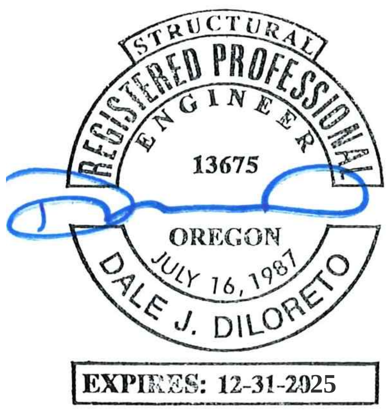
WDY Structural · Civil Engineers

Structural Calculations
For
CFD #1 Training Warehouse Remodel

16170 SE 130th Ave
Happy Valley, OR 97015

Project Number: 24254
December 20, 2024



Design Parameters: 2022 Oregon Structural Specialty Code

Roof (PEMB)
- Dead Load ....7 psf
- Design Snow Load ....25 psf
- Importance Factor ....I_S = 1.2

Floor (Mezz.)
- Dead Load ....15 psf
- Live Load ....100 psf

Wind (PEMB)
- Basic Wind Speed ....109 mph (Ult)
- Exposure Factor C
- Topographic Factor ....K_{zt} = 1.0

Seismic (PEMB & Mezz.)
- Mapped Response ....S_S = 0.829, S_1 = 0.366
- Seismic Design Category.......................D
- Site Class ....D
- Importance Factor ....I_E = 1.5, 1.0

Contents:

6443 SW Beaverton-Hillsdale Hwy, Suite 210, Portland, OR 97221 • ph: 503.203.8111 • www.wdyi.com

DESIGN LOADS

Gravity

PEMB Roof Dead Loads

Roof Deck:	2.0	psf
Framing:	2.0	psf
Insulation:	1.3	psf
Misc:	1.0	psf
Total:	***7***	***psf***

PEMB. Wall Dead Load

Siding	2.0	psf
Framing	2.0	psf
Insulation:	1.3	psf
Misc:	1.0	psf
Total:	***7***	***psf***

PEMB Roof Snow Load

Ground Snow Load:	9	psf
Roof Slope:	1	/12
Importance Factor (I):	1.2	
Exposure Factor (C_e):	1.0	
Thermal Factor (C_t):	1.2	
Roof Slope Factor (C_s):	1.0	
$p_f = 0.7*C_e*C_t*I*p_g$=	9.07	psf
$p_s = C_s*p_f$=	9.07	psf
Building Dept. SL:	25	psf
Design Load:	***25***	***psf***

Mezz. Floor Dead Loads

Flooring	2	psf
Structural Sheathing:	4	psf
Framing:	4.5	psf
Insulation:	0.6	psf
Gypsum:	2.2	psf
Misc:	1	
Total :	***15***	***psf***

Mezz. Int. Wall Dead Load:

Structural Sheathing:	1.8	psf
Studs	1.7	psf
Insulation:	0.6	psf
Gypsum:	2.2	psf
Misc:	1	psf
Total:	***8***	***psf***

Windard Snow Drift Load

Length of Lower Roof, N/S:	N/A	ft.
Length of Lower Roof, E/W:	25.5	ft.
Drift Height, N/S (h_d):	N/A	ft.
Drift Height, E/W (h_d):	0.94	ft.
Snow Density (γ):	15.17	pcf
Base Snow Height (h_b):	0.60	ft.
Wall Height (h_r):	7.5	ft.
h_c:	6.90	ft.
Width of Drift, N/S (w):	N/A	ft.
Width of Drift, E/W (w):	3.75	ft.
Additional Drift Load, N/S:	N/A	**psf**
Additional Drift Load, E/W:	**14.2**	**psf**

Leeward Snow Drift Load

Length of Upper Roof, N/S:	N/A	ft.
Length of Upper Roof, E/W:	150	ft.
Drift Height, N/S (h_d):	N/A	ft.
Drift Height, E/W (h_d):	3.58	ft.
Snow Density (γ):	15.17	pcf
Base Snow Height (h_b):	0.60	ft.
Wall Height (h_r):	7.5	ft.
h_c:	6.90	ft.
Width of Drift, N/S (w):	N/A	ft.
Width of Drift, E/W (w):	14.33	ft.
Additional Drift Load, N/S:	N/A	**psf**
Additional Drift Load, E/W:	**54.3**	**psf**

Oregon Snow Loading

The design ground snow of any location in the state of Oregon may be determined by entering the latitude and longitude of your site into the boxes below. The tool provides the design ground snow load (pg in ASCE7*) for your site. The design ground snow load values can also be viewed on the online map. Users are strongly recommended to review the Map Usage Notes.

Ground snow loads are very sensitive to geographic location, and particularly sensitive to elevation. It is recommended that the latitude and longitude values be entered with a precision of 0.001 (about 105 yards).

* ASCE Standard (ASCE/SEI 7-10) *Minimum Design Loads for Buildings and Other Structures* published by the American Society of Civil Engineers.

Latitude - Longitude Lookup

Results

Latitude:	45.405320
Longitude:	-122.529738
Snow Load:	9.0 psf
Modeled Elevation:	305 ft

Site Elevation versus Modeled Grid Elevation

Site elevation refers to the elevation (above sea level, in feet) of the location for which the snow load is required. The modeled grid elevation is the average elevation of the 4 km (about 2-1/2 miles) grid cell that was used in the snow load modeling. In relatively flat terrain, the two elevations will likely be the same or very similar. In sloped or mountainous terrain, the two elevations may be quite different.

The design ground snow load may be underreported for some locations where the site elevation is higher than the modeled grid elevation. Consult the Map Usage Notes if your site elevation is more than 100 ft. above the modeled grid elevation shown, or if your site is at or near the top of a hill.

Oregon Design Ground Snow Load Look Up Results

It is important that the user of this tool understand the principals and limitations of the modeling used to create it. Ground snow loads can vary dramatically over short distances due to changes in precipitation and elevation. It is critical to use good engineering judgment when interpreting and using the results reported by this tool. The user is recommended to review the online map, to gain a better understanding of the variations and range of magnitudes of the ground snow loads in the vicinity of the site location.

In remote regions at high elevation, reliable snow data was not available during the creation of the map. A site-specific case study is required to determine the design ground snow load in these areas. The ground snow load values on the map are based on extrapolation, and are not recommended for design. See the Map Usage Notes for the regions that require a site-specific case study.

It is recommended that the local building official having jurisdiction at the site be consulted for minimum design ground snow or roof snow loads.

The reported design ground snow loads must be adjusted as required by Chapter 7 of ASCE7* for site exposure, roof slope, roof configuration, etc. Only the properly adjusted loads can be used to design roof structural elements.

Oregon requires a minimum roof snow load of 20 psf (pm in ASCE7*) for all roofs, plus a 5 psf rain-on-snow surcharge for many roof types, resulting in a 25 psf minimum roof design load for most roofs. See the Map Usage Notes or *Snow Load Analysis for Oregon, Part II* for further information.

* ASCE Standard (ASCE/SEI 7-10) Minimum Design Loads for Buildings and Other Structures published by the American Society of Civil Engineers.

Mezzanine Seismic

Per ASCE 7-16 Ch. 12: Equivalent Lateral Force Procedure

Design Criteria

Risk Category:	II
Seismic Design Category:	D
Site Soil Classification:	D
Importance Factor, I_e=	1

Design Parameters

S_S=	0.898	g
S_1=	0.365	g
F_a=	1.2	
F_v=	1.95	

Spectral Acceleration Parameters

$S_{MS}=F_a(S_S)$=	1.08	g
$S_{M1}=F_v(S_1)$=	0.712	g
$S_{DS}=2/3(S_{MS})$=	0.718	g
$S_{D1}=2/3(S_{M1})$=	0.475	g

Period of Structure

h =	12	ft
C_t=	0.02	
x=	0.75	
T=Ct(h^x)=	0.129	s

Structural System Coefficients North-South

R=	6.5
Ω_0=	2.5
C_d=	4
ρ=	1.3

Structural System Coefficients East-West

R=	6.5
Ω_0=	2.5
C_d=	4
ρ=	1.3

Response Coefficient North-South

$C_{smin}=0.044(\rho)(S_{DS})(I_e)$=	0.041	
$C_{smax}=\rho(S_{D1})/(T(R/I_e))$=	0.736	
$C_s=\rho(S_{DS})/(R/I_e)$=	0.144	
C_s=	**0.144**	**(LRFD)**
C_s=	**0.101**	**(ASD)**

Response Coefficient East-West

$C_{smin}=0.044(\rho)(S_{DS})(I_e)$=	0.041	
$C_{smax}=\rho(S_{D1})/(T(R/I_e))$=	0.736	
$C_s=\rho(S_{DS})/(R/I_e)$=	0.144	
C_s=	**0.144**	**(LRFD)**
C_s=	**0.101**	**(ASD)**

East-West Diaphragm Loads

Diaphragm Label	Diaphragm Area (ft^2)	Trib. Area Ext. Wall (ft^2)	Trib. Area Int. Wall (ft^2)	Misc. (lb)	Seismic Weight (lb)	**LRFD Dia. Load (lb)**	**ASD Dia. Load (lb)**
Mezzanine 1	1360	0	1370	0	31360	**4506**	**3154**
Mezzanine 2	420	0	680	0	11740	**1687**	**1181**

North-South Diaphragm Loads

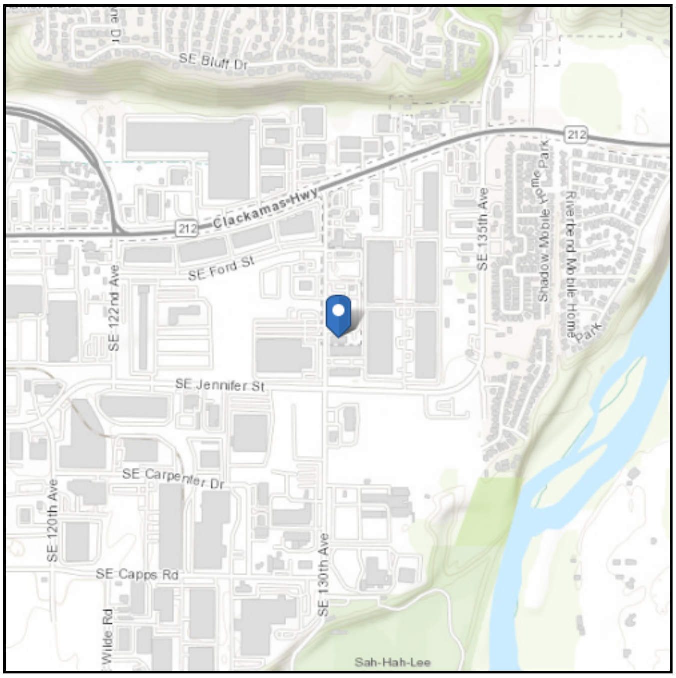
Label	Diaphragm Area (ft^2)	Trib. Area Ext. Wall (ft^2)	Trib. Area Int. Wall (ft^2)	Misc. (lb)	Weight (lb)	**Load (lb)**	**Load (lb)**
Mezzanine 1	1360	0	1370	0	31360	**4506**	**3154**
Mezzanine 2	420	0	680	0	11740	**1687**	**1181**

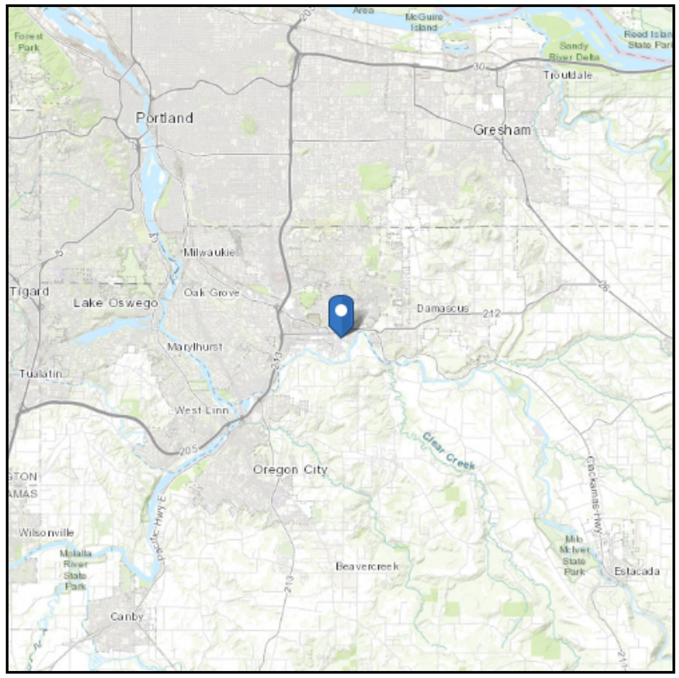
ASCE Hazards Report

Address:
16170 SE 130th Ave
Clackamas, Oregon
97015

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

Latitude: 45.405293
Longitude: -122.529812
Elevation: 135.09972321426713 ft (NAVD 88)





Seismic

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

Results:

S_S :	0.828	S_{D1} :	N/A
S_1 :	0.365	T_L :	16
F_a :	1.2	PGA :	0.374
F_v :	N/A	PGA_M :	0.458
S_{MS} :	0.994	F_{PGA} :	1.226
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.663	C_v :	1.214

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Tue Dec 03 2024

Date Source: USGS Seismic Design Maps

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PEMB Seismic

Per ASCE 7-16 Ch. 12: Equivalent Lateral Force Procedure

Design Criteria

Risk Category:	IV
Seismic Design Category:	D
Site Soil Classification:	D
Importance Factor, I_e=	1.5

Design Parameters

S_S=	0.829	g
S_1=	0.366	g
F_a=	1.2	
F_v=	1.95	

Spectral Acceleration Parameters

$S_{MS}=F_a(S_S)$=	0.99	g
$S_{M1}=F_v(S_1)$=	0.714	g
$S_{DS}=2/3(S_{MS})$=	0.663	g
$S_{D1}=2/3(S_{M1})$=	0.476	g

Period of Structure

h =	15.5	ft
C_t=	0.028	
x=	0.8	
T=Ct(h^x)=	0.251	s

Structural System Coefficients North-South

R=	3.5
Ω_0=	3
C_d=	3
ρ=	1.3

Structural System Coefficients East-West

R=	3.25
Ω_0=	2
C_d=	3.25
ρ=	1.3

Response Coefficient North-South

$C_{smin}=0.044(\rho)(S_{DS})(I_e)$=	0.057	
$C_{smax}=\rho(S_{D1})/(T(R/I_e))$=	1.057	
$C_s=\rho(S_{DS})/(R/I_e)$=	0.369	
C_s=	**0.369**	**(LRFD)**
C_s=	**0.259**	**(ASD)**

Response Coefficient East-West

$C_{smin}=0.044(\rho)(S_{DS})(I_e)$=	0.057	
$C_{smax}=\rho(S_{D1})/(T(R/I_e))$=	1.138	
$C_s=\rho(S_{DS})/(R/I_e)$=	0.398	
C_s=	**0.398**	**(LRFD)**
C_s=	**0.279**	**(ASD)**

North-South Diaphragm Loads

Diaphragm Label	Diaphragm Area (ft^2)	Trib. Area Ext. Wall (ft^2)	Trib. Area Int. Wall (ft^2)	Misc. (lb)	Seismic Weight (lb)	**LRFD Dia. Load (lb)**	**ASD Dia. Load (lb)**
Roof	1030	1390	0	8300	25240	**9326**	**6528**

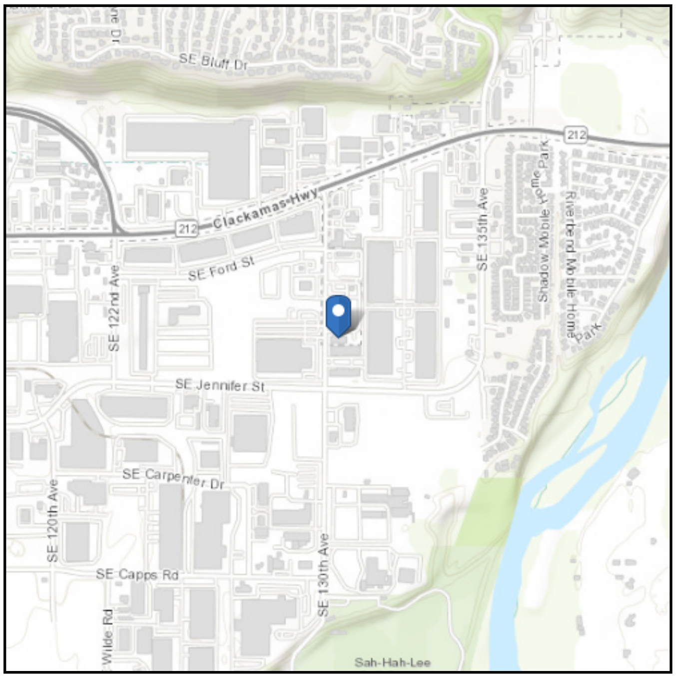
East-West Diaphragm Loads

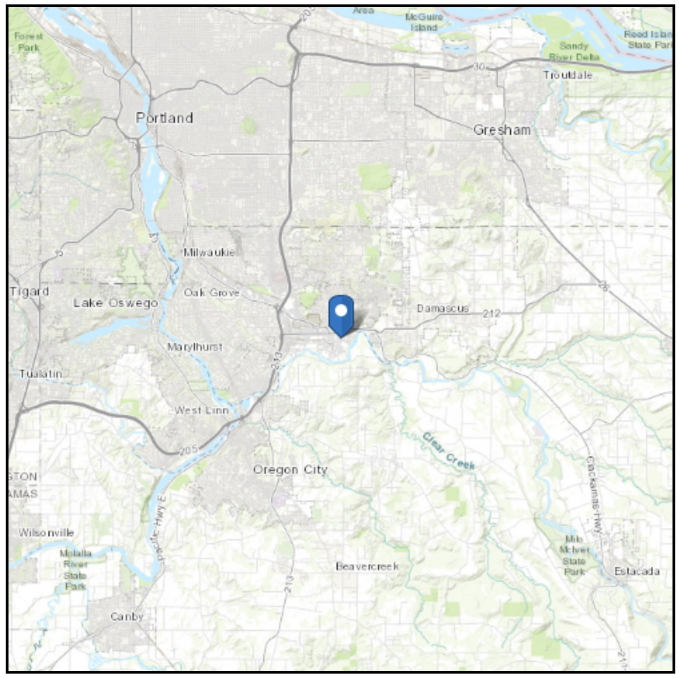
Diaphragm Label	Diaphragm Area (ft^2)	Trib. Area Ext. Wall (ft^2)	Trib. Area Int. Wall (ft^2)	Misc. (lb)	Seismic Weight (lb)	**LRFD Dia. Load (lb)**	**ASD Dia. Load (lb)**
Roof	1030	1390	0	8300	25240	**10044**	**7030**

