AL-IMAN Group, LLC
2318 Woodson Road, # 140007,
Saint Louis, MO 63114

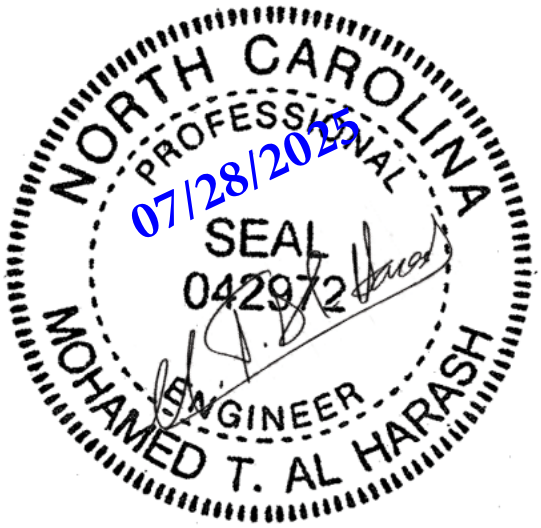
Structural Calculation

Client : Andrew Jesus Guillermo

Address : 176 Old Mill Road Fuquay Varina, NC 27526

References : ASCE 7-16/IBC 2015

Job Number : 25.02.04



Date:

July 28 , 2025

AL-IMAN Group, LLC
2318 Woodson Road, # 140007,
Saint Louis, MO 63114

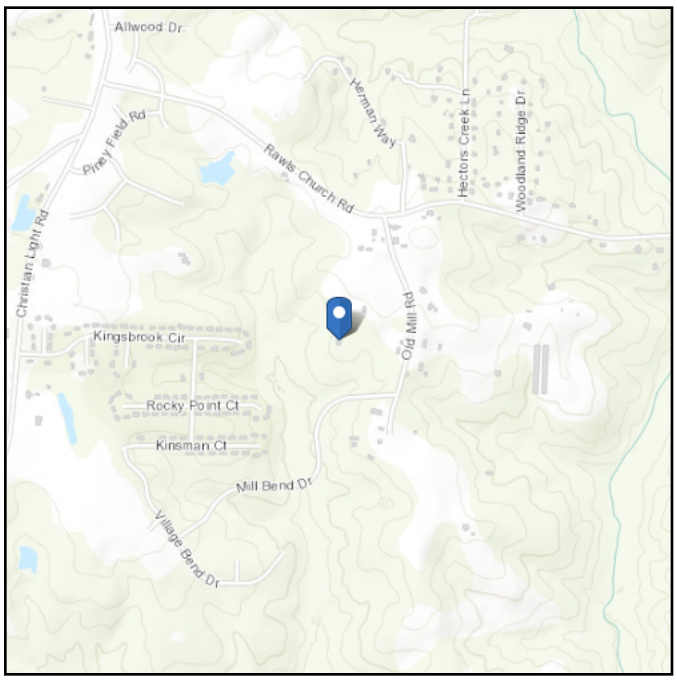
Contents

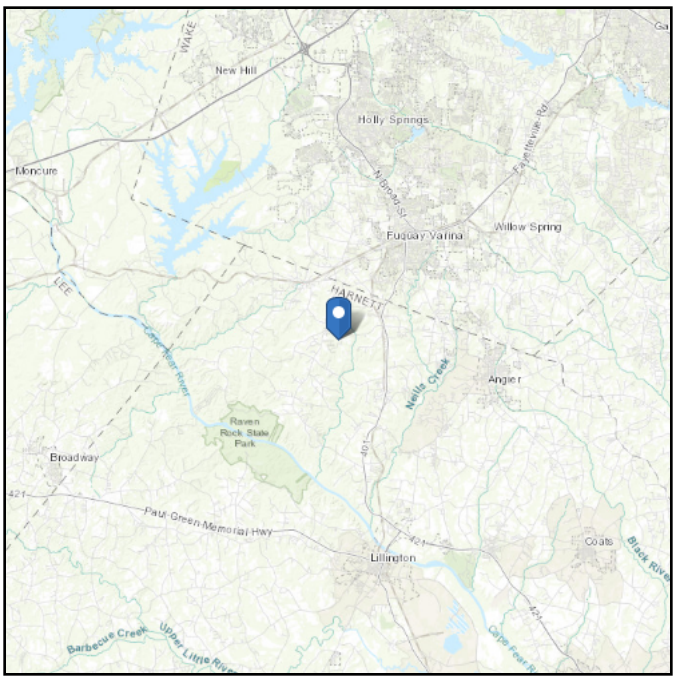
ASCE Hazards Report

Address:
176 Old Mill Road
Fuquay Varina, North Carolina
27526

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 35.528269
Longitude: -78.84797
Elevation: 347.0419696913007 ft (NAVD 88)





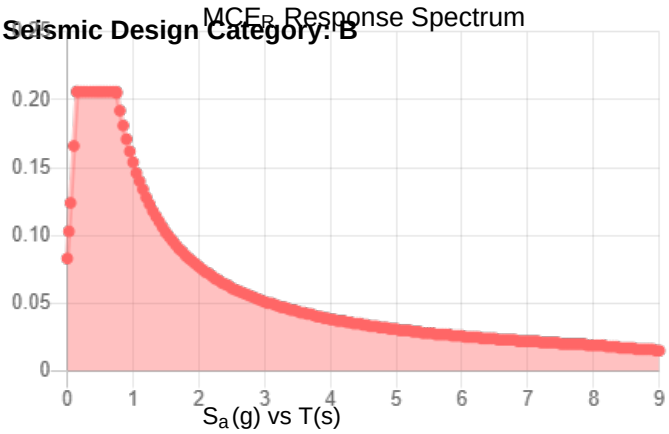
Seismic

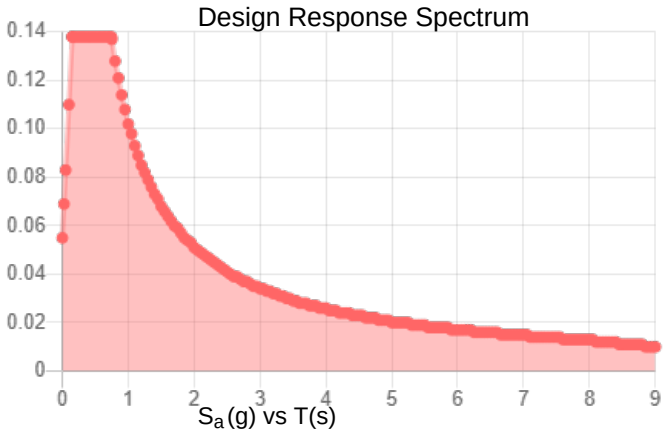
Site Soil Class: D - Default (see Section 11.4.3)

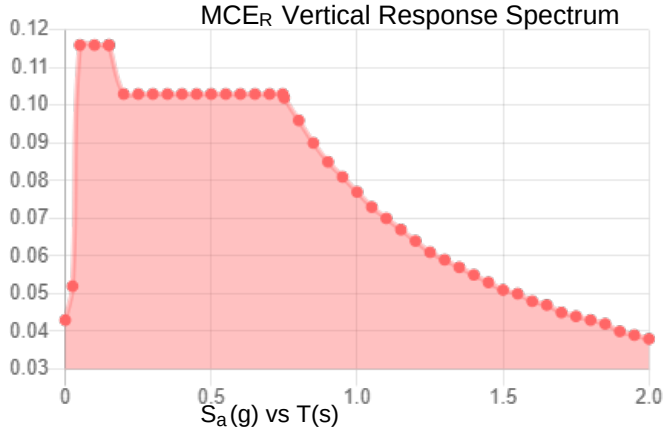
Results:

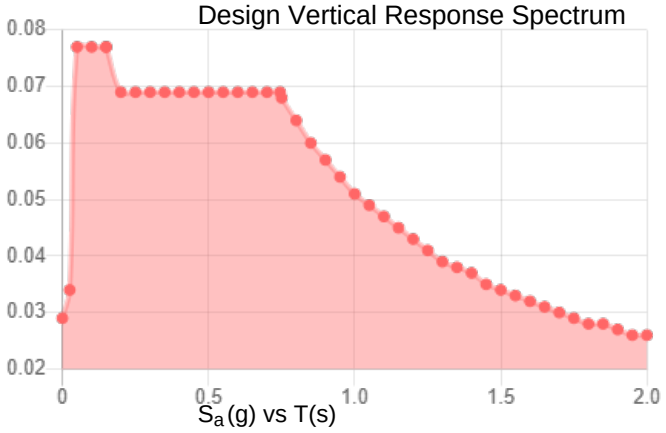
S_S :	0.129	S_{D1} :	0.102
S_1 :	0.064	T_L :	8
F_a :	1.6	PGA :	0.062
F_v :	2.4	PGA_M :	0.099
S_{MS} :	0.206	F_{PGA} :	1.6
S_{M1} :	0.154	I_e :	1
S_{DS} :	0.138	C_v :	0.7

Seismic Design Category: B









Data Accessed: **Sat Jul 26 2025**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

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FRAME RIDGE

Dead Load

$DL := 1.5\ psf$ Considered Roof Dead Load

Live Load

$L_0 := 20\ psf$ Considered Roof Live Load

Snow Load

$P_g := 35\ psf$ Ground snow load

$\gamma := 18\ \frac{lbf}{ft^3}$ Density of snow

$\theta := 14 \cdot deg$ Roof Angle

$C_e := 0.9$ Snow exposure factor (Table 7.3-1; ASCE 7-16) Fully exposed

$C_t := 1.0$ Thermal factor (Table 7.3-2; ASCE 7-16)

$C_s := 1.0$ Roof slope factor (Figure 7.4-1; ASCE 7-16)

$I_s := 1$ Importance factor (Table 1.5-2; ASCE 7-16)

Flat Roof Snow Load:

$$P_f := \begin{cases} \text{if } P_g \le 20\ psf \\ \quad I_s \cdot 20\ psf \\ \text{else if } P_g > 20\ psf \\ \quad 0.7 \cdot C_t \cdot C_e \cdot I_s \cdot P_g \end{cases} = 22.05\ psf$$

Equation: 7.4-1; ASCE 7-16

Sloped Roof Snow Load (Balanced):

$$P_s := C_s \cdot P_f = 22.05\ psf$$

Table 1.5-2 Importance Factors by Risk Category of Buildings and Other Structures for Snow, Ice, and Earthquake Loads

Risk Category from Table 1.5-1	Snow Importance Factor, I_s	Ice Importance Factor—Thickness, I_i	Ice Importance Factor—Wind, I_w	Seismic Importance Factor, I_e
I	0.80	0.80	1.00	1.00
II	1.00	1.00	1.00	1.00
III	1.10	1.15	1.00	1.25
IV	1.20	1.25	1.00	1.50

Table 7.3-1 Exposure Factor, C_e

Surface Roughness Category	Exposure of Roof[a]		
	Fully Exposed	Partially Exposed	Sheltered
B (see Section 26.7)	0.9	1.0	1.2
C (see Section 26.7)	0.9	1.0	1.1
D (see Section 26.7)	0.8	0.9	1.0
Above the tree line in windswept mountainous areas	0.7	0.8	NA
In Alaska, in areas where trees do not exist within a 2-mi (3-km) radius of the site	0.7	0.8	NA

Table 7.3-2 Thermal Factor, C_t

Thermal Condition[a]	C_t
All structures except as indicated below	1.0
Structures kept just above freezing and others with cold, ventilated roofs in which the thermal resistance (R-value) between the ventilated space and the heated space exceeds $25°F \times h \times ft^2/Btu$ ($4.4\ K \times m^2/W$)	1.1
Unheated and open air structures	1.2
Freezer building	1.3
Continuously heated greenhouses[b] with a roof having a thermal resistance (R-value) less than $2.0°F \times h \times ft^2/Btu$ ($0.4\ K \times m^2/W$)	0.85

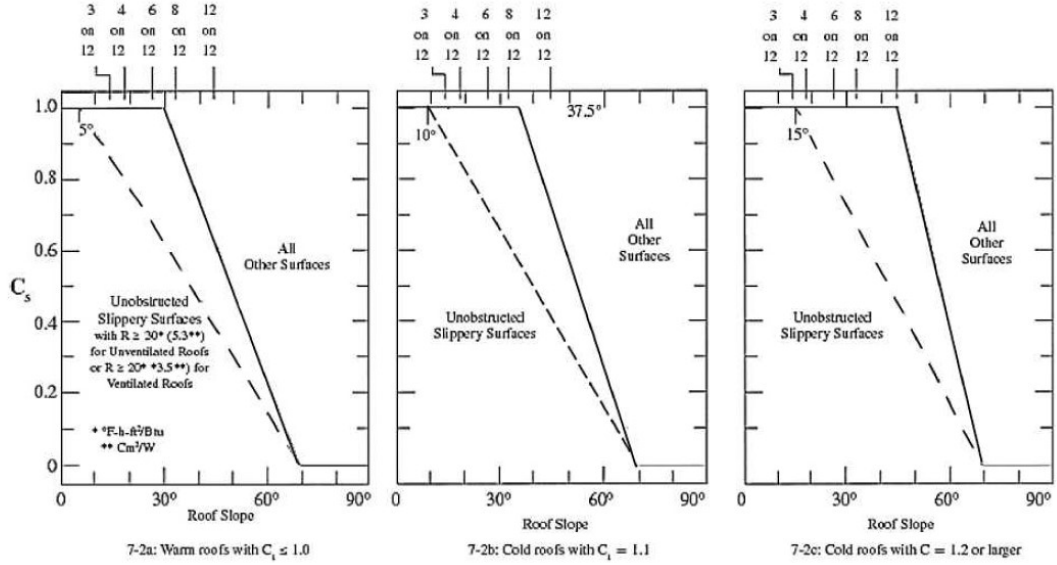


FIGURE 7.4-1 Graphs for Determining Roof Slope Factor, C_s, for Warm and Cold Roofs (See Table 7.3-2 for C_t Definitions)

FRAME RIDGE

Wind Load

Wind Exposure: C Risk Category: II

$V_{ult} := 140\ mph$

$Z_g := 900\ ft$ Terrain Expusur Constant (Table 26.11-1 of ASCE 7-16)

$\alpha := 9.5$ Terrain Expusur Constant (Table 26.11-1 of ASCE 7-16)

$K_z := 0.9$ Velocity Pressure Exposure Coefficient (Table 28.3-1 of ASCE 7-16)

$K_{zt} := 1.0$ Topographic Factor (Figure 26.8.1 of ASCE 7-16)

$K_d := 0.85$ Wind Directionality Factor (Table 26.6-1 of ASCE 7-16)

$K_e := 1$ Ground Elevation Factor (Table 26.9-1 of ASCE 7-16)

$G := 0.85$ Gust factor (Section 26.11.1 of ASCE 7-16)

$GC_{pi\_P} := 0.18$ Internal pressure coefficient (Positive); Table 26.13-1of ASCE 7-16

$GC_{pi\_N} := -0.18$ Internal pressure coefficient (Negative); Table 26.13-1of ASCE 7-16

$$q_z := 0.00256\ \frac{psf}{mph^2} \cdot K_z \cdot K_{zt} \cdot K_d \cdot K_e \cdot V_{ult}^{\ 2} = 38.4\ psf$$

Wall Pressure Coefficients, C_p

Surface	L/B	C_p	Use With
Windward wall	All values	0.8	q_z
Leeward wall	0–1	−0.5	q_h
	2	−0.3	q_h
	≥4	−0.2	q_h
Sidewall	All values	−0.7	q_h

Roof Pressure Coefficients, C_p, for use with q_h

		Windward								Leeward		
		Angle, θ (degrees)								Angle, θ (degrees)		
Wind Direction	h/L	10	15	20	25	30	35	45	≥60°	10	15	≥20
Normal to Ridge for θ ≥ 10°	≤0.25	−0.7	−0.5	−0.3	−0.2	−0.2	0.0[a]					
		−0.18	0.0[a]	0.2	0.3	0.3	0.4	0.4	0.01 θ	−0.3	−0.5	−0.6
	0.5	−0.9	−0.7	−0.4	−0.3	−0.2	−0.2	0.0[a]				
		−0.18	−0.18	0.0[a]	0.2	0.2	0.3	0.4	0.01 θ	−0.5	−0.5	−0.6
	≥1.0	−1.3[b]	−1.0	−0.7	−0.5	−0.3	−0.2	0.0[a]				
		−0.18	−0.18	−0.18	0.0[a]	0.2	0.2	0.3	0.01 θ	−0.7	−0.6	−0.6

Wind Direction	h/L	Horizontal Distance from Windward Edge	C_p
Normal to Ridge for θ < 10° and Parallel to Ridge for All θ	≤0.5	0 to h/2	−0.9, −0.18
		h/2 to h	−0.9, −0.18
		h to 2h	−0.5, −0.18
		>2 h	−0.3, −0.18
	≥1.0	0 to h/2	−1.3[b], −0.18
		>h/2	−0.7, −0.18

[a]Value is provided for interpolation purposes.
[b]Value can be reduced linearly with area over which it is applicable as follows:
[c]For roof slopes greater than 80°, use $C_p = 0.8$.

