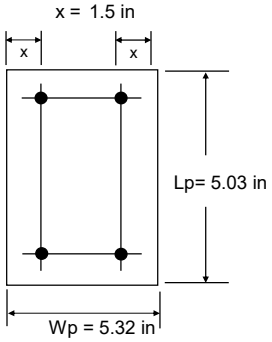
End Plate Check: 0.625" Thick				Allowable		Actual	Load Combination / Member	
4	Shear Yielding		AISC (J4-3)	R_N/Ω	47.9 kip	10.1 kip	68 / Brace7	**OK**
5	Shear Rupture		AISC (J4-4)	R_N/Ω	40.2 kip	10.1 kip	17 / Brace1	**OK**
6	Weld Check	*w = 0.25"*	AISC (J2-3)	R_N/Ω	3.7 kip/in	1.4 kip/in	68 / Brace7	**OK**
7	Plate Thickness (t_P)			$\sqrt{\frac{4M_{PL}}{22W_P}}$	0.47 in	0.63 in	62 / Brace8	**OK**

Design Forces / Moments

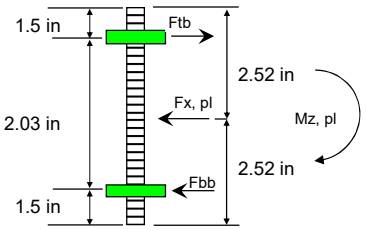
Check	Load Combination	Member	Fx (Axial) [k]	Fy [k]	Fz [k]	Mx [k-in]	My [k-in]	Mz [k-in]
1	68	Brace7	-28.7	0.4	0.4	0.0	0.0	0.0
2	62	Brace8	-28.6	0.4	-0.2	0.0	0.0	0.0
3	68	Brace7	-28.7	0.4	0.4	0.0	0.0	0.0
4	68	Brace7	-28.7	0.4	0.4	0.0	0.0	0.0
5	17	Brace1	1.0	0.4	-0.1	0.0	0.0	0.0
6	68	Brace7	-28.7	0.4	0.4	0.0	0.0	0.0
7	62	Brace8	-28.6	0.4	-0.2	0.0	0.0	0.0



Connection Elevation



End Plate Elevation



End Plate Section

Member Height (in):	5	Number of Bolts:	4
Member Width (in):	5	Bolt Diameter (in):	0.750
Member Thickness (in):	0.375	End Plate Thickness (in):	0.625
End Plate Weld Size (in):	0.250	Flange Plate Thickness (in):	0.750
	UNIQUE WELD SIZE		

BRACE TO COMPRESSION TUBE

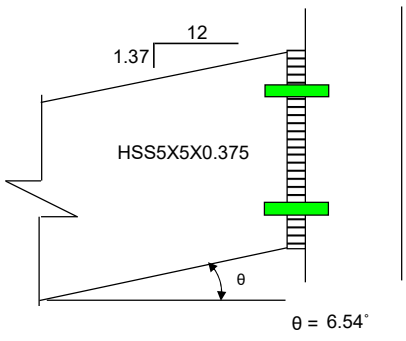
4 BOLTS - PRETENSIONED JOINT

Bolt Check: (4) 0.75" Diameter, A325 Bolts				Allowable		Actual	Load Combination / Member	
1	Shear		AISC (J3-1)	R_N/Ω	11.9 kip	2.6 kip	62 / Brace8	**OK**
2	Tension	*allowable per J3.7*	AISC (J3-2)	R_N/Ω	19.9 kip	6.6 kip	68 / Brace7	**OK**
3	Bearing		AISC (J3-6b,d)	R_N/Ω	23.8 kip	2.6 kip	62 / Brace8	**OK**

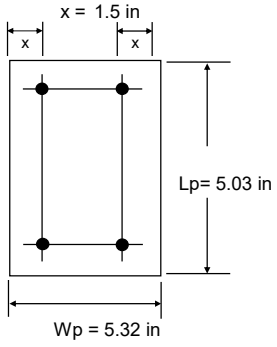
End Plate Check: 0.625" Thick				Allowable		Actual	Load Combination / Member	
4	Shear Yielding		AISC (J4-3)	R_N/Ω	38.3 kip	9.8 kip	62 / Brace8	**OK**
5	Shear Rupture		AISC (J4-4)	R_N/Ω	32.2 kip	9.8 kip	62 / Brace8	**OK**
6	Weld Check	*w = 0.25"*	AISC (J2-3)	R_N/Ω	3.7 kip/in	1.4 kip/in	68 / Brace7	**OK**
7	Plate Thickness (t_P)			$\sqrt{\frac{4M_{PL}}{22W_P}}$	0.47 in	0.63 in	68 / Brace7	**OK**

Design Forces / Moments

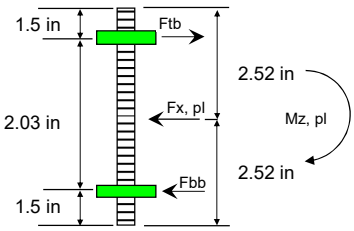
Check	Load Combination	Member	Fx (Axial) [k]	Fy [k]	Fz [k]	Mx [k-in]	My [k-in]	Mz [k-in]
1	62	Brace8	-28.0	-0.4	0.2	0.0	0.0	0.0
2	68	Brace7	-28.1	-0.4	-0.4	0.0	0.0	0.0
3	62	Brace8	-28.0	-0.4	0.2	0.0	0.0	0.0
4	62	Brace8	-28.0	-0.4	0.2	0.0	0.0	0.0
5	62	Brace8	-28.0	-0.4	0.2	0.0	0.0	0.0
6	68	Brace7	-28.1	-0.4	-0.4	0.0	0.0	0.0
7	68	Brace7	-28.1	-0.4	-0.4	0.0	0.0	0.0



Connection Elevation



End Plate Elevation



End Plate Section

Member Height (in):	5	Number of Bolts:	4
Member Width (in):	5	Bolt Diameter (in):	0.750
Member Thickness (in):	0.375	End Plate Thickness (in):	0.625
End Plate Weld Size (in):	0.250	Flange Plate Thickness (in):	0.750
	UNIQUE WELD SIZE		

NON-SLOPING TAIL CONNECTION

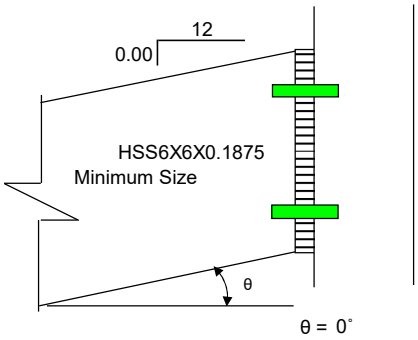
2 BOLTS - PRETENSIONED JOINT

Bolt Check: (2) 0.625" Diameter, A325 Bolts				**Allowable**		**Actual**		**Load Combination / Member**	
1	Shear		AISC (J3-1)	R_N/Ω	8.3 kip	0.6 kip		20 / Purlin Tail8	**OK**
2	Tension		AISC (J3-1)	R_N/Ω	13.8 kip	2.0 kip		20 / Purlin Tail1	**OK**
3	Bearing		AISC (J3-6b,d)	R_N/Ω	14.8 kip	0.6 kip		20 / Purlin Tail8	**OK**

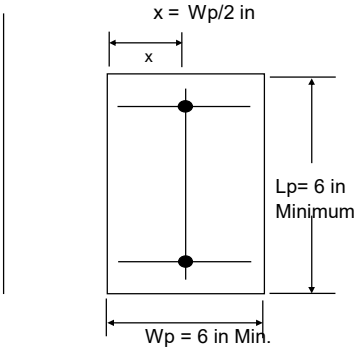
End Plate Check: 0.375" Thick				**Allowable**		**Actual**		**Load Combination / Member**	
4	Shear Yielding		AISC (J4-3)	R_N/Ω	32.4 kip	0.6 kip		20 / Purlin Tail1	**OK**
5	Shear Rupture		AISC (J4-4)	R_N/Ω	30.2 kip	0.6 kip		20 / Purlin Tail1	**OK**
6	Weld Check	*w = 0.1875"*	AISC (J2-3)	R_N/Ω	2.8 kip/in	0.2 kip/in		20 / Purlin Tail1	**OK**
7	Plate Thickness (t_p)			$\sqrt{\frac{4M_{PL}}{22W_P}}$	0.16 in	0.38 in		20 / Purlin Tail1	**OK**

Design Forces / Moments

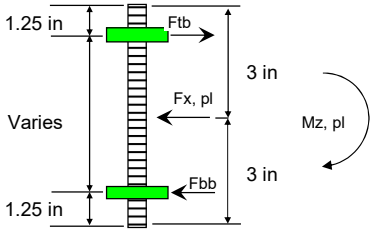
Check	Load Combination	Member	Fx (Axial) [k]	Fy [k]	Fz [k]	Mx [k-in]	My [k-in]	Mz [k-in]
1	20	Purlin Tail8	0.0	-0.6	-0.2	0.0	-2.3	7.0
2	20	Purlin Tail1	0.0	-0.6	0.2	0.0	2.3	7.0
3	20	Purlin Tail8	0.0	-0.6	-0.2	0.0	-2.3	7.0
4	20	Purlin Tail1	0.0	-0.6	0.2	0.0	2.3	7.0
5	20	Purlin Tail1	0.0	-0.6	0.2	0.0	2.3	7.0
6	20	Purlin Tail1	0.0	-0.6	0.2	0.0	2.3	7.0
7	20	Purlin Tail1	0.0	-0.6	0.2	0.0	2.3	7.0



Connection Elevation



End Plate Elevation



End Plate Section

Member Height (in):	6	Number of Bolts:	2
Member Width (in):	6	Bolt Diameter (in):	0.625
Member Thickness (in):	0.188	End Plate Thickness (in):	0.375
End Plate Weld Size (in):	0.188	Flange Plate Thickness (in):	NONE