ASCE Hazards Report

Address:
16170 SE 130th Ave
Clackamas, Oregon
97015

Standard:	ASCE/SEI 7-16	**Latitude:**	45.405293
Risk Category:	IV	**Longitude:**	-122.529812
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	135.09972321426713 ft (NAVD 88)





Seismic

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

Results:

S_S :	0.828	S_{D1} :	N/A
S_1 :	0.365	T_L :	16
F_a :	1.2	PGA :	0.374
F_v :	N/A	PGA_M :	0.458
S_{MS} :	0.994	F_{PGA} :	1.226
S_{M1} :	N/A	I_e :	1.5
S_{DS} :	0.663	C_v :	1.214

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Thu Dec 05 2024

Date Source: USGS Seismic Design Maps

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PEMB Wind

Per ASCE 7-16 Ch. 27: MWFRS (Directional Procedure)

Design Criteria

Risk Category:	IV	
Basic Wind Speed (V):	109	mph
Exposure Class:	C	
Topographic Factor (K_{zt}):	1.00	
Mean Roof Height:	15'-6"	

Net Design Pressures

Net Wall Pressure, P_h*K_{zt} =	24.7	psf	(LRFD)
	14.8	psf	(ASD)
Net Roof Pressure (Slope 1:12), P_h*K_{zt} =	23.3	psf	(LRFD)
	14.0	psf	(ASD)

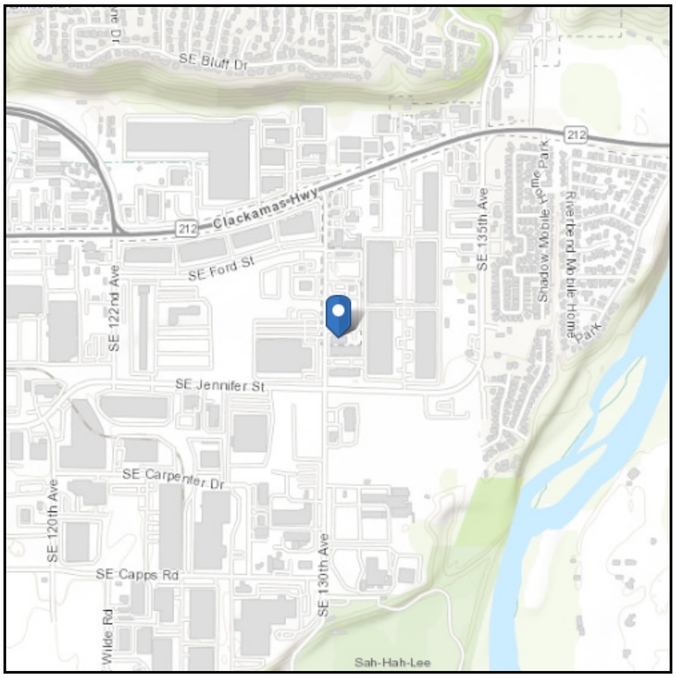
AMERICAN SOCIETY OF CIVIL ENGINEERS

ASCE Hazards Report

Address:
16170 SE 130th Ave
Clackamas, Oregon
97015

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

Latitude: 45.405293
Longitude: -122.529812
Elevation: 135.09972321426713 ft (NAVD 88)



Wind

Results:

Wind Speed	~~107 Vmph~~ 109 Vmph - CLACKAMAS COUNTY
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	77 Vmph
100-year MRI	82 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1D and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Thu Dec 05 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 1.6% probability of exceedance in 50 years (annual exceedance probability = 0.00033, MRI = 3,000 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

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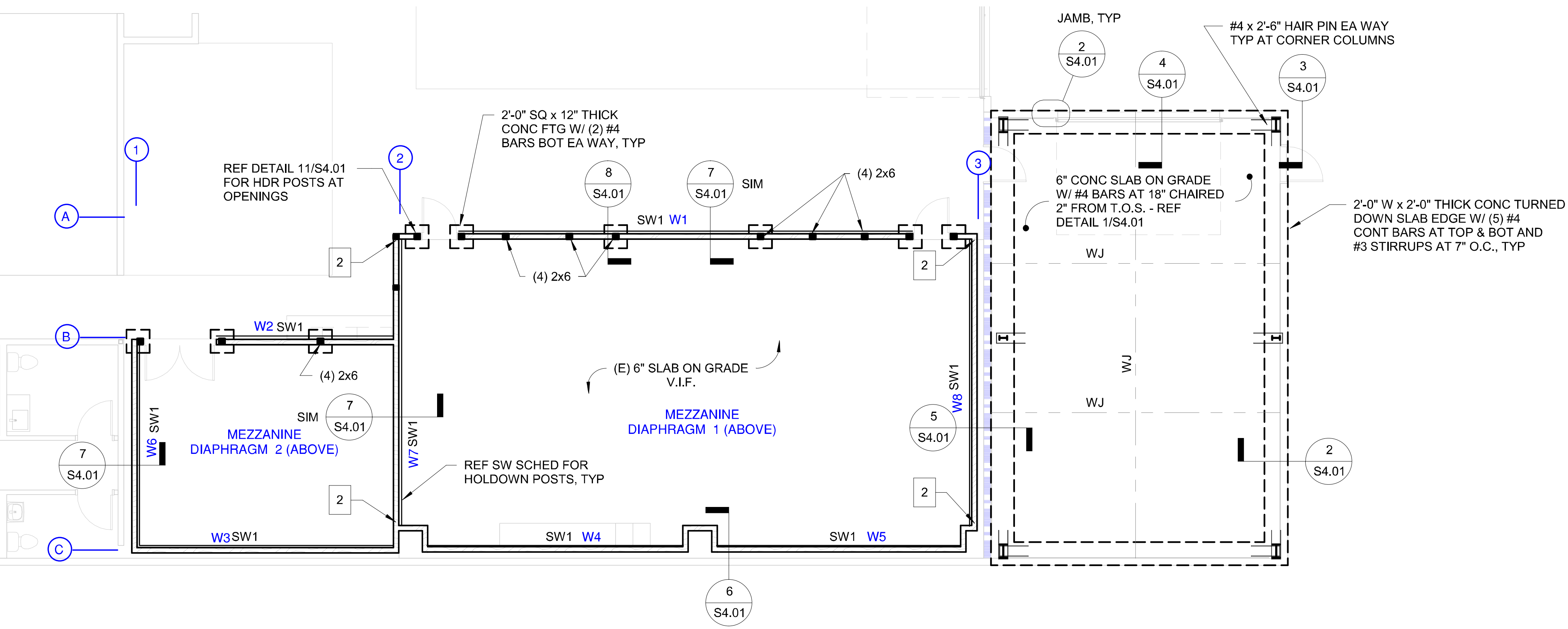
MEZZANINE LATERAL CALCULATIONS


JAMB, TYP
#4 x 2'-6" HAIR PIN EA WAY
TYP AT CORNER COLUMNS
2'-0" SQ x 12" THICK
CONC FTG W/ (2) #4
BARS BOT EA WAY, TYP
REF DETAIL 11/S4.01
FOR HDR POSTS AT
OPENINGS
(4) 2x6
SIM
SW1 W1
6" CONC SLAB ON GRADE
W/ #4 BARS AT 18" CHAIRED
2" FROM T.O.S. - REF
DETAIL 1/S4.01
2'-0" W x 2'-0" THICK CONC TURNED
DOWN SLAB EDGE W/ (5) #4
CONT BARS AT TOP & BOT AND
#3 STIRRUPS AT 7" O.C., TYP
WJ
W2 SW1
(E) 6" SLAB ON GRADE
V.I.F.
MEZZANINE
DIAPHRAGM 1 (ABOVE)
MEZZANINE
DIAPHRAGM 2 (ABOVE)
W6 SW1
W7 SW1
W8 SW1
REF SW SCHED FOR
HOLDOWN POSTS, TYP
W3 SW1
SW1 W4
SW1 W5
S4.01

Mezzanine Lateral Calculations

East-West Line Loads

Mezzanine Diaphragm 1:

Grid Line	Trib. Width (ft)	Diaphragm Width (ft)	ASD Seismic Dia. Load (lb)	ASD Seismic Line Load (lb)
A	13.75	27.5	3154	1577
C	13.75	27.5	3154	1577

Mezzanine Diaphragm 2:

Grid Line	Trib. Width (ft)	Diaphragm Width (ft)	ASD Seismic Dia. Load (lb)	ASD Seismic Line Load (lb)
B	9.17	18.3	1181	591
C	9.17	18.3	1181	591

North-South Line Loads

Mezzanine Diaphragm 1:

Grid Line	Trib. Width (ft)	Diaphragm Width (ft)	ASD Seismic Dia. Load (lb)	ASD Seismic Line Load (lb)
2	25.0	50.0	3154	1577
3	25.0	50.0	3154	1577

Mezzanine Diaphragm 2:

Grid Line	Trib. Width (ft)	Diaphragm Width (ft)	ASD Seismic Dia. Load (lb)	ASD Seismic Line Load (lb)
1	11.4	22.8	1181	591
2	11.4	22.8	1181	591

East-West Shear Walls

Mezzanine Diaphragm:

Grid Line	SW Lable	Annalysis Method	Pier Length (ft)	Wall Length (ft)	Wall Height (ft)	Restoring DL (plf)	Unit Shear Seismic (plf)	HD Seismic (lb)	***Wall Type***	***Anchor Type***
A	W1	Seg.	39	39	10	285	40	0	***6***	***N.R.***
B	W2	Seg.	15.25	15.25	10	218	39	0	***6***	***N.R.***
C	W3	Seg.	22.0	22.0	10	218	27	0	***6***	***N.R.***
C	W4	Seg.	22.0	22.0	10	285	37	0	***6***	***N.R.***
C	W5	Seg.	21.0	21.0	10	285	37	0	***6***	***N.R.***

North-South Shear Walls

Mezzanine Diaphragm:

Grid Line	SW Lable	Annalysis Method	Pier Length (ft)	Wall Length (ft)	Wall Height (ft)	Restoring DL (plf)	Unit Shear Seismic (plf)	HD Seismic (lb)	***Wall Type***	***Anchor Type***
1	W6	Seg.	17.67	17.67	10	80	33	0	***6***	***N.R.***
2	W7	Seg.	24.75	24.75	10	80	88	300	***6***	***HDU2***
3	W8	Seg.	24.75	24.75	10	80	64	56	***6***	***HDU2***

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-19
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.625
Effective Embedment depth, h_{ef} (inch): 4.000
Code report: ICC-ES ESR-4057
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 5.38
c_{ac} (inch): 8.37
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 6.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: Supplementary reinforcement not present
Supplemental edge reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Continuous
Temperature range, Short/Long: 150/110°F
Reduced installation torque (for AT-3G): Not applicable
Ignore 6do requirement: Not applicable
Build-up grout pad: No

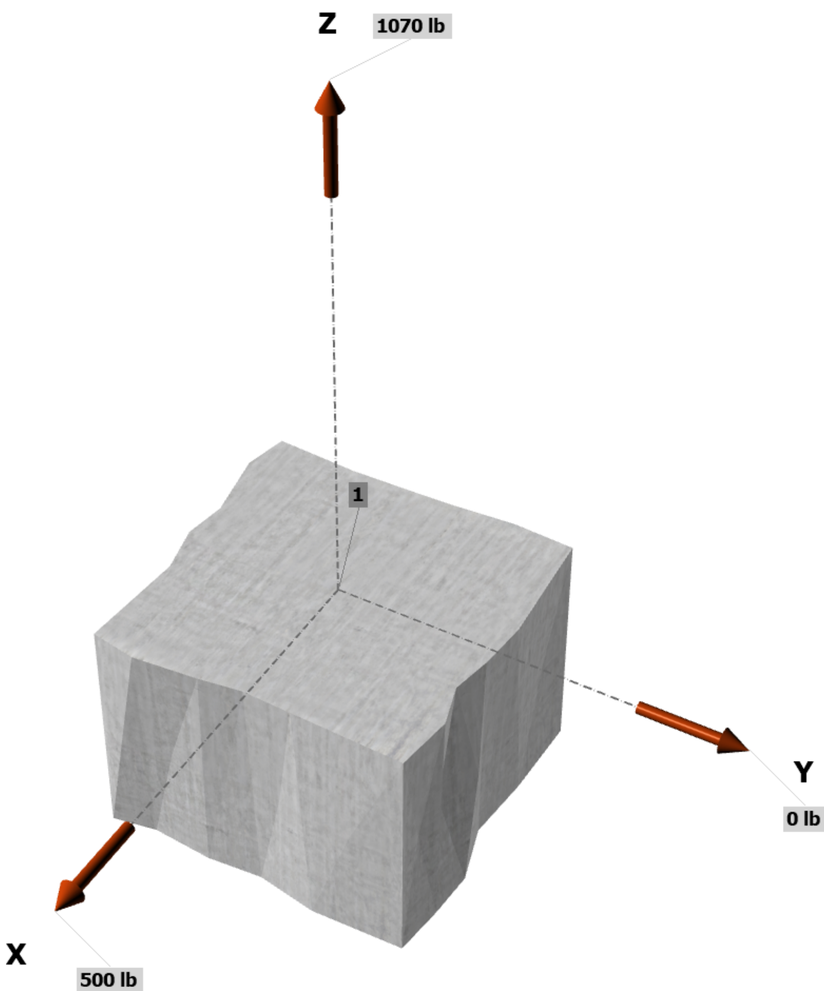
Recommended Anchor
Anchor Name: SET-3G™ - SET-3G w/ 5/8"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-4057

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: Yes
Anchors subjected to sustained tension: No
Ductility section for tension: 17.10.5.3 (d) is satisfied
Ductility section for shear: 17.10.6.3 (c) is satisfied
Ω_0 factor: not set
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

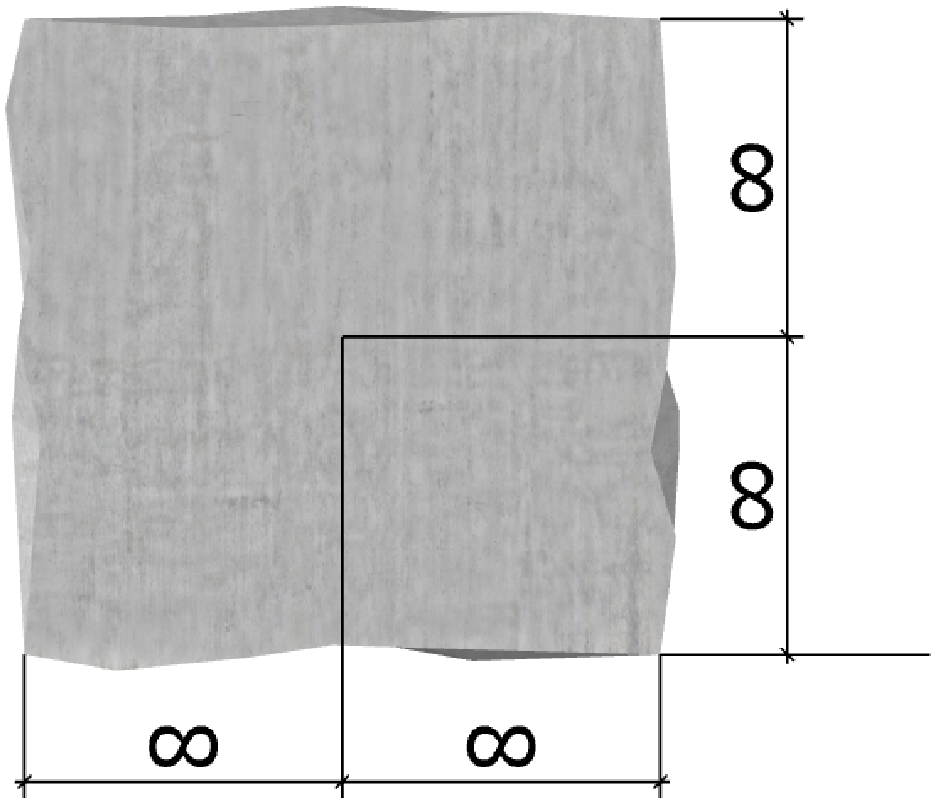
Strength level loads:

N_{ua} [lb]: 1070
V_{uax} [lb]: 500
V_{uay} [lb]: 0

<Figure 1>



<Figure 2>



3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1070.0	500.0	0.0	500.0
Sum	1070.0	500.0	0.0	500.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 1070
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

4. Steel Strength of Anchor in Tension (Sec. 17.6.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
13110	0.75	9833

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2)

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

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	4.000	6800

$0.75\phi N_{cb} = 0.75\phi\,(A_{Nc} / A_{Nco})\,\Psi_{ed,N}\,\Psi_{c,N}\,\Psi_{cp,N} N_b$ (Sec. 17.5.1.2 & Eq. 17.6.2.1a)

A_{Nc} (in^2)	A_{Nco} (in^2	$c_{a,min}$ (in)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	$0.75\phi N_{cb}$ (lb)
144.00	144.00	-	1.000	1.00	1.000	6800	0.65	3315

6. Adhesive Strength of Anchor in Tension (Sec. 17.6.5)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat} (f'_c / 2{,}500)^n \alpha_{N.seis}$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	$\alpha_{N.seis}$	f'_c (psi)	n	$\tau_{k,cr}$ (psi)
1356	1.00	1.00	1.00	2500	0.24	1356

$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef}$ (Eq. 17.6.5.2.1)

λ_a	τ_{cr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	1356	0.63	4.000	10650

$0.75\phi N_a = 0.75\phi\,(A_{Na} / A_{Na0})\,\Psi_{ed,Na}\,\Psi_{cp,Na} N_{ba}$ (Sec. 17.5.1.2 & Eq. 17.6.5.1a)

A_{Na} (in^2)	A_{Na0} (in^2)	c_{Na} (in)	$c_{a,min}$ (in)	$\Psi_{ed,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	ϕ	$0.75\phi N_a$ (lb)
307.10	307.10	8.76	-	1.000	1.000	10650	0.65	5192

8. Steel Strength of Anchor in Shear (Sec. 17.7.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\alpha_{V,seis}$	$\phi_{grout}\alpha_{V,seis}\phi V_{sa}$ (lb)
7865	1.0	0.65	0.75	3834

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.7.3)

$\phi V_{cp} = \phi \min|k_{cp}N_a\ ;\ k_{cp}N_{cb}| = \phi \min|k_{cp}(A_{Na}/A_{Na0})\Psi_{ed,Na}\Psi_{cp,Na}N_{ba}\ ;\ k_{cp}(A_{Nc}/A_{Nco})\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Sec. 17.5.1.2 & Eq. 17.7.3.1a)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	307.10	307.10	1.000	1.000	10650	10650

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ	ϕV_{cp} (lb)
144.00	144.00	1.000	1.000	1.000	6800	6800	0.70	9520

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.8)

Tension	Factored Load, N_{ua} (lb)	Design Strength, øN_n (lb)	Ratio	Status
Steel	1070	9833	0.11	Pass
Concrete breakout	**1070**	**3315**	**0.32**	**Pass (Governs)**
Adhesive	1070	5192	0.21	Pass

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	**500**	**3834**	**0.13**	**Pass (Governs)**
Pryout	500	9520	0.05	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. 17.8.1	0.32	0.00	32.3%	1.0	Pass

SET-3G w/ 5/8"Ø F1554 Gr. 36 with hef = 4.000 inch meets the selected design criteria.

12. Warnings

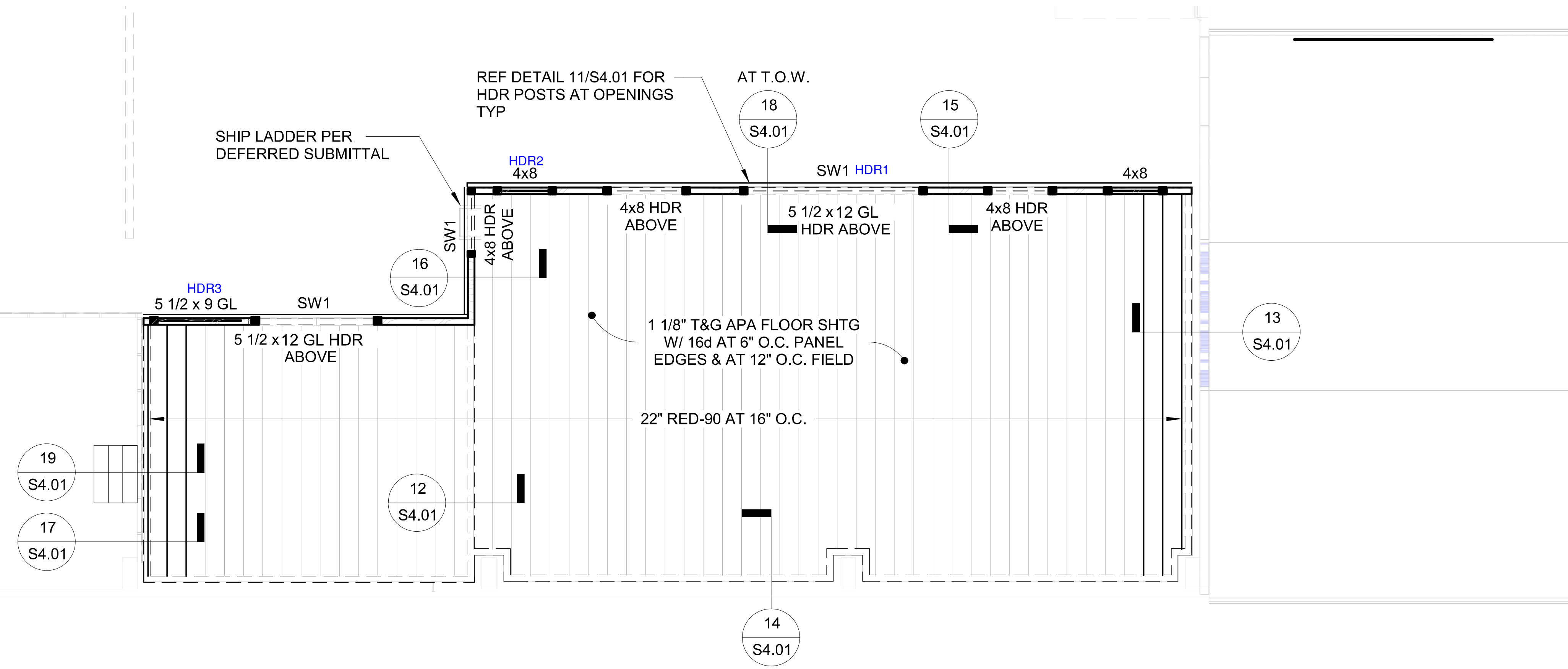
- Per designer input, ductility requirements for tension have been determined to be satisfied – designer to verify.

- Per designer input, ductility requirements for shear have been determined to be satisfied – designer to verify.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

MEZZANINE VERTICAL CALCULATIONS


REF DETAIL 11/S4.01 FOR
HDR POSTS AT OPENINGS
TYP
AT T.O.W.
18
S4.01
15
S4.01
SHIP LADDER PER
DEFERRED SUBMITTAL
HDR2
4x8
SW1
HDR1
4x8
4x8 HDR
ABOVE
5 1/2 x 12 GL
HDR ABOVE
4x8 HDR
ABOVE
SW1
4x8 HDR
ABOVE
16
S4.01
HDR3
5 1/2 x 9 GL
SW1
5 1/2 x 12 GL HDR
ABOVE
1 1/8" T&G APA FLOOR SHTG
W/ 16d AT 6" O.C. PANEL
EDGES & AT 12" O.C. FIELD
13
S4.01
22" RED-90 AT 16" O.C.
19
S4.01
12
S4.01
17
S4.01
14
S4.01

RedSpec™ by RedBuilt™
v7.1.17

Project: Project
Location:
Folder: Folder
Date: 11/20/24 1:45 PM
Designer:
Comment:

Type: MJ1 TJI
27

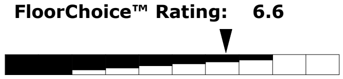
22" Red-I90™ @ 16" o.c. with Glued Sheathing

This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS	%	Design	Allow.	DOL	Combination	Pattern	Pass/Fail
Shear (lb)	57%	2070	3615	Floor(100%)	1.0D+1.0L	All Spans	PASS
Positive Moment (ft-lb)	77%	13972	18075	Floor(100%)	1.0D+1.0L	All Spans	PASS

DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Combination	Pattern	Pass/Fail
Span Live	93%	0.624	0.675	L / 519	L / 480	1.0L	All Spans	PASS
Span Total	80%	0.718	0.900	L / 451	L / 360	1.0D+1.0L	All Spans	PASS

FloorChoice™ Rating: 6.6

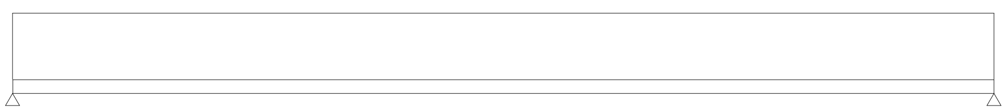


Performance rating is based on: 48 oc (1 1/8") sheathing, glued and nailed, 1/2" Gypsum ceiling, simple span, rigid supports. RedSpec has not performed a structural analysis of the sheathing.

SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	1800 (100)	1800 (100)
Dead Reaction (lb)	270	270
Total Reaction (lb) (DOL%)	2070 (100)	2070 (100)
Bearing	Bottom	Bottom
Support	Wall	Wall
Req'd Bearing, No Stiffeners (in)	-	-
Req'd Bearing, Stiffeners (in)	1.75	1.75

SPANS AND LOADS

Dimensions represent horizontal design spans.



APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Floor(100%)	100	15	0	16"	Glued Floor Joist

NOTES

- Building code and design methodology: 2021 IBC ASD (US).
- Product Acceptance: ICC-ES ESR-2994 and LABC/LARC Supplement.
- Deflection analysis is based on composite action with 48 oc (1 1/8") sheathing, glued and nailed.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.

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	COMPANY	PROJECT
WoodWorks® SOFTWARE FOR WOOD DESIGN	Dec. 20, 2024 11:50	CFD #1 Training Warehouse Remodel Job No. 24254 ZH HDR1

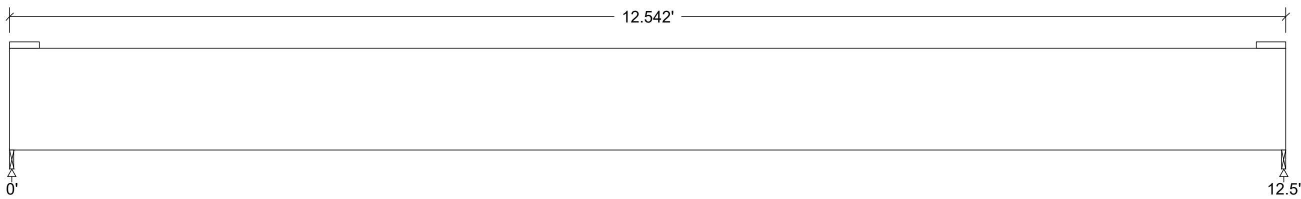
Design Check Calculation Sheet

WoodWorks Sizer 2023

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Live	Point		6.25		3100		lbs
Self-weight	Dead	Full UDL				15.2		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



	0'	12.5'
Unfactored:		
Dead	95	95
Live	1555	1545
Factored:		
Total	1650	1640
Bearing:		
Capacity		
Beam	1787	1787
Support	1836	1836
Des ratio		
Beam	0.92	0.92
Support	0.90	0.89
Load comb	#2	#2
Length	0.50*	0.50*
Min req'd	0.50*	0.50*
Cb	1.00	1.00
Cb min	1.00	1.00
Cb support	1.07	1.07
Fcp sup	625	625

*Minimum bearing length setting used: 1/2" for end supports

Glulam-Unbalan., West Species, 24F-V4 DF, 5-1/2"x12"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 12.56'; Clear span: 12.438'; Volume = 5.7 cu.ft.; 8 laminations, 5-1/2" maximum width,

Lateral support: top = at supports, bottom = at supports;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 37	Fv' = 265	psi	fv/Fv' = 0.14
Bending(+)	fb = 908	Fb' = 2359	psi	fb/Fb' = 0.38
Dead Defl'n	0.01 = < L/999			
Live Defl'n	0.15 = L/981	0.42 = L/360	in	0.37
Total Defl'n	0.16 = L/927	0.62 = L/240	in	0.26

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	0.983	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million		1.00	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
 Shear     : LC #2  = D + L
 Bending(+): LC #2  = D + L
 Deflection: LC #2  = D + L  (live)
             LC #2  = D + L  (total)
 Bearing   : Support 1 - LC #2 = D + L
             Support 2 - LC #2 = D + L
 L=live
 All LC's are listed in the Analysis output
 Load combinations: ASD Basic from ASCE 7-16 2.4
```

CALCULATIONS:

```
 V max = 1650, V design = 1635 (NDS 3.4.3.1(a)) lbs; M(+) = 9984 lbs-ft
 EI = 1425.58e06 lb-in^2
 "Live" deflection is due to all non-dead loads (live, wind, snow…)
 Total deflection = 1.50 permanent + "live"
 Lateral stability(+):  Lu = 12.50'  Le = 23.38'  RB = 10.5
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2021) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

COMPANY

Dec. 19, 2024 18:21

PROJECT
CFD #1 Training Warehouse Remodel
Job No. 24254
ZH
HDR1 OOP

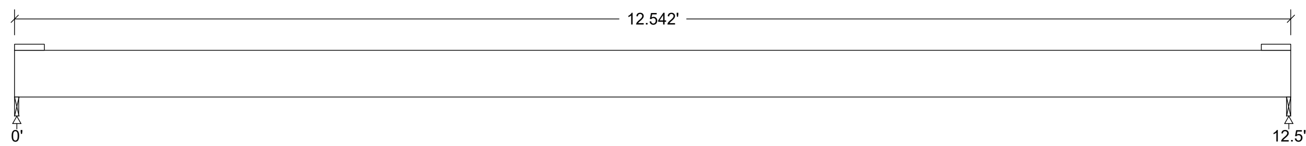
Design Check Calculation Sheet

WoodWorks Sizer 2023

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Live	Point		6.25		2200		lbs
Self-weight	Dead	Full UDL				15.2		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



	0'	12.5'
Unfactored:		
Dead	95	95
Live	1104	1096
Factored:		
Total	1199	1191
Bearing:		
Capacity		
Beam	3360	3360
Support	3750	3750
Des ratio		
Beam	0.36	0.35
Support	0.32	0.32
Load comb	#2	#2
Length	0.50*	0.50*
Min req'd	0.50*	0.50*
Cb	1.00	1.00
Cb min	1.00	1.00
Cb support	1.00	1.00
Fcp sup	625	625

*Minimum bearing length setting used: 1/2" for end supports

Glulam-Unbalan., West Species, 24F-V4 DF, 5-1/2"x12"
Supports: All - Timber-soft Beam, D.Fir-L No.2
Total length: 12.56'; Clear span: 12.438'; Volume = 5.7 cu.ft.; 8 laminations, 5-1/2" maximum width,
Lateral support: top = at supports, bottom = at supports; Oblique angle: 90.0 deg;
This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion		Analysis Value	Design Value	Unit	Analysis/Design
Shear	x-x	fv = 0	Fv' = 265	psi	fv/Fv' = 0.00
	y-y	fv = 27	Fv' = 230	psi	fv/Fv' = 0.12
Bending(+)	x-x	fb = 0	Fb' = 2359	psi	fb/Fb' = 0.00
	y-y	fb = 1422	Fb' = 1580	psi	fb/Fb' = 0.90
Dead Defl'n		0.03 = < L/999			
Live Defl'n		0.58 = L/258	1.25 = L/120	in	0.46
Total Defl'n		0.63 = L/238	1.25 = L/120	in	0.50

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fvy'	230	1.00	1.00	1.00	-	-	-	-	1.00	1.00	-	2
Fby'	1450	1.00	1.00	1.00	0.999	-	1.09	-	1.00	1.00	-	2
Fcp'	560	-	1.00	1.00	-	-	-	-	1.00	-	-	-
Ey'	1.6 million		1.00	1.00	-	-	-	-	1.00	-	-	2
Emin'	0.95 million		1.00	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
Shear : LC #2 = D + L
Bending(+): LC #2 = D + L
Deflection: LC #2 = D + L (live)
LC #2 = D + L (total)
Bearing : Support 1 - LC #2 = D + L
Support 2 - LC #2 = D + L
L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4

CALCULATIONS:
V max = 1199, V design = 1191 (NDS 3.4.3.1(a)) lbs; M(+) = 7172 lbs-ft
EIy = 266.20e06 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow…)
Total deflection = 1.50 permanent + "live"
Lateral stability(+): Lu = 12.50' Le = 23.00' RB = 3.2

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2021) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

COMPANY	PROJECT
Dec. 19, 2024 15:27	CFD #1 Training Warehouse Remodel Job No. 24254 ZH HDR2

