PRMH20221388

City of Puyallup
Building
ACCEPTED
JMontgomery
11/02/2022
1:27:41 PM

THE APPROVED CONSTRUCTION PLANS, DOCUMENTS AND ALL ENGINEERING MUST BE POSTED ON THE JOB AT ALL INSPECTIONS IN A VISIBLE AND READILY ACCESSIBLE LOCATION.

FULL SIZED LEDGIBLE COLOR PLANS ARE REQUIRED TO BE PROVIDED BY THE PERMITEE ON SITE FOR INSPECTION

City of Puyallup
Development & Permitting Services
ISSUED PERMIT

Building	Planning
Engineering	Public Works
Fire	Traffic

MILLER
CONSULTING
ENGINEERS

STRUCTURAL CALCULATIONS

7 Eleven New Mechanical Units
941 S Meridian, Puyallup, WA
CoolSys Commercial & Industrial Solutions

October 26, 2022
Project No. 221449
15 pages

Principal Checked: PRA

10/26/2022

ANDREW RYAN LEICHTY
STATE OF WASHINGTON
44007
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

*** LIMITATIONS ***

Miller Consulting Engineers, Inc. was retained in a limited capacity for this project. This design is based upon information provided by the client, who is solely responsible for accuracy of same. No responsibility and or liability is assumed by or is to be assigned to the engineer for items beyond that shown on these sheets.

Building Code: 2018 Washington State Building Code

Soils Report: No **Soils Report by:** **Dated:**

Soil Bearing: 1500 PSF **Retaining Walls:** No

Equivalent Fluid Pressure (active): N/A PCF **Passive bearing:** PCF **Friction:**

Structural System: Building Structure

Vertical System: Wood framed Construction **Lateral Sys:** Flexible Diaphragm / Wood shearwalls

Basic Design Loads:					
	Element	Roof	Unit Weight		
	Load Type	Dead	Dead		
	Value (PSF)	15	179 lbs		
	Load Type	Snow			
	Value (PSF)	25			
	Deflection Criteria	L/240			

PRMH20221388

Lateral Design Parameters:

Wind Design: ASCE 7-16 **Wind Speed (3 sec Gust):** 97 MPH

Exposure C

Importance Factors	I_W =	I_E =	I_S =	I_i =	**Risk Cat:**
	1.00 (ice)	1.00 (seismic)	1.00 (snow)	1.00 (ice)	II

Seismic Design

Seismic design parameters are based on published values from the USGS web site.

Latitude:
Longitude:

2% PE in 50 years, 0.2 sec SA = Ss

2% PE in 50 years, 1.0 sec SA = S1

(Site class B parameters are indicated on this page, for actual site class used in design, refer to seismic design summary)

Design Summary:

The scope of these calculations is the support and anchorage requirements for the addition of (2) mechanical units to the roof of the structure.

MILLER CONSULTING ENGINEERS

9600 SW Oak St #400 Portland, OR 97223

503.246.1250 miller-se.com

Project Name 7 Eleven New Mechanical Units Project # 221449

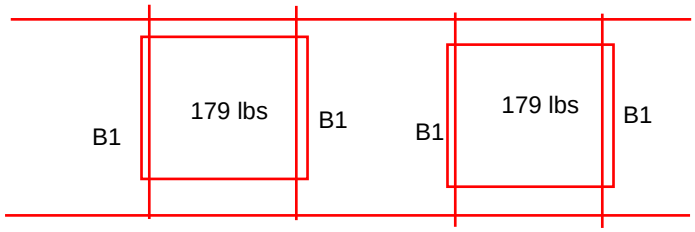
Location 941 S Meridian, Puyallup, WA

Client CoolSys Commercial & Industrial Solutions

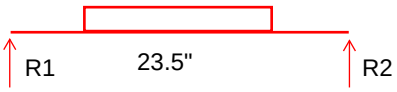
By ADJ Ck'd PRA Date 10/17/2022

PRMH20221388

Unit Framing



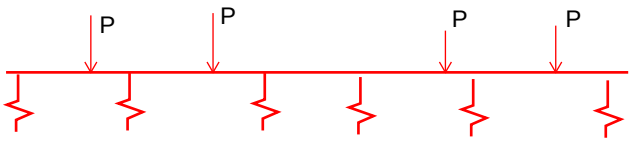
Member B1:



L = 3'
R1 = R2 = 179/4 = 45 lbs
V = 45 lbs
M = 23 ft lbs

PT 4 x 4 Hem Fir No 2

Member B2:



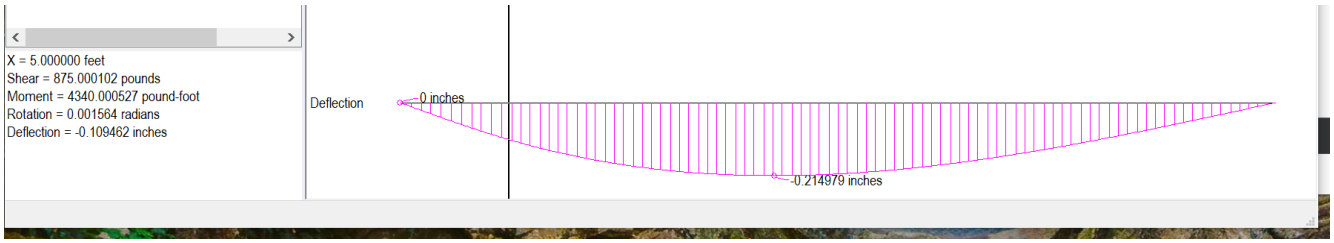
P = 45 lbs

Determine spring stiffness for trusses to use as springs on support member to determine reaction to truss

Estimate Truss Stiffness:

I = (1.5(30^3-19^3)/12) = 2518 in^4
E = 1.6 x 10^6 psi

Load truss with 1000 lbs load at location of mech units

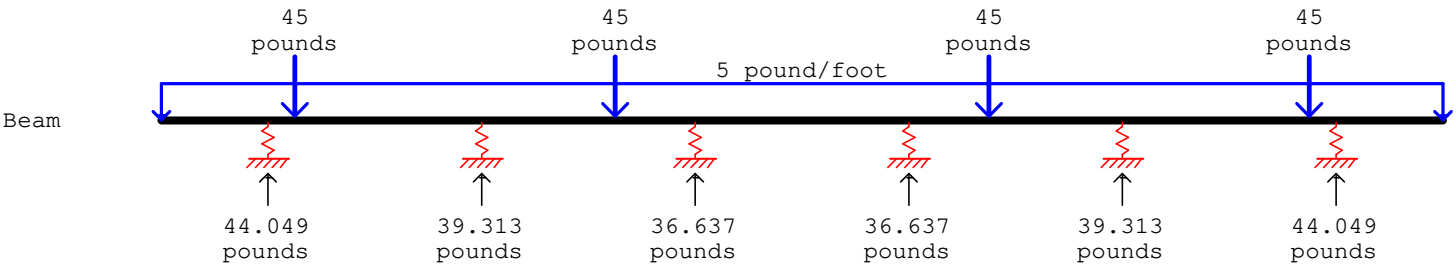


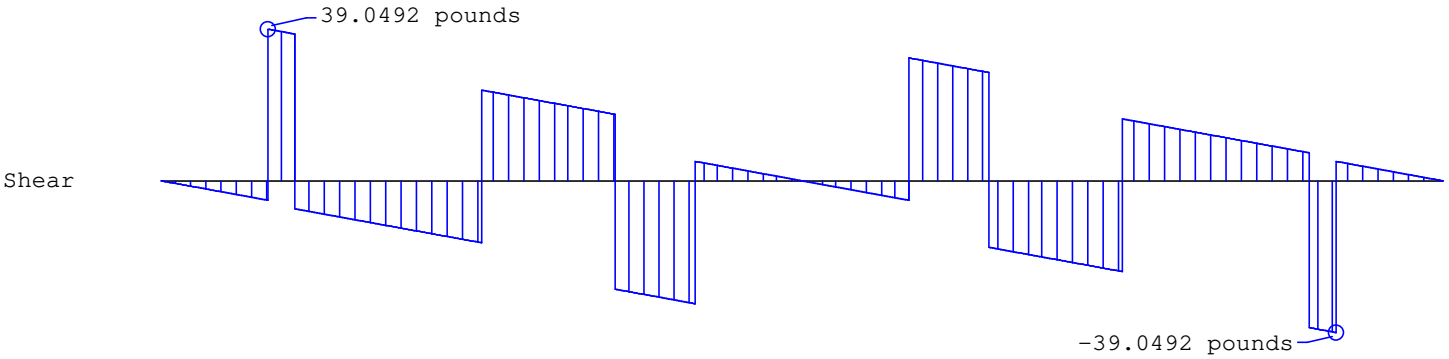
Spring Constant, k = 1000 lbs / 0.109462 in = 9130 lbs/in

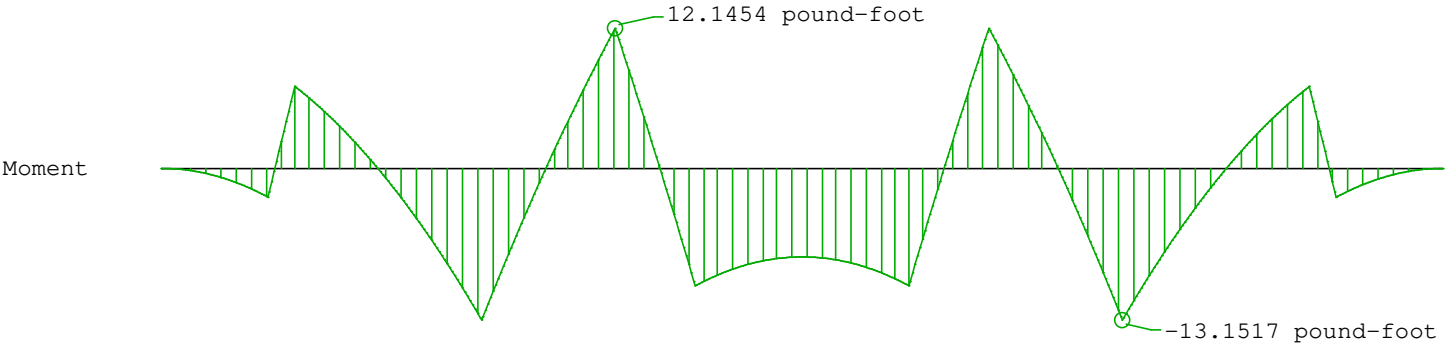
MILLER CONSULTING ENGINEERS
9600 SW Oak St #400
Portland, OR 97223
503.246.1250
miller-se.com

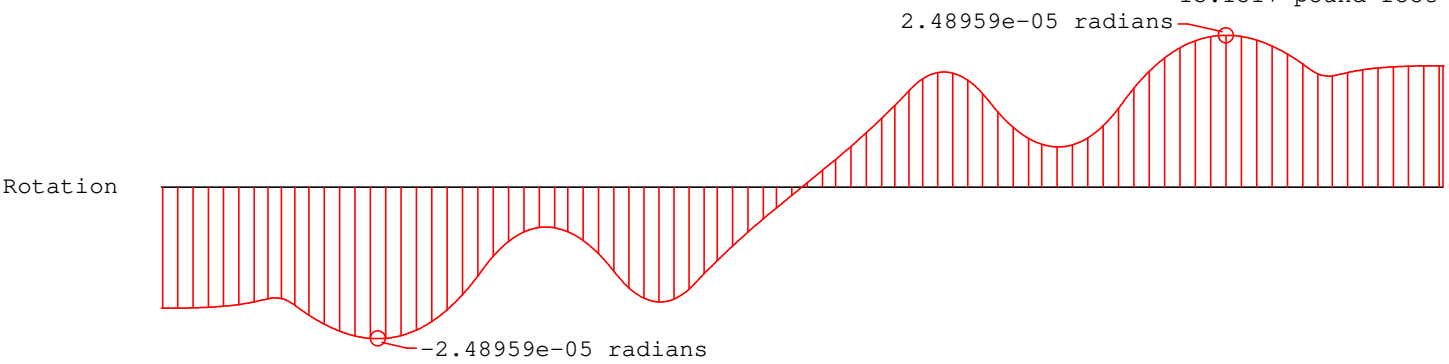
PRMH20221388

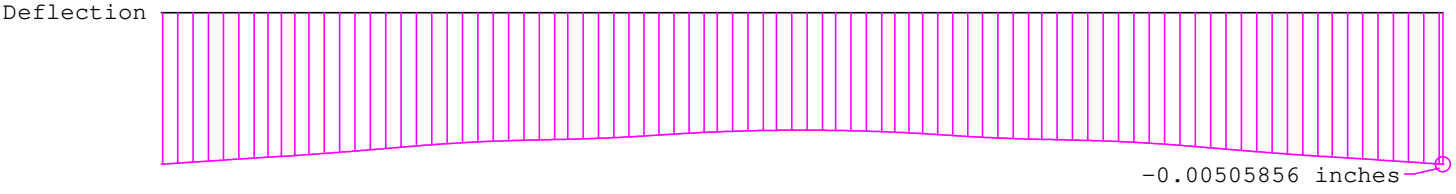
Beam length = 12 feet, E = 1600 ksi, I = 48.53 inches^4