WELDED CONNECTION IS PERMITTED

RISA ANALYSIS REPORT

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Distributed	Area(Member)
1	FRAMEWEIGHT	DL		-1				
2	DL	DL						2
3	LL	LL				4		2
4	SL	SL						2
5	SLU	SL						3
6	SLsliding	SL						
7	SLdrift	SL						
8	X WINDWARD LOW	WL						3
9	X LEEWARD LOW	WL						3
10	X SIDEWARD LOW	WL						
11	X WINDWARD UPPER	WL						
12	X LEEWARD UPPER	WL						
13	X SIDEWARD UPPER	WL						
14	X10MINWIND	WL						3
15	Z WINDWARD LOW	WL						2
16	Z LEEWARD LOW	WL						
17	Z SIDEWARD LOW	WL						6
18	Z WINDWARD UPPER	WL						
19	Z LEEWARD UPPER	WL						
20	Z SIDEWARD UPPER	WL						
21	Z10MINWIND	WL						2
22	EX FRAME	EL	-1					
23	EX ROOF	EL						2
24	EZ FRAME	EL			-1			
25	EZ ROOF	EL						2
30	BLC 2 Transient Area Loads	None					366	
31	BLC 3 Transient Area Loads	None					366	
32	BLC 4 Transient Area Loads	None					366	
33	BLC 5 Transient Area Loads	None					413	
34	BLC 8 Transient Area Loads	None					432	
35	BLC 9 Transient Area Loads	None					432	
36	BLC 14 Transient Area Loads	None					256	
37	BLC 15 Transient Area Loads	None					72	
38	BLC 17 Transient Area Loads	None					732	
39	BLC 21 Transient Area Loads	None					72	
40	BLC 23 Transient Area Loads	None					366	
41	BLC 25 Transient Area Loads	None					366	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC
1	SERVICE D			1	1	2	6	26						
2	SERVICE Lr			3	20									
3	SERVICE S			4	26.04									
4	SERVICE Su			5	42.402									
5	SERVICE Ssliding			6										
6	SERVICE Sdrift			7										
7	SERVICE Wx (LC A)			8	11.44	9	-1.778	10	-8.32	11		12		13
8	SERVICE Wx (LC B)			8	0.09	9	-10.011	10	8.32	11		12		13
9	SERVICE Wz (LC A)			15	11.44	16	-1.778	17	-8.32	18		19		20
10	SERVICE Wz (LC B)			15	0.087	16	-10.011	17	8.32	18		19		20
11	SERVICE Ex			22	0.965	23	13.813	27						
12	SERVICE Ez			24	0.965	25	13.813	28						
13	SERVICE Ev			1	0.186	2	1.323	29						
14														
15														
16														
17	D	Yes	Y	L1	1									
18	D + Lr	Yes	Y	L1	1	L2	1							
19	D + S	Yes	Y	L1	1	L3	1							
20	D + Su	Yes	Y	L1	1	L4	1							
21	D+Ssliding	Yes	Y	L1	1	L5	1							
22	D+Sdrift	Yes	Y	L1	1	L6	1							
23	D + 0.6Wx (LC A)	Yes	Y	L1	1	L7	1							
24	D + 0.6Wx (LC B)	Yes	Y	L1	1	L8	1							
25	D + 0.6Wz (LC A)	Yes	Y	L1	1	L9	1							
26	D + 0.6Wz (LC B)	Yes	Y	L1	1	L10	1							
27	D + (0.6Wx (Min.))	Yes	Y	L1	1	14	9.6							

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC
28	D + (0.6Wz (Min.))	Yes	Y	L1	1	21	9.6							
29	D+0.6(0.75Wx(LC A)+0.75Wz(LC A))	Yes	Y	L1	1	L7	0.75	L9	0.75					
30	D+0.6(0.75Wx(LC B)+0.75Wz(LC B))	Yes	Y	L1	1	L8	0.75	L10	0.75					
31	D+0.6(0.75Wx(Min.)+0.75Wz(Min.))	Yes	Y	L1	1	14	7.2	21	7.2					
32	D + 0.75(0.6Wx (LC A)) + 0.75Lr	Yes	Y	L1	1	L7	0.75	L2	0.75					
33	D + 0.75(0.6Wx (LC B)) + 0.75Lr	Yes	Y	L1	1	L8	0.75	L2	0.75					
34	D + 0.75(0.6Wz (LC A)) + 0.75Lr	Yes	Y	L1	1	L9	0.75	L2	0.75					
35	D + 0.75(0.6Wz (LC B)) + 0.75Lr	Yes	Y	L1	1	L10	0.75	L2	0.75					
36	D + 0.75(0.6Wx (Min.)) + 0.75Lr	Yes	Y	L1	1	14	7.2	L2	0.75					
37	D + 0.75(0.6Wz (Min.)) + 0.75Lr	Yes	Y	L1	1	21	7.2	L2	0.75					
38	D+0.75(0.6(0.75Wx(LC A)+0.75Wz(LC A))) + 0.75Lr	Yes	Y	L1	1	L7	0.563	L9	0.563	L2	0.75			
39	D+0.75(0.6(0.75Wx(LC B)+0.75Wz(LC B)) + 0.75Lr	Yes	Y	L1	1	L8	0.563	L10	0.563	L2	0.75			
40	D+ 0.75(0.6(0.75Wx(Min.)+0.75Wz(Min.))) + 0.75Lr	Yes	Y	L1	1	14	5.4	21	5.4	L2	0.75			
41	D + 0.75(0.6Wx (LC A)) + 0.75S	Yes	Y	L1	1	L7	0.75	L3	0.75					
42	D + 0.75(0.6Wx (LC B)) + 0.75S	Yes	Y	L1	1	L8	0.75	L3	0.75					
43	D + 0.75(0.6Wz (LC A)) + 0.75S	Yes	Y	L1	1	L9	0.75	L3	0.75					
44	D + 0.75(0.6Wz (LC B)) + 0.75S	Yes	Y	L1	1	L10	0.75	L3	0.75					
45	D + 0.75(0.6Wx (Min.)) + 0.75S	Yes	Y	L1	1	14	7.2	L3	0.75					
46	D + 0.75(0.6Wz (Min.)) + 0.75S	Yes	Y	L1	1	21	7.2	L3	0.75					
47	D+0.75(0.6(0.75Wx(LC A)+0.75Wz(LC A))) + 0.75S	Yes	Y	L1	1	L7	0.563	L9	0.563	L3	0.75			
48	D+0.75(0.6(0.75Wx(LC B)+0.75Wz(LC B)) + 0.75S	Yes	Y	L1	1	L8	0.563	L10	0.563	L3	0.75			
49	D+ 0.75(0.6(0.75Wx(Min.)+0.75Wz(Min.))) + 0.75S	Yes	Y	L1	1	14	5.4	21	5.4	L3	0.75			
50	0.6D + 0.6Wx (LC A)	Yes	Y	L1	0.6	L7	1							
51	0.6D + 0.6Wx (LC B)	Yes	Y	L1	0.6	L8	1							
52	0.6D + 0.6Wz (LC A)	Yes	Y	L1	0.6	L9	1							
53	0.6D + 0.6Wz (LC B)	Yes	Y	L1	0.6	L10	1							
54	0.6D + (0.6Wx (Min.))	Yes	Y	L1	0.6	14	9.6							
55	0.6D + (0.6Wz (Min.))	Yes	Y	L1	0.6	21	9.6							
56	0.6D+0.6(0.75Wx(LC A)+0.75Wz(LC A))	Yes	Y	L1	0.6	L7	0.75	L9	0.75					
57	0.6D+0.6(0.75Wx(LC B)+0.75Wz(LC B))	Yes	Y	L1	0.6	L8	0.75	L10	0.75					
58	0.6D+0.6(0.75Wx(Min.)+0.75Wz(Min.))	Yes	Y	L1	0.6	14	7.2	21	7.2					
59	1.0D+0.7Ev+0.7Ehx	Yes	Y	L1	1	L13	0.7	L11	0.7					
60	1.0D+0.525Ev+0.525Ehx+0.75S	Yes	Y	L1	1	L13	0.525	L11	0.525	L3	0.75			
61	0.6D-0.7Ev+0.7Ehx	Yes	Y	L1	0.6	L13	-0.7	L11	0.7					
62	1.0D+0.7Ev+0.7Ehz	Yes	Y	L1	1	L13	0.7	L12	0.7					
63	1.0D+0.525Ev+0.525Ehz+0.75S	Yes	Y	L1	1	L13	0.525	L12	0.525	L3	0.75			
64	0.6D-0.7Ev+0.7Ehz	Yes	Y	L1	0.6	L13	-0.7	L12	0.7					
65	1.0D+0.7Ev+0.7Ehx+0.21Ehz	Yes	Y	L1	1	L13	0.7	L11	0.7	L12	0.21			
66	1.0D+0.525Ev+0.525Ehx+0.1575Ehz+0.75S	Yes	Y	L1	1	L13	0.525	L11	0.525	L12	0.16	L3	0.75	
67	0.6D-0.7Ev+0.7Ehx+0.21Ehz	Yes	Y	L1	0.6	L13	-0.7	L11	0.7	L12	0.21			
68	1.0D+0.7Ev+0.7Ehz+0.21Ehx	Yes	Y	L1	1	L13	0.7	L12	0.7	L11	0.21			
69	1.0D+0.525Ev+0.525Ehz+0.1575Ehx+0.75S	Yes	Y	L1	1	L13	0.525	L12	0.525	L11	0.16	L3	0.75	
70	0.6D-0.7Ev+0.7Ehz+0.21Ehx	Yes	Y	L1	0.6	L13	-0.7	L12	0.7	L11	0.21			
71														
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92	1.4D			L1	1.4									
93	1.2D + 0.5Lr			L1	1.2	L2	0.5							
94	1.2D + 0.5S			L1	1.2	L3	0.5							
95	1.2D + 1.6Lr + 0.5Wx (LC A)			L1	1.2	L2	1.6	L7	0.833					

