

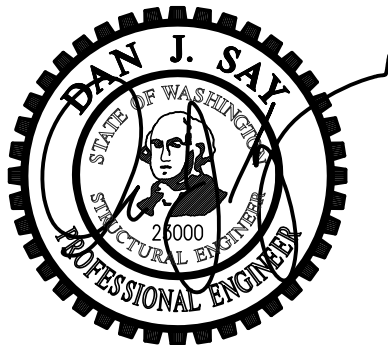


Supplemental Structural Calculations for:

McLear Residence

9120 SE 50th ST

Mercer Island, WA 98040



Prepared for: Brandt Design Group

Job #: 01519-2020-13-00

Date: August 6, 2021

Criteria Sheet

Codes

Structural IBC 2018
 Loading ASCE 7-16
 Wood: NDS 2018
 Steel: AISC 360-16
 Concrete: ACI 318-14
 Masonry: TMS 402/602-16

Project Location

Street & Number 9120 SE 50th st
 City: Mercer Island State: WA
 ZIP: 98040
 Latitude: 47.5579 N
 Longitude: -122.2155 W
 Ground Elevation 345 ft

Occupancy Category

Risk Category: II ASCE 7 Table 1.5-1

Seismic Load Summary:

Analysis Procedure: Equivalent Lateral Force Procedure
 Lateral System: Light-frame (wood) Walls Sheathed with Wood
 Structural Panels Rated for Shear Resistance
 R: 6.50 $C_d = 4$
 Base Shear V = 17 kips $\Omega_e = 2.5$
 $S_s = 1.438$ $S_f = 0.499$
 $S_{DS} = 1.15$ $S_{D1} = 0.50$
 $C_s = 0.177$ $I_E = 1.0$



Story Information

Stories Above Grade (Including Mezzanine Levels) 2

Horizontal and Vertical Irregularities:

Is the building a "Regular Structure"? (No horizontal or vertical irregularities) Yes

Wind Load Summary:

V = 98 $K_{ZT} = 1.00$
 Exposure = C

Dead Loads:

Roof		Floor	
Roofing	2.5 psf	Finish Floor	1 psf
1/2" Sheathing	1.8 psf	3/4" Sheathing	2.7 psf
Trusses @ 24" oc	2.5 psf	Joists @ 16" oc	2.2 psf
Misc./Mech.	1.5 psf	Misc./Mech.	2 psf
Ceiling Finish	2.8 psf	Ceiling Finish	2.8
Solar Panels	4		10.7 psf
	15 psf	Use	12 psf
Use	15 psf		

Deck	
5/4x IPE	7.5 psf
3/4" Sheathing	2.7 psf
Joists @ 16" oc	2.2 psf
Ceiling Finish	2.5
	14.9 psf
Use	15 psf

Live Loads:

Snow	25 psf	Deck	60 psf
Floor	40 psf		

Soils:

Soils Report Provided? Yes
 Allowable Bearing 3000 psf Active 55/35 pcf (Restrained/Unrestrained)
 Sliding, μ 0.5 Seismic Surcharge 8H
 Passive 300 pcf



McLear _____
 Criteria _____

DATE 8/9/2021
 PROJ. # 01519-2020-13
 DESIGN BDM
 SHEET 1

Seismic Design

ASCE 7-16 Seismic Analysis Equivalent Lateral Force Procedure

Seismic Force Resisting System Per Table 12.2-1	System	Bearing Wall Systems
	Type:	Light-frame (wood) Walls Sheathed with Wood Structural Panels Rated for Shear Resistance

Seismic Design Cat.	D
Risk Category	II
Site Class	C
Diaphragm Flexibility	Flexible

I, II, or III, or IV per Table 1.5-1
Per soils report.

Section 12.8.1.3 Exceptions

Regular Structure	Yes
≤ 5 Stories above grade	Yes
$T \leq 0.5s$	Yes
$\rho = 1.0$	No
Not Site Class E or F	Yes
Risk Category I or II	Yes

If all exceptions are met, S_{DS} may be taken as 1, but not less than $0.7^{(Calculated S_{DS})}$

S_s	1.438 g	2% in 50 yr, Latitude & Longitude lookup
S_1	0.499 g	2% in 50 yr, Latitude & Longitude lookup
R	6.50	
C_d	4.0	
Ω_o	2.5	
I_e	1.00	Table 1.5-2
h_n	20.5 ft	
C_t	0.02	Table 12.8-2
x	0.75	Table 12.8-2
T_a	0.19 sec	
T	0.19 sec	Eq. 12.8-7
T_0	0.09 sec	
T_s	0.43 sec	
T_L	6.00 sec	
F_a	1.20	Table 11.4-1
F_v	1.50	Table 11.4-2
S_{MS}	1.73 g	Eq. 11.4-1
S_{M1}	0.75 g	Eq. 11.4-2
S_{DS}	1.150 g	Eq. 11.4-3
S_{D1}	0.499 g	Eq. 11.4-4
C_s	0.177 Controls	Eq. 12.8-2
	0.398	Eq. 12.8-3 need not exceed, $T < T_L$
	0.010	Eq. 12.8-5 or 12.8-6 minimum
$C_{s, design}$	0.177	
Bldg. Weight	94.0 k	
$V = C_s W$	16.6 k	Eq. 12.8-1, Strength Level Base Shear
$V = C_{s,asd} W$	11.6 k	Eq. 12.8-1 ASD Base Shear

Building Period Per Alternate Analysis

T (sec)	
---------	--

Per Geotech Report

F_a	
F_v	

$$T_a = C_t h_n^x \quad \text{Eq. 12.8.7}$$

$$S_{MS} = F_a S_s \quad \text{Eq. 11.4-1}$$

$$S_{M1} = F_v S_1 \quad \text{Eq. 11.4-2}$$

$$S_{DS} = 2/3 S_{MS} \quad \text{Eq. 11.4-3}$$

$$S_{D1} = 2/3 S_{M1} \quad \text{Eq. 11.4-4}$$

$$C_s = \frac{S_{DS}}{(R/I_e)} \quad \text{Eq. 12.8-2}$$

$$C_s = \frac{S_{D1}}{T(R/I_e)} \quad \text{Eq. 12.8-3}$$

$$C_s = \frac{S_{D1} T_L}{T^2 (R/I_e)} \quad \text{Eq. 12.8-4}$$

$$C_s \geq 0.044 S_{DS} I_e \quad \text{Eq. 12.8-5}$$

$$C_s \geq 0.01 \quad \text{Eq. 12.8-5}$$

$$C_{Vx} = w_x h_x^k / \sum_{i=1}^n w_x h_i^k \quad \text{Eq. 12.8-12}$$

$$F_{px} = \frac{\sum_{i=x}^n F_i}{\sum_{i=x}^n w_i} w_{px} \quad \text{Eq. 12.10-1}$$

$$F_{px} \geq 0.2 S_{DS} I_e w_{px} \quad \text{Eq. 12.10-2}$$

$$F_{px} \leq 0.4 S_{DS} I_e w_{px} \quad \text{Eq. 12.10-3}$$

Vertical Distribution ASD $\rho = 1.3$ $k = 1.000$

Level	h_x (ft)	W_x (k)	h_x^k (ft)	$W_x h_x^k$	Story Shear ASD			Diaphragm Force (ρ not included)						
					C_{vx} (%)	F_x (k)	SV (k)	$F_{px,calc}$	$F_{px,min}$	$F_{px,max}$	$F_{px,design}$	$V = F_{px}/F_x$		
Upper Roof	20.5	42.9	20.5	879	0.604	9.1	9.1	7.0	6.9	13.8	7.0	0.77		
Lower Roof	15.8	17.8	15.8	280	0.193	2.9	12.1	2.7	2.9	5.7	2.9	0.98		
Main	8.9	33	8.9	296	0.203	3.1	15.1	4.1	5.4	10.7	5.4	1.74		
Σ		94.0		1456		15.1								



McLear _____
Seismic Criteria _____

DATE 8/9/2021
PROJ. # 01519-2020-13
DESIGN BDM
SHEET 2

Wind Design - MWFRS

ASCE 7 Chapter 27 - Directional Procedure

Design Method	ASD
---------------	-----

Wind Coefficients

Exposure	C	
V=	98	mph
K_d =	0.85	Table 26.6-1
K_{zt} =	0.90	Table 26.10-1
K_e =	0.99	Table 26.9-1
G=	0.85	26.9.4

Transverse Wind Pressures

L/B = 0.74 h/L = 0.42

Pressure Coefficients from Figure 27.3-1:

Bldg Face	C_p
Windward Wall	0.8
Leeward Wall	-0.50
Windward Roof	-0.87 / -0.18
Leeward Roof	-0.44

Location and Building Dimensions

Calculate K_{zt} ?	No	
K_{zt}	1.00	
Roof Type	Monoslope	
Roof Angle - Transverse Dir	4.17	degrees
Roof Angle - Long Dir	0	degrees
Ground to top of roof	21.5	ft
Bot of roof to top of roof	2.5	ft
Mean Roof Height, h	20.25	ft
Short Plan Dimension	48	ft
Long Plan Dimension	65	ft
Parapet ?	No	
Ground to top of parapet		ft
Average Parapet Height		ft
Ht of 2nd Level Above Grade	8	ft

Velocity Pressure at Mean Roof Height, q_h =	18.7	psf
--	------	-----

Wall Pressures (Unfactored):

Ht	K_z	q_z	ASD		
			$P_{ww\ walls}$	$P_{lw\ walls}$	$P_{w\ walls} \text{ (psf)}$
0-15	0.85	17.54	11.93	7.93	11.9
15-20	0.9	18.57	12.63	7.93	12.3
20-25	0.94	19.40	13.19	7.93	12.7
25-30	0.98	20.23	13.75	7.93	13.0
30-40	1.04	21.46	14.60	7.93	13.5
41-50	1.09	22.50	15.30	7.93	13.9
51-60	1.13	23.32	15.86	7.93	14.3
61-70	1.17	24.15	16.42	7.93	14.6
71-80	1.21	24.97	16.98	7.93	14.9
81-90	1.24	25.59	17.40	7.93	15.2
91-100	1.26	26.00	17.68	7.93	15.4

Roof Pressures (Unfactored)

Windward		Leeward	Horiz Proj (psf)
Max	Min		
-2.9	-13.9	-6.9	4.80



McLear _____
 Wind Criteria _____

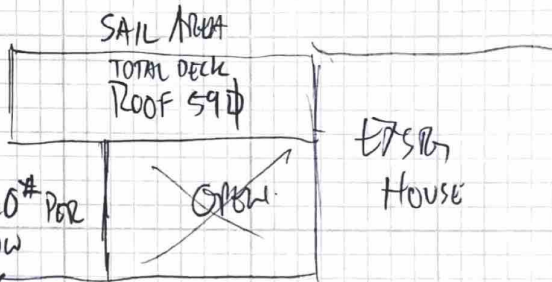
DATE 8/9/2021
 PROJ. # 01519-2020-13
 DESIGN BDM
 SHEET 3

MCCLEAR LATERAL SUPPLEMENTAL/REVISED CALC

Wind Load:

TOTAL NEW ROOF = $59\# (4.8\text{ psf}) = 283\#$

From Wind - LESS THAN
SEISMIC $283\# < 3,620\#$ PER
BELOW
∴ SEISMIC GOVERNS



EXISTG HOUSE:

@ ROOF $DL_{SEISMIC} = 2036\# (15\text{ psf})$ ROOF
+ $1101\# (5\text{ psf})$ WALLS

36.0k SEISMIC DL

EXISTG HOUSE w/ NEW ROOF

@ ROOF $DL_{SEISMIC} = 2493\# (15\text{ psf})$ ROOF
+ $1101\# (5\text{ psf})$ WALLS

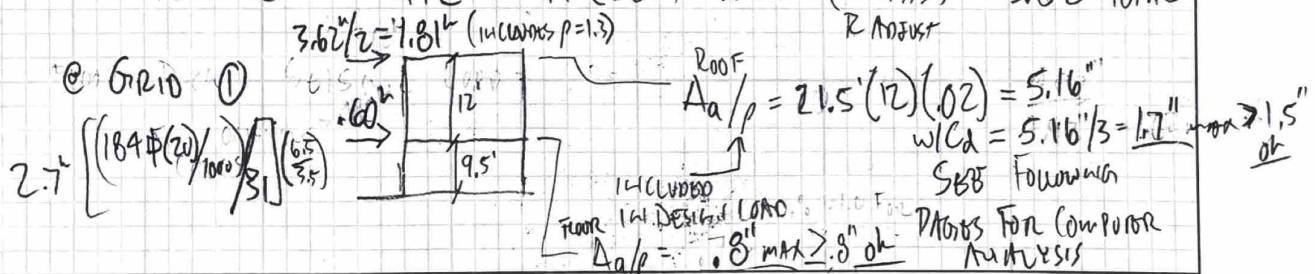
42.9k SEISMIC DL

NET INCREASE = $42.9/36.0 = 1.19 > 10\%$ ∴ DESIGN
NEW ROOF TO SELF SUPPORT DECK ROOF LOADS

N/S DIRECTION - PROVIDE DESIGN FOR NEW ROOF @ DECK

USE O.C.M.F. TO SUPPORT NEW DECK ROOF

ROOF DECK SEISMIC LOAD = $612\# (15\text{ psf}) / 42.9k = .21$ OF SEISMIC
PER CALIFORNIA P.2 $9.1k (.21) = 1.95k$ ($6.5/3.5$) = 3.62k TOTAL
R ADJUST