Input:

```
 Beam Element: Length = 12 feet; E = 1600 ksi; I = 48.53 inches^4;
 Vertical Spring: X = 1 feet; V = 9.13 kip/inch;
 Vertical Spring: X = 3 feet; V = 9.13 kip/inch;
 Vertical Spring: X = 5 feet; V = 9.13 kip/inch;
 Vertical Spring: X = 7 feet; V = 9.13 kip/inch;
 Vertical Spring: X = 9 feet; V = 9.13 kip/inch;
 Vertical Spring: X = 11 feet; V = 9.13 kip/inch;
 Uniform Load: X = 0, 12 feet; U = -5, -5 pound/foot;
 Point Load: X = 1.25 feet; P = -45 pounds;
 Point Load: X = 4.25 feet; P = -45 pounds;
 Point Load: X = 7.75 feet; P = -45 pounds;
 Point Load: X = 10.75 feet; P = -45 pounds;
```

Analysis Data:

```
 Beam Length = 12 feet
 515 Nodes, 514 Beam Elements, 1030 Degrees of Freedom
```

Reactions:

X	Vert	Rot
feet	pounds	pound-foot
1.000000	44.049	
3.000	39.313	
5.000	36.637	
7.000	36.637	
9.000	39.313	
11.000	44.049	

Equilibrium:

	Force	Reaction	Error	
Vert	-240.000	240.000	0.000	pounds
Rot	1440.000	-1440.000	-0.000	pound-foot

Min & Max values:

```
 Min Shear      =    -39.049 pounds     at   11.000000 feet
 Max Shear      =     39.049 pounds     at    1.000000 feet
 Min Moment     =    -13.152 pound-foot at    9.000000 feet
 Max Moment     =     12.145 pound-foot at    4.250000 feet
 Min Rotation   =  -2.49e-05 radians    at    2.029111 feet
 Max Rotation   =   2.49e-05 radians    at    9.970889 feet
 Min Deflection =  -0.005059 inches     at   12.000000 feet
 Max Deflection =  -0.003923 inches     at    6.000000 feet
```

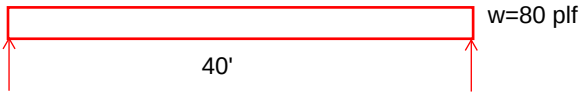
PRMH20221388

Check Existing trusses for load from mechanical equipment:

Loading on Trusses without mechanical equipment:

Roof loads:

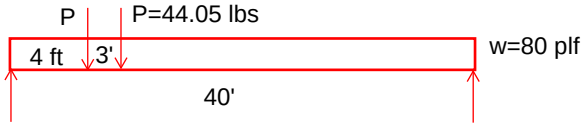
Dead: 15 psf
Snow: 25 psf



w = (15 + 25)(2) = 80 plf

M = wl^2/8 = (80)(40^2)/8 = 16000 ft lbs
V = wl/2 = (80)(40/2) = 1600 lbs
Δ = 5wl^4/384EI = 5(80/12)(40 x 12)^4/384(1.6 x 10^6)(2518) =1.14 inches

Loading on Trusses with mechanical equipment:



(see following pages for beam analysis to determine net moment shear and deflection with mechanical unit)

M = 16243 ft lbs
V = 1676 lbs
Δ = 1.16"

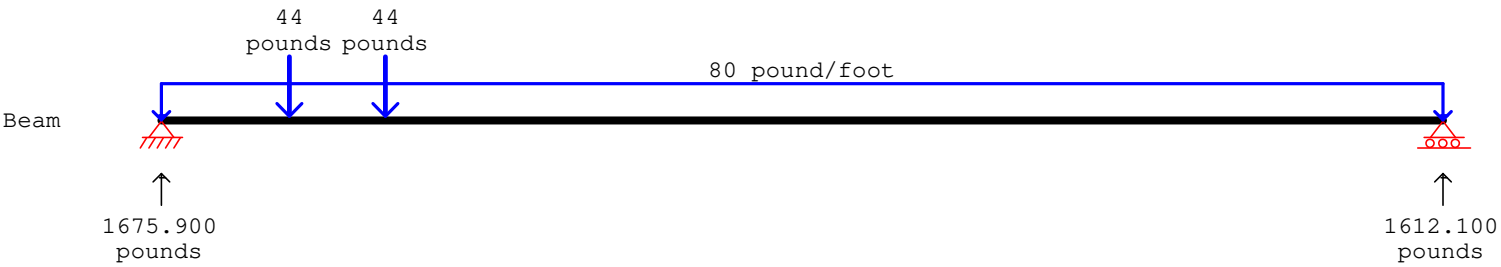
Increase in truss bending (16243 - 16000)/16000 = 1.5% < 5%
Increase in truss end shear (1676 - 1600)/1600 = 4.75% < 5%
Increase in truss deflection (1.16 - 1.14)/1.14 = 1.75% < 5%

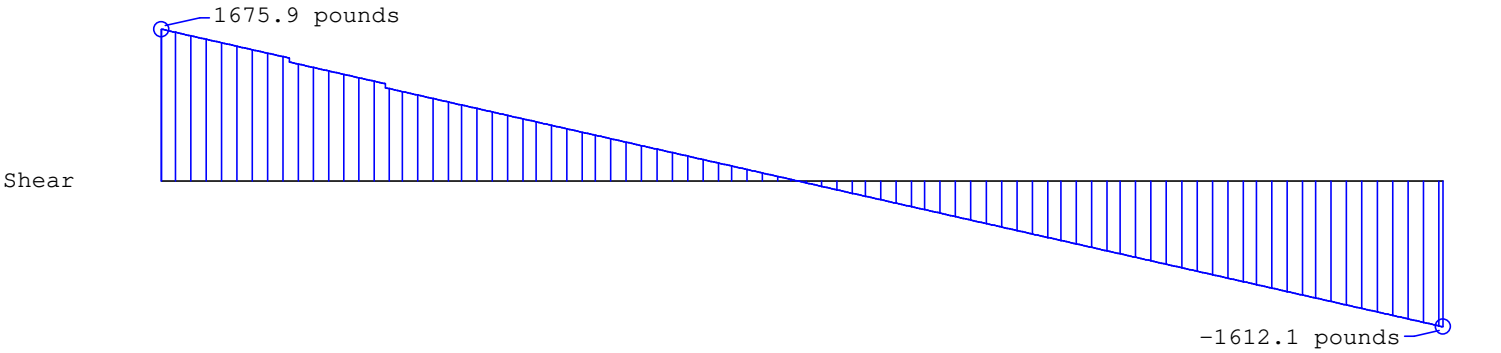
Loading on existing trusses not increased by more than 5% on any one element as per section 503.3 of the Washington State Existing Building Code

