

Seattle	1011 Western Avenue, Suite 810   Seattle, WA 98104   206.292.5076
Tacoma	1250 Pacific Avenue, Suite 701   Tacoma, WA 98402   253.383.2797
Portland	101 SW Main Street, Suite 280   Portland, OR 97204   503.232.3746
www.pcs-structural.com	

City of Puyallup Development & Permitting Services	
<b>ISSUED PERMIT</b>	
Building	Planning
Engineering	Public Works
Fire	Traffic

# STRUCTURAL CALCULATIONS

FOR

TACO TIME  
EAST MAIN STREET  
PUYALLUP, WASHINGTON


PREPARED BY  
PCS STRUCTURAL SOLUTIONS



JULY 19, 2023  
23-514

**City of Puyallup  
Building  
REVIEWED  
FOR  
COMPLIANCE**

BSnowden  
11/07/2023  
11:31:12 AM



Calculations required to be provided by  
the Permittee on site for all Inspections

# DESIGN CRITERIA



Project: Taco Time NW Job Number: 23-514  
 Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB  
 Originating Office: Tacoma Date: 2023-06-16

**DESIGN CRITERIA CHECKLIST**

CODE: IBC 2018, ASCE 7-16 LOCATION: PUYALLUP, WA  
 RISK CATEGORY: II (Per ASCE 7-16 Table 1.5-1 & IBC Table 1604.5)

**VERTICAL DESIGN CRITERIA**

	DEAD	LIVE	PARTITION	CONCENTRATED
ROOF:	<u>20 PSF</u>	<u>25 PSF</u>		<u>(INCLUDES 5 PSF FUTURE PV)</u>

**WIND DESIGN CRITERIA**

BASIC WIND SPEED (V) = 100 MPH (Per ASCE 7-16 Sec. 26.5.1, Fig. 26.5-1A; 1B; 1C & 1D, or as required by Bld'g Dept.)  
 EXPOSURE CATEGORY: B (Per ASCE 7-16 Section 26.7.3)  
 DIRECTIONALITY FACTOR (K<sub>d</sub>): 0.85 (Per ASCE 7-16 Table 26.6-1)  
 GUST EFFECT FACTOR (G): 0.85 (Per ASCE 7-16 Section 26.11)  
 TOPOGRAPHIC FEATURE: None (See ASCE 7-16 Figure 26.8-1) \_\_\_\_\_  
 HILL HEIGHT (H): 0 FT (See ASCE 7-16 Figure 26.8-1)  
 UPWIND DISTANCE TO HALF HILL (L<sub>h</sub>): 0 FT (See ASCE 7-16 Figure 26.8-1)  
 DISTANCE FROM CREST TO SITE (x): 0 FT UPWIND (See ASCE 7-16 Figure 26.8-1)  
 MEAN ROOF HEIGHT: 20 FT (See ASCE 7-16 Section 26.2 - Definitions)  
 ELEVATION: 0 FT (See ASCE 7-16 Section 26.9)  
 ENCLOSURE CLASSIFICATION: Enclosed (See ASCE 7-16 Section 26.2 & Table 26.13-1)  
 ROOF TYPE: Monoslope (See ASCE 7-16 Figure 27.3-1)  
 ROOF SLOPE ( \_:12): 3.00:12 (Enter vertical rise in 12 horizontal units) θ (degrees): 14.04

**SEISMIC DESIGN CRITERIA**

SITE CLASS: D (Per IBC Section 1613.2.2, Assumed as "D" or per Geotech.)  
 IMPORTANCE FACTOR (I<sub>E</sub>): 1 (Per ASCE 7-16 Table 1.5-2)  
 STRUCTURAL SYSTEM (R): 6.5 (Per ASCE 7-16 Table 12.2-1)  
 OVERSTRENGTH FACTOR (Ω<sub>o</sub>): 3.0 (Per ASCE 7-16 Table 12.2-1)  
 INFORMATION BELOW FROM APPLIED TECHNOLOGY COUNCIL (ATC) "HAZARDS BY LOCATION"  
 LATITUDE: 47.192 S<sub>S</sub> = 1.266 F<sub>a</sub> = 1.200  
 LONGITUDE: -122.279 S<sub>1</sub> = 0.436 F<sub>v</sub> = 1.864

**DEFLECTION CRITERIA**

FLOOR (LIVE):	L/	<u>480</u>	ROOF (LIVE):	L/	<u>360</u>
FLOOR (TOTAL):	L/	<u>360</u>	ROOF (TOTAL):	L/	<u>240</u>
WALLS:	L/	<u>360</u>	SPECIAL:	L/	<u></u>

**SOIL DESIGN CRITERIA**

REPORT: <u>NO</u>	<b>ASSUMED VALUES</b>
BEARING: <u>1500 PSF</u>	MINIMUM FOOTING DIMENSIONS:
ACTIVE: <u>35 PCF</u>	CONTINUOUS: <u>1'-4"</u>
PASSIVE: <u>250 PCF</u>	SPREAD: <u>1'-6"</u>
COEFFICIENT OF FRICTION: <u>0.35</u>	FROST DEPTH: <u>1'-6"</u>
PILE TYPE: <u>NONE</u>	LATERAL CAPACITY: <u>N/A</u>
VERTICAL CAPACITY: <u>N/A</u>	SIZE: <u>N/A</u>
UPLIFT CAPACITY: <u>N/A</u>	



Project: Taco Time NW

Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_

Name: JMB

Originating Office: Tacoma

Date: 06-16-23

**MATERIALS**

**CONCRETE**

Footings/Piles:	3000 PSI	Columns:	4000 PSI
Slabs/Walls:	4000 PSI	Beams:	4000 PSI
-	-	-	-

**REINFORCING**

Steel Grade = 60  $f_y = 60$  KSI

**STRUCTURAL STEEL**

W-Flange Beams	ASTM A992	$f_y = 50$ KSI
Shapes & Plates	ASTM A36	$f_y = 36$ KSI
Pipes	ASTM A53, Grade B	$f_y = 35$ KSI
HSS Rect.	ASTM A500, Grade C	$f_y = 50$ KSI
HSS Round	ASTM A500, Grade C	$f_y = 46$ KSI

**MASONRY**

ASTM C90  $f_m = 1900$  PSI SOLID GROUTED

**GLULAM BEAMS**

Simple Spans	Grade =	Cantilevers
24F-V4	24F-V8	
1.80E+06 PSI	E = 1.80E+06 PSI	
2400 PSI	$F_{b(BOTTOM)} = 2400$ PSI	
1850 PSI	$F_{b(TOP)} = 2400$ PSI	
240 PSI	$F_v = 240$ PSI	

**SCL PRODUCTS**

	2x SCL	1¾" SCL	3½, 5¼ SCL
E =	1.30E+06 PSI	1.80E+06 PSI	2.00E+06 PSI
$F_b =$	1700 PSI	2600 PSI	2900 PSI
$F_v =$	285 PSI	285 PSI	285 PSI
$F_c =$	1400 PSI	2400 PSI	2600 PSI

**FRAMING LUMBER**

	2x DF #2	2x HF #1	-
<u>Joists &amp; Studs</u>			
E =	1.60E+06 PSI	1.50E+06 PSI	-
$F_b =$	900 PSI	975 PSI	-
$F_v =$	180 PSI	150 PSI	-
$F_c =$	1350 PSI	1350 PSI	-
<u>Beams &amp; Headers</u>	4x DF #2	4x HF #1	6x DF #1
E =	1.60E+06 PSI	1.50E+06 PSI	1.60E+06 PSI
$F_b =$	900 PSI	975 PSI	1350 PSI
$F_v =$	180 PSI	150 PSI	170 PSI
<u>Posts &amp; Timbers</u>	6x DF #1	-	-
E =	1.60E+06 PSI	-	-
$F_c =$	1000 PSI	-	-





**DESIGN CRITERIA - WIND**

BASIC WIND SPEED (V):	100 MPH	MEAN ROOF HEIGHT:	20 FT
RISK CATEGORY:	II	GROUND ELEVATION FACTOR (K <sub>e</sub> ):	1.00
EXPOSURE CATEGORY:	B	ENCLOSURE CLASSIFICATION:	Enclosed
DIRECTIONALITY FACTOR (K <sub>d</sub> ):	0.85	ROOF TYPE:	Monoslope
GUST EFFECT FACTOR (G):	0.85	ROOF SLOPE ( _:12):	3.0:12
		θ (degrees):	14.04

ROOF PRESSURES (Figure 27.3-1)						
Wind Direction:		External Pressures (q <sub>h</sub> *(GC <sub>p</sub> ):			Internal Pressures (±q <sub>i</sub> *(GC <sub>pi</sub> ))	
h/L:		Windward (Positive)	Windward (Negative)	Leeward	All Roofs	
Normal to Ridge for θ ≥ 10°	≤0.25	-0.4	-6.2	-5.3	2.4	
	0.50	-2.1	-8.5	-5.7		
	≥1.0	-2.1	-12.1	-7.1		
Normal to Ridge for θ < 10° and Parallel to Ridge for All θ	h/L:	Horizontal Distance from Windward Edge	External Pressures (q*(GC <sub>p</sub> ):		Internal Pressures (±q <sub>i</sub> *(GC <sub>pi</sub> ))	
			Positive Pressure	Negative Pressure	All Roofs	
	≤0.5	0 to h	-2.1	-10.3		2.4
		h to 2h		-5.7		
		>2h		-3.4		
	≥1.0	0 to h/2	-2.1	-14.9		
>h/2		-8.0				

**ASCE 7-16 CHAPTER 27: WIND LOADS ON BUILDINGS: MWFRS (DIRECTIONAL PROCEDURE)  
PART 1: ENCLOSED AND PARTIALLY ENCLOSED BUILDINGS OF ALL HEIGHTS**

HORIZONTAL WALL PRESSURES (Figure 27.3-1)						
Windward External Pressures (q <sub>z</sub> *(GC <sub>p</sub> ):			Leeward & Sidewall External Pressures (q <sub>h</sub> *(GC <sub>p</sub> ):			Internal Pressures (±q <sub>i</sub> *(GC <sub>pi</sub> ))
Height Above Ground Level, z	K <sub>zt</sub>	Windward wall	L/B:	Leeward wall	Sidewall	All walls
15	1.00	8.4	0-1	-5.7	-8.0	2.4
20	1.00	9.2	2	-3.4		
25	1.00	9.8	≥4	-2.3		
30	1.00	10.4				
40	1.00	11.2				
50	1.00	12.0				
60	1.00	12.6				
70	1.00	13.2				
80	1.00	13.8				
90	1.00	14.2				
100	1.00	14.6				
120	1.00	15.4				
140	1.00	16.1				
160	1.00	16.7				
180	1.00	17.3				
200	1.00	17.8				
250	1.00	18.9				
300	1.00	20.0				
350	1.00	20.9				
400	1.00	21.8				
450	1.00	22.5				
500	1.00	23.1				

**NOTES:**

- Minimum Design Wind Loads (Per ASCE 7-16 27.1.5): The wind load used for design of the MWFRS shall not be less than 16 PSF multiplied by the wall area of the building, and 8 PSF multiplied by the roof area of the building projected on a vertical plane normal to the assumed wind direction. Wall and roof loads shall be applied simultaneously.
- q<sub>i</sub> has conservatively been taken equal to q<sub>h</sub>  
 $K_{int} = 1.00$   
 $q_h = 13.5 \text{ PSF}$



Project: Taco Time NW

Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_

Name: JMB

Originating Office: Tacoma

Date: 06-16-23

**DESIGN CRITERIA - WIND**

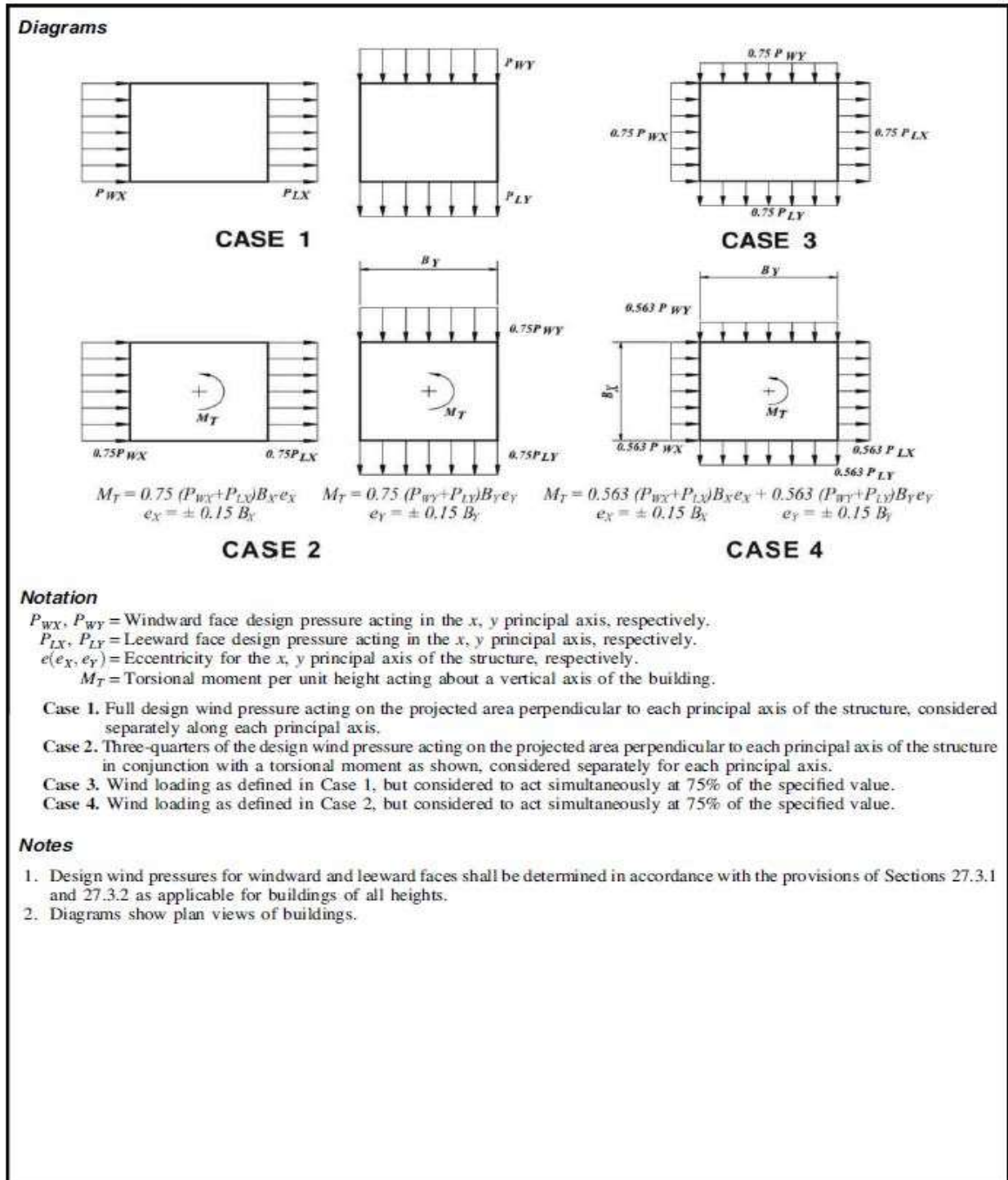
BASIC WIND SPEED (V): 100 MPH  
 RISK CATEGORY: II  
 EXPOSURE CATEGORY: B  
 DIRECTIONALITY FACTOR (K<sub>d</sub>): 0.85  
 GUST EFFECT FACTOR (G): 0.85

MEAN ROOF HEIGHT: 20 FT  
 GROUND ELEVATION FACTOR (K<sub>e</sub>): 1.00  
 ENCLOSURE CLASSIFICATION: Enclosed  
 ROOF TYPE: Monoslope  
 ROOF SLOPE (∠:12): 3.0:12  
 θ (degrees): 14.04

ASCE 7-16 CHAPTER 30: WIND LOADS: COMPONENTS AND CLADDING											
PART 1: LOW-RISE BUILDINGS (h≤60 ft)											
ROOF SURFACES											
Effective Wind Area	POSITIVE PRESSURES				NEGATIVE PRESSURES						
					ZONE						
	ALL ZONES				1	2	3	N/A	N/A	N/A	
10 SF	16.0				-20.0	-24.0	-41.6	N/A	N/A	N/A	
20 SF	16.0				-18.9	-22.7	-37.5	N/A	N/A	N/A	
50 SF	16.0				-18.3	-19.7	-32.9	N/A	N/A	N/A	
100 SF	16.0				-17.3	-18.6	-29.4	N/A	N/A	N/A	
WALL SURFACES & ROOF OVERHANGS											
Effective Wind Area	WALL ZONES				ROOF OVERHANG ZONES						
	POSITIVE PRESSURES		NEGATIVE PRESSURES		NEGATIVE PRESSURES						
	4	5	4	5	1	2	3	N/A	N/A	N/A	
10 SF	16.0	16.0	-17.3	-21.3	-31.0	-35.1	-52.6	N/A	N/A	N/A	
20 SF	16.0	16.0	-16.6	-19.9	-29.2	-33.0	-47.9	N/A	N/A	N/A	
50 SF	16.0	16.0	-16.0	-18.0	-27.7	-29.1	-42.3	N/A	N/A	N/A	
100 SF	16.0	16.0	-16.0	-16.6	-25.9	-27.3	-38.1	N/A	N/A	N/A	
500 SF	16.0	16.0	-16.0	-16.0	-24.3	-25.6	-36.4	N/A	N/A	N/A	

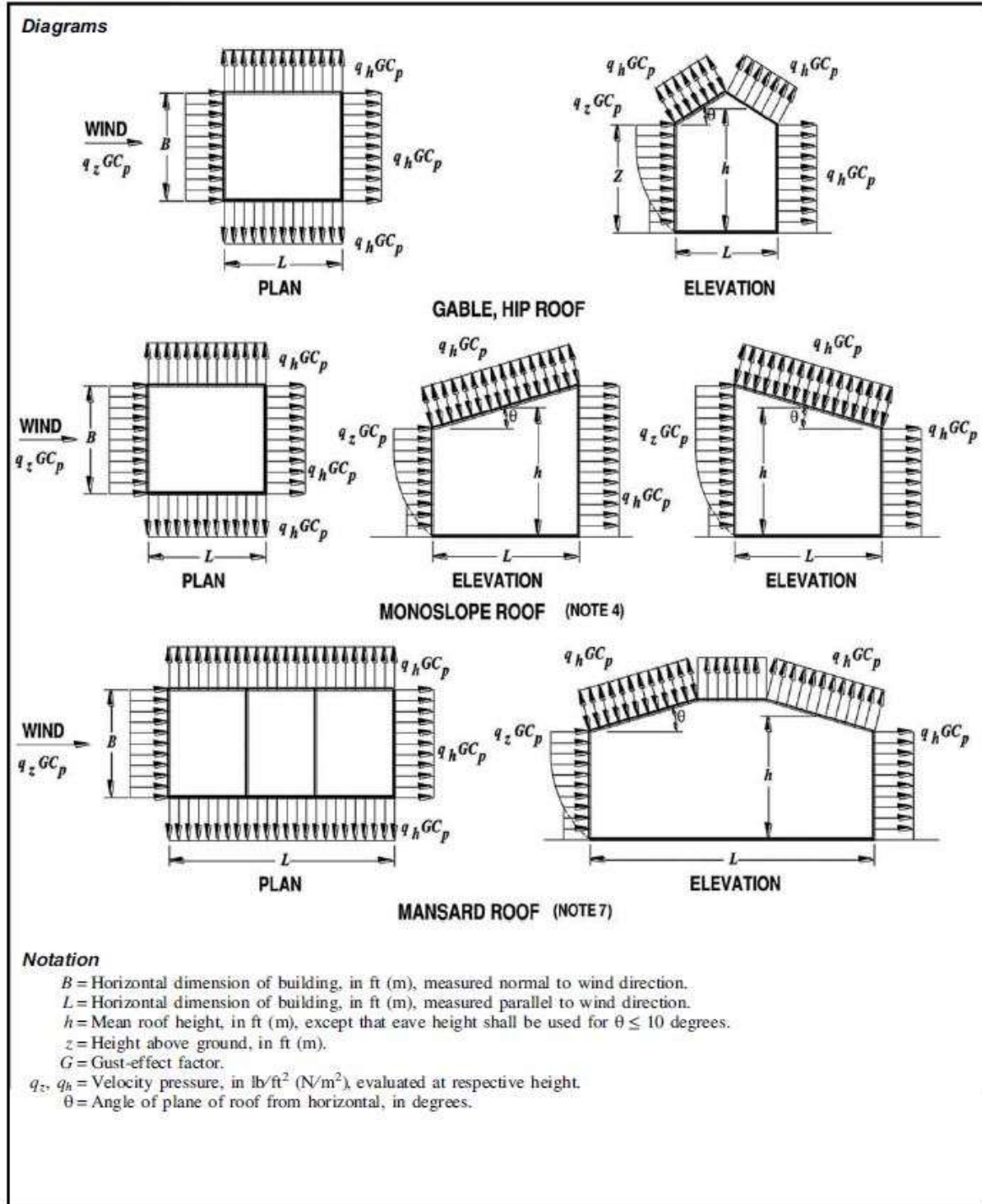
**NOTES:**

- ASCE 7-16 30.2.2: Minimum Design Wind Loads: The design wind pressure for C&C of buildings shall not be less than a net pressure of 16 PSF acting in either direction normal to the surface.
- q<sub>i</sub> has conservatively been taken equal to q<sub>n</sub>  
 K<sub>ht</sub> = 1.00  
 q<sub>h</sub> = 13.5 PSF