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC
96	1.2D + 1.6Lr + 0.5Wx (LC B)			L1	1.2	L2	1.6	L8	0.833					
97	1.2D + 1.6Lr + 0.5Wz (LC A)			L1	1.2	L2	1.6	L9	0.833					
98	1.2D + 1.6Lr + 0.5Wz (LC B)			L1	1.2	L2	1.6	L10	0.833					
99	1.2D + 1.6Lr + 0.5Wx (Min.)			L1	1.2	L2	1.6	14	8					
100	1.2D + 1.6Lr + 0.5Wz (Min.)			L1	1.2	L2	1.6	21	8					
101	1.2D + 1.6Lr + 0.5(0.75Wx (LC A)+0.75Wz (LC A))			L1	1.2	L2	1.6	L7	0.625	L9	0.63			
102	1.2D + 1.6Lr + 0.5(0.75Wx (LC B)+0.75Wz (LC B))			L1	1.2	L2	1.6	L8	0.625	L10	0.63			
103	1.2D + 1.6Lr + 0.5(0.75Wx (Min.)+0.75Wz (Min.))			L1	1.2	L2	1.6	14	6	21	6			
104	1.2D + 1.6S + 0.5Wx (LC A)			L1	1.2	L3	1.6	L7	0.833					
105	1.2D + 1.6S + 0.5Wx (LC B)			L1	1.2	L3	1.6	L8	0.833					
106	1.2D + 1.6S + 0.5Wz (LC A)			L1	1.2	L3	1.6	L9	0.833					
107	1.2D + 1.6S + 0.5Wz (LC B)			L1	1.2	L3	1.6	L10	0.833					
108	1.2D + 1.6S + 0.5Wx (Min.)			L1	1.2	L3	1.6	14	8					
109	1.2D + 1.6S + 0.5Wz (Min.)			L1	1.2	L3	1.6	21	8					
110	1.2D + 1.6S + 0.5(0.75Wx (LC A)+0.75Wz (LC A))			L1	1.2	L3	1.6	L7	0.625	L9	0.63			
111	1.2D + 1.6S + 0.5(0.75Wx (LC B)+0.75Wz (LC B))			L1	1.2	L3	1.6	L8	0.625	L10	0.63			
112	1.2D + 1.6S + 0.5(0.75Wx (Min.)+0.75Wz (Min.))			L1	1.2	L3	1.6	14	6	21	6			
113	1.2D + 1.6Su + 0.5Wx (LC A)			L1	1.2	L4	1.6	L7	0.833					
114	1.2D + 1.6Su + 0.5Wx (LC B)			L1	1.2	L4	1.6	L8	0.833					
115	1.2D + 1.6Su + 0.5Wz (LC A)			L1	1.2	L4	1.6	L9	0.833					
116	1.2D + 1.6Su + 0.5Wz (LC B)			L1	1.2	L4	1.6	L10	0.833					
117	1.2D + 1.6Su + 0.5Wx (Min.)			L1	1.2	L4	1.6	14	8					
118	1.2D + 1.6Su + 0.5Wz (Min.)			L1	1.2	L4	1.6	21	8					
119	1.2D + 1.6Su + 0.5(0.75Wx (LC A)+0.75Wz (LC A))			L1	1.2	L4	1.6	L7	0.625	L9	0.63			
120	1.2D + 1.6Su + 0.5(0.75Wx (LC B)+0.75Wz (LC B))			L1	1.2	L4	1.6	L8	0.625	L10	0.63			
121	1.2D + 1.6Su + 0.5(0.75Wx (Min.)+0.75Wz (Min.))			L1	1.2	L4	1.6	14	6	21	6			
122	1.2D + 1.6Ssliding + 0.5Wx (LC A)			L1	1.2	L5	1.6	L7	0.833					
123	1.2D + 1.6Ssliding + 0.5Wx (LC B)			L1	1.2	L5	1.6	L8	0.833					
124	1.2D + 1.6Ssliding + 0.5Wz (LC A)			L1	1.2	L5	1.6	L9	0.833					
125	1.2D + 1.6Ssliding + 0.5Wz (LC B)			L1	1.2	L5	1.6	L10	0.833					
126	1.2D + 1.6Ssliding + 0.5Wx (Min.)			L1	1.2	L5	1.6	14	8					
127	1.2D + 1.6Ssliding + 0.5Wz (Min.)			L1	1.2	L5	1.6	21	8					
128	1.2D + 1.6Ssliding + 0.5(0.75Wx (LC A)+0.75Wz (LC A))			L1	1.2	L5	1.6	L7	0.625	L9	0.63			
129	1.2D + 1.6Ssliding + 0.5(0.75Wx (LC B)+0.75Wz (LC B))			L1	1.2	L5	1.6	L8	0.625	L10	0.63			
130	1.2D + 1.6Ssliding + 0.5(0.75Wx (Min.)+0.75Wz (Min.))			L1	1.2	L5	1.6	14	6	21	6			
131	1.2D + 1.6Sdrift + 0.5Wx (LC A)			L1	1.2	L6	1.6	L7	0.833					
132	1.2D + 1.6Sdrift + 0.5Wx (LC B)			L1	1.2	L6	1.6	L8	0.833					
133	1.2D + 1.6Sdrift + 0.5Wz (LC A)			L1	1.2	L6	1.6	L9	0.833					
134	1.2D + 1.6Sdrift + 0.5Wz (LC B)			L1	1.2	L6	1.6	L10	0.833					
135	1.2D + 1.6Sdrift + 0.5Wx (Min.)			L1	1.2	L6	1.6	14	8					
136	1.2D + 1.6Sdrift + 0.5Wz (Min.)			L1	1.2	L6	1.6	21	8					
137	1.2D + 1.6Sdrift + 0.5(0.75Wx (LC A)+0.75Wz (LC A))			L1	1.2	L6	1.6	L7	0.625	L9	0.63			
138	1.2D + 1.6Sdrift + 0.5(0.75Wx (LC B)+0.75Wz (LC B))			L1	1.2	L6	1.6	L8	0.625	L10	0.63			
139	1.2D + 1.6Sdrift + 0.5(0.75Wx (Min.)+0.75Wz (Min.))			L1	1.2	L6	1.6	14	6	21	6			
140	1.2D + 1.0Wx (LC A) + 0.5Lr			L1	1.2	L7	1.667	L2	0.5					
141	1.2D + 1.0Wx (LC B) + 0.5Lr			L1	1.2	L8	1.667	L2	0.5					
142	1.2D + 1.0Wz (LC A) + 0.5Lr			L1	1.2	L9	1.667	L2	0.5					
143	1.2D + 1.0Wz (LC B) + 0.5Lr			L1	1.2	L10	1.667	L2	0.5					
144	1.2D + 1.0Wx (Min.) + 0.5Lr			L1	1.2	14	16	L2	0.5					
145	1.2D + 1.0Wz (Min.) + 0.5Lr			L1	1.2	21	16	L2	0.5					
146	1.2D + 1.0(0.75Wx (LC A)+0.75Wz (LC A)) + 0.5Lr			L1	1.2	L7	1.25	L9	1.25	L2	0.5			
147	1.2D + 1.0(0.75Wx (LC B)+0.75Wz (LC B)) + 0.5Lr			L1	1.2	L8	1.25	L10	1.25	L2	0.5			
148	1.2D + 1.0(0.75Wx (Min.)+0.75Wz (Min.)) + 0.5Lr			L1	1.2	14	12	21	12	L2	0.5			
149	1.2D + 1.0Wx (LC A) + 0.5S			L1	1.2	L7	1.667	L3	0.5					
150	1.2D + 1.0Wx (LC B) + 0.5S			L1	1.2	L8	1.667	L3	0.5					
151	1.2D + 1.0Wz (LC A) + 0.5S			L1	1.2	L9	1.667	L3	0.5					
152	1.2D + 1.0Wz (LC B) + 0.5S			L1	1.2	L10	1.667	L3	0.5					
153	1.2D + 1.0Wx (Min.) + 0.5S			L1	1.2	14	16	L3	0.5					
154	1.2D + 1.0Wz (Min.) + 0.5S			L1	1.2	21	16	L3	0.5					
155	1.2D + 1.0(0.75Wx (LC A)+0.75Wz (LC A)) + 0.5S			L1	1.2	L7	1.25	L9	1.25	L3	0.5			
156	1.2D + 1.0(0.75Wx (LC B)+0.75Wz (LC B)) + 0.5S			L1	1.2	L8	1.25	L10	1.25	L3	0.5			
157	1.2D + 1.0(0.75Wx (Min.)+0.75Wz (Min.)) + 0.5S			L1	1.2	14	12	21	12	L3	0.5			
158	0.9D + 1.0Wx (LC A)			L1	0.9	L7	1.667							
159	0.9D + 1.0Wx (LC B)			L1	0.9	L8	1.667							
160	0.9D + 1.0Wz (LC A)			L1	0.9	L9	1.667							
161	0.9D + 1.0Wz (LC B)			L1	0.9	L10	1.667							
162	0.9D + 1.0Wx (Min.)			L1	0.9	14	16							
163	0.9D + 1.0Wz (Min.)			L1	0.9	21	16							

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC
164	0.9D + 1.0(0.75Wx (LC A)+0.75Wz (LC A))			L1	0.9	L7	1.25	L9	1.25					
165	0.9D + 1.0(0.75Wx (LC B)+0.75Wz (LC B))			L1	0.9	L8	1.25	L10	1.25					
166	0.9D + 1.0(0.75Wx (Min.)+0.75Wz (Min.))			L1	0.9	14	12	21	12					
167	1.2D+Ev+Ehx+0.2S			L1	1.2	L13	1	L11	1	L3	0.2			
168	0.9D-Ev+Ehx			L1	0.9	L13	-1	L11	1					
169	1.2D+Ev+Ehz+0.2S			L1	1.2	L13	1	L12	1	L3	0.2			
170	0.9D-Ev+Ehz			L1	0.9	L13	-1	L12	1					
171	1.2D+Ev+Ehx+0.3Ehz+0.2S			L1	1.2	L13	1	L11	1	L12	0.3	L3	0.2	
172	0.9D-Ev+Ehx+0.3Ehz			L1	0.9	L13	-1	L11	1	L12	0.3			
173	1.2D+Ev+Ehz+0.3Ehx+0.2S			L1	1.2	L13	1	L12	1	L11	0.3	L3	0.2	
174	0.9D-Ev+Ehz+0.3Ehx			L1	0.9	L13	-1	L12	1	L11	0.3			
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203														
204														
205														
206														
207														
208	SERVICE Emx			22	1.102	23	13.282							
209	SERVICE Emz			24	1.102	25	13.282							
210														
211	1.0D+0.7Ev+0.7Emhx			L1	1	L13	0.7	L208	0.7					
212	1.0D+0.525Ev+0.525Emhx+0.75S			L1	1	L13	0.525	L208	0.525	L3	0.75			
213	0.6D-0.7Ev+0.7Emhx			L1	0.6	L13	-0.7	L208	0.7					
214	1.0D+0.7Ev+0.7Emhz			L1	1	L13	0.7	L209	0.7					
215	1.0D+0.525Ev+0.525Emhz+0.75S			L1	1	L13	0.525	L209	0.525	L3	0.75			
216	0.6D-0.7Ev+0.7Emhz			L1	0.6	L13	-0.7	L209	0.7					
217														
218														
219														
220														
221	1.2D+Ev+Emhx+0.2S			L1	1.2	L13	1	L208	1	L3	0.2			
222	0.9D-Ev+Emhx			L1	0.9	L13	-1	L208	1					
223	1.2D+Ev+Emhx+0.2S			L1	1.2	L13	1	L209	1	L3	0.2			
224	0.9D-Ev+Emhz			L1	0.9	L13	-1	L209	1					
225														
226														
227														
228														
229														
230														
231														