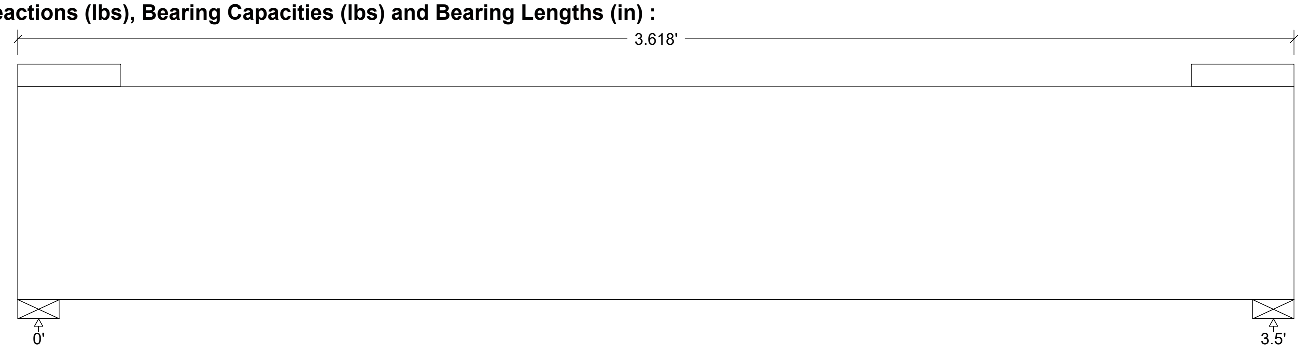
Design Check Calculation Sheet

WoodWorks Sizer 2023

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	Location [ft] End	Magnitude Start	Magnitude End	Unit
Load1	Dead	Full UDL				350.0		plf
Load2	Live	Full UDL				1350.0		plf
Self-weight	Dead	Full UDL				6.0		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



	0'	3.5'
Unfactored:		
Dead	644	644
Live	2442	2442
Factored:		
Total	3085	3085
Bearing:		
Capacity		
Beam	3085	3085
Support	3416	3416
Des ratio		
Beam	1.00	1.00
Support	0.90	0.90
Load comb	#2	#2
Length	1.41	1.41
Min req'd	1.41	1.41
Cb	1.00	1.00
Cb min	1.00	1.00
Cb support	1.11	1.11
Fcp sup	625	625

Lumber-soft, D.Fir-L, No.2, 4x8 (3-1/2"x7-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2
Total length: 3.63'; Clear span: 3.375'; Volume = 0.6 cu.ft.
Lateral support: top = at supports, bottom = at supports;
This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 110	Fv' = 180	psi	fv/Fv' = 0.61
Bending(+)	fb = 1022	Fb' = 1165	psi	fb/Fb' = 0.88
Dead Defl'n	0.01 = < L/999			
Live Defl'n	0.03 = < L/999	0.12 = L/360	in	0.22
Total Defl'n	0.04 = < L/999	0.17 = L/240	in	0.20

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	LC#
Fv'	180	1.00	1.00	1.00	-	-	-	-	1.00	1.00	2
Fb'+	900	1.00	1.00	1.00	0.995	1.300	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-
E'	1.6 million		1.00	1.00	-	-	-	-	1.00	1.00	2
Emin'	0.58 million		1.00	1.00	-	-	-	-	1.00	1.00	2

CRITICAL LOAD COMBINATIONS:

```
 Shear     : LC #2  = D + L
 Bending(+): LC #2  = D + L
 Deflection: LC #2  = D + L  (live)
             LC #2  = D + L  (total)
 Bearing   : Support 1 - LC #2 = D + L
             Support 2 - LC #2 = D + L
 D=dead L=live
 All LC's are listed in the Analysis output
 Load combinations: ASD Basic from ASCE 7-16 2.4
```

CALCULATIONS:

```
 V max = 2986, V design = 1855 (NDS 3.4.3.1(a)) lbs; M(+) = 2612 lbs-ft
 EI = 177.83e06 lb-in^2
 "Live" deflection is due to all non-dead loads (live, wind, snow…)
 Total deflection = 1.50 permanent + "live"
 Lateral stability(+):  Lu = 3.50'  Le = 7.19'  RB = 7.2
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2021) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

	COMPANY	PROJECT
WoodWorks® SOFTWARE FOR WOOD DESIGN	Dec. 19, 2024 15:29	CFD #1 Training Warehouse Remodel Job No. 24254 ZH HDR3

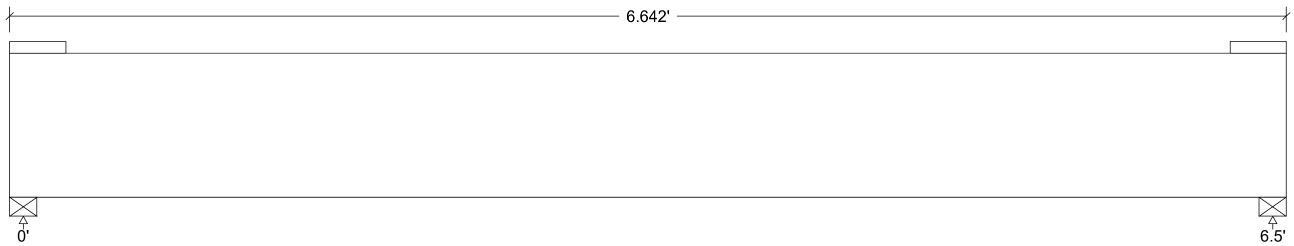
Design Check Calculation Sheet

WoodWorks Sizer 2023

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				260.0		plf
Load2	Live	Full UDL				900.0		plf
Self-weight	Dead	Full UDL				7.3		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



	0'	6.5'
Unfactored:		
Dead	887	887
Live	2989	2989
Factored:		
Total	3876	3876
Bearing:		
Capacity		
Beam	3876	3876
Support	4126	4126
Des ratio		
Beam	1.00	1.00
Support	0.94	0.94
Load comb	#2	#2
Length	1.70	1.70
Min req'd	1.70	1.70
Cb	1.00	1.00
Cb min	1.00	1.00
Cb support	1.11	1.11
Fcp sup	625	625

Glulam-Unbalan., West Species, 24F-V4 DF, 3-1/2"x9"

Supports: All - Timber-soft Beam, D.Fir-L No.2
Total length: 6.63'; Clear span: 6.375'; Volume = 1.5 cu.ft.; 6 laminations, 3-1/2" maximum width,
Lateral support: top = at supports, bottom = at supports;
This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 135	Fv' = 265	psi	fv/Fv' = 0.51
Bending(+)	fb = 1566	Fb' = 2358	psi	fb/Fb' = 0.66
Dead Defl'n	0.03 = < L/999			
Live Defl'n	0.09 = L/825	0.22 = L/360	in	0.44
Total Defl'n	0.14 = L/571	0.32 = L/240	in	0.42

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	0.983	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million		1.00	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
 Shear     : LC #2  = D + L
 Bending(+): LC #2  = D + L
 Deflection: LC #2  = D + L  (live)
             LC #2  = D + L  (total)
 Bearing   : Support 1 - LC #2 = D + L
             Support 2 - LC #2 = D + L
 D=dead L=live
 All LC's are listed in the Analysis output
 Load combinations: ASD Basic from ASCE 7-16 2.4
```