MCCLEAR

PROJECT _____

DATE _____

PROJ. # _____

DESIGN _____

SHEET _____

7/16/21

DATE 01519-2020-13

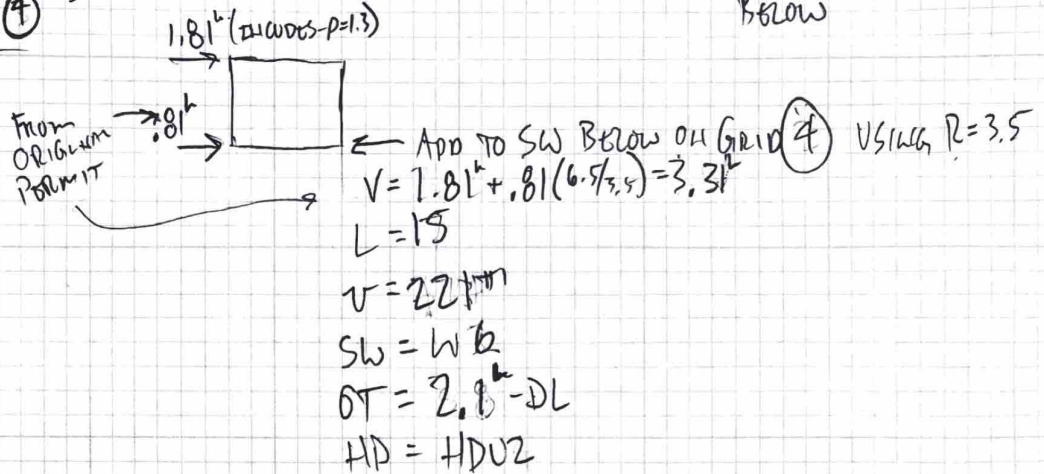
PROJ. # BDM

DESIGN |

SHEET

RELOCATE FRAME

From ③ TO GRID ④ → USE SAME FRAME - LOADS ARE THE SAME - ADD LOAD TO WALL ON ④ BELOW



ALL OTHER CALCULATIONS FROM PERMIT CALCS FOR N/S DIRECTION REMAIN UNCHANGED

E/W DIRECTION

@ UPPER ROOF USE REVISED EQ LOADS

$V_{eq} = 9.1 \text{ k}'$

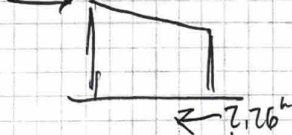
ADD D.M.F. @ GRID ④. NO INCREASE IN LOAD TO EXIST' STRUCTURE IN E/W DIRECTION

AD UPPER DECK ROOF. NO LONGER USE OPEN FRAME STRUCTURE

@ M.F. $V_{eq} = 383 \text{ lb} (15 \text{ psf}) / 42.9' = .13$

$9.1' (.13) = 1.2 \text{ k}' (6.5/3.5) = 2.26' \text{ TOTAL}$
↑ R INCREASE

$2.26'$ (includes $p=1.3$)



$A_{afp} = 12'(12')(0.02) = 2.88''$

$\sqrt{6} \approx 2.88'/3 = .96'' \text{ MAX}$

TRANSFER LOAD @ FLOOR TO S.W. ON GRID ③ USING DISTRIBUTION



SWENSON SAY FAGÉT
 A STRUCTURAL ENGINEERING CORPORATION

Seattle: 2124 Third Avenue · Suite 100 · Seattle · WA · 98121

Tel: 206 · 443 · 6212 Fax: 206 · 443 · 4870

Tacoma: 934 Broadway · Suite 100 · Tacoma · WA · 98402

Tel: 253 · 284 · 9470 Fax: 253 · 284 · 9471

M CLEAR

Project

Date 7/16/21

Date

01519-2020-13

Proj. No.

Design

2

Sheet

AT MAIN FLOOR: PER PERM. RECALCS NO CURTAIN @
 MAIN DECK LEVEL. ADD ADDED ROOF DECK
 SEISMIC LOAD TO WALLS. PREVIOUS
 DESIGN METHODOLOGY USED CONSERVATIVELY
 HALF THE SEISMIC LOAD. WILL CONTINUE TO
 DO THAT PLUS ADD THE UPPER ROOF DECK LOAD

$$V_{eq} = 12.1^k / 2 = \underline{6.05^k} > V_w = 4.6^k$$

$$L = 4.5' \quad L_{min} = 3.68'$$

$$V = 1356^k \quad SW = 2WB$$

$$OT = 6.10^k \quad HD = HDUB$$

↑ USE STRAPS ABOVE & BELOW WINDOW TO
 REDUCE EFFECTIVE OT HT. TO 4.5'



SWENSON SAY FAGÉT
 A STRUCTURAL ENGINEERING CORPORATION

Seattle: 2124 Third Avenue · Suite 100 · Seattle · WA · 98121

Tel: 206 · 443 · 6212 Fax: 206 · 443 · 4870

Tacoma: 934 Broadway · Suite 100 · Tacoma · WA · 98402

Tel: 253 · 284 · 9470 Fax: 253 · 284 · 9471

Project McLEAR

Date 7/16/21

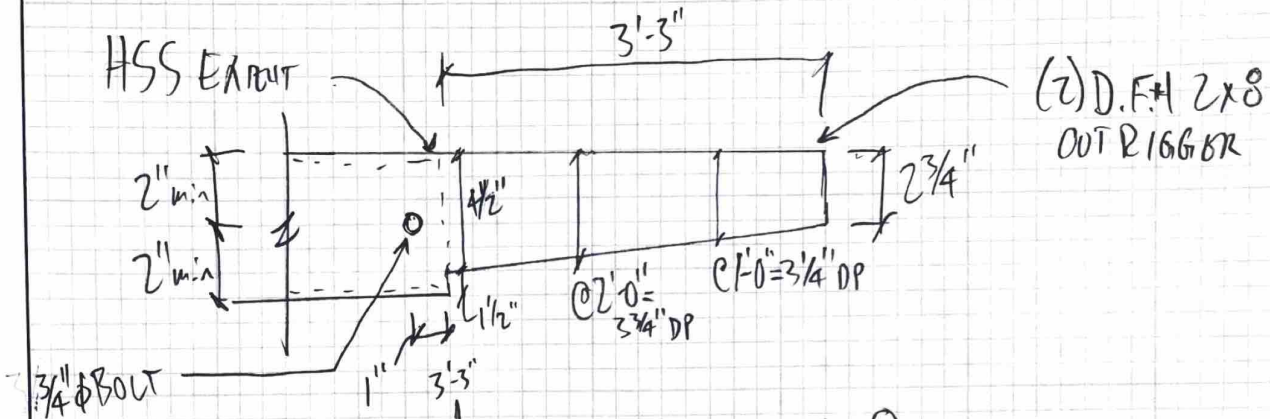
01519-2020-13

Proj. No. BDM

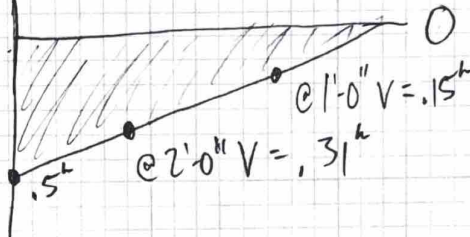
Design 3

Sheet _____

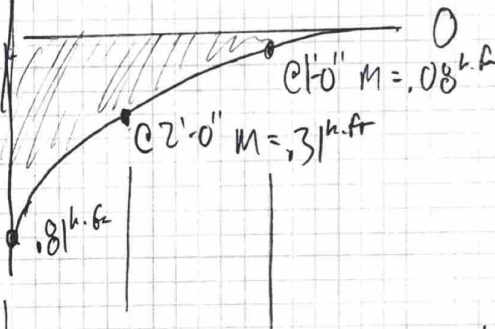
OUTRIGGER CHECK



Shear



Moment



CHECK STRESSES @ CRIT POINTS

$f_b = .97^{ks}$	$f_b = .53^{ks}$	$f_b = .18^{ks}$	<u>OK</u>
$f_v = 55^{ps}$	$f_v = 41^{ps}$	$f_v = 20^{ps}$	<u>OK</u>

$\Delta T = .22" = 24/360$ (ASSUMING 3 1/2" NET SECTION DEPTH) OK

• CHECK BOLT: $P = 500\# < Z_L = 512\#(1.15) = 589\#$ OK

PROVIDE EDGE DISTANCE OF 3" AT BEARING EDGE.



SWENSON SAY FAGÉT
A STRUCTURAL ENGINEERING CORPORATION

Seattle: 2124 Third Avenue · Suite 100 · Seattle · WA · 98121
Tel: 206 · 443 · 6212 Fax: 206 · 443 · 4870
Tacoma: 934 Broadway · Suite 100 · Tacoma · WA · 98402
Tel: 253 · 284 · 9470 Fax: 253 · 284 · 9471

Project _____

Date _____

Proj. No. _____

Design _____

Sheet _____

4

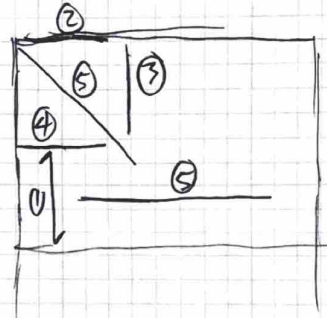
REVISED GRAVITY CALCS

UPPER ROOF:

① - RAFTER

$$\begin{aligned}
 W &= 40^{\text{plf}} \\
 L &= 9' \\
 R &= .18^{\text{k}} \\
 M &= .41^{\text{k}\cdot\text{ft}}
 \end{aligned}$$

$$\begin{aligned}
 R_D &= 1.36^{\text{k}} \\
 R_V &= 4.1^{\text{ps}} \\
 \Delta r &= .47'' = 2/229 \\
 \text{LVL } &1\frac{3}{4} \times 3\frac{1}{2} @ 12
 \end{aligned}$$

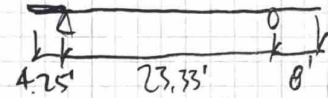


② - Rim

$$\begin{aligned}
 W &= 57^{\text{plf}} \\
 L &= 9' \\
 R &= .26^{\text{k}} \\
 M &= 1.78^{\text{k}\cdot\text{ft}}
 \end{aligned}$$

$$\begin{aligned}
 R_D &= .97^{\text{k}} \\
 R_V &= 2.9^{\text{ps}} \\
 \Delta r &= .34'' = 2/321 \\
 \text{(2) LVL } &1\frac{3}{4} \times 3\frac{1}{2} @ 12
 \end{aligned}$$

③ - Revision Purlin Spans



$$R_{\text{max}} = 2.6^{\text{k}} < 4^{\text{k}} \quad R_{\text{max}} = 3.4^{\text{k}} = 3.4^{\text{k}}$$

$$M_{\text{max}} = 10.2^{\text{k}\cdot\text{ft}} < 12.5^{\text{k}\cdot\text{ft}} \quad \text{OK}$$

STRESSES REDUCED FROM ORIGINAL DESIGN
 NO CURTAILMENTS
HSSB x 6 x 1/2

③ - Bm

$$\begin{aligned}
 W_1 &= W_2 = 40^{\text{plf}} \\
 P &= 260^{\text{plf}} \\
 L &= 6.17' \quad A = 2.83' \\
 R_1 &= -.02^{\text{k}} \quad R_2 = .64^{\text{k}} \\
 M &= .9^{\text{k}\cdot\text{ft}} < 8.03^{\text{k}\cdot\text{ft}} \quad \text{OK}
 \end{aligned}$$

$$\begin{aligned}
 \Delta r &= .08'' = 2/249 \\
 \text{HSS } &3\frac{1}{2} \times 3\frac{1}{2} \times 1/4
 \end{aligned}$$

④ - Bm

$$\begin{aligned}
 W_1 &= 220^{\text{plf}} \quad W_2 = 310^{\text{plf}} \\
 L &= 4.5' \quad A = 4.25' \\
 R_1 &= -.13^{\text{k}} \quad R_2 = 2.4^{\text{k}} \\
 M &= 2.8^{\text{k}\cdot\text{ft}} < 8.03^{\text{k}\cdot\text{ft}} \quad \text{OK}
 \end{aligned}$$

$$\begin{aligned}
 \Delta r &= .32'' = 2/620 \\
 \text{HSS } &3\frac{1}{2} \times 3\frac{1}{2} \times 1/4
 \end{aligned}$$



SWENSON SAY FAGÉT
 A STRUCTURAL ENGINEERING CORPORATION

Seattle: 2124 Third Avenue · Suite 100 · Seattle · WA · 98121

Tel: 206 · 443 · 6212 Fax: 206 · 443 · 4870

Tacoma: 934 Broadway · Suite 100 · Tacoma · WA · 98402

Tel: 253 · 284 · 9470 Fax: 253 · 284 · 9471

Project _____

Date _____

Proj. No. _____

Design _____

Sheet _____

5

MAIN FLOOR

① - Joist

$W = 75^{\#}$

$L = 12' \quad A = 3.25'$

$R_1 = .42' \quad R_2 = .73'$

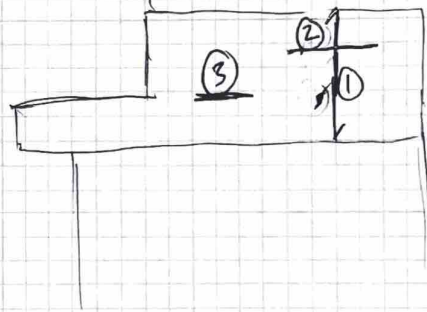
$M = 1.16^{\text{ft}}$

$f_b = .91^{\text{ks}}$

$R_v = 52^{\text{ps}}$

$\Delta_{TL} = .18'' = 2\ell / 442$

LVL $1\frac{3}{4} \times 7\frac{1}{4}$ @ 12



② - HDR

$W = 730^{\#}$

$L = 11.5'$

$R = 4.2'$

$M = 12.1^{\text{ft}}$

$f_b = 1.24^{\text{ks}}$

$R_v = 77^{\text{ps}}$

$\Delta_{TL} = .25'' = 0 / 560$

(4) LVL $1\frac{3}{4} \times 10'$

③ - Rim

$W = 450^{\#}$

$L = 8'$

$R = 1.0'$

$M = 3.6^{\text{ft}}$

$f_b = 1.41^{\text{ks}}$

$R_v = 90^{\text{ps}}$

$\Delta_{TL} = .19'' = 0 / 515$

(2) LVL $1\frac{3}{4} \times 7\frac{1}{4}$



SWENSON SAY FAGÉT
A STRUCTURAL ENGINEERING CORPORATION

Seattle: 2124 Third Avenue · Suite 100 · Seattle · WA · 98121
Tel: 206 · 443 · 6212 Fax: 206 · 443 · 4870
Tacoma: 934 Broadway · Suite 100 · Tacoma · WA · 98402
Tel: 253 · 284 · 9470 Fax: 253 · 284 · 9471

Project _____

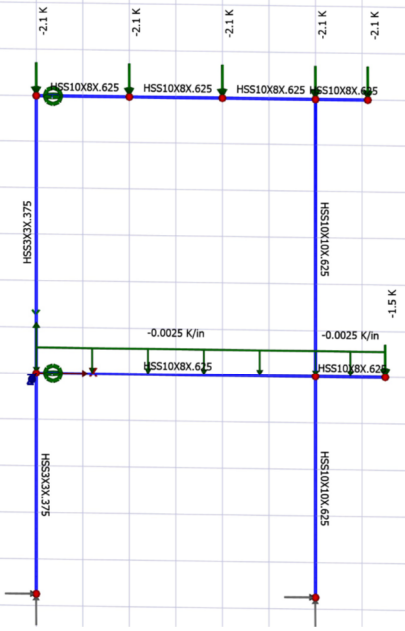
Date _____

Proj. No. _____

Design _____

Sheet _____

6



Model Summary

Model Dimensions: X: 180 in Y: 258 in Z: 0 in Object Counts: Nodes: 10 Spring Supports: 0 Members: 10 Cables: 0 Areas: 0 Plates: 0 Auto-Meshed Areas: 0 Auto-Meshed Plates: 0 Foundations: 0 Nonlinear Features: One-Way Spring Supports: 0 One-Way Members: 0
--