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC
232														
233														
234														
235														
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Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N140	Reaction	Reaction	Reaction			
2	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N6	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N4	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N9	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N75	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N76	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N77	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
9	N78	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
10	N104	Reaction	Reaction	Reaction			
11	N124	Reaction	Reaction	Reaction			
12	N149	Reaction	Reaction	Reaction			
13	N185	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
14	N187	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
15	N196	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
16	N198	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Column	HSS14X14X6	Column	Tube	A500 Gr.C Rect	Typical	18.7	577	577	900
2	Truss	HSS20X8X6	Beam	Tube	A500 Gr.C Rect	Typical	18.7	222	926	586
3	Tension	HSS6X6X3	Beam	Tube	A500 Gr.C Rect	Typical	3.98	22.3	22.3	35
4	Ridge	HSS8X4X3	Beam	Tube	A500 Gr.C Rect	Typical	3.98	11.3	33.1	27.2
5	Purlin	HSS8X6X3	Beam	Tube	A500 Gr.C Rect	Typical	4.67	28.2	43.7	53.7
6	Purlin Tail	HSS8X6X3	Beam	Tube	A500 Gr.C Rect	Typical	4.67	28.2	43.7	53.7
7	Tension Tail	HSS6X6X3	Beam	Tube	A500 Gr.C Rect	Typical	3.98	22.3	22.3	35
8	Ridge Tail	HSS8X4X3	Beam	Tube	A500 Gr.C Rect	Typical	3.98	11.3	33.1	27.2
9	Vert Ornamentation	HSS4X2X2	Column	Tube	A500 Gr.C Rect	Typical	1.3	0.898	2.65	2.2
10	Brace	HSS5X5X6	Beam	Tube	A500 Gr.C Rect	Typical	6.18	21.7	21.7	36.1

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	Brace1	N175	N62	13	Brace	Beam	Tube	A500 Gr.C Rect	Typical
2	Brace2	N177	N62	347	Brace	Beam	Tube	A500 Gr.C Rect	Typical
3	Brace3	N174	N61	347	Brace	Beam	Tube	A500 Gr.C Rect	Typical
4	Brace4	N176	N61	13	Brace	Beam	Tube	A500 Gr.C Rect	Typical
5	Brace5	N200	N62	13	Brace	Beam	Tube	A500 Gr.C Rect	Typical
6	Brace6	N201	N62	347	Brace	Beam	Tube	A500 Gr.C Rect	Typical
7	Brace7	N202	N61	347	Brace	Beam	Tube	A500 Gr.C Rect	Typical
8	Brace8	N203	N61	13	Brace	Beam	Tube	A500 Gr.C Rect	Typical
9	Column1	N1	N2	180	Column	Column	Tube	A500 Gr.C Rect	Typical
10	Column2	N77	N58	180	Column	Column	Tube	A500 Gr.C Rect	Typical
11	Column3	N78	N60		Column	Column	Tube	A500 Gr.C Rect	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
12	Column4	N76	N59		Column	Column	Tube	A500 Gr.C Rect	Typical
13	Column5	N75	N57	180	Column	Column	Tube	A500 Gr.C Rect	Typical
14	Column6	N9	N10		Column	Column	Tube	A500 Gr.C Rect	Typical
15	Column7	N6	N7	180	Column	Column	Tube	A500 Gr.C Rect	Typical
16	Column8	N4	N5		Column	Column	Tube	A500 Gr.C Rect	Typical
17	Column9	N187	N181	180	Column	Column	Tube	A500 Gr.C Rect	Typical
18	Column10	N185	N182		Column	Column	Tube	A500 Gr.C Rect	Typical
19	Column11	N198	N194	180	Column	Column	Tube	A500 Gr.C Rect	Typical
20	Column12	N196	N191		Column	Column	Tube	A500 Gr.C Rect	Typical
21	Purlin Tail1	NPT402	NP402	18.43	Purlin Tail	Beam	Tube	A500 Gr.C Rect	Typical
22	Purlin Tail2	NPT403	NP403	18.43	Purlin Tail	Beam	Tube	A500 Gr.C Rect	Typical
23	Purlin Tail3	NPT401	NP401	341.57	Purlin Tail	Beam	Tube	A500 Gr.C Rect	Typical
24	Purlin Tail4	NPT303	NP303	18.43	Purlin Tail	Beam	Tube	A500 Gr.C Rect	Typical
25	Purlin Tail5	NPT204	NP204	341.57	Purlin Tail	Beam	Tube	A500 Gr.C Rect	Typical
26	Purlin Tail6	NPT202	NP202	18.43	Purlin Tail	Beam	Tube	A500 Gr.C Rect	Typical
27	Purlin Tail7	NPT301	NP301	341.57	Purlin Tail	Beam	Tube	A500 Gr.C Rect	Typical
28	Purlin Tail8	NPT404	NP404	341.57	Purlin Tail	Beam	Tube	A500 Gr.C Rect	Typical
29	Purlin1	N65	NP401	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
30	Purlin2	N55	N179	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
31	Purlin3	N56	NP404	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
32	Purlin4	N66	N190	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
33	Purlin5	NP202	N71	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
34	Purlin6	NP403	N66	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
35	Purlin7	N71	N183	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
36	Purlin8	N72	NP204	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
37	Purlin9	NP303	N74	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
38	Purlin10	NP402	N55	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
39	Purlin11	N73	NP301	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
40	Purlin12	N74	N192	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
41	Purlin13	N179	N193	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
42	Purlin14	N180	N65	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
43	Purlin15	N183	N195	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
44	Purlin16	N184	N73	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
45	Purlin17	N190	N180	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
46	Purlin18	N192	N184	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
47	Purlin19	N193	N56	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
48	Purlin20	N195	N72	18.43	Purlin	Beam	Tube	A500 Gr.C Rect	Typical
49	RIGID1	N113	N81	180	RIGID	None	None	RIGID	Typical
50	RIGID2	N105	N112		RIGID	None	None	RIGID	Typical
51	RIGID3	N140	N139	180	RIGID	None	None	RIGID	Typical
52	RIGID4	N124	N116		RIGID	None	None	RIGID	Typical
53	RIGID5	N104	N83	180	RIGID	None	None	RIGID	Typical
54	RIGID6	N63	N98		RIGID	None	None	RIGID	Typical
55	RIGID7	N141	N142	180	RIGID	None	None	RIGID	Typical
56	RIGID8	N150	N135		RIGID	None	None	RIGID	Typical
57	RIGID9	N145	N144		RIGID	None	None	RIGID	Typical
58	RIGID10	N125	N132		RIGID	None	None	RIGID	Typical
59	RIGID11	N117	N119		RIGID	None	None	RIGID	Typical
60	RIGID12	N149	N143		RIGID	None	None	RIGID	Typical
61	RIGID13	N82	N97		RIGID	None	None	RIGID	Typical
62	RIGID14	N157	N138		RIGID	None	None	RIGID	Typical
63	RIGID15	N133	N115		RIGID	None	None	RIGID	Typical
64	RIGID16	N85	N99		RIGID	None	None	RIGID	Typical
65	RIGID17	N173	N168		RIGID	None	None	RIGID	Typical
66	RIGID18	N172	N167		RIGID	None	None	RIGID	Typical
67	RIGID19	N170	N166		RIGID	None	None	RIGID	Typical
68	RIGID20	N171	N169		RIGID	None	None	RIGID	Typical
69	Ridge Tail1	NT16	N8		Ridge Tail	Beam	Tube	A500 Gr.C Rect	Typical
70	Ridge Tail2	NT15	N3		Ridge Tail	Beam	Tube	A500 Gr.C Rect	Typical
71	Ridge1	N61	N178		Ridge	Beam	Tube	A500 Gr.C Rect	Typical
72	Ridge2	N3	N61		Ridge	Beam	Tube	A500 Gr.C Rect	Typical
73	Ridge3	N62	N8		Ridge	Beam	Tube	A500 Gr.C Rect	Typical
74	Ridge4	N178	N189		Ridge	Beam	Tube	A500 Gr.C Rect	Typical
75	Ridge5	N189	N62		Ridge	Beam	Tube	A500 Gr.C Rect	Typical
76	Tension Tail1	NT11	N2		Tension Tail	Beam	Tube	A500 Gr.C Rect	Typical
77	Tension Tail2	NT13	N7		Tension Tail	Beam	Tube	A500 Gr.C Rect	Typical
78	Tension Tail3	NT14	N10		Tension Tail	Beam	Tube	A500 Gr.C Rect	Typical
79	Tension Tail4	NT12	N5		Tension Tail	Beam	Tube	A500 Gr.C Rect	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
80	Tension1	N59	N182		Tension	Beam	Tube	A500 Gr.C Rect	Typical
81	Tension2	N60	N10		Tension	Beam	Tube	A500 Gr.C Rect	Typical
82	Tension3	N7	N58		Tension	Beam	Tube	A500 Gr.C Rect	Typical
83	Tension4	N5	N59		Tension	Beam	Tube	A500 Gr.C Rect	Typical
84	Tension5	N57	N2		Tension	Beam	Tube	A500 Gr.C Rect	Typical
85	Tension6	N58	N194		Tension	Beam	Tube	A500 Gr.C Rect	Typical
86	Tension7	N181	N57		Tension	Beam	Tube	A500 Gr.C Rect	Typical
87	Tension8	N182	N191		Tension	Beam	Tube	A500 Gr.C Rect	Typical
88	Tension9	N191	N60		Tension	Beam	Tube	A500 Gr.C Rect	Typical
89	Tension10	N194	N181		Tension	Beam	Tube	A500 Gr.C Rect	Typical
90	Truss1	N60	N62		Truss	Beam	Tube	A500 Gr.C Rect	Typical
91	Truss2	N58	N62		Truss	Beam	Tube	A500 Gr.C Rect	Typical
92	Truss3	N59	N61		Truss	Beam	Tube	A500 Gr.C Rect	Typical
93	Truss4	N57	N61		Truss	Beam	Tube	A500 Gr.C Rect	Typical
94	Truss5	N7	N8		Truss	Beam	Tube	A500 Gr.C Rect	Typical
95	Truss6	N5	N3		Truss	Beam	Tube	A500 Gr.C Rect	Typical
96	Truss7	N2	N3		Truss	Beam	Tube	A500 Gr.C Rect	Typical
97	Truss8	N10	N8		Truss	Beam	Tube	A500 Gr.C Rect	Typical
98	Truss9	N182	N178		Truss	Beam	Tube	A500 Gr.C Rect	Typical
99	Truss10	N181	N178		Truss	Beam	Tube	A500 Gr.C Rect	Typical
100	Truss11	N194	N189		Truss	Beam	Tube	A500 Gr.C Rect	Typical
101	Truss12	N191	N189		Truss	Beam	Tube	A500 Gr.C Rect	Typical
102	Vert Ornamentation1	N136	N154		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
103	Vert Ornamentation2	N144	N135		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
104	Vert Ornamentation3	N145	N150		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
105	Vert Ornamentation4	N146	N151		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
106	Vert Ornamentation5	N97	N98	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
107	Vert Ornamentation6	N87	N109	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
108	Vert Ornamentation7	N103	N110	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
109	Vert Ornamentation8	N137	N152		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
110	Vert Ornamentation9	N134	N153		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
111	Vert Ornamentation10	N102	N111	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
112	Vert Ornamentation11	N148	N155		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
113	Vert Ornamentation12	N147	N156		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
114	Vert Ornamentation13	N120	N126		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
115	Vert Ornamentation14	N119	N125		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
116	Vert Ornamentation15	N93	N90	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
117	Vert Ornamentation16	N94	N91	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
118	Vert Ornamentation17	N99	N105	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
119	Vert Ornamentation18	N84	N67	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
120	Vert Ornamentation19	N82	N63	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
121	Vert Ornamentation20	N100	N106	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
122	Vert Ornamentation21	N101	N107	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
123	Vert Ornamentation22	N117	N132		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
124	Vert Ornamentation23	N86	N69	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
125	Vert Ornamentation24	N89	N92	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
126	Vert Ornamentation25	N122	N131		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
127	Vert Ornamentation26	N118	N129		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
128	Vert Ornamentation27	N85	N112	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
129	Vert Ornamentation28	N80	N108	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
130	Vert Ornamentation29	N114	N128		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
131	Vert Ornamentation30	N121	N127		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
132	Vert Ornamentation31	N88	N79	180	Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical
133	Vert Ornamentation32	N123	N130		Vert Ornamentation	Column	Tube	A500 Gr.C Rect	Typical