Area, ft²	Area, m²	Reduction Factor
≤100	≤9.3	1.0
250	23.2	0.9
≥1,000	≥92.9	0.8

$B := 30\ ft$ Horizontal dimension of building, (**measured normal to wind direction**)

$L := 50\ ft$ Horizontal dimension of building, (**measured parallel to wind direction**)

$h := 15.875\ ft$ **Mean roof height**,

$\frac{L}{B} = 1.67$

$\frac{h}{L} = 0.32$

$\theta = 14\ deg$

External pressure coefficient (Cp)

$$\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof} \\ C_{p\_LW\_Roof} \end{bmatrix} := \begin{bmatrix} 0.8 \\ -0.5 \\ -0.7 \\ -0.7 \\ -0.5 \end{bmatrix}$$

ASCE 7-16 (Figure 27.3-1)

$$\begin{bmatrix} P_{WW\_Wall\_1} \\ P_{LW\_Wall\_1} \\ P_{SideWall\_1} \\ P_{WW\_Roof\_1} \\ P_{LW\_Roof\_1} \end{bmatrix} := q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_P} \right) = \begin{bmatrix} 19.19 \\ -23.22 \\ -29.75 \\ -29.75 \\ -23.22 \end{bmatrix} psf$$

$$\begin{bmatrix} P_{WW\_Wall\_2} \\ P_{LW\_Wall\_2} \\ P_{SideWall\_2} \\ P_{WW\_Roof\_2} \\ P_{LW\_Roof\_2} \end{bmatrix} := q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_N} \right) = \begin{bmatrix} 33.01 \\ -9.4 \\ -15.93 \\ -15.93 \\ -9.4 \end{bmatrix} psf$$

$$\begin{bmatrix} P_{WW\_Wall\_3} \\ P_{LW\_Wall\_3} \\ P_{SideWall\_3} \\ P_{WW\_Roof\_3} \\ P_{LW\_Roof\_3} \end{bmatrix} := q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_P} \right) = \begin{bmatrix} 19.19 \\ -23.22 \\ -29.75 \\ -29.75 \\ -23.22 \end{bmatrix} psf$$

$$\begin{bmatrix} P_{WW\_Wall\_4} \\ P_{LW\_Wall\_4} \\ P_{SideWall\_4} \\ P_{WW\_Roof\_4} \\ P_{LW\_Roof\_4} \end{bmatrix} := q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_N} \right) = \begin{bmatrix} 33.01 \\ -9.4 \\ -15.93 \\ -15.93 \\ -9.4 \end{bmatrix} psf$$

FRAME RIDGE

Earthquake load

General Input: Seismic Design Category: B, Soil Site Class D , ASCE 7-16 Loading

S_S :	0.129	S_{D1} :	0.102
S_1 :	0.064	T_L :	8
F_a :	1.6	PGA :	0.062
F_v :	2.4	PGA_M :	0.099
S_{MS} :	0.206	F_{PGA} :	1.6
S_{M1} :	0.154	I_e :	1
S_{DS} :	0.138	C_v :	0.7

$S_s := 0.129\ g$ $S_{MS} := 0.206\ g$ **General Input**

$S_1 := 0.064\ g$ $S_{DS} := 0.138\ g$

$F_v := 2.4$

$S_{m1} := F_v \cdot S_1 = 0.154\ g$ Eq:11.4-2; ASCE 7-16

$S_{D1} := \frac{2}{3} \cdot S_{m1} = 0.102\ g$ Eq:11.4-4; ASCE 7-16

$R := 3.25$ The Response Modification factor (Table 12.2-1; ASCE 7-16)

$I := 1.0$ The Occupancy Importance Factor

$\rho := 1.0$ Sec. 12.3.4; ASCE 7-16

Seismic Response Coefficient

$C_s := \frac{S_{DS}}{\frac{R}{I}} = 0.04\ g$ ASCE 7-16; Equation 12.8-2

Approximate Fundamental Period

$C_t := 0.028$ ASCE 7-16: Table 12.8-2

$h_n := 15.875\ \ ft$

$x := 0.8$ ASCE 7-16: Table 12.8-2

$T_a := \left(C_t \cdot {h_n}^x\right) = 0.26$

Fundamental Period

$C_u := 1.7$ ASCE 7-16: Table 12.8-1

Table 12.8-1 Coefficient for Upper Limit on Calculated Period

Design Spectral Response Acceleration Parameter at 1 s, S_{D1}	Coefficient C_u
≥0.4	1.4
0.3	1.4
0.2	1.5
0.15	1.6
≤0.1	1.7

$T := C_u \cdot T_a = 0.43$

$T_L := 8$ ASCE 7-16: Figure 22-14

$T_s := \frac{S_{D1}}{S_{DS}} = 0.742$

$\text{if}\left(T \le 1.5 \cdot T_s, \text{“Cs according to eq 12.8–2”}, \text{“not okay”}\right) = \text{“Cs according to eq 12.8–2”}$

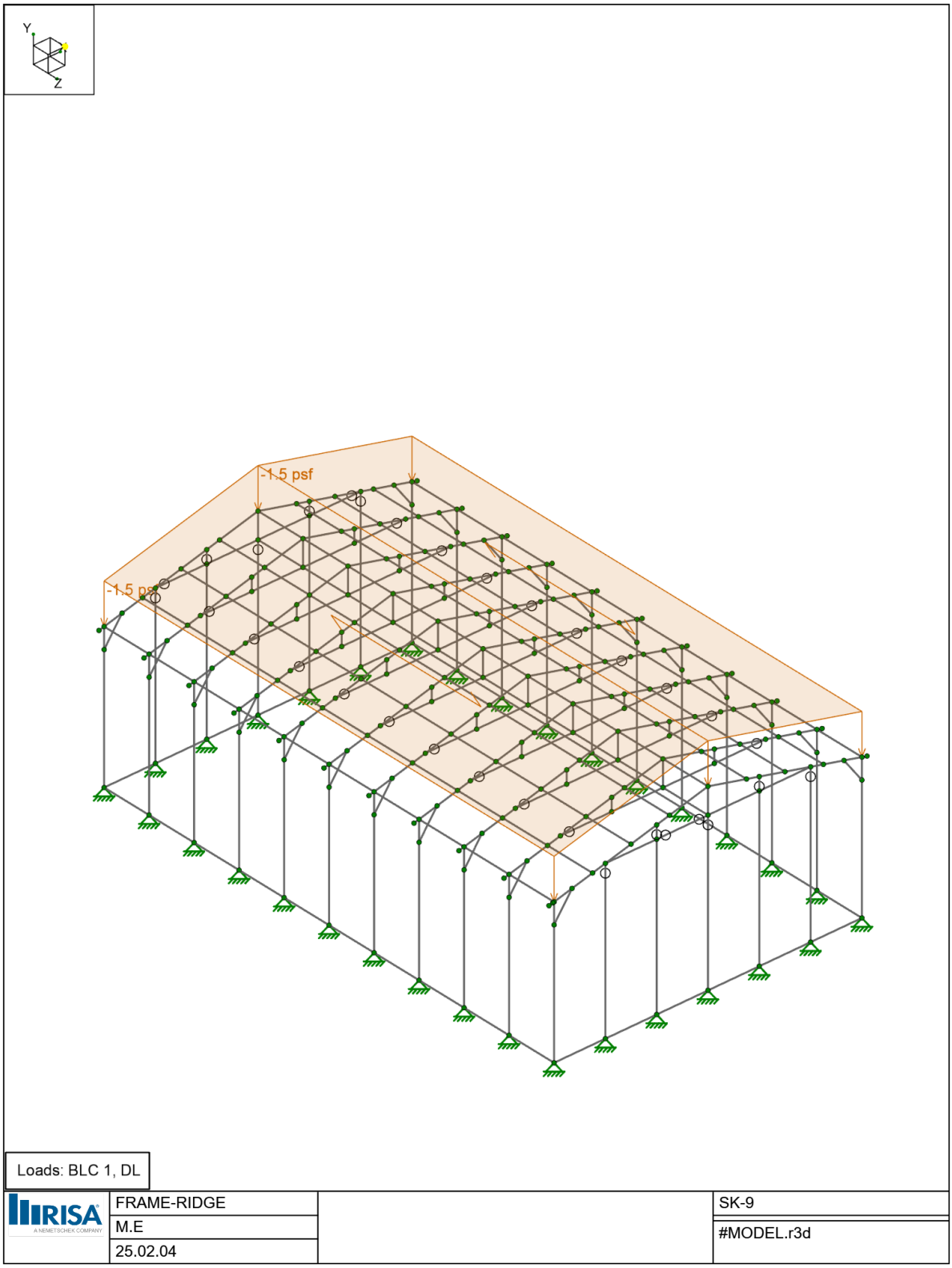
Maximum seismic response coefficient

$$C_{s\_max} := \text{if}\left(T \le T_L, \frac{S_{D1} \cdot 1}{T \cdot \left(\frac{R}{I}\right)}, \frac{S_{D1} \cdot T_L \cdot 1}{T^2 \cdot \left(\frac{R}{I}\right)}\right) = 0.072\ g$$