Materials

Name	Elasticity, E Ksi	Poisson, v	Density, γ K/in ³	Thermal, α in/in/deg-F	Shear Modulus, G Ksi
ASTM A500 Grade B (Fy = 46ksi)	29000.0000000	0.2900000	0.0002840	0.0000064	11240.3100775

Nodal Supports

Name	Fix DX	Fix DY	Fix RZ
N005	Yes	Yes	No
N006	Yes	Yes	No

Nodes

Name	X in	Y in	Support	Mass K	Scissor
N001	0.0000000	0.0000000	Free	0.0000000	No
N002	0.0000000	144.0000000	Free	0.0000000	No
N003	144.0000000	144.0000000	Free	0.0000000	No
N004	144.0000000	0.0000000	Free	0.0000000	No
N005	0.0000000	-114.0000000	DX DY	0.0000000	No
N006	144.0000000	-114.0000000	DX DY	0.0000000	No
N007	48.0000000	144.0000000	Free	0.0000000	No
N008	96.0000000	144.0000000	Free	0.0000000	No
N009	171.0000000	144.0000000	Free	0.0000000	No
N010	180.0000000	0.0000000	Free	0.0000000	No

Members

Name	Node 1	Node 2	Shape	Material	End Connection	Crossing Connection?	Beta, B deg	Length in	Weight K	Offset y in	Offset z in	Framing	Action
BmX001	N001	N004	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Simple Rigid	Yes	90.000000	144.000000	0.7647552	0.0000000	0.0000000	Beam	Normal
BmX002	N003	N009	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	90.000000	27.000000	0.1433916	0.0000000	0.0000000	Beam	Normal

Members (continued)

Name	Node 1	Node 2	Shape	Material	End Connection	Crossing Connection?	Beta, B deg	Length in	Weight K	Offset y in	Offset z in	Framing	Action
BmX003	N004	N010	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	90.000000	36.000000	0.191188	0.0000000	0.0000000	Beam	Normal
COLO01	N001	N002	HSS3X3X.375	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.000000	144.000000	0.138637	0.0000000	0.0000000	Column	Normal
COLO02	N003	N004	HSS10X10X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.000000	144.000000	0.858816	0.0000000	0.0000000	Column	Normal
COLO03	N001	N005	HSS3X3X.375	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.000000	114.000000	0.109754	0.0000000	0.0000000	Column	Normal
COLO04	N004	N006	HSS10X10X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.000000	114.000000	0.679896	0.0000000	0.0000000	Column	Normal
RBX001	N002	N007	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Simple Rigid	Yes	90.000000	48.000000	0.254918	0.0000000	0.0000000	Bracing	Normal
RBX002	N007	N008	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	90.000000	48.000000	0.254918	0.0000000	0.0000000	Bracing	Normal
RBX003	N008	N003	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	90.000000	48.000000	0.254918	0.0000000	0.0000000	Bracing	Normal

Nodal Loads

Node	Service Case	Type & Direction	Magnitude	Predefined Load
N001	E+X	Force X	0.9700000 K	N.A.
N002	D	Force Y	-2.1000000 K	N.A.
N002	E+X	Force X	2.5900000 K	N.A.
N002	S	Force Y	-2.1000000 K	N.A.
N003	D	Force Y	-2.1000000 K	N.A.
N003	S	Force Y	-2.1000000 K	N.A.
N007	D	Force Y	-2.1000000 K	N.A.
N007	S	Force Y	-2.1000000 K	N.A.
N008	D	Force Y	-2.1000000 K	N.A.
N008	S	Force Y	-2.1000000 K	N.A.
N009	D	Force Y	-2.1000000 K	N.A.
N009	S	Force Y	-2.1000000 K	N.A.
N010	D	Force Y	-1.5000000 K	N.A.
N010	L	Force Y	-6.0000000 K	N.A.

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset in	End Offset in	Projected?	Predefined Load
BmX001	D	Force Y	-0.0025000 K/in	Yes	0.0000000	144.0000000	No	N.A.
BmX001	L	Force Y	-0.0066667 K/in	Yes	0.0000000	144.0000000	No	N.A.
BmX003	D	Force Y	-0.0025000 K/in	Yes	0.0000000	36.0000000	No	N.A.
BmX003	L	Force Y	-0.0066667 K/in	Yes	0.0000000	36.0000000	No	N.A.

Factored Load Combinations

Name	Code	Effective Equation	Design	Deflection
1. 1.4D	ASCE 7-16 LRFD	1.4D	Strength	Other

Factored Load Combinations (continued)

Name	Code	Effective Equation	Design	Deflection
1. D	ASCE 7-16 ASD	D	Allowable	Other
2. 1.2D+1.6L+0.5Lr	ASCE 7-16 LRFD	1.2D + 1.6L	Strength	Dead Plus Live
2. 1.2D+1.6L+0.5S	ASCE 7-16 LRFD	1.2D + 1.6L + 0.5S	Strength	Other
2. D+L	ASCE 7-16 ASD	D + L	Allowable	Dead Plus Live
3. 1.2D+1.6Lr+0.5W	ASCE 7-16 LRFD	1.2D	Strength	Other
3. 1.2D+1.6Lr+L	ASCE 7-16 LRFD	1.2D + 0.5L	Strength	Dead Plus Live
3. 1.2D+1.6S+0.5W	ASCE 7-16 LRFD	1.2D + 1.6S	Strength	Other
3. 1.2D+1.6S+L	ASCE 7-16 LRFD	1.2D + 0.5L + 1.6S	Strength	Other
3. D+S	ASCE 7-16 ASD	D + S	Allowable	Other
4. 1.2D+W+L+0.5S	ASCE 7-16 LRFD	1.2D + 0.5L + 0.5S	Strength	Other
4. D+0.75(L+Lr)	ASCE 7-16 ASD	D + 0.75L	Allowable	Dead Plus Live
4. D+0.75(L+S)	ASCE 7-16 ASD	D + 0.75L + 0.75S	Allowable	Other
5. 0.9D+W	ASCE 7-16 LRFD	0.9D	Strength	Other
6. 1.2D+E+L+0.2S »+X	ASCE 7-16 LRFD	1.2D + 0.5L + 0.2S + E+X	Strength	Other
6. 1.2D+E+L+0.2S »+X (custom)	Custom	1.2D + 0.5L + 0.2S + -1E+X	Strength	Other
7. 0.6D+0.6W	ASCE 7-16 ASD	0.6D	Allowable	Other
7. 0.9D+E »+X	ASCE 7-16 LRFD	0.9D + E+X	Strength	Other
8. D+0.7E »+X	ASCE 7-16 ASD	D + 0.7E+X	Allowable	Other
9. D+0.75(0.7E+L+S) »+X	ASCE 7-16 ASD	D + 0.75L + 0.75S + 0.525E+X	Allowable	Other
10. 0.6D+0.7E »+X	ASCE 7-16 ASD	0.6D + 0.7E+X	Allowable	Other

Member:COL001

<p>1. Member Properties Length: 144 in Shape: HSS3X3X.375 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.13863744 K Framing: Column</p>	<p>2. Connections Start: N001 @ (0, 0, 0 in) - Free End: N002 @ (0, 144, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -10.909835 K (12) -> 2.0447755 K (4) My: 0 K-in (11) -> 0 K-in (11) Mz: -2.0465788 K-in (5) -> 3.2978183 K-in (15) Vy: -0.02290152 K (15) -> 0.01421235 K (5) Vz: 0 K (2) -> 0 K (11) Torsion: 0 K-in (1)</p>
<p>5. Extreme Deflections (all cases) Total Dy: -1.4545765 in (15) -> 1.1895629 in (5) Total Dz: 0 in (12) -> 0 in (15) Beam Dy: 0.00568736 in (11) -> 0.64723652 in (15) Beam Dz: 0 in (2) -> 0 in (11)</p>		

Member Design Checks:COL001

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.2649180	Pass	10.909835 K	41.181927 K	3. 1.2D+1.6S+0.5W	E3-3
Combined Check	0.2684073	Pass	0.2684073	1	3. 1.2D+1.6S+0.5W	H1-1a
Strong Flexure Check	0.0245100	Pass	3.2978183 K-in	134.55 K-in	6. 1.2D+E+L+0.2S »+X	F7-1
Strong Shear Check	0.0006763	Pass	-0.02290152 K	33.861739 K	6. 1.2D+E+L+0.2S »+X	G4-1

Member:COL002

<p>1. Member Properties Length: 144 in Shape: HSS10X10X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.858816 K Framing: Column</p>	<p>2. Connections Start: N003 @ (144, 144, 0 in) - Free End: N004 @ (144, 0, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -20.964567 K (11) -> -0.37536219 K (2) My: 0 K-in (12) -> 0 K-in (12) Mz: -355.29869 K-in (15) -> 233.59666 K-in (5) Vy: -2.6042124 K (5) -> 2.6129015 K (15) Vz: 0 K (12) -> 0 K (7) Torsion: 0 K-in (5) -> 0 K-in (4)</p>
<p>5. Extreme Deflections (all cases) Total Dy: -1.1888714 in (5) -> 1.4538827 in (15) Total Dz: 0 in (11) -> 0 in (3) Beam Dy: 0.00569221 in (11) -> 0.6467865 in (15) Beam Dz: 0 in (15) -> 0 in (12)</p>		

Member Design Checks:COL002

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0265530	Pass	20.964567 K	789.53754 K	3. 1.2D+1.6S+L	E3-2
Combined Check	0.1251487	Pass	0.12514867	1	6. 1.2D+E+L+0.2S »+X	H1-1b
Strong Flexure Check	0.1172417	Pass	-355.29869 K-in	3030.48 K-in	6. 1.2D+E+L+0.2S »+X	F7-1
Strong Shear Check	0.0109633	Pass	2.6129015 K	238.33071 K	6. 1.2D+E+L+0.2S »+X	G4-1

Member:BmX001

<p>1. Member Properties Length: 144 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.7647552 K Framing: Beam</p>	<p>2. Connections Start: N001 @ (0, 0, 0 in) - Free End: N004 @ (144, 0, 0 in) - Free</p>	<p>3. Applied Loads Unif.: (D) Force Y -0.0025 K/in (L) Force Y -0.00666667 K/in</p>
<p>4. Extreme Forces Axial: -0.92800273 K (4) -> 0.9378352 K (5) My: -364.16967 K-in (5) -> 604.53498 K-in (15) Mz: 0 K-in (15) -> 0 K-in (5) Vy: 0 K (15) -> 0 K (5) Vz: -3.4438091 K (5) -> 5.1130127 K (15) Torsion: 0 K-in (8) -> 0 K-in (22)</p>		
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (5) -> 0 in (15) Total Dz: -0.13965928 in (15) -> 0.11432297 in (5) Beam Dy: 0 in (24) -> 0 in (5) Beam Dz: 0.00037632 in (24) -> 0.01031342 in (5)</p>		

Member Design Checks:BmX001

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0013413	Pass	0.92420737 K	689.04903 K	7. 0.9D+E »+X	E3-2
Combined Check	0.2746305	Pass	0.2746305	1	6. 1.2D+E+L+0.2S »+X	H1-1b
Weak Flexure Check	0.2739642	Pass	604.53498 K-in	2206.62 K-in	6. 1.2D+E+L+0.2S »+X	F7-1
Weak Shear Check	0.0283109	Pass	5.1130127 K	180.60255 K	6. 1.2D+E+L+0.2S »+X	G4-1

Member:COL003

<p>1. Member Properties Length: 114 in Shape: HSS3X3X.375 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.10975464 K Framing: Column</p>	<p>2. Connections Start: N001 @ (0, 0, 0 in) - Free End: N005 @ (0, -114, 0 in) - Other</p>	<p>4. Extreme Forces Axial: -11.580967 K (12) -> 5.4083333 K (4) My: 0 K-in (15) -> 0 K-in (15) Mz: -3.2978183 K-in (15) -> 2.0465788 K-in (5) Vy: -0.01795245 K (5) -> 0.02892823 K (15) Vz: 0 K (5) -> 0 K (15) Torsion: 0 K-in (1)</p>
<p>5. Extreme Deflections (all cases) Total Dy: -0.62778174 in (5) -> 0.80734002 in (15) Total Dz: 0 in (5) -> 0 in (15) Beam Dy: 0.00499718 in (19) -> 0.80734002 in (15) Beam Dz: 0 in (19) -> 0 in (15)</p>		

Member Design Checks:COL003

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.1807336	Pass	11.580967 K	64.077543 K	3. 1.2D+1.6S+0.5W	E3-2
Combined Check	0.1010740	Pass	0.10107405	1	6. 1.2D+E+L+0.2S »+X (custom)	H1-1b
Strong Flexure Check	0.0245100	Pass	-3.2978183 K-in	134.55 K-in	6. 1.2D+E+L+0.2S »+X	F7-1
Strong Shear Check	0.0008543	Pass	0.02892823 K	33.861739 K	6. 1.2D+E+L+0.2S »+X	G4-1

Member:COL004

<p>1. Member Properties Length: 114 in Shape: HSS10X10X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.679896 K Framing: Column</p>	<p>2. Connections Start: N004 @ (144, 0, 0 in) - Free End: N006 @ (144, -114, 0 in) - Other</p>	<p>4. Extreme Forces Axial: -30.377342 K (8) -> -5.4083333 K (4) My: 0 K-in (7) -> 0 K-in (7) Mz: -403.1678 K-in (4) -> 403.79342 K-in (5) Vy: -3.5420476 K (5) -> 3.5365597 K (4) Vz: 0 K (7) -> 0 K (3) Torsion: 0 K-in (4) -> 0 K-in (5)</p>
<p>5. Extreme Deflections (all cases) Total Dy: -0.62753271 in (5) -> 0.80709622 in (15) Total Dz: 0 in (7) -> 0 in (3) Beam Dy: 0.00499552 in (19) -> 0.80709622 in (15) Beam Dz: 0 in (3) -> 0 in (7)</p>		

Member Design Checks:COL004

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0371156	Pass	30.377342 K	818.45103 K	2. 1.2D+1.6L+0.5S	E3-2
Combined Check	0.1474238	Pass	0.14742377	1	6. 1.2D+E+L+0.2S »+X	H1-1b
Strong Flexure Check	0.1332440	Pass	403.79342 K-in	3030.48 K-in	6. 1.2D+E+L+0.2S »+X (custom)	F7-1
Strong Shear Check	0.0148619	Pass	-3.5420476 K	238.33071 K	6. 1.2D+E+L+0.2S »+X (custom)	G4-1