Member Advanced Data

	Label	I Release	J Release	Col-Wall Vert Release	Physical	Deflection Ratio Options	Seismic DR
1	Brace1	BenPIN	AllPIN		Yes	Default	None
2	Brace2	BenPIN	AllPIN		Yes	Default	None
3	Brace3	BenPIN	AllPIN		Yes	Default	None
4	Brace4	BenPIN	AllPIN		Yes	Default	None
5	Brace5	AllPIN	BenPIN		Yes	Default	None
6	Brace6	AllPIN	BenPIN		Yes	Default	None
7	Brace7	AllPIN	BenPIN		Yes	Default	None
8	Brace8	AllPIN	BenPIN		Yes	Default	None
9	Column1				Yes	** NA **	None
10	Column2				Yes	** NA **	None
11	Column3				Yes	** NA **	None

Member Advanced Data (Continued)

	Label	I Release	J Release	Col-Wall Vert Release	Physical	Deflection Ratio Options	Seismic DR
12	Column4				Yes	** NA **	None
13	Column5				Yes	** NA **	None
14	Column6				Yes	** NA **	None
15	Column7				Yes	** NA **	None
16	Column8				Yes	** NA **	None
17	Column9				Yes	** NA **	None
18	Column10				Yes	** NA **	None
19	Column11				Yes	** NA **	None
20	Column12				Yes	** NA **	None
21	Purlin Tail1				Yes	Default	None
22	Purlin Tail2				Yes	Default	None
23	Purlin Tail3				Yes	Default	None
24	Purlin Tail4				Yes	Default	None
25	Purlin Tail5				Yes	Default	None
26	Purlin Tail6				Yes	Default	None
27	Purlin Tail7				Yes	Default	None
28	Purlin Tail8				Yes	Default	None
29	Purlin1	AllPIN	BenPIN		Yes	Default	None
30	Purlin2	AllPIN	BenPIN		Yes	Default	None
31	Purlin3	AllPIN	BenPIN		Yes	Default	None
32	Purlin4	AllPIN	BenPIN		Yes	Default	None
33	Purlin5	AllPIN	BenPIN		Yes	Default	None
34	Purlin6	AllPIN	BenPIN		Yes	Default	None
35	Purlin7	AllPIN	BenPIN		Yes	Default	None
36	Purlin8	AllPIN	BenPIN		Yes	Default	None
37	Purlin9	AllPIN	BenPIN		Yes	Default	None
38	Purlin10	AllPIN	BenPIN		Yes	Default	None
39	Purlin11	AllPIN	BenPIN		Yes	Default	None
40	Purlin12	AllPIN	BenPIN		Yes	Default	None
41	Purlin13	AllPIN	BenPIN		Yes	Default	None
42	Purlin14	AllPIN	BenPIN		Yes	Default	None
43	Purlin15	AllPIN	BenPIN		Yes	Default	None
44	Purlin16	AllPIN	BenPIN		Yes	Default	None
45	Purlin17	AllPIN	BenPIN		Yes	Default	None
46	Purlin18	AllPIN	BenPIN		Yes	Default	None
47	Purlin19	AllPIN	BenPIN		Yes	Default	None
48	Purlin20	AllPIN	BenPIN		Yes	Default	None
49	RIGID1		XOOOXX		Yes	** NA **	None
50	RIGID2				Yes	** NA **	None
51	RIGID3				Yes	** NA **	None
52	RIGID4				Yes	** NA **	None
53	RIGID5				Yes	** NA **	None
54	RIGID6				Yes	** NA **	None
55	RIGID7		XOOOXX		Yes	** NA **	None
56	RIGID8				Yes	** NA **	None
57	RIGID9				Yes	** NA **	None
58	RIGID10				Yes	** NA **	None
59	RIGID11				Yes	** NA **	None
60	RIGID12				Yes	** NA **	None
61	RIGID13				Yes	** NA **	None
62	RIGID14		XOOOXX		Yes	** NA **	None
63	RIGID15		XOOOXX		Yes	** NA **	None
64	RIGID16				Yes	** NA **	None
65	RIGID17				Yes	** NA **	None
66	RIGID18				Yes	** NA **	None
67	RIGID19				Yes	** NA **	None
68	RIGID20				Yes	** NA **	None
69	Ridge Tail1				Yes	Default	None
70	Ridge Tail2				Yes	Default	None
71	Ridge1	BenPIN	BenPIN		Yes	Default	None
72	Ridge2	BenPIN	BenPIN		Yes	Default	None
73	Ridge3	BenPIN	BenPIN		Yes	Default	None
74	Ridge4	BenPIN	BenPIN		Yes	Default	None
75	Ridge5	BenPIN	BenPIN		Yes	Default	None
76	Tension Tail1				Yes	Default	None
77	Tension Tail2				Yes	Default	None
78	Tension Tail3				Yes	Default	None
79	Tension Tail4				Yes	Default	None

Member Advanced Data (Continued)