**DESIGN CRITERIA - WIND**
**FIGURE 27.3-8: Main Wind Force Resisting System, Part 1 (All Heights): Design Wind Load Cases per ASCE 7-16**

**FIGURE 27.3-8 Main Wind Force Resisting System, Part 1 (All Heights): Design Wind Load Cases**

**DESIGN CRITERIA - WIND**

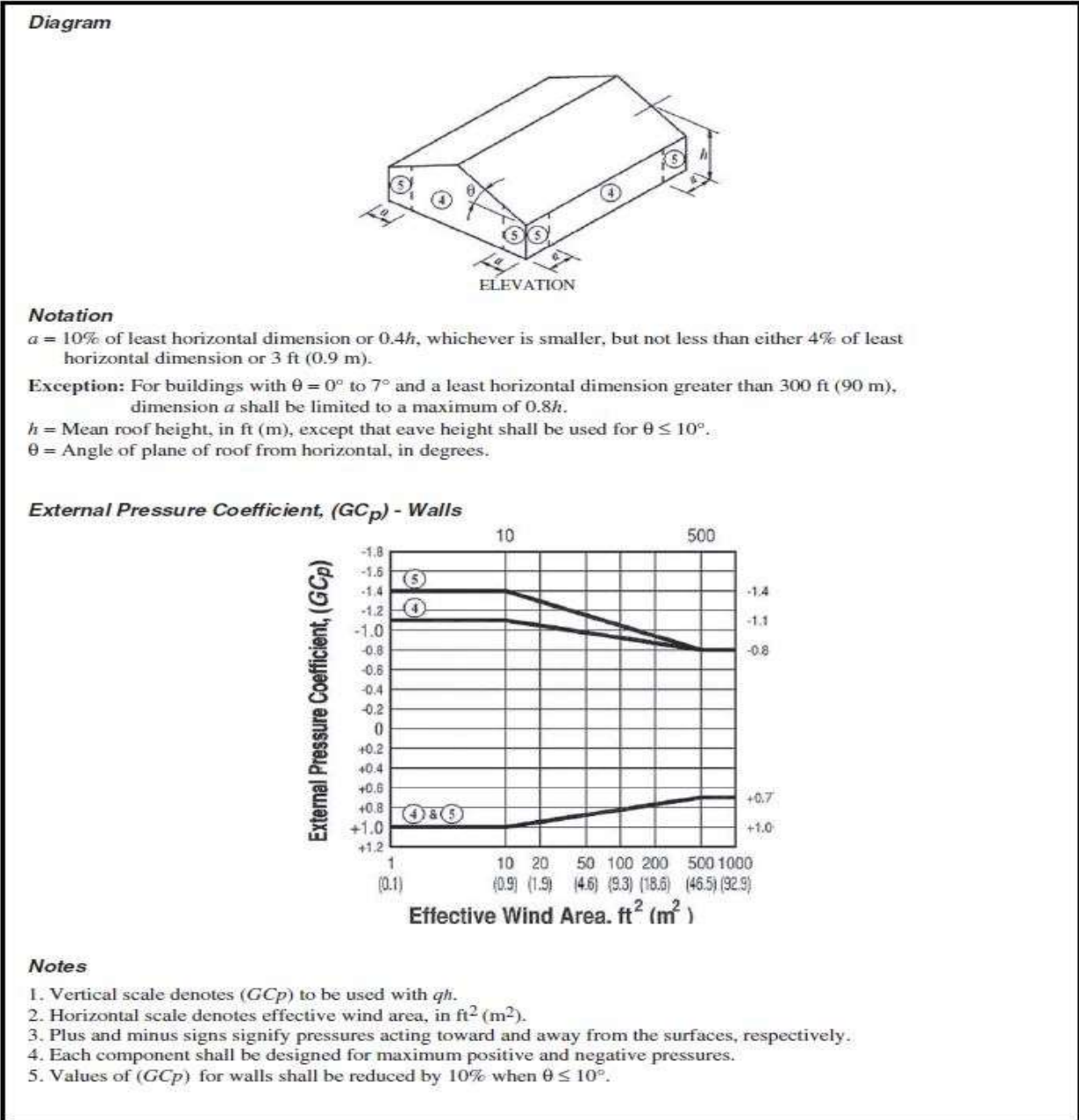
**FIGURE 27.3-1 Main Wind Force Resisting System, Part 1 (All Heights): External Pressure Coefficients,  $C_p$ , for Enclosed and Partially Enclosed Buildings - Walls and Roofs per ASCE 7-16**



**FIGURE 27.3-1 Main Wind Force Resisting System, Part 1 (All Heights): External Pressure Coefficients,  $C_p$ , for Enclosed and Partially Enclosed Buildings—Walls and Roofs**

**DESIGN CRITERIA - WIND**

**FIGURE 30.3-1: Components and Cladding [ $h \leq 60$  ft]: External Pressure Coefficients, ( $GC_p$ ), for Enclosed and Partially Enclosed Buildings - Walls**



**FIGURE 30.3-1 Components and Cladding [ $h \leq 60$  ft ( $h \leq 18.3$  m)]: External Pressure Coefficients, ( $GC_p$ ), for Enclosed and Partially Enclosed Buildings—Walls**



Project: Taco Time NW

Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_

Name: JMB

Originating Office: Tacoma

Date: 06-16-23

**DESIGN CRITERIA - SEISMIC**

**ASCE 7-16 SECTION 12.8 - EQUIVALENT LATERAL FORCE PROCEDURE**

RISK CATEGORY:	II	LATITUDE:	47.192
SITE CLASS:	D	LONGITUDE:	-122.279
IMPORTANCE FACTOR (I <sub>E</sub> ):	1	S <sub>S</sub> =	1.266
STRUCTURAL SYSTEM (R):	6.5	S <sub>1</sub> =	0.436
OVERSTRENGTH FACTOR (Ω <sub>0</sub> ):	3	F <sub>a</sub> =	1.200
		F <sub>v</sub> =	1.864

**ASCE 7-16 SECTION 11.4 SEISMIC GROUND MOTION VALUES**

Section 11.4.4 - Coefficients and Risk-Targeted Maximum Considered Earthquake (MCER) Spectral Response Acceleration Parameters

$$S_{MS} = F_a * S_S = 1.519 \quad S_{M1} = F_v * S_1 = 0.813$$

Section 11.4.5 - Design Spectral Response Acceleration Parameters

$$S_{DS} = 2/3 * S_{MS} = 1.013 \quad S_{D1} = 2/3 * S_{M1} = 0.542$$

**ASCE 7-16 SECTION 11.6 - SEISMIC DESIGN CATEGORY - SECTION 12.8.2 - PERIOD DETERMINATION**

ASCE 7-16 TABLE 11.6-1			
SEISMIC DESIGN CATEGORY BASED ON S <sub>DS</sub>			
	RISK CATEGORY:		
	I & II	III	IV
< 0.167g	A	A	A
< 0.33g	B	B	C
< 0.50g	C	C	D
>= 0.50g	D	D	D
<b>D</b>			

Each building and structure shall be assigned to the most severe Seismic Design Category in accordance with Table 11.6-1 or Table 11.6-2, irrespective of the fundamental period of vibration of the structure.

ASCE 7-16 TABLE 11.6-2			
SEISMIC DESIGN CATEGORY BASED ON S <sub>D1</sub>			
	RISK CATEGORY:		
	I & II	III	IV
< 0.067g	A	A	A
< 0.133g	B	B	C
< 0.20g	C	C	D
>= 0.20g	D	D	D
<b>D</b>			

PERIOD DETERMINATION:	
C <sub>t</sub> =	0.02
h <sub>n</sub> =	20 FT
x =	0.75
T <sub>a</sub> = C <sub>t</sub> *h <sub>n</sub> <sup>x</sup> =	0.189

**ASCE 7-16 SECTION 12.8.1.1 - SEISMIC RESPONSE COEFFICIENT**

GENERAL EQUATION:	C <sub>s</sub> = S <sub>DS</sub> /(R/I) =	0.156	<--CONTROLS	EQ. 12.8-2
MAXIMUM:	C <sub>s</sub> = 1.5*SD1/(T*(R/I)) =	0.661		EQ. 12.8-3
MINIMUM:	C <sub>s</sub> = 0.044*S <sub>DS</sub> *I > 0.01 =	0.045		EQ. 12.8-5
	For structures located where S1 > 0.6g			
	C <sub>s</sub> = 0.5*S <sub>1</sub> /(R/I) =	0.000		EQ. 12.8-6

**ASCE 7-16 SECTION 12.8.1 - SEISMIC BASE SHEAR**

$$V = C_s * W = \mathbf{0.156 * W}$$

W = the total dead load and applicable portion of other loads as indicated in Section 12.7.2

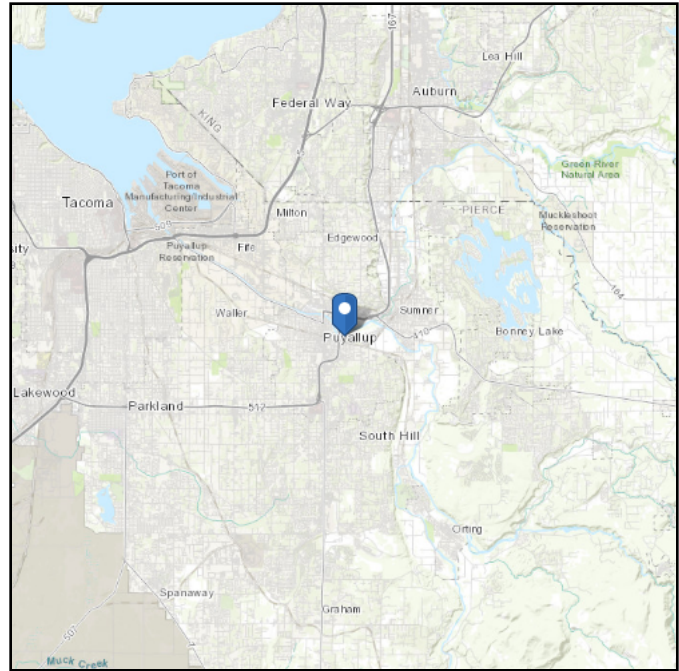
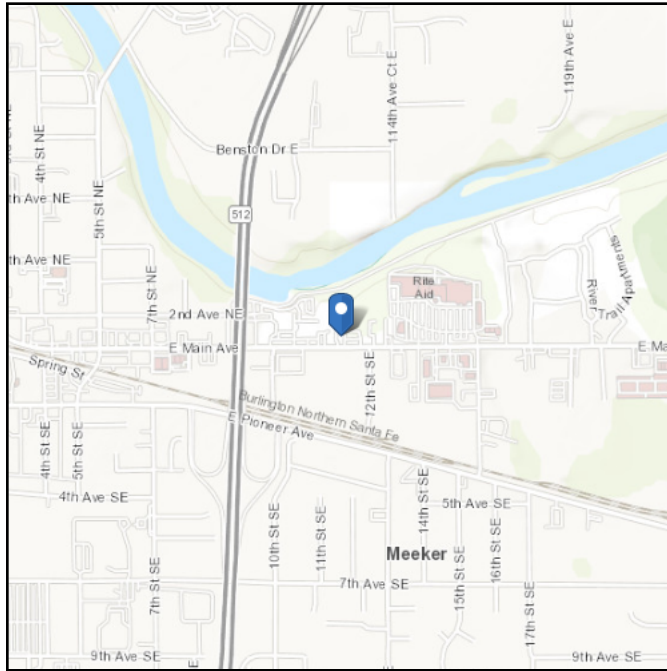


# ASCE 7 Hazards Report

**Address:**  
1115 E Main  
Puyallup, Washington  
98372

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

**Latitude:** 47.192103  
**Longitude:** -122.27905  
**Elevation:** 54.273300457218 ft (NAVD 88)



## Wind

### Results:

Wind Speed	98 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: Fri Jun 16 2023

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.

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

**Results:**

$S_s$ :	1.266	$S_{D1}$ :	N/A
$S_1$ :	0.436	$T_L$ :	6
$F_a$ :	1.2	PGA :	0.5
$F_v$ :	N/A	PGA <sub>M</sub> :	0.6
$S_{MS}$ :	1.519	$F_{PGA}$ :	1.2
$S_{M1}$ :	N/A	$I_e$ :	1
$S_{DS}$ :	1.013	$C_v$ :	1.353

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

**Data Accessed:** Fri Jun 16 2023

**Date Source:** [USGS Seismic Design Maps](#)



The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

LATERAL

Seismic

$C_s = 0.156$  (Per Design Criteria)

Roof Area =  $3,212 \text{ ft}^2$  total

Includes wall weights

Seismic Wt. =  $3,212 \text{ ft}^2 \times 25 \text{ pcf effective} = 80.3 \text{ K}$   
 $+ 555 \text{ ft}^2 \times 20 \text{ pcf eff. canopy} = 11 \text{ K}$  (Arch Revision)

Seismic Base Shear =  $80.3 \text{ K} \times 0.156 = \underline{12.5 \text{ K}}$  Controls  
 $+ 1.7 \text{ K Canopy}$   
14.2 K Total

Wind

Windward + Leeward Wall Pressures =  $9.2 \text{ pcf} + 5.7 \text{ pcf} = 14.9 \text{ pcf}$   
 $< 16 \text{ pcf}$  min.

$\Rightarrow$  16 pcf wall pressure controls  
 $+$   
 8 pcf projected roof pressure

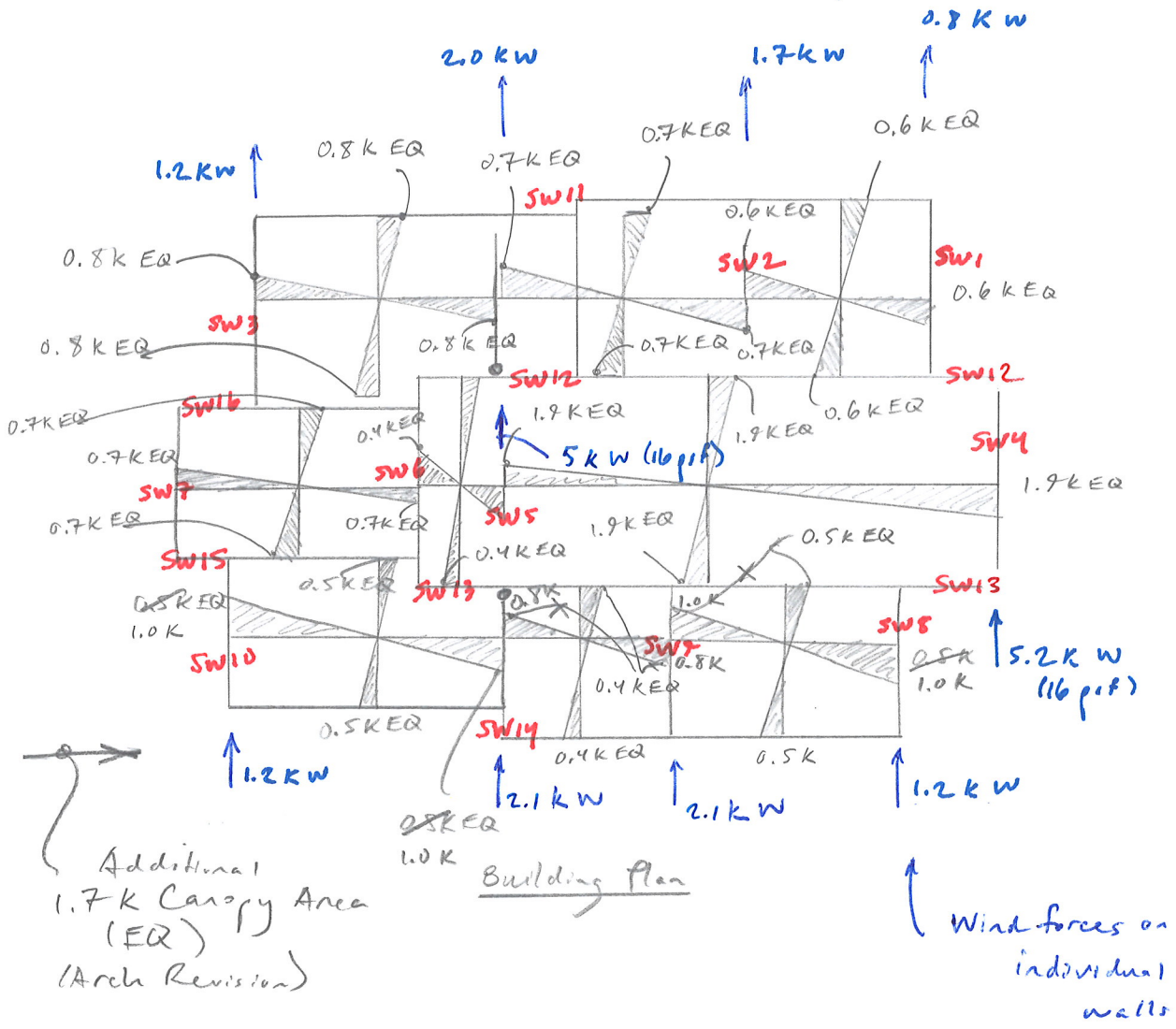
o South Elevation (Broad Face of Bldg)

Wall Area Trib to Roof Diaphragms =  $857 \text{ ft}^2 \times 16 \text{ pcf}$   
 $= \underline{13.7 \text{ K}}$

Comparing 0.6 W vs. 0.7 EQ, Seismic Controls Lateral Design.  
 $\rightarrow$  By inspection, the same is true in narrow direction of building.

$\therefore$  Seismic Controls Global Lateral Design

$\rightarrow$  Review individual walls where wind may govern its design locally.  
 w/ windward pressures.  
 (or 16 pcf whichever applicable)



Lateral Map

\* All forces noted are ultimate level

Sw 1

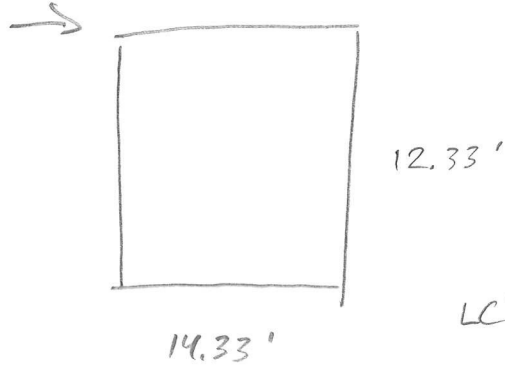
0.8 k (W, u/f)  
0.6 (EQ, u/f)

$w_d = 0.12 \text{ klf}$

$v_w = \frac{0.6 \cdot 0.8 \cdot k}{14.33'} = 33 \text{ pif}$

\* See attached shear wall capacity schedule

10d @ 6" o.c. OK



LC's for OT:

$(0.6 - 0.14 \frac{1.013}{0.05}) D$   
 $= 0.46 D$

$M_{OT} = 0.6 \cdot 0.8 \cdot 12.33' = 5.9 \text{ k-ft}$

Conservative for wind, captures similar seismic loading.

$M_{res} = 0.46 \cdot 0.12 \text{ klf} \times 14.33' \times 14.33' / 2 = 5.7 \text{ k-ft}$

$M_{diff} = 0.2 \text{ k-ft}$

$H/D = 0.2 \text{ k-ft} / 13.33' \leq 0.1 \text{ k}$  HORIZ MIN

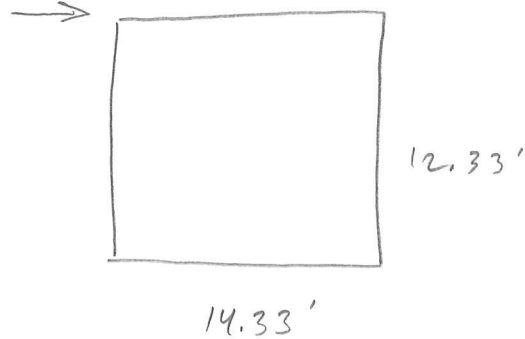
SW2

1.7 k (W, ult.)  
1.3 k (EQ, ult.)