CALCULATIONS:

```
 V max = 3794, V design = 2835 (NDS 3.4.3.1(a)) lbs; M(+) = 6165 lbs-ft
 EI = 382.72e06 lb-in^2
 "Live" deflection is due to all non-dead loads (live, wind, snow…)
 Total deflection = 1.50 permanent + "live"
 Lateral stability(+):  Lu = 6.50'  Le = 12.88'  RB = 10.6
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2021) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

Concrete Pad Footing Design

Design Information

Bending Strength Factor	0.9		t - Footing Thickness
Shear Strength Factor	0.75		b - Width of Footing (square)
Concrete Comp. Stress, Fc	2500	psi	CLR - Bottom Clear Cover to Rebar
Concrete Load Factor	1		bc - Width of Column
Steel Modulus of Elasticity	29000000	psi	Wf - weight of footing
Conc Modulus of Elasticity	2850000	psi	Pa - Allowable Point Load
Steel Yield Stress, Fy	60000	psi	Pu - Ultimate Point Load
Soil Bearing Capacity, qt	1500	psf	d - depth to ftg reinforcement
Ultimate Soil Bearing	1500	psf	bo - two way shear width
Standard Clear Dist	3	in	V-2 - Two way shear loads
Weight of Concrete	150	pcf	V-1 - One way shear loads
concrete constant, m	32		

Soil Bearing Capacity

Label	bc, in	t, in	d, in	b, ft	Wf, lbs	Pa, lbs	Pu	**Capacity, k**
F2.0	3.50	12.00	8.75	2.00	600	6000	6000	**6.000**
F2.5	3.50	12.00	8.75	2.50	938	9375	9375	**9.375**
F3.0	3.50	12.00	8.75	3.00	1350	13500	13500	**13.500**
F3.5	3.50	12.00	8.75	3.50	1838	18375	18375	**18.375**
F4.0	3.50	12.00	8.75	4.00	2400	24000	24000	**24.000**
F4.5	3.50	12.00	8.75	4.50	3038	30375	30375	**30.375**
F5.0	3.50	12.00	8.75	5.00	3750	37500	37500	**37.500**
F5.5	3.50	14.00	10.75	5.50	5294	45375	45375	**45.375**
F6.0	3.50	12.00	8.75	6.00	5400	54000	54000	**54.000**

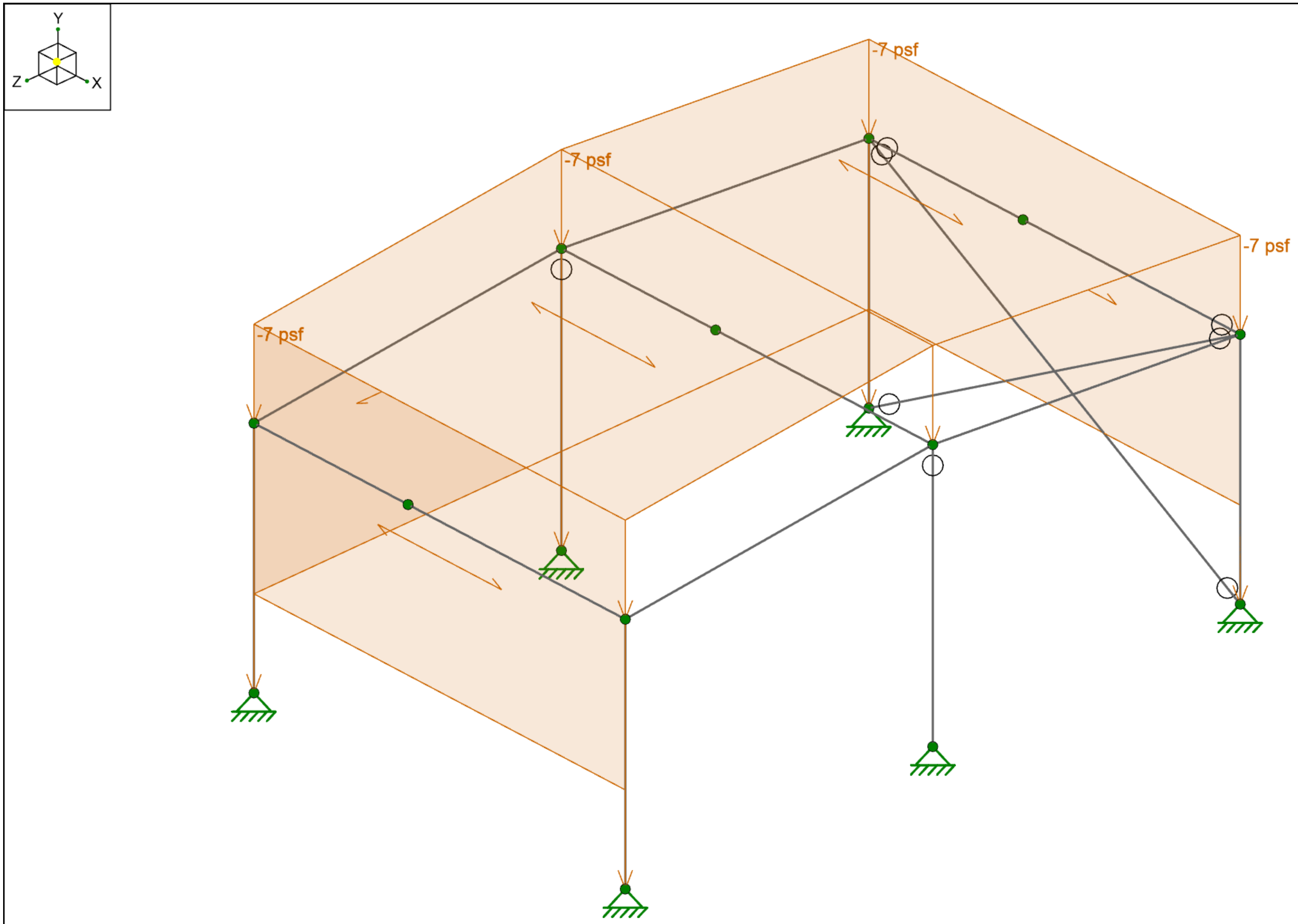
Concrete Shear Capacity

Label	Qu, psf	Mu, k*ft	V-2, k	V-1, k	bo, in	Vc-2, k	Vc-1, k	**two-way**	**one-way**
F2.0	1500	1.09	4.4	0.4	49	64	16	**OK**	**OK**
F2.5	1500	2.29	7.8	1.4	49	64	20	**OK**	**OK**
F3.0	1500	4.13	11.9	2.8	49	64	24	**OK**	**OK**
F3.5	1500	6.76	16.8	4.6	49	64	28	**OK**	**OK**
F4.0	1500	10.31	22.4	6.8	49	64	32	**OK**	**OK**
F4.5	1500	14.94	28.8	9.3	49	64	35	**OK**	**OK**
F5.0	1500	20.78	35.9	12.2	49	64	39	**OK**	**OK**
F5.5	1500	27.97	43.3	14.1	57	92	53	**OK**	**OK**
F6.0	1500	36.66	52.4	19.1	49	64	47	**OK**	**OK**

Concrete Moment Capacity

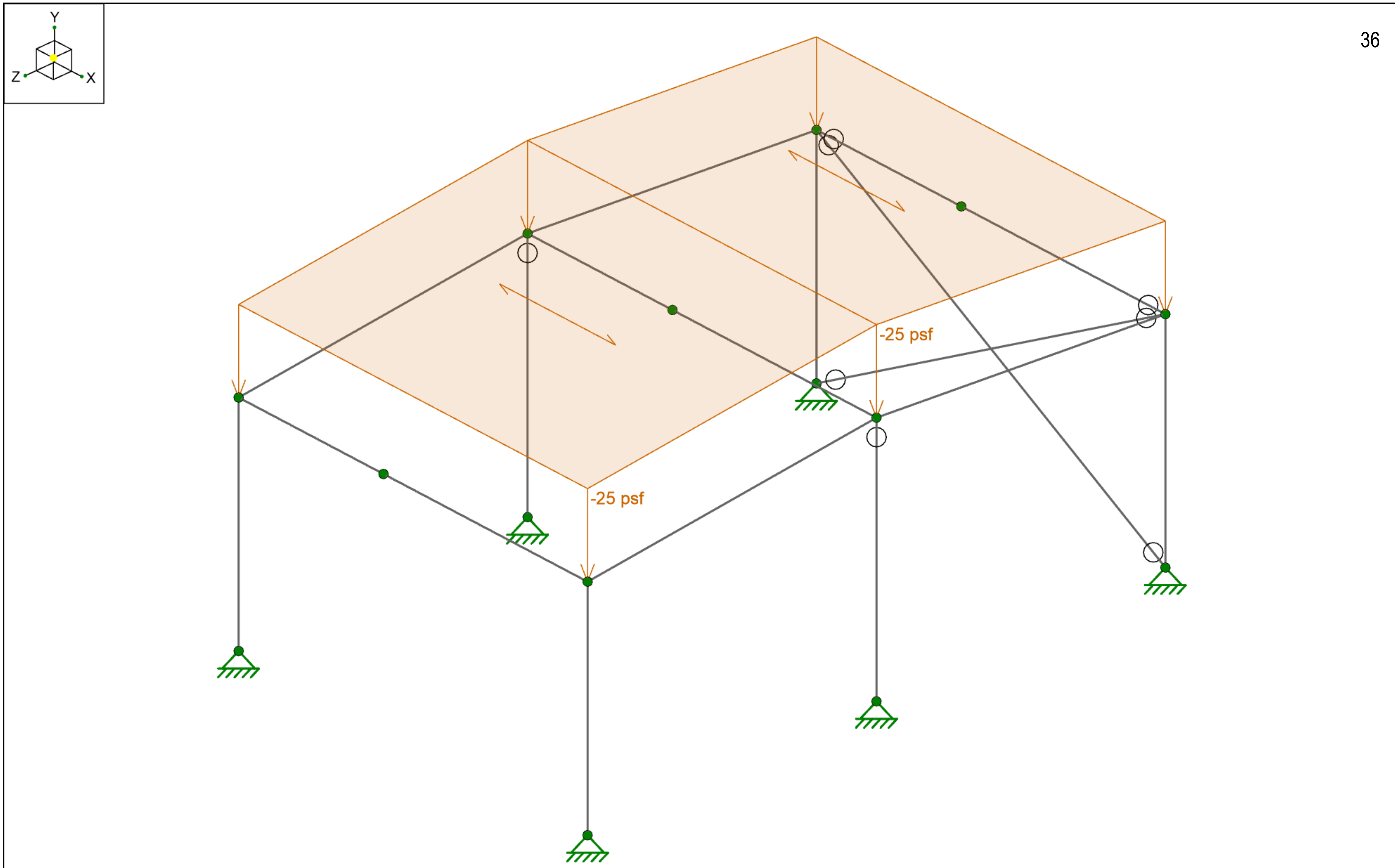
Label	Rn, psi	p	Bar Size	Bar Area	# of Bars	As, in^2	p-act	a, in	Mn, k*ft	**Bending**
F2.0	7.9412	0.0001	4	0.196	2	0.39	0.00187	0.524	15	**OK**
F2.5	13.27	0.0002	4	0.196	2	0.39	0.0015	0.419	15	**OK**
F3.0	19.959	0.0003	4	0.196	3	0.59	0.00187	0.524	22	**OK**
F3.5	28.009	0.0005	4	0.196	4	0.79	0.00214	0.598	30	**OK**
F4.0	37.42	0.0006	4	0.196	4	0.79	0.00187	0.524	30	**OK**
F4.5	48.191	0.0008	4	0.196	4	0.79	0.00166	0.465	30	**OK**
F5.0	60.322	0.001	4	0.196	5	0.98	0.00187	0.524	37	**OK**
F5.5	48.903	0.0008	4	0.196	6	1.18	0.00166	0.571	55	**OK**
F6.0	88.667	0.0015	4	0.196	7	1.37	0.00218	0.611	52	**OK**

PEMB FOUNDATION CALCULATIONS

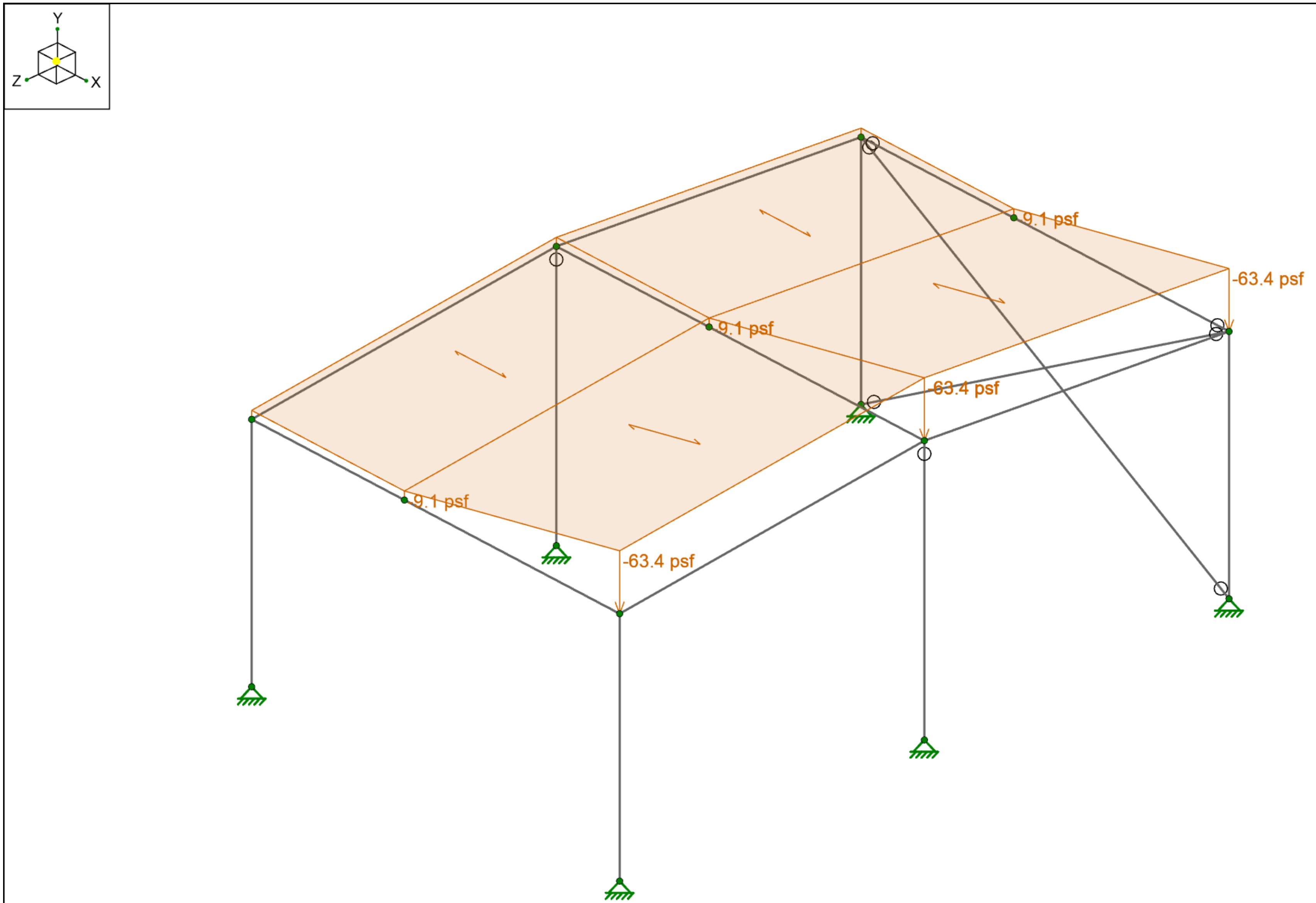


Loads: BLC 1, Dead Load
Envelope Only Solution

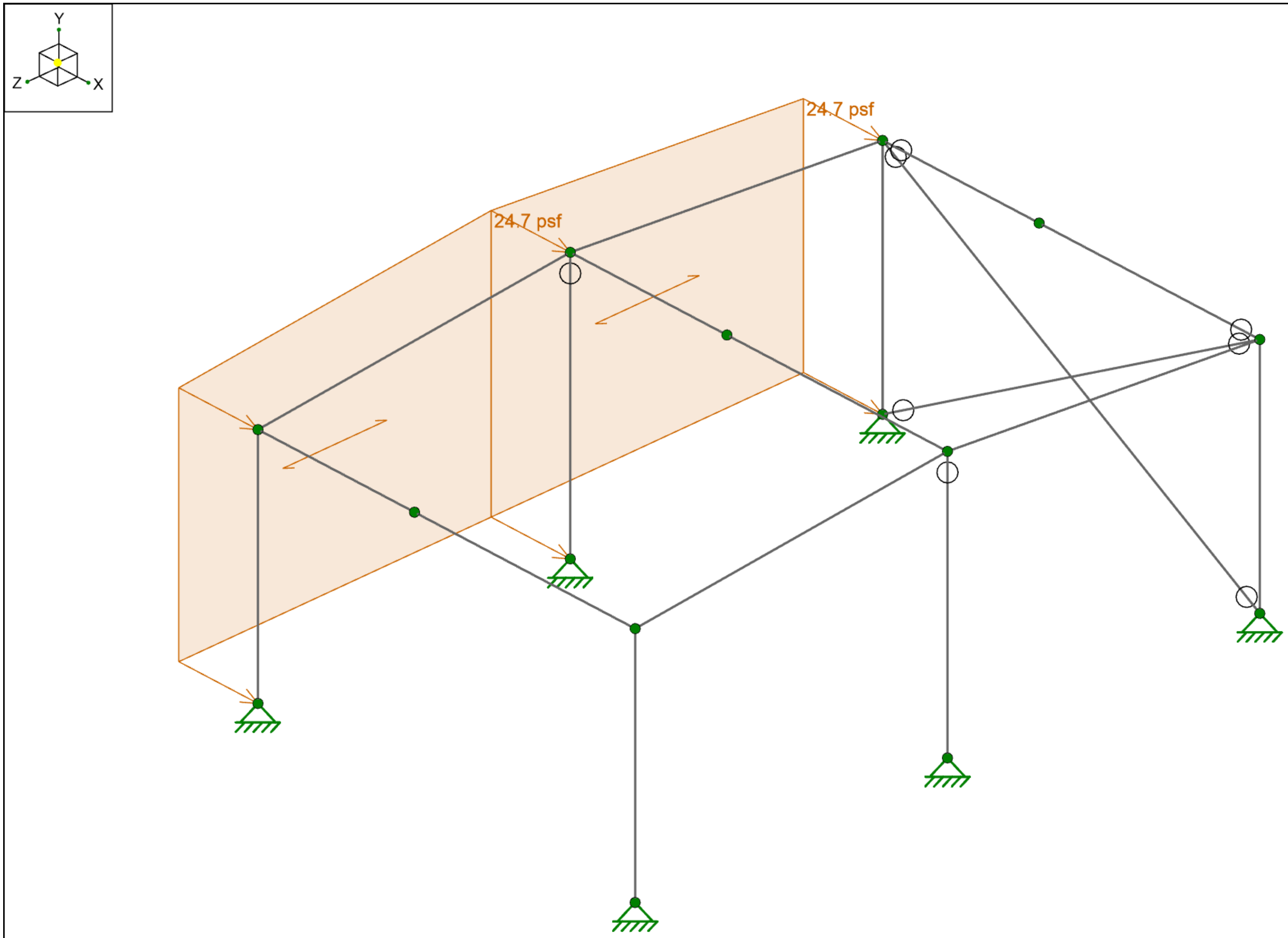
RISA A NEMETSCHEK COMPANY	WDY, Inc.	MFR Metal Building FND Reactions	
	ZH		MFR Metal Buildling FND Reactions - G...



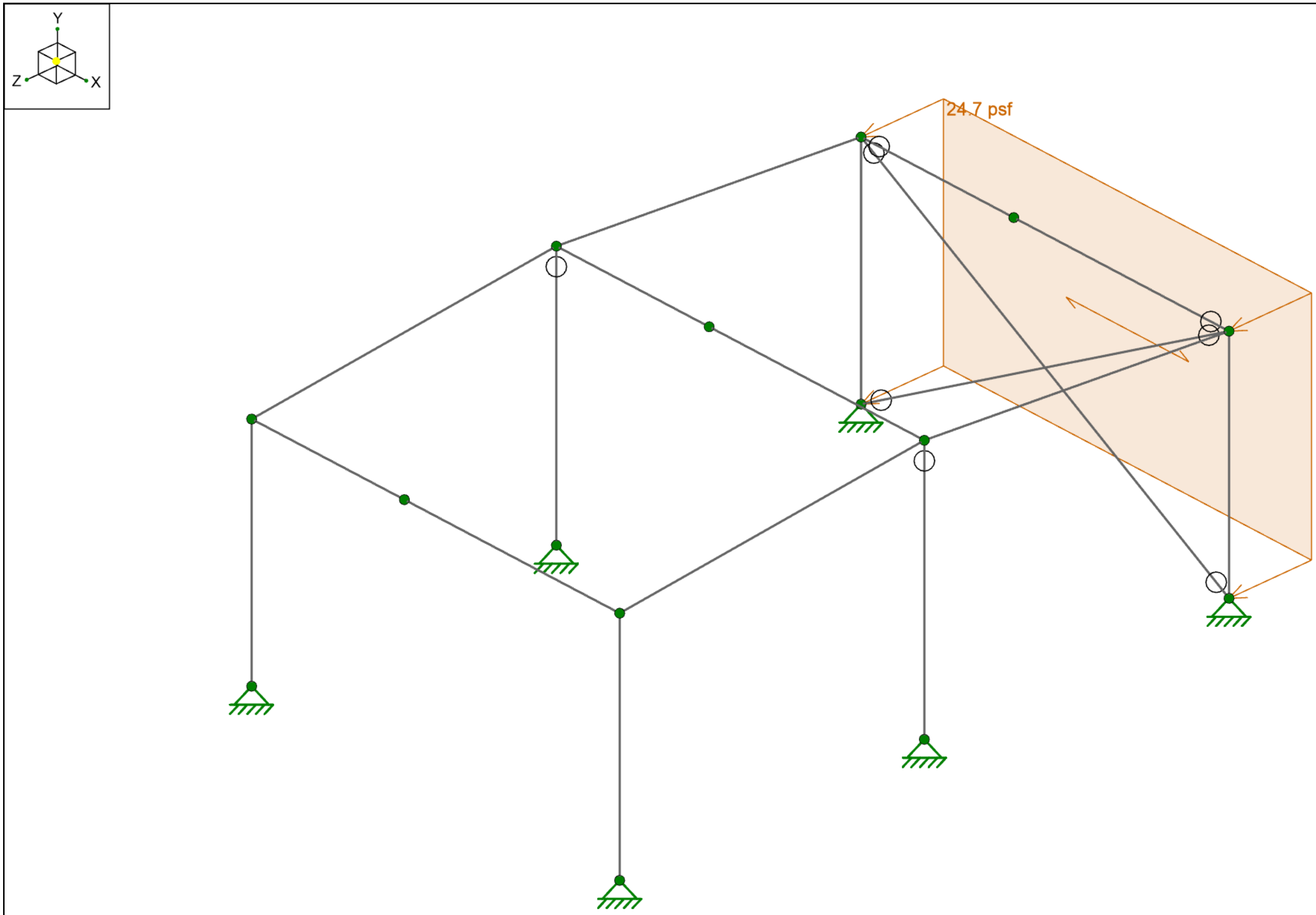
Loads: BLC 2, Snow Load
Envelope Only Solution



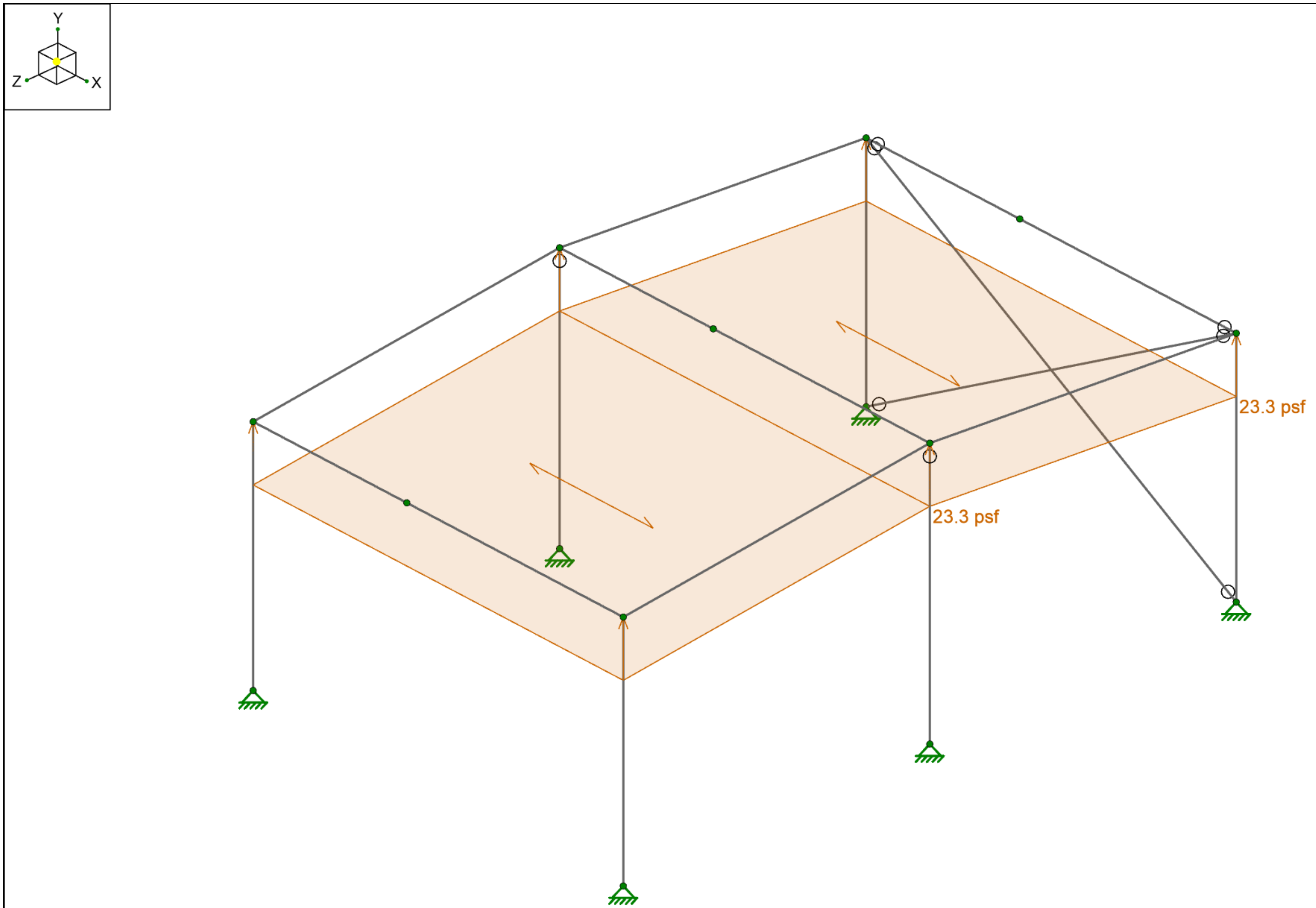
Loads: BLC 9, Snow Drift Load
Envelope Only Solution



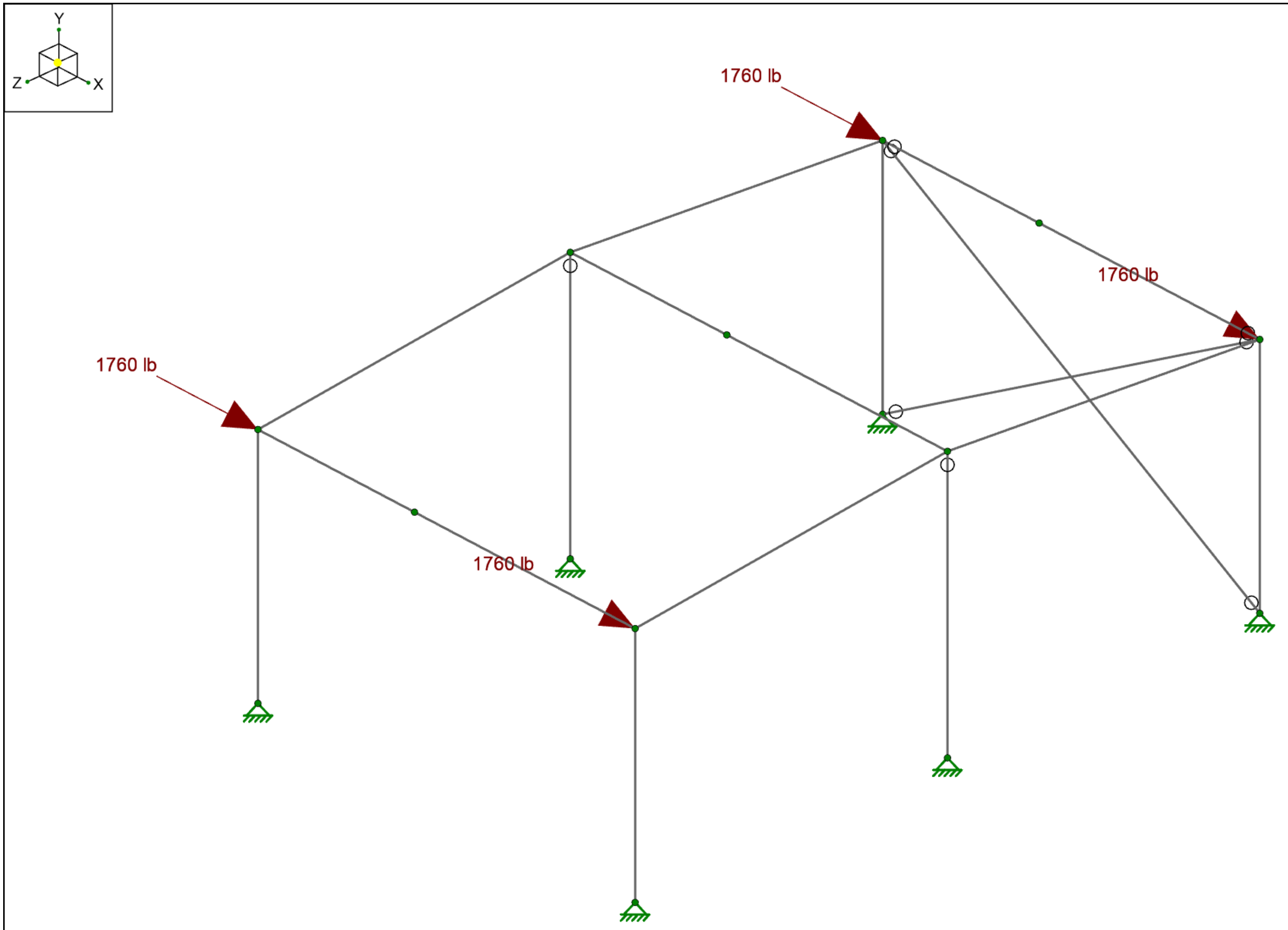
Loads: BLC 3, Wind Load X
Envelope Only Solution



Loads: BLC 4, Wind Load Z
Envelope Only Solution

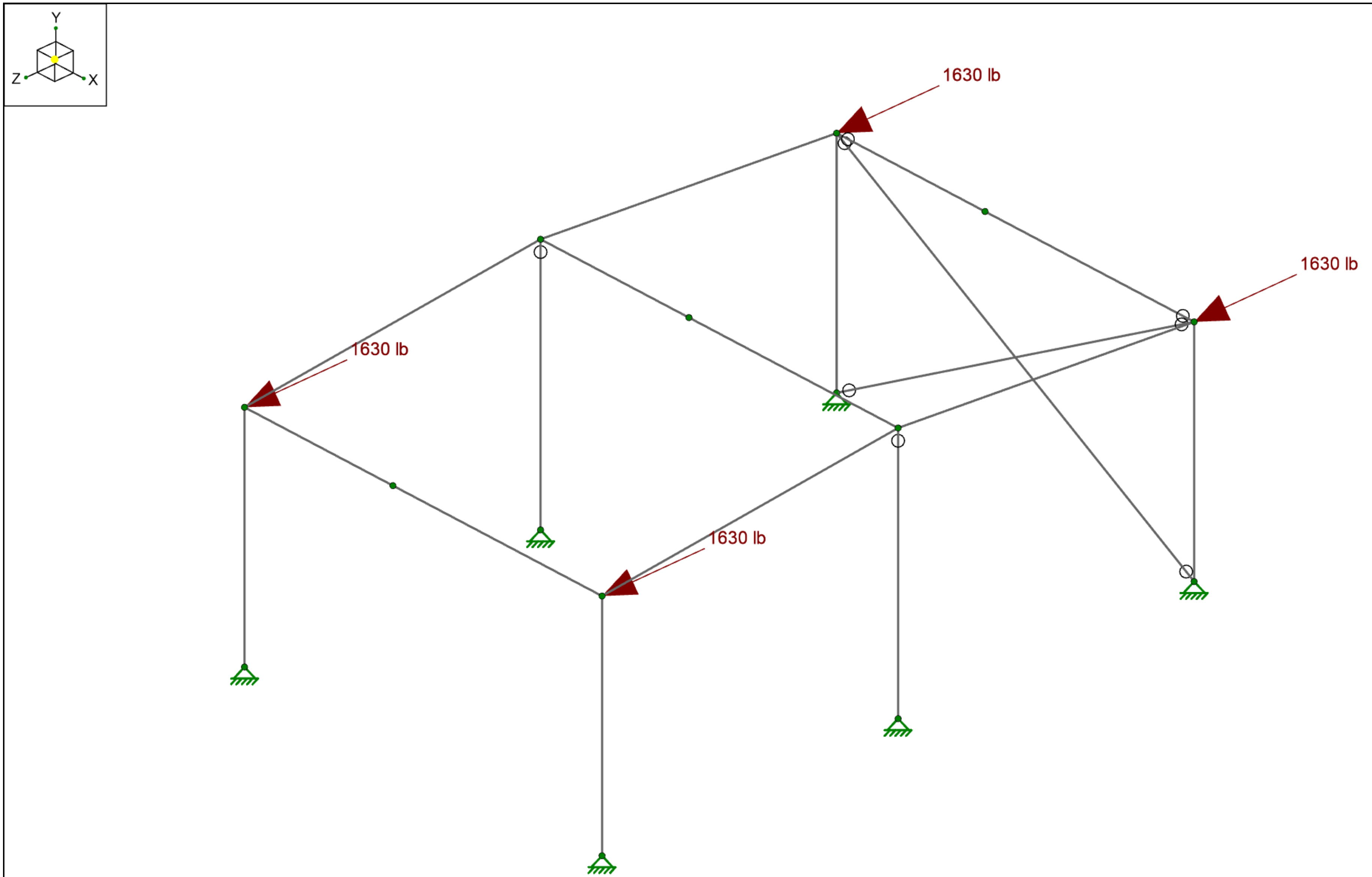


Loads: BLC 7, Wind Load Roof X
Envelope Only Solution



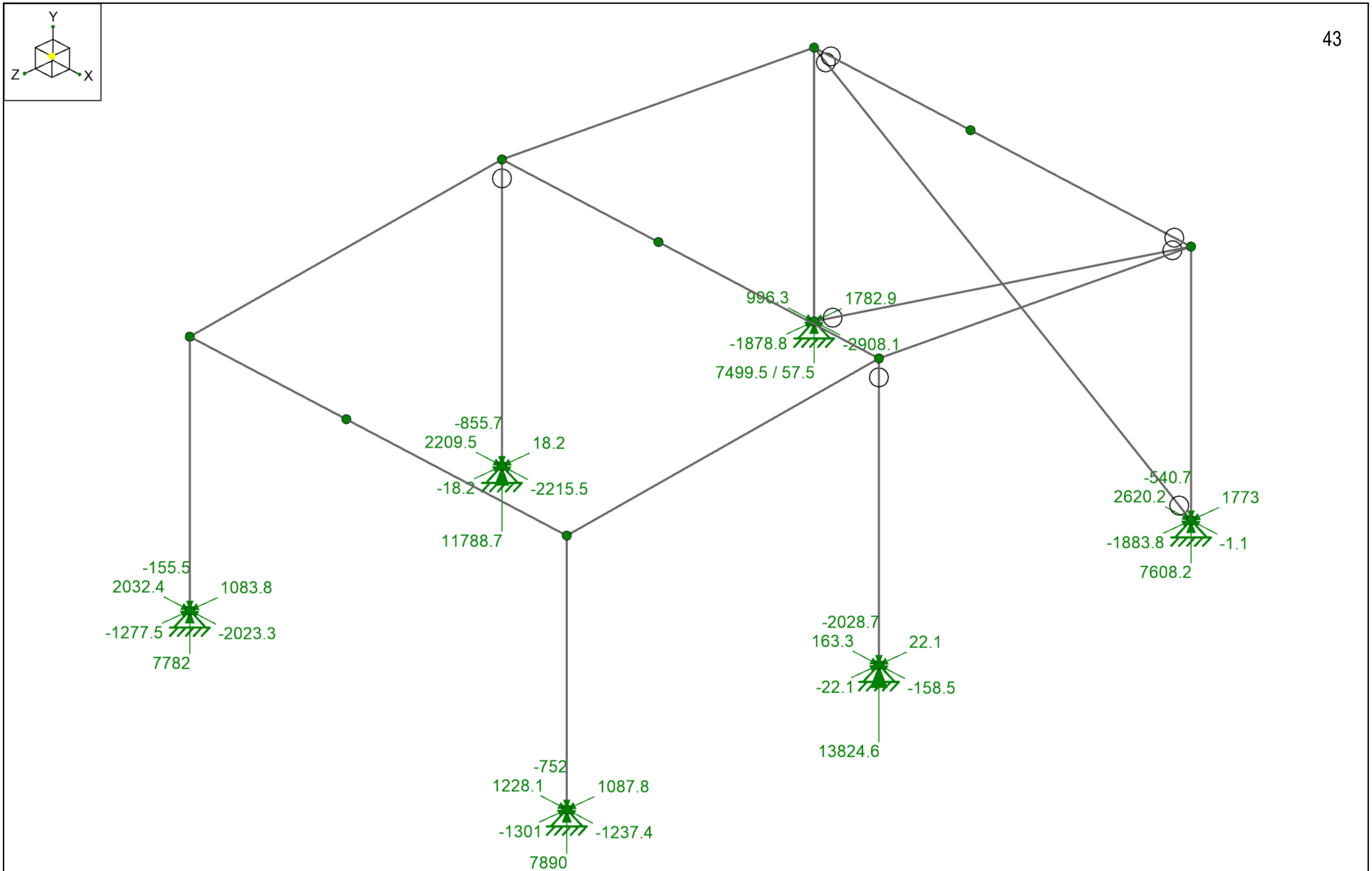
Loads: BLC 5, Seismic Load X
Envelope Only Solution

RISA A NEMETSCHEK COMPANY	WDY, Inc.	MFR Metal Building FND Reactions	
	ZH		MFR Metal Buildling FND Reactions - G...



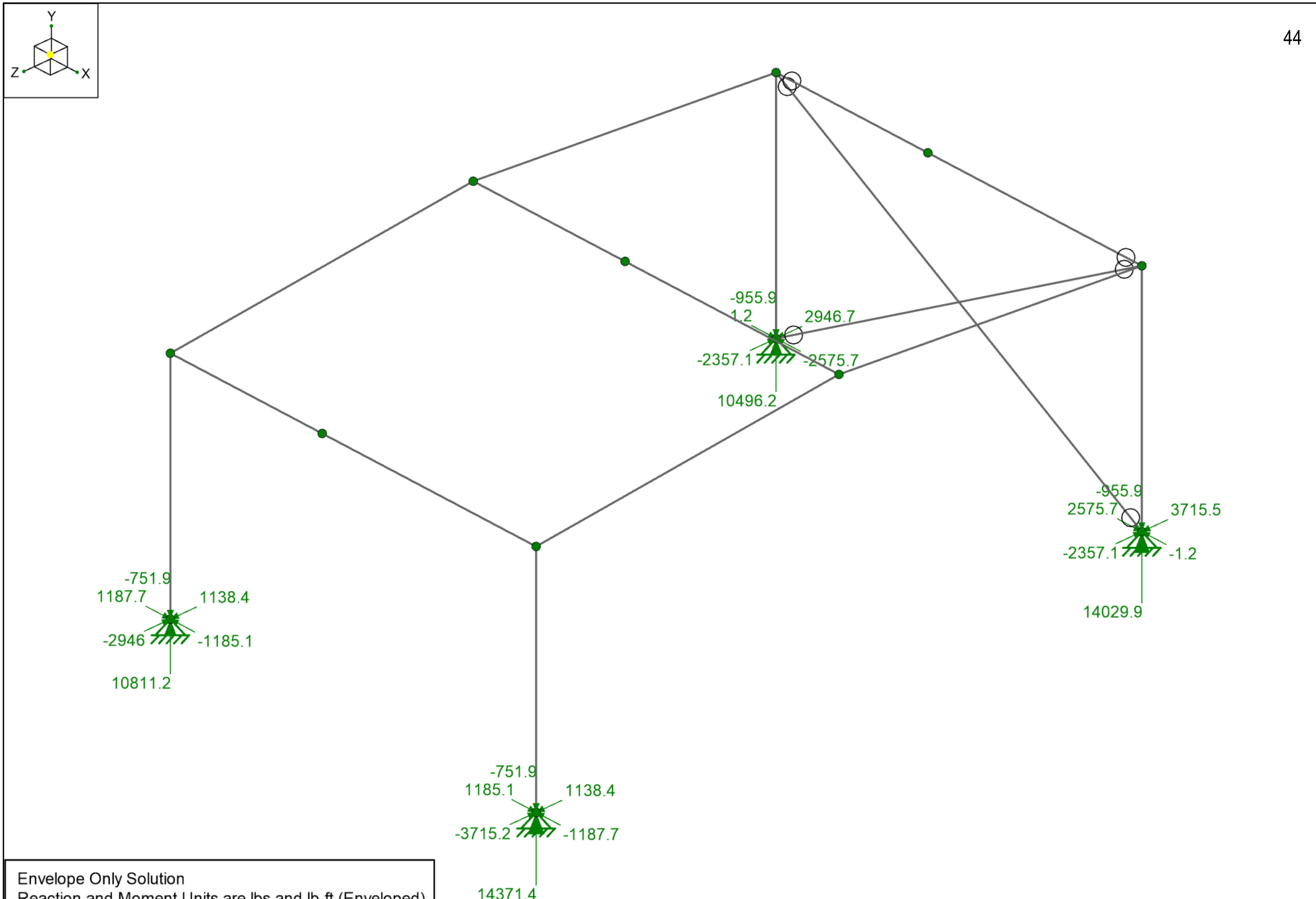
Loads: BLC 6, Seismic Load Z
Envelope Only Solution