Minimum seismic response coefficient

$$C_{s\_min} := 0.5\ \frac{S_1}{\frac{R}{I}} = 0.32\ \frac{ft}{s^2}$$

$\text{if}\left(C_{s\_max} > C_s > C_{s\_min}, \text{“OK”}, \text{“NOT OK”}\right) = \text{“OK”}$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-1.5 psf
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M.E
25.02.04
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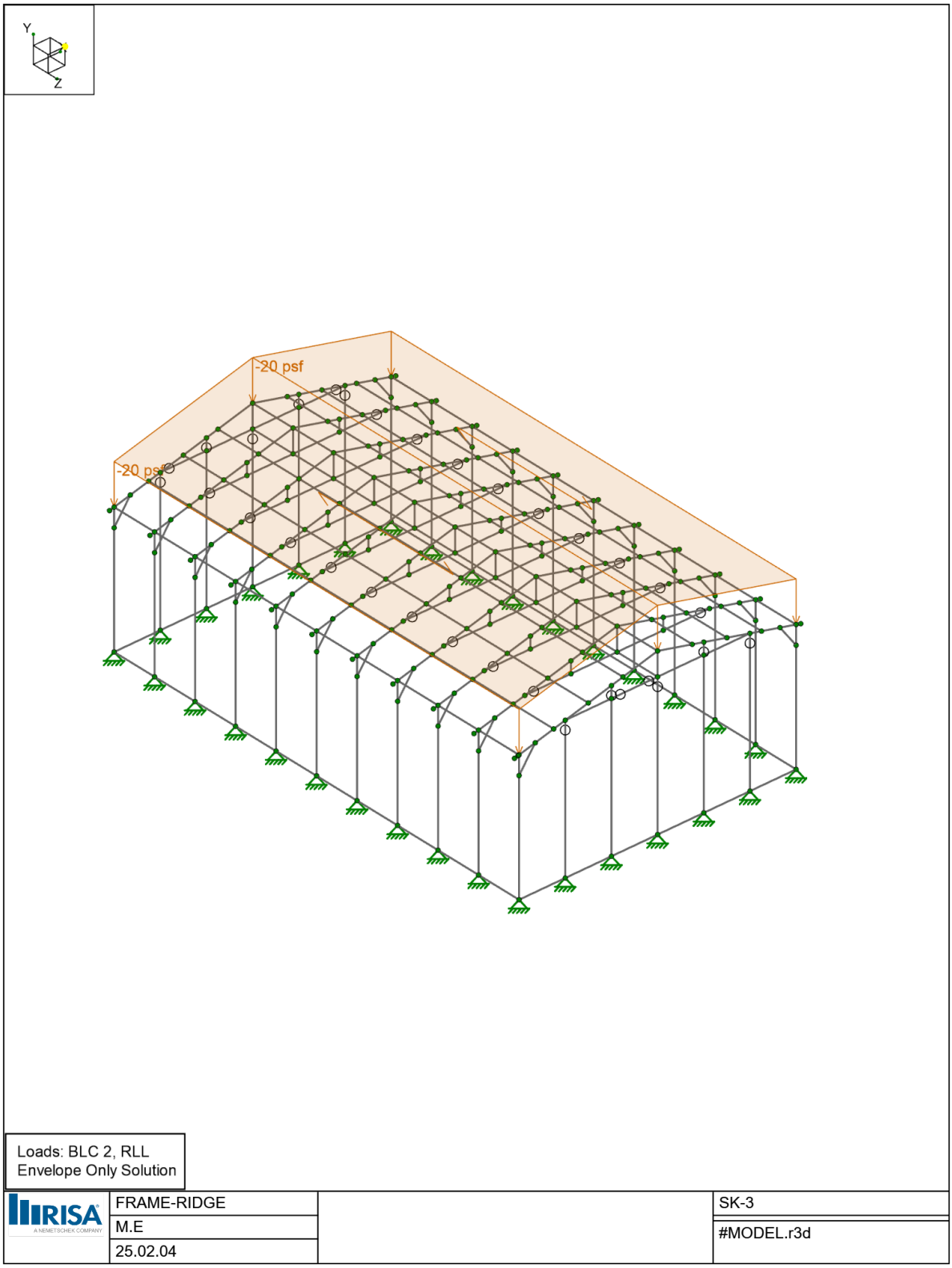
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Z
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-20 psf
Loads: BLC 2, RLL
Envelope Only Solution
FRAME-RIDGE
M.E
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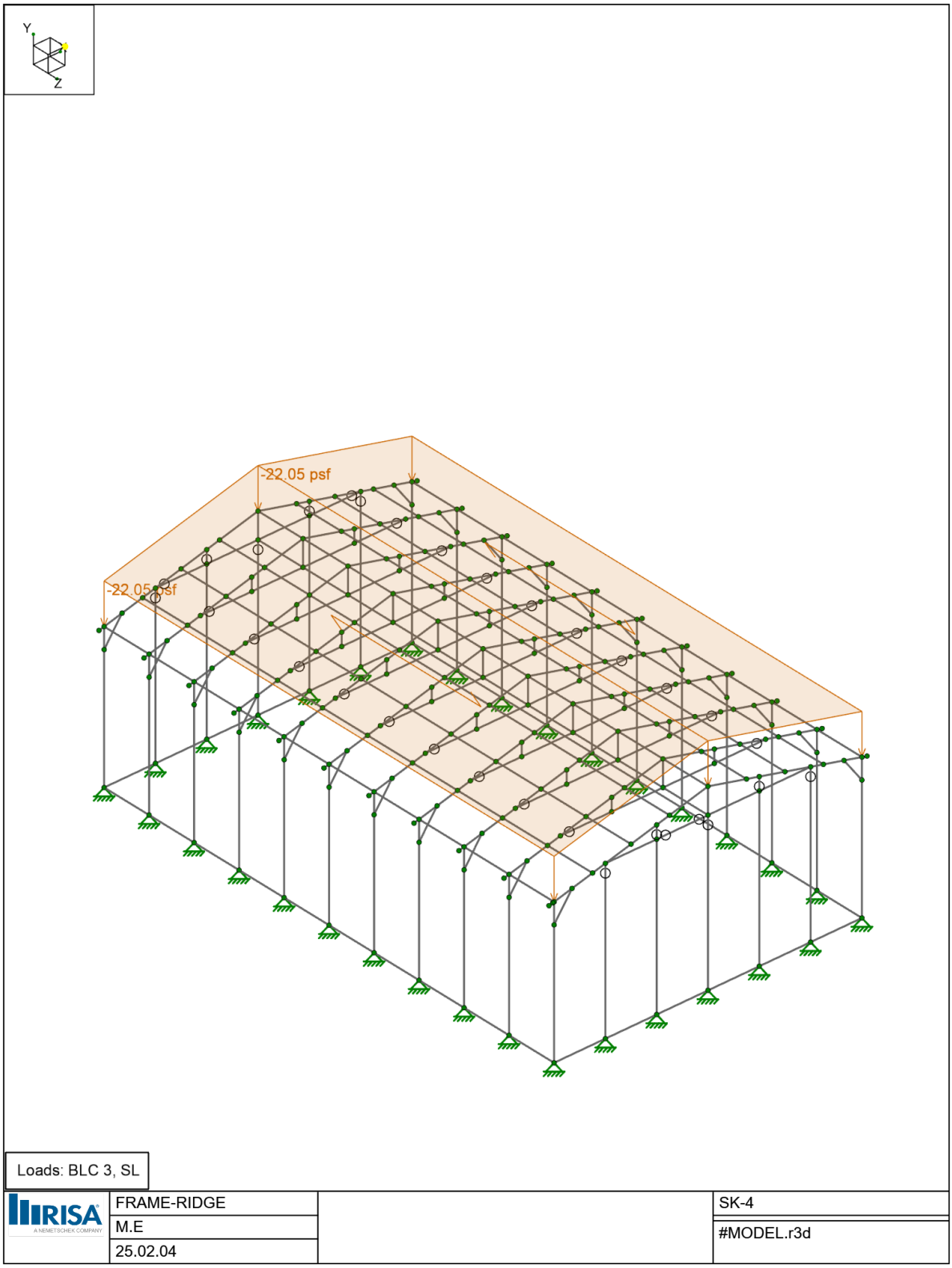
Y
Z
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25.02.04
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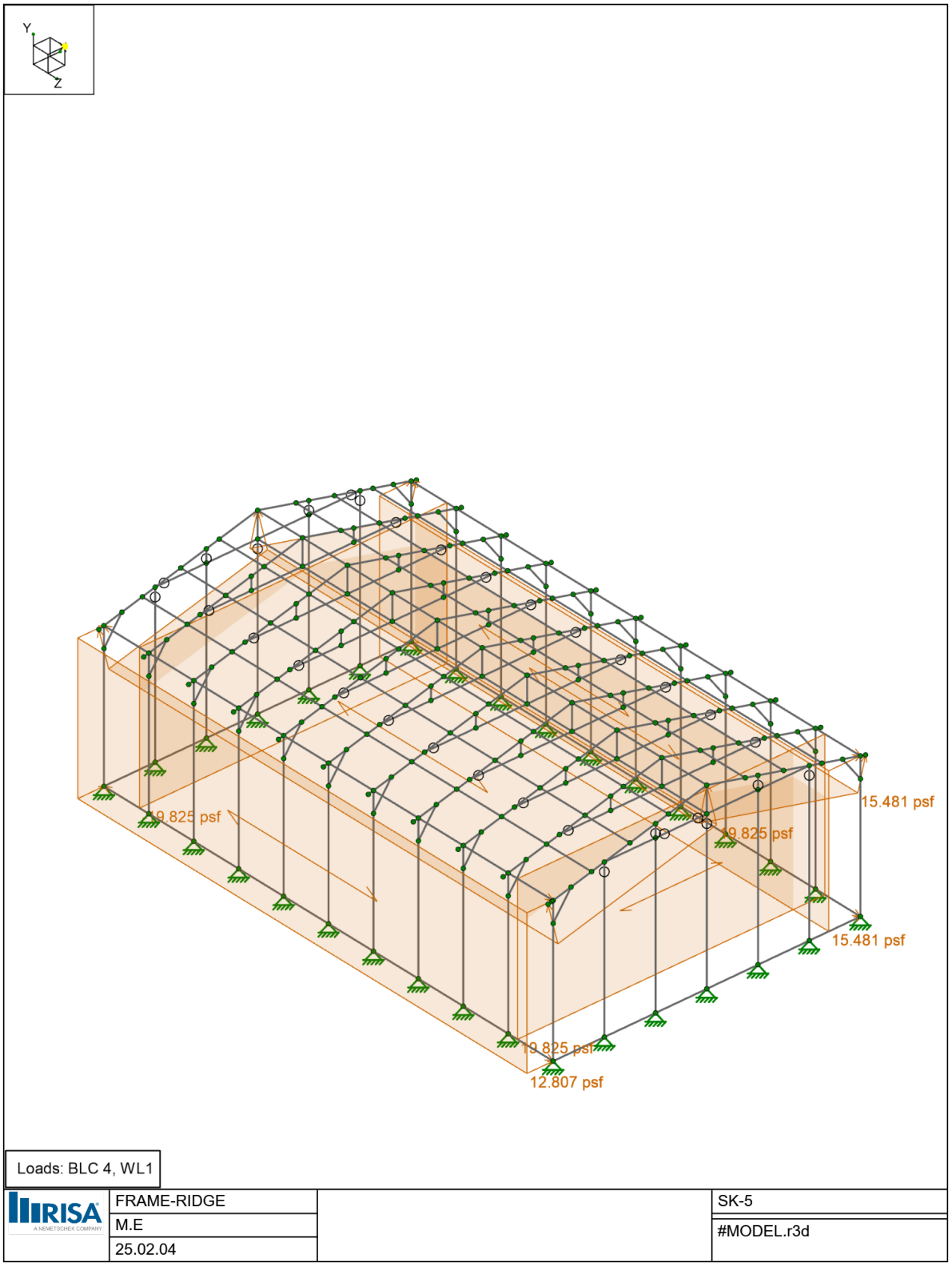
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19.825 psf
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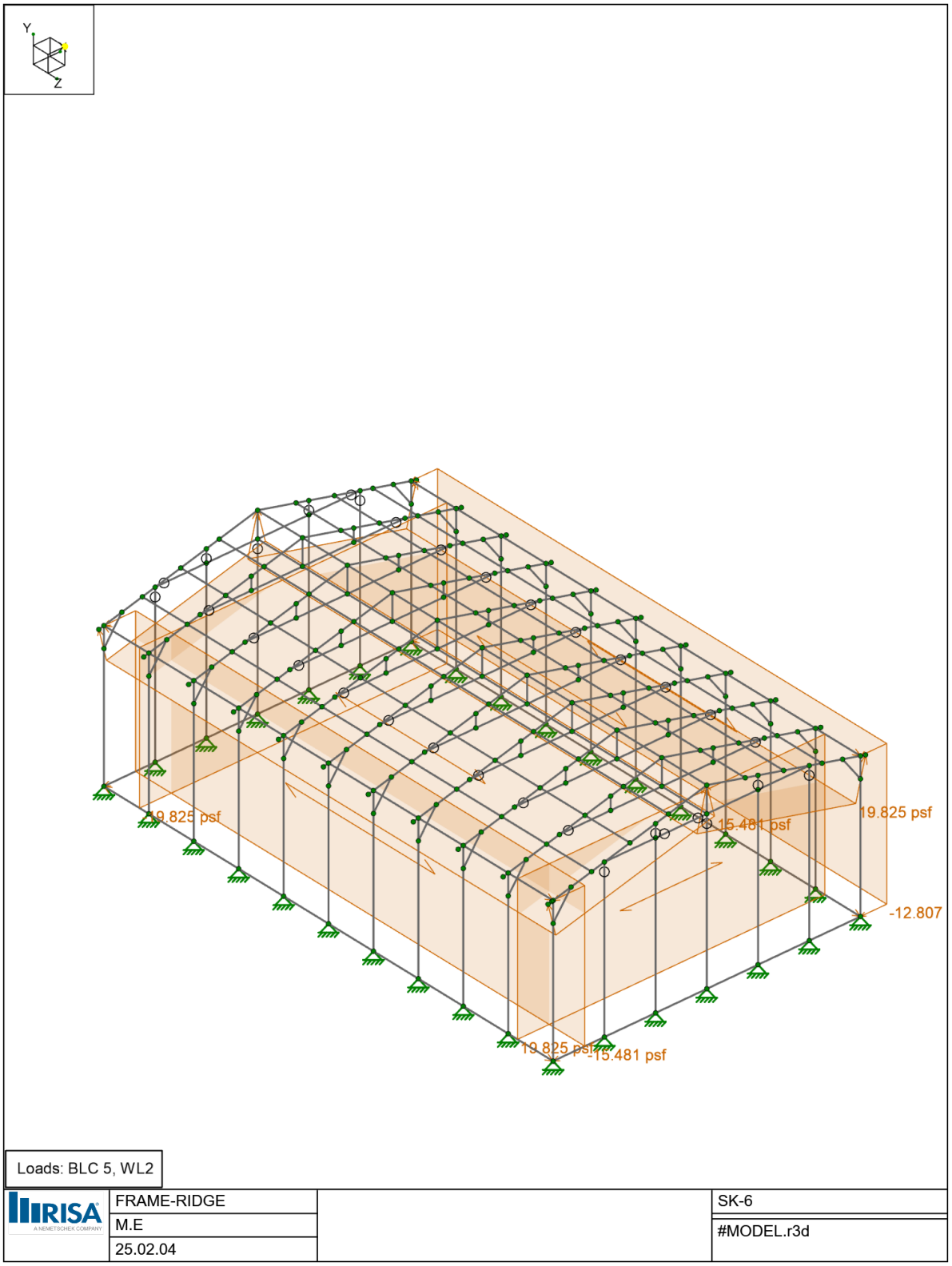
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25.02.04
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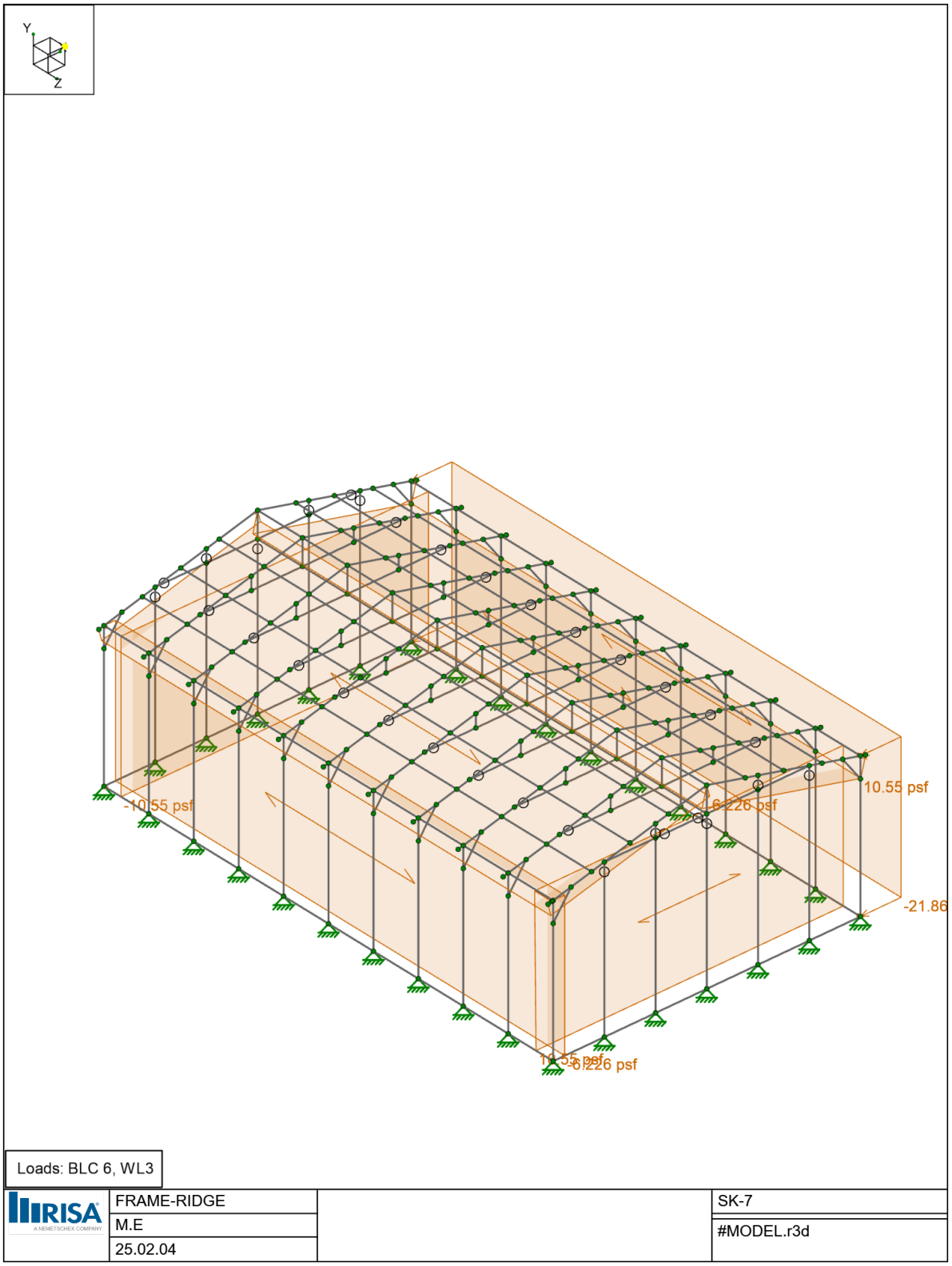
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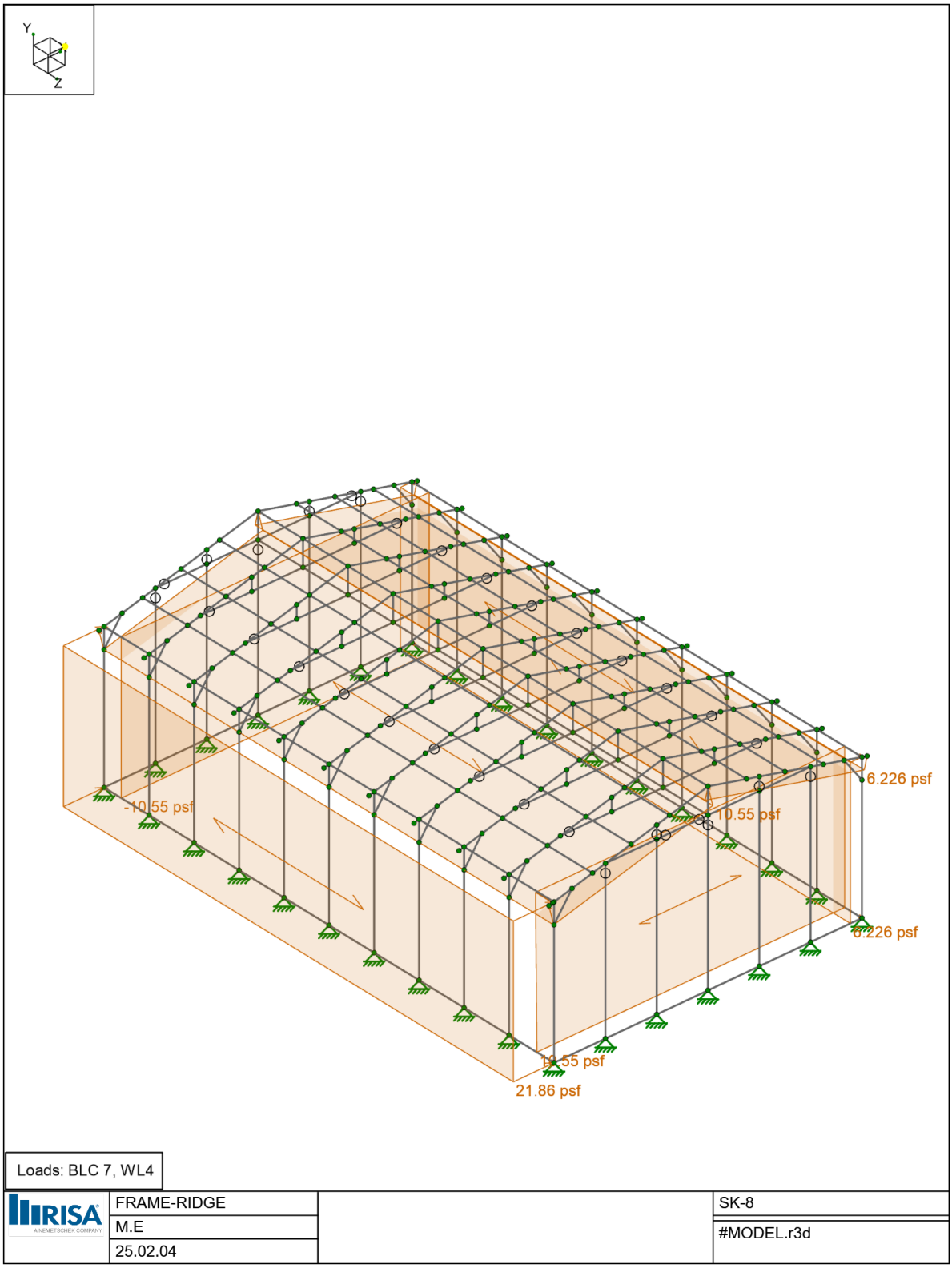
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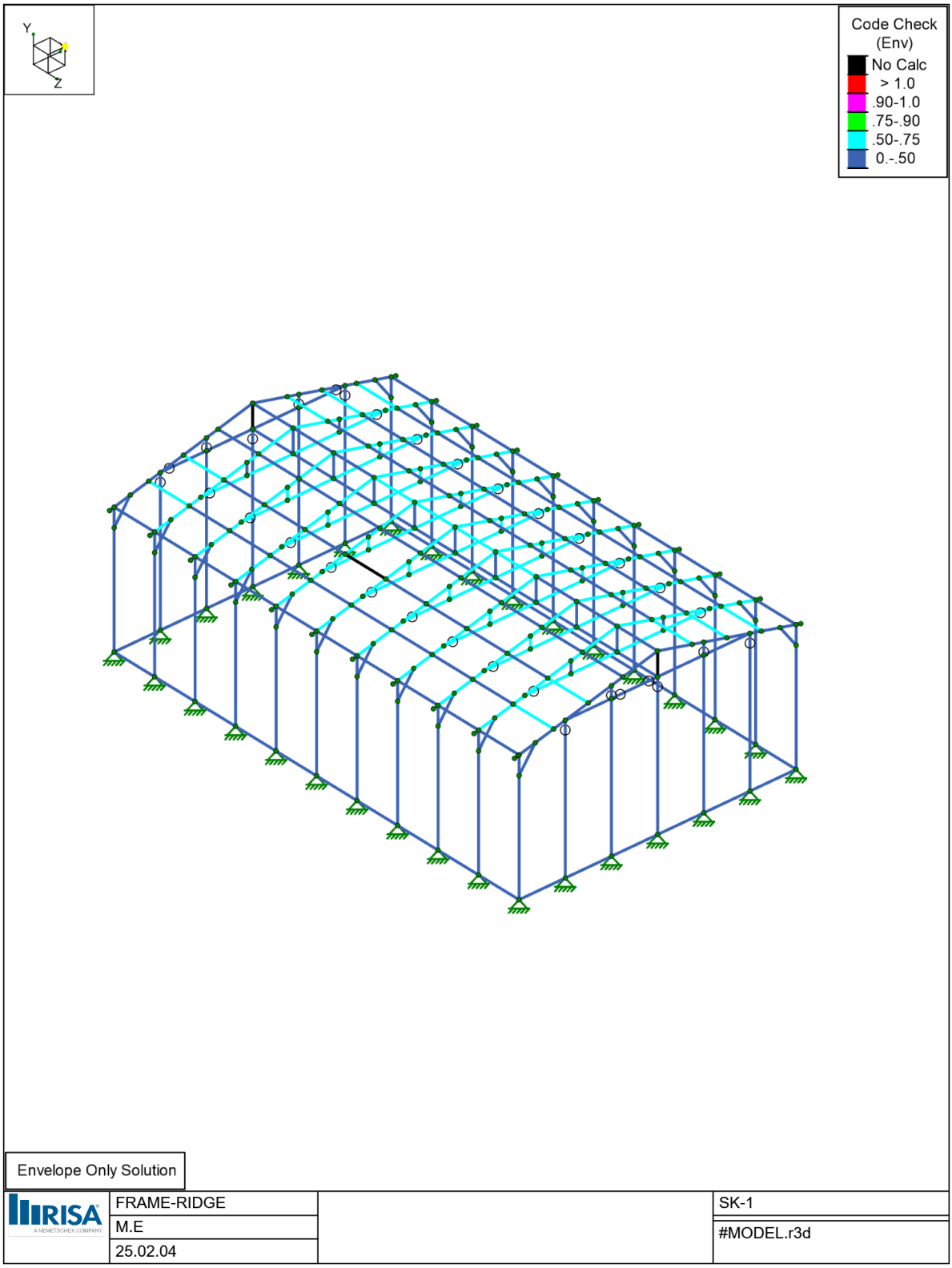
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0.-.50
Envelope Only Solution
FRAME-RIDGE
M.E
25.02.04
SK-1
#MODEL.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B RECT	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A500 Gr.C RND	29000	11154	0.3	0.65	0.527	46	1.4	62	1.3
7	A500 Gr.C RECT	29000	11154	0.3	0.65	0.527	50	1.4	62	1.3
8	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
9	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
10	A913 Gr.65	29000	11154	0.3	0.65	0.49	65	1.1	80	1.1
11	A500 Gr.C	29000	11154	0.3	0.65	0.49	54	1.1	62	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	RHS 2.5x2.5x14ga_C	HSS2.5X2.5X14GA_HRA	Column	Tube	A500 Gr.C RECT	Typical	0.774	0.757	0.757	1.134
2	2RHS 2.5x2.5x14ga_C	2HSS2.5X2.5X14GA_HRC	Column	Tube	A500 Gr.C RECT	Typical	1.528	1.438	3.871	1.483
3	RHS 2.5x2.5x14ga_B	HSS2.5X2.5X14GA_HRA	Beam	Tube	A500 Gr.C RECT	Typical	0.774	0.757	0.757	1.134
4	2RHS 2.5x2.5x14ga_B	2HSS2.5X2.5X14GA_HRC	Beam	Tube	A500 Gr.C RECT	Typical	1.528	1.438	3.871	1.483
5	RHS 2.5x2.5x14ga_HB	HSS2.5X2.5X14GA_HRA	HBrace	Tube	A500 Gr.C RECT	Typical	0.774	0.757	0.757	1.134
6	RHS 2.5x2.5x14ga_VB	HSS2.5X2.5X14GA_HRA	VBrace	Tube	A500 Gr.C RECT	Typical	0.774	0.757	0.757	1.134