$w_d = 0.12 \text{ klf}$

$$N_{ER} = \frac{0.6 \cdot 1.7 \text{ k}}{14.33'} = 71 \text{ plf}$$

10 de 6" o.c. OK



$$M_{or} = 0.6 \cdot 1.7 \text{ k} \cdot 12.33' = 12.6 \text{ k-ft}$$

$$M_{res} = 0.46 \cdot 0.12 \text{ klf} \times 14.33' \times 14.33' / 2 = 5.6 \text{ k-ft}$$

$$M_{diff} = 7.0 \text{ k-ft}$$

$$HD = 7.0 \text{ k-ft} / 13.33' = 0.5 \text{ k} \quad \text{HOW2 Min}$$

2'-0" x 1'-0" Thickened slab Fdn

$$M_{res} = 0.46 \cdot 0.3 \text{ klf} \cdot 15' \times 15' / 2 = 15.5 \text{ k-ft} > M_{diff} \quad \text{OK}$$

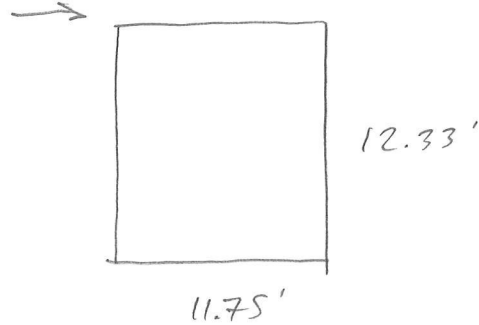
SW 3

1.2 k (w, ult.)  
0.8 k (EQ, ult.)

$w_d = 0.12 \text{ klf}$

$$V_w = \frac{0.6 \cdot 1.2 \text{ k}}{11.75'} = 61 \text{ plf}$$

10d @ 6" o.c. OK



$$M_{OT} = 0.6 \cdot 1.2 \text{ k} \times 12.33' = 8.9 \text{ k-ft}$$

$$M_{res} = 0.46 \cdot 0.12 \text{ klf} \times 11.75' \times 11.75' / 2 = 3.8 \text{ k-ft}$$

$$M_{diff} = 5.1 \text{ k-ft}$$

$$H_D = 5.1 \text{ k-ft} / 10.75' = 0.5 \text{ k horizontal}$$

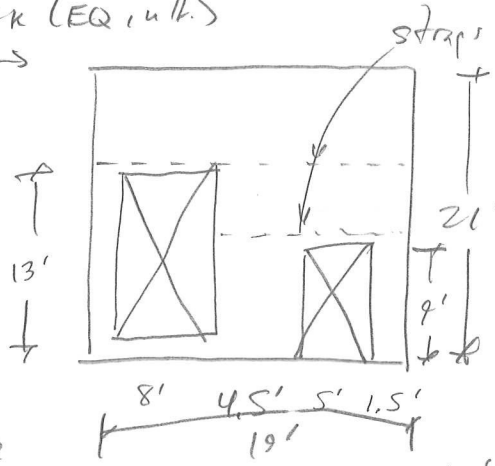
Conventional strip footing (12" x 10" min)

$$M_{res} = 0.46 \cdot 0.24 \text{ klf} \cdot 12' \times 12' / 2 = 8 \text{ k-ft} > M_{diff} \text{ OK}$$

fda

SW4

5.2 k (W, ult.)  
1.9 k (EQ, ult.)  
 $W_D = 0.1 \text{ klf}$



$$V_w = \frac{0.6 \cdot 5.2 \text{ k}}{4.5' \cdot 0.89} = 780 \text{ plf}$$

{ Aspect Ratio =  $13' / 4.5' = 2.9$   
 $1.25 - 0.125 \cdot 2.9 = 0.89$

straps (2) Sides  
w/ 10 x 4" ...  
OK

Global:

$$M_{OT} = 0.6 \cdot 5.2 \text{ k} \cdot 21' = 65.5 \text{ k-ft}$$

$$M_{res} = 0.46 \cdot 0.1 \text{ klf} \cdot 19' \cdot 19' / 2 = 8.3 \text{ k-ft}$$

$$M_{diff} = 57.2 \text{ k-ft}$$

$$H_D = 57.2 \text{ k-ft} / 19' = 3 \text{ k Hou 4 min}$$

$$M, \text{ res, ftg} = 0.6 \cdot 0.725 \text{ klf} \cdot 24' \cdot 24' / 2 = 125 \text{ K-ft} > M_{diff} \text{ OK}$$

Local:

3'x1.5" ftg  
actual load factor for wind

$$M_{OT} = 0.6 \cdot 5.2 \text{ k} \cdot 13' = 40.6 \text{ k-ft}$$

$$H_D = 40.6 \text{ k-ft} / 3.5' = 11.6 \text{ k Hou 14 w/ 6x6 DF#1}$$

Strap:

$$T = 0.6 \cdot 5.2 \text{ k} = 3.1 \text{ k}$$

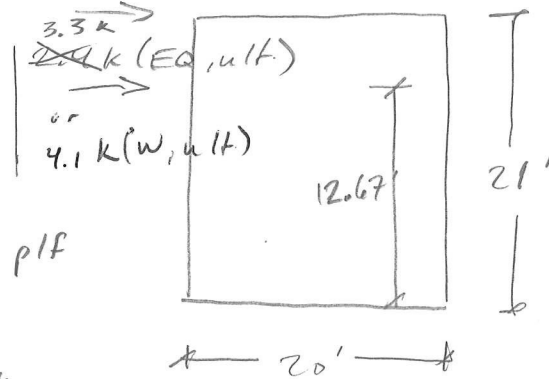
use EMSTC16 (4.7K Capacity (160T))  
OK



SWS

5.0 k (w, ult.)  
2.3 k (EQ, ult.)

$w_d = 0.2 \text{ klf}$



$V_w = \frac{0.6 \cdot 9.1 \text{ k}}{20'} = 273 \text{ plf}$

10d @ 6" o.c. OK

$M_{OT} = 0.6 (5 \text{ k} \times 21' + 4.1 \text{ k} \times 12.67') = 99.2 \text{ k-ft}$

$M_{res} = 0.46 \cdot 0.2 \text{ klf} \times 20' \times 20' / 2 = 18.4 \text{ k-ft}$

$M_{diff} = 75.8 \text{ k-ft}$

$H_D = 75.8 \text{ k-ft} / 19' = 4.0 \text{ k}$  HOUS Min

For wind loading, actual load factor applicable

$M_{res} = 0.6 \cdot 0.725 \text{ klf} \cdot 20' \times 20' / 2 = 87 \text{ k-ft} > M_{diff}$

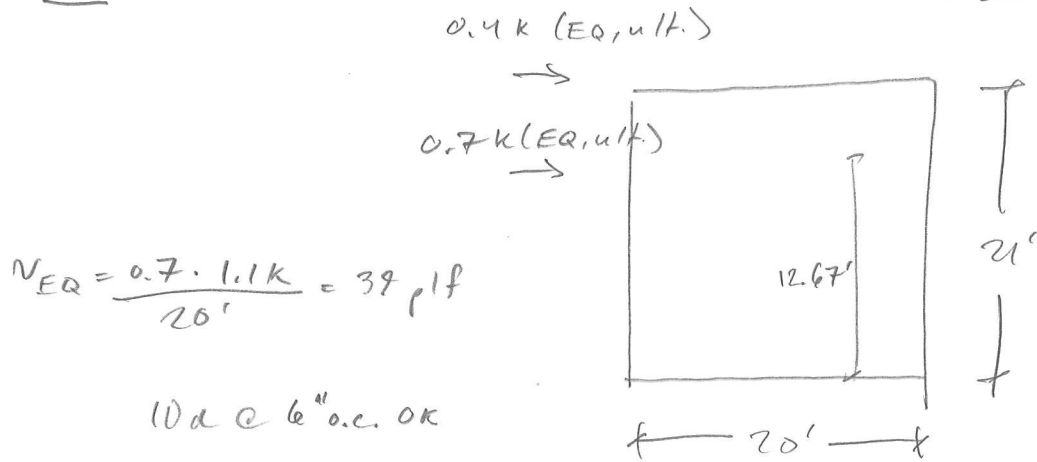
fy

3' x 1.5' Fy

OTOK

SW 6

$W_D = 0.2 \text{ klf}$



Conservative  
 $M_{OT} = 0.7 \cdot 1.1 \text{ k} \times 21' = 16.2 \text{ k-ft}$

$M_{res} = 0.4 \text{ k} \cdot 0.2 \text{ klf} \cdot 20' \times 20' / 2 = 18.4 \text{ k-ft} > M_{OT}$

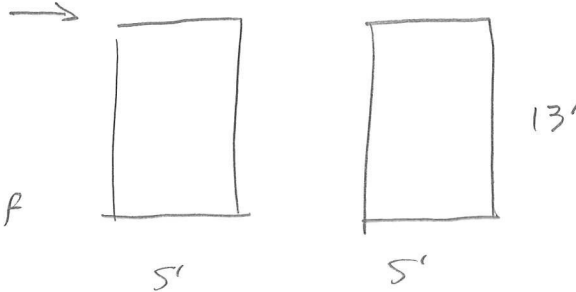
No OT

No HD's Req'd

SW 7

$w_d = 0.13 \text{ klf}$

0.7 k (EQ. ult.)



$N_{EQ} = \frac{0.7 \cdot 0.7 \text{ k}}{10' \cdot 0.925} = 53 \text{ plf}$

10 d @ 6" o.c. OK

$\left\{ \begin{array}{l} 1.25 - 0.125 \frac{w}{b} = 0.925 \end{array} \right.$

$M_{OT} = \frac{0.7 \cdot 0.7 \text{ k} \times 13'}{2} = 3.2 \text{ k-ft}$

$M_{res} = 0.46 \cdot 0.13 \text{ klf} \cdot 5' \times 5' \frac{1}{2} = 0.7 \text{ k-ft}$

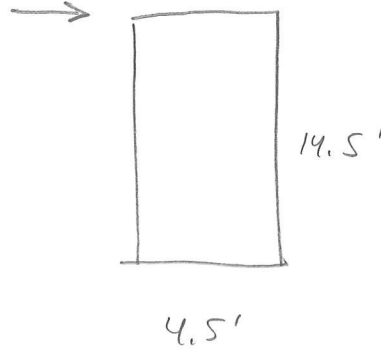
$M_{diff} = 2.5 \text{ k-ft}$

$H_D = \frac{2.5}{4'} = 0.6 \text{ k} \quad \text{HOU 2 min}$

SW 8

$w_d = 0.14 \text{ klf}$

1.2 k (w, ult.)  
 0.5 k (EQ, ult.)  
 1.0



$$V_w = \frac{0.6 \cdot 1.2k}{4.5' \times 0.85} = 188 \text{ plf}$$

10d @ 6" o.c. OK

$\{ 1.25 - 0.125 \frac{4}{6} = 0.85$

$M_{ot} = 0.6 \cdot 1.2k \cdot 14.5' = 10.4 \text{ k-ft}$

Use Seismic EC → Similar loading

$M_{res} = 0.46 \cdot 0.14 \text{ klf} \times 4.5' \times 4.5' / 2 = 0.6 \text{ k-ft}$

$M_{diff} = 9.8 \text{ k-ft}$

$HD = \frac{9.8 \text{ k-ft}}{3.5'} = 2.8 \text{ k Horizontal min.}$

3' x 1.5' Fty.

$M_{res} = 0.46 \cdot 0.675 \text{ klf} \cdot 8.5' \times 8.5' / 2 = 11.2 \text{ k-ft} > M_{diff}$

fdn

OT OK

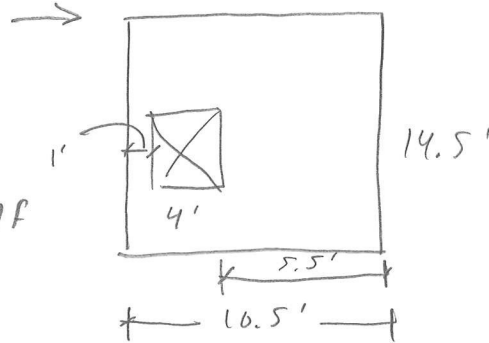
SW 9

2.1 k (w, u/l.)  
~~0.9 k (EQ, u/l.)~~  
 1.8

$w_d = 0.14 \text{ klf}$

$v_w = \frac{0.6 \cdot 2.1 \text{ k}}{5.5' \times 0.92} = 249 \text{ plf}$

10 d @ 6" o.c. OK



$\left\{ 1.25 - 0.125 \frac{h}{b} = 0.92 \right.$

$M_{OT} = 0.6 \cdot 2.1 \text{ k} \cdot 14.5 \text{ ft} = 18.3 \text{ k-ft}$

Use Seismic LC, similar loadings

$M_{res} = 0.46 \cdot 0.14 \text{ klf} \cdot 5.5' \cdot 5.5' / 2 = 1 \text{ k-ft}$

$M_{diff} = 17.3 \text{ k-ft}$

$H_D = 17.3 \text{ k-ft} / 4.5' = 3.8 \text{ k}$  Hous min

3' x 1.5' ft<sub>g</sub>.

$M_{res} = 0.46 \cdot 0.675 \text{ klf} \times 13' \times 13' / 2 = 26 \text{ k-ft} > M_{diff}$   
 fdr OT OK

SWID

1.2 k (w, ult)  $w_d = 0.1 \text{ klf}$

~~1.0 k~~ (EQ, ult)

$V_w = \frac{0.6 \cdot 1.2 \text{ k}}{4.5' \cdot 0.62} = 258 \text{ plf}$

10 @ 6" o.c. OK

$\left\{ \begin{array}{l} 1.25 - 0.125 \text{ h/6} = 0.89 \\ 26 \text{ h} = 0.62 \end{array} \right.$

Strap Above: Below  
 $P = 0.6 \cdot 1.2 \text{ k} = 0.7 \text{ k}$   
 Try Simpson C50  
 2x 1 k capacity (160)  
 OK

Global:

$M_{OT} = 0.6 \cdot 1.2 \text{ k} \cdot 11.33' = 8.2 \text{ k-ft}$   
 use seismic IC, similar loading

$M_{res} = 0.46 \cdot 0.1 \text{ klf} \cdot 10.5' \cdot \frac{10.5'}{2} = 2.5 \text{ k-ft}$

$M_{diff} = 5.7 \text{ k-ft}$

$H_D = 5.7 \text{ k-ft} / 9.5' = 0.6 \text{ k}$

Local:

$M_{OT} = 0.6 \cdot 1.2 \text{ k} \left( \frac{2'}{4.5'} \right) \cdot 6.5' = 2.1 \text{ k-ft}$

$H_D = 2.1 \text{ k-ft} / 1.5' = 1.4 \text{ k}$

$N_w = 1.4 \text{ k} / 2.5' = 560 \text{ plf} \rightarrow \text{Too High, Provide } H_D$

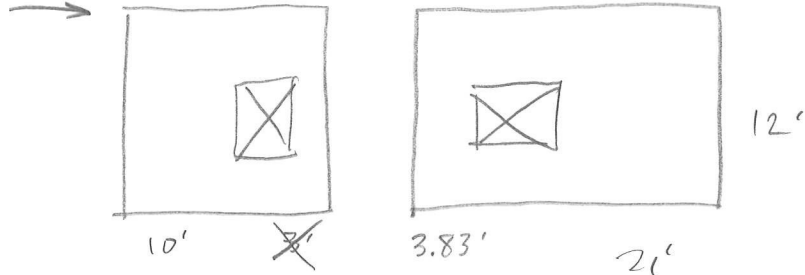
Global + Local

$H_D = 1.4 \text{ k} + 0.6 \text{ k} = 2.0 \text{ k}$  Provide Hou 2 min

SW11

$w_d = 0.261f$

2.1 K (EQ. ult.)



$$V_{EQ} = \frac{0.7 \cdot 2.1 \text{ K}}{34.83' \cdot 0.64} = 66 \text{ plf}$$

(for 3.83' pier)

$$\left\{ \frac{26}{h} = 0.64 \right.$$

10d @ 6" o.c. OK

3.83' Pier

$$M_{OT} = 0.7 \cdot 2.1 \text{ K} \left( \frac{3.83}{34.83} \right) \cdot 12' = 1.74 \text{ K-ft}$$

$$M_{RES} = 0.46 \cdot 0.261f \cdot 3.83' \cdot \frac{3.83'}{2} = 0.67 \text{ K-ft}$$

$$M_{diff} = 1.27 \text{ K-ft}$$

$$H_D = \frac{1.27 \text{ K-ft}}{2.83'} = 0.4 \text{ K} \text{ HDU 2 Min}$$

10' Pier

$$M_{OT} = 0.7 \cdot 2.1 \text{ K} \left( \frac{10}{34.83} \right) \cdot 12' = 5.1 \text{ K-ft}$$

$$M_{RES} = 0.46 \cdot 0.261f \cdot 10' \cdot \frac{10'}{2} = 4.6 \text{ K-ft}$$

$$M_{diff} = 0.5 \text{ K-ft}$$

$$H_D = \frac{0.5 \text{ K-ft}}{9'} \leq 0.1 \text{ K} \text{ HDU 2 Min}$$

21' Pier

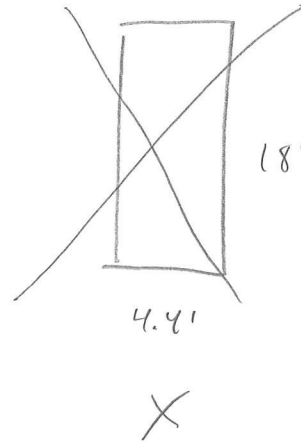
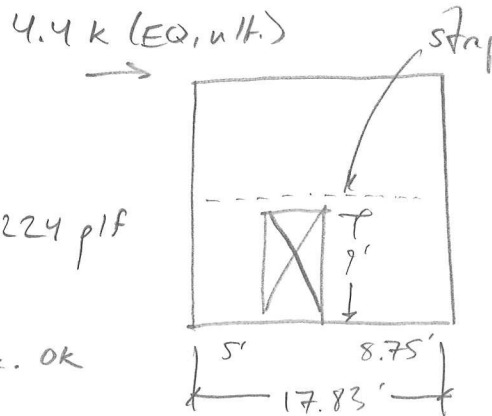
NO OT → NO HD'S Req'd by inspection

SW12

$W_d = 0.4 \text{ klf}$

$$V_{EQ} = \frac{0.7 \cdot 4.4 \text{ k}}{13.75'} = 224 \text{ plf}$$

10d @ 6" o.c. OK



Global:

$$M_{OT} = 0.7 \cdot 4.4 \text{ k} \cdot 18' = 55.4 \text{ k-ft}$$

$$M_{res} = 0.46 \cdot 0.4 \text{ klf} \cdot (17.83') \cdot (17.83') / 2 = 29.2 \text{ k-ft}$$

$$M_{diff} = 26.2 \text{ k-ft}$$

$$HD = 26.2 \text{ k-ft} / 16.83' = 1.6 \text{ k}$$

Local:

$$M_{OT} = 0.7 \cdot 4.4 \text{ k} \cdot \left(\frac{5}{13.75}\right) \cdot 9' = 10.1 \text{ k-ft}$$

$$HD = 10.1 \text{ k-ft} / 4' = 2.5 \text{ k}$$

Global + Local:

$$HD = 2.5 \text{ k} + 1.6 \text{ k} = 4.1 \text{ k} \quad \text{HDUS Min}$$

Strap:

$$P = 0.7 \cdot 4.4 \text{ k} \cdot \left(\frac{8.75'}{13.75}\right) = 2 \text{ k} \rightarrow \text{CS14 Strap} \rightarrow 2.5 \text{ k Capacity (160) OK}$$



SW 12 Cont'd

↙ 2' x 1.5' F<sub>ty</sub>

$$M_{OT} = 0.46 \cdot 0.45 \text{ klf} \cdot 18' \times 18' \text{ h} = 33.5 \text{ k-ft} > M_{d,AF} \text{ g.l.}$$

Edn

OK OT

∴ Use 2' wide x 18" Thick F<sub>ty</sub>.

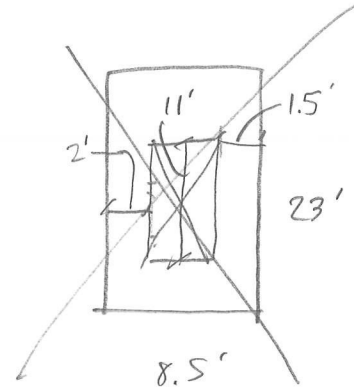
SW13

3.7k (EQ, ult.)  
→



9.33'

$w_d = 0.4$  klf



$$V_{EQ} = \frac{0.7 \cdot 3.7k}{9.33' \cdot 0.94} = 295 \text{ plf}$$

10d @ 4" o.c. OK

$$\left\{ 1.25 - 0.125 \frac{h}{b} = 0.94 \right.$$

$$M_{OT} = 0.7 \cdot 3.7k \cdot 23' = 59.6 \text{ k-ft}$$

$$M_{res} = 0.46 \cdot 0.4 \text{ klf} \times 9.33' \times 9.33' / 2 = 8 \text{ k-ft}$$

$$M_{diff} = 51.6 \text{ k-ft}$$

$$HD = 51.6 \text{ k-ft} / 8.33' = 6.2 \text{ k} \quad \text{HOW 8w / (3) Studs min}$$

↙ 3.5' x 2' Reef Fty.