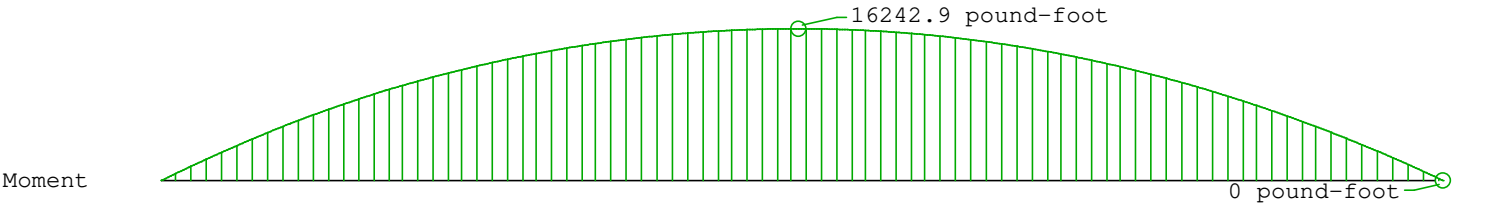
MILLER CONSULTING ENGINEERS
9600 SW Oak St #400
Portland, OR 97223
503.246.1250
miller-se.com

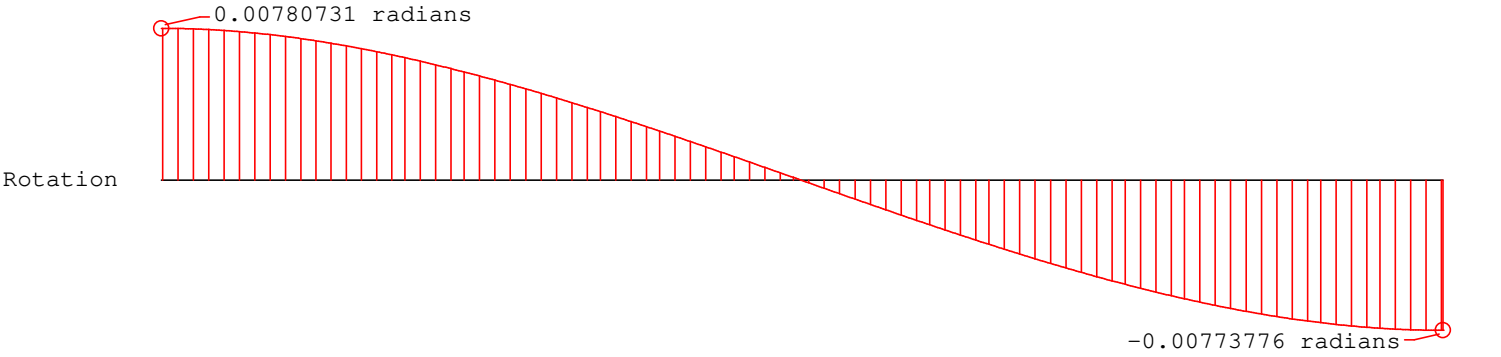
PRMH20221388

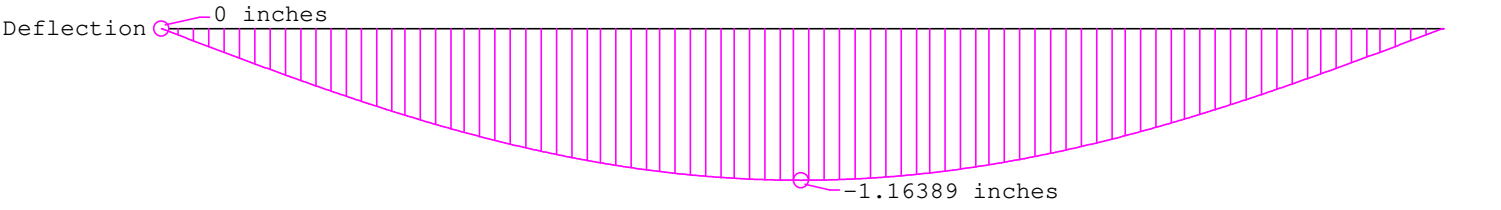
Beam length = 40 feet, E = 1600 ksi, I = 2518 inches^4











Input:

Beam Element: Length = 40 feet; E = 1600 ksi; I = 2518 inches^4;
Pin Support: X = 0 feet;
Roller Support: X = 40 feet;
Uniform Load: X = 0, 40 feet; U = -80, -80 pound/foot;
Point Load: X = 4 feet; P = -44 pounds;
Point Load: X = 7 feet; P = -44 pounds;

Analysis Data:

Beam Length = 40 feet
503 Nodes, 502 Beam Elements, 1006 Degrees of Freedom

Reactions:

X	Vert	Rot
feet	pounds	pound-foot
0	1675.900	
40.000	1612.100	

Equilibrium:

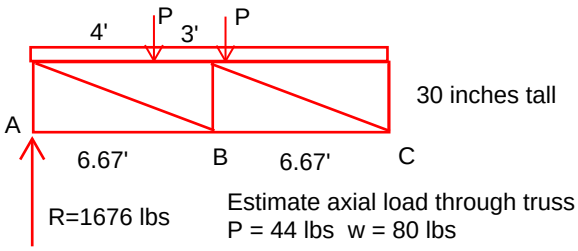
	Force	Reaction	Error
Vert	-3288.000	3288.000	0.000 pounds
Rot	64484.000	-64483.999	0.001 pound-foot

Min & Max values:

Min Shear	=	-1612.100 pounds	at	40.000 feet
Max Shear	=	1675.900 pounds	at	0 feet
Min Moment	=	-1.24e-09 pound-foot	at	40.000 feet
Max Moment	=	16242.857 pound-foot	at	19.887 feet
Min Rotation	=	-0.007738 radians	at	40.000 feet
Max Rotation	=	0.007807 radians	at	0 feet
Min Deflection	=	-1.164 inches	at	19.967 feet
Max Deflection	=	0 inches	at	0 feet