RISA A NEMETSCHEK COMPANY	WDY, Inc.	MFR Metal Building FND Reactions	
	ZH		MFR Metal Buildling FND Reactions - G...



Envelope Only Solution
Reaction and Moment Units are lbs and lb-ft (Enveloped)

RISA A NEMETSCHEK COMPANY	WDY, Inc.	MFR Metal Building FND Reactions	
	ZH	PRELIMINARY	MFR Metal Buildling FND Reactions - G...



Envelope Only Solution
Reaction and Moment Units are lbs and lb-ft (Enveloped)

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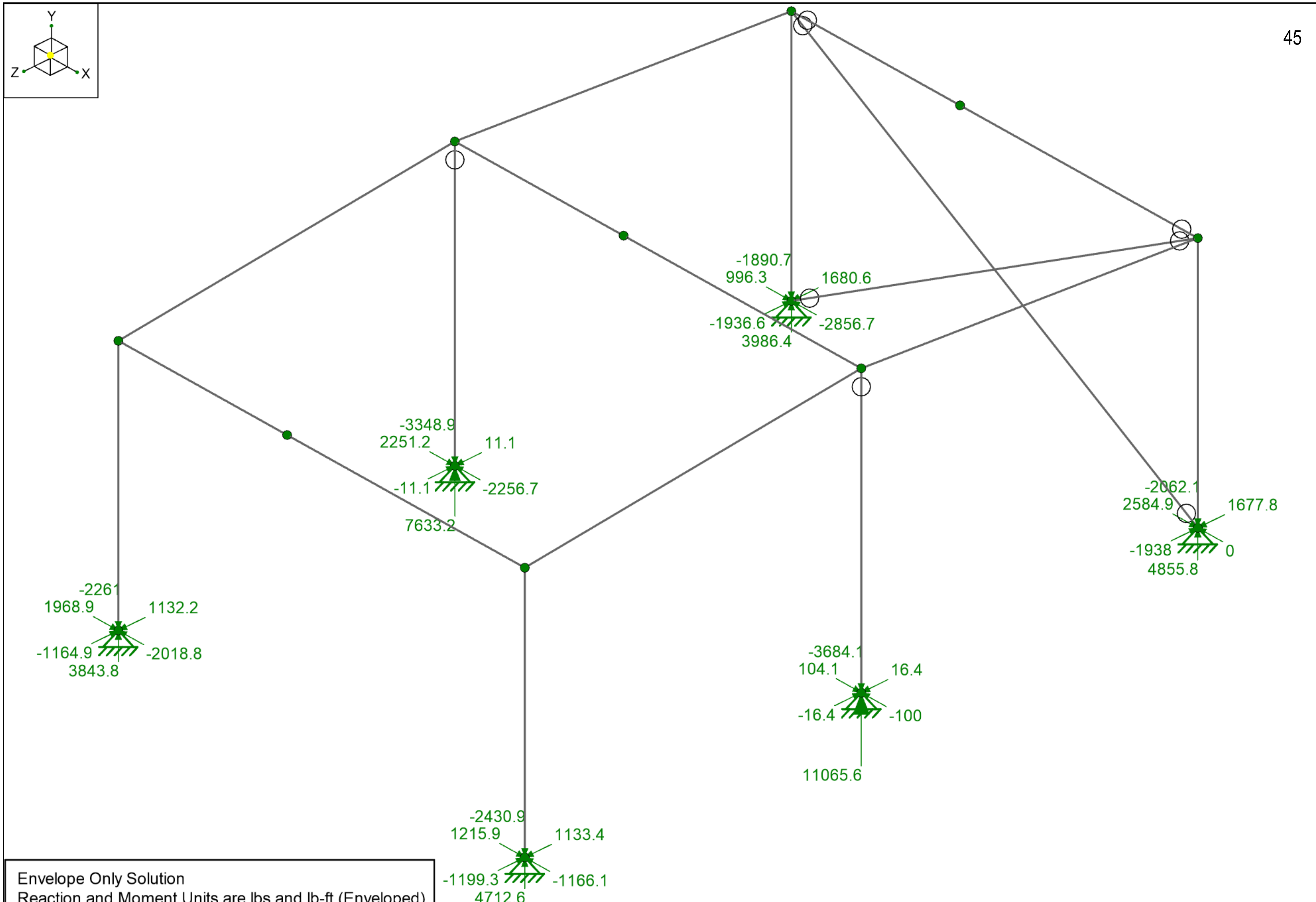
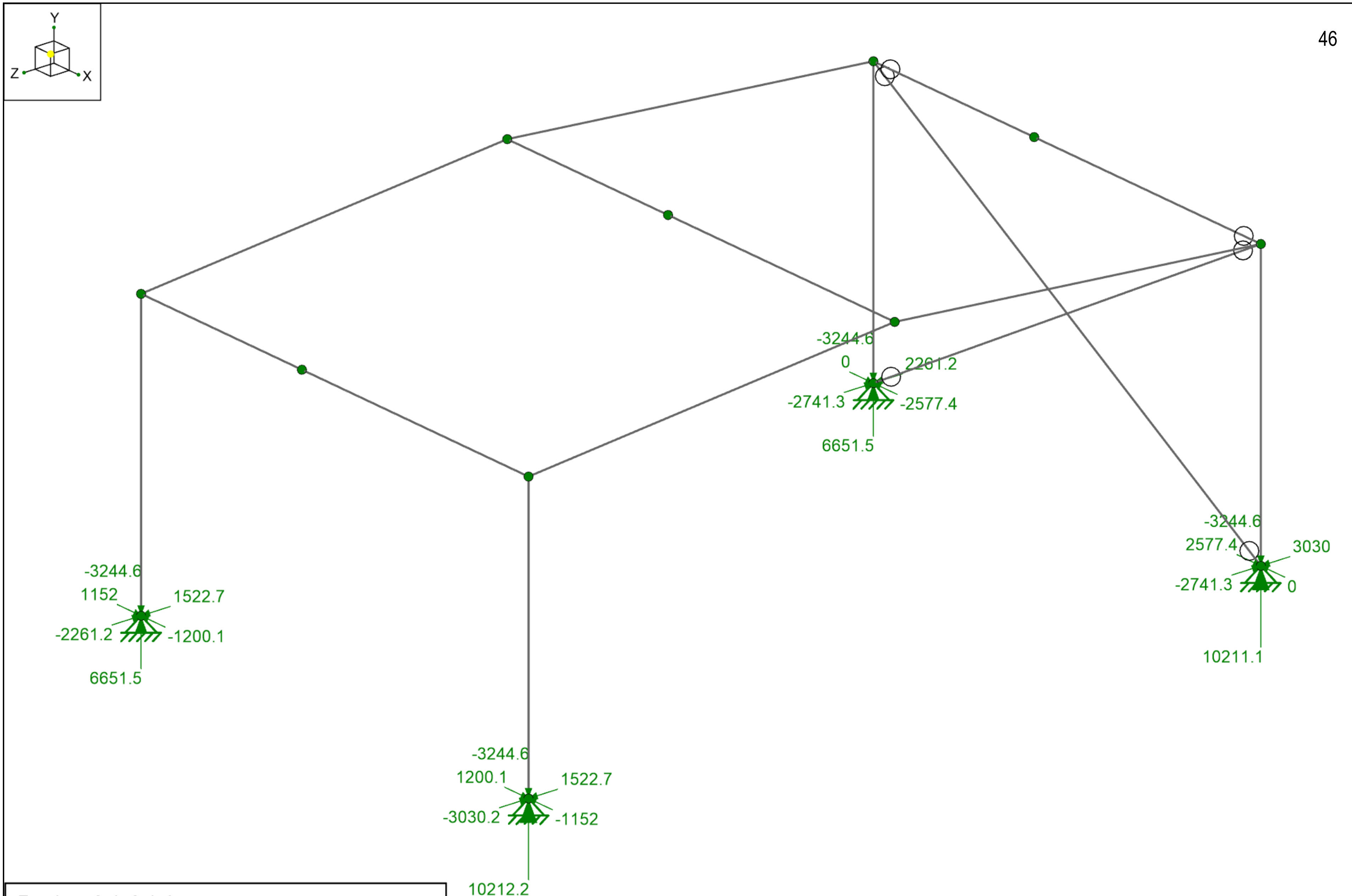
	ZH	PRELIMINARY	MFR Metal Buildling FND Reactions - G...



Envelope Only Solution
Reaction and Moment Units are lbs and lb-ft (Enveloped)

RISA A NEMETSCHEK COMPANY	WDY, Inc.	MFR Metal Building FND Reactions	
	ZH	PRELIMINARY	MFR Metal Buildling FND Reactions - U...



Envelope Only Solution
Reaction and Moment Units are lbs and lb-ft (Enveloped)

RISA A NEMETSCHEK COMPANY	WDY, Inc.	MFR Metal Building FND Reactions	
	ZH	PRELIMINARY	MFR Metal Buildling FND Reactions - U...

PEMB COLUMN ANCHORAGE

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-19
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.750
Effective Embedment depth, h_{ef} (inch): 12.000
Code report: ICC-ES ESR-4057
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 13.75
c_{ac} (inch): 25.69
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 24.00
State: Cracked
Compressive strength, f'_c (psi): 3500
$\Psi_{c,V}$: 1.0
Reinforcement condition: Supplementary reinforcement not present
Supplemental edge reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: Yes
Hole condition: Dry concrete
Inspection: Continuous
Temperature range, Short/Long: 150/110°F
Reduced installation torque (for AT-3G): Not applicable
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 7.00 x 7.00 x 0.75

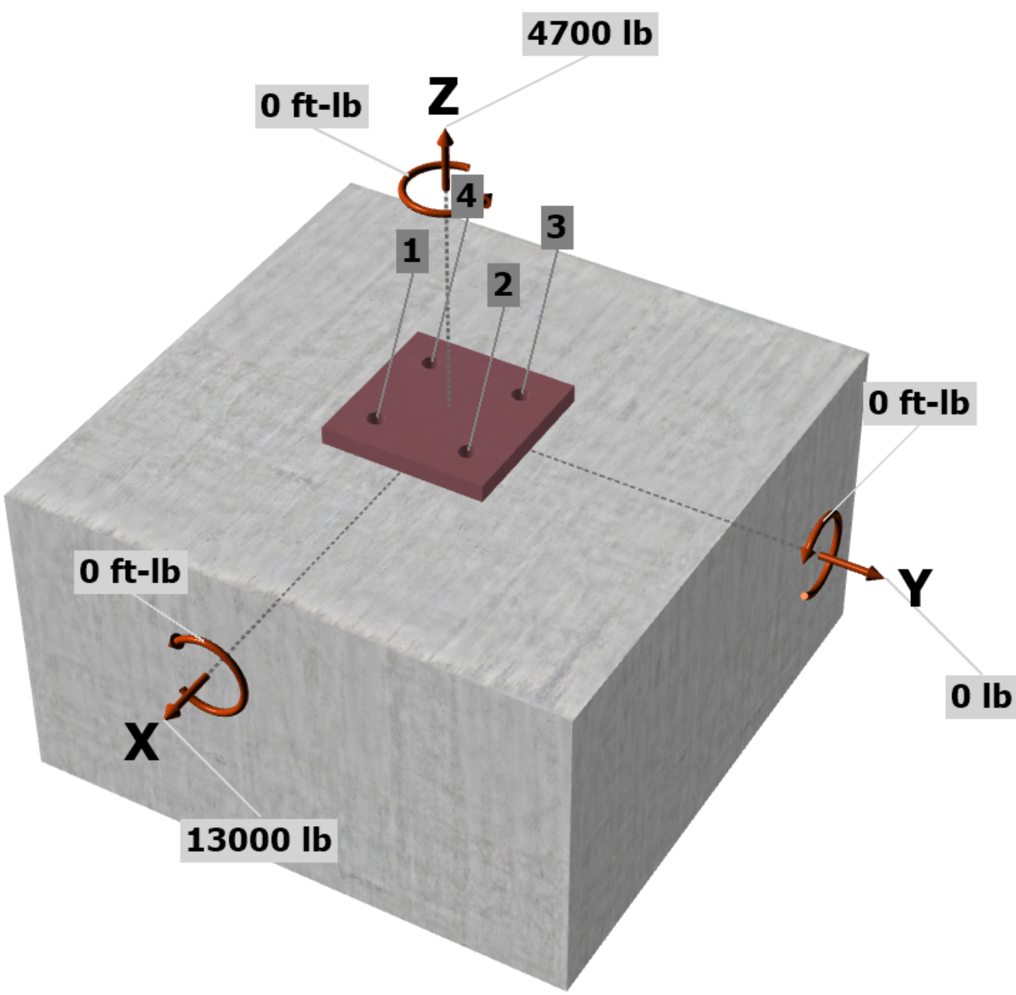
Recommended Anchor
Anchor Name: SET-3G™ - SET-3G w/ 3/4"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-4057

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: Yes
Anchors subjected to sustained tension: No
Ductility section for tension: 17.10.5.3 (d) is satisfied
Ductility section for shear: 17.10.6.3 (c) is satisfied
Ω_0 factor: not set
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

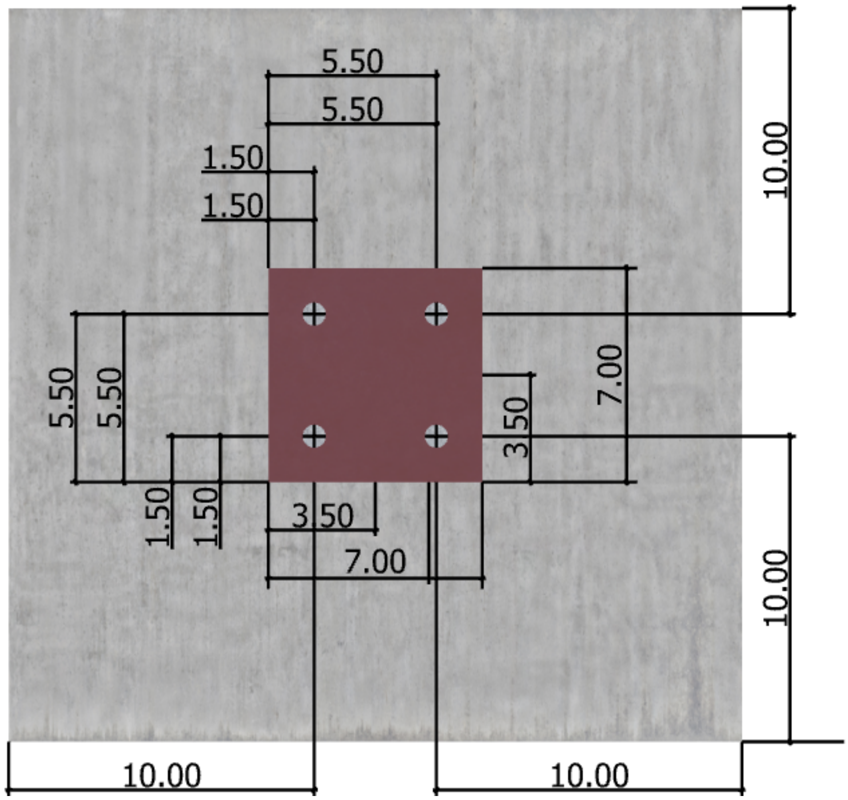
Strength level loads:

N_{ua} [lb]: 4700
V_{uax} [lb]: 13000
V_{uay} [lb]: 0
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0
M_{uz} [ft-lb]: 0

<Figure 1>



<Figure 2>

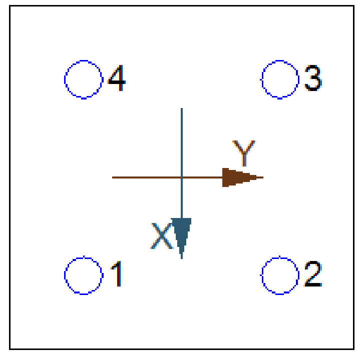

5.50
5.50
1.50
1.50
10.00
5.50
5.50
7.00
3.50
1.50
1.50
3.50
7.00
10.00
10.00
10.00

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1175.0	3250.0	0.0	3250.0
2	1175.0	3250.0	0.0	3250.0
3	1175.0	3250.0	0.0	3250.0
4	1175.0	3250.0	0.0	3250.0
Sum	4700.0	13000.0	0.0	13000.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4700
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.6.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
19370	0.75	14528

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.6.2)

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

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	3500	6.667	17312

$0.75\phi N_{cbg} = 0.75\phi\,(A_{Nc}/A_{Nco})\,\Psi_{ec,N}\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b$ (Sec. 17.5.1.2 & Eq. 17.6.2.1a)

A_{Nc} (in^2)	A_{Nco} (in^2)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	$0.75\phi N_{cbg}$ (lb)
576.00	400.00	10.00	1.000	1.000	1.00	1.000	17312	0.65	12153

6. Adhesive Strength of Anchor in Tension (Sec. 17.6.5)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat} (f'_c / 2{,}500)^n \alpha_{N.seis}$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	$\alpha_{N.seis}$	f'_c (psi)	n	$\tau_{k,cr}$ (psi)
1310	1.00	1.00	1.00	3500	0.24	1420

$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef}$ (Eq. 17.6.5.2.1)

λ_a	τ_{cr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	1420	0.75	12.000	40155