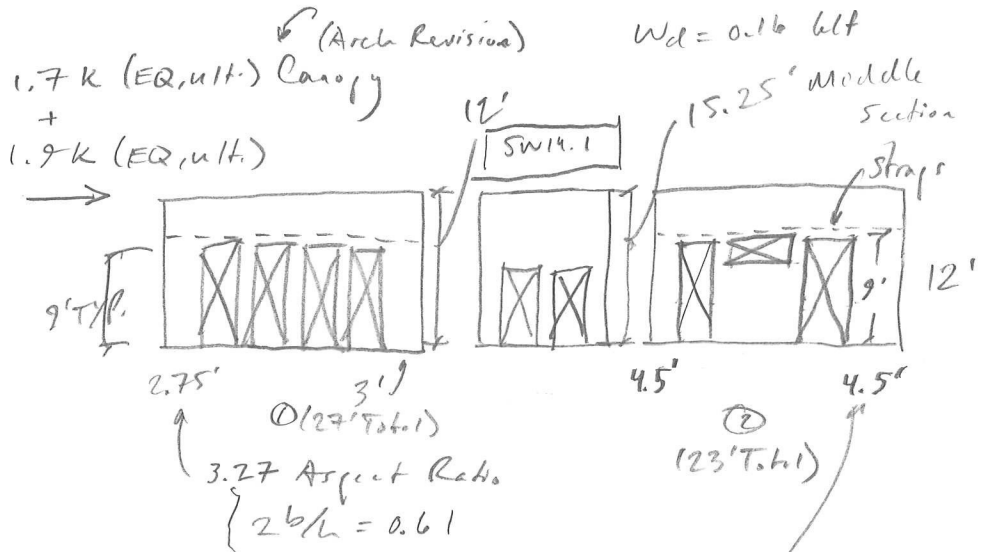
$$M_{res} = 0.46 \cdot 1.05 \text{ klf} \cdot 15' \cdot 15' / 2 = 54.3 \text{ k-ft} > M_{diff}$$

fld

OT OK

∴ Use 3.5' x 2' Footing  
x 15' long min

SW14



Walls act together as they are tied together w/ a low roof diaphragm.

Aspect ratio = 2.0, no adjustment req'd.

$$V_s = \frac{0.7 \cdot (1.7K + 1.9K)}{(2.75' + 3' + 4.5' + 4.5') \cdot 0.61 \text{ Adjustment.}}$$

$$= 280 \text{ plf} \rightarrow 10 \text{ d @ } \underline{4'' \text{ o.c. OK}}$$

Segment ①:

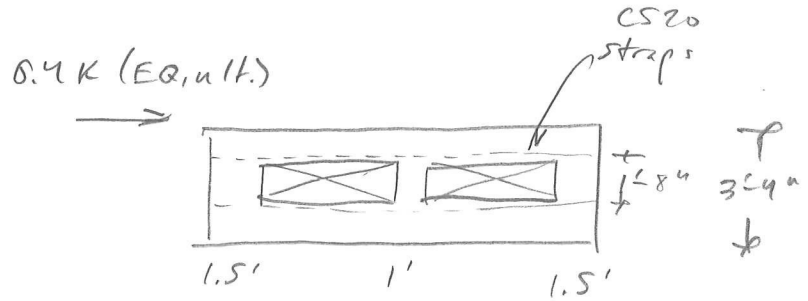
Global 1:	$M_{OT} = 0.7 \cdot 3.6K \left( \frac{5.75}{14.75} \right) \cdot 12' = 11.8K\text{-ft}$ $M_{res} = 0.46 \cdot 0.16 \text{ klf} \cdot 27 \frac{3}{2} = 26.8K\text{-ft}$ NO Global OT	Local:	$M_{OT} = 0.7 \cdot 3.6K \left( \frac{2.75}{14.75} \right) \cdot 9'$ $H_D = \frac{4.3K\text{-ft}}{1.75'} = 2.5K \text{ HDU } 4 \text{ min}$
-----------	---	--------	--

Segment ②:

Global 1:	$M_{OT} = 0.7 \cdot 3.6K \left( \frac{9}{14.75} \right) \cdot 12' = 18.5K\text{-ft}$ $M_{res} = 0.46 \cdot 0.16 \text{ klf} \cdot 23 \frac{3}{2} = 19.5K\text{-ft}$ NO Global OT	Local:	$M_{OT} = 0.7 \cdot 3.6K \left( \frac{4.5}{14.75} \right) \cdot 9'$ $H_D = \frac{6.9K\text{-ft}}{3.5'} = 2.0K \text{ HDU } 2 \text{ min}$
-----------	--	--------	--

Straps:  $T = 0.7 \cdot 3.6K \left( \frac{9}{14.75} \right) = 1.5K \text{ CS16 MIN.}$

SW14.1



$$V_s = \frac{0.7 \cdot 0.4 \text{ k}}{4'} = 70 \text{ plf}$$

10 d @ 6" o.c. OK

OT OK by inspection

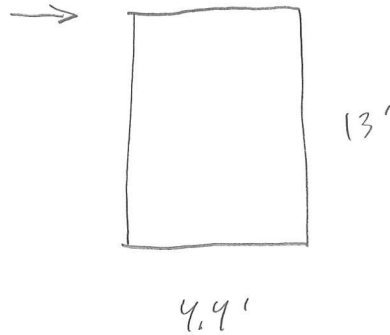
SW15

$w_d = 0.23 \text{ klf}$

1.2K (EQ, u/f)

$$V_{EQ} = \frac{0.7 \cdot 1.2 \text{ k}}{4.4' \times 0.88} = 217 \text{ plf}$$

10d @ 6" o.c. OK



$$\left\{ 1.25 - 0.125 \frac{w_d}{b} = 0.88 \right.$$

$$M_{OT} = 0.7 \cdot 1.2 \text{ k} \cdot 13' = 10.9 \text{ k-ft}$$

$$M_{res} = 0.46 \cdot 0.23 \text{ klf} \cdot 4.4' \times 4.4' / 2 = 1.0 \text{ k-ft}$$

$$M_{dist} = 9.9 \text{ k-ft}$$

$$H_D = 9.9 \text{ k-ft} / 3.4' = 2.9 \text{ k} \quad \text{HOU 4 min}$$

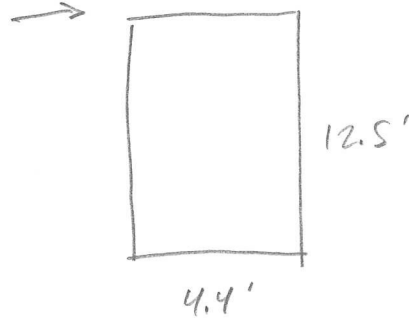
SW 46

$w_d = 0.23 \text{ klf}$

$$N_{EQ} = \frac{0.7 \cdot 1.5 \text{ k}}{4.4' \cdot 0.89} = 268 \text{ plf}$$

10 d @ 6" o.c. OK

1.5 k (EQ, ulf.)



$$\left\{ 1.25 - 0.125 \frac{h}{4} = 0.89 \right.$$

$$M_{OT} = 0.7 \cdot 1.5 \text{ k} \cdot 12.5' = 13.1 \text{ k-ft}$$

$$M_{res} = 0.46 \cdot 0.23 \text{ klf} \times 4.4' \times 4.4' / 2 = 1 \text{ k-ft}$$

$$M_{Oiff} = 12.1 \text{ k-ft}$$

$$HD = 12.1 \text{ k-ft} / 3.4' = 3.6 \text{ k} \quad \text{Hous Min}$$

Fdn  $\Rightarrow$  Similar to SW 8  $\Rightarrow$  Use 3' x 1.5' Ftg.

Diaphragms

- o Check High Roof Diaphragm Stress (Worst Case) <sub>shear</sub>

$$v_w = \frac{0.6 \cdot 5.2 \text{ K}}{20'} = 156 \text{ plf}$$

Try unblocked WSP Diaphragm "Rated" Sheathing w/ 8d nails (unblocked)

$$\hookrightarrow v_{allow} = \frac{480 \text{ plf}}{2} = 240 \text{ plf (allow)} > v_w \text{ OK}$$

- o High Roof Chord Force (Worst Case)

$$M_w = 0.6 \cdot 213 \text{ plf} \cdot \frac{(47 \text{ ft})^2}{8} = 35.3 \text{ k-ft}$$

$$T_c = 35.3 \text{ k-ft} / 19.5' = 1.8 \text{ K Cont. Top Chord OK}$$

- o Low Roof Chord Force (Worst Case)

$$M_s = 0.7 \cdot 80 \text{ plf} \cdot \frac{(26 \text{ ft})^2}{8} = 4.7 \text{ k-ft}$$

$$T_c = 4.7 \text{ k-ft} / 7.5' = 630 \text{ lb CS20 OK (1K capacity (60))}$$

- o SWS Low Roof Collector Straps

$$T_w = 0.6 \cdot 2.1 \text{ K} = 1.3 \text{ K CS16 OK (1.7K Capacity (60))}$$



Project: Taco Time NW Job Number: 23-514 Name: JMB  
 Originating Office: Tacoma Sheet: \_\_\_\_\_ of \_\_\_\_\_ Date: 06-16-23

**ALLOWABLE SHEAR (PLF) FOR WOOD STRUCTURAL PANEL SHEAR WALLS - RATED SHEATHING**

<b>DOUGLAS FIR-LARCH (S.G. = 0.50)</b>																
Sheathing	Edge Attachment (in. O.C.)	Field Attachment (in. O.C.)	Framing Lumber <sup>3,4</sup>	Sill Plate	Seismic						Wind					
					Allow (plf)	Sole Nailing <sup>6,7</sup>		Framing Clips <sup>8</sup>	5/8" A.B. (in. O.C.)	3/4" A.B. (in. O.C.)	Allow (plf)	Sole Nailing <sup>6,7</sup>		Framing Clips <sup>8</sup>	5/8" A.B. (in. O.C.)	3/4" A.B. (in. O.C.)
						Spacing	# of Rows					Spacing	Spacing			
<b>Single Sided with 10d Nails</b>																
15/32" (1) Side	10d @ 6"	10d @ 12"	2x D.F.	2x D.F.	310	16d @ 8"	2	24"	48	48	434	16d @ 8"	2	18	32	48
15/32" (1) Side	10d @ 4"	10d @ 12"	3x D.F.	2x D.F.	460	16d @ 8"	2	16"	32	48	644	SDS @ 6"	1	12"	24	32
15/32" (1) Side	10d @ 3"	10d @ 12"	3x D.F.	2x D.F.	600	SDS @ 6"	1	12"	24	32	840	SDS @ 6"	2	9"	16	24
<b>Double Sided with 10d Nails</b>																
15/32" (2) Sides	10d @ 6"	10d @ 12"	2x D.F.	2x D.F.	620	SDS @ 6"	1	12"	24	32	868	SDS @ 6"	2	9"	16	24
15/32" (2) Sides	10d @ 4"	10d @ 12"	3x D.F.	3x D.F.	920	SDS @ 6"	2	8"	24	32	1288	SDS @ 6"	2	6"	16	24
15/32" (2) Sides	10d @ 3"	10d @ 12"	3x D.F.	3x D.F.	1200	SDS @ 6"	2	6"	16	24	1680	SDS @ 6"	3	4"	12	16

<b>HEM-FIR (S.G. = 0.43)</b>																
Sheathing	Edge Attachment (in. O.C.)	Field Attachment (in. O.C.)	Framing Lumber <sup>3,4</sup>	Sill Plate	Seismic						Wind					
					Allow (plf)	Sole Nailing <sup>6,7</sup>		Framing Clips <sup>8</sup>	5/8" A.B. (in. O.C.)	3/4" A.B. (in. O.C.)	Allow (plf)	Sole Nailing <sup>6,7</sup>		Framing Clips <sup>8</sup>	5/8" A.B. (in. O.C.)	3/4" A.B. (in. O.C.)
						Spacing	# of Rows					Spacing	Spacing			
<b>Single Sided with 10d Nails</b>																
15/32" (1) Side	10d @ 6"	10d @ 12"	2x H.F.	2x H.F.	288	16d @ 8"	2	22"	48	48	404	16d @ 8"	2	16"	32	48
15/32" (1) Side	10d @ 4"	10d @ 12"	3x H.F.	2x H.F.	428	16d @ 8"	2	16"	32	48	599	SDS @ 6"	1	10"	24	32
15/32" (1) Side	10d @ 3"	10d @ 12"	3x H.F.	2x H.F.	558	SDS @ 6"	1	12"	24	32	781	SDS @ 6"	2	8"	16	24
<b>Double Sided with 10d Nails</b>																
15/32" (2) Sides	10d @ 6"	10d @ 12"	2x H.F.	2x H.F.	577	SDS @ 6"	1	12"	24	32	807	SDS @ 6"	2	8	16	24
15/32" (2) Sides	10d @ 4"	10d @ 12"	3x H.F.	3x H.F.	856	SDS @ 6"	2	8"	24	32	1198	SDS @ 6"	2	5	16	16
15/32" (2) Sides	10d @ 3"	10d @ 12"	3x H.F.	3x H.F.	1116	SDS @ 6"	2	6"	16	24	1562	SDS @ 6"	2	4	12	16

- NOTES:**
- DESIGN AND CONSTRUCTION OF SHEAR WALLS PER 2018 IBC & 2018 SDPWS
  - CAPACITIES BASED ON SDPWS TABLE 4.3A.
  - 3x OR (2) 2x MEMBERS ARE REQUIRED AT ABUTTING PANEL EDGES WHERE SEISMIC LOAD EXCEEDS 350 PLF/SIDE. (SDPWS 4.3.7.1.5c)
  - 3x OR (2) 2x MEMBERS ARE REQUIRED WHERE NAILING IS LESS THAN 6" FROM BOTH SIDES INTO COMMON MEMBER. (NOTE 6 OF SDPWS TABLE 4.3A)
  - SHEAR WALLS ARE BLOCKED AT ALL PANEL EDGES
  - STAGGER SOLE NAIL ROWS 1/2"
  - SDS SCREWS ARE 1/4"x4 1/2" MINIMUM (ASD CAPACITY 350# DF/ 250# HF). 16d COMMON NAILS ARE 0.148"x3.5" (ASD CAPACITY 100# DF/86# HF).
  - FRAMING CLIPS ARE SIMPSON A35 OR LTP5. (ASD CAPACITY A35-670#DF/575#HF LTP5-620#DF/535# HF). CONSIDER CLIP LENGTH & OPTIONS AT TIGHT SPACING.
  - SDPWS 4.3.6.4.3 - SILL PLATE WITH 0.229x3"x3" PLATE WASHER ON AB'S 1/2" MAX FROM SHEATHED EDGE. PCS STANDARD USES SIMPSON SLOTTED WASHER.
  - ANCHOR BOLTS BASED ON NDS TABLE 12E. 5/8" ASD CAPACITY 930# 2xDF/1180# 3xDF/860# 2xHF/1070#3xHF. 3/4" ASD CAPACITY 1270#/1540#/1200#/1400#.
  - REQUIRES 3x or (2) 2x RIMBOARD AND/OR BLOCKING - DISCUSS WITH PM.



VERTICAL

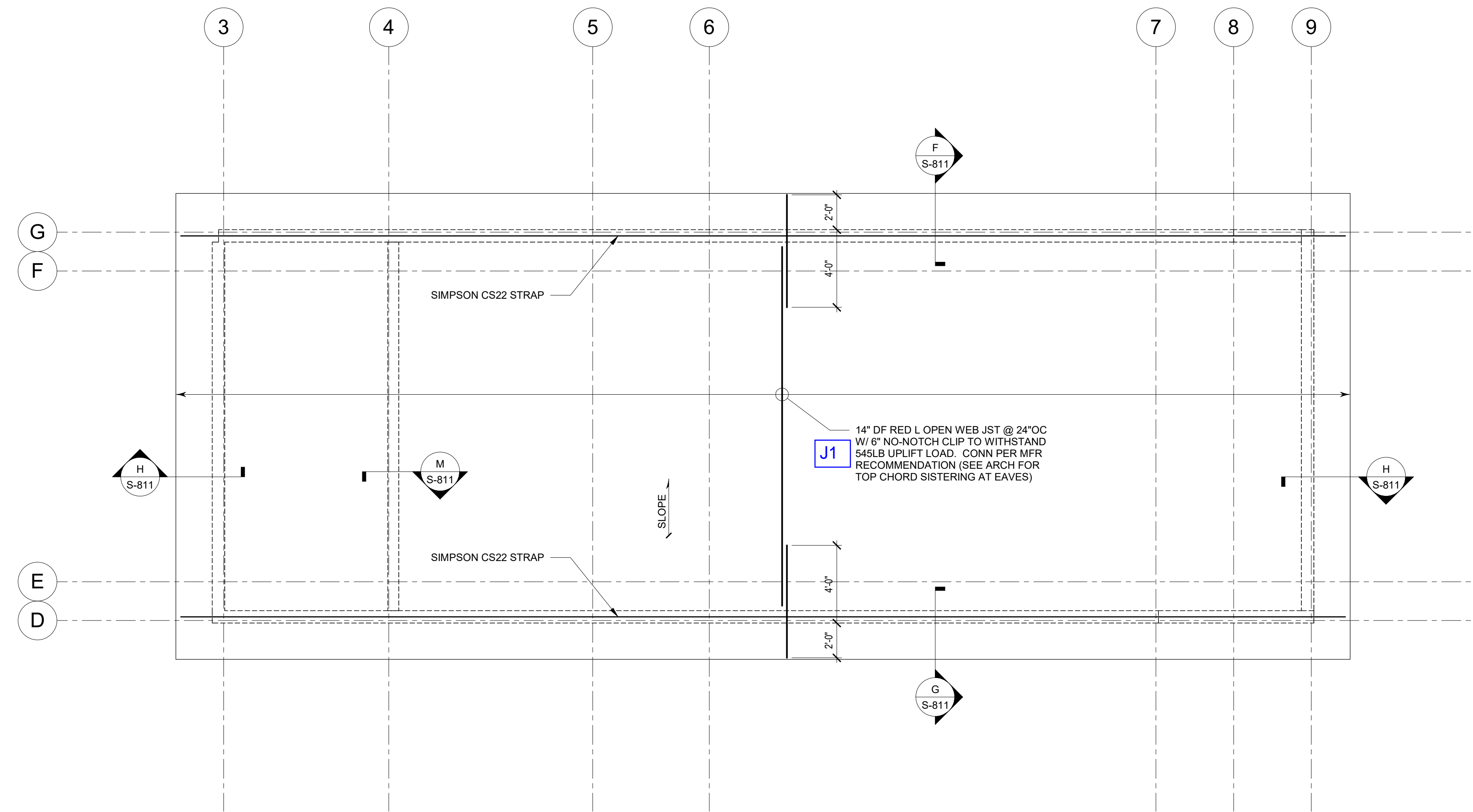




# VERTICAL MAPS

THIS MAP IS FOR REFERENCE OF LOCATION ONLY AND SIZES NOTED ARE PRELIMINARY

- NOTES:**
1. SEE S4.01, S4.02, AND S8.01 FOR TYPICAL DETAILS.
  2. 1/2" APA RATED SHEATHING TYPICAL FOR ROOF SHEATHING. NAIL WITH 10d @ 6" OC AT PANEL EDGES AND 12" OC IN THE FIELD.
  3. SEE ARCHITECTURAL DRAWINGS FOR TOP PLATE ELEVATIONS.
  4. TYPICAL HEADERS TO BE (2) 2x12 FOR OPENINGS UP TO 8'-0". (1) 4x12 ACCEPTABLE.
  5. SEE ARCH FOR PLATE HEIGHT.
  6. BLOCK BELOW SIMPSON CHORD STRAPS.



1 UPPER ROOF FRAMING PLAN  
1/4" = 1'-0"

PROJECT:  
NEW CONSTRUCTION  
**TACO TIME**  
EAST MAIN STREET  
PUYALLUP, WA 98372

REVISIONS

NO.	DATE	DESCRIPTION

DATE: 6.30.2022  
BCRA NO: 19110  
DRAWN BY: Author  
REVIEWED BY:  
SHEET TITLE: UPPER ROOF FRAMING PLAN



RedSpec™ by RedBuilt™  
v7.1.14

**Project:** Project  
**Location:** Puyallup, WA  
**Folder:** Folder  
**Date:** 7-19-23 11:20 AM  
**Designer:** JMB  
**Comment:**

**Type:** J1

## 14" Red-L™ @ 24" o.c.

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

This truss design is feasible. The finished design shall be produced by RedBuilt Engineering. All open-web trusses are custom designed to carry the specific design loads for each project. Actual truss capacity when fabricated is limited to that required to resist the specific loads. Do not use this analysis to verify the capacity of existing trusses.