Member:RBX001

<p>1. Member Properties Length: 48 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.2549184 K Framing: Bracing</p>	<p>2. Connections Start: N002 @ (0, 144, 0 in) - Free End: N007 @ (48, 144, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -2.6129015 K (15) -> 2.6042124 K (5) My: -226.10489 K-in (12) -> 98.149225 K-in (4) Mz: 0 K-in (4) -> 0 K-in (12) Vy: 0 K (4) -> 0 K (12) Vz: -4.8634697 K (12) -> 2.0447755 K (4) Torsion: 0 K-in (2) -> 0 K-in (11)</p>
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (5) -> 0 in (4) Total Dz: -0.06408948 in (4) -> 0.1060307 in (5) Beam Dy: 0 in (24) -> 0 in (5) Beam Dz: 0.0033683 in (24) -> 0.08224256 in (5)</p>		

Member Design Checks:RBX001

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0034305	Pass	2.6129015 K	761.67675 K	6. 1.2D+E+L+0.2S »+X	E3-2
Combined Check	0.1024690	Pass	0.10246903	1	3. 1.2D+1.6S+0.5W	H1-1b
Weak Flexure Check	0.1024666	Pass	-226.10489 K-in	2206.62 K-in	3. 1.2D+1.6S+0.5W	F7-1
Weak Shear Check	0.0269291	Pass	-4.8634697 K	180.60255 K	3. 1.2D+1.6S+0.5W	G4-1

Member:RBX002

<p>1. Member Properties Length: 48 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.2549184 K Framing: Bracing</p>	<p>2. Connections Start: N007 @ (48, 144, 0 in) - Free End: N008 @ (96, 144, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -2.6129015 K (15) -> 2.6042124 K (5) My: -257.06577 K-in (5) -> 196.29845 K-in (4) Mz: 0 K-in (4) -> 0 K-in (5) Vy: 0 K (15) -> 0 K (5) Vz: -1.2077685 K (5) -> 3.1876846 K (15) Torsion: 0 K-in (12) -> 0 K-in (7)</p>
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (5) -> 0 in (4) Total Dz: -0.07900643 in (4) -> 0.11963091 in (5) Beam Dy: 0 in (5) -> 0 in (15) Beam Dz: 0.00114688 in (5) -> 0.02088334 in (15)</p>		

Member Design Checks:RBX002

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0034305	Pass	2.6129015 K	761.67675 K	6. 1.2D+E+L+0.2S »+X	E3-2
Combined Check	0.1181794	Pass	0.11817944	1	6. 1.2D+E+L+0.2S »+X (custom)	H1-1b
Weak Flexure Check	0.1164975	Pass	-257.06577 K-in	2206.62 K-in	6. 1.2D+E+L+0.2S »+X (custom)	F7-1
Weak Shear Check	0.0176503	Pass	3.1876846 K	180.60255 K	6. 1.2D+E+L+0.2S »+X	G4-1

Member:RBX003

<p>1. Member Properties Length: 48 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.2549184 K Framing: Bracing</p>	<p>2. Connections Start: N008 @ (96, 144, 0 in) - Free End: N003 @ (144, 144, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -2.6129015 K (15) -> 2.6042124 K (5) My: -257.06577 K-in (5) -> 437.00164 K-in (15) Mz: 0 K-in (15) -> 0 K-in (5) Vy: 0 K (11) -> 0 K (2) Vz: 0.37536219 K (2) -> 8.0019177 K (11) Torsion: 0 K-in (12) -> 0 K-in (7)</p>
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (5) -> 0 in (4) Total Dz: -0.07510458 in (4) -> 0.10717757 in (5) Beam Dy: 0 in (7) -> 0 in (5) Beam Dz: 0.00542479 in (7) -> 0.10254748 in (5)</p>		

Member Design Checks:RBX003

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0034261	Pass	2.6129015 K	762.6506 K	6. 1.2D+E+L+0.2S »+X	E3-2
Combined Check	0.1997542	Pass	0.19975422	1	6. 1.2D+E+L+0.2S »+X	H1-1b
Weak Flexure Check	0.1980412	Pass	437.00164 K-in	2206.62 K-in	6. 1.2D+E+L+0.2S »+X	F7-1
Weak Shear Check	0.0443068	Pass	8.0019177 K	180.60255 K	3. 1.2D+1.6S+L	G4-1

Member:BmX002

<p>1. Member Properties Length: 27 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.1433916 K Framing: Beam</p>	<p>2. Connections Start: N003 @ (144, 144, 0 in) - Free End: N009 @ (171, 144, 0 in) - Free</p>	<p>4. Extreme Forces Axial: 0 K (5) -> 0 K (4) My: 0 K-in (5) -> 161.08294 K-in (11) Mz: 0 K-in (11) -> 0 K-in (6) Vy: 0 K (2) -> 0 K (11) Vz: -6.0520699 K (12) -> 0 K (2) Torsion: 0 K-in (7) -> 0 K-in (12)</p>
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (15) -> 0 in (5) Total Dz: -0.07285614 in (5) -> 0.08202286 in (15) Beam Dy: 0 in (9) -> 0 in (5) Beam Dz: 0.00022872 in (9) -> 0.07748623 in (5)</p>		

Member Design Checks:BmX002

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Weak Flexure Check	0.0729999	Pass	161.08294 K-in	2206.62 K-in	3. 1.2D+1.6S+L	F7-1
Weak Shear Check	0.0335104	Pass	-6.0520699 K	180.60255 K	3. 1.2D+1.6S+0.5W	G4-1

Member:BmX003

<p>1. Member Properties Length: 36 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.1911888 K Framing: Beam</p>	<p>2. Connections Start: N004 @ (144, 0, 0 in) - Free End: N010 @ (180, 0, 0 in) - Free</p>	<p>3. Applied Loads Unif.: (D) Force Y -0.0025 K/in (L) Force Y -0.00666667 K/in</p>
<p>4. Extreme Forces Axial: 0 K (12) -> 0 K (1) My: 0 K-in (5) -> 423.38568 K-in (8) Mz: 0 K-in (8) -> 0 K-in (7) Vy: 0 K (3) -> 0 K (8) Vz: -12.121427 K (7) -> 0 K (3) Torsion: 0 K-in (22) -> 0 K-in (8)</p>		
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (15) -> 0 in (5) Total Dz: -0.11800949 in (5) -> 0.21193498 in (15) Beam Dy: 0 in (12) -> 0 in (15) Beam Dz: 0.00199079 in (12) -> 0.20738722 in (15)</p>		

Member Design Checks:BmX003

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Weak Flexure Check	0.1918707	Pass	423.38568 K-in	2206.62 K-in	2. 1.2D+1.6L+0.5S	F7-1
Weak Shear Check	0.0671166	Pass	-12.121427 K	180.60255 K	2. 1.2D+1.6L+0.5Lr	G4-1

Result Case Legend

(1) D	(10) 3. 1.2D+1.6Lr+0.5W
(3) S	(4) E+X
(5) 6. 1.2D+E+L+0.2S »+X (custom)	(6) 1. 1.4D
(7) 2. 1.2D+1.6L+0.5Lr	(8) 2. 1.2D+1.6L+0.5S
(9) 3. 1.2D+1.6Lr+L	
(11) 3. 1.2D+1.6S+L	(12) 3. 1.2D+1.6S+0.5W
(13) 4. 1.2D+W+L+0.5S	(14) 5. 0.9D+W
(15) 6. 1.2D+E+L+0.2S »+X	(16) 7. 0.9D+E »+X
(17) 1. D	(18) 2. D+L
(19) 3. D+S	(2) L
(20) 4. D+0.75(L+Lr)	(21) 4. D+0.75(L+S)
(22) 7. 0.6D+0.6W	(23) 8. D+0.7E »+X
(24) 9. D+0.75(0.7E+L+S) »+X	(25) 10. 0.6D+0.7E »+X

Model Check Information

No errors were found in your model.

Result Cases

Name	ID	Design Checks	Result Type	P-Delta?	Seismic Type
1. 1.4D	6	Strength (LRFD)	Static	No	N.A.
1. D	17	Allowable (ASD)	Static	No	N.A.
2. 1.2D+1.6L+0.5Lr	7	Strength (LRFD)	Static	No	N.A.
2. 1.2D+1.6L+0.5S	8	Strength (LRFD)	Static	No	N.A.
2. D+L	18	Allowable (ASD)	Static	No	N.A.
3. 1.2D+1.6Lr+0.5W	10	Strength (LRFD)	Static	No	N.A.
3. 1.2D+1.6Lr+L	9	Strength (LRFD)	Static	No	N.A.
3. 1.2D+1.6S+0.5W	12	Strength (LRFD)	Static	No	N.A.
3. 1.2D+1.6S+L	11	Strength (LRFD)	Static	No	N.A.
3. D+S	19	Allowable (ASD)	Static	No	N.A.
4. 1.2D+W+L+0.5S	13	Strength (LRFD)	Static	No	N.A.
4. D+0.75(L+Lr)	20	Allowable (ASD)	Static	No	N.A.
4. D+0.75(L+S)	21	Allowable (ASD)	Static	No	N.A.
5. 0.9D+W	14	Strength (LRFD)	Static	No	N.A.
6. 1.2D+E+L+0.2S »+X	15	Strength (LRFD)	Static	No	Normal
6. 1.2D+E+L+0.2S »+X (custom)	5	Strength (LRFD)	Static	No	Normal
7. 0.6D+0.6W	22	Allowable (ASD)	Static	No	N.A.

Result Cases (continued)

Name	ID	Design Checks	Result Type	P-Delta?	Seismic Type
7. 0.9D+E »+X	16	Strength (LRFD)	Static	No	Normal
8. D+0.7E »+X	23	Allowable (ASD)	Static	No	Normal
9. D+0.75(0.7E+L+S) »+X	24	Allowable (ASD)	Static	No	Normal
10. 0.6D+0.7E »+X	25	Allowable (ASD)	Static	No	Normal
D	1	No Design	Static	No	N.A.
E+X	4	No Design	Static	No	Normal
L	2	No Design	Static	No	N.A.
S	3	No Design	Static	No	N.A.

Result Check Information

<p>INFORMATION: Analysis results could be inaccurate. This report might assist your validation efforts. The following are heuristic and may or may not indicate problems. Please check your results carefully.</p> <p>INFORMATION: Displacements appear to be within reason.</p> <p>INFORMATION: Stresses are less than yield or crushing strength.</p>
--

Member Analysis Properties

Name	Member Section	X1 in	Y1 in	Z1 in	X2 in	Y2 in	Z2 in	Elasticity, E Ksi	A in ²	Iz in ⁴	Iy in ⁴	Releases	Action
BmX001	HSS10X8X.625	0.00000	0.00000	0.00000	144.0000	0.000000	0.00000	29000.0000000	18.7000	253.0000	178.0000	RY1,RZ1	Normal
BmX002	HSS10X8X.625	144.000000	144.000000	0.000000	171.0000	144.000000	0.000000	29000.0000000	18.7000	253.0000	178.0000	(none)	Normal
BmX003	HSS10X8X.625	144.000000	0.000000	0.000000	180.0000	0.000000	0.000000	29000.0000000	18.7000	253.0000	178.0000	(none)	Normal
COL001	HSS3X3X.375	0.000000	0.000000	0.000000	0.000000	144.000000	0.000000	29000.0000000	3.390000	3.780000	3.780000	(none)	Normal
COL002	HSS10X10X.625	144.000000	144.000000	0.000000	144.0000	0.000000	0.000000	29000.0000000	21.0000	304.0000	304.0000	(none)	Normal
COL003	HSS3X3X.375	0.000000	0.000000	0.000000	0.000000	114.000000	0.000000	29000.0000000	3.390000	3.780000	3.780000	(none)	Normal
COL004	HSS10X10X.625	144.000000	0.000000	0.000000	144.0000	114.000000	0.000000	29000.0000000	21.0000	304.0000	304.0000	(none)	Normal
RBX001	HSS10X8X.625	0.000000	144.000000	0.000000	48.000000	144.000000	0.000000	29000.0000000	18.7000	253.0000	178.0000	RY1,RZ1	Normal
RBX002	HSS10X8X.625	48.000000	144.000000	0.000000	96.000000	144.000000	0.000000	29000.0000000	18.7000	253.0000	178.0000	(none)	Normal
RBX003	HSS10X8X.625	96.000000	144.000000	0.000000	144.0000	144.000000	0.000000	29000.0000000	18.7000	253.0000	178.0000	(none)	Normal

Member Connection Forces

Member	Result Case	Location	Fx K	Ry K	Rz K	Torsion K-in	My K-in	Mz K-in
BmX001	6. 1.2D+E+L+0.2S »+X	End	-0.9181703	0.0000000	-5.1130127	0.0000000	604.5349837	0.0000000
BmX001	6. 1.2D+E+L+0.2S »+X (custom)	End	0.9378352	0.0000000	1.6141029	0.0000000	-364.1696662	0.0000000

Member Connection Forces (continued)