$0.75\phi N_{ag} = 0.75\phi\,(A_{Na}/A_{Na0})\,\Psi_{ec,Na}\Psi_{ed,Na}\Psi_{cp,Na}N_{ba}$ (Sec. 17.5.1.2 & Eq. 17.6.5.1b)

A_{Na} (in^2)	A_{Na0} (in^2)	c_{Na} (in)	$c_{a,min}$ (in)	$\Psi_{ec,Na}$	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba}(lb)	ϕ	$0.75\phi N_{ag}$ (lb)
576.00	422.18	10.27	10.00	1.000	0.992	1.000	40155	0.65	26494

8. Steel Strength of Anchor in Shear (Sec. 17.7.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\alpha_{V,seis}$	$\phi_{grout}\alpha_{V,seis}\phi V_{sa}$ (lb)
11625	1.0	0.65	0.75	5667

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.7.3)

$\phi V_{cpg} = \phi \min|k_{cp}N_{ag}\ ;\ k_{cp}N_{cbg}| = \phi \min|k_{cp}(A_{Na} / A_{Na0})\Psi_{ec,Na}\Psi_{ed,Na}\Psi_{cp,Na}N_{ba}\ ;\ k_{cp}(A_{Nc} / A_{Nco})\Psi_{ec,N}\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Sec. 17.5.1.2 & Eq. 17.7.3.1b)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{ec,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	576.00	422.18	0.992	1.000	1.000	40155	54347

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
576.00	400.00	1.000	1.000	1.000	1.000	17312	24929	0.70

ϕV_{cpg} (lb)
34901

11. Results

Interaction of Tensile and Shear Forces (Sec. R17.8)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	1175	14528	0.08	Pass
Concrete breakout	**4700**	**12153**	**0.39**	**Pass (Governs)**
Adhesive	4700	26494	0.18	Pass

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	**3250**	**5667**	**0.57**	**Pass (Governs)**
Pryout	13000	34901	0.37	Pass

Interaction check	$(N_{ua}/\phi N_{ua})^{5/3}$	$(V_{ua}/\phi V_{ua})^{5/3}$	Combined Ratio	Permissible	Status
Sec. R17.8	0.21	0.40	60.1%	1.0	Pass

SET-3G w/ 3/4"Ø F1554 Gr. 36 with hef = 12.000 inch meets the selected design criteria.

12. Warnings

- Concrete breakout strength in shear has not been evaluated against applied shear load(s) per designer option. Refer to ACI 318 Section 17.5.2.1 for conditions where calculations of the concrete breakout strength may not be required.

- Per designer input, ductility requirements for tension have been determined to be satisfied – designer to verify.

- Per designer input, ductility requirements for shear have been determined to be satisfied – designer to verify.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

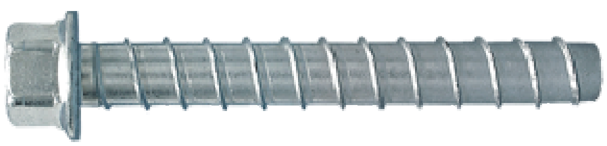
General
Design method:ACI 318-19
Units: Imperial units

Anchor Information:
Anchor type: Concrete screw
Material: Carbon Steel
Diameter (inch): 0.625
Nominal Embedment depth (inch): 5.000
Effective Embedment depth, h_{ef} (inch): 3.820
Code report: ICC-ES ESR-2713
Anchor category: 1
Anchor ductility: No
h_{min} (inch): 7.67
c_{ac} (inch): 5.75
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 3500
$\Psi_{c,V}$: 1.0
Reinforcement condition: Supplementary reinforcement not present
Supplemental edge reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 4.00 x 12.00 x 0.75

Recommended Anchor
Anchor Name: Titen HD® - 5/8"Ø Titen HD, hnom:5" (127mm)
Code Report: ICC-ES ESR-2713

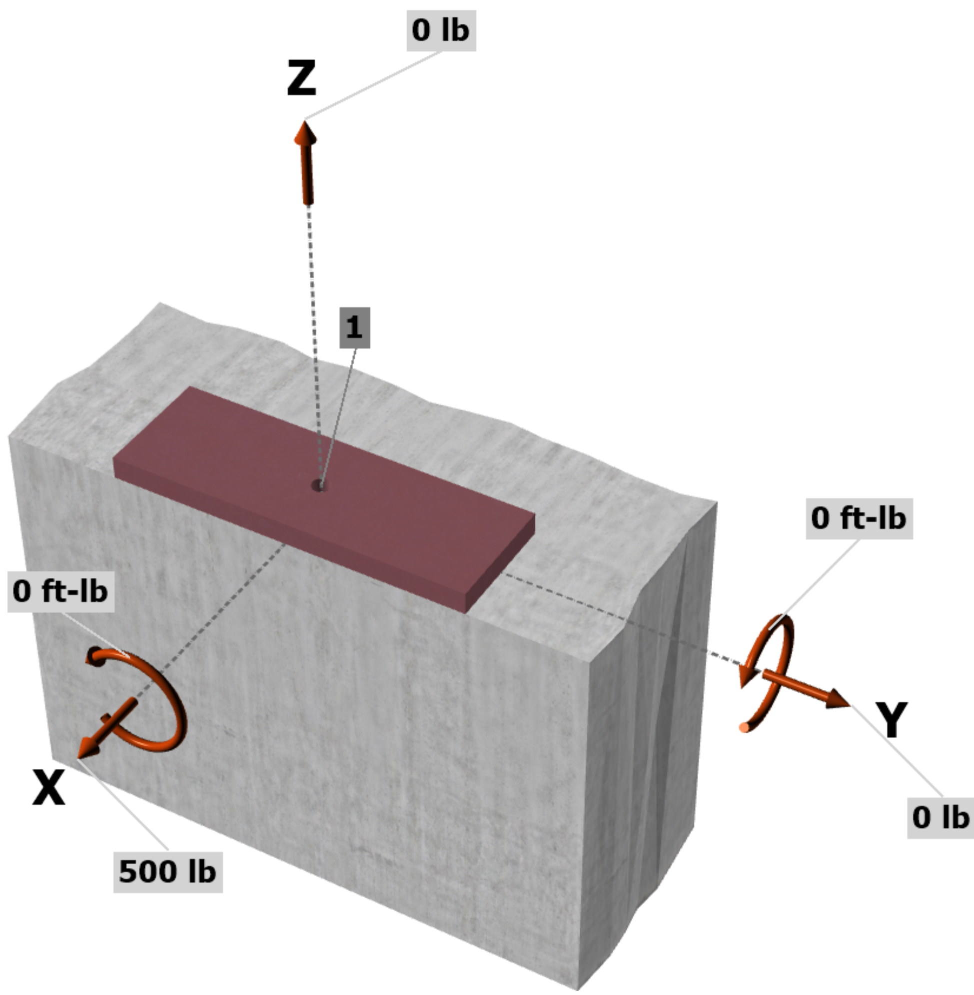


Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

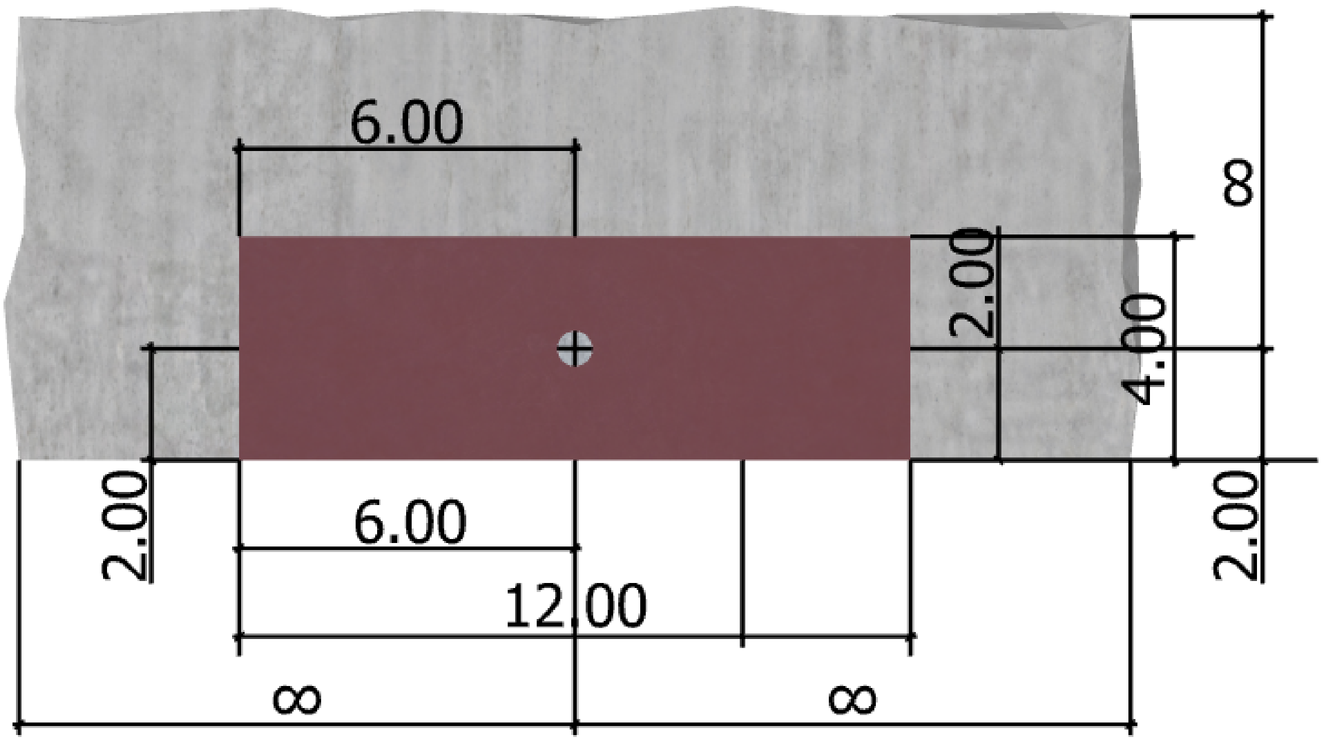
Strength level loads:

N_{ua} [lb]: 0
V_{uax} [lb]: 500
V_{uay} [lb]: 0
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0

<Figure 1>



<Figure 2>

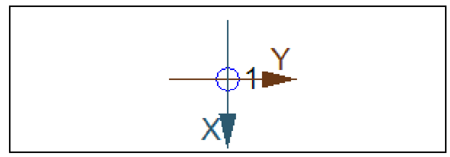


3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	0.0	500.0	0.0	500.0
Sum	0.0	500.0	0.0	500.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 0
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



8. Steel Strength of Anchor in Shear (Sec. 17.7.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
10000	1.0	0.60	6000

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
3.82	0.625	1.00	3500	2.00	1330

$\phi V_{cbx} = \phi (A_{Vc} / A_{Vco}) \Psi_{ed,V} \Psi_{c,V} \Psi_{h,V} V_{bx}$ (Sec. 17.5.1.2 & Eq. 17.7.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbx} (lb)
18.00	18.00	1.000	1.000	1.000	1330	0.70	931