	Label	I Release	J Release	Col-Wall Vert Release	Physical	Deflection Ratio Options	Seismic DR
80	Tension1	BenPIN	BenPIN		Yes	Default	None
81	Tension2	BenPIN	BenPIN		Yes	Default	None
82	Tension3	BenPIN	BenPIN		Yes	Default	None
83	Tension4	BenPIN	BenPIN		Yes	Default	None
84	Tension5	BenPIN	BenPIN		Yes	Default	None
85	Tension6	BenPIN	BenPIN		Yes	Default	None
86	Tension7	BenPIN	BenPIN		Yes	Default	None
87	Tension8	BenPIN	BenPIN		Yes	Default	None
88	Tension9	BenPIN	BenPIN		Yes	Default	None
89	Tension10	BenPIN	BenPIN		Yes	Default	None
90	Truss1	BenPIN			Yes	Default	None
91	Truss2	BenPIN			Yes	Default	None
92	Truss3	BenPIN			Yes	Default	None
93	Truss4	BenPIN			Yes	Default	None
94	Truss5	BenPIN			Yes	Default	None
95	Truss6	BenPIN			Yes	Default	None
96	Truss7	BenPIN			Yes	Default	None
97	Truss8	BenPIN			Yes	Default	None
98	Truss9	BenPIN			Yes	Default	None
99	Truss10	BenPIN			Yes	Default	None
100	Truss11	BenPIN			Yes	Default	None
101	Truss12	BenPIN			Yes	Default	None
102	Vert Ornamentation1				Yes	** NA **	None
103	Vert Ornamentation2				Yes	** NA **	None
104	Vert Ornamentation3				Yes	** NA **	None
105	Vert Ornamentation4				Yes	** NA **	None
106	Vert Ornamentation5				Yes	** NA **	None
107	Vert Ornamentation6				Yes	** NA **	None
108	Vert Ornamentation7				Yes	** NA **	None
109	Vert Ornamentation8				Yes	** NA **	None
110	Vert Ornamentation9				Yes	** NA **	None
111	Vert Ornamentation10				Yes	** NA **	None
112	Vert Ornamentation11				Yes	** NA **	None
113	Vert Ornamentation12				Yes	** NA **	None
114	Vert Ornamentation13				Yes	** NA **	None
115	Vert Ornamentation14				Yes	** NA **	None
116	Vert Ornamentation15				Yes	** NA **	None
117	Vert Ornamentation16				Yes	** NA **	None
118	Vert Ornamentation17				Yes	** NA **	None
119	Vert Ornamentation18				Yes	** NA **	None
120	Vert Ornamentation19				Yes	** NA **	None
121	Vert Ornamentation20				Yes	** NA **	None
122	Vert Ornamentation21				Yes	** NA **	None
123	Vert Ornamentation22				Yes	** NA **	None
124	Vert Ornamentation23				Yes	** NA **	None
125	Vert Ornamentation24				Yes	** NA **	None
126	Vert Ornamentation25				Yes	** NA **	None
127	Vert Ornamentation26				Yes	** NA **	None
128	Vert Ornamentation27				Yes	** NA **	None
129	Vert Ornamentation28				Yes	** NA **	None
130	Vert Ornamentation29				Yes	** NA **	None
131	Vert Ornamentation30				Yes	** NA **	None
132	Vert Ornamentation31				Yes	** NA **	None
133	Vert Ornamentation32				Yes	** NA **	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	K y-y	K z-z	Channel Conn.	a [ft]	Function
1	Brace1	Brace	17.15		1	1	N/A	N/A	Lateral
2	Brace2	Brace	17.15		1	1	N/A	N/A	Lateral
3	Brace3	Brace	17.15		1	1	N/A	N/A	Lateral
4	Brace4	Brace	17.15		1	1	N/A	N/A	Lateral
5	Brace5	Brace	17.15		1	1	N/A	N/A	Lateral
6	Brace6	Brace	17.15		1	1	N/A	N/A	Lateral
7	Brace7	Brace	17.15		1	1	N/A	N/A	Lateral
8	Brace8	Brace	17.15		1	1	N/A	N/A	Lateral
9	Column1	Column	11.75		2	2	N/A	N/A	Lateral
10	Column2	Column	11.75		2	2	N/A	N/A	Lateral
11	Column3	Column	11.75		2	2	N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [ft]	Lb y-y [ft]	K y-y	K z-z	Channel Conn.	a [ft]	Function
12	Column4	Column	11.75		2	2	N/A	N/A	Lateral
13	Column5	Column	11.75		2	2	N/A	N/A	Lateral
14	Column6	Column	11.75		2	2	N/A	N/A	Lateral
15	Column7	Column	11.75		2	2	N/A	N/A	Lateral
16	Column8	Column	11.75		2	2	N/A	N/A	Lateral
17	Column9	Column	11.75		2	2	N/A	N/A	Lateral
18	Column10	Column	11.75		2	2	N/A	N/A	Lateral
19	Column11	Column	11.75		2	2	N/A	N/A	Lateral
20	Column12	Column	11.75		2	2	N/A	N/A	Lateral
21	Purlin Tail1	Purlin Tail	2		2.1	2.1	N/A	N/A	Lateral
22	Purlin Tail2	Purlin Tail	2		2.1	2.1	N/A	N/A	Lateral
23	Purlin Tail3	Purlin Tail	2		2.1	2.1	N/A	N/A	Lateral
24	Purlin Tail4	Purlin Tail	2		2.1	2.1	N/A	N/A	Lateral
25	Purlin Tail5	Purlin Tail	2		2.1	2.1	N/A	N/A	Lateral
26	Purlin Tail6	Purlin Tail	2		2.1	2.1	N/A	N/A	Lateral
27	Purlin Tail7	Purlin Tail	2		2.1	2.1	N/A	N/A	Lateral
28	Purlin Tail8	Purlin Tail	2		2.1	2.1	N/A	N/A	Lateral
29	Purlin1	Purlin	16		1	1	N/A	N/A	Lateral
30	Purlin2	Purlin	16		1	1	N/A	N/A	Lateral
31	Purlin3	Purlin	16		1	1	N/A	N/A	Lateral
32	Purlin4	Purlin	16		1	1	N/A	N/A	Lateral
33	Purlin5	Purlin	16		1	1	N/A	N/A	Lateral
34	Purlin6	Purlin	16		1	1	N/A	N/A	Lateral
35	Purlin7	Purlin	16		1	1	N/A	N/A	Lateral
36	Purlin8	Purlin	16		1	1	N/A	N/A	Lateral
37	Purlin9	Purlin	16		1	1	N/A	N/A	Lateral
38	Purlin10	Purlin	16		1	1	N/A	N/A	Lateral
39	Purlin11	Purlin	16		1	1	N/A	N/A	Lateral
40	Purlin12	Purlin	16		1	1	N/A	N/A	Lateral
41	Purlin13	Purlin	16		1	1	N/A	N/A	Lateral
42	Purlin14	Purlin	16		1	1	N/A	N/A	Lateral
43	Purlin15	Purlin	16		1	1	N/A	N/A	Lateral
44	Purlin16	Purlin	16		1	1	N/A	N/A	Lateral
45	Purlin17	Purlin	16		1	1	N/A	N/A	Lateral
46	Purlin18	Purlin	16		1	1	N/A	N/A	Lateral
47	Purlin19	Purlin	16		1	1	N/A	N/A	Lateral
48	Purlin20	Purlin	16		1	1	N/A	N/A	Lateral
49	Ridge Tail1	Ridge Tail	2		2.1	2.1	N/A	N/A	Lateral
50	Ridge Tail2	Ridge Tail	2		2.1	2.1	N/A	N/A	Lateral
51	Ridge1	Ridge	16		0.65	0.65	N/A	N/A	Lateral
52	Ridge2	Ridge	16		0.65	0.65	N/A	N/A	Lateral
53	Ridge3	Ridge	16		0.65	0.65	N/A	N/A	Lateral
54	Ridge4	Ridge	16		0.65	0.65	N/A	N/A	Lateral
55	Ridge5	Ridge	16		0.65	0.65	N/A	N/A	Lateral
56	Tension Tail1	Tension Tail	2		2.1	2.1	N/A	N/A	Lateral
57	Tension Tail2	Tension Tail	2		2.1	2.1	N/A	N/A	Lateral
58	Tension Tail3	Tension Tail	2		2.1	2.1	N/A	N/A	Lateral
59	Tension Tail4	Tension Tail	2		2.1	2.1	N/A	N/A	Lateral
60	Tension1	Tension	16		1	1	N/A	N/A	Lateral
61	Tension2	Tension	16		1	1	N/A	N/A	Lateral
62	Tension3	Tension	16		1	1	N/A	N/A	Lateral
63	Tension4	Tension	16		1	1	N/A	N/A	Lateral
64	Tension5	Tension	16		1	1	N/A	N/A	Lateral
65	Tension6	Tension	16		1	1	N/A	N/A	Lateral
66	Tension7	Tension	16		1	1	N/A	N/A	Lateral
67	Tension8	Tension	16		1	1	N/A	N/A	Lateral
68	Tension9	Tension	16		1	1	N/A	N/A	Lateral
69	Tension10	Tension	16		1	1	N/A	N/A	Lateral
70	Truss1	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
71	Truss2	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
72	Truss3	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
73	Truss4	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
74	Truss5	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
75	Truss6	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
76	Truss7	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
77	Truss8	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
78	Truss9	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
79	Truss10	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [ft]	Lb y-y [ft]	K y-y	K z-z	Channel Conn.	a [ft]	Function
80	Truss11	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
81	Truss12	Truss	21.609	Segment	0.8	0.8	N/A	N/A	Lateral
82	Vert Ornamentation1	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
83	Vert Ornamentation2	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
84	Vert Ornamentation3	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
85	Vert Ornamentation4	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
86	Vert Ornamentation5	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
87	Vert Ornamentation6	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
88	Vert Ornamentation7	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
89	Vert Ornamentation8	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
90	Vert Ornamentation9	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
91	Vert Ornamentation10	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
92	Vert Ornamentation11	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
93	Vert Ornamentation12	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
94	Vert Ornamentation13	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
95	Vert Ornamentation14	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
96	Vert Ornamentation15	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
97	Vert Ornamentation16	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
98	Vert Ornamentation17	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
99	Vert Ornamentation18	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
100	Vert Ornamentation19	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
101	Vert Ornamentation20	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
102	Vert Ornamentation21	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
103	Vert Ornamentation22	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
104	Vert Ornamentation23	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
105	Vert Ornamentation24	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
106	Vert Ornamentation25	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
107	Vert Ornamentation26	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
108	Vert Ornamentation27	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
109	Vert Ornamentation28	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
110	Vert Ornamentation29	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
111	Vert Ornamentation30	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
112	Vert Ornamentation31	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral
113	Vert Ornamentation32	Vert Ornamentation	9.9		1	1	N/A	N/A	Lateral

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e^{5}°F^{-1}]	Density [lb/ft^{3}]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	490	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	490	50	1.1	58	1.2
3	A992	29000	11154	0.3	0.65	490	50	1.1	58	1.2
4	A500 Gr.B RND	29000	11154	0.3	0.65	527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	527	46	1.4	58	1.3
6	A53 Gr. B	29000	11154	0.3	0.65	527	35	1.5	58	1.2
7	A500 Gr.C Rect	29000	11154	0.3	0.65	527	50	1.4	62	1.3
8	A500 Gr.C RND	29000	11154	0.3	0.65	527	46	1.4	62	1.3

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-in]	Mnzz/om [k-in]	Cb	Eqn
1	Brace1	HSS5X5X6	0.247	8.575	19	0.023	0	y	41	76.602	185.03	317.365	317.365	1.135	H1-1b
2	Brace2	HSS5X5X6	0.331	8.575	20	0.03	0	y	20	76.602	185.03	317.365	317.365	1.137	H1-1b
3	Brace3	HSS5X5X6	0.363	8.4	63	0.023	0	y	41	76.602	185.03	317.365	317.365	1.136	H1-1a
4	Brace4	HSS5X5X6	0.378	8.4	69	0.03	0	y	20	76.602	185.03	317.365	317.365	1.136	H1-1a
5	Brace5	HSS5X5X6	0.304	8.575	20	0.03	0	y	20	76.602	185.03	317.365	317.365	1.137	H1-1b
6	Brace6	HSS5X5X6	0.3	8.4	68	0.023	0	y	41	76.602	185.03	317.365	317.365	1.136	H1-1a
7	Brace7	HSS5X5X6	0.304	8.575	20	0.03	0	y	20	76.602	185.03	317.365	317.365	1.137	H1-1b
8	Brace8	HSS5X5X6	0.232	8.575	63	0.023	0	y	41	76.602	185.03	317.365	317.365	1.135	H1-1b
9	Column1	HSS14X14X6	0.569	0	63	0.038	11.75	y	63	463.219	559.88	2377.761	2377.761	1.659	H1-1b
10	Column2	HSS14X14X6	0.57	0	63	0.04	11.75	y	19	463.219	559.88	2377.761	2377.761	1.661	H1-1b
11	Column3	HSS14X14X6	0.653	0	66	0.062	0	y	60	463.219	559.88	2377.761	2377.761	1.671	H1-1b
12	Column4	HSS14X14X6	0.654	0	66	0.063	0	y	66	463.219	559.88	2377.761	2377.761	1.671	H1-1b
13	Column5	HSS14X14X6	0.571	0	63	0.04	11.75	y	19	463.219	559.88	2377.761	2377.761	1.661	H1-1b
14	Column6	HSS14X14X6	0.546	0	66	0.052	0.959	y	60	463.219	559.88	2377.761	2377.761	1.669	H1-1b
15	Column7	HSS14X14X6	0.432	0	63	0.038	0	z	70	463.219	559.88	2377.761	2377.761	1.652	H1-1b
16	Column8	HSS14X14X6	0.636	0	69	0.055	0.959	y	66	463.219	559.88	2377.761	2377.761	1.663	H1-1b
17	Column9	HSS14X14X6	0.523	0	63	0.042	11.75	y	19	463.219	559.88	2377.761	2377.761	1.653	H1-1b
18	Column10	HSS14X14X6	0.66	0	66	0.064	0	y	60	463.219	559.88	2377.761	2377.761	1.669	H1-1b