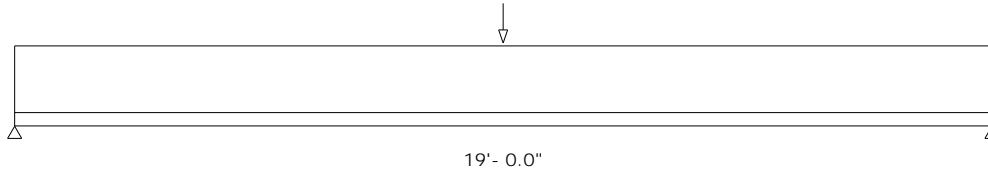
DEFLECTIONS (in)	%	Design	Allow.	Design	Allow.	Pass/Fail
Span Live	36%	0.226	0.633	L / 999+	L / 360	PASS
Span Total	55%	0.525	0.950	L / 434	L / 240	PASS

SUPPORTS	Support 1	Support 2
Live Reaction (lb) (DOL%)	489 (115)	490 (115)
Dead Reaction (lb)	541	543
Total Reaction (lb) (DOL%)	1030 (115)	1033 (115)
Bearing Support	Top Chord Wall	Top Chord Wall
Bearing Clip	6" No-Notch Clip	6" No-Notch Clip
Approx. Clip Height	1.5"	1.5"
Approx. Clip Width	7.1875"	7.1875"
Assumed Bearing Width	3.5"	3.5"

### SPANS AND LOADS

Dimensions represent horizontal clear span.

Member Slope: 3/12 f



### APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	25	20	0	24"	Snow Roof Joist

### ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Point	lb	Snow(115%)	0	300	9'-6.0"	Adds To	

### NOTES

- Building code and design methodology: 2018 IBC ASD (US).
- Repetitive member increase applied in design.
- Beveled plate required at left support.
- Beveled plate required at right support.
- Truss design includes consideration for partial span application live load.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Pricing Load (plf) = 105
- Pricing Index (plf) = 121

G:\2023 Jobs\23514 Taco Time NW\Calcs\23514 redspec 2023-06-17 jmb.red

The products noted are intended for interior, untreated, non-corrosive applications with normal temperatures and dry conditions of use, and must be installed in accordance with local building code requirements and RedBuilt™ recommendations. The loads, spans, and spacing have been provided by others and must be approved for the specific application by the design professional for the project. Unless otherwise noted, this output has not been reviewed by a RedBuilt™ associate. PRODUCT SUBSTITUTION VOIDS THIS ANALYSIS.

RedBuilt™, RedSpec™, Red-I™, Red-I45™, Red-I45L™, Red-I58™, Red-I65™, Red-I90™, Red-I90H™, Red-I90HS™, Red-L™, Red-W™, Red-S™, Red-M™, Red-H™, RedLam™, FloorChoice™ are trademarks of RedBuilt LLC, Boise ID, USA. Copyright © 2010-2022 RedBuilt LLC. All rights reserved.

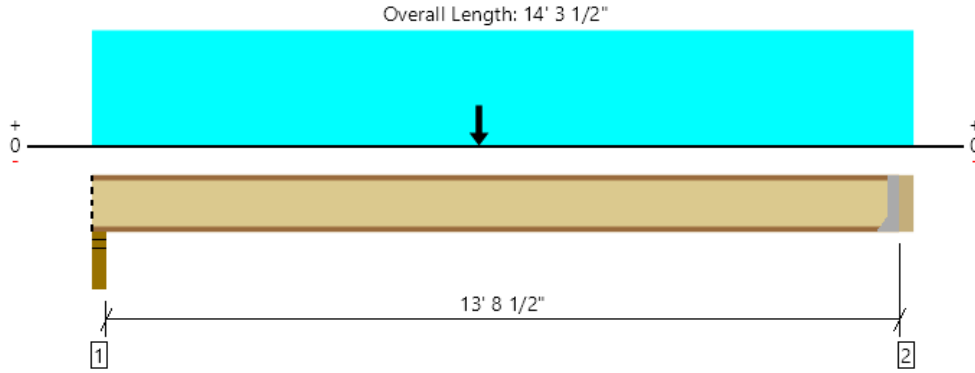
Roof			
Member Name	Results	Current Solution	Comments
J2	Passed	1 piece(s) 11 7/8" TJI® 210 @ 24" OC	
J3 Dbl	Passed	2 piece(s) 11 7/8" TJI® 210 @ 19.2" OC	
J3	Passed	1 piece(s) 11 7/8" TJI® 210 @ 19.2" OC	
J6	Passed	1 piece(s) 3 1/2" x 11 7/8" 1.55E TimberStrand® LSL @ 36" OC	
J3 - Option 2	Passed	1 piece(s) 11 7/8" TJI® 360 @ 24" OC	
J3 Dbl - Option 2	Passed	2 piece(s) 11 7/8" TJI® 360 @ 24" OC	

ForteWEB Software Operator	Job Notes
Jacob Baker PCS Structural Solutions (253) 383-2797 JBaker@pcs-structural.com	Taco Time NW, Puyallup, WA





Roof, J2  
1 piece(s) 11 7/8" TJI @ 210 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	862 @ 14'	1156 (1.75")	Passed (75%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	872 @ 3 1/2"	1903	Passed (46%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	3859 @ 6' 10 1/4"	4364	Passed (88%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.151 @ 7' 1 1/4"	0.460	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.451 @ 6' 10 1/4"	0.690	Passed (L/367)	--	1.0 D + 1.0 S (All Spans)

System : Roof  
Member Type : Joist  
Building Use : Commercial  
Building Code : IBC 2018  
Design Methodology : ASD  
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.75"	543	284	355	898	Blocking
2 - Hanger on 11 7/8" DF beam	3.50"	Hanger <sup>1</sup>	1.75" / - <sup>2</sup>	528	288	359	888	See note <sup>1</sup>

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- <sup>1</sup> See Connector grid below for additional information and/or requirements.
- <sup>2</sup> Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 7" o/c	
Bottom Edge (Lu)	14' o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS2.06/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 14' 3 1/2"	24"	20.0	20.0	25.0	Default Load
2 - Point (lb)	6' 10 1/4"	N/A	500	-	-	Assumed Mech Unit Load

**Weyerhaeuser Notes**

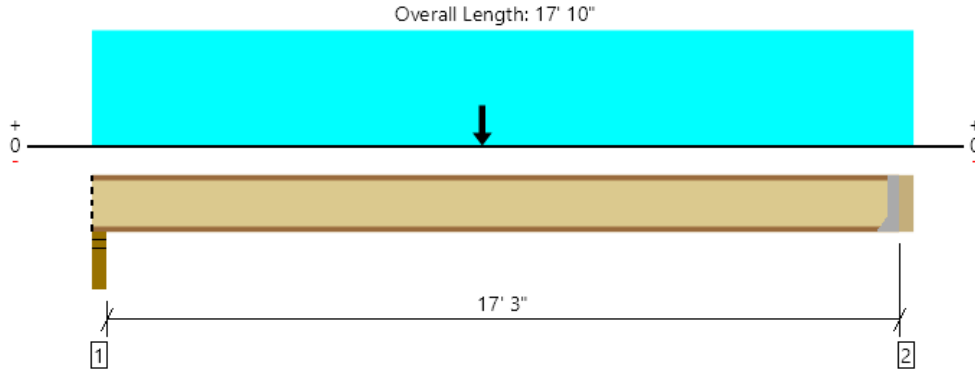
Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to [www.weyerhaeuser.com/woodproducts/document-library](http://www.weyerhaeuser.com/woodproducts/document-library).

The product application, input design loads, dimensions and support information have been provided by JMB

Forteweb Software Operator	Job Notes
Jacob Baker PCS Structural Solutions (253) 383-2797 JBaker@pcs-structural.com	Taco Time NW, Puyallup, WA



Roof, J3 Dbl  
2 piece(s) 11 7/8" TJI® 210 @ 19.2" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	867 @ 17' 6 1/2"	2312 (1.75")	Passed (37%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	875 @ 3 1/2"	3807	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4867 @ 8' 7 1/2"	8729	Passed (56%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.142 @ 8' 10 1/2"	0.578	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.424 @ 8' 7 1/2"	0.867	Passed (L/490)	--	1.0 D + 1.0 S (All Spans)

System : Roof  
Member Type : Joist  
Building Use : Commercial  
Building Code : IBC 2018  
Design Methodology : ASD  
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.75"	541	284	355	896	Blocking
2 - Hanger on 11 7/8" DF beam	3.50"	Hanger <sup>1</sup>	1.75" / - <sup>2</sup>	529	287	358	888	See note <sup>1</sup>

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- <sup>1</sup> See Connector grid below for additional information and/or requirements.
- <sup>2</sup> Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 8" o/c	
Bottom Edge (Lu)	17' 7" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	MIU4.28/11	2.50"	N/A	20-10dx1.5	2-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 17' 10"	19.2"	20.0	20.0	25.0	Default Load
2 - Point (lb)	8' 7 1/2"	N/A	500	-	-	Assumed Mech Unit Load

**Weyerhaeuser Notes**

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to [www.weyerhaeuser.com/woodproducts/document-library](http://www.weyerhaeuser.com/woodproducts/document-library).

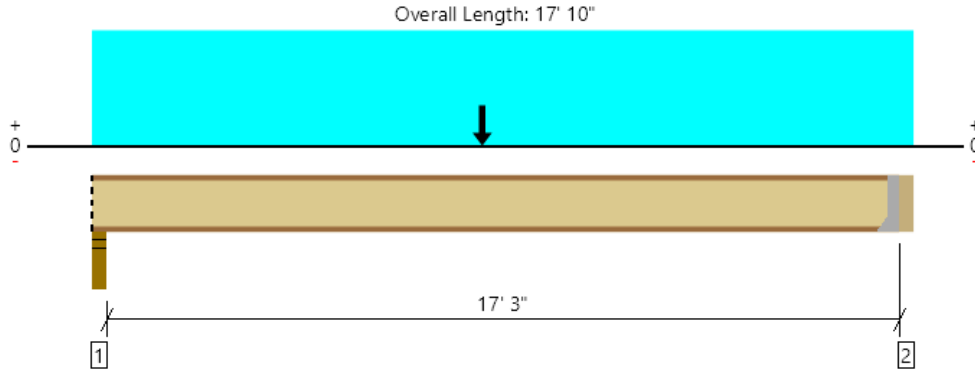
The product application, input design loads, dimensions and support information have been provided by JMB

Forteweb Software Operator	Job Notes
Jacob Baker PCS Structural Solutions (253) 383-2797 JBaker@pcs-structural.com	Taco Time NW, Puyallup, WA





Roof, J3  
1 piece(s) 11 7/8" TJI® 210 @ 19.2" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	770 @ 17' 6 1/2"	1156 (1.75")	Passed (67%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	772 @ 3 1/2"	1903	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4001 @ 8' 7 1/2"	4364	Passed (92%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.285 @ 8' 10 1/2"	0.578	Passed (L/730)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.714 @ 8' 7 1/2"	0.867	Passed (L/291)	--	1.0 D + 1.0 S (All Spans)

System : Roof  
Member Type : Joist  
Building Use : Commercial  
Building Code : IBC 2018  
Design Methodology : ASD  
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.75"	438	284	355	793	Blocking
2 - Hanger on 11 7/8" DF beam	3.50"	Hanger <sup>1</sup>	1.75" / - <sup>2</sup>	432	287	358	791	See note <sup>1</sup>

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- <sup>1</sup> See Connector grid below for additional information and/or requirements.
- <sup>2</sup> Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 6" o/c	
Bottom Edge (Lu)	17' 7" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS2.06/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 17' 10"	19.2"	20.0	20.0	25.0	Default Load
2 - Point (lb)	8' 7 1/2"	N/A	300	-	-	

**Weyerhaeuser Notes**

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to [www.woodyhaeuser.com/woodproducts/document-library](http://www.woodyhaeuser.com/woodproducts/document-library).

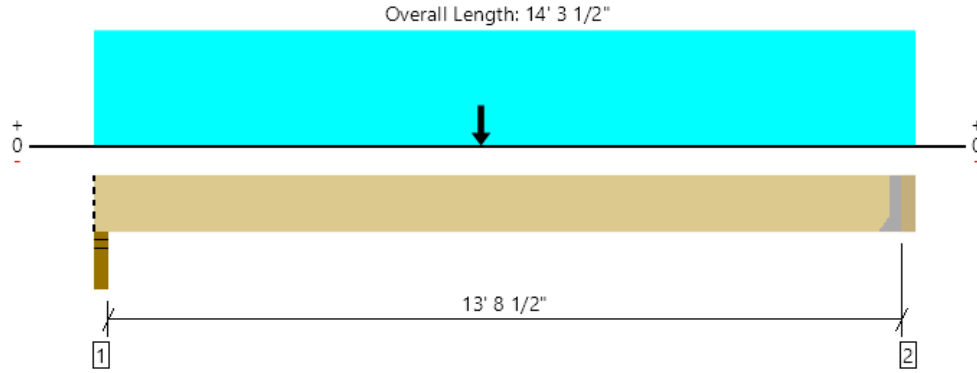
The product application, input design loads, dimensions and support information have been provided by JMB

FortewEB Software Operator	Job Notes
Jacob Baker PCS Structural Solutions (253) 383-2797 JBaker@pcs-structural.com	Taco Time NW, Puyallup, WA



Roof, J6

1 piece(s) 3 1/2" x 11 7/8" 1.55E TimberStrand® LSL @ 36" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1172 @ 14'	4725 (1.50")	Passed (25%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1045 @ 1' 3 3/8"	9878	Passed (11%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4927 @ 6' 10 1/4"	18346	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.087 @ 7' 1 1/4"	0.460	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.225 @ 7' 1"	0.690	Passed (L/736)	--	1.0 D + 1.0 S (All Spans)

System : Roof  
 Member Type : Joist  
 Building Use : Commercial  
 Building Code : IBC 2018  
 Design Methodology : ASD  
 Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.50"	685	426	533	1218	Blocking
2 - Hanger on 11 7/8" DF beam	3.50"	Hanger <sup>1</sup>	1.50"	672	431	539	1211	See note <sup>1</sup>

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- <sup>1</sup> See Connector grid below for additional information and/or requirements.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	14' o/c	
Bottom Edge (Lu)	14' o/c	

- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS410	2.00"	N/A	8-10dx1.5	6-10d	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 14' 3 1/2"	36"	20.0	20.0	25.0	Default Load
2 - Point (lb)	6' 10 1/4"	N/A	500	-	-	Assumed Mech Unit Load

**Weyerhaeuser Notes**

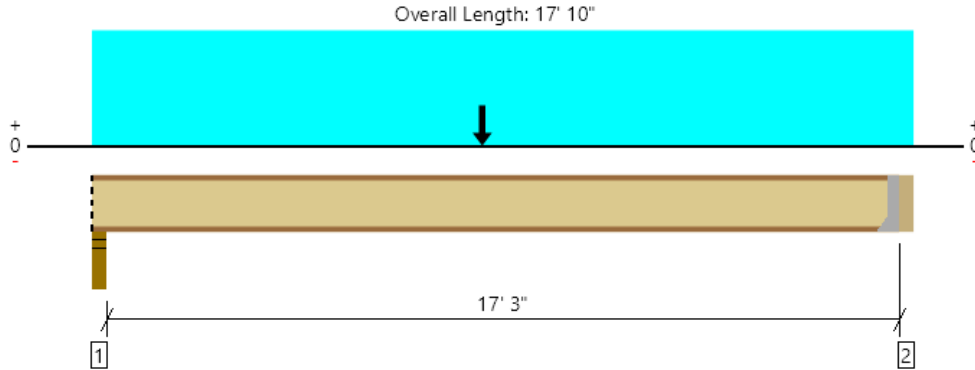
Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to [www.weyerhaeuser.com/woodproducts/document-library](http://www.weyerhaeuser.com/woodproducts/document-library).

The product application, input design loads, dimensions and support information have been provided by JMB

ForteWEB Software Operator	Job Notes
Jacob Baker PCS Structural Solutions (253) 383-2797 JBaker@pcs-structural.com	Taco Time NW, Puyallup, WA



Roof, J3 - Option 2  
1 piece(s) 11 7/8" TJI @ 360 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	926 @ 17' 6 1/2"	1242 (1.75")	Passed (75%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	927 @ 3 1/2"	1961	Passed (47%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	4676 @ 8' 7 1/2"	7107	Passed (66%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.276 @ 8' 10 1/2"	0.578	Passed (L/753)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.654 @ 8' 7 1/2"	0.867	Passed (L/318)	--	1.0 D + 1.0 S (All Spans)

System : Roof  
Member Type : Joist  
Building Use : Commercial  
Building Code : IBC 2018  
Design Methodology : ASD  
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.75"	509	355	444	953	Blocking
2 - Hanger on 11 7/8" DF beam	3.50"	Hanger <sup>1</sup>	1.75" / - <sup>2</sup>	504	358	448	952	See note <sup>1</sup>

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- <sup>1</sup> See Connector grid below for additional information and/or requirements.
- <sup>2</sup> Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 3" o/c	
Bottom Edge (Lu)	17' 7" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	IUS2.37/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 17' 10"	24"	20.0	20.0	25.0	Default Load
2 - Point (lb)	8' 7 1/2"	N/A	300	-	-	

**Weyerhaeuser Notes**

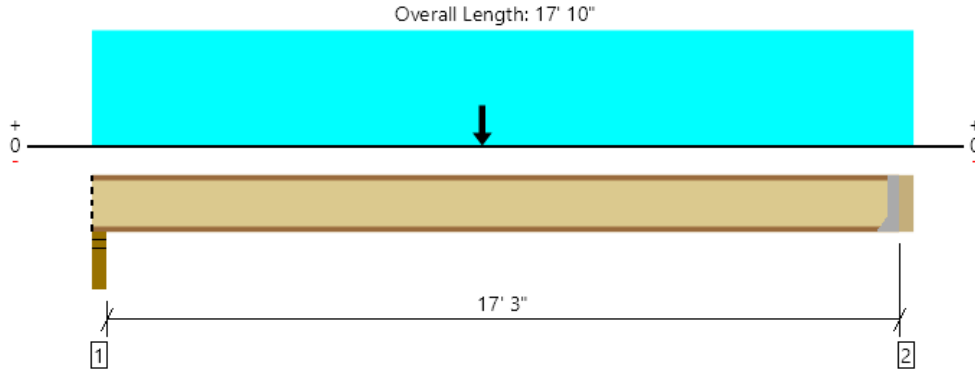
Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to [www.weyerhaeuser.com/woodproducts/document-library](http://www.weyerhaeuser.com/woodproducts/document-library).

The product application, input design loads, dimensions and support information have been provided by JMB

ForteWEB Software Operator	Job Notes
Jacob Baker PCS Structural Solutions (253) 383-2797 JBaker@pcs-structural.com	Taco Time NW, Puyallup, WA



Roof, J3 Dbl - Option 2  
2 piece(s) 11 7/8" TJI @ 360 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1023 @ 17' 6 1/2"	2484 (1.75")	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1030 @ 3 1/2"	3922	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5542 @ 8' 7 1/2"	14214	Passed (39%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.138 @ 8' 10 1/2"	0.578	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.379 @ 8' 7 1/2"	0.867	Passed (L/548)	--	1.0 D + 1.0 S (All Spans)

System : Roof  
Member Type : Joist  
Building Use : Commercial  
Building Code : IBC 2018  
Design Methodology : ASD  
Member Pitch : 0/12

- Deflection criteria: LL (L/360) and TL (L/240).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Factored	
1 - Stud wall - HF	3.50"	3.50"	1.75"	612	355	444	1056	Blocking
2 - Hanger on 11 7/8" DF beam	3.50"	Hanger <sup>1</sup>	1.75" / - <sup>2</sup>	601	358	448	1049	See note <sup>1</sup>

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- <sup>1</sup> See Connector grid below for additional information and/or requirements.
- <sup>2</sup> Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 8" o/c	
Bottom Edge (Lu)	17' 7" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	MIU4.75/11	2.50"	N/A	20-10dx1.5	2-10dx1.5	

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 17' 10"	24"	20.0	20.0	25.0	Default Load
2 - Point (lb)	8' 7 1/2"	N/A	500	-	-	Assumed Mech Unit Load

**Weyerhaeuser Notes**

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to [www.weyerhaeuser.com/woodproducts/document-library](http://www.weyerhaeuser.com/woodproducts/document-library).