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Distributed	Area(Member)
1	DL	DL		-1			2
2	RLL	RLL					2
3	SL	SL					2
4	WL1	WL					6
5	WL2	WL					6
6	WL3	WL					6
7	WL4	WL					6
8	WL5	WL					
9	WL6	WL					
10	WL7	WL					
11	WL8	WL					
12	Ex+	EL	0.13				2
13	Ex-	EL	-0.13				2
14	Ez+	EL			0.13		2
15	Ez-	EL			-0.13		2
16	BLC 1 Transient Area Loads	None				22	
17	BLC 2 Transient Area Loads	None				22	
18	BLC 3 Transient Area Loads	None				22	
19	BLC 4 Transient Area Loads	None				388	
20	BLC 5 Transient Area Loads	None				388	
21	BLC 6 Transient Area Loads	None				431	
22	BLC 7 Transient Area Loads	None				431	
23	BLC 12 Transient Area Loads	None				22	
24	BLC 13 Transient Area Loads	None				22	
25	BLC 14 Transient Area Loads	None				22	
26	BLC 15 Transient Area Loads	None				22	

Load Combination Design

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	1		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	2		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	3		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	4		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	5		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	6		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	7		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	8		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	9		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	10		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	11		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	12		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	13		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	14		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	15		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	16		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	17		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	18		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	19		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	20		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	21		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	22		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	23		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	24		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	25		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
26	26		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	27		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	28		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	29		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30	30		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	31		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	32		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33	33		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
34	34		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
35	35		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
36	36		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
37	37		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
38	38		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
39	39		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40	40		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
41	41		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
42	42		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
43	43		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
44	44		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
45	45		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
46	46		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
47	47		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
48	48		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
49	49		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50	50		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
51	51		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Member Area Loads (BLC 1 : DL)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N4	N13	N15	N6	Y	A-B	-1.5	-1.5	-1.5	-1.5	Yes
2	N6	N15	N17	N10	Y	A-B	-1.5	-1.5	-1.5	-1.5	Yes

Member Area Loads (BLC 2 : RLL)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N6	N15	N17	N10	Y	A-B	-20	-20	-20	-20	Yes
2	N4	N13	N15	N6	Y	A-B	-20	-20	-20	-20	Yes

Member Area Loads (BLC 3 : SL)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N6	N15	N17	N10	Y	A-B	-22.05	-22.05	-22.05	-22.05	Yes
2	N4	N13	N15	N6	Y	A-B	-22.05	-22.05	-22.05	-22.05	Yes

Member Area Loads (BLC 4 : WL1)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N3	N5	N10	N4	Perp	A-B	-19.825	-19.825	-19.825	-19.825	Yes
2	N14	N5	N10	N17	Perp	A-B	15.481	15.481	15.481	15.481	Yes
3	N16	N8	N6	N15	Perp	A-B	15.481	15.481	15.481	15.481	Yes
4	N12	N3	N4	N13	Perp	A-B	12.807	12.807	12.807	12.807	Yes
5	N15	N6	N2	N11	Perp	A-B	19.825	19.825	19.825	19.825	Yes
6	N12	N14	N17	N13	Z	A-B	19.825	19.825	19.825	19.825	Yes

Member Area Loads (BLC 5 : WL2)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N3	N5	N10	N4	Perp	A-B	-19.825	-19.825	-19.825	-19.825	Yes
2	N14	N5	N10	N17	Perp	A-B	-12.807	-12.807	-12.807	-12.807	Yes
3	N16	N8	N6	N15	Perp	A-B	19.825	19.825	19.825	19.825	Yes
4	N12	N3	N4	N13	Perp	A-B	-15.481	-15.481	-15.481	-15.481	Yes
5	N15	N6	N2	N11	Perp	A-B	15.481	15.481	15.481	15.481	Yes
6	N12	N14	N17	N13	Z	A-B	19.825	19.825	19.825	19.825	Yes

Member Area Loads (BLC 6 : WL3)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N3	N5	N10	N4	Perp	A-B	-10.55	-10.55	-10.55	-10.55	Yes
2	N14	N5	N10	N17	Perp	A-B	-21.86	-21.86	-21.86	-21.86	Yes
3	N16	N8	N6	N15	Perp	A-B	10.55	10.55	10.55	10.55	Yes
4	N12	N3	N4	N13	Perp	A-B	-6.226	-6.226	-6.226	-6.226	Yes
5	N15	N6	N2	N11	Perp	A-B	6.226	6.226	6.226	6.226	Yes
6	N12	N14	N17	N155	Z	A-B	10.55	10.55	10.55	10.55	Yes

Member Area Loads (BLC 7 : WL4)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N3	N5	N10	N4	Perp	A-B	-10.55	-10.55	-10.55	-10.55	Yes
2	N14	N5	N10	N17	Perp	A-B	6.226	6.226	6.226	6.226	Yes
3	N16	N8	N6	N15	Perp	A-B	6.226	6.226	6.226	6.226	Yes
4	N12	N3	N4	N13	Perp	A-B	21.86	21.86	21.86	21.86	Yes

Member Area Loads (BLC 7 : WL4) (Continued)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
5	N15	N6	N2	N11	Perp	A-B	10.55	10.55	10.55	10.55	Yes
6	N12	N14	N17	N155	Z	A-B	10.55	10.55	10.55	10.55	Yes

Member Area Loads (BLC 12 : Ex+)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N4	N13	N15	N6	X	A-B	0.195	0.195	0.195	0.195	Yes
2	N6	N15	N17	N10	X	A-B	0.195	0.195	0.195	0.195	Yes

Member Area Loads (BLC 13 : Ex-)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N4	N13	N15	N6	X	A-B	-0.195	-0.195	-0.195	-0.195	Yes
2	N6	N15	N17	N10	X	A-B	-0.195	-0.195	-0.195	-0.195	Yes

Member Area Loads (BLC 14 : Ez+)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N4	N13	N15	N6	Z	A-B	0.195	0.195	0.195	0.195	Yes
2	N6	N15	N17	N10	Z	A-B	0.195	0.195	0.195	0.195	Yes

Member Area Loads (BLC 15 : Ez-)

	Node A	Node B	Node C	Node D	Direction	Load Direction	A Magnitude [psf]	B Magnitude [psf]	C Magnitude [psf]	D Magnitude [psf]	Exclude Braces
1	N4	N13	N15	N6	Z	A-B	-0.195	-0.195	-0.195	-0.195	Yes
2	N6	N15	N17	N10	Z	A-B	-0.195	-0.195	-0.195	-0.195	Yes