Member	Result Case	Location	Fx K	Ry K	Rz K	Torsion K-in	My K-in	Mz K-in
BmX001	6. 1.2D+E+L+0.2S »+X (custom)	Start	0.9378352	0.0000000	-3.4438091	0.0000000	0.0000000	0.0000000
BmX001	E+X	End	-0.9280027	0.0000000	-3.3635578	0.0000000	484.3523250	0.0000000
BmX001	E+X	Start	-0.9280027	0.0000000	3.3635578	0.0000000	0.0000000	0.0000000
BmX002	3. 1.2D+1.6S+0.5W	End	0.0000000	0.0000000	5.8800000	0.0000000	0.0000000	0.0000000
BmX002	3. 1.2D+1.6S+0.5W	Start	0.0000000	0.0000000	-6.0520699	0.0000000	161.0829439	0.0000000
BmX002	3. 1.2D+1.6S+L	Start	0.0000000	0.0000000	-6.0520699	0.0000000	161.0829439	0.0000000
BmX003	2. 1.2D+1.6L+0.5Lr	End	0.0000000	0.0000000	11.4000000	0.0000000	0.0000000	0.0000000
BmX003	2. 1.2D+1.6L+0.5Lr	Start	0.0000000	0.0000000	-12.1214266	0.0000000	423.3856781	0.0000000
BmX003	2. 1.2D+1.6L+0.5S	Start	0.0000000	0.0000000	-12.1214266	0.0000000	423.3856781	0.0000000
COL001	3. 1.2D+1.6S+0.5W	End	-10.7434697	0.0036678	0.0000000	0.0000000	0.0000000	0.0000000
COL001	3. 1.2D+1.6S+0.5W	Start	-10.9098346	-0.0036678	0.0000000	0.0000000	0.0000000	0.5281671
COL001	6. 1.2D+E+L+0.2S »+X	End	-3.3041195	0.0229015	0.0000000	0.0000000	0.0000000	0.0000000
COL001	6. 1.2D+E+L+0.2S »+X	Start	-3.4704844	-0.0229015	0.0000000	0.0000000	0.0000000	3.2978183
COL001	6. 1.2D+E+L+0.2S »+X (custom)	End	-7.3936706	-0.0142124	0.0000000	0.0000000	0.0000000	0.0000000
COL001	6. 1.2D+E+L+0.2S »+X (custom)	Start	-7.5600355	0.0142124	0.0000000	0.0000000	0.0000000	-2.0465788
COL001	E+X	End	2.0447755	0.0185569	0.0000000	0.0000000	0.0000000	0.0000000
COL001	E+X	Start	2.0447755	-0.0185569	0.0000000	0.0000000	0.0000000	2.6721985
COL002	3. 1.2D+1.6S+L	End	-20.9645668	-0.0055974	0.0000000	0.0000000	0.0000000	-77.5923217
COL002	3. 1.2D+1.6S+L	Start	-19.9339876	0.0055974	0.0000000	0.0000000	0.0000000	-78.3983485
COL002	6. 1.2D+E+L+0.2S »+X	End	-13.5162358	-2.6129015	0.0000000	0.0000000	0.0000000	20.9591239
COL002	6. 1.2D+E+L+0.2S »+X	Start	-12.4856566	2.6129015	0.0000000	0.0000000	0.0000000	355.2986944
COL002	6. 1.2D+E+L+0.2S »+X (custom)	End	-9.4266848	2.6042124	0.0000000	0.0000000	0.0000000	141.4099231
COL002	6. 1.2D+E+L+0.2S »+X (custom)	Start	-8.3961056	-2.6042124	0.0000000	0.0000000	0.0000000	233.5966557
COL002	E+X	End	-2.0447755	-2.6085569	0.0000000	0.0000000	0.0000000	81.1845235
COL003	3. 1.2D+1.6S+0.5W	End	-11.5809669	-0.0046330	0.0000000	0.0000000	0.0000000	0.0000000
COL003	3. 1.2D+1.6S+0.5W	Start	-11.4492613	0.0046330	0.0000000	0.0000000	0.0000000	-0.5281671
COL003	6. 1.2D+E+L+0.2S »+X	End	-0.3188835	-0.0289282	0.0000000	0.0000000	0.0000000	0.0000000
COL003	6. 1.2D+E+L+0.2S »+X	Start	-0.1871780	0.0289282	0.0000000	0.0000000	0.0000000	-3.2978183
COL003	6. 1.2D+E+L+0.2S »+X (custom)	End	-11.1355502	0.0179524	0.0000000	0.0000000	0.0000000	0.0000000
COL003	6. 1.2D+E+L+0.2S »+X (custom)	Start	-11.0038446	-0.0179524	0.0000000	0.0000000	0.0000000	2.0465788
COL003	E+X	End	5.4083333	-0.0234403	0.0000000	0.0000000	0.0000000	0.0000000
COL003	E+X	Start	5.4083333	0.0234403	0.0000000	0.0000000	0.0000000	-2.6721985
COL004	2. 1.2D+1.6L+0.5S	End	-30.3773420	0.0111892	0.0000000	0.0000000	0.0000000	0.0000000
COL004	2. 1.2D+1.6L+0.5S	Start	-29.5614668	-0.0111892	0.0000000	0.0000000	0.0000000	1.2755698
COL004	6. 1.2D+E+L+0.2S »+X (custom)	End	-13.8858837	3.5420476	0.0000000	0.0000000	0.0000000	0.0000000
COL004	6. 1.2D+E+L+0.2S »+X (custom)	Start	-13.0700085	-3.5420476	0.0000000	0.0000000	0.0000000	403.7934212
COL004	E+X	End	-5.4083333	-3.5365597	0.0000000	0.0000000	0.0000000	0.0000000
COL004	E+X	Start	-5.4083333	3.5365597	0.0000000	0.0000000	0.0000000	403.1678015
RBX001	3. 1.2D+1.6S+0.5W	End	-0.0036678	0.0000000	4.5575676	0.0000000	-226.1048949	0.0000000

Member Connection Forces (continued)

Member	Result Case	Location	Fx K	Ry K	Rz K	Torsion K-in	My K-in	Mz K-in
RBX001	3. 1.2D+1.6S+0.5W	Start	-0.0036678	0.0000000	-4.8634697	0.0000000	0.0000000	0.0000000
RBX001	6. 1.2D+E+L+0.2S »+X	End	-2.6129015	0.0000000	0.0582174	0.0000000	-10.1360871	0.0000000
RBX001	6. 1.2D+E+L+0.2S »+X	Start	-2.6129015	0.0000000	-0.3641195	0.0000000	0.0000000	0.0000000
RBX001	6. 1.2D+E+L+0.2S »+X (custom)	End	2.6042124	0.0000000	4.1477685	0.0000000	-206.4345371	0.0000000
RBX001	6. 1.2D+E+L+0.2S »+X (custom)	Start	2.6042124	0.0000000	-4.4536706	0.0000000	0.0000000	0.0000000
RBX001	E+X	End	-2.6085569	0.0000000	-2.0447755	0.0000000	98.1492250	0.0000000
RBX001	E+X	Start	-2.6085569	0.0000000	2.0447755	0.0000000	0.0000000	0.0000000
RBX002	3. 1.2D+1.6S+0.5W	Start	-0.0036678	0.0000000	1.3224324	0.0000000	-226.1048949	0.0000000
RBX002	6. 1.2D+E+L+0.2S »+X	End	-2.6129015	0.0000000	-3.1876846	0.0000000	135.5311257	0.0000000
RBX002	6. 1.2D+E+L+0.2S »+X	Start	-2.6129015	0.0000000	2.8817826	0.0000000	-10.1360871	0.0000000
RBX002	6. 1.2D+E+L+0.2S »+X (custom)	End	2.6042124	0.0000000	0.9018664	0.0000000	-257.0657744	0.0000000
RBX002	6. 1.2D+E+L+0.2S »+X (custom)	Start	2.6042124	0.0000000	-1.2077685	0.0000000	-206.4345371	0.0000000
RBX002	E+X	End	-2.6085569	0.0000000	-2.0447755	0.0000000	196.2984500	0.0000000
RBX002	E+X	Start	-2.6085569	0.0000000	2.0447755	0.0000000	98.1492250	0.0000000
RBX003	3. 1.2D+1.6S+L	End	-0.0055974	0.0000000	-8.0019177	0.0000000	239.4812924	0.0000000
RBX003	3. 1.2D+1.6S+L	Start	-0.0055974	0.0000000	7.6960156	0.0000000	-137.2691049	0.0000000
RBX003	6. 1.2D+E+L+0.2S »+X	End	-2.6129015	0.0000000	-6.4335867	0.0000000	437.0016383	0.0000000
RBX003	6. 1.2D+E+L+0.2S »+X	Start	-2.6129015	0.0000000	6.1276846	0.0000000	135.5311257	0.0000000
RBX003	6. 1.2D+E+L+0.2S »+X (custom)	End	2.6042124	0.0000000	-2.3440357	0.0000000	-151.8937118	0.0000000
RBX003	6. 1.2D+E+L+0.2S »+X (custom)	Start	2.6042124	0.0000000	2.0381336	0.0000000	-257.0657744	0.0000000
RBX003	E+X	Start	-2.6085569	0.0000000	2.0447755	0.0000000	196.2984500	0.0000000

Ry and Rz reactions are positive when in the direction of member local y and z (i.e. in typical situations uplift is negative).

Member Forces

(extreme rows: max and min)

Member	Fx Min K	Fx Max K	Vy K	Vz K	Torsion K-in	My Min K-in	My Max K-in	Mz Min K-in	Mz Max K-in
BmX001	-0.9280027 (4)	0.9378352 (5)	0.0000000 (15)	5.1130127 (15)	0.0000000 (8)	-364.1696662 (5)	604.5349837 (15)	0.0000000 (15)	0.0000000 (5)
BmX003	0.0000000 (12)	0.0000000 (25)	0.0000000 (8)	12.121426 (7)	0.0000000 (8)	0.0000000 (5)	423.3856781 (8)	0.0000000 (8)	0.0000000 (7)
COL001	-10.9098346 (12)	2.0447755 (4)	-0.0229015 (15)	0.0000000 (11)	0.0000000 (25)	0.0000000 (11)	0.0000000 (11)	-2.0465788 (5)	3.2978183 (15)
COL002	-20.9645668 (11)	-0.3753622 (2)	2.6129015 (15)	0.0000000 (12)	0.0000000 (5)	0.0000000 (12)	0.0000000 (12)	-355.2986944 (15)	233.5966557 (5)
COL003	-11.5809669 (12)	5.4083333 (4)	0.0289282 (15)	0.0000000 (15)	0.0000000 (25)	0.0000000 (15)	0.0000000 (15)	-3.2978183 (15)	2.0465788 (5)
COL004	-30.3773420 (8)	-5.4083333 (4)	3.5420476 (5)	0.0000000 (7)	0.0000000 (5)	0.0000000 (7)	0.0000000 (7)	-403.1678015 (4)	403.7934212 (5)
RBX001	-2.6129015 (15)	2.6042124 (5)	0.0000000 (12)	-4.8634697 (12)	0.0000000 (11)	-226.1048949 (12)	98.1492250 (4)	0.0000000 (4)	0.0000000 (12)
RBX003	-2.6129015 (15)	2.6042124 (5)	0.0000000 (11)	8.0019177 (11)	0.0000000 (12)	-257.0657744 (5)	437.0016383 (15)	0.0000000 (15)	0.0000000 (5)

Member Stresses

(extreme rows: max and min)

Member	fa Min Ksi	fa Max Ksi	fby Min Ksi	fby Max Ksi	fbz Min Ksi	fbz Max Ksi	fc comb Min Ksi	fc comb Max Ksi
BmX001	-0.0496258 (4)	0.0501516 (5)	-13.5850558 (15)	13.5850558 (15)	0.0000000 (15)	0.0000000 (15)	-13.6341558 (15)	13.5359558 (15)
BmX002	0.0000000 (5)	0.0000000 (25)	-3.6198414 (11)	3.6198414 (11)	0.0000000 (11)	0.0000000 (11)	-3.6198414 (12)	3.6198414 (11)
COL001	-3.2182403 (12)	0.6031786 (4)	0.0000000 (11)	0.0000000 (11)	-1.3086580 (15)	1.3086580 (15)	-3.4827291 (11)	1.6635749 (4)
COL003	-3.4162144 (12)	1.5953786 (4)	0.0000000 (15)	0.0000000 (15)	-1.3086580 (15)	1.3086580 (15)	-4.0581063 (5)	2.6557748 (4)
COL004	-1.4465401 (8)	-0.2575397 (4)	0.0000000 (7)	0.0000000 (7)	-6.6413392 (5)	6.6413392 (5)	-7.7582203 (15)	6.3735097 (4)

Node Reactions

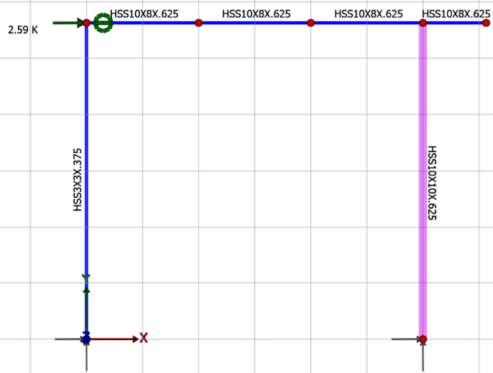
(extreme rows: max and min)

Node	Result Case	FX K	FY K	MZ K-in
N005	E+X	-0.0234403	-5.4083333	0.0000000
N006	2. 1.2D+1.6L+0.5S	0.0111892	30.3773420	0.0000000
N006	6. 1.2D+E+L+0.2S »+X (custom)	3.5420476	13.8858837	0.0000000
N006	E+X	-3.5365597	5.4083333	0.0000000

Node Results

(extreme rows: max and min)

Node	Result Case	DX in	DY in	FX K	FY K	MZ K-in
N002	6. 1.2D+E+L+0.2S »+X	1.4545765	-0.0052550	0.0000000	0.0000000	0.0000000
N002	6. 1.2D+E+L+0.2S »+X (custom)	-1.1895629	-0.0237881	0.0000000	0.0000000	0.0000000
N005	E+X	0.0000000	0.0000000	-0.0234403	-5.4083333	0.0000000
N006	2. 1.2D+1.6L+0.5S	0.0000000	0.0000000	0.0111892	30.3773420	0.0000000
N006	6. 1.2D+E+L+0.2S »+X (custom)	0.0000000	0.0000000	3.5420476	13.8858837	0.0000000
N006	E+X	0.0000000	0.0000000	-3.5365597	5.4083333	0.0000000
N010	6. 1.2D+E+L+0.2S »+X	0.8070962	-0.2119350	0.0000000	0.0000000	0.0000000
N010	6. 1.2D+E+L+0.2S »+X (custom)	-0.6275327	0.1180095	0.0000000	0.0000000	0.0000000



Front

Model Summary

	Model Dimensions: X: 171 in Y: 135 in Z: 0 in Object Counts: Nodes: 7 Spring Supports: 0 Members: 6 Cables: 0 Areas: 0 Plates: 0 Auto-Meshed Areas: 0 Auto-Meshed Plates: 0 Foundations: 0 Nonlinear Features: One-Way Spring Supports: 0 One-Way Members: 0
--	--

Materials

Name	Elasticity, E Ksi	Poisson, v	Density, γ K/in ³	Thermal, α in/in/deg-F	Shear Modulus, G Ksi
ASTM A500 Grade B (Fy = 46ksi)	29000.0000000	0.2900000	0.0002840	0.0000064	11240.3100775

Nodal Supports

Name	Fix DX	Fix DY	Fix RZ
N001	Yes	Yes	No
N004	Yes	Yes	No

Nodes

Name	X in	Y in	Support	Mass K	Scissor
N001	0.0000000	0.0000000	DX DY	0.0000000	No
N002	0.0000000	135.0000000	Free	0.0000000	No
N003	144.0000000	135.0000000	Free	0.0000000	No
N004	144.0000000	0.0000000	DX DY	0.0000000	No
N007	48.0000000	135.0000000	Free	0.0000000	No
N008	96.0000000	135.0000000	Free	0.0000000	No
N009	171.0000000	135.0000000	Free	0.0000000	No

Members

Name	Node 1	Node 2	Shape	Material	End Connection	Crossing Connection?	Beta, B deg	Length in	Weight K	Offset y in	Offset z in	Framing	Action	
BmX002	N003	N009	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	90.000000	27.000000	0.1433916	0.0000000	0.0000000	0	Beam	Normal
COLO01	N001	N002	HSS3X3X.375	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.0000000	135.000000	0.1299726	0.0000000	0.0000000	0	Column	Normal
COLO02	N003	N004	HSS10X10X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.0000000	135.000000	0.8051400	0.0000000	0.0000000	0	Column	Normal
RBX001	N002	N007	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Simple Rigid	Yes	90.000000	48.000000	0.2549184	0.0000000	0.0000000	0	Bracing	Normal

Members (continued)

Member	Node 1	Node 2	Shape	Material	End Connection	Crossing Connection?	Beta, B deg	Length in	Weight K	Offset y in	Offset z in	Framing	Action
RBX002	N007	N008	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	90.000000	48.000000	0.2549184	0.0000000	0.0000000	Bracing	Normal
RBX003	N008	N003	HSS10X8X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	90.000000	48.000000	0.2549184	0.0000000	0.0000000	Bracing	Normal

Nodal Loads

Node	Service Case	Type & Direction	Magnitude	Predefined Load
N002	D	Force Y	-2.1000000 K	N.A.
N002	E+X	Force X	2.5900000 K	N.A.
N002	S	Force Y	-2.1000000 K	N.A.
N003	D	Force Y	-2.1000000 K	N.A.
N003	S	Force Y	-2.1000000 K	N.A.
N007	D	Force Y	-2.1000000 K	N.A.
N007	S	Force Y	-2.1000000 K	N.A.
N008	D	Force Y	-2.1000000 K	N.A.
N008	S	Force Y	-2.1000000 K	N.A.
N009	D	Force Y	-2.1000000 K	N.A.
N009	S	Force Y	-2.1000000 K	N.A.