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.7.3)

$\phi V_{cp} = \phi k_{cp} N_{cb} = \phi k_{cp}(A_{Nc} / A_{Nco}) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.5.1.2 & Eq. 17.7.3.1a)

k_{cp}	A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cp} (lb)
2.0	88.59	131.33	0.805	1.000	1.000	7509	0.70	5706

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.8)

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status

Steel	500	6000	0.08	Pass
T Concrete breakout x+	**500**	**931**	**0.54**	**Pass (Governs)**
Pryout	500	5706	0.09	Pass

5/8"Ø Titen HD, hnom:5" (127mm) meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer’s product literature for hole cleaning and installation instructions.

PEMB DOOR JAMB ANCHORAGE

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

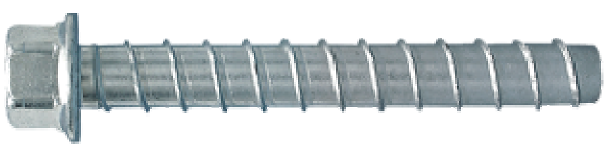
General
Design method:ACI 318-19
Units: Imperial units

Anchor Information:
Anchor type: Concrete screw
Material: Carbon Steel
Diameter (inch): 0.625
Nominal Embedment depth (inch): 5.000
Effective Embedment depth, h_{ef} (inch): 3.820
Code report: ICC-ES ESR-2713
Anchor category: 1
Anchor ductility: No
h_{min} (inch): 7.67
c_{ac} (inch): 5.75
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'$_c$ (psi): 3500
$\Psi_{c,V}$: 1.0
Reinforcement condition: Supplementary reinforcement not present
Supplemental edge reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 5.00 x 2.00 x 0.25

Recommended Anchor
Anchor Name: Titen HD® - 5/8"Ø Titen HD, hnom:5" (127mm)
Code Report: ICC-ES ESR-2713

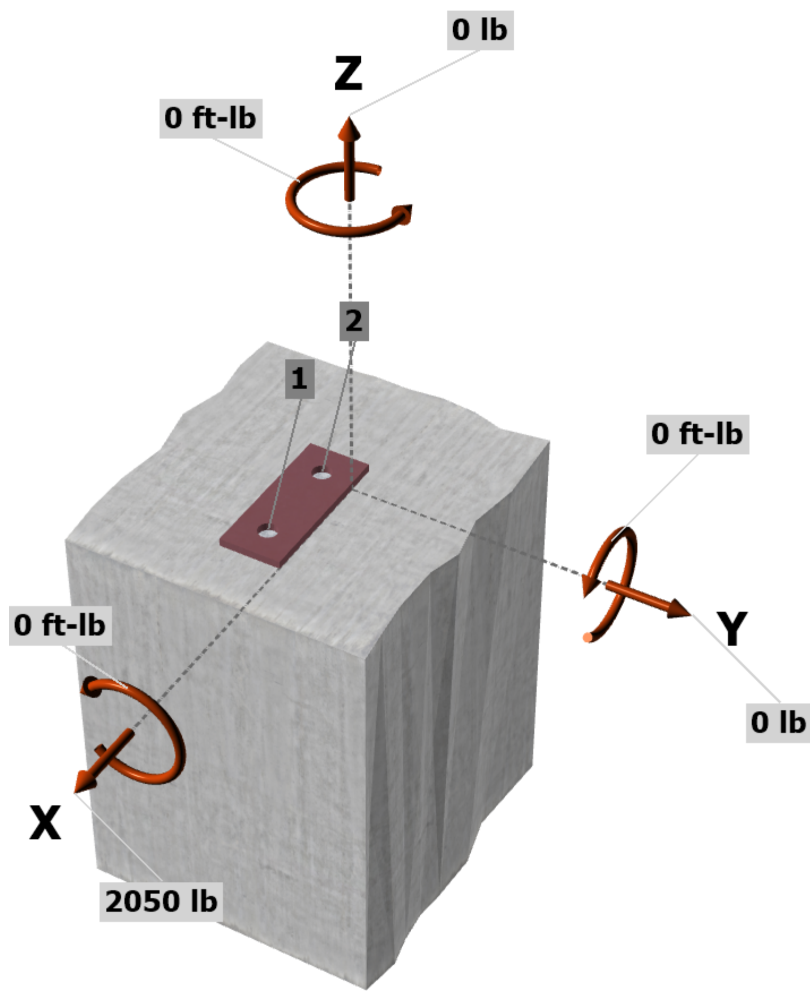


Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: Not applicable
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

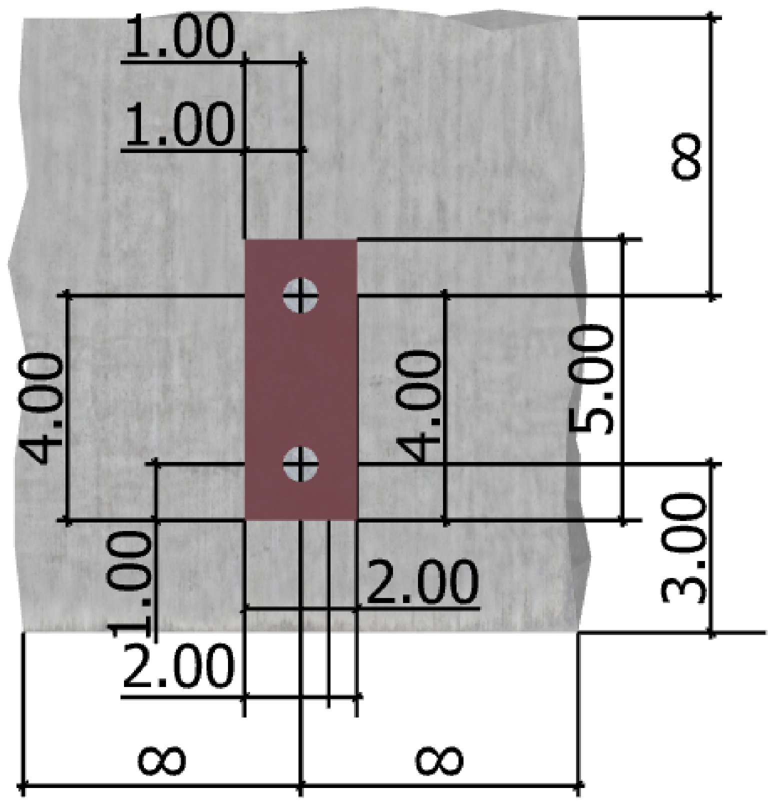
Strength level loads:

N_{ua} [lb]: 0
V_{uax} [lb]: 2050
V_{uay} [lb]: 0
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0
M_{uz} [ft-lb]: 0

<Figure 1>



<Figure 2>

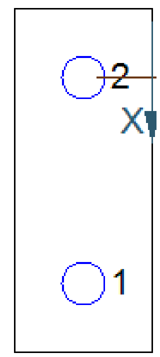


3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	0.0	1025.0	-683.3	1231.9
2	0.0	1025.0	683.3	1231.9
Sum	0.0	2050.0	0.0	2463.8

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 0
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



8. Steel Strength of Anchor in Shear (Sec. 17.7.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
10000	1.0	0.60	6000

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.7.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
3.82	0.625	1.00	3500	3.00	2443

$\phi V_{cbx} = \phi\ (A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.5.1.2 & Eq. 17.7.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbx} (lb)
40.50	40.50	1.000	1.000	1.000	2443	0.70	1710

Shear parallel to edge in x-direction:

$V_{by} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5}; 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.7.2.2.1a & Eq. 17.7.2.2.1b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
3.82	0.625	1.00	3500	3.00	2443

$\phi V_{cbx} = \phi\ (2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.5.1.2, 17.7.2.1(c) & Eq. 17.7.2.1a)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
40.50	40.50	1.000	1.000	1.000	2443	0.70	3421

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.7.3)

$\phi V_{cp} = \phi k_{cp} N_{cb} = \phi k_{cp}(A_{Nc} / A_{Nco}) \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.5.1.2 & Eq. 17.7.3.1a)

k_{cp}	A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕV_{cp} (lb)
2.0	51.57	131.33	0.857	1.000	1.000	7509	0.70	3538

11. Results

Interaction of Tensile and Shear Forces (Sec. 17.8)

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	1232	6000	0.21	Pass
T Concrete breakout x+	**1025**	**1710**	**0.60**	**Pass (Governs)**
|| Concrete breakout x+	**683**	**3421**	**0.20**	**Pass (Governs)**
Pryout	1232	3538	0.35	Pass

5/8"Ø Titen HD, hnom:5" (127mm) meets the selected design criteria.

12. Warnings

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.