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	Pnc/om [lb]	Pnt/om [lb]	Mnyy/om [lb-ft]	Mnzz/om [lb-ft]	Cb	Eqn
1	M1	2HSS2.5X2.5X14GA_HRC	0.3	126	3	0.036	168	z	5	10423.529	45748.503	2282.936	4598.179	1.495	H1-1a
2	M2	HSS2.5X2.5X14GA_HRA	0.002	6.185	28	0.002	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
3	M3	2HSS2.5X2.5X14GA_HRC	0.3	126	3	0.036	168	z	4	10423.529	45748.503	2282.936	4598.179	1.973	H1-1a
4	M4	HSS2.5X2.5X14GA_HRA	0.002	6.185	29	0.002	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
5	M5	HSS2.5X2.5X14GA_HRA	0.17	185.54	3	0.119	92.77	z	28	20915.573	23185.629	1708.318	1708.318	1	H1-1b
6	M6	HSS2.5X2.5X14GA_HRA	0.108	60	3	0.042	60	y	3	17710.374	23185.629	1708.318	1708.318	2.208	H1-1b*
7	M7	HSS2.5X2.5X14GA_HRA	0.108	60	3	0.042	60	y	3	17710.374	23185.629	1708.318	1708.318	2.208	H1-1b*
8	M8	HSS2.5X2.5X14GA_HRA	0.147	60	3	0.03	60	y	3	17710.374	23185.629	1708.318	1708.318	2.145	H1-1b*
9	M9	HSS2.5X2.5X14GA_HRA	0.147	60	3	0.03	60	y	3	17710.374	23185.629	1708.318	1708.318	2.145	H1-1b*
10	M10	HSS2.5X2.5X14GA_HRA	0.17	60	3	0.019	60	y	3	17710.374	23185.629	1708.318	1708.318	1.753	H1-1b*
11	M11	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
12	M12	2HSS2.5X2.5X14GA_HRC	0.288	84	30	0.052	168	y	3	10423.529	45748.503	2282.936	4598.179	1.174	H1-1b
13	M13	HSS2.5X2.5X14GA_HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
14	M14	HSS2.5X2.5X14GA_HRA	0.537	185.54	3	0.107	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
15	M15	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
16	M16	2HSS2.5X2.5X14GA_HRC	0.346	126	3	0.071	168	y	3	10423.529	45748.503	2282.936	4598.179	2.145	H1-1b
17	M17	HSS2.5X2.5X14GA_HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
18	M18	HSS2.5X2.5X14GA_HRA	0.572	185.54	3	0.094	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
19	M19	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
20	M20	2HSS2.5X2.5X14GA_HRC	0.417	126	3	0.084	168	y	3	10423.529	45748.503	2282.936	4598.179	2.145	H1-1b
21	M21	HSS2.5X2.5X14GA_HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
22	M22	HSS2.5X2.5X14GA_HRA	0.555	185.54	3	0.1	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
23	M23	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
24	M24	2HSS2.5X2.5X14GA_HRC	0.46	126	3	0.092	168	y	3	10423.529	45748.503	2282.936	4598.179	2.145	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	Pnc/om [lb]	Pnt/om [lb]	Mnyy/om [lb-ft]	Mnzz/om [lb-ft]	Cb	Eqn
25	M25	HSS2.5X2.5X14GA__HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
26	M26	HSS2.5X2.5X14GA__HRA	0.535	185.54	3	0.095	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
27	M27	2HSS2.5X2.5X14GA__HRC	0.228	84	28	0.037	168	z	5	21526.016	45748.503	2282.936	4598.179	1.331	H1-1b
28	M28	HSS2.5X2.5X14GA__HRA	0.002	6.185	28	0.002	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
29	M29	HSS2.5X2.5X14GA__HRA	0.159	0	31	0.112	60	y	4	20691.412	23185.629	1708.318	1708.318	2.272	H1-1b
30	M30	2HSS2.5X2.5X14GA__HRC	0.228	84	29	0.037	168	z	4	21526.016	45748.503	2282.936	4598.179	1.332	H1-1b
31	M31	HSS2.5X2.5X14GA__HRA	0.002	6.185	29	0.002	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
32	M32	HSS2.5X2.5X14GA__HRA	0.171	185.54	3	0.13	92.77	z	28	20915.573	23185.629	1708.318	1708.318	1	H1-1b
33	M33	2HSS2.5X2.5X14GA__HRC	0.368	91.5	28	0.038	0	y	5	10084.575	45748.503	2282.936	4598.179	1.144	H1-1b
34	M34	2HSS2.5X2.5X14GA__HRC	0.369	91.5	28	0.04	0	y	5	10084.575	45748.503	2282.936	4598.179	1.144	H1-1b
35	M35	2HSS2.5X2.5X14GA__HRC	0.343	99	29	0.048	198	y	21	10084.575	45748.503	2282.936	4598.179	1.42	H1-1b
36	M36	2HSS2.5X2.5X14GA__HRC	0.36	99	29	0.082	198	y	28	27592.342	45748.503	2282.936	4598.179	1.17	H1-1b
37	M37	2HSS2.5X2.5X14GA__HRC	0.379	91.5	28	0.034	0	y	5	10084.575	45748.503	2282.936	4598.179	1.138	H1-1b
38	M38	2HSS2.5X2.5X14GA__HRC	0.38	91.5	29	0.039	0	y	5	27592.342	45748.503	2282.936	4598.179	1.138	H1-1b
39	M39	2HSS2.5X2.5X14GA__HRC	0.343	99	28	0.049	198	y	20	10084.575	45748.503	2282.936	4598.179	1.42	H1-1b
40	M40	2HSS2.5X2.5X14GA__HRC	0.343	99	28	0.04	198	y	20	27592.342	45748.503	2282.936	4598.179	1.18	H1-1b
41	M41	2HSS2.5X2.5X14GA__HRC	0.368	91.5	29	0.038	0	y	4	10084.575	45748.503	2282.936	4598.179	1.144	H1-1b
42	M42	2HSS2.5X2.5X14GA__HRC	0.368	91.5	29	0.04	0	y	4	27592.342	45748.503	2282.936	4598.179	1.145	H1-1b
43	M43	HSS2.5X2.5X14GA__HRA	0.344	60	3	0.012	60	y	5	17710.374	23185.629	1708.318	1708.318	2.267	H1-1a
44	M44	HSS2.5X2.5X14GA__HRA	0.457	60	3	0.005	0	y	3	17710.374	23185.629	1708.318	1708.318	2.27	H1-1a
45	M45	HSS2.5X2.5X14GA__HRA	0.525	60	3	0.003	0	y	42	17710.374	23185.629	1708.318	1708.318	2.269	H1-1a
46	M46	HSS2.5X2.5X14GA__HRA	0.017	0	20	0.027	0	y	3	20691.412	23185.629	1708.318	1708.318	2.26	H1-1b
47	M47	HSS2.5X2.5X14GA__HRA	0.01	0	43	0.017	0	y	3	20691.412	23185.629	1708.318	1708.318	2.221	H1-1b
48	M48	HSS2.5X2.5X14GA__HRA	0.055	0	29	0.038	0	y	3	20691.412	23185.629	1708.318	1708.318	1.722	H1-1b
49	M49	HSS2.5X2.5X14GA__HRA	0.15	36.008	22	0.024	36.008	y	30	21041.844	23185.629	1708.318	1708.318	1.888	H1-1b
50	M50	HSS2.5X2.5X14GA__HRA	0.186	36.008	22	0.02	36.008	y	22	21041.844	23185.629	1708.318	1708.318	1.62	H1-1b
51	M51	HSS2.5X2.5X14GA__HRA	0.219	36.008	3	0.02	36.008	y	22	21041.844	23185.629	1708.318	1708.318	1.633	H1-1b
52	M52	HSS2.5X2.5X14GA__HRA	0.241	36.008	3	0.019	36.008	y	22	21041.844	23185.629	1708.318	1708.318	1.629	H1-1b
53	M53	HSS2.5X2.5X14GA__HRA	0.655	180	3	0.041	120	z	3	7898.371	23185.629	1708.318	1708.318	1.037	H1-1a
54	M54	HSS2.5X2.5X14GA__HRA	0.572	180	3	0.053	120	z	3	7898.371	23185.629	1708.318	1708.318	1.044	H1-1b
55	M55	HSS2.5X2.5X14GA__HRA	0.538	180	3	0.052	120	z	3	7898.371	23185.629	1708.318	1708.318	1.048	H1-1b
56	M56	HSS2.5X2.5X14GA__HRA	0.519	180	3	0.051	120	z	3	7898.371	23185.629	1708.318	1708.318	1.05	H1-1b
57	M57	HSS2.5X2.5X14GA__HRA	0.036	0	7	0.018	60	y	5	20691.412	23185.629	1708.318	1708.318	1.754	H1-1b
58	M58	HSS2.5X2.5X14GA__HRA	0.011	0	5	0.006	0	y	21	20691.412	23185.629	1708.318	1708.318	1.977	H1-1b
59	M59	HSS2.5X2.5X14GA__HRA	0.011	60	4	0.006	60	y	20	20691.412	23185.629	1708.318	1708.318	2.038	H1-1b
60	M60	HSS2.5X2.5X14GA__HRA	0.036	60	6	0.018	0	y	4	20691.412	23185.629	1708.318	1708.318	1.693	H1-1b
61	M61	HSS2.5X2.5X14GA__HRA	0.162	60	30	0.112	0	y	5	20691.412	23185.629	1708.318	1708.318	2.219	H1-1b
62	M62	HSS2.5X2.5X14GA__HRA	0.037	0	7	0.025	60	y	5	20691.412	23185.629	1708.318	1708.318	2.247	H1-1b
63	M63	HSS2.5X2.5X14GA__HRA	0.013	0	5	0.013	0	y	21	20691.412	23185.629	1708.318	1708.318	2.235	H1-1b
64	M64	HSS2.5X2.5X14GA__HRA	0.011	60	4	0.006	60	y	20	20691.412	23185.629	1708.318	1708.318	2.251	H1-1b
65	M65	HSS2.5X2.5X14GA__HRA	0.037	60	6	0.018	0	y	4	20691.412	23185.629	1708.318	1708.318	2.181	H1-1b
66	M66	HSS2.5X2.5X14GA__HRA	0.159	60	30	0.112	0	y	5	20691.412	23185.629	1708.318	1708.318	2.238	H1-1b
67	M67	HSS2.5X2.5X14GA__HRA	0.146	36.008	30	0.026	36.008	y	29	21041.844	23185.629	1708.318	1708.318	1.442	H1-1b
68	M68	HSS2.5X2.5X14GA__HRA	0.285	120	28	0.165	120	y	29	7898.371	23185.629	1708.318	1708.318	2.379	H1-1b
69	M69	HSS2.5X2.5X14GA__HRA	0.146	36.008	31	0.026	36.008	y	28	21041.844	23185.629	1708.318	1708.318	1.443	H1-1b
70	M70	HSS2.5X2.5X14GA__HRA	0.144	36.008	30	0.024	36.008	y	29	21041.844	23185.629	1708.318	1708.318	1.438	H1-1b
71	M71	HSS2.5X2.5X14GA__HRA	0.143	36.008	31	0.023	36.008	y	28	21041.844	23185.629	1708.318	1708.318	1.42	H1-1b
72	M72	2HSS2.5X2.5X14GA__HRC	0.288	84	31	0.052	168	y	3	10423.529	45748.503	2282.936	4598.179	1.42	H1-1b
73	M73	HSS2.5X2.5X14GA__HRA	0.017	0	21	0.027	0	y	3	20691.412	23185.629	1708.318	1708.318	2.26	H1-1b
74	M74	HSS2.5X2.5X14GA__HRA	0.055	0	28	0.038	0	y	3	20691.412	23185.629	1708.318	1708.318	1.668	H1-1b
75	M75	HSS2.5X2.5X14GA__HRA	0.01	0	43	0.017	0	y	3	20691.412	23185.629	1708.318	1708.318	2.22	H1-1b
76	M76	HSS2.5X2.5X14GA__HRA	0.186	36.008	23	0.02	36.008	y	23	21041.844	23185.629	1708.318	1708.318	1.615	H1-1b
77	M77	2HSS2.5X2.5X14GA__HRC	0.346	126	3	0.071	168	y	3	10423.529	45748.503	2282.936	4598.179	1.369	H1-1b
78	M78	2HSS2.5X2.5X14GA__HRC	0.417	126	3	0.084	168	y	3	10423.529	45748.503	2282.936	4598.179	1.368	H1-1b
79	M79	2HSS2.5X2.5X14GA__HRC	0.46	126	3	0.092	168	y	3	10423.529	45748.503	2282.936	4598.179	1.367	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	Pnc/om [lb]	Pnt/om [lb]	Mnyy/om [lb-ft]	Mnzz/om [lb-ft]	Cb	Eqn
80	M80	HSS2.5X2.5X14GA_HRA	0.15	36.008	23	0.024	36.008	y	31	21041.844	23185.629	1708.318	1708.318	1.878	H1-1b
81	M81	HSS2.5X2.5X14GA_HRA	0.219	36.008	3	0.02	36.008	y	23	21041.844	23185.629	1708.318	1708.318	1.633	H1-1b
82	M82	HSS2.5X2.5X14GA_HRA	0.241	36.008	3	0.019	36.008	y	23	21041.844	23185.629	1708.318	1708.318	1.629	H1-1b
83	M83	HSS2.5X2.5X14GA_HRA	0.59	15	3	0.217	15	z	3	22798.535	23185.629	1708.318	1708.318	2.216	H1-1b
84	M84	HSS2.5X2.5X14GA_HRA	0.525	15	3	0.212	15	z	3	22798.535	23185.629	1708.318	1708.318	2.229	H1-1b
85	M85	HSS2.5X2.5X14GA_HRA	0.566	15	3	0.217	15	z	3	22798.535	23185.629	1708.318	1708.318	2.221	H1-1b
86	M86	HSS2.5X2.5X14GA_HRA	0.453	15	3	0.206	15	z	3	22798.535	23185.629	1708.318	1708.318	2.241	H1-1b
87	M87	HSS2.5X2.5X14GA_HRA	0.17	60	3	0.019	60	y	3	17710.374	23185.629	1708.318	1708.318	1.751	H1-1b*
88	M88	HSS2.5X2.5X14GA_HRA	0.162	0	31	0.112	60	y	4	20691.412	23185.629	1708.318	1708.318	2.215	H1-1b
89	M89	HSS2.5X2.5X14GA_HRA	0.162	0	28	0.134	60	y	28	17710.374	23185.629	1708.318	1708.318	2.063	H1-1b
90	M109	HSS2.5X2.5X14GA_HRA	0.085	60	3	0.156	60	z	29	17710.374	23185.629	1708.318	1708.318	1.136	H1-1b*
91	M110	HSS2.5X2.5X14GA_HRA	0.214	60	4	0.161	60	y	28	17710.374	23185.629	1708.318	1708.318	1.203	H1-1b
92	M111	HSS2.5X2.5X14GA_HRA	0.22	0	29	0.133	60	y	29	17710.374	23185.629	1708.318	1708.318	2.065	H1-1b
93	M112	HSS2.5X2.5X14GA_HRA	0.095	60	3	0.012	60	y	5	17710.374	23185.629	1708.318	1708.318	2.264	H1-1b
94	M113	HSS2.5X2.5X14GA_HRA	0.081	60	3	0.006	0	y	3	17710.374	23185.629	1708.318	1708.318	2.272	H1-1b
95	M114	HSS2.5X2.5X14GA_HRA	0.064	60	3	0.004	0	y	3	17710.374	23185.629	1708.318	1708.318	2.269	H1-1b
96	M117	HSS2.5X2.5X14GA_HRA	0.17	60	3	0.019	0	y	3	17710.374	23185.629	1708.318	1708.318	1.72	H1-1b*
97	M118	HSS2.5X2.5X14GA_HRA	0.01	60	42	0.017	60	y	3	20691.412	23185.629	1708.318	1708.318	2.221	H1-1b
98	M119	2HSS2.5X2.5X14GA_HRC	0.473	126	3	0.093	168	y	3	10423.529	45748.503	2282.936	4598.179	2.145	H1-1b
99	M120	HSS2.5X2.5X14GA_HRA	0.149	36.008	22	0.024	36.008	y	30	21041.844	23185.629	1708.318	1708.318	1.899	H1-1b
100	M121	HSS2.5X2.5X14GA_HRA	0.591	15	3	0.211	15	z	3	22798.535	23185.629	1708.318	1708.318	2.215	H1-1b
101	M122	HSS2.5X2.5X14GA_HRA	0.17	60	3	0.019	0	y	3	17710.374	23185.629	1708.318	1708.318	1.72	H1-1b*
102	M123	HSS2.5X2.5X14GA_HRA	0.147	60	3	0.03	0	y	3	17710.374	23185.629	1708.318	1708.318	2.141	H1-1b*
103	M124	HSS2.5X2.5X14GA_HRA	0.574	185.54	3	0.094	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
104	M125	HSS2.5X2.5X14GA_HRA	0.147	60	3	0.03	0	y	3	17710.374	23185.629	1708.318	1708.318	2.141	H1-1b*
105	M126	HSS2.5X2.5X14GA_HRA	0.108	60	3	0.042	0	y	3	17710.374	23185.629	1708.318	1708.318	2.207	H1-1b*
106	M127	HSS2.5X2.5X14GA_HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
107	M128	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
108	M129	HSS2.5X2.5X14GA_HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
109	M131	HSS2.5X2.5X14GA_HRA	0.511	185.54	3	0.085	185.54	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
110	M132	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
111	M133	2HSS2.5X2.5X14GA_HRC	0.346	126	3	0.071	168	y	3	10423.529	45748.503	2282.936	4598.179	2.145	H1-1b
112	M134	2HSS2.5X2.5X14GA_HRC	0.46	126	3	0.092	168	y	3	10423.529	45748.503	2282.936	4598.179	2.145	H1-1b
113	M135	HSS2.5X2.5X14GA_HRA	0.017	60	20	0.027	60	y	3	20691.412	23185.629	1708.318	1708.318	2.26	H1-1b
114	M136	HSS2.5X2.5X14GA_HRA	0.537	185.54	3	0.095	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
115	M137	HSS2.5X2.5X14GA_HRA	0.181	60	3	0.007	0	y	3	17710.374	23185.629	1708.318	1708.318	1.239	H1-1b*
116	M138	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
117	M140	HSS2.5X2.5X14GA_HRA	0.345	0	3	0.012	0	y	4	17710.374	23185.629	1708.318	1708.318	2.232	H1-1a
118	M142	HSS2.5X2.5X14GA_HRA	0.526	0	3	0.003	60	y	43	17710.374	23185.629	1708.318	1708.318	2.265	H1-1a
119	M144	2HSS2.5X2.5X14GA_HRC	0.417	126	3	0.084	168	y	3	10423.529	45748.503	2282.936	4598.179	2.145	H1-1b
120	M145	HSS2.5X2.5X14GA_HRA	0.241	36.008	3	0.019	36.008	y	22	21041.844	23185.629	1708.318	1708.318	1.62	H1-1b
121	M146	HSS2.5X2.5X14GA_HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
122	M147	HSS2.5X2.5X14GA_HRA	0.557	185.54	3	0.1	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
123	M148	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
124	M149	HSS2.5X2.5X14GA_HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
125	M150	HSS2.5X2.5X14GA_HRA	0.243	36.008	3	0.017	36.008	y	22	21041.844	23185.629	1708.318	1708.318	1.132	H1-1b
126	M151	2HSS2.5X2.5X14GA_HRC	0.473	126	3	0.093	168	y	3	10423.529	45748.503	2282.936	4598.179	1.367	H1-1b
127	M152	HSS2.5X2.5X14GA_HRA	0.005	6.185	28	0.005	6.185	y	28	23119.362	23185.629	1708.318	1708.318	1	H1-1b
128	M153	2HSS2.5X2.5X14GA_HRC	0.289	84	30	0.052	168	y	3	10423.529	45748.503	2282.936	4598.179	1.173	H1-1b
129	M154	HSS2.5X2.5X14GA_HRA	0.005	6.185	29	0.005	6.185	y	29	23119.362	23185.629	1708.318	1708.318	1	H1-1b
130	M155	HSS2.5X2.5X14GA_HRA	0.54	185.54	3	0.107	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
131	M156	HSS2.5X2.5X14GA_HRA	0.186	36.008	22	0.021	36.008	y	22	21041.844	23185.629	1708.318	1708.318	1.622	H1-1b
132	M157	HSS2.5X2.5X14GA_HRA	0.539	60	3	0.053	120	z	3	7898.371	23185.629	1708.318	1708.318	3	H1-1b
133	M159	HSS2.5X2.5X14GA_HRA	0.457	0	3	0.005	60	y	3	17710.374	23185.629	1708.318	1708.318	2.271	H1-1a
134	M160	HSS2.5X2.5X14GA_HRA	0.055	60	29	0.038	60	y	3	20691.412	23185.629	1708.318	1708.318	1.97	H1-1b