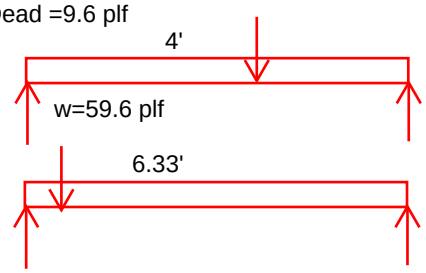
Check localized bending at top chord

PRMH20221388



Estimate axial load through truss topchord.
P = 44 lbs w = 80 lbs

Axial load (AB)= (1676)(6.67)-80(6.67^2/2) - 44(2.67) / (30-5.5)/12 = 4546 lbs
Axial load (BC)= [1676(13.33)-80(13.33^2/2)-44(9.33) - 44(6.33)] /(30 - 5.5)/12)=7124 lbs
Top Chord moment:
Load on top chord:
Snow = 25 (2) = 50 plf Dead: plywd = 1.5 psf(2) = 3 plf roofing =2.2 psf(2) =4.4 plf 2 x 6 TC = 2.2 plf
Dead =9.6 plf



Case 1: outside span
R1 = 59.6(6.67/2) +44(2.67/6.67) =216.38 lbs
R2 = 59.6(6.67^2/2) + 44(4/6.67) = 225.2 lbs
x = 216.38/59.6 = 3.63 ft
M = 216.38(3.63/2) = 392.8 ft lbs P = 4546 lbs
Case 2: inside adjacent span
R1 = 59.6(6.67/2) + 44(6.33/6.66) = 240.5 lbs
R2 = 59.6(6.67) +44 - 240.5 = 201.3 lbs
x = 201.3/59.6 = 3.38 ft
M = 201.3(3.38)(1/2) = 340 ft lbs P = 7124 lbs

MILLER CONSULTING ENGINEERS
9600 SW Oak St #400
Portland, OR 97223
503.246.1250
miller-se.com

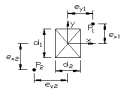
PRMH20221388

2012 National Design Specification for Wood Construction

Post Mark: Top chord case 1

Material: DIMENSIONAL LUMBER

Grade: DF/L No. 2 or Better



Height =	6.67	ft	lu_1 =	6.67	ft	size =	2 x 6	
P1 =	4546	lb	lu_2 =	1	ft	d_1 =	5.50	in
P2 =	0	lb	M_{xv} =	0	ft-lbs	d_2 =	1.50	in
ex1 =	0	in	M_{yv} =	0	ft-lbs	A =	8.25	in^2
ey1 =	0	in	M_{xh} =	392.8	ft-lbs	S_x =	7.56	in^3
ex2 =	0	in	M_{yh} =	0	ft-lbs	S_y =	2.06	in^3
ey2 =	0	in	Ke_1 =	1		Le_1 =	2.06	ft
w_x =	0	lbs/ft	Ke_2 =	1		Le_2 =	12.27	ft
w_y =	58	lbs/ft	le_1 =	6.67	ft	Fb_x =	900	psi
			le_2 =	1.00	ft	Fb_y =	900	psi
			le_1/d_1 =	14.55		Ex =	1600	ksi
			le_2/d_2 =	8.00		Ey =	1600	ksi
						Ex_{min} =	580	ksi
						Ey_{min} =	580	ksi
						Fc =	1350	psi
						Fc,sill =	625	psi
						c =	0.8	
						I_x =	20.80	in^4
						I_y =	1.55	in^4

Reduction	Bending	Axial, Fc	E	Emin
C_D	1.15	1.15		
C_r	1.15			
C_t	1.00	1.00	1.00	1.00
C_F	1.30	1.10		
C_M	1.00	1.00	1.00	1.00
C_i	1.00	1.00	1.00	1.00
C_T				1.00
C_V	1.00			
C_{Lx}	0.99			
C_{Ly}	1.00			
C_P		0.78		
Cfu	1.15			
C_E	1.00	1.00	1.00	1.00

C_E = Exterior wet use of SCL lumber

C_{sp}	1.00	1.00		

C_{sp} = Single Pile Factor (piles only)

C_u			1.00	1.00

C_u = Untreated Factor (piles only)

Fce_1 =	2251	psi
Fce_2 =	7449	psi
Rb_x	7.8	
Rb_y	2.7	
Fbe_x	11518	psi
Fbe_y	95306	psi
K_M	2300	
K_T	0.59	
Fb_x*	1547	psi
Fb_y*	1547	psi
Fbe_x/Fb_x*	7	
Fbe_y/Fb_y*	62	
Fc*	1708	psi
Fb_x'	1547	psi
Fb_y'	1779	psi
Fc'	1327	psi
Fc',sill	625	psi
Ex'	1600	psi
Ey'	1600	psi
Ex_{min}'	580000	psi
Ey_{min}'	580000	psi

Fbx'=(Fbx*)(CL)(Cfu) = 1,547 psi

Fby'=(Fby*)(CL)(Cfu) = 1,779 psi

Fc'= (Fc)(Cd)(Cm)(Ct)(Cf)(Ci)(Cp) = 1,327 psi

E'= (E)(Ct)(Cm)(Ci) = 1,600 ksi

Emin'= (Emin)(Ct)(Cm)(Ci)(CT) = 580 ksi

fbx = 623 psi < Fbx' = 1,547 psi — Bending Capacity = 40.3%

fby = 0 psi < Fby' = 1,779 psi

fc = 551 psi < Fc' = 1,327 psi — Axial Capacity = 41.5%

Combined Axial Compression and Bending — Combined Capacity = 70.6%

Equation 3.9-3; 2005 NDS page 20

Material	
Grade	
Load Duration, C_D	
Temperature Factor, C_t	
Wet Service Factor, C_M	
Incising Factor, CI	
Repetitive Factor Cr	
Built up Member	
Member	
Sill PL?	
Sill PL Type	
Fire Treated?	