Factored Load Combinations

Name	Code	Effective Equation	Design	Deflection
1. 1.4D	ASCE 7-16 LRFD	1.4D	Strength	Other
1. D	ASCE 7-16 ASD	D	Allowable	Other
2. 1.2D+1.6L+0.5Lr	ASCE 7-16 LRFD	1.2D	Strength	Other
2. 1.2D+1.6L+0.5S	ASCE 7-16 LRFD	1.2D + 0.5S	Strength	Other
3. 1.2D+1.6S+L	ASCE 7-16 LRFD	1.2D + 1.6S	Strength	Other
3. D+S	ASCE 7-16 ASD	D + S	Allowable	Other
4. D+0.75(L+S)	ASCE 7-16 ASD	D + 0.75S	Allowable	Other
5. 0.9D+W	ASCE 7-16 LRFD	0.9D	Strength	Other
6. 1.2D+E+L+0.2S »+X	ASCE 7-16 LRFD	1.2D + 0.2S + E+X	Strength	Other
6. 1.2D+E+L+0.2S »+X (custom)	Custom	1.2D + 0.2S + -1E+X	Strength	Other
7. 0.6D+0.6W	ASCE 7-16 ASD	0.6D	Allowable	Other
7. 0.9D+E »+X	ASCE 7-16 LRFD	0.9D + E+X	Strength	Other
8. D+0.7E »+X	ASCE 7-16 ASD	D + 0.7E+X	Allowable	Other
9. D+0.75(0.7E+L+S) »+X	ASCE 7-16 ASD	D + 0.75S + 0.525E+X	Allowable	Other
10. 0.6D+0.7E »+X	ASCE 7-16 ASD	0.6D + 0.7E+X	Allowable	Other

Member:COL001

<p>1. Member Properties Length: 135 in Shape: HSS3X3X.375 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.1299726 K Framing: Column</p>	<p>2. Connections Start: N001 @ (0, 0, 0 in) - Other End: N002 @ (0, 135, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -11.256189 K (8) -> 2.428125 K (3) My: 0 K-in (4) -> 0 K-in (4) Mz: 0 K-in (3) -> 0 K-in (4) Vy: 0 K (3) -> 0 K (4) Vz: 0 K (3) -> 0 K (4) Torsion: 0 K-in (1)</p>
<p>5. Extreme Deflections (all cases) Total Dy: -0.68418312 in (3) -> 0.78485546 in (4) Total Dz: 0 in (4) -> 0 in (3) Beam Dy: 0.04444927 in (15) -> 0.78485546 in (4) Beam Dz: 0 in (16) -> 0 in (4)</p>		

Member Design Checks:COL001

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.2402300	Pass	11.256189 K	46.855881 K	3. 1.2D+1.6S+L	E3-3

Member:COL002

<p>1. Member Properties Length: 135 in Shape: HSS10X10X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.80514 K Framing: Column</p>	<p>2. Connections Start: N003 @ (144, 135, 0 in) - Free End: N004 @ (144, 0, 0 in) - Other</p>	<p>4. Extreme Forces Axial: -20.355723 K (8) -> -2.428125 K (3) My: 0 K-in (8) -> 0 K-in (8) Mz: -349.65 K-in (10) -> 349.65 K-in (4) Vy: -2.59 K (4) -> 2.59 K (10) Vz: 0 K (8) -> 0 K (3) Torsion: 0 K-in (3) -> 0 K-in (4)</p>
<p>5. Extreme Deflections (all cases) Total Dy: -0.78416772 in (4) -> 0.68349539 in (3) Total Dz: 0 in (8) -> 0 in (3) Beam Dy: 0.04444927 in (15) -> 0.78416772 in (4) Beam Dz: 0 in (3) -> 0 in (8)</p>		

Member Design Checks:COL002

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0254828	Pass	20.355723 K	798.8039 K	3. 1.2D+1.6S+L	E3-2
Combined Check	0.1231684	Pass	0.12316843	1	6. 1.2D+E+L+0.2S »+X	H1-1b
Strong Flexure Check	0.1153778	Pass	349.65 K-in	3030.48 K-in	6. 1.2D+E+L+0.2S »+X (custom)	F7-1
Strong Shear Check	0.0108673	Pass	2.59 K	238.33071 K	6. 1.2D+E+L+0.2S »+X	G4-1

Member:RBX001

<p>1. Member Properties Length: 48 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.2549184 K Framing: Bracing</p>	<p>2. Connections Start: N002 @ (0, 135, 0 in) - Free End: N007 @ (48, 135, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -2.59 K (10) -> 2.59 K (4) My: -245.11899 K-in (4) -> 116.55 K-in (3) Mz: 0 K-in (3) -> 0 K-in (4) Vy: 0 K (3) -> 0 K (4) Vz: -5.2595966 K (4) -> 2.428125 K (3) Torsion: 0 K-in (3) -> 0 K-in (4)</p>
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (4) -> 0 in (3) Total Dz: -0.07140448 in (3) -> 0.11982483 in (4) Beam Dy: 0 in (17) -> 0 in (4) Beam Dz: 0.01250131 in (17) -> 0.10845799 in (4)</p>		

Member Design Checks:RBX001

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0034004	Pass	2.59 K	761.67675 K	6. 1.2D+E+L+0.2S »+X	E3-2
Combined Check	0.1127562	Pass	0.1127562	1	6. 1.2D+E+L+0.2S »+X (custom)	H1-1b
Weak Flexure Check	0.1110835	Pass	-245.11899 K-in	2206.62 K-in	6. 1.2D+E+L+0.2S »+X (custom)	F7-1
Weak Shear Check	0.0291225	Pass	-5.2595966 K	180.60255 K	6. 1.2D+E+L+0.2S »+X (custom)	G4-1

Member:RBX002

<p>1. Member Properties Length: 48 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.2549184 K Framing: Bracing</p>	<p>2. Connections Start: N007 @ (48, 135, 0 in) - Free End: N008 @ (96, 135, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -2.59 K (3) -> 2.59 K (4) My: -334.43467 K-in (4) -> 233.1 K-in (3) Mz: 0 K-in (3) -> 0 K-in (4) Vy: 0 K (10) -> 0 K (4) Vz: -2.0136945 K (4) -> 3.1484576 K (10) Torsion: 0 K-in (8) -> 0 K-in (3)</p>
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (4) -> 0 in (3) Total Dz: -0.09119937 in (3) -> 0.14164375 in (4) Beam Dy: 0 in (15) -> 0 in (10) Beam Dz: 0.00257077 in (15) -> 0.02200285 in (10)</p>		

Member Design Checks:RBX002

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0034004	Pass	2.59 K	761.67675 K	6. 1.2D+E+L+0.2S »+X	E3-2
Combined Check	0.1532324	Pass	0.15323244	1	6. 1.2D+E+L+0.2S »+X (custom)	H1-1b
Weak Flexure Check	0.1515597	Pass	-334.43467 K-in	2206.62 K-in	6. 1.2D+E+L+0.2S »+X (custom)	F7-1
Weak Shear Check	0.0174331	Pass	3.1484576 K	180.60255 K	6. 1.2D+E+L+0.2S »+X	G4-1

Member:RBX003

<p>1. Member Properties Length: 48 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.2549184 K Framing: Bracing</p>	<p>2. Connections Start: N008 @ (96, 135, 0 in) - Free End: N003 @ (144, 135, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -2.59 K (3) -> 2.59 K (4) My: -334.43467 K-in (4) -> 431.35294 K-in (10) Mz: 0 K-in (10) -> 0 K-in (4) Vy: 0 K (8) -> 0 K (4) Vz: 1.2322076 K (4) -> 7.4574847 K (8) Torsion: 0 K-in (8) -> 0 K-in (3)</p>
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (4) -> 0 in (3) Total Dz: -0.08745388 in (3) -> 0.12992077 in (4) Beam Dy: 0 in (17) -> 0 in (4) Beam Dz: 0.00165021 in (17) -> 0.12813113 in (4)</p>		

Member Design Checks:RBX003

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0033958	Pass	2.59 K	762.69711 K	6. 1.2D+E+L+0.2S »+X	E3-2
Combined Check	0.1971792	Pass	0.19717922	1	6. 1.2D+E+L+0.2S »+X	H1-1b
Weak Flexure Check	0.1954813	Pass	431.35294 K-in	2206.62 K-in	6. 1.2D+E+L+0.2S »+X	F7-1
Weak Shear Check	0.0412922	Pass	7.4574847 K	180.60255 K	3. 1.2D+1.6S+L	G4-1

Member: BmX002

<p>1. Member Properties Length: 27 in Shape: HSS10X8X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.1433916 K Framing: Beam</p>	<p>2. Connections Start: N003 @ (144, 135, 0 in) - Free End: N009 @ (171, 135, 0 in) - Free</p>	<p>4. Extreme Forces Axial: 0 K (4) -> 0 K (11) My: 0 K-in (4) -> 161.08294 K-in (8) Mz: 0 K-in (8) -> 0 K-in (5) Vy: 0 K (3) -> 0 K (8) Vz: -6.0520699 K (8) -> 0 K (3) Torsion: 0 K-in (3) -> 0 K-in (8)</p>
<p>5. Extreme Deflections (all cases) Total Dy: 0 in (3) -> 0 in (4) Total Dz: -0.10303717 in (4) -> 0.08904941 in (3) Beam Dy: 0 in (15) -> 0 in (4) Beam Dz: 0.00724736 in (15) -> 0.10482681 in (4)</p>		

Member Design Checks: BmX002

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Weak Flexure Check	0.0729999	Pass	161.08294 K-in	2206.62 K-in	3. 1.2D+1.6S+L	F7-1
Weak Shear Check	0.0335104	Pass	-6.0520699 K	180.60255 K	3. 1.2D+1.6S+L	G4-1

Result Case Legend

(1) D	(10) 6. 1.2D+E+L+0.2S »+X
(2) S	(3) E+X
(4) 6. 1.2D+E+L+0.2S »+X (custom)	(5) 1. 1.4D
(6) 2. 1.2D+1.6L+0.5Lr	(7) 2. 1.2D+1.6L+0.5S
(8) 3. 1.2D+1.6S+L	(9) 5. 0.9D+W
(11) 7. 0.9D+E »+X	(12) 1. D
(13) 3. D+S	(14) 4. D+0.75(L+S)
(15) 7. 0.6D+0.6W	(16) 8. D+0.7E »+X
(17) 9. D+0.75(0.7E+L+S) »+X	(18) 10. 0.6D+0.7E »+X

Model Check Information

No errors were found in your model.

Result Cases

Name	ID	Design Checks	Result Type	P-Delta?	Seismic Type
1. 1.4D	5	Strength (LRFD)	Static	No	N.A.
1. D	12	Allowable (ASD)	Static	No	N.A.
2. 1.2D+1.6L+0.5Lr	6	Strength (LRFD)	Static	No	N.A.
2. 1.2D+1.6L+0.5S	7	Strength (LRFD)	Static	No	N.A.
3. 1.2D+1.6S+L	8	Strength (LRFD)	Static	No	N.A.
3. D+S	13	Allowable (ASD)	Static	No	N.A.
4. D+0.75(L+S)	14	Allowable (ASD)	Static	No	N.A.
5. 0.9D+W	9	Strength (LRFD)	Static	No	N.A.
6. 1.2D+E+L+0.2S »+X	10	Strength (LRFD)	Static	No	Normal
6. 1.2D+E+L+0.2S »+X (custom)	4	Strength (LRFD)	Static	No	Normal
7. 0.6D+0.6W	15	Allowable (ASD)	Static	No	N.A.

Result Cases (continued)

Name	ID	Design Checks	Result Type	P-Delta?	Seismic Type
7. 0.9D+E »+X	11	Strength (LRFD)	Static	No	Normal
8. D+0.7E »+X	16	Allowable (ASD)	Static	No	Normal
9. D+0.75(0.7E+L+S) »+X	17	Allowable (ASD)	Static	No	Normal
10. 0.6D+0.7E »+X	18	Allowable (ASD)	Static	No	Normal
D	1	No Design	Static	No	N.A.
E+X	3	No Design	Static	No	Normal
S	2	No Design	Static	No	N.A.