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

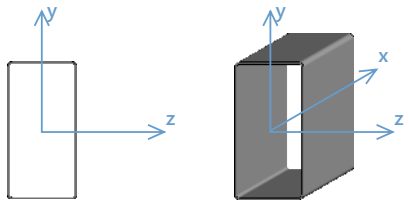
	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	Pnc/om [lb]	Pnt/om [lb]	Mnyy/om [lb-ft]	Mnzz/om [lb-ft]	Cb	Eqn
135	M161	HSS2.5X2.5X14GA_HRA	0.219	36.008	3	0.02	36.008	y	22	21041.844	23185.629	1708.318	1708.318	1.628	H1-1b
136	M162	HSS2.5X2.5X14GA_HRA	0.511	60	3	0.048	120	z	3	7898.371	23185.629	1708.318	1708.318	3	H1-1b
137	M163	HSS2.5X2.5X14GA_HRA	0.519	60	3	0.051	120	z	3	7898.371	23185.629	1708.318	1708.318	3	H1-1b
138	M164	HSS2.5X2.5X14GA_HRA	0.573	60	3	0.054	120	z	3	7898.371	23185.629	1708.318	1708.318	3	H1-1b
139	M165	HSS2.5X2.5X14GA_HRA	0.655	60	3	0.041	120	z	3	7898.371	23185.629	1708.318	1708.318	3	H1-1a
140	M167	HSS2.5X2.5X14GA_HRA	0.181	60	3	0.007	60	y	3	17710.374	23185.629	1708.318	1708.318	1.28	H1-1b*
141	M168	HSS2.5X2.5X14GA_HRA	0.555	45	3	0.002	0	y	42	17710.374	23185.629	1708.318	1708.318	2.268	H1-1a
142	M169	HSS2.5X2.5X14GA_HRA	0.007	0	43	0.006	0	y	3	20691.412	23185.629	1708.318	1708.318	1.13	H1-1b
143	M170	HSS2.5X2.5X14GA_HRA	0.181	60	3	0.007	60	y	3	17710.374	23185.629	1708.318	1708.318	1.282	H1-1b*
144	M171	HSS2.5X2.5X14GA_HRA	0.186	36.008	23	0.02	36.008	y	23	21041.844	23185.629	1708.318	1708.318	1.617	H1-1b
145	M172	2HSS2.5X2.5X14GA_HRC	0.46	126	3	0.092	168	y	3	10423.529	45748.503	2282.936	4598.179	1.367	H1-1b
146	M173	2HSS2.5X2.5X14GA_HRC	0.288	84	31	0.052	168	y	3	10423.529	45748.503	2282.936	4598.179	1.419	H1-1b
147	M174	HSS2.5X2.5X14GA_HRA	0.017	60	21	0.027	60	y	3	20691.412	23185.629	1708.318	1708.318	2.261	H1-1b
148	M176	HSS2.5X2.5X14GA_HRA	0.01	60	42	0.017	60	y	3	20691.412	23185.629	1708.318	1708.318	2.221	H1-1b
149	M177	HSS2.5X2.5X14GA_HRA	0.056	60	28	0.038	60	y	3	20691.412	23185.629	1708.318	1708.318	1.814	H1-1b
150	M178	HSS2.5X2.5X14GA_HRA	0.007	0	43	0.006	0	y	3	20691.412	23185.629	1708.318	1708.318	1.127	H1-1b
151	M179	HSS2.5X2.5X14GA_HRA	0.219	36.008	3	0.021	36.008	y	23	21041.844	23185.629	1708.318	1708.318	1.628	H1-1b
152	M180	2HSS2.5X2.5X14GA_HRC	0.417	126	3	0.084	168	y	3	10423.529	45748.503	2282.936	4598.179	1.368	H1-1b
153	M181	2HSS2.5X2.5X14GA_HRC	0.346	126	3	0.071	168	y	3	10423.529	45748.503	2282.936	4598.179	1.369	H1-1b
154	M182	HSS2.5X2.5X14GA_HRA	0.243	36.008	3	0.017	36.008	y	23	21041.844	23185.629	1708.318	1708.318	1.001	H1-1b
155	M183	HSS2.5X2.5X14GA_HRA	0.241	36.008	3	0.019	36.008	y	23	21041.844	23185.629	1708.318	1708.318	1.62	H1-1b
156	M184	HSS2.5X2.5X14GA_HRA	0.15	36.008	23	0.024	36.008	y	31	21041.844	23185.629	1708.318	1708.318	1.912	H1-1b
157	M185	HSS2.5X2.5X14GA_HRA	0.453	15	3	0.207	15	z	3	22798.535	23185.629	1708.318	1708.318	2.241	H1-1b
158	M187	HSS2.5X2.5X14GA_HRA	0.567	15	3	0.218	15	z	3	22798.535	23185.629	1708.318	1708.318	2.221	H1-1b
159	M188	HSS2.5X2.5X14GA_HRA	0.526	15	3	0.213	15	z	3	22798.535	23185.629	1708.318	1708.318	2.229	H1-1b
160	M189	HSS2.5X2.5X14GA_HRA	0.59	15	3	0.218	15	z	3	22798.535	23185.629	1708.318	1708.318	2.216	H1-1b
161	M190	HSS2.5X2.5X14GA_HRA	0.007	60	42	0.006	60	y	3	20691.412	23185.629	1708.318	1708.318	1.228	H1-1b
162	M191	HSS2.5X2.5X14GA_HRA	0.181	60	3	0.007	0	y	3	17710.374	23185.629	1708.318	1708.318	1.241	H1-1b*
163	M192	HSS2.5X2.5X14GA_HRA	0.556	15	3	0.002	60	y	43	17710.374	23185.629	1708.318	1708.318	2.267	H1-1a
164	M193	HSS2.5X2.5X14GA_HRA	0.048	60	3	0.002	0	y	42	17710.374	23185.629	1708.318	1708.318	2.269	H1-1b*
165	M194	HSS2.5X2.5X14GA_HRA	0.007	60	42	0.006	60	y	3	20691.412	23185.629	1708.318	1708.318	1.219	H1-1b
166	M195	HSS2.5X2.5X14GA_HRA	0.108	60	3	0.042	0	y	3	17710.374	23185.629	1708.318	1708.318	2.206	H1-1b*
167	M217	HSS2.5X2.5X14GA_HRA	0.065	0	3	0.004	60	y	3	17710.374	23185.629	1708.318	1708.318	2.257	H1-1b
168	M218	HSS2.5X2.5X14GA_HRA	0.081	0	3	0.006	60	y	3	17710.374	23185.629	1708.318	1708.318	2.218	H1-1b
169	M219	HSS2.5X2.5X14GA_HRA	0.095	0	3	0.012	60	y	23	17710.374	23185.629	1708.318	1708.318	2.164	H1-1b
170	M220	HSS2.5X2.5X14GA_HRA	0.049	0	3	0.002	60	y	43	17710.374	23185.629	1708.318	1708.318	2.269	H1-1b
171	M221	HSS2.5X2.5X14GA_HRA	0.289	60	28	0.038	0	y	29	17710.374	23185.629	1708.318	1708.318	2.195	H1-1b
172	M222	HSS2.5X2.5X14GA_HRA	0.247	60	4	0.091	0	y	20	17710.374	23185.629	1708.318	1708.318	2.144	H1-1b
173	M224	HSS2.5X2.5X14GA_HRA	0.191	0	3	0.028	0	y	29	17710.374	23185.629	1708.318	1708.318	1.081	H1-1b
174	M227	HSS2.5X2.5X14GA_HRA	0.254	60	4	0.094	60	y	30	20691.412	23185.629	1708.318	1708.318	2.184	H1-1b
175	M228	HSS2.5X2.5X14GA_HRA	0.256	60	5	0.094	60	y	31	20691.412	23185.629	1708.318	1708.318	2.173	H1-1b
176	M229	HSS2.5X2.5X14GA_HRA	0.251	60	5	0.093	0	y	21	17710.374	23185.629	1708.318	1708.318	2.145	H1-1b
177	M233	HSS2.5X2.5X14GA_HRA	0.243	0	5	0.091	60	y	21	17710.374	23185.629	1708.318	1708.318	2.086	H1-1b
178	M234	HSS2.5X2.5X14GA_HRA	0.244	0	4	0.091	60	y	20	17710.374	23185.629	1708.318	1708.318	2.12	H1-1b
179	M235	HSS2.5X2.5X14GA_HRA	0.191	60	3	0.028	60	y	29	17710.374	23185.629	1708.318	1708.318	2.248	H1-1b
180	M236	HSS2.5X2.5X14GA_HRA	0.254	0	4	0.093	0	y	30	20691.412	23185.629	1708.318	1708.318	2.174	H1-1b
181	M237	HSS2.5X2.5X14GA_HRA	0.254	0	5	0.093	0	y	31	20691.412	23185.629	1708.318	1708.318	2.172	H1-1b
182	M244	HSS2.5X2.5X14GA_HRA	0.215	0	28	0.039	60	y	29	17710.374	23185.629	1708.318	1708.318	2.261	H1-1b
183	M245	HSS2.5X2.5X14GA_HRA	0.125	30	3	0.022	30	y	3	21675.598	23185.629	1708.318	1708.318	1	H1-1b
184	M246	HSS2.5X2.5X14GA_HRA	0.238	30	3	0.047	30	y	3	21675.598	23185.629	1708.318	1708.318	1	H1-1b
185	M247	HSS2.5X2.5X14GA_HRA	0.077	30	29	0.014	30	z	29	21675.598	23185.629	1708.318	1708.318	2.271	H1-1b
186	M248	HSS2.5X2.5X14GA_HRA	0.107	30	29	0.014	30	y	3	21675.598	23185.629	1708.318	1708.318	2.271	H1-1b
187	M249	HSS2.5X2.5X14GA_HRA	0.092	30	29	0.014	30	z	29	21675.598	23185.629	1708.318	1708.318	2.271	H1-1b
188	M250	HSS2.5X2.5X14GA_HRA	0.24	30	3	0.048	30	y	3	21675.598	23185.629	1708.318	1708.318	2.174	H1-1b
189	M251	HSS2.5X2.5X14GA_HRA	0.127	30	3	0.023	30	y	3	21675.598	23185.629	1708.318	1708.318	2.236	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	Pnc/om [lb]	Pnt/om [lb]	Mnyy/om [lb-ft]	Mnzz/om [lb-ft]	Cb	Eqn
190	M252	HSS2.5X2.5X14GA_HRA	0.098	30	22	0.014	30	y	3	21675.598	23185.629	1708.318	1708.318	2.269	H1-1b
191	M253	HSS2.5X2.5X14GA_HRA	0.079	30	22	0.014	30	z	4	21675.598	23185.629	1708.318	1708.318	2.269	H1-1b
192	M254	HSS2.5X2.5X14GA_HRA	0.17	185.54	3	0.118	92.77	z	29	20915.573	23185.629	1708.318	1708.318	1	H1-1b
193	M255	HSS2.5X2.5X14GA_HRA	0.525	15	3	0.212	15	z	3	22798.535	23185.629	1708.318	1708.318	2.229	H1-1b
194	M256	HSS2.5X2.5X14GA_HRA	0.453	15	3	0.206	15	z	3	22798.535	23185.629	1708.318	1708.318	2.241	H1-1b
195	M257	HSS2.5X2.5X14GA_HRA	0.536	185.54	3	0.095	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
196	M258	HSS2.5X2.5X14GA_HRA	0.536	185.54	3	0.095	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
197	M259	HSS2.5X2.5X14GA_HRA	0.51	185.54	3	0.085	185.54	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
198	M260	HSS2.5X2.5X14GA_HRA	0.591	15	3	0.211	15	z	3	22798.535	23185.629	1708.318	1708.318	2.215	H1-1b
199	M261	HSS2.5X2.5X14GA_HRA	0.539	185.54	3	0.107	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
200	M262	HSS2.5X2.5X14GA_HRA	0.538	185.54	3	0.107	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
201	M263	HSS2.5X2.5X14GA_HRA	0.572	185.54	3	0.094	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
202	M264	HSS2.5X2.5X14GA_HRA	0.556	185.54	3	0.1	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
203	M265	HSS2.5X2.5X14GA_HRA	0.168	185.54	3	0.138	92.77	z	29	20915.573	23185.629	1708.318	1708.318	1	H1-1b
204	M266	HSS2.5X2.5X14GA_HRA	0.573	185.54	3	0.094	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
205	M267	HSS2.5X2.5X14GA_HRA	0.556	185.54	3	0.1	46.385	y	3	20915.573	23185.629	1708.318	1708.318	1	H1-1b
206	M268	HSS2.5X2.5X14GA_HRA	0.59	15	3	0.217	15	z	3	22798.535	23185.629	1708.318	1708.318	2.216	H1-1b
207	M269	HSS2.5X2.5X14GA_HRA	0.59	15	3	0.217	15	z	3	22798.535	23185.629	1708.318	1708.318	2.216	H1-1b
208	M270	HSS2.5X2.5X14GA_HRA	0.566	15	3	0.217	15	z	3	22798.535	23185.629	1708.318	1708.318	2.221	H1-1b
209	M271	HSS2.5X2.5X14GA_HRA	0.453	15	3	0.207	15	z	3	22798.535	23185.629	1708.318	1708.318	2.241	H1-1b
210	M272	HSS2.5X2.5X14GA_HRA	0.566	15	3	0.218	15	z	3	22798.535	23185.629	1708.318	1708.318	2.221	H1-1b
211	M273	HSS2.5X2.5X14GA_HRA	0.525	15	3	0.213	15	z	3	22798.535	23185.629	1708.318	1708.318	2.229	H1-1b

Detail Report: M173

Load Combination: Envelope **Code check:** 0.288 (LC 31)



Input Data

Shape:	2HSS2.5X2.5X14GA_ __HRC	**I Node:**	N213
Member Type:	Beam	**J Node:**	N190
Length (in):	168	**I Release:**	Fixed
Material Type:	Hot Rolled Steel	**J Release:**	Fixed
Design Rule:	Typical	**I Offset:**	N/A
Internal Sections:	5	**J Offset:**	N/A
Design Code:	AISC 15th (360-16): ASD	**T/C Only:**	Both Way

Material Properties

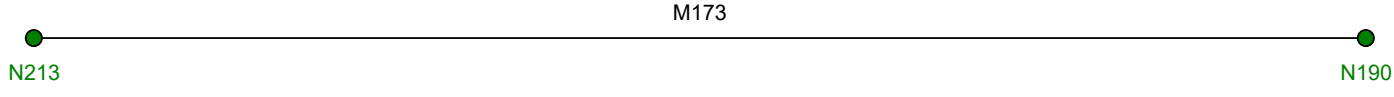
Material:	A500 Gr.C RECT	**Therm. Coeff. (/1E5 F):**	0.65	**F_u (ksi):**	62
E (ksi):	29000	**Density (k/ft^3):**	0.527	**R_t:**	1.3
G (ksi):	11154	**F_y (ksi):**	50		
Nu:	0.3	**R_y:**	1.4		

Shape Properties

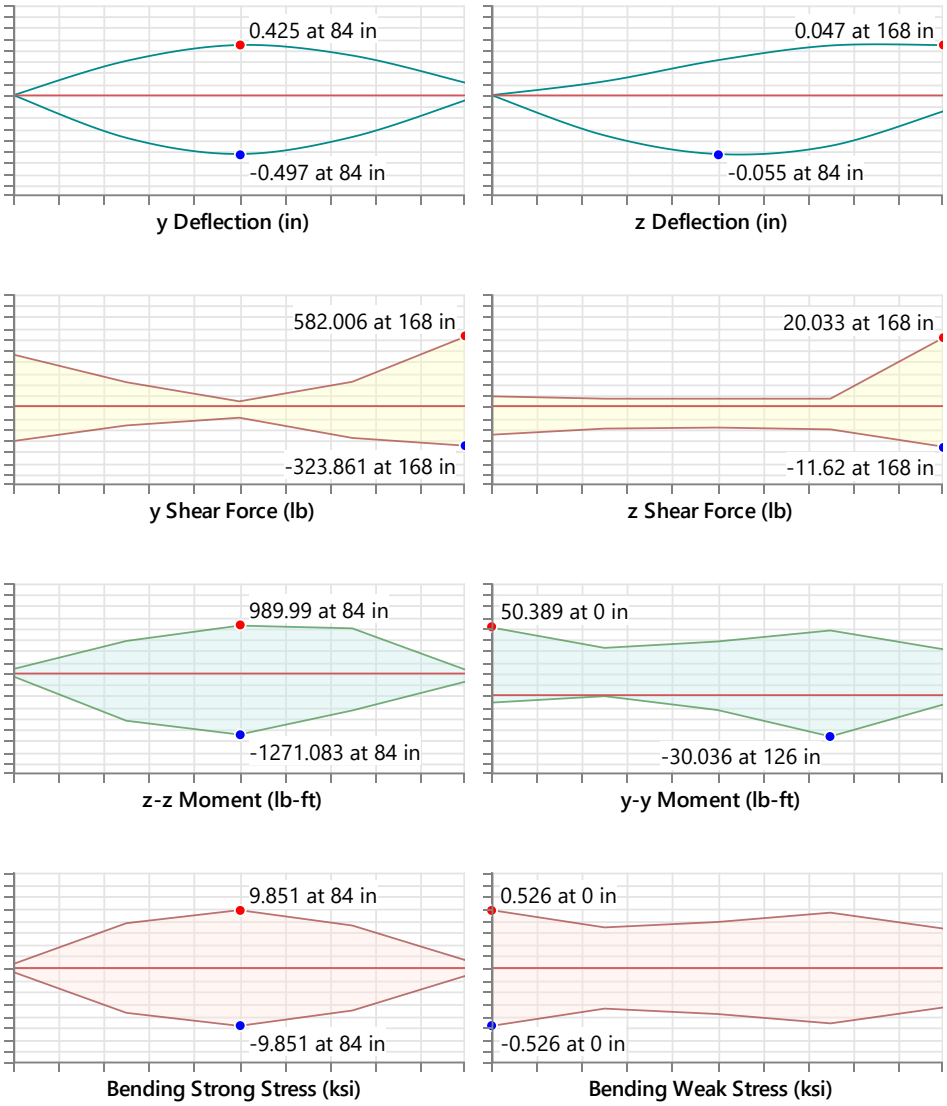
d (in):	5	**I_{yy} (in^4):**	1.438	**J (in^4):**	1.483
b_f (in):	2.5	**I_{zz} (in^4):**	3.871		
t (in):	0.08	**Area (in^2):**	1.528		

Design Properties

$L_{b\ y\text{-}y}$:	Segment	**$K_{y\text{-}y}$:**	1	**Seismic DR:**	None
$L_{b\ z\text{-}z}$ (in):	120	**$K_{z\text{-}z}$:**	1	**Max Defl Ratio:**	L/424
$L_{comp\ top}$:	Lbyy	**y sway:**	No	**Max Defl Location:**	84
$L_{comp\ bot}$ (in):	168	**z sway:**	No	**Span:**	1
L_{torque} (in):	0	**Function:**	Lateral	**τ_b:**	1



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

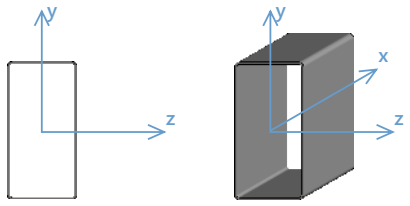
AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	31	-	-	-	-
Applied Loading - Shear + Torsion	3	-	-	-	-
Axial Tension Analysis	31	77.059 lb	45748.504 lb	-	-
Axial Compression Analysis	31	0 lb	10423.528 lb	-	-
Flexural Analysis (Strong Axis)	31	1271.083 lb-ft	4598.179 lb-ft	-	-
Flexural Analysis (Weak Axis)	-	23.768 lb-ft	2282.937 lb-ft	-	-
Shear Analysis (Major Axis y)	3	714.348 lb	13620.92 lb	**0.052**	**PASS**