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-in]	Mnzz/om [k-in]	Cb	Eqn
19	Column11	HSS14X14X6	0.663	0	63	0.047	11.75	y	63	463.219	559.88	2377.761	2377.761	1.666	H1-1b
20	Column12	HSS14X14X6	0.737	0	69	0.066	0	y	66	463.219	559.88	2377.761	2377.761	1.669	H1-1b
21	Purlin Tail1	HSS8X6X3	0.029	2	20	0.012	2	y	20	124.898	139.82	253.574	347.791	2.316	H1-1b
22	Purlin Tail2	HSS8X6X3	0.023	2	41	0.011	2	y	41	124.898	139.82	253.574	347.791	2.339	H1-1b
23	Purlin Tail3	HSS8X6X3	0.023	2	41	0.011	2	y	41	124.898	139.82	253.574	347.791	2.339	H1-1b
24	Purlin Tail4	HSS8X6X3	0.023	2	41	0.011	2	y	41	124.898	139.82	253.574	347.791	2.339	H1-1b
25	Purlin Tail5	HSS8X6X3	0.023	2	66	0.01	2	y	44	124.898	139.82	253.574	347.791	2.339	H1-1b
26	Purlin Tail6	HSS8X6X3	0.023	2	66	0.01	2	y	44	124.898	139.82	253.574	347.791	2.339	H1-1b
27	Purlin Tail7	HSS8X6X3	0.023	2	41	0.011	2	y	41	124.898	139.82	253.574	347.791	2.339	H1-1b
28	Purlin Tail8	HSS8X6X3	0.029	2	20	0.012	2	y	20	124.898	139.82	253.574	347.791	2.317	H1-1b
29	Purlin1	HSS8X6X3	0.305	7.673	19	0.037	0	y	41	88.876	139.82	253.574	347.791	1.138	H1-1b
30	Purlin2	HSS8X6X3	0.365	7.673	20	0.042	0	y	20	88.876	139.82	253.574	347.791	1.139	H1-1b
31	Purlin3	HSS8X6X3	0.368	7.673	20	0.042	0	y	20	88.876	139.82	253.574	347.791	1.139	H1-1b
32	Purlin4	HSS8X6X3	0.301	7.673	19	0.037	0	y	41	88.876	139.82	253.574	347.791	1.138	H1-1b
33	Purlin5	HSS8X6X3	0.374	8	60	0.039	16	y	44	88.876	139.82	253.574	347.791	1.136	H1-1b
34	Purlin6	HSS8X6X3	0.302	8.327	19	0.036	16	y	41	88.876	139.82	253.574	347.791	1.139	H1-1b
35	Purlin7	HSS8X6X3	0.376	8	66	0.039	16	y	44	88.876	139.82	253.574	347.791	1.136	H1-1b
36	Purlin8	HSS8X6X3	0.374	8	66	0.039	16	y	44	88.876	139.82	253.574	347.791	1.136	H1-1b
37	Purlin9	HSS8X6X3	0.365	8	41	0.042	16	y	41	88.876	139.82	253.574	347.791	1.136	H1-1b
38	Purlin10	HSS8X6X3	0.369	8.327	20	0.042	16	y	20	88.876	139.82	253.574	347.791	1.139	H1-1b
39	Purlin11	HSS8X6X3	0.365	8	41	0.042	16	y	41	88.876	139.82	253.574	347.791	1.136	H1-1b
40	Purlin12	HSS8X6X3	0.367	8	19	0.042	16	y	41	88.876	139.82	253.574	347.791	1.136	H1-1b
41	Purlin13	HSS8X6X3	0.472	8	20	0.05	0	y	20	88.876	139.82	253.574	347.791	1.139	H1-1b
42	Purlin14	HSS8X6X3	0.299	8.327	19	0.036	16	y	41	88.876	139.82	253.574	347.791	1.139	H1-1b
43	Purlin15	HSS8X6X3	0.376	8	60	0.039	16	y	44	88.876	139.82	253.574	347.791	1.136	H1-1b
44	Purlin16	HSS8X6X3	0.367	8	19	0.042	16	y	41	88.876	139.82	253.574	347.791	1.136	H1-1b
45	Purlin17	HSS8X6X3	0.368	8	19	0.042	16	y	41	88.876	139.82	253.574	347.791	1.136	H1-1b
46	Purlin18	HSS8X6X3	0.367	8	19	0.042	16	y	41	88.876	139.82	253.574	347.791	1.136	H1-1b
47	Purlin19	HSS8X6X3	0.366	8.327	20	0.042	16	y	20	88.876	139.82	253.574	347.791	1.139	H1-1b
48	Purlin20	HSS8X6X3	0.375	8	60	0.039	16	y	44	88.876	139.82	253.574	347.791	1.136	H1-1b
49	Ridge Tail1	HSS8X4X3	0.025	2	66	0.01	2	y	19	102.074	119.162	150.638	305.389	2.339	H1-1b
50	Ridge Tail2	HSS8X4X3	0.025	2	66	0.01	2	y	19	102.074	119.162	150.638	305.389	2.339	H1-1b
51	Ridge1	HSS8X4X3	0.362	8.98	69	0.025	16	y	20	78.425	119.162	150.638	305.389	1.151	H1-1a
52	Ridge2	HSS8X4X3	0.227	7.02	66	0.024	0	y	20	78.425	119.162	150.638	305.389	1.154	H1-1b
53	Ridge3	HSS8X4X3	0.303	8.653	68	0.024	16	y	20	78.425	119.162	150.638	305.389	1.142	H1-1a
54	Ridge4	HSS8X4X3	0.423	8	60	0.04	16	y	19	78.425	119.162	150.638	305.389	1.136	H1-1b
55	Ridge5	HSS8X4X3	0.22	6.857	60	0.025	0	y	20	78.425	119.162	150.638	305.389	1.154	H1-1b
56	Tension Tail1	HSS6X6X3	0.022	2	41	0.012	2	y	41	115.276	119.162	234.49	234.49	2.339	H1-1b
57	Tension Tail2	HSS6X6X3	0.022	2	41	0.012	2	y	41	115.276	119.162	234.49	234.49	2.339	H1-1b
58	Tension Tail3	HSS6X6X3	0.021	2	66	0.011	2	y	19	115.276	119.162	234.49	234.49	2.339	H1-1b
59	Tension Tail4	HSS6X6X3	0.021	2	66	0.011	2	y	19	115.276	119.162	234.49	234.49	2.339	H1-1b
60	Tension1	HSS6X6X3	0.344	8	66	0.048	16	y	19	73.657	119.162	234.49	234.49	1.136	H1-1b
61	Tension2	HSS6X6X3	0.348	8	60	0.054	0	y	69	73.657	119.162	234.49	234.49	1.136	H1-1b
62	Tension3	HSS6X6X3	0.355	8	41	0.055	0	y	41	73.657	119.162	234.49	234.49	1.136	H1-1b
63	Tension4	HSS6X6X3	0.349	7.837	66	0.054	0	y	19	73.657	119.162	234.49	234.49	1.136	H1-1b
64	Tension5	HSS6X6X3	0.355	8	41	0.055	16	y	41	73.657	119.162	234.49	234.49	1.136	H1-1b
65	Tension6	HSS6X6X3	0.356	8	41	0.05	16	y	41	73.657	119.162	234.49	234.49	1.136	H1-1b
66	Tension7	HSS6X6X3	0.356	8	41	0.05	16	y	41	73.657	119.162	234.49	234.49	1.136	H1-1b
67	Tension8	HSS6X6X3	0.344	8	60	0.053	16	y	63	73.657	119.162	234.49	234.49	1.136	H1-1b
68	Tension9	HSS6X6X3	0.344	8	60	0.048	16	y	69	73.657	119.162	234.49	234.49	1.136	H1-1b
69	Tension10	HSS6X6X3	0.356	8	41	0.053	16	y	69	73.657	119.162	234.49	234.49	1.136	H1-1b
70	Truss1	HSS20X8X6	0.605	14.332	63	0.114	21.609	z	64	424.608	559.88	1306.05	3502.994	1.22	H1-1b
71	Truss2	HSS20X8X6	0.608	14.332	69	0.114	21.609	z	70	424.608	559.88	1306.05	3502.994	1.212	H1-1b
72	Truss3	HSS20X8X6	0.64	14.332	63	0.12	21.609	z	68	424.608	559.88	1306.05	3502.994	1.22	H1-1b
73	Truss4	HSS20X8X6	0.641	14.332	69	0.12	21.609	z	62	424.608	559.88	1306.05	3502.994	1.212	H1-1b
74	Truss5	HSS20X8X6	0.49	15.435	68	0.122	21.609	z	70	424.608	559.88	1306.05	3502.994	1.137	H1-1b
75	Truss6	HSS20X8X6	0.658	15.435	69	0.134	21.609	z	68	424.608	559.88	1306.05	3502.994	1.322	H1-1b
76	Truss7	HSS20X8X6	0.655	15.435	63	0.133	21.609	z	62	424.608	559.88	1306.05	3502.994	1.313	H1-1b
77	Truss8	HSS20X8X6	0.482	15.435	62	0.121	21.609	z	64	424.608	559.88	1306.05	3502.994	1.138	H1-1b
78	Truss9	HSS20X8X6	0.586	15.435	63	0.125	21.609	z	68	424.608	559.88	1306.05	3502.994	1.2	H1-1b
79	Truss10	HSS20X8X6	0.587	15.435	69	0.125	21.609	z	62	424.608	559.88	1306.05	3502.994	1.199	H1-1b
80	Truss11	HSS20X8X6	0.69	15.435	69	0.126	21.609	z	68	424.608	559.88	1306.05	3502.994	1.257	H1-1b
81	Truss12	HSS20X8X6	0.687	15.435	63	0.125	21.609	z	62	424.608	559.88	1306.05	3502.994	1.267	H1-1b
82	Vert Ornamentation1	HSS4X2X2	0.016	0	25	0.003	9.9	z	25	9.564	38.922	28.103	48.989	1	H1-1b
83	Vert Ornamentation2	HSS4X2X2	0.018	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.256	H1-1b
84	Vert Ornamentation3	HSS4X2X2	0.014	9.9	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.256	H1-1b
85	Vert Ornamentation4	HSS4X2X2	0.014	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.25	H1-1b
86	Vert Ornamentation5	HSS4X2X2	0.014	9.9	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.257	H1-1b