2 x 6, DIMENSIONAL LUMBER
DF/L No. 2 or Better column

MILLER CONSULTING ENGINEERS

9600 SW Oak St #400
Portland, OR 97223

503.246.1250
miller-se.com

Project Name 7 Eleven New Mechanical Units — Project # 221449

Location 941 S Meridian, Puyallup, WA

Client CoolSys Commercial & Industrial Solutions

By ADJ — Ck'd PRA — Date 10/25/2022 — Page 9 of 15

PRMH20221388

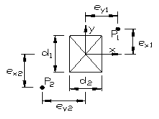
2012 National Design Specification for Wood Construction

Post

Mark: Top chord case 2

Material: DIMENSIONAL LUMBER

Grade: DF/L No. 2 or Better



Height =	6.67	ft	lu_1 =	6.67	ft	size =	2 x 6	
P1 =	7124	lb	lu_2 =	1	ft	d_1 =	5.50	in
P2 =	0	lb	M_{xv} =	0	ft-lbs	d_2 =	1.50	in
ex1 =	0	in	M_{yv} =	0	ft-lbs	A =	8.25	in^2
ey1 =	0	in	M_{xh} =	340	ft-lbs	S_x =	7.56	in^3
ex2 =	0	in	M_{yh} =	0	ft-lbs	S_y =	2.06	in^3
ey2 =	0	in	Ke_1 =	1		Le_1 =	2.06	ft
w_x =	0	lbs/ft	Ke_2 =	1		Le_2 =	12.27	ft
w_y =	58	lbs/ft	le_1 =	6.67	ft	Fb_x =	900	psi
			le_2 =	1.00	ft	Fb_y =	900	psi
			le_1/d_1 =	14.55		Ex =	1600	ksi
			le_2/d_2 =	8.00		Ey =	1600	ksi
						Ex_{min} =	580	ksi
						Ey_{min} =	580	ksi
						Fc =	1350	psi
						Fc,sill =	625	psi
						c =	0.8	
						I_x =	20.80	in^4
						I_y =	1.55	in^4

Reduction	Bending	Axial, Fc	E	Emin
C_D	1.15	1.15		
C_r	1.15			
C_t	1.00	1.00	1.00	1.00
C_F	1.30	1.10		
C_M	1.00	1.00	1.00	1.00
C_i	1.00	1.00	1.00	1.00
C_T				1.00
C_V	1.00			
C_{Lx}	0.99			
C_{Ly}	1.00			
C_P		0.78		
Cfu	1.15			
C_E	1.00	1.00	1.00	1.00

C_E = Exterior wet use of SCL lumber

C_{sp}	1.00	1.00		

C_{sp} = Single Pile Factor (piles only)

C_u			1.00	1.00

C_u = Untreated Factor (piles only)

Fce_1 =	2251	psi
Fce_2 =	7449	psi
Rb_x	7.8	
Rb_y	2.7	
Fbe_x	11518	psi
Fbe_y	95306	psi
K_M	2300	
K_T	0.59	
Fb_x*	1547	psi
Fb_y*	1547	psi
Fbe_x/Fb_x*	7	
Fbe_y/Fb_y*	62	
Fc*	1708	psi
Fb_x'	1547	psi
Fb_y'	1779	psi
Fc'	1327	psi
Fc',sill	625	psi
Ex'	1600	psi
Ey'	1600	psi
Ex_{min}'	580000	psi
Ey_{min}'	580000	psi

Fbx'=(Fbx*)(CL)(Cfu) = 1,547 psi

Fby'=(Fby*)(CL)(Cfu) = 1,779 psi

Fc'= (Fc)(Cd)(Cm)(Ct)(Cf)(Ci)(Cp) = 1,327 psi

E'= (E)(Ct)(Cm)(Ci) = 1,600 ksi

Emin'= (Emin)(Ct)(Cm)(Ci)(CT) = 580 ksi

fbx = 540 psi < Fbx' = 1,547 psi — Bending Capacity = 34.9%

fby = 0 psi < Fby' = 1,779 psi

fc = 864 psi < Fc' = 1,327 psi — Axial Capacity = 65.1%

Combined Axial Compression and Bending — Combined Capacity = 98.9%

Equation 3.9-3; 2005 NDS page 20

Material	
Grade	
Load Duration, C_D	
Temperature Factor, C_t	
Wet Service Factor, C_M	
Incising Factor, CI	
Repetitive Factor Cr	
Built up Member	
Member	
Sill PL?	
Sill PL Type	
Fire Treated?	

2 x 6, DIMENSIONAL LUMBER
DF/L No. 2 or Better column

MILLER CONSULTING ENGINEERS

9600 SW Oak St #400
Portland, OR 97223

503.246.1250
miller-se.com

Project Name: 7 Eleven New Mechanical Units — Project #: 221449

Location: 941 S Meridian, Puyallup, WA

Client: CoolSys Commercial & Industrial Solutions

By: ADJ — Ck'd: PRA — Date: 10/25/2022

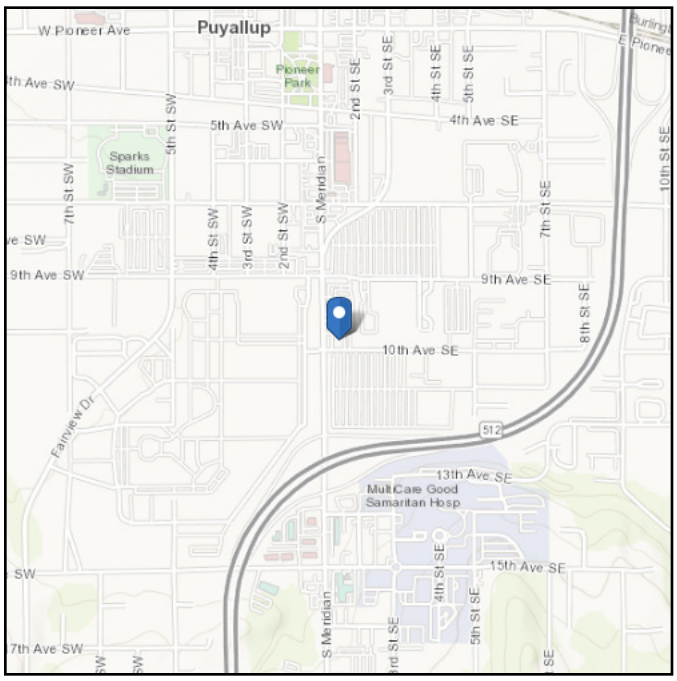
PRMH20221388

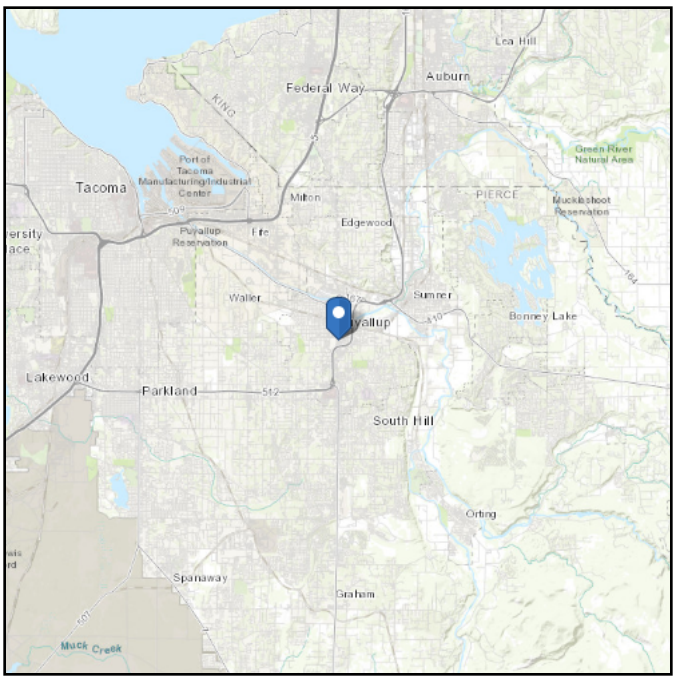
ASCE 7 Hazards Report

Address:
941 S Meridian
Puyallup, Washington
98371

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

Elevation: 45.69 ft (NAVD 88)
Latitude: 47.182897
Longitude: -122.293039





Wind

Results:

Wind Speed	97 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Thu Oct 13 2022

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 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

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

AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

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

Results:

S_S :	1.269	S_{D1} :	N/A
S_1 :	0.437	T_L :	6
F_a :	1.2	PGA :	0.5
F_v :	N/A	PGA_M :	0.6
S_{MS} :	1.523	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.015	C_v :	1.354

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

Data Accessed: Thu Oct 13 2022

Date Source: USGS Seismic Design Maps

ASCE 7-16: SEISMIC DESIGN FORCE, SECTION 13.3

Elements of Structures, Nonstructural Components, and Equipment Supported by Structures

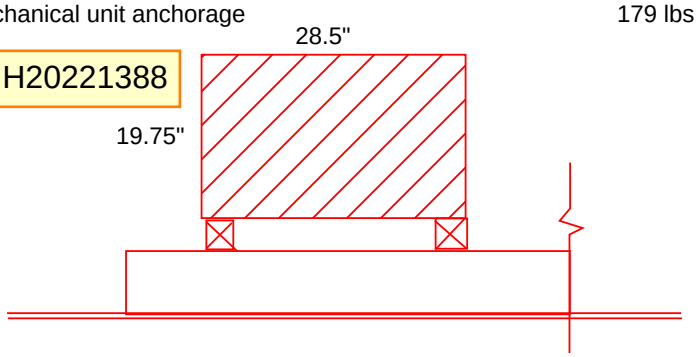
PRMH20221388

Site Class:	D (default)		*Section 20.3, Table 20.3-1*
Seismic Design Category:	D		*Section 11.6*
Risk Category:	II		*Table 1.5-1*
S_s =	126.90%		*Figure 22-1*
S_1 =	43.70%		*Figure 22-2*
F_a =	1.20		*Table 11.4-1 (Linear interpolation is used)*
F_v =	1.86		*Table 11.4-2 (Linear interpolation is used)*
S_{MS} =	1.52		*Eqn. 11.4-1*
S_{M1} =	0.814		*Eqn. 11.4-2*
S_{DS} =	1.015		*Eqn. 11.4-3*
S_{D1} =	0.543		*Eqn. 11.4-4*
I_p =	1.00		*Section 13.1.3*
a_p =	2.5		*Table 13.6-1*
R_p =	6.0		*Table 13.6-1*
z =	12	*ft, Component attachment elevation w/ respect to grade*	
h =	12	*ft, Structure roof elevation with respect to grade*	
F_p =	0.508	* W_p	*Eqn. 13.3-1*
OR	1.624	* W_p	*Eqn. 13.3-2*
Not less than	0.305	* W_p	*Eqn. 13.3-3*

F_p =	**0.508**	*** W_p**	
$0.2S_{DS}W_p$ =	**0.203**	*** W_p**	*Sec. 13.3.1.2*

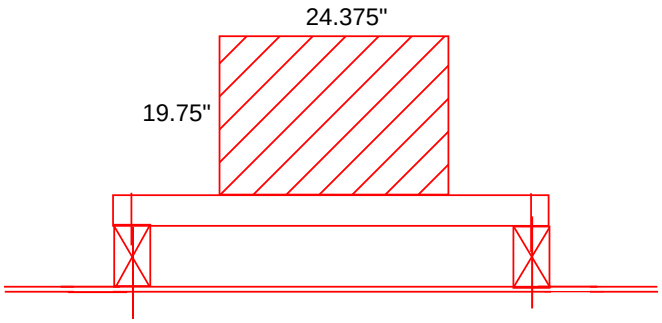
Mechanical unit anchorage

PRMH20221388



Long side

179 lbs Condenser



Short Side

Roof Elevation: 12 ft Top of Unit El 13.94 ft (use 14 ft for wind load)

Wind: 97 mph Exposure C Kz = 0.85 Kzt = 1 Kd = 0.9 Ke = 1
q = 0.00256(0.85)(1)(0.9)(1)(97^2) = 18.43 psf

Wind applied to long direction: Fh = (19.75"/12)(28.5"/12)(18.43 psf)(1.9) = 137 lbs (on Unit)
Wind load applied to curb: (5.5"/12)(6')(18.43 psf)(1.9 GCr) = 96 lbs (on long side curb)

Wind applied to short direction: Fh = (19.75"/12)(24.375"/12)(18.43 psf)(1.9) = 117 lbs (on Unit)
Wind load applied to curb: (3.5"/12)(3')(18.43 psf)(1.9 GCr) = 31 lbs (on short side curb)

Wind uplift: Fv = (28.5/12)(24.375/12)(18.43)(1.5 GCr) = 134 lbs

Seismic loading

Sds = 1.269 I=1.0 ap = 2.5 Rp = 6 z = h = 12'

Fp = 0.508Wp = (179)(0.508) = 91 lbs

Fpv = 0.203Wp = (179)(0.203) = 36 lbs

Unit wind loads

0.6W: Fs = (0.6)(137) = 83 lbs (short axis direction)
0.6W: F_L = (0.6)(117) = 71 lbs(long axis direction)
0.6W: Fu = (0.6)(134) = 81 lbs (up)

Mot(short) = (83)(19.75/2)(1/12) = 69 ft lbs
Mot(long)= (71)(19.75/2)(1/12) = 59 ft lbs

Unit Seismic loads

0.7E: Fs = F_L = 91(0.7) = 64 lbs (ea dir)
0.7E: Fu = (0.7)(36) = 26 lbs

Mot = 64(19.75/2)(1/12) = 53 ft lbs

0.6D: Mr = (0.6)(179)(23.5/12(2)) = 106 ft lbs

Check overturning and Net uplift on connections
Connection wind load: H = (Mot - Mr)/d(2 connections)+uplift/(4 connections) = (69 - 106)/(23.5/12)(1/2 conn)+81/4 conn = 11 lbs (uplift)
Connection shear load: V = 83 lbs/4 = 21 lbs/connection