Shear Analysis (Minor Axis z)	3	82.868 lb	6495.809 lb	**0.013**	**PASS**
Bending & Axial Interaction Check (UC Bending Max)	31	-	-	**0.288**	**PASS**
Torsional Analysis	31	0.335 lb-ft	2825.114 lb-ft	**0.0001187**	**PASS**

Detail Report: M42

Load Combination: Envelope **Code check:** 0.368 (LC 29)



Input Data

Shape:	2HSS2.5X2.5X14GA_ __HRC	**I Node:**	N57
Member Type:	Column	**J Node:**	N43
Length (in):	183	**I Release:**	Fixed
Material Type:	Hot Rolled Steel	**J Release:**	BenPIN
Design Rule:	Typical	**I Offset:**	N/A
Internal Sections:	5	**J Offset:**	N/A
Design Code:	AISC 15th (360-16): ASD	**T/C Only:**	Both Way

Material Properties

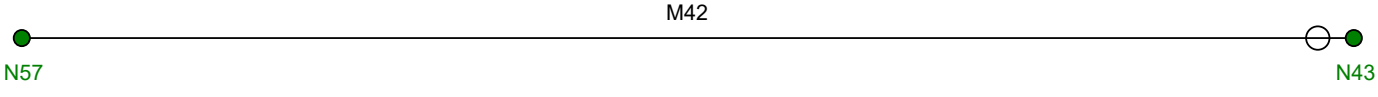
Material:	A500 Gr.C RECT	**Therm. Coeff. (/1E5 F):**	0.65	**F_u (ksi):**	62
E (ksi):	29000	**Density (k/ft^3):**	0.527	**R_t:**	1.3
G (ksi):	11154	**F_y (ksi):**	50		
Nu:	0.3	**R_y:**	1.4		

Shape Properties

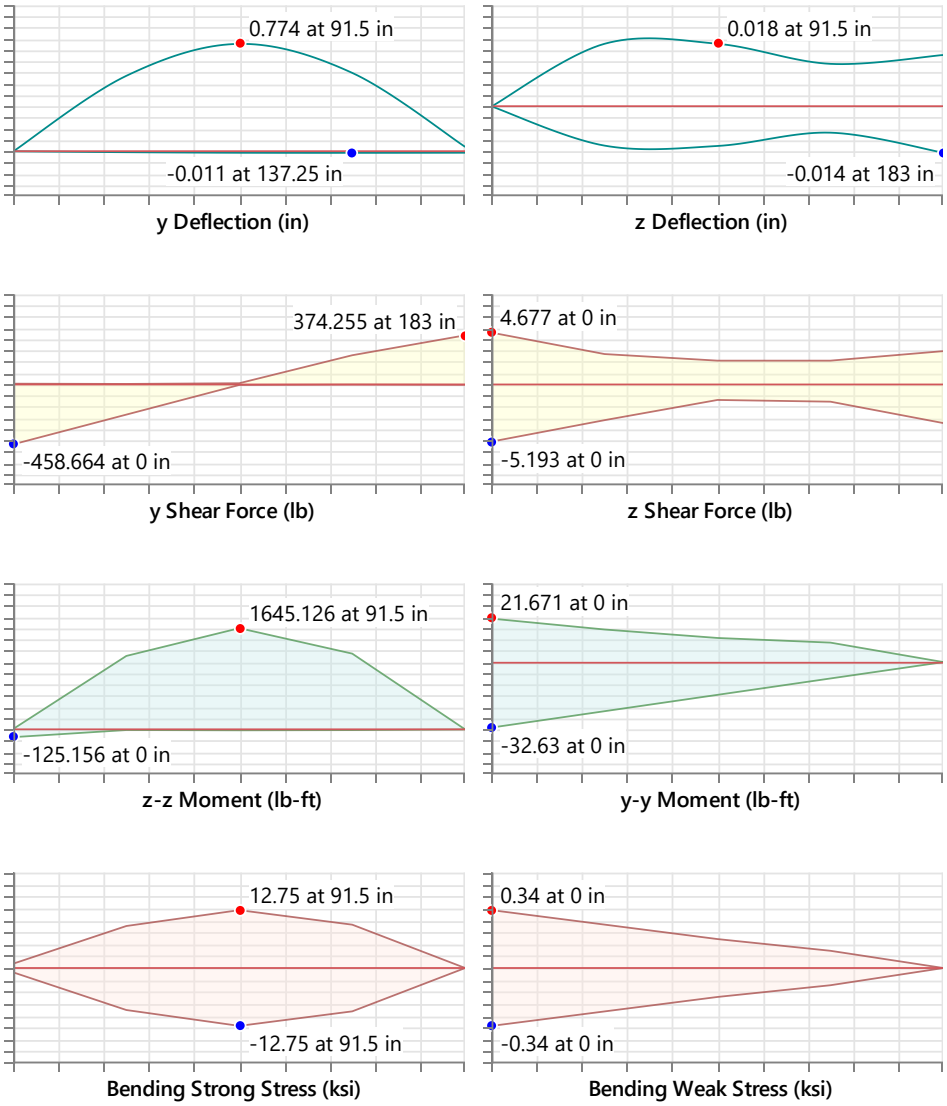
d (in):	5	**I_{yy} (in^4):**	1.438	**J (in^4):**	1.483
b_f (in):	2.5	**I_{zz} (in^4):**	3.871		
t (in):	0.08	**Area (in^2):**	1.528		

Design Properties

$L_{b\ y\text{-}y}$ (in):	48	**$K_{y\text{-}y}$:**	0.8	**Seismic DR:**	None
$L_{b\ z\text{-}z}$ (in):	144	**$K_{z\text{-}z}$:**	0.8	**Max Defl Ratio:**	L/241
$L_{comp\ top}$:	Lbyy	**y sway:**	No	**Max Defl Location:**	91.5
$L_{comp\ bot}$ (in):	183	**z sway:**	No	**Span:**	N/A
L_{torque} (in):	183	**Function:**	Lateral	**τ_b:**	1



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

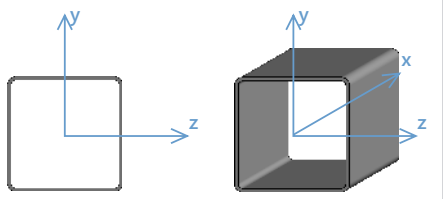
AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	29	-	-	-	-
Applied Loading - Shear + Torsion	4	-	-	-	-
Axial Tension Analysis	29	510.087 lb	45748.504 lb	-	-
Axial Compression Analysis	29	0 lb	27592.342 lb	-	-
Flexural Analysis (Strong Axis)	29	1643.171 lb-ft	4598.179 lb-ft	-	-
Flexural Analysis (Weak Axis)	-	11.513 lb-ft	2282.937 lb-ft	-	-
Shear Analysis (Major Axis y)	4	539.926 lb	13620.92 lb	**0.04**	**PASS**

Shear Analysis (Minor Axis z)	4	40.034 lb	6495.809 lb	**0.006**	**PASS**
Bending & Axial Interaction Check (UC Bending Max)	29	-	-	**0.368**	**PASS**
Torsional Analysis	29	12.345 lb-ft	2825.114 lb-ft	**0.004**	**PASS**

Detail Report: M68

Load Combination: Envelope **Code check:** 0.285 (LC 28)



Input Data

Shape:	HSS2.5X2.5X14GA__HRA	**I Node:**	N7
Member Type:	HBrace	**J Node:**	N9
Length (in):	240	**I Release:**	BenPIN
Material Type:	Hot Rolled Steel	**J Release:**	BenPIN
Design Rule:	Typical	**I Offset:**	N/A
Internal Sections:	5	**J Offset:**	N/A
Design Code:	AISC 15th (360-16): ASD	**T/C Only:**	Both Way

Material Properties

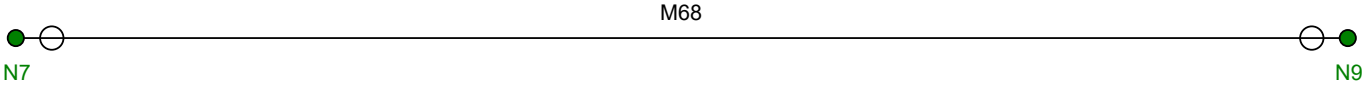
Material:	A500 Gr.C RECT	**Therm. Coeff. (/1E5 F):**	0.65	**F_u (ksi):**	62
E (ksi):	29000	**Density (k/ft^3):**	0.527	**R_t:**	1.3
G (ksi):	11154	**F_y (ksi):**	50		
Nu:	0.3	**R_y:**	1.4		

Shape Properties

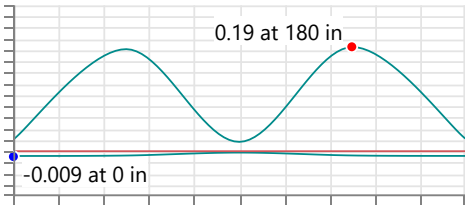
d (in):	2.5	**I_{yy} (in^4):**	0.757	**J (in^4):**	1.134
b_f (in):	2.5	**I_{zz} (in^4):**	0.757		
t (in):	0.08	**Area (in^2):**	0.774		

Design Properties

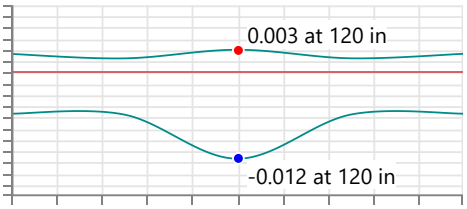
$L_{b\ y\text{-}y}$:	Segment	**$K_{y\text{-}y}$:**	1	**Seismic DR:**	None
$L_{b\ z\text{-}z}$ (in):	120	**$K_{z\text{-}z}$:**	1	**Max Defl Ratio:**	L/1436
$L_{comp\ top}$:	Lbyy	**y sway:**	No	**Max Defl Location:**	180
$L_{comp\ bot}$ (in):	240	**z sway:**	No	**Span:**	N/A
L_{torque} (in):	240	**Function:**	Lateral	**τ_b:**	1



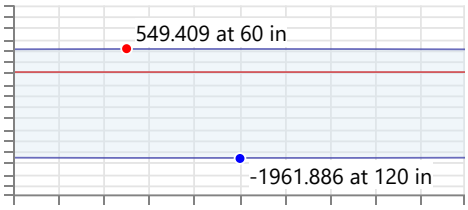
Diagrams:



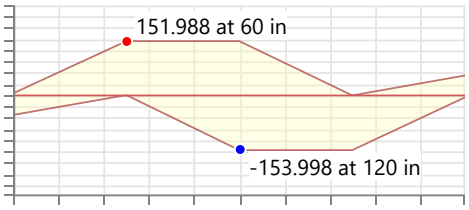
y Deflection (in)



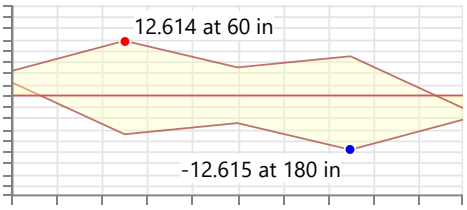
z Deflection (in)



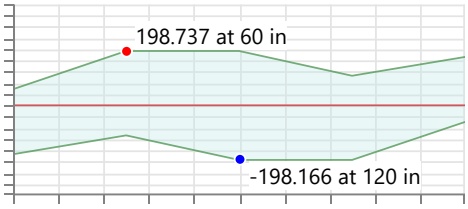
Axial Force (lb)



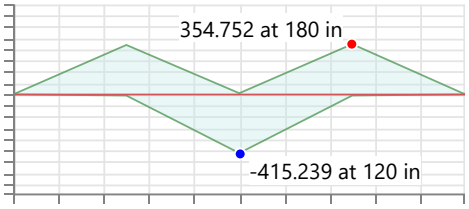
y Shear Force (lb)



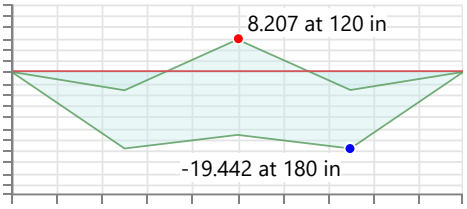
z Shear Force (lb)



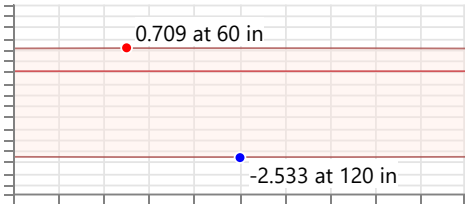
Torsion (lb-ft)



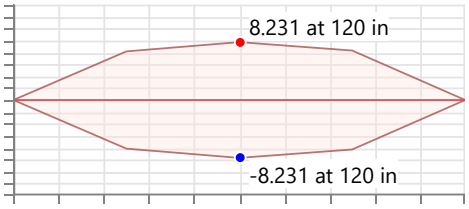
z-z Moment (lb-ft)



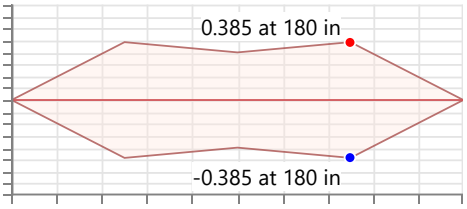
y-y Moment (lb-ft)



Axial Stress (ksi)



Bending Strong Stress (ksi)



Bending Weak Stress (ksi)

WARNING: Detail Report Based On Less Than 10 Sections!

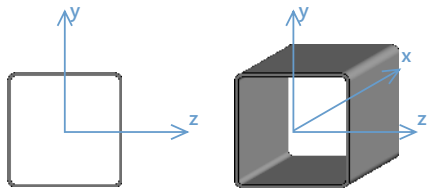
AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	28	-	-	-	-
Applied Loading - Shear + Torsion	29	-	-	-	-
Axial Tension Analysis	28	0 lb	23185.629 lb	-	-
Axial Compression Analysis	28	549.409 lb	7898.371 lb	-	-
Flexural Analysis (Strong Axis)	28	413.991 lb-ft	1708.318 lb-ft	-	-
Flexural Analysis (Weak Axis)	-	14.306 lb-ft	1708.318 lb-ft	-	-
Shear Analysis (Major Axis y)	29	1071.51 lb	6495.809 lb	**0.165**	**PASS**

Shear Analysis (Minor Axis z)	29	923.653 lb	6495.809 lb	**0.142**	**PASS**
Bending & Axial Interaction Check (UC Bending Max)	28	-	-	**0.285**	**PASS**
Torsional Analysis	28	198.166 lb-ft	1399.77 lb-ft	**0.142**	**PASS**

Detail Report: M83

Load Combination: Envelope **Code check:** 0.590 (LC 3)



Input Data

Shape:	HSS2.5X2.5X14GA__HRA	**I Node:**	N94
Member Type:	VBrace	**J Node:**	N95
Length (in):	15	**I Release:**	Fixed
Material Type:	Hot Rolled Steel	**J Release:**	Fixed
Design Rule:	Typical	**I Offset:**	N/A
Internal Sections:	5	**J Offset:**	N/A
Design Code:	AISC 15th (360-16): ASD	**T/C Only:**	Both Way

Material Properties

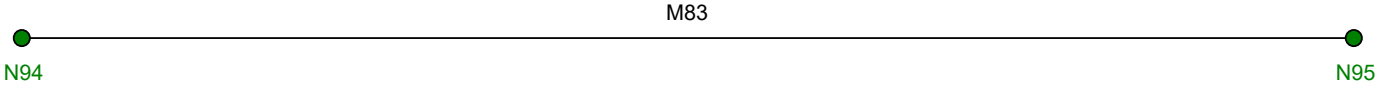
Material:	A500 Gr.C RECT	**Therm. Coeff. (/1E5 F):**	0.65	**F_u (ksi):**	62
E (ksi):	29000	**Density (k/ft^3):**	0.527	**R_t:**	1.3
G (ksi):	11154	**F_y (ksi):**	50		
Nu:	0.3	**R_y:**	1.4		

Shape Properties

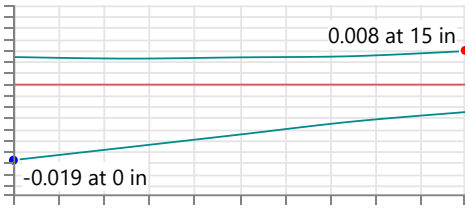
d (in):	2.5	**I_{yy} (in^4):**	0.757	**J (in^4):**	1.134
b_f (in):	2.5	**I_{zz} (in^4):**	0.757		
t (in):	0.08	**Area (in^2):**	0.774		

Design Properties

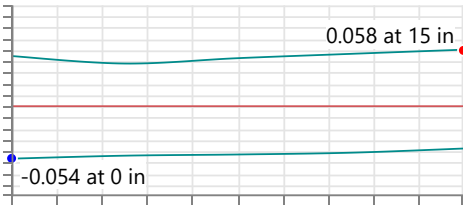
$L_{b\ y\text{-}y}$ (in):	15	**$K_{y\text{-}y}$:**	1	**Seismic DR:**	None
$L_{b\ z\text{-}z}$ (in):	15	**$K_{z\text{-}z}$:**	1	**Max Defl Ratio:**	L/3748
$L_{comp\ top}$ (in):	15	**y sway:**	No	**Max Defl Location:**	11.25
$L_{comp\ bot}$ (in):	15	**z sway:**	No	**Span:**	N/A
L_{torque} (in):	0	**Function:**	Lateral	**τ_b:**	1