Result Check Information

<p>INFORMATION: Analysis results could be inaccurate. This report might assist your validation efforts. The following are heuristic and may or may not indicate problems. Please check your results carefully.</p> <p>INFORMATION: Displacements appear to be within reason.</p> <p>INFORMATION: Stresses are less than yield or crushing strength.</p>
--

Member Analysis Properties

Name	Member Section	X1 in	Y1 in	Z1 in	X2 in	Y2 in	Z2 in	Elasticity, E Ksi	A in ²	Iz in ⁴	Iy in ⁴	Releases	Action
BmX002	HSS10X8X.625	144.000000	135.000000	0.000000	171.000000	135.000000	0.000000	29000.0000000	18.7000000	253.0000000	178.0000000	(none)	Normal
COL001	HSS3X3X.375	0.000000	0.000000	0.000000	0.000000	135.000000	0.000000	29000.0000000	3.3900000	3.7800000	3.7800000	(none)	Normal
COL002	HSS10X10X.625	144.000000	135.000000	0.000000	144.000000	0.000000	0.000000	29000.0000000	21.0000000	304.0000000	304.0000000	(none)	Normal
RBX001	HSS10X8X.625	0.000000	135.000000	0.000000	48.000000	135.000000	0.000000	29000.0000000	18.7000000	253.0000000	178.0000000	RY1,RZ1	Normal
RBX002	HSS10X8X.625	48.000000	135.000000	0.000000	96.000000	135.000000	0.000000	29000.0000000	18.7000000	253.0000000	178.0000000	(none)	Normal
RBX003	HSS10X8X.625	96.000000	135.000000	0.000000	144.000000	135.000000	0.000000	29000.0000000	18.7000000	253.0000000	178.0000000	(none)	Normal

Member Connection Forces

Member	Result Case	Location	Fx K	Ry K	Rz K	Torsion K-in	My K-in	Mz K-in
BmX002	3. 1.2D+1.6S+L	End	0.0000000	0.0000000	5.8800000	0.0000000	0.0000000	0.0000000
BmX002	3. 1.2D+1.6S+L	Start	0.0000000	0.0000000	-6.0520699	0.0000000	161.0829439	0.0000000
COL001	3. 1.2D+1.6S+L	End	-11.1002216	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
COL001	3. 1.2D+1.6S+L	Start	-11.2561887	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
COL001	E+X	End	2.4281250	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
COL001	E+X	Start	2.4281250	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
COL002	3. 1.2D+1.6S+L	End	-20.3557226	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
COL002	3. 1.2D+1.6S+L	Start	-19.3895546	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
COL002	6. 1.2D+E+L+0.2S »+X	End	-13.4125976	-2.5900000	0.0000000	0.0000000	0.0000000	0.0000000

Member Connection Forces (continued)

Member	Result Case	Location	Fx K	Ry K	Rz K	Torsion K-in	My K-in	Mz K-in
COL002	6. 1.2D+E+L+0.2S »+X	Start	-12.4464296	2.5900000	0.0000000	0.0000000	0.0000000	-349.6500000
COL002	6. 1.2D+E+L+0.2S »+X (custom)	End	-8.5563476	2.5900000	0.0000000	0.0000000	0.0000000	0.0000000
COL002	6. 1.2D+E+L+0.2S »+X (custom)	Start	-7.5901796	-2.5900000	0.0000000	0.0000000	0.0000000	349.6500000
RBX001	6. 1.2D+E+L+0.2S »+X	End	-2.5900000	0.0000000	0.0974445	0.0000000	-12.0189852	0.0000000
RBX001	6. 1.2D+E+L+0.2S »+X	Start	-2.5900000	0.0000000	-0.4033466	0.0000000	0.0000000	0.0000000
RBX001	6. 1.2D+E+L+0.2S »+X (custom)	End	2.5900000	0.0000000	4.9536945	0.0000000	-245.1189852	0.0000000
RBX001	6. 1.2D+E+L+0.2S »+X (custom)	Start	2.5900000	0.0000000	-5.2595966	0.0000000	0.0000000	0.0000000
RBX001	E+X	End	-2.5900000	0.0000000	-2.4281250	0.0000000	116.5500000	0.0000000
RBX001	E+X	Start	-2.5900000	0.0000000	2.4281250	0.0000000	0.0000000	0.0000000
RBX002	6. 1.2D+E+L+0.2S »+X	End	-2.5900000	0.0000000	-3.1484576	0.0000000	131.7653294	0.0000000
RBX002	6. 1.2D+E+L+0.2S »+X	Start	-2.5900000	0.0000000	2.8425555	0.0000000	-12.0189852	0.0000000
RBX002	6. 1.2D+E+L+0.2S »+X (custom)	End	2.5900000	0.0000000	1.7077924	0.0000000	-334.4346706	0.0000000
RBX002	6. 1.2D+E+L+0.2S »+X (custom)	Start	2.5900000	0.0000000	-2.0136945	0.0000000	-245.1189852	0.0000000
RBX002	E+X	End	-2.5900000	0.0000000	-2.4281250	0.0000000	233.1000000	0.0000000
RBX002	E+X	Start	-2.5900000	0.0000000	2.4281250	0.0000000	116.5500000	0.0000000
RBX003	3. 1.2D+1.6S+L	End	0.0000000	0.0000000	-7.4574847	0.0000000	161.0829439	0.0000000
RBX003	3. 1.2D+1.6S+L	Start	0.0000000	0.0000000	7.1515826	0.0000000	-189.5346706	0.0000000
RBX003	6. 1.2D+E+L+0.2S »+X	End	-2.5900000	0.0000000	-6.3943597	0.0000000	431.3529439	0.0000000
RBX003	6. 1.2D+E+L+0.2S »+X (custom)	End	2.5900000	0.0000000	-1.5381097	0.0000000	-267.9470561	0.0000000
RBX003	6. 1.2D+E+L+0.2S »+X (custom)	Start	2.5900000	0.0000000	1.2322076	0.0000000	-334.4346706	0.0000000
RBX003	E+X	End	-2.5900000	0.0000000	-2.4281250	0.0000000	349.6500000	0.0000000
RBX003	E+X	Start	-2.5900000	0.0000000	2.4281250	0.0000000	233.1000000	0.0000000

Ry and Rz reactions are positive when in the direction of member local y and z (i.e. in typical situations uplift is negative).

Member Forces

(extreme rows: max and min)

Member	Fx Min K	Fx Max K	Vy K	Vz K	Torsion K-in	My Min K-in	My Max K-in	Mz Min K-in	Mz Max K-in
BmX002	0.0000000 (4)	0.0000000 (11)	0.0000000 (8)	-6.0520699 (8)	0.0000000 (8)	0.0000000 (4)	161.0829439 (8)	0.0000000 (8)	0.0000000 (5)
COL002	-20.3557226 (8)	-2.4281250 (3)	2.5900000 (10)	0.0000000 (8)	0.0000000 (4)	0.0000000 (8)	0.0000000 (8)	-349.6500000 (10)	349.6500000 (4)
RBX001	-2.5900000 (11)	2.5900000 (4)	0.0000000 (4)	-5.2595966 (4)	0.0000000 (4)	-245.1189852 (4)	116.5500000 (3)	0.0000000 (3)	0.0000000 (4)
RBX002	-2.5900000 (11)	2.5900000 (4)	0.0000000 (10)	3.1484576 (10)	0.0000000 (8)	-334.4346706 (4)	233.1000000 (3)	0.0000000 (3)	0.0000000 (4)
RBX003	-2.5900000 (11)	2.5900000 (4)	0.0000000 (8)	7.4574847 (8)	0.0000000 (8)	-334.4346706 (4)	431.3529439 (10)	0.0000000 (10)	0.0000000 (4)

Member Stresses

(extreme rows: max and min)

Member	fa Min Ksi	fa Max Ksi	fbx Min Ksi	fbx Max Ksi	fbz Min Ksi	fbz Max Ksi	fc comb Min Ksi	fc comb Max Ksi
BmX002	0.0000000 (4)	0.0000000 (11)	-3.6198414 (8)	3.6198414 (8)	0.0000000 (8)	0.0000000 (8)	-3.6198414 (8)	3.6198414 (8)

Member Stresses (continued)

(extreme rows: max and min)

Member	fa Min Ksi	fa Max Ksi	fbx Min Ksi	fbx Max Ksi	fbz Min Ksi	fbz Max Ksi	fc comb Min Ksi	fc comb Max Ksi
COL001	-3.3204096 (8)	0.7162611 (3)	0.0000000 (4)	0.0000000 (4)	0.0000000 (4)	0.0000000 (3)	-3.3204096 (8)	0.7162611 (3)
COL002	-0.9693201 (8)	-0.1156250 (3)	0.0000000 (8)	0.0000000 (8)	-5.7508224 (10)	5.7508224 (10)	-6.3435095 (10)	5.6351974 (3)
RBX001	-0.1385027 (11)	0.1385027 (4)	-5.5082918 (4)	5.5082918 (4)	0.0000000 (4)	0.0000000 (4)	-5.4658199 (8)	5.6467945 (4)
RBX002	-0.1385027 (11)	0.1385027 (4)	-7.5153859 (4)	7.5153859 (4)	0.0000000 (4)	0.0000000 (4)	-7.3768832 (4)	7.6538885 (4)
RBX003	-0.1385027 (11)	0.1385027 (4)	-9.6933246 (10)	9.6933246 (10)	0.0000000 (10)	0.0000000 (10)	-9.8318273 (10)	9.5548219 (10)

Node Reactions

(extreme rows: max and min)

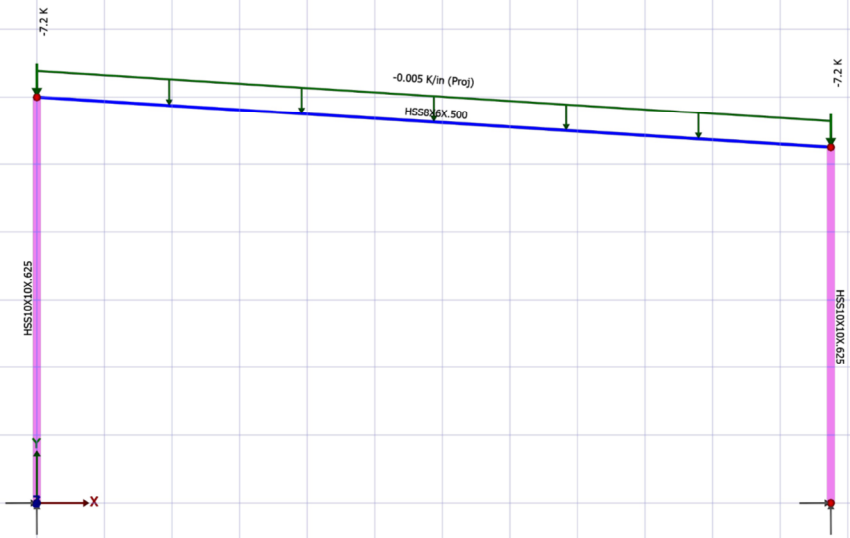
Node	Result Case	FX K	FY K	MZ K-in
N001	E+X	0.0000000	-2.4281250	0.0000000
N004	3. 1.2D+1.6S+L	0.0000000	20.3557226	0.0000000
N004	6. 1.2D+E+L+0.2S »+X	-2.5900000	13.4125976	0.0000000
N004	6. 1.2D+E+L+0.2S »+X (custom)	2.5900000	8.5563476	0.0000000
N004	7. 0.9D+E »+X	-2.5900000	9.6624169	0.0000000
N004	E+X	-2.5900000	2.4281250	0.0000000

Node Results

(extreme rows: max and min)

Node	Result Case	DX in	DY in	FX K	FY K	MZ K-in
N001	E+X	0.0000000	0.0000000	0.0000000	-2.4281250	0.0000000
N002	6. 1.2D+E+L+0.2S »+X (custom)	-0.7848555	-0.0113668	0.0000000	0.0000000	0.0000000
N002	E+X	0.6841831	0.0033343	0.0000000	0.0000000	0.0000000
N004	3. 1.2D+1.6S+L	0.0000000	0.0000000	0.0000000	20.3557226	0.0000000
N004	6. 1.2D+E+L+0.2S »+X	0.0000000	0.0000000	-2.5900000	13.4125976	0.0000000
N004	6. 1.2D+E+L+0.2S »+X (custom)	0.0000000	0.0000000	2.5900000	8.5563476	0.0000000
N004	7. 0.9D+E »+X	0.0000000	0.0000000	-2.5900000	9.6624169	0.0000000
N004	E+X	0.0000000	0.0000000	-2.5900000	2.4281250	0.0000000
N008	6. 1.2D+E+L+0.2S »+X (custom)	-0.7843970	-0.1299208	0.0000000	0.0000000	0.0000000
N009	6. 1.2D+E+L+0.2S »+X (custom)	-0.7841677	0.1030372	0.0000000	0.0000000	0.0000000

Front



Model Summary

	Model Dimensions: X: 282 in Y: 144 in Z: 0 in Object Counts: Nodes: 4 Spring Supports: 0 Members: 3 Cables: 0 Areas: 0 Plates: 0 Auto-Meshed Areas: 0 Auto-Meshed Plates: 0 Foundations: 0 Nonlinear Features: One-Way Spring Supports: 0 One-Way Members: 0
--	--

Materials

Name	Elasticity, E Ksi	Poisson, ν	Density, γ K/in ³	Thermal, α in/in/deg-F	Shear Modulus, G Ksi
ASTM A500 Grade B (Fy = 46ksi)	29000.0000000	0.2900000	0.0002840	0.0000064	11240.3100775

Nodal Supports

Name	Fix DX	Fix DY	Fix RZ
N001	Yes	Yes	No
N004	Yes	Yes	No

Nodes

Name	X in	Y in	Support	Mass K	Scissor
N001	0.0000000	0.0000000	DX DY	0.0000000	No
N002	0.0000000	144.0000000	Free	0.0000000	No
N003	282.0000000	126.0000000	Free	0.0000000	No
N004	282.0000000	0.0000000	DX DY	0.0000000	No

Members

Name	Node 1	Node 2	Shape	Material	End Connection	Crossing Connection?	Beta, B deg	Length in	Weight K	Offset y in	Offset z in	Framin g	Action
BmX001	N002	N003	HSS8X6X.500	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.0000000	282.5738841	0.9309114	0.0000000	0.0000000	Bracing	Normal
COLO01	N001	N002	HSS10X10X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.0000000	144.0000000	0.8588160	0.0000000	0.0000000	Column	Normal
COLO02	N003	N004	HSS10X10X.625	ASTM A500 Grade B (Fy = 46ksi)	Rigid Connect	Yes	0.0000000	126.0000000	0.7514640	0.0000000	0.0000000	Column	Normal

Nodal Loads

Node	Service Case	Type & Direction	Magnitude	Predefined Load
N002	D	Force Y	-7.2000000 K	N.A.
N002	E+X	Force X	3.2300000 K	N.A.

Nodal Loads (continued)

Node	Service Case	Type & Direction	Magnitude	Predefined Load
N002	S	Force Y	-8.0600000 K	N.A.
N003	D	Force Y	-7.2000000 K	N.A.
N003	S	Force Y	-8.0600000 K	N.A.