Connection uplift for seismic: H = Mot - Mr/d(2 connections)+uplift/4 conn) = (53 - 106)/(23.5/12)(1/2 conn)+26/4 conn = -47 lbs (no uplift)

Connection from unit to framing: T = 11 lbs, V= 21 lbs (0.6D+0.6W)
T= -43 V = 139/4 = 35 lbs (0.6D+0.7E)

Anchor from unit to cross members: Use 3/8" x 3 inch lag screw:
Vcap = 170 lbs(1.6) = 272 lbs > 21 lbs
Tcap = 292 lbs/ in(1.78 in) = 523 lbs (1.6) = 837 lbs > 11 lbs

3/8" Dia x 3 inch hex lag screw
at each corner of unit to 4x4's

MILLER
CONSULTING
ENGINEERS

9600 SW Oak St #400
Portland, OR 97223

503.246.1250
miller-se.com

Project Name 7 Eleven New Mechanical Units Project # 221449

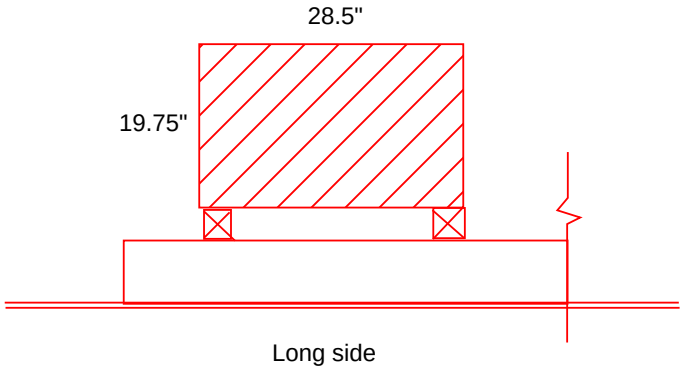
Location 941 S Meridian, Puyallup, WA

Client CoolSys Commercial & Industrial Solutions

By ADJ Ck'd PRA Date 10/17/2022

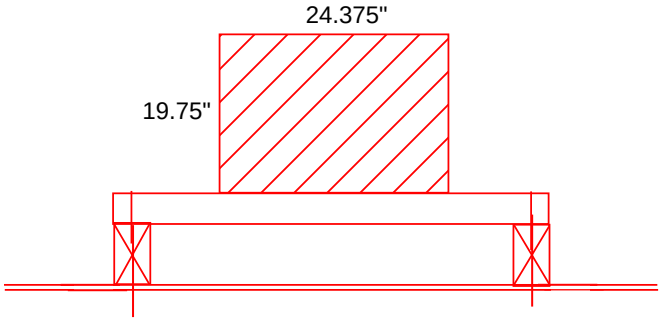
PRMH20221388

Mechanical unit anchorage



Long side

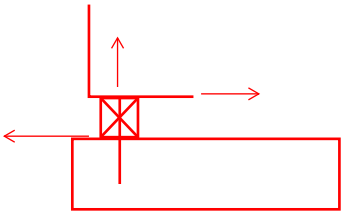
179 lbs Condenser



Short Side

Connection between unit members and trusses

Case 1:



wind loads

0.6W: F_S = (0.6)(117 lbs) = 83 lbs + 31(0.6) = 89 lbs
0.6W: Fu = (0.6)(134 lbs) = 81 lbs (up)

Seismic loads

0.7E: $F_S = F_L$ = (179 lbs unit)(0.508)(0.7) = 64 lbs (ea dir)
0.7E: Fu = (179 lbs unit)(0.203)(0.7) = 26 lbs

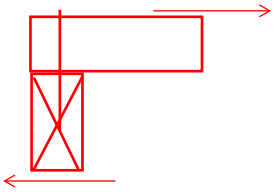
0.6W Mot = 89((19.75+3.5)/2)/12 = 87 ft lbs
0.7E Mot = 64((19.75 +3.5)/2)/12 = 62 ft lbs

0.6D Mr = (179)(0.6)(2') = 214 ft lbs

0.6W+0.6D H = (Mot - Mr)/2' (2 conn) + Fu /4 conn = (87 - 214)/(2'*2) + 81/4 = -12 lbs (no uplift)
0.7E + 0.6D H = (Mot - Mr)/2' (2 conn) + Fu /4 conn = (64 - 214)/(2'*2) + 27/4 = -31 lbs (no uplift)

0.6W V = 141 /(4 conn) = 35 lbs/ conn Z = (-12^2+ 35^2)^1/2 = 37 lbs
0.7E V = 64/(4 conn) = 16 lbs / conn

Case 2:



0.6W F_L = (137 lbs + 96 lbs)(0.6) = 140 lbs
0.7E F_L = (179+10)(.508)(0.7) = 67 lbs

M = 140 lbs (5.5") = 770 in lbs

T = 770 in lbs / (3.5"/2) = 440 lbs / 2 fasteners per side = 220 lbs
V = 140/2 conn = 70 lbs

Z = [(70^2)+(220^2)]^0.5 = 231 lbs > 37 (Case 2 controls)
α = tan-1(220/70) = 72.35 deg

Use 6" long SDS screw
Tcap = 240 lbs
Vcap = 200 lbs
Zα = (240)(200) / 240 cos^2(72.35) + 200sin^2(72.35)
Zα = 236 lbs > 35 lbs

1/4" Dia x 6" Simpson SDS screw at each end to each cross member to 4 x 6 sleeper

Sleeper to Roof:
V = 140 lbs x 2 units / 4 corners = 70 lbs/corner (0.6W controls)
T = 0 lbs/corner (no uplift to sleepers)

Use 8" long SDS screw
Tcap = 121 lbs/in x (8" screw - 5.5" sleeper - 0.5" plywood - 0.25" misc = 1.75") = 212 lbs
Vcap = 200 lbs > 70 lbs OK

1/4" Dia x 8" Simpson SDS screw to truss chord at each end of sleeper

MILLER CONSULTING ENGINEERS
9600 SW Oak St #400 Portland, OR 97223
503.246.1250 miller-se.com

Project Name 7 Eleven New Mechanical Units Project # 221449
Location 941 S Meridian, Puyallup, WA
Client CoolSys Commercial & Industrial Solutions
By ADJ Ck'd PRA Date 10/17/2022 Page 15 of 15