The product application, input design loads, dimensions and support information have been provided by JMB

Forteweb Software Operator	Job Notes
Jacob Baker PCS Structural Solutions (253) 383-2797 JBaker@pcs-structural.com	Taco Time NW, Puyallup, WA







Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Typical Header 1**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
Length = 4.250 ft	1		0.356	0.239	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.14	405.1	1,138.5	1.11	49.5	207.0	
+0.60D								1.00	1.00	1.00	1.100	1.00	1.00	1.00		0.0	0.00	0.0	0.0
Length = 4.250 ft	1		0.096	0.064	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.80	151.6	1,584.0	0.41	18.4	288.0	

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0135	2.141		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.138	2.138
Max Upward from Load Combinations	2.138	2.138
Max Upward from Load Cases	1.129	1.129
D Only	1.129	1.129
+D+Lr	1.936	1.936
+D+S	2.138	2.138
+D+0.750Lr	1.734	1.734
+D+0.750S	1.886	1.886
+0.60D	0.677	0.677
Lr Only	0.808	0.808
S Only	1.009	1.009

## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

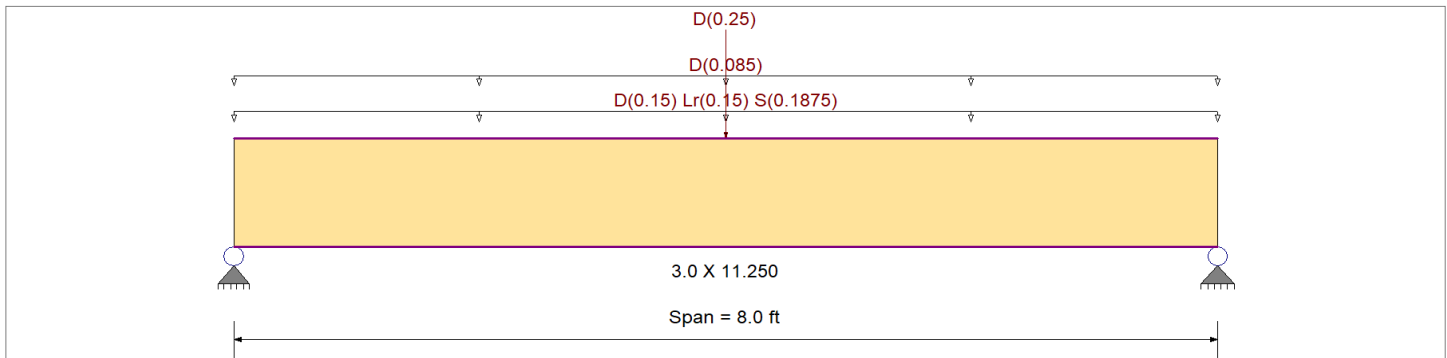
DESCRIPTION: Typical Header 2

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	900.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	900.0 psi	Ebend- xx
	Fc - Prll	1,350.0 psi	Eminbend - xx
Wood Species : Douglas Fir-Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	
	Ft	575.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			31.210pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading  
 Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 7.50 ft  
 Uniform Load : D = 0.010 ksf, Tributary Width = 8.50 ft  
 Point Load : D = 0.250 k @ 4.0 ft, (Assumed Mech Unit Load)

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.656</b> : 1	Maximum Shear Stress Ratio	=	<b>0.310</b> : 1
Section used for this span		<b>3.0 X 11.250</b>	Section used for this span		<b>3.0 X 11.250</b>
fb: Actual	=	746.86psi	fv: Actual	=	64.12 psi
F'b	=	1,138.50psi	F'v	=	207.00 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	4.000ft	Location of maximum on span	=	7.066 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.031 in	Ratio =	<b>3145</b> >=360	Span: 1 : S Only
Max Upward Transient Deflection		0 in	Ratio =	<b>0</b> <360	n/a
Max Downward Total Deflection		0.078 in	Ratio =	<b>1229</b> >=240	Span: 1 : +D+S
Max Upward Total Deflection		0 in	Ratio =	<b>0</b> <240	n/a

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v		
D Only																				
Length = 8.0 ft	1		0.519	0.238	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.44	462.4	891.0	0.0	0.00	0.0	0.0	162.0
+D+Lr																				
Length = 8.0 ft	1		0.558	0.262	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.64	690.0	1,237.5	0.0	0.00	0.0	0.0	225.0
+D+S																				
Length = 8.0 ft	1		0.656	0.310	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.94	746.9	1,138.5	0.0	0.00	0.0	0.0	207.0
+D+0.750Lr																				
Length = 8.0 ft	1		0.512	0.240	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.34	633.1	1,237.5	0.0	0.00	0.0	0.0	225.0
+D+0.750S																				
Length = 8.0 ft	1					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0	0.0	



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Typical Header 2**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F <sup>b</sup>	V	f <sub>v</sub>	F <sup>v</sup>
Length = 8.0 ft	1		0.594	0.279	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.56	675.7	1,138.5	1.30	57.7	207.0
+0.60D															0.0	0.00	0.0	0.0
Length = 8.0 ft	1		0.175	0.080	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.46	277.4	1,584.0	0.52	23.1	288.0

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0781	4.029		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.844	1.844
Max Upward from Load Combinations	1.844	1.844
Max Upward from Load Cases	1.094	1.094
D Only	1.094	1.094
+D+Lr	1.694	1.694
+D+S	1.844	1.844
+D+0.750Lr	1.544	1.544
+D+0.750S	1.657	1.657
+0.60D	0.657	0.657
Lr Only	0.600	0.600
S Only	0.750	0.750



## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

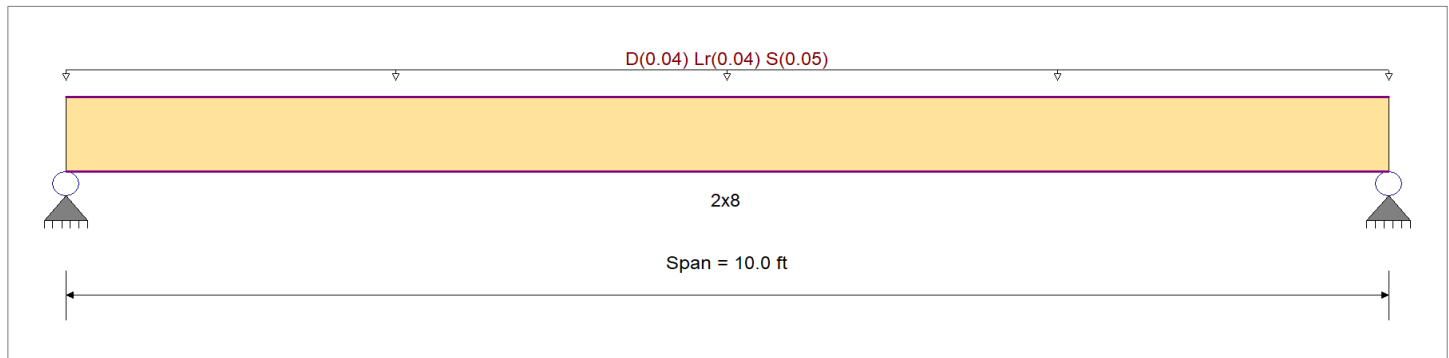
DESCRIPTION: J4

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	900.0 psi	<i>E : Modulus of Elasticity</i>	
Load Combination : ASCE 7-16	Fb -	900.0 psi	Ebend- xx	1,600.0ksi
	Fc - Prll	1,350.0 psi	Eminbend - xx	580.0ksi
Wood Species : Douglas Fir-Larch	Fc - Perp	625.0 psi		
Wood Grade : No.2	Fv	180.0 psi		
	Ft	575.0 psi	Density	31.210pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added  
 Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 2.0 ft

### DESIGN SUMMARY

**Design OK**

<b>Maximum Bending Stress Ratio</b>	=	<b>0.827</b> : 1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.265</b> : 1
Section used for this span		<b>2x8</b>	Section used for this span		<b>2x8</b>
fb: Actual	=	1,027.35psi	fv: Actual	=	54.82 psi
F'b	=	1,242.00psi	F'v	=	207.00 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	5.000ft	Location of maximum on span	=	0.000ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.148 in Ratio =	808 >=360	Span: 1 : S Only	
Max Upward Transient Deflection		0 in Ratio =	0 <360	n/a	
Max Downward Total Deflection		0.267 in Ratio =	449 >=240	Span: 1 : +D+S	
Max Upward Total Deflection		0 in Ratio =	0 <240	n/a	

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v		
D Only																				
Length = 10.0 ft	1		0.470	0.150	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.50	456.6	972.0	0.18	24.4	162.0		
+D+Lr																				
Length = 10.0 ft	1		0.676	0.217	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.00	913.2	1,350.0	0.35	48.7	225.0		
+D+S																				
Length = 10.0 ft	1		0.827	0.265	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.13	1,027.3	1,242.0	0.40	54.8	207.0		
+D+0.750Lr																				
Length = 10.0 ft	1		0.592	0.190	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.88	799.0	1,350.0	0.31	42.6	225.0		
+D+0.750S																				
Length = 10.0 ft	1		0.712	0.228	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.97	884.7	1,242.0	0.34	47.2	207.0		



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: J4**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F <sup>b</sup>	V	f <sub>v</sub>	F <sup>v</sup>
+0.60D						1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 10.0 ft	1		0.159	0.051	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.30	274.0	1,728.0	0.11	14.6	288.0

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.2672	5.036		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.450	0.450
Max Upward from Load Combinations	0.450	0.450
Max Upward from Load Cases	0.250	0.250
D Only	0.200	0.200
+D+Lr	0.400	0.400
+D+S	0.450	0.450
+D+0.750Lr	0.350	0.350
+D+0.750S	0.388	0.388
+0.60D	0.120	0.120
Lr Only	0.200	0.200
S Only	0.250	0.250

## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

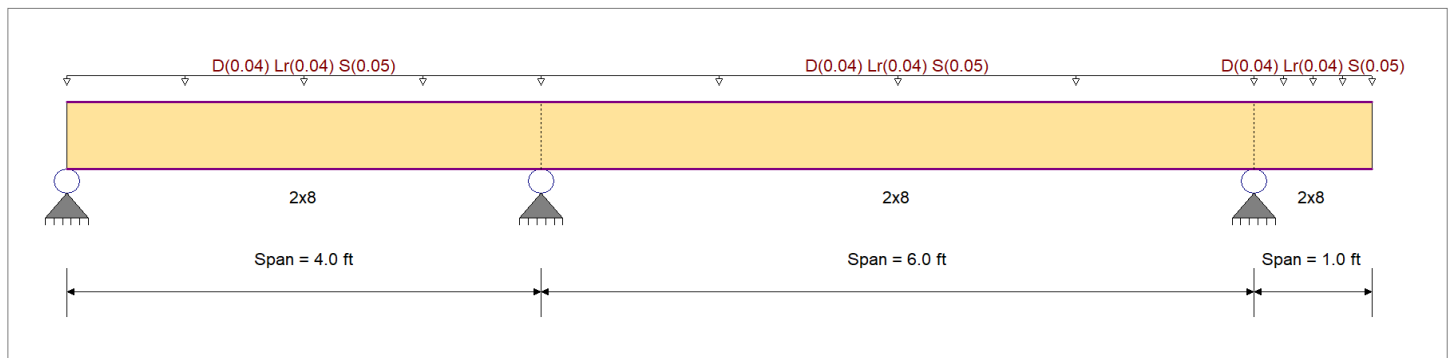
DESCRIPTION: J5

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	900.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	900.0 psi	Ebend- xx
	Fc - Prll	1,350.0 psi	Eminbend - xx
Wood Species : Douglas Fir-Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	180.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling	Ft	575.0 psi	31.210 pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added

Load for Span Number 1

Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 2.0 ft

Load for Span Number 2

Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 2.0 ft

Load for Span Number 3

Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 2.0 ft

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.222</b>	1	Maximum Shear Stress Ratio	=	<b>0.175</b>	: 1
Section used for this span		<b>2x8</b>		Section used for this span		<b>2x8</b>	
fb: Actual	=	275.33psi		fv: Actual	=	36.25 psi	
F'b	=	1,242.00psi		F'v	=	207.00 psi	
Load Combination		+D+S		Load Combination		+D+S	
Location of maximum on span	=	4.000ft		Location of maximum on span	=	4.000 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
<b>Maximum Deflection</b>							
Max Downward Transient Deflection		0.009 in	Ratio =	<b>7601</b>	>=360	Span: 2 : S Only	
Max Upward Transient Deflection		-0.005 in	Ratio =	<b>4676</b>	>=360	Span: 3 : S Only	
Max Downward Total Deflection		0.017 in	Ratio =	<b>4223</b>	>=240	Span: 2 : +D+S	
Max Upward Total Deflection		-0.009 in	Ratio =	<b>2598</b>	>=240	Span: 3 : +D+S	

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
D Only																			
	Length = 4.0 ft	1	0.126	0.099	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.13	122.4	972.0	0.12	16.1	162.0	
	Length = 6.0 ft	2	0.126	0.099	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.13	122.4	972.0	0.12	16.1	162.0	
	Length = 1.0 ft	3	0.019	0.099	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.02	18.3	972.0	0.02	16.1	162.0	
+D+Lr																			
	Length = 4.0 ft	1	0.181	0.143	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.27	244.7	1,350.0	0.23	32.2	225.0	



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: J5**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v
	Length = 6.0 ft	2	0.181	0.143	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.27	244.7	1,350.0	0.23	32.2	225.0
	Length = 1.0 ft	3	0.027	0.143	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.04	36.5	1,350.0	0.03	32.2	225.0
+D+S															0.0	0.00	0.0	0.0
	Length = 4.0 ft	1	0.222	0.175	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.30	275.3	1,242.0	0.26	36.3	207.0
	Length = 6.0 ft	2	0.222	0.175	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.30	275.3	1,242.0	0.26	36.3	207.0
	Length = 1.0 ft	3	0.033	0.175	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.04	41.1	1,242.0	0.04	36.3	207.0
+D+0.750Lr															0.0	0.00	0.0	0.0
	Length = 4.0 ft	1	0.159	0.125	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.23	214.1	1,350.0	0.20	28.2	225.0
	Length = 6.0 ft	2	0.159	0.125	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.23	214.1	1,350.0	0.20	28.2	225.0
	Length = 1.0 ft	3	0.024	0.125	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.03	32.0	1,350.0	0.03	28.2	225.0
+D+0.750S															0.0	0.00	0.0	0.0
	Length = 4.0 ft	1	0.191	0.151	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.26	237.1	1,242.0	0.23	31.2	207.0
	Length = 6.0 ft	2	0.191	0.151	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.26	237.1	1,242.0	0.23	31.2	207.0
	Length = 1.0 ft	3	0.028	0.151	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.04	35.4	1,242.0	0.03	31.2	207.0
+0.60D															0.0	0.00	0.0	0.0
	Length = 4.0 ft	1	0.042	0.034	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.08	73.4	1,728.0	0.07	9.7	288.0
	Length = 6.0 ft	2	0.042	0.034	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.08	73.4	1,728.0	0.07	9.7	288.0
	Length = 1.0 ft	3	0.006	0.034	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.01	11.0	1,728.0	0.01	9.7	288.0

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0006	1.042	+D+S	-0.0012	3.261
+D+S	2	0.0170	3.277		0.0000	3.261
	3	0.0000	3.277	+D+S	-0.0092	1.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions	0.105	0.568	0.317	
Max Upward from Load Combinations	0.105	0.568	0.317	
Max Upward from Load Cases	0.058	0.316	0.176	
D Only	0.047	0.252	0.141	
+D+Lr	0.093	0.505	0.282	
+D+S	0.105	0.568	0.317	
+D+0.750Lr	0.081	0.442	0.247	
+D+0.750S	0.090	0.489	0.273	
+0.60D	0.028	0.151	0.085	
Lr Only	0.047	0.252	0.141	
S Only	0.058	0.316	0.176	





Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B1**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F <sup>b</sup>	V	f <sub>v</sub>	F <sup>v</sup>
Length = 16.0 ft	1	0.656	0.360	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	23.48	1,809.9	2,760.0	5.06	109.6	304.8	
+0.60D														0.0	0.00	0.0	0.0	
Length = 16.0 ft	1	0.160	0.088	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.97	614.2	3,840.0	1.72	37.2	424.0	

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.6587	8.058		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	6.720	6.720
Max Upward from Load Combinations	6.720	6.720
Max Upward from Load Cases	3.400	3.400
D Only	3.320	3.320
+D+Lr	6.040	6.040
+D+S	6.720	6.720
+D+0.750Lr	5.360	5.360
+D+0.750S	5.870	5.870
+0.60D	1.992	1.992
Lr Only	2.720	2.720
S Only	3.400	3.400

## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2

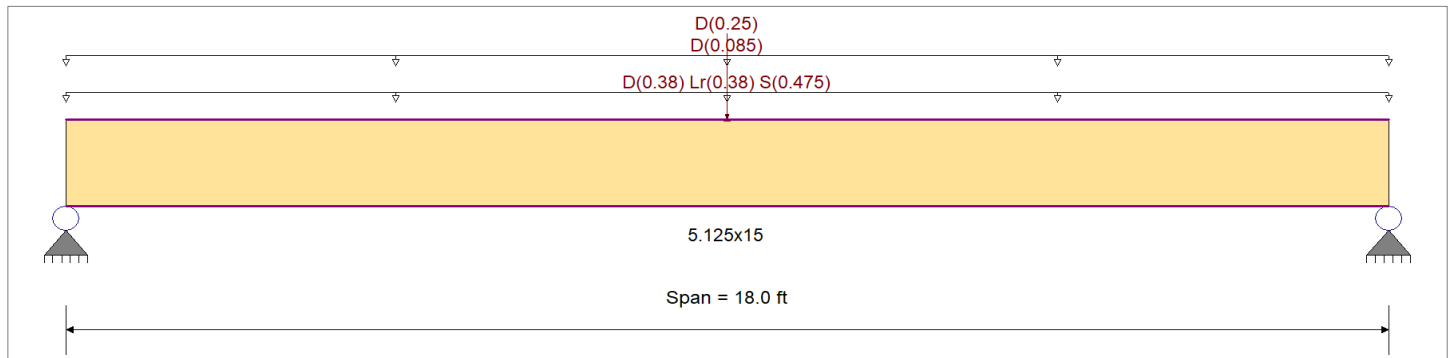
### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,400.0 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx
	Fc - Prll	1,650.0 psi	Eminbend - xx
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy
Wood Grade : 24F-V4	Fv	265.0 psi	Eminbend - yy
	Ft	1,100.0 psi	Density
			31.210pcf

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading  
 Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 19.0 ft  
 Uniform Load : D = 0.010 ksf, Tributary Width = 8.50 ft  
 Point Load : D = 0.250 k @ 9.0 ft, (Assumed Mech Unit Load)

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.908</b> : 1	Maximum Shear Stress Ratio	=	<b>0.483</b> : 1
Section used for this span		<b>5.125x15</b>	Section used for this span		<b>5.125x15</b>
fb: Actual	=	2,489.43psi	fv: Actual	=	147.14 psi
F'b	=	2,741.02psi	F'v	=	304.75 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	9.000ft	Location of maximum on span	=	16.752 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.435 in	Ratio =	<b>496</b> >=360	Span: 1 : S Only
Max Upward Transient Deflection		0 in	Ratio =	<b>0</b> <360	n/a
Max Downward Total Deflection		0.896 in	Ratio =	<b>240</b> >=240	Span: 1 : +D+S
Max Upward Total Deflection		0 in	Ratio =	<b>0</b> <240	n/a

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
D Only	Length = 18.0 ft	1	0.601	0.316	0.90	1.00	1.00	1.00	0.993	1.00	1.00	1.00	20.63	1,288.3	2,145.1	0.0	0.00	0.0	0.0
+D+Lr	Length = 18.0 ft	1	0.755	0.401	1.25	1.00	1.00	1.00	0.993	1.00	1.00	1.00	36.02	2,249.2	2,979.4	0.0	0.00	0.0	0.0
+D+S	Length = 18.0 ft	1	0.908	0.483	1.15	1.00	1.00	1.00	0.993	1.00	1.00	1.00	39.87	2,489.4	2,741.0	0.0	0.00	0.0	0.0
+D+0.750Lr	Length = 18.0 ft	1	0.674	0.357	1.25	1.00	1.00	1.00	0.993	1.00	1.00	1.00	32.17	2,009.0	2,979.4	0.0	0.00	0.0	0.0
+D+0.750S	Length = 18.0 ft	1				1.00	1.00	1.00	0.993	1.00	1.00	1.00			0.0	0.00	0.0	0.0	



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B2**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F <sup>b</sup>	V	f <sub>v</sub>	F <sup>v</sup>
Length = 18.0 ft	1		0.799	0.424	1.15	1.00	1.00	1.00	0.993	1.00	1.00	1.00	35.06	2,189.1	2,741.0	6.62	129.2	304.8
+0.60D						1.00	1.00	1.00	0.993	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1		0.203	0.107	1.60	1.00	1.00	1.00	0.993	1.00	1.00	1.00	12.38	773.0	3,813.6	2.32	45.2	424.0

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.8963	9.066		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.735	8.735
Max Upward from Load Combinations	8.735	8.735
Max Upward from Load Cases	4.460	4.460
D Only	4.460	4.460
+D+Lr	7.880	7.880
+D+S	8.735	8.735
+D+0.750Lr	7.025	7.025
+D+0.750S	7.666	7.666
+0.60D	2.676	2.676
Lr Only	3.420	3.420
S Only	4.275	4.275







Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B3**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v
Length = 23.0 ft	1		0.680	0.335	1.15	1.00	1.00	1.00	0.952	1.00	1.00	1.00	41.16	1,784.8	2,626.3	6.27	102.0	304.8
+0.60D						1.00	1.00	1.00	0.952	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 23.0 ft	1		0.169	0.083	1.60	1.00	1.00	1.00	0.952	1.00	1.00	1.00	14.28	619.3	3,654.0	2.18	35.4	424.0

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	1.0029	11.584		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.165	8.165
Max Upward from Load Combinations	8.165	8.165
Max Upward from Load Cases	4.140	4.140
D Only	4.140	4.140
+D+Lr	7.360	7.360
+D+S	8.165	8.165
+D+0.750Lr	6.555	6.555
+D+0.750S	7.159	7.159
+0.60D	2.484	2.484
Lr Only	3.220	3.220
S Only	4.025	4.025

## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

DESCRIPTION: B4

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combination Set : ASCE 7-16

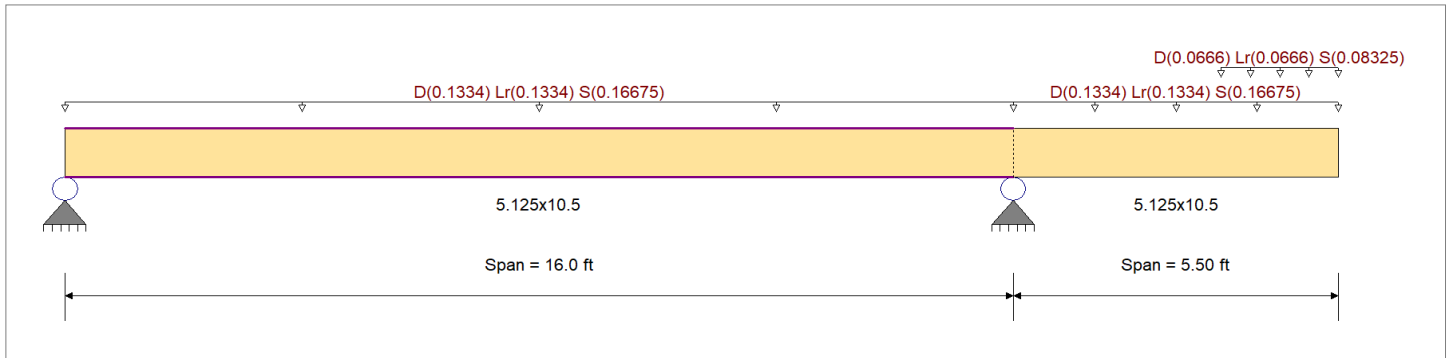
### Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,400.0 psi	<i>E : Modulus of Elasticity</i>
Load Combination : ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx
	Fc - Prll	1,650.0 psi	Eminbend - xx
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy
Wood Grade : 24F-V4	Fv	265.0 psi	Eminbend - yy
	Ft	1,100.0 psi	Density
			31.210pcf

Beam Bracing : Beam bracing is defined Beam-by-Beam

### Unbraced Lengths

Span # 1, Fully Braced  
 Span # 2, Defined Brace Locations, First Brace at ft, Second Brace at ft, Third Brace at ft



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 6.670 ft

Load for Span Number 2

Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 6.670 ft

Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Extent = 3.50 --> 5.50 ft, Tributary Width = 3.330 ft

### DESIGN SUMMARY

**Design OK**

<b>Maximum Bending Stress Ratio</b>	=	<b>0.365</b>	1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.240</b>	: 1
Section used for this span		<b>5.125x10.5</b>		Section used for this span		<b>5.125x10.5</b>	
fb: Actual	=	772.82psi		fv: Actual	=	73.11 psi	
F'b	=	2,115.63psi		F'v	=	304.75 psi	
Load Combination		+D+S+H		Load Combination		+D+S+H	
Location of maximum on span	=	0.000ft		Location of maximum on span	=	15.196 ft	
Span # where maximum occurs	=	Span # 2		Span # where maximum occurs	=	Span # 1	
<b>Maximum Deflection</b>							
Max Downward Transient Deflection		0.189 in	Ratio =	698	>=	360	Span: 2 : Lr Only, LL Comb Run (*L)
Max Upward Transient Deflection		-0.243 in	Ratio =	542	>=	360	Span: 2 : Lr Only, LL Comb Run (L*)
Max Downward Total Deflection		0.379 in	Ratio =	507	>=	240	Span: 2 : +D+Lr+H, LL Comb Run (*L)
Max Upward Total Deflection		-0.306 in	Ratio =	430	>=	240	Span: 2 : +D+Lr+H, LL Comb Run (L*)

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
+D+H																0.0	0.00	0.0	0.0
	Length = 16.0 ft	1	0.198	0.142	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.35	426.9	2,160.0	1.22	34.0	238.5	
	Length = 5.50 ft	2	0.215	0.142	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.79	356.0	1,657.9	0.81	34.0	238.5	
+D+L+H, LL Comb Run (*L)						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0	



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B4**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv
Length = 16.0 ft	1	0.178	0.128	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.35	426.9	2,400.0	1.22	34.0	265.0
Length = 5.50 ft	2	0.193	0.128	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.79	356.0	1,841.1	0.81	34.0	265.0
+D+L+H, LL Comb Run (L*)						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.178	0.128	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.35	426.9	2,400.0	1.22	34.0	265.0
Length = 5.50 ft	2	0.193	0.128	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.79	356.0	1,841.1	0.81	34.0	265.0
+D+L+H, LL Comb Run (LL)						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.178	0.128	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.35	426.9	2,400.0	1.22	34.0	265.0
Length = 5.50 ft	2	0.193	0.128	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.79	356.0	1,841.1	0.81	34.0	265.0
+D+Lr+H, LL Comb Run (*L)						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.298	0.131	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.41	689.4	2,312.5	1.56	43.4	331.3
Length = 5.50 ft	2	0.300	0.131	1.25	1.00	1.00	0.99	1.000	1.00	1.00	1.00	5.41	689.4	2,298.4	1.56	43.4	331.3
+D+Lr+H, LL Comb Run (L*)						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.321	0.183	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.57	964.4	3,000.0	2.18	60.7	331.3
Length = 5.50 ft	2	0.155	0.183	1.25	1.00	1.00	0.99	1.000	1.00	1.00	1.00	2.79	356.0	2,298.4	0.81	60.7	331.3
+D+Lr+H, LL Comb Run (LL)						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.272	0.197	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.41	816.9	3,000.0	2.34	65.3	331.3
Length = 5.50 ft	2	0.300	0.197	1.25	1.00	1.00	0.99	1.000	1.00	1.00	1.00	5.41	689.4	2,298.4	1.56	65.3	331.3
+D+S+H						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.331	0.240	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.18	914.4	2,760.0	2.62	73.1	304.8
Length = 5.50 ft	2	0.365	0.240	1.15	1.00	1.00	0.99	1.000	1.00	1.00	1.00	6.06	772.8	2,115.6	1.75	73.1	304.8
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.262	0.115	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.76	606.1	2,312.5	1.37	38.2	331.3
Length = 5.50 ft	2	0.264	0.115	1.25	1.00	1.00	0.99	1.000	1.00	1.00	1.00	4.76	606.1	2,298.4	1.37	38.2	331.3
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.276	0.163	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.51	829.4	3,000.0	1.94	54.0	331.3
Length = 5.50 ft	2	0.155	0.163	1.25	1.00	1.00	0.99	1.000	1.00	1.00	1.00	2.79	356.0	2,298.4	0.81	54.0	331.3
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.240	0.173	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.65	719.4	3,000.0	2.06	57.4	331.3
Length = 5.50 ft	2	0.264	0.173	1.25	1.00	1.00	0.99	1.000	1.00	1.00	1.00	4.76	606.1	2,298.4	1.37	57.4	331.3
+D+0.750L+0.750S+H, LL Co						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.287	0.208	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	2,760.0	2.27	63.3	304.8
Length = 5.50 ft	2	0.316	0.208	1.15	1.00	1.00	0.99	1.000	1.00	1.00	1.00	5.25	668.6	2,115.6	1.51	63.3	304.8
+D+0.750L+0.750S+H, LL Co						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.287	0.208	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	2,760.0	2.27	63.3	304.8
Length = 5.50 ft	2	0.316	0.208	1.15	1.00	1.00	0.99	1.000	1.00	1.00	1.00	5.25	668.6	2,115.6	1.51	63.3	304.8
+D+0.750L+0.750S+H, LL Co						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.287	0.208	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	2,760.0	2.27	63.3	304.8
Length = 5.50 ft	2	0.316	0.208	1.15	1.00	1.00	0.99	1.000	1.00	1.00	1.00	5.25	668.6	2,115.6	1.51	63.3	304.8
+D+0.60W+H						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.111	0.080	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.35	426.9	3,840.0	1.22	34.0	424.0
Length = 5.50 ft	2	0.121	0.080	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	2.79	356.0	2,936.1	0.81	34.0	424.0
+D+0.750Lr+0.750L+0.450W-						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.205	0.090	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.76	606.1	2,960.0	1.37	38.2	424.0
Length = 5.50 ft	2	0.206	0.090	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	4.76	606.1	2,936.1	1.37	38.2	424.0
+D+0.750Lr+0.750L+0.450W-						1.00	1.00	0.99	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.216	0.127	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.51	829.4	3,840.0	1.94	54.0	424.0
Length = 5.50 ft	2	0.121	0.127	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	2.79	356.0	2,936.1	0.81	54.0	424.0



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B4**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Max Stress Ratios											Moment Values			Shear Values			
	Segment Length	Span #	M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v
+D+0.750Lr+0.750L+0.450W-						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.187	0.135	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.65	719.4	3,840.0	2.06	57.4	424.0
Length = 5.50 ft	2	0.206	0.135	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	4.76	606.1	2,936.1	1.37	57.4	424.0
+D+0.750L+0.750S+0.450W+						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.206	0.149	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	3,840.0	2.27	63.3	424.0
Length = 5.50 ft	2	0.228	0.149	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	5.25	668.6	2,936.1	1.51	63.3	424.0
+D+0.750L+0.750S+0.450W+						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.206	0.149	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	3,840.0	2.27	63.3	424.0
Length = 5.50 ft	2	0.228	0.149	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	5.25	668.6	2,936.1	1.51	63.3	424.0
+D+0.750L+0.750S+0.450W+						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.206	0.149	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	3,840.0	2.27	63.3	424.0
Length = 5.50 ft	2	0.228	0.149	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	5.25	668.6	2,936.1	1.51	63.3	424.0
+0.60D+0.60W+0.60H						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.067	0.048	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.01	256.2	3,840.0	0.73	20.4	424.0
Length = 5.50 ft	2	0.073	0.048	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	1.68	213.6	2,936.1	0.48	20.4	424.0
+D+0.70E+0.60H						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.111	0.080	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.35	426.9	3,840.0	1.22	34.0	424.0
Length = 5.50 ft	2	0.121	0.080	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	2.79	356.0	2,936.1	0.81	34.0	424.0
+D+0.750L+0.750S+0.5250E-						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.206	0.149	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	3,840.0	2.27	63.3	424.0
Length = 5.50 ft	2	0.228	0.149	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	5.25	668.6	2,936.1	1.51	63.3	424.0
+D+0.750L+0.750S+0.5250E-						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.206	0.149	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	3,840.0	2.27	63.3	424.0
Length = 5.50 ft	2	0.228	0.149	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	5.25	668.6	2,936.1	1.51	63.3	424.0
+D+0.750L+0.750S+0.5250E-						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.206	0.149	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.22	792.5	3,840.0	2.27	63.3	424.0
Length = 5.50 ft	2	0.228	0.149	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	5.25	668.6	2,936.1	1.51	63.3	424.0
+0.60D+0.70E+H						1.00	1.00	0.99	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.067	0.048	1.60	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.01	256.2	3,840.0	0.73	20.4	424.0
Length = 5.50 ft	2	0.073	0.048	1.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	1.00	1.68	213.6	2,936.1	0.48	20.4	424.0

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H, LL Comb Run (L*)	1	0.3785	7.777	+D+Lr+H, LL Comb Run (L*)	0.0000	0.000
	2	0.0000	7.777		-0.3059	5.500

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	2.115	4.888	
Max Upward from Load Combinations	2.115	4.888	
Max Upward from Load Cases	1.130	2.622	
Max Downward from all Load Conditions	-0.164		
Max Downward from Load Cases (Resis)	-0.164		
+D+H	0.986	2.266	
+D+L+H, LL Comb Run (*L)	0.986	2.266	
+D+L+H, LL Comb Run (L*)	0.986	2.266	
+D+L+H, LL Comb Run (LL)	0.986	2.266	
+D+Lr+H, LL Comb Run (*L)	0.822	3.297	
+D+Lr+H, LL Comb Run (L*)	2.053	3.333	
+D+Lr+H, LL Comb Run (LL)	1.890	4.364	
+D+S+H	2.115	4.888	
+D+0.750Lr+0.750L+H, LL Comb Run (*)	0.863	3.039	



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B4**

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
+D+0.750Lr+0.750L+H, LL Comb Run (L	1.786	3.067	
+D+0.750Lr+0.750L+H, LL Comb Run (L	1.664	3.839	
+D+0.750L+0.750S+H, LL Comb Run (*L	1.833	4.233	
+D+0.750L+0.750S+H, LL Comb Run (L*	1.833	4.233	
+D+0.750L+0.750S+H, LL Comb Run (LL	1.833	4.233	
+D+0.60W+H	0.986	2.266	
+D+0.750Lr+0.750L+0.450W+H, LL Comb	0.863	3.039	
+D+0.750Lr+0.750L+0.450W+H, LL Comb	1.786	3.067	
+D+0.750Lr+0.750L+0.450W+H, LL Comb	1.664	3.839	
+D+0.750L+0.750S+0.450W+H, LL Comb	1.833	4.233	
+D+0.750L+0.750S+0.450W+H, LL Comb	1.833	4.233	
+D+0.750L+0.750S+0.450W+H, LL Comb	1.833	4.233	
+0.60D+0.60W+0.60H	0.592	1.360	
+D+0.70E+0.60H	0.986	2.266	
+D+0.750L+0.750S+0.5250E+H, LL Comb	1.833	4.233	
+D+0.750L+0.750S+0.5250E+H, LL Comb	1.833	4.233	
+D+0.750L+0.750S+0.5250E+H, LL Comb	1.833	4.233	
+0.60D+0.70E+H	0.592	1.360	
D Only	0.986	2.266	
Lr Only, LL Comb Run (*L)	-0.164	1.030	
Lr Only, LL Comb Run (L*)	1.067	1.067	
Lr Only, LL Comb Run (LL)	0.904	2.098	
S Only	1.130	2.622	
H Only			





Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B5**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F <sup>b</sup>	V	f <sub>v</sub>	F <sup>v</sup>
Length = 8.750 ft	1		0.456	0.293	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.16	708.6	1,552.5	2.42	57.3	195.5
+0.60D															0.0	0.00	0.0	0.0
Length = 8.750 ft	1		0.118	0.073	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.57	254.6	2,160.0	0.83	19.8	272.0

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0981	4.407		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	3.460	3.460
Max Upward from Load Combinations	3.460	3.460
Max Upward from Load Cases	1.750	1.750
D Only	1.710	1.710
+D+Lr	3.110	3.110
+D+S	3.460	3.460
+D+0.750Lr	2.760	2.760
+D+0.750S	3.022	3.022
+0.60D	1.026	1.026
Lr Only	1.400	1.400
S Only	1.750	1.750



## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

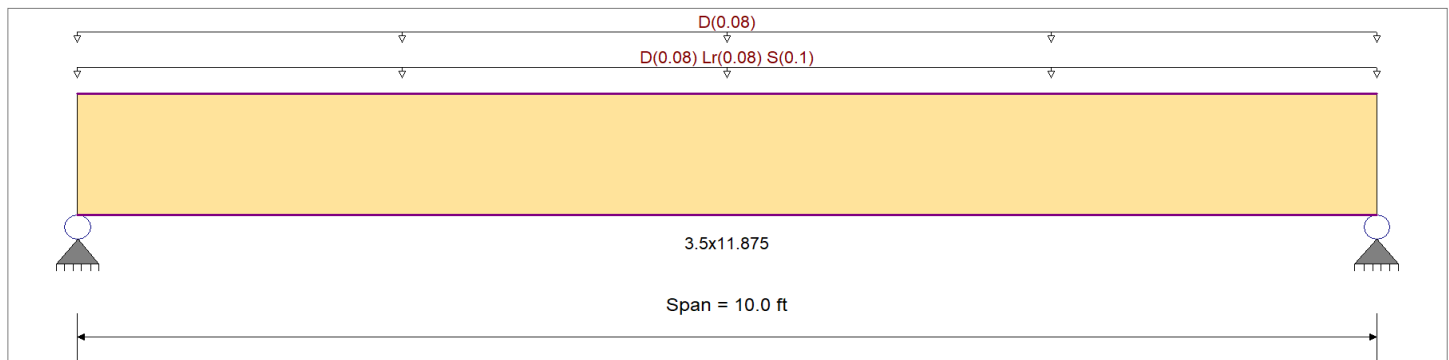
DESCRIPTION: B6

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combination Set : ASCE 7-16

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	1700 psi	E : Modulus of Elasticity
Load Combination : ASCE 7-16	Fb -	1700 psi	Ebend- xx
	Fc - Prll	1400 psi	Eminbend - xx
Wood Species : iLevel Truss Joist	Fc - Perp	680 psi	
Wood Grade : TimberStrand LSL 1.3E - Beam/Col	Fv	400 psi	
	Ft	1075 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			45.01 pcf



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading  
 Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 4.0 ft  
 Uniform Load : D = 0.010 ksf, Tributary Width = 8.0 ft

### DESIGN SUMMARY

**Design OK**

<b>Maximum Bending Stress Ratio</b>	=	<b>0.254</b> : 1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.086</b> : 1
Section used for this span	=	<b>3.5x11.875</b>	Section used for this span	=	<b>3.5x11.875</b>
fb: Actual	=	497.80psi	fv: Actual	=	39.55 psi
F'b	=	1,957.27psi	F'v	=	460.00 psi
Load Combination	=	+D+S	Load Combination	=	+D+S
Location of maximum on span	=	5.000ft	Location of maximum on span	=	0.000ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection	0.036 in	Ratio = 3366 >=360	Span: 1 : S Only		
Max Upward Transient Deflection	0 in	Ratio = 0 <360	n/a		
Max Downward Total Deflection	0.097 in	Ratio = 1233 >=240	Span: 1 : +D+S		
Max Upward Total Deflection	0 in	Ratio = 0 <240	n/a		

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v		
D Only																				
Length = 10.0 ft	1	0.206	0.070	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.16	315.5	1,531.8	0.0	0.00	0.0	0.0	0.0	360.0
+D+Lr																				
Length = 10.0 ft	1	0.217	0.073	1.25	1.00	1.00	1.00	1.001	1.00	1.00	1.00	3.16	461.3	2,127.5	0.0	0.00	0.0	0.0	0.0	500.0
+D+S																				
Length = 10.0 ft	1	0.254	0.086	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	3.41	497.8	1,957.3	0.0	0.00	0.0	0.0	0.0	460.0
+D+0.750Lr																				
Length = 10.0 ft	1	0.200	0.068	1.25	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.91	424.9	2,127.5	0.0	0.00	0.0	0.0	0.0	500.0
+D+0.750S																				
Length = 10.0 ft	1				1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0	0.0	0.0	0.0



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

DESCRIPTION: B6

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F <sup>b</sup>	V	f <sub>v</sub>	F <sup>v</sup>	
Length = 10.0 ft	1		0.231	0.078	1.15	1.00	1.00	1.00	1.001	1.00	1.00	1.00	3.10	452.2	1,957.3	1.00	35.9	460.0	
+0.60D									1.00	1.00	1.00	1.001	1.00	1.00	1.00		0.0	0.0	0.0
Length = 10.0 ft	1		0.070	0.023	1.60	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.30	189.3	2,723.2	0.42	15.0	640.0	

### Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0973	5.036		0.0000	0.000

### Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.365	1.365
Max Upward from Load Combinations	1.365	1.365
Max Upward from Load Cases	0.865	0.865
D Only	0.865	0.865
+D+Lr	1.265	1.265
+D+S	1.365	1.365
+D+0.750Lr	1.165	1.165
+D+0.750S	1.240	1.240
+0.60D	0.519	0.519
Lr Only	0.400	0.400
S Only	0.500	0.500

## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

DESCRIPTION: B7

### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combination Set : ASCE 7-16