Envelope AISC 15TH (360-16): ASD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/om [k]	Pnt/om [k]	Mnyy/om [k-in]	Mnzz/om [k-in]	Cb	Eqn
87	Vert Ornamentation6	HSS4X2X2	0.017	9.9	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	1.733	H1-1b
88	Vert Ornamentation7	HSS4X2X2	0.017	9.9	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.168	H1-1b
89	Vert Ornamentation8	HSS4X2X2	0.015	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.237	H1-1b
90	Vert Ornamentation9	HSS4X2X2	0.015	0	25	0.003	9.9	z	25	9.564	38.922	28.103	48.989	1	H1-1b
91	Vert Ornamentation10	HSS4X2X2	0.018	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.25	H1-1b
92	Vert Ornamentation11	HSS4X2X2	0.017	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.237	H1-1b
93	Vert Ornamentation12	HSS4X2X2	0.018	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.25	H1-1b
94	Vert Ornamentation13	HSS4X2X2	0.021	0	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.246	H1-1b
95	Vert Ornamentation14	HSS4X2X2	0.022	0	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.253	H1-1b
96	Vert Ornamentation15	HSS4X2X2	0.015	0	25	0.003	9.9	z	25	9.564	38.922	28.103	48.989	1	H1-1b
97	Vert Ornamentation16	HSS4X2X2	0.015	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.237	H1-1b
98	Vert Ornamentation17	HSS4X2X2	0.016	9.9	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.211	H1-1b
99	Vert Ornamentation18	HSS4X2X2	0.018	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.251	H1-1b
100	Vert Ornamentation19	HSS4X2X2	0.018	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.257	H1-1b
101	Vert Ornamentation20	HSS4X2X2	0.016	9.9	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.191	H1-1b
102	Vert Ornamentation21	HSS4X2X2	0.016	9.9	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.152	H1-1b
103	Vert Ornamentation22	HSS4X2X2	0.016	0	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.253	H1-1b
104	Vert Ornamentation23	HSS4X2X2	0.017	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.237	H1-1b
105	Vert Ornamentation24	HSS4X2X2	0.014	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.251	H1-1b
106	Vert Ornamentation25	HSS4X2X2	0.017	0	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.245	H1-1b
107	Vert Ornamentation26	HSS4X2X2	0.019	0	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.161	H1-1b
108	Vert Ornamentation27	HSS4X2X2	0.018	0	25	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.257	H1-1b
109	Vert Ornamentation28	HSS4X2X2	0.017	9.9	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	1.4	H1-1b
110	Vert Ornamentation29	HSS4X2X2	0.02	0	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.176	H1-1b
111	Vert Ornamentation30	HSS4X2X2	0.02	0	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.231	H1-1b
112	Vert Ornamentation31	HSS4X2X2	0.016	0	25	0.003	9.9	z	25	9.564	38.922	28.103	48.989	1	H1-1b
113	Vert Ornamentation32	HSS4X2X2	0.018	0	34	0.003	9.9	z	25	9.564	38.922	28.103	49.701	2.228	H1-1b

Material Take-Off

	Material	Size	Pieces	Length[ft]	Weight[LB]
1	General Members				
2	RIGID		20	32.5	0
3	Total General		20	32.5	0
4					
5	Hot Rolled Steel				
6	A500 Gr.C Rect	HSS14X14X6	12	141	9649.59
7	A500 Gr.C Rect	HSS20X8X6	12	259.3	17746.127
8	A500 Gr.C Rect	HSS4X2X2	32	316.8	1507.22
9	A500 Gr.C Rect	HSS5X5X6	8	137.2	3102.981
10	A500 Gr.C Rect	HSS6X6X3	14	168	2447.037
11	A500 Gr.C Rect	HSS8X4X3	7	84	1223.518
12	A500 Gr.C Rect	HSS8X6X3	28	336	5742.543
13	Total HR Steel		113	1442.3	41419.016

PANEL DATA

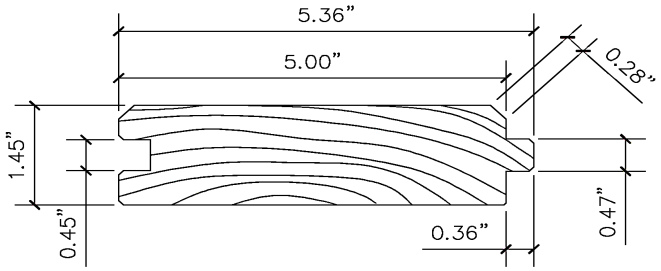
2 x 6 Tongue and Groove Panels

Allowable Loads

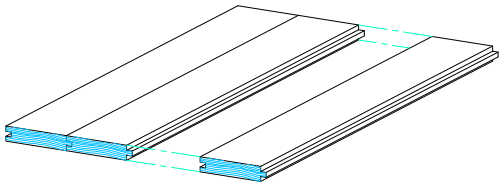
Hem Fir No. 1

Factory Stained

Section / Isometric View of Panel Cross-Section



Section View of Typical Panel



Isometric View of Panels

Section Properties (Out of Plane Bending)

Member Size	Weight (psf)	F_b (ksi)	I_x (in^4)	S_e (in^3)	M_a (in-kips)
2" X 6"	3.15	0.979	1.251	1.734	1.698

Allowable Loads

Span Type	Span Lengths (ft)	Allowable Load (psf)
Single Span	4	160
	5	102
	6	71
	7	52
	8	40
Two Span	4	106
	5	68
	6	47
	7	35
	8	27
Three Span	4	133
	5	85
	6	59
	7	43
	8	33

Load Duration Factors (C_D)

Typical Design Loads	C_D
Dead Load	0.9
Live Load	1.0
Snow Load	1.15
Wind Load	1.6
Earthquake Load	1.6

Notes

1. All calculations for properties of panels are calculated in accordance with the National Design Specification (NDS) for Wood Construction, 2018 Edition. Allowable loads are based on at least two sections of the tongue and groove decking in place, with tongue and groove in contact.
2. The spans shown assume equal spacing between the multi-span conditions.
3. Weight of panels and roof covering material must be deducted from values to obtain net allowable load.
4. Per NDS 2018 Section 2.3.2, reference design values shall be multiplied by the appropriate load duration factor, C_D.

Medallion-Lok 16"

Bare & Painted

SECTION PROPERTIES						TOP IN COMPRESSION			BOTTOM IN COMPRESSION		
GAUGE	FY (KSI)	WEIGHT (PSF)	V_a kip/ft.	P_{a_end} lbs/ft.	P_{a_int} lbs/ft.	I_x ($in.^4$/ft.)	S_e ($in.^3$/ft.)	M_a kip-in./ft.	I_x ($in.^4$/ft.)	S_e ($in.^3$/ft.)	M_a kip-in./ft.
24	50.0	1.30	0.7920	125.03	371.48	0.0848	0.0565	1.4115	0.0390	0.0476	1.0305

1. Section properties are calculated in accordance with the 2016 AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
2. Va is the allowable shear.
3. Pa is the allowable load for web crippling on end & interior supports.
4. Ix is for deflection determination.
5. Se is for bending.
6. Ma is the allowable bending moment.
7. All values are for one foot of panel width.

Allowable Uniform Loads (PSF)

		Span in Feet															
Span Type	Load Type	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50
Single	Positive Wind	500	418	235	150	104	76	58	46	37	31	26	22	19	16	14	13
	Live	500	418	235	150	104	76	58	46	37	31	26	22	19	16	14	13
	Deflection (L/180)	500	500	500	474	274	172	115	81	59	44	34	26	21	17	14	12
	Deflection (L/240)	500	500	500	355	205	129	86	60	44	33	25	20	16	13	10	9
2 Span	Positive Wind	500	287	165	107	75	55	42	33	27	22	19	16	13	12	10	9
	Live	500	287	165	107	75	55	42	33	27	22	19	16	13	12	10	9
	Deflection (L/180)	500	500	500	500	482	303	203	142	104	78	60	47	37	30	25	21
	Deflection (L/240)	500	500	500	500	361	227	152	107	78	58	45	35	28	23	19	15
3 Span	Positive Wind	500	350	204	132	93	68	52	41	34	28	23	20	17	15	13	11
	Live	500	350	204	132	93	68	52	41	34	28	23	20	17	15	13	11
	Deflection (L/180)	500	500	500	500	377	238	159	111	81	61	47	37	29	24	19	16
	Deflection (L/240)	500	500	500	489	283	178	119	83	61	46	35	27	22	18	14	12
4 Span	Positive Wind	500	329	191	124	87	64	49	39	31	26	22	18	16	14	12	11
	Live	500	329	191	124	87	64	49	39	31	26	22	18	16	14	12	11
	Deflection (L/180)	500	500	500	500	401	252	169	118	86	65	50	39	31	25	21	17
	Deflection (L/240)	500	500	500	500	300	189	126	89	65	48	37	29	23	19	15	13
ASTM E1592 Uplift Testing		75.7	66.4	57.0	53.2	49.4	45.6	41.8	38.0	34.2							

Notes:

1. Allowable uniform loads are based upon equal span lengths.
2. Live is the allowable live or snow load.
3. Deflection (L/180) is the allowable load that limits the panel's deflection to L/180 while under positive or live load.
4. Deflection (L/240) is the allowable load that limits the panel's deflection to L/240 while under positive or live load.
5. The weight of the panel has **NOT** been deducted from the allowable loads.
6. Positive wind and Live load values are limited to combined shear & bending using Eq. H2-1 of the AISI Specification.
7. Values of ASTM E1592 Wind Uplift Testing include a factor of safety of 1.67. Shaded areas are outside of test range. Contact McElroy Metal for more information.
8. Positive Wind and Live Load values are limited by web crippling using a bearing length of 2".
9. Web crippling values are determined using a ratio of the uniform load **actually** supported by the top flanges of the section.
10. Load Tables are limited to a maximum allowable load of 500 psf.