Member Loads, Uniform

Member	Service Case	Direction	Magnitude	Full Length?	Start Offset in	End Offset in	Projected?	Predefined Load
BmX001	D	Force Y	-0.0050000 K/in	Yes	0.0000000	282.5738841	Yes	N.A.
BmX001	S	Force Y	-0.0083333 K/in	Yes	0.0000000	282.5738841	Yes	N.A.

Factored Load Combinations

Name	Code	Effective Equation	Design	Deflection
1. 1.4D	ASCE 7-16 LRFD	1.4D	Strength	Other
1. D	ASCE 7-16 ASD	D	Allowable	Other
2. 1.2D+1.6L+0.5Lr	ASCE 7-16 LRFD	1.2D	Strength	Other
2. 1.2D+1.6L+0.5S	ASCE 7-16 LRFD	1.2D + 0.5S	Strength	Other
3. 1.2D+1.6S+L	ASCE 7-16 LRFD	1.2D + 1.6S	Strength	Other
3. D+S	ASCE 7-16 ASD	D + S	Allowable	Other
4. D+0.75(L+S)	ASCE 7-16 ASD	D + 0.75S	Allowable	Other
5. 0.9D+W	ASCE 7-16 LRFD	0.9D	Strength	Other
6. 1.2D+E+L+0.2S »+X	ASCE 7-16 LRFD	1.2D + 0.2S + E+X	Strength	Other
7. 0.6D+0.6W	ASCE 7-16 ASD	0.6D	Allowable	Other
7. 0.9D+E »+X	ASCE 7-16 LRFD	0.9D + E+X	Strength	Other
8. D+0.7E »+X	ASCE 7-16 ASD	D + 0.7E+X	Allowable	Other
9. D+0.75(0.7E+L+S) »+X	ASCE 7-16 ASD	D + 0.75S + 0.525E+X	Allowable	Other
10. 0.6D+0.7E »+X	ASCE 7-16 ASD	0.6D + 0.7E+X	Allowable	Other

Member:COL001

<p>1. Member Properties Length: 144 in Shape: HSS10X10X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.858816 K Framing: Column</p>	<p>2. Connections Start: N001 @ (0, 0, 0 in) - Other End: N002 @ (0, 144, 0 in) - Free</p>	<p>4. Extreme Forces Axial: -25.851126 K (7) -> 1.6493617 K (3) My: 0 K-in (1) Mz: -148.8567 K-in (7) -> 209.64386 K-in (3) Vy: -1.0337271 K (7) -> 1.4558601 K (3) Vz: 0 K (1) Torsion: 0 K-in (1)</p>
<p>5. Extreme Deflections (all cases) Total Dy: -0.63094279 in (3) -> 0.04423153 in (7) Total Dz: 0 in (1) Beam Dy: 0.00712903 in (14) -> 0.63094279 in (3) Beam Dz: 0 in (1)</p>		

Member Design Checks:COL001

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0327421	Pass	25.851126 K	789.53754 K	3. 1.2D+1.6S+L	E3-2

Member Design Checks:COL001 (continued)

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Combined Check	0.0648383	Pass	0.06483825	1	3. 1.2D+1.6S+L	H1-1b
Strong Flexure Check	0.0534249	Pass	161.90298 K-in	3030.48 K-in	7. 0.9D+E »+X	F7-1
Strong Shear Check	0.0047175	Pass	1.1243262 K	238.33071 K	7. 0.9D+E »+X	G4-1

Member:BmX001

<p>1. Member Properties Length: 282.57388 in Shape: HSS8X6X.500 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.9309114 K Framing: Bracing</p>	<p>2. Connections Start: N002 @ (0, 144, 0 in) - Free End: N003 @ (282, 126, 0 in) - Free</p>	<p>3. Applied Loads Unif.: (D) Force Y -0.005 K/in (Proj) (S) Force Y -0.00833333 K/in (Proj)</p>
<p>4. Extreme Forces Axial: -2.4949982 K (9) -> -0.17583878 K (14) My: 0 K-in (1) Mz: -288.55831 K-in (9) -> 209.64386 K-in (3) Vy: -3.2120276 K (7) -> 3.3437248 K (7) Vz: 0 K (1) Torsion: 0 K-in (1)</p>	<p>5. Extreme Deflections (all cases) Total Dy: -0.1949542 in (7) -> 0.15393564 in (3) Total Dz: 0 in (1) Beam Dy: 0.00000485 in (16) -> 0.0008333 in (3) Beam Dz: 0 in (1)</p>	

Member Design Checks:BmX001

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0141096	Pass	2.4949982 K	176.82995 K	6. 1.2D+E+L+0.2S »+X	E3-3
Combined Check	0.2355796	Pass	0.23557963	1	6. 1.2D+E+L+0.2S »+X	H1-1b
Strong Flexure Check	0.2285248	Pass	-288.55831 K-in	1262.7 K-in	6. 1.2D+E+L+0.2S »+X	F7-1
Strong Shear Check	0.0219141	Pass	3.3437248 K	152.58343 K	3. 1.2D+1.6S+L	G4-1

Member:COL002

<p>1. Member Properties Length: 126 in Shape: HSS10X10X.625 Material: ASTM A500 Grade B (Fy = 46ksi) Weight: 0.751464 K Framing: Column</p>	<p>2. Connections Start: N003 @ (282, 126, 0 in) - Free End: N004 @ (282, 0, 0 in) - Other</p>	<p>4. Extreme Forces Axial: -25.722304 K (7) -> -1.6493617 K (3) My: 0 K-in (1) Mz: -288.55831 K-in (9) -> 0 K-in (15) Vy: 0.22102259 K (14) -> 2.2901453 K (9) Vz: 0 K (1) Torsion: 0 K-in (1)</p>
<p>5. Extreme Deflections (all cases) Total Dy: -0.03416288 in (7) -> 0.62931742 in (3) Total Dz: 0 in (1) Beam Dy: 0.00730431 in (14) -> 0.62931742 in (3) Beam Dz: 0 in (1)</p>		

Member Design Checks:COL002

Type	Unity Check	Status	Demand	Capacity	Result Case	Code Reference
Axial Check	0.0318515	Pass	25.722304 K	807.57086 K	3. 1.2D+1.6S+L	E3-2
Combined Check	0.1036024	Pass	0.10360241	1	6. 1.2D+E+L+0.2S »+X	H1-1b
Strong Flexure Check	0.0952187	Pass	-288.55831 K-in	3030.48 K-in	6. 1.2D+E+L+0.2S »+X	F7-1
Strong Shear Check	0.0096091	Pass	2.2901453 K	238.33071 K	6. 1.2D+E+L+0.2S »+X	G4-1

Result Case Legend

(1) D	(10) 7. 0.9D+E »+X
(3) E+X	(4) 1. 1.4D
(5) 2. 1.2D+1.6L+0.5Lr	(6) 2. 1.2D+1.6L+0.5S
(7) 3. 1.2D+1.6S+L	(8) 5. 0.9D+W
(9) 6. 1.2D+E+L+0.2S »+X	
(11) 1. D	(12) 3. D+S
(13) 4. D+0.75(L+S)	(14) 7. 0.6D+0.6W
(15) 8. D+0.7E »+X	(16) 9. D+0.75(0.7E+L+S) »+X
(17) 10. 0.6D+0.7E »+X	(2) S

Model Check Information

No errors were found in your model.

Result Cases

Name	ID	Design Checks	Result Type	P-Delta?	Seismic Type
1. 1.4D	4	Strength (LRFD)	Static	No	N.A.
1. D	11	Allowable (ASD)	Static	No	N.A.
2. 1.2D+1.6L+0.5Lr	5	Strength (LRFD)	Static	No	N.A.
2. 1.2D+1.6L+0.5S	6	Strength (LRFD)	Static	No	N.A.
3. 1.2D+1.6S+L	7	Strength (LRFD)	Static	No	N.A.
3. D+S	12	Allowable (ASD)	Static	No	N.A.
4. D+0.75(L+S)	13	Allowable (ASD)	Static	No	N.A.
5. 0.9D+W	8	Strength (LRFD)	Static	No	N.A.
6. 1.2D+E+L+0.2S »+X	9	Strength (LRFD)	Static	No	Normal
7. 0.6D+0.6W	14	Allowable (ASD)	Static	No	N.A.
7. 0.9D+E »+X	10	Strength (LRFD)	Static	No	Normal
8. D+0.7E »+X	15	Allowable (ASD)	Static	No	Normal
9. D+0.75(0.7E+L+S) »+X	16	Allowable (ASD)	Static	No	Normal
10. 0.6D+0.7E »+X	17	Allowable (ASD)	Static	No	Normal
D	1	No Design	Static	No	N.A.
E+X	3	No Design	Static	No	Normal
S	2	No Design	Static	No	N.A.

Result Check Information

INFORMATION:
Analysis results could be inaccurate. This report might assist your validation efforts.
The following are heuristic and may or may not indicate problems.
Please check your results carefully.

INFORMATION:
Displacements appear to be within reason.

INFORMATION:
Stresses are less than yield or crushing strength.

Member Analysis Properties

Name	Member Section	X1 in	Y1 in	Z1 in	X2 in	Y2 in	Z2 in	Elasticity, E Ksi	A in ²	Iz in ⁴	Iy in ⁴	Releases	Action
BmX001	HSS8X6X.500	0.000000	144.000000	0.000000	282.000000	126.000000	0.000000	29000.0000000	11.600000	98.200000	62.500000	(none)	Normal
COL001	HSS10X10X.625	0.000000	0.000000	0.000000	0.000000	144.000000	0.000000	29000.0000000	21.000000	304.000000	304.000000	(none)	Normal
COL002	HSS10X10X.625	282.000000	126.000000	0.000000	282.000000	0.000000	0.000000	29000.0000000	21.000000	304.000000	304.000000	(none)	Normal

Member Connection Forces

Member	Result Case	Location	Fx K	Ry K	Rz K	Torsion K-in	My K-in	Mz K-in
BmX001	3. 1.2D+1.6S+L	End	-1.2408538	3.2120276	0.0000000	0.0000000	0.0000000	-130.2496107
BmX001	3. 1.2D+1.6S+L	Start	-0.8224015	3.3437248	0.0000000	0.0000000	0.0000000	-148.8566980
BmX001	6. 1.2D+E+L+0.2S »+X	End	-2.4949982	3.1363464	0.0000000	0.0000000	0.0000000	-288.5583066
BmX001	6. 1.2D+E+L+0.2S »+X	Start	-2.2861194	0.1360877	0.0000000	0.0000000	0.0000000	135.3390781
BmX001	E+X	Start	-1.8756013	-1.5329990	0.0000000	0.0000000	0.0000000	209.6438577
COL001	3. 1.2D+1.6S+L	End	-24.8205468	1.0337271	0.0000000	0.0000000	0.0000000	-148.8566980
COL001	3. 1.2D+1.6S+L	Start	-25.8511260	-1.0337271	0.0000000	0.0000000	0.0000000	0.0000000
COL001	E+X	End	1.6493617	-1.4558601	0.0000000	0.0000000	0.0000000	209.6438577
COL001	E+X	Start	1.6493617	1.4558601	0.0000000	0.0000000	0.0000000	0.0000000
COL002	3. 1.2D+1.6S+L	End	-25.7223036	-1.0337271	0.0000000	0.0000000	0.0000000	0.0000000
COL002	3. 1.2D+1.6S+L	Start	-24.8205468	1.0337271	0.0000000	0.0000000	0.0000000	-130.2496107
COL002	6. 1.2D+E+L+0.2S »+X	End	-14.4426653	-2.2901453	0.0000000	0.0000000	0.0000000	0.0000000
COL002	6. 1.2D+E+L+0.2S »+X	Start	-13.5409085	2.2901453	0.0000000	0.0000000	0.0000000	-288.5583066

Ry and Rz reactions are positive when in the direction of member local y and z (i.e. in typical situations uplift is negative).

Member Forces

(extreme rows: max and min)

Member	Fx Min K	Fx Max K	Vy K	Vz K	Torsion K-in	My Min K-in	My Max K-in	Mz Min K-in	Mz Max K-in
BmX001	-2.4949982 (9)	-0.1758388 (14)	3.3437248 (7)	0.0000000 (17)	0.0000000 (17)	0.0000000 (17)	0.0000000 (17)	-288.5583066 (9)	209.6438577 (3)
COL001	-25.8511260 (7)	1.6493617 (3)	1.4558601 (3)	0.0000000 (17)	0.0000000 (17)	0.0000000 (17)	0.0000000 (17)	-148.8566980 (7)	209.6438577 (3)
COL002	-25.7223036 (7)	-1.6493617 (3)	2.2901453 (9)	0.0000000 (17)	0.0000000 (17)	0.0000000 (17)	0.0000000 (17)	-288.5583066 (9)	0.0000000 (15)

Member Stresses

(extreme rows: max and min)

Member	fa Min Ksi	fa Max Ksi	fbx Min Ksi	fbx Max Ksi	fbz Min Ksi	fbz Max Ksi	fc comb Min Ksi	fc comb Max Ksi
BmX001	-0.2150860 (9)	-0.0151585 (14)	0.0000000 (17)	0.0000000 (17)	-11.7539025 (9)	11.7539025 (9)	-11.9689886 (9)	11.5388165 (9)
COL001	-1.2310060 (7)	0.0785410 (3)	0.0000000 (17)	0.0000000 (17)	-3.4480898 (3)	3.4480898 (3)	-3.6302318 (7)	3.5266308 (3)
COL002	-1.2248716 (7)	-0.0785410 (3)	0.0000000 (17)	0.0000000 (17)	-4.7460248 (9)	4.7460248 (9)	-5.3908299 (9)	4.1012196 (9)

Node Reactions

(extreme rows: max and min)

Node	Result Case	FX K	FY K	MZ K-in
N001	3. 1.2D+1.6S+L	1.0337271	25.8511260	0.0000000
N001	E+X	-1.4558601	-1.6493617	0.0000000
N004	6. 1.2D+E+L+0.2S »+X	-2.2901453	14.4426653	0.0000000

Node Results

(extreme rows: max and min)

Node	Result Case	DX in	DY in	FX K	FY K	MZ K-in
N001	3. 1.2D+1.6S+L	0.0000000	0.0000000	1.0337271	25.8511260	0.0000000
N001	E+X	0.0000000	0.0000000	-1.4558601	-1.6493617	0.0000000
N002	3. 1.2D+1.6S+L	-0.0333432	-0.0059907	0.0000000	0.0000000	0.0000000
N002	E+X	0.6309428	0.0003900	0.0000000	0.0000000	0.0000000
N003	3. 1.2D+1.6S+L	-0.0341629	-0.0052286	0.0000000	0.0000000	0.0000000
N004	6. 1.2D+E+L+0.2S »+X	0.0000000	0.0000000	-2.2901453	14.4426653	0.0000000