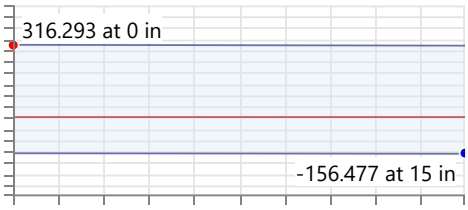
Diagrams:



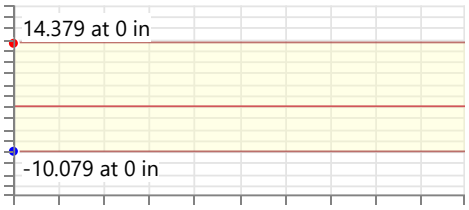
y Deflection (in)



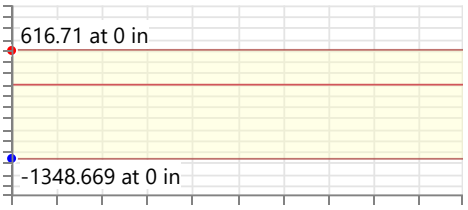
z Deflection (in)



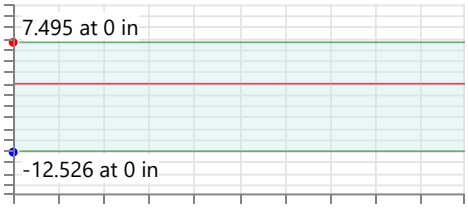
Axial Force (lb)



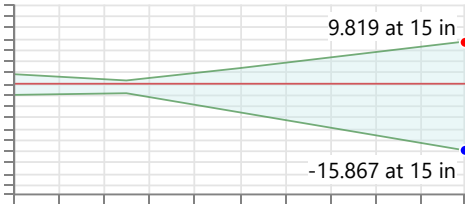
y Shear Force (lb)



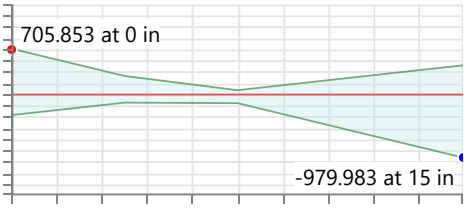
z Shear Force (lb)



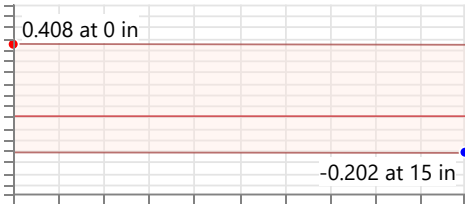
Torsion (lb-ft)



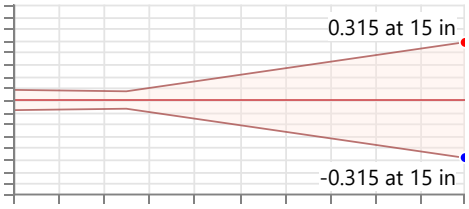
z-z Moment (lb-ft)



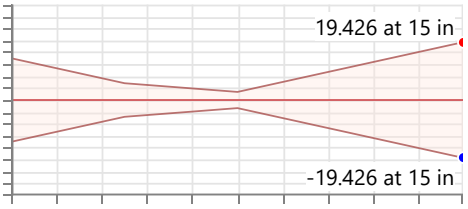
y-y Moment (lb-ft)



Axial Stress (ksi)



Bending Strong Stress (ksi)



Bending Weak Stress (ksi)

WARNING: Detail Report Based On Less Than 10 Sections!

AISC 15th (360-16): ASD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	3	-	-	-	-
Applied Loading - Shear + Torsion	3	-	-	-	-
Axial Tension Analysis	3	0 lb	23185.629 lb	-	-
Axial Compression Analysis	3	312.751 lb	22798.535 lb	-	-
Flexural Analysis (Strong Axis)	3	15.867 lb-ft	1708.318 lb-ft	-	-
Flexural Analysis (Weak Axis)	-	979.983 lb-ft	1708.318 lb-ft	-	-
Shear Analysis (Major Axis y)	3	72.386 lb	6495.809 lb	**0.011**	**PASS**

Shear Analysis (Minor Axis z)	3	1406.675 lb	6495.809 lb	**0.217**	**PASS**
Bending & Axial Interaction Check (UC Bending Max)	3	-	-	**0.59**	**PASS**
Torsional Analysis	3	12.526 lb-ft	1399.77 lb-ft	**0.009**	**PASS**

1.Project Information

Company:	Frame-Ridge
Project Engineer:	Mahmoud Elmesery
Address:	MO
Phone:	+1(929) 242-9016
Email:	engineerelmesery@gmail.com
Project Name:	25.02.04
Project Address:	NC
Notes:	

2.Selected Anchor Information

Selected Anchor :	Headed Hex Bolt
Brand:	Generic
Material:	1/2" Ø Threaded Bolt Hex Head ASTM F1554 GR36/A36
Embedment:	h_{ef} 5.88 in h_{nom} 6.25 in
Approval:	- -
Issued/Revision:	- -

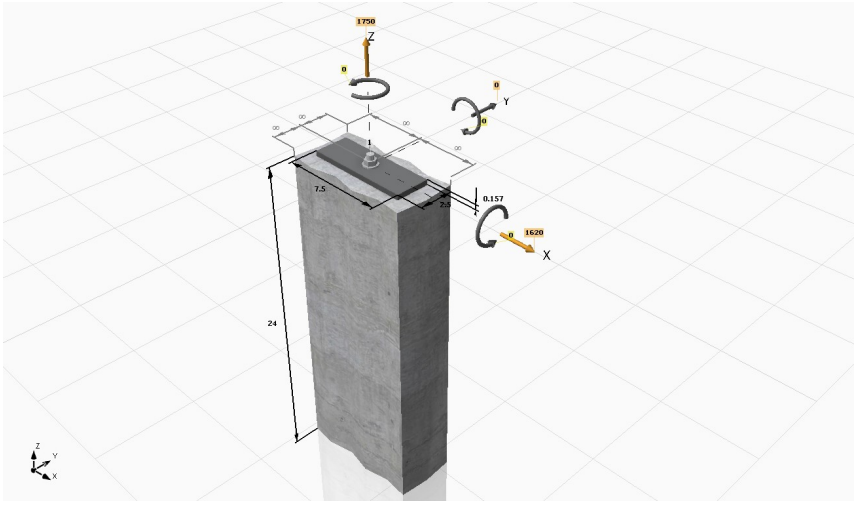
3.Design Principles

Design Method:	ACI 318-19
Load Combinations:	Section 5.3 User Defined Loads

4.Base Material Information

Concrete:								
Type:	Cracked	Normal Weight Concrete						
Strength	3000	psi						
Reinforcement:								
Edge Reinforcement	None or < #4 Rebar							
Spacing	Tension	No (Condition B)	Shear	No (Condition B)				
Controls Breakout	Tension	False	Shear	False				
Base Plate:								
Sizing	Thickness	0.157 in	Length	2.5 in	Width	7.5 in		
Standoff	None		Height	0 in				
Strength	36000	psi						
Profile:	None							
Torqued Anchor Bolt:								
Concrete Covers:	Base Cover:	0.25 in	End Cover:	0.25 in				

5.Geometric Conditions



h_{slab}	24	in	h_{min}	6.500	in
Edge Cx-	∞	in	c_{min}	0.688	in
Edge Cx+	∞	in	c_{ac}	8.812	in
Edge Cy-	∞	in	s_{min}	2.000	in
Edge Cy+	∞	in			

6.Summary Results

Tension Loading

Design Proof	Demand(lb)	Capacity(lb)	Utilization	Status	Critical
Steel Strength:	1750.00	6173.00	0.284	OK	
Concrete Breakout Strength:	1750.00	13103.00	0.134	OK	
Pullout Strength:	1750.00	4885.00	0.358	OK	Controls

Shear Loading

Design Proof	Demand(lb)	Capacity(lb)	Utilization	Status	Critical
Steel Strength	1620.00	3210.00	0.505	OK	Controls
Pryout Strength	1620.00	26207.00	0.062	OK	

7.Warnings and Remarks

ANCHOR DESIGN CRITERIA IS SATISFIED

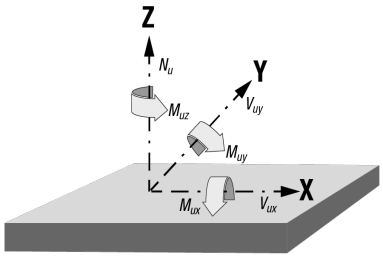
- The results of the calculations carried out by means of the DDA Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an design professional/engineer, particularly with regard to compliance with applicable standards, norms and permits, prior to using them for your specific project. The DDA Software serves only as an aid to interpret standards, norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.

8.Load Condition

Design Loads / Actions

Nu	1750.0	lb	Vux	1620.0	lb	Vuy	0.0	lb
Muz	0.0	in-lb	Mux	0.0	in-lb	Muy	0.0	in-lb

Consider Load Reversal X Direction 0% Y Direction 0%



9.Load Distribution

Max. concrete compressive strain:	0.000	%	Anchor Eccentricity				
Max. concrete compressive stress:	0.000	psi	ex	0	in	ey	0 in
Resulting tension force:	1750.000	lb	Profile Eccentricity				
Resulting compression force:	0.000	lb	ex	0	in	ey	0 in

Resulting anchor forces / Load distribution

Anchor	Tension Load (lb)	Shear Load (lb)	Component Shear Load (lb)		Anchor Coordinates (in)	
			Shear X	Shear Y	X	Y
1	1750.00	1620.0	1620.0	0.0	0.000	0.000

10.Design Proof Tension Loading

Steel Strength

ACI 318-19 17.6.1

Variables

N_{sa} (lb)	φ
8230.132	0.75

Results

φN_{sa}	=	6173.0	lb	Table 17.5.2
N_{ua}	=	1750.0	lb	
Utilization	=	28.4%		

Concrete Breakout Strength

ACI 318-19 17.6.2

Equations

$N_{cb} = (A_{Nc} / A_{Nc0}) . \Psi_{ed,N} . \Psi_{c,N} . \Psi_{cp,N} . N_b$ Eqn. 17.6.2.1a

$N_b = k_c . \lambda_a . (f'_c)^{0.5} . h_{ef}^{1.5}$ Eqn. 17.6.2.2.1

Variables

A_{Nc} (in²)	A_{Nc0} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$
310.641	310.641	1.000	1.000	1.000	1.000

c_{ac} (in)	k_c	λ_a	f'_c (psi)	h_{ef} (in)
8.812	24.000	1.000	3000	5.88

N_b (lb)	φ
18719.040	0.70

Results

φN_{cb}	=	13103	lb	Table 17.5.2
N_{ua}	=	1750.0	lb	
Utilization	=	13.4%		

Pullout Strength:

ACI 318-19 17.6.3

Equations

$N_{pn} = \Psi_{c,P} \cdot N_p$ Eqn. 17.6.3.1

$N_p = 8 \cdot A_{brg} \cdot f'_c$ Eqn. 17.6.3.2.2a

Variables

$\Psi_{c,P}$	$N_{p,cr}$ (lb)	A_{brg} (in²)	f'_c (psi)	φ
1.000	6979.000	0.291	3000	0.70

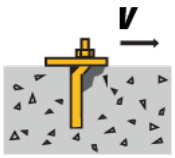
Results

φN_{pn}	=	4885	lb	
N_{ua}	=	1750	lb	Table 17.5.2
Utilization	=	35.8%		

11.Design Proof Shear Loading

Reference

Steel Strength



ACI 318-19 17.7.1

Variables

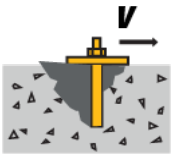
V_{sa} (lb)	φ
4938.08	0.65

Results

φv_{sa}	=	3210	lb	
V_{ua}	=	1620	lb	Table 17.5.2
Utilization	=	50.5%		

Pryout Strength

ACI 318-19 17.7.3



Equations

$V_{cp} = k_{cp} \cdot N_{cp}$ Eqn. 17.7.3.1a

$N_{cb} = (A_{Nc} / A_{Nc0}) \cdot \Psi_{ed,N} \cdot \Psi_{c,N} \cdot \Psi_{cp,N} \cdot N_b$ Eqn. 17.6.2.1a

$N_b = k_c \cdot \lambda_a \cdot (f'_c)^{0.5} \cdot h_{ef}^{1.5}$ Eqn. 17.6.2.2.1

Variables

A_{Nc} (in²)	A_{Nc0} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$
310.641	310.641	1.000	1.000	1.000	1.000

c_{ac} (in)	k_c	λ_a	h_{ef} (in)	f'_c (psi)
8.812	24.000	1.000	5.88	3000.000

N_b (lb)	k_{cp}	N_{cp} (lb)	φ
18719.044	2.000	18719.044	0.70

Results

φV_{cp}	=	26207.00	lb
V_{ua}	=	1620	lb
Utilization	=	6.2%	

Table 17.5.2

12.Interaction of Tension and Shear Loads

Reference

ACI 318-19 17.8

Equations

$$(N_{ua} / \varphi \cdot N_n)^{5/3} + (V_{ua} / \varphi \cdot V_n)^{5/3} <= 1.0$$ Eqn. 17.8.3

Variables

$N_{ua} / \varphi \cdot N_n$	$V_{ua} / \varphi \cdot V_n$
0.358	0.505

Results

0.501	≤	1.0
Status	:	OK

ANCHOR DESIGN CRITERIA IS SATISFIED

General Input

slab geometry

$t_{slab} := 4\ in$ slab thickness

slab thickening

$b_f := 16\ in$

$h_f := 24\ in$

$b_{wd} := 2.5\ in$

steel properties

$f_y := 60\ ksi$

concrete properties

$\gamma_c := 150\ pcf$ Concrete Density,

$f_c' := 3000\ psi$

soil properties

$BC := 1500\ psf$ soil bearing capacity

$FS := 1.5$ factor of safety,

$k_s := 100\ pci$ modulus of subgrade reaction

$R_1 := 0.5\ b_{wd} = 1.25\ in$ one-half of width or diameter of base plate

$E_c := 57000 \cdot \sqrt{\frac{f_c'}{psi}} \cdot psi = 3122.019\ ksi$ modulus of elasticity of of concrete

$\lambda := 1$ Lightweight Concrete Reduction Factor

$f_t' := 7.5 \cdot \sqrt{\frac{f_c'}{psi}} \cdot psi \cdot \lambda = 410.792\ psi$ tensile strength in flexure concrete

$\beta := 0.85$ β=1 for d<7", β=0.85 for d>=7"

$\mu := 0.45$ Poisson's ratio

$FL := 10\ in$

Loading

$w_1 := 7.8\ kip$ — Downward force of post (RISA 3D)

$DL := 10\ psf$ — Dead Load

$LL := 100\ psf$ — Live Load

$w_{O.C.S.\_post} := 60\ in$ — O.C. spacing of post (Drawings)

Slab Calculation

Check 1: Load Capacity

$w_2 := \gamma_c \cdot 1\ ft \cdot t_{slab} \cdot 1\ ft + (DL + LL) \cdot 1\ ft^2 = 0.16\ kip$ — Self weight

$P_{applied} := w_1 + w_2 = 7.96\ kip$ — Total load

$P_n := 1.72 \cdot \left(\left(k_s \cdot \frac{R_1}{E_c} \right) \cdot 10^4 + 3.60 \right) \cdot f_t' \cdot t_{slab}^{\ 2} = 45.224\ kip$ — Nominal load carrying capacity of slab

$P_a := \frac{P_n}{FS} = 30.15\ kip$ — Allowable load carrying capacity of slab

$\text{if}\left(P_a \geq P_{applied}, \text{“OK”}, \text{“NOT OK”}\right) = \text{“OK”}$

Check 2: Average Bearing Capacity of Soil

$W_1 := \frac{w_1}{w_{O.C.S.\_post} \cdot b_f} = 1170\ psf$

$W_2 := \frac{w_2}{1\ ft^2} = 160\ psf$

$W_{total} := W_1 + W_2 = 1330\ psf$

$\text{if}\left(W_{total} \leq BC, \text{“OK”}, \text{“NOT OK”}\right) = \text{“OK”}$

Check 4: Reinforcement Design

$A_{req} := 0.0015 \cdot 12\ in \cdot \left(t_{slab} - 2.5\ in\right) = 0.027\ in^2$

$A_{smin} := 0.0018 \cdot t_{slab} \cdot 1\ ft = 0.086\ in^2$

$\text{if}\left(A_{req} \geq A_{smin}, \text{“Use Areq”}, \text{“Use Asmin”}\right) = \text{“Use Asmin”}$

Use 4x4/6x6 Wire mesh