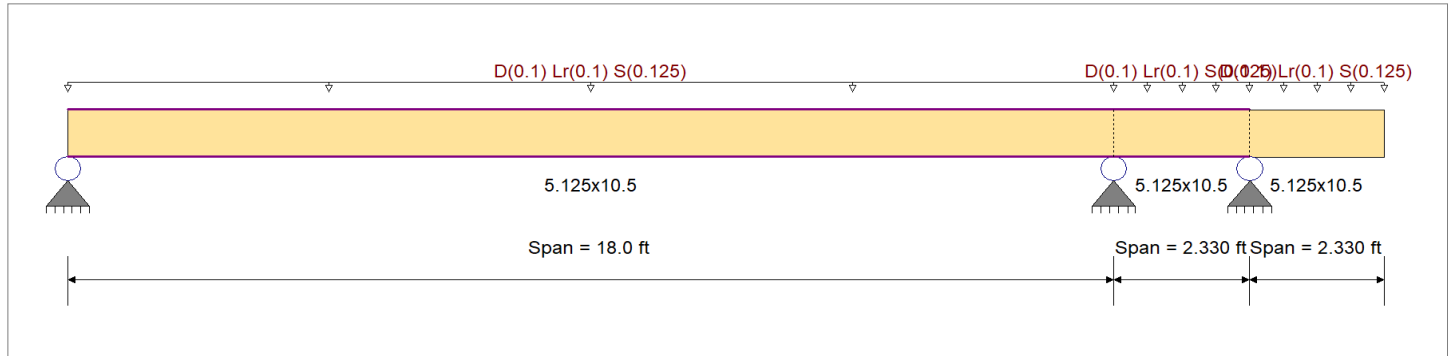
### Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,400.0 psi	<i>E : Modulus of Elasticity</i>
Load Combination : ASCE 7-16	Fb -	1,850.0 psi	Ebend- xx
	Fc - Prll	1,650.0 psi	Eminbend - xx
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy
Wood Grade : 24F-V4	Fv	265.0 psi	Eminbend - yy
	Ft	1,100.0 psi	Density
			31.210pcf

Beam Bracing : Beam bracing is defined Beam-by-Beam

### Unbraced Lengths

Span # 1, Fully Braced  
 Span # 2, Fully Braced  
 Span # 3, Defined Brace Locations, First Brace at ft, Second Brace at ft, Third Brace at ft



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading  
 Load for Span Number 1  
 Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 5.0 ft  
 Load for Span Number 2  
 Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 5.0 ft  
 Load for Span Number 3  
 Uniform Load : D = 0.020, Lr = 0.020, S = 0.0250 ksf, Tributary Width = 5.0 ft

### DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio	=	<b>0.507</b> : 1	Maximum Shear Stress Ratio	=	<b>0.314</b> : 1
Section used for this span	=	<b>5.125x10.5</b>	Section used for this span	=	<b>5.125x10.5</b>
fb: Actual	=	1,079.04psi	fv: Actual	=	95.62 psi
F'b	=	2,127.50psi	F'v	=	304.75 psi
Load Combination	=	+D+S+H	Load Combination	=	+D+S+H
Location of maximum on span	=	18.000ft	Location of maximum on span	=	18.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection		0.162 in	Ratio =	<b>1332</b> >=360	Span: 3 : S Only
Max Upward Transient Deflection		-0.003 in	Ratio =	<b>8712</b> >=360	Span: 3 : Lr Only, LL Comb Run (*L*)
Max Downward Total Deflection		0.307 in	Ratio =	<b>703</b> >=240	Span: 3 : +D+S+H
Max Upward Total Deflection		-0.006 in	Ratio =	<b>4601</b> >=240	Span: 2 : +D+S+H

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v	
+D+H																			
	Length = 18.0 ft	1	0.306	0.189	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,665.0	0.0	0.00	0.0	238.5
	Length = 2.330 ft	2	0.306	0.189	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,665.0	1.62	45.1	238.5	238.5



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B7**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv
Length = 2.330 ft	3	0.023	0.189	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	1,662.1	0.16	45.1	238.5
+D+L+H, LL Comb Run (**L)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	2	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	3	0.021	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	1,846.4	0.16	45.1	265.0
+D+L+H, LL Comb Run (*L*)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	2	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	3	0.021	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	1,846.4	0.16	45.1	265.0
+D+L+H, LL Comb Run (*LL)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	2	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	3	0.021	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	1,846.4	0.16	45.1	265.0
+D+L+H, LL Comb Run (L**)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	2	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	3	0.021	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	1,846.4	0.16	45.1	265.0
+D+L+H, LL Comb Run (L*L)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	2	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	3	0.021	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	1,846.4	0.16	45.1	265.0
+D+L+H, LL Comb Run (LL*)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	2	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	3	0.021	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	1,846.4	0.16	45.1	265.0
+D+L+H, LL Comb Run (LLL)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	2	0.275	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	1,850.0	1.62	45.1	265.0
Length = 2.330 ft	3	0.021	0.170	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	1,846.4	0.16	45.1	265.0
+D+Lr+H, LL Comb Run (**L)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.219	0.126	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.98	507.1	2,312.5	1.50	41.7	331.3
Length = 2.330 ft	2	0.219	0.126	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.98	507.1	2,312.5	1.50	41.7	331.3
Length = 2.330 ft	3	0.032	0.126	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.57	73.2	2,306.9	0.31	41.7	331.3
+D+Lr+H, LL Comb Run (*L*)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.221	0.139	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	510.1	2,312.5	1.65	46.1	331.3
Length = 2.330 ft	2	0.221	0.139	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	510.1	2,312.5	1.65	46.1	331.3
Length = 2.330 ft	3	0.017	0.139	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,306.9	0.16	46.1	331.3
+D+Lr+H, LL Comb Run (*LL)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.220	0.129	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.99	508.1	2,312.5	1.53	42.6	331.3
Length = 2.330 ft	2	0.220	0.129	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.99	508.1	2,312.5	1.53	42.6	331.3
Length = 2.330 ft	3	0.032	0.129	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.57	73.2	2,306.9	0.31	42.6	331.3
+D+Lr+H, LL Comb Run (L**)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.418	0.266	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.58	966.0	2,312.5	3.16	88.0	331.3
Length = 2.330 ft	2	0.418	0.266	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.58	966.0	2,312.5	3.16	88.0	331.3
Length = 2.330 ft	3	0.017	0.266	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,306.9	0.16	88.0	331.3
+D+Lr+H, LL Comb Run (L*L)									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.417	0.255	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.57	964.1	2,312.5	3.03	84.6	331.3



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B7**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv
Length = 2.330 ft	2	0.417	0.255	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.57	964.1	2,312.5	3.03	84.6	331.3
Length = 2.330 ft	3	0.032	0.255	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.57	73.2	2,306.9	0.31	84.6	331.3
+D+Lr+H, LL Comb Run (LL*)						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.418	0.269	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.59	967.0	2,312.5	3.19	89.0	331.3
Length = 2.330 ft	2	0.418	0.269	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.59	967.0	2,312.5	3.19	89.0	331.3
Length = 2.330 ft	3	0.017	0.269	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,306.9	0.16	89.0	331.3
+D+Lr+H, LL Comb Run (LLL')						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.417	0.258	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.57	965.1	2,312.5	3.07	85.5	331.3
Length = 2.330 ft	2	0.417	0.258	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.57	965.1	2,312.5	3.07	85.5	331.3
Length = 2.330 ft	3	0.032	0.258	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.57	73.2	2,306.9	0.31	85.5	331.3
+D+S+H						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.507	0.314	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	8.47	1,079.0	2,127.5	3.43	95.6	304.8
Length = 2.330 ft	2	0.507	0.314	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	8.47	1,079.0	2,127.5	3.43	95.6	304.8
Length = 2.330 ft	3	0.039	0.314	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.64	81.9	2,122.7	0.35	95.6	304.8
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.220	0.128	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.98	507.6	2,312.5	1.53	42.5	331.3
Length = 2.330 ft	2	0.220	0.128	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.98	507.6	2,312.5	1.53	42.5	331.3
Length = 2.330 ft	3	0.028	0.128	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.51	64.6	2,306.9	0.27	42.5	331.3
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.220	0.138	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.9	2,312.5	1.64	45.8	331.3
Length = 2.330 ft	2	0.220	0.138	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.9	2,312.5	1.64	45.8	331.3
Length = 2.330 ft	3	0.017	0.138	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,306.9	0.16	45.8	331.3
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.220	0.131	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.99	508.4	2,312.5	1.55	43.2	331.3
Length = 2.330 ft	2	0.220	0.131	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.99	508.4	2,312.5	1.55	43.2	331.3
Length = 2.330 ft	3	0.028	0.131	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.51	64.6	2,306.9	0.27	43.2	331.3
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.368	0.233	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.68	851.8	2,312.5	2.77	77.3	331.3
Length = 2.330 ft	2	0.368	0.233	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.68	851.8	2,312.5	2.77	77.3	331.3
Length = 2.330 ft	3	0.017	0.233	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,306.9	0.16	77.3	331.3
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.368	0.226	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.67	850.3	2,312.5	2.68	74.7	331.3
Length = 2.330 ft	2	0.368	0.226	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.67	850.3	2,312.5	2.68	74.7	331.3
Length = 2.330 ft	3	0.028	0.226	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.51	64.6	2,306.9	0.27	74.7	331.3
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.369	0.235	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.69	852.6	2,312.5	2.80	78.0	331.3
Length = 2.330 ft	2	0.369	0.235	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.69	852.6	2,312.5	2.80	78.0	331.3
Length = 2.330 ft	3	0.017	0.235	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,306.9	0.16	78.0	331.3
+D+0.750Lr+0.750L+H, LL Cc						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.368	0.228	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.68	851.1	2,312.5	2.71	75.4	331.3
Length = 2.330 ft	2	0.368	0.228	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.68	851.1	2,312.5	2.71	75.4	331.3
Length = 2.330 ft	3	0.028	0.228	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.51	64.6	2,306.9	0.27	75.4	331.3
+D+0.750L+0.750S+H, LL Co						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	2	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	3	0.033	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,122.7	0.30	83.0	304.8
+D+0.750L+0.750S+H, LL Co						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B7**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values		
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv
Length = 18.0 ft	1	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	2	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	3	0.033	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,122.7	0.30	83.0	304.8
+D+0.750L+0.750S+H, LL Co									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	2	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	3	0.033	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,122.7	0.30	83.0	304.8
+D+0.750L+0.750S+H, LL Co									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	2	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	3	0.033	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,122.7	0.30	83.0	304.8
+D+0.750L+0.750S+H, LL Co									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	2	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	3	0.033	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,122.7	0.30	83.0	304.8
+D+0.750L+0.750S+H, LL Co									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	2	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	3	0.033	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,122.7	0.30	83.0	304.8
+D+0.750L+0.750S+H, LL Co									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	2	0.440	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,127.5	2.98	83.0	304.8
Length = 2.330 ft	3	0.033	0.272	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,122.7	0.30	83.0	304.8
+D+0.750L+0.750S+H, LL Co									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.172	0.106	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	2,960.0	1.62	45.1	424.0
Length = 2.330 ft	2	0.172	0.106	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	2,960.0	1.62	45.1	424.0
Length = 2.330 ft	3	0.013	0.106	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,950.7	0.16	45.1	424.0
+D+0.750Lr+0.750L+0.450W-									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.171	0.100	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.98	507.6	2,960.0	1.53	42.5	424.0
Length = 2.330 ft	2	0.171	0.100	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.98	507.6	2,960.0	1.53	42.5	424.0
Length = 2.330 ft	3	0.022	0.100	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.51	64.6	2,950.7	0.27	42.5	424.0
+D+0.750Lr+0.750L+0.450W-									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.172	0.108	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.9	2,960.0	1.64	45.8	424.0
Length = 2.330 ft	2	0.172	0.108	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.9	2,960.0	1.64	45.8	424.0
Length = 2.330 ft	3	0.013	0.108	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,950.7	0.16	45.8	424.0
+D+0.750Lr+0.750L+0.450W-									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.172	0.102	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.99	508.4	2,960.0	1.55	43.2	424.0
Length = 2.330 ft	2	0.172	0.102	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.99	508.4	2,960.0	1.55	43.2	424.0
Length = 2.330 ft	3	0.022	0.102	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.51	64.6	2,950.7	0.27	43.2	424.0
+D+0.750Lr+0.750L+0.450W-									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.288	0.182	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.68	851.8	2,960.0	2.77	77.3	424.0
Length = 2.330 ft	2	0.288	0.182	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.68	851.8	2,960.0	2.77	77.3	424.0
Length = 2.330 ft	3	0.013	0.182	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,950.7	0.16	77.3	424.0
+D+0.750Lr+0.750L+0.450W-									1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.287	0.176	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.67	850.3	2,960.0	2.68	74.7	424.0
Length = 2.330 ft	2	0.287	0.176	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.67	850.3	2,960.0	2.68	74.7	424.0
Length = 2.330 ft	3	0.022	0.176	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.51	64.6	2,950.7	0.27	74.7	424.0



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B7**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v
+D+0.750Lr+0.750L+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.0 ft	1	0.288	0.184	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.69	852.6	2,960.0	2.80	78.0	424.0	
Length = 2.330 ft	2	0.288	0.184	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.69	852.6	2,960.0	2.80	78.0	424.0	
Length = 2.330 ft	3	0.013	0.184	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,950.7	0.16	78.0	424.0	
+D+0.750Lr+0.750L+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.288	0.178	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.68	851.1	2,960.0	2.71	75.4	424.0	
Length = 2.330 ft	2	0.288	0.178	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.68	851.1	2,960.0	2.71	75.4	424.0	
Length = 2.330 ft	3	0.022	0.178	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.51	64.6	2,950.7	0.27	75.4	424.0	
+D+0.750L+0.750S+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0	
+D+0.750L+0.750S+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0	
+D+0.750L+0.750S+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0	
+D+0.750L+0.750S+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0	
+D+0.750L+0.750S+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0	
+D+0.750L+0.750S+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0	
+0.60D+0.60W+0.60H						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.103	0.064	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.40	305.5	2,960.0	0.97	27.1	424.0	
Length = 2.330 ft	2	0.103	0.064	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.40	305.5	2,960.0	0.97	27.1	424.0	
Length = 2.330 ft	3	0.008	0.064	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.18	23.2	2,950.7	0.10	27.1	424.0	
+D+0.70E+0.60H						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.172	0.106	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	2,960.0	1.62	45.1	424.0	
Length = 2.330 ft	2	0.172	0.106	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.00	509.1	2,960.0	1.62	45.1	424.0	
Length = 2.330 ft	3	0.013	0.106	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.30	38.6	2,950.7	0.16	45.1	424.0	
+D+0.750L+0.750S+0.5250E-						1.00	1.00	1.00	1.000	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	
Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0	





Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: B7**

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>v</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S+0.5250E-	Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0
															0.0	0.00	0.0	0.0
+D+0.750L+0.750S+0.5250E-	Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
	Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
+D+0.750L+0.750S+0.5250E-	Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0
															0.0	0.00	0.0	0.0
+D+0.750L+0.750S+0.5250E-	Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
	Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
+D+0.750L+0.750S+0.5250E-	Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0
															0.0	0.00	0.0	0.0
+D+0.750L+0.750S+0.5250E-	Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
	Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
+D+0.750L+0.750S+0.5250E-	Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0
															0.0	0.00	0.0	0.0
+D+0.750L+0.750S+0.5250E-	Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
	Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
+D+0.750L+0.750S+0.5250E-	Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0
															0.0	0.00	0.0	0.0
+D+0.750L+0.750S+0.5250E-	Length = 18.0 ft	1	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
	Length = 2.330 ft	2	0.316	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.35	936.6	2,960.0	2.98	83.0	424.0
+D+0.750L+0.750S+0.5250E-	Length = 2.330 ft	3	0.024	0.196	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.56	71.1	2,950.7	0.30	83.0	424.0
															0.0	0.00	0.0	0.0
+0.60D+0.70E+H	Length = 18.0 ft	1	0.103	0.064	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.40	305.5	2,960.0	0.97	27.1	424.0
	Length = 2.330 ft	2	0.103	0.064	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.40	305.5	2,960.0	0.97	27.1	424.0
+0.60D+0.70E+H	Length = 2.330 ft	3	0.008	0.064	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.18	23.2	2,950.7	0.10	27.1	424.0
															0.0	0.00	0.0	0.0

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.3070	7.866	+D+S+H	0.0000	0.000
	2	0.0000	7.866		-0.0061	1.018
+D+S+H	3	0.0183	2.330		0.0000	1.018

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Max Upward from all Load Conditions	1.660	6.235	0.469	
Max Upward from Load Combinations	1.660	6.235		
Max Upward from Load Cases	0.877	3.293	0.469	
Max Downward from all Load Conditions	-0.000	-0.124	-2.733	
Max Downward from Load Combinations			-2.733	
Max Downward from Load Cases (Resis)	-0.000	-0.124	-1.539	
+D+H	0.783	2.942	-1.194	
+D+L+H, LL Comb Run (**L)	0.783	2.942	-1.194	
+D+L+H, LL Comb Run (*L*)	0.783	2.942	-1.194	
+D+L+H, LL Comb Run (*LL)	0.783	2.942	-1.194	
+D+L+H, LL Comb Run (L**)	0.783	2.942	-1.194	
+D+L+H, LL Comb Run (L*L)	0.783	2.942	-1.194	
+D+L+H, LL Comb Run (LLL*)	0.783	2.942	-1.194	
+D+L+H, LL Comb Run (LLL)	0.783	2.942	-1.194	







**Wood Column**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: C1**

**Maximum Reactions**

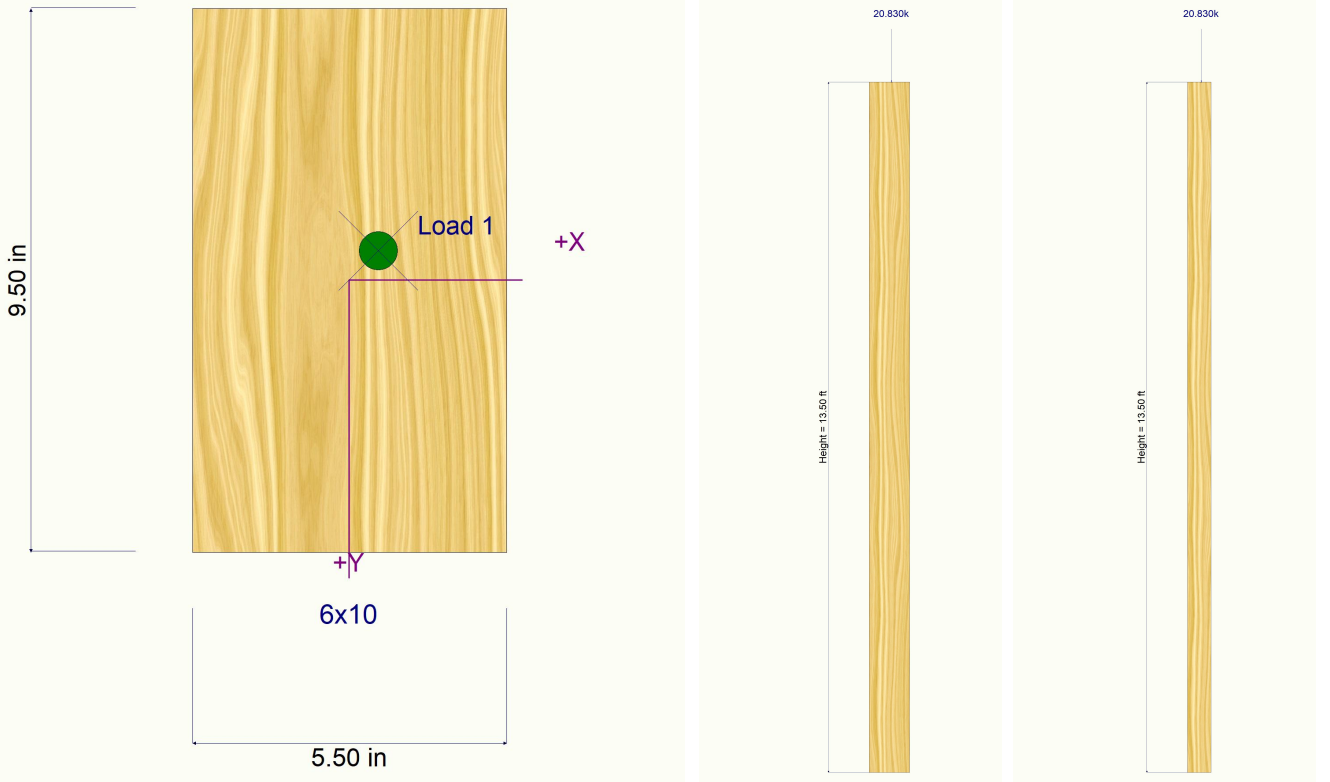
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
+D+Lr	-0.041	0.041		-0.041	0.041	13.553				
+D+S	-0.046	0.046		-0.046	0.046	15.043				
+D+0.750Lr	-0.037	0.037		-0.037	0.037	12.068				
+D+0.750S	-0.040	0.040		-0.040	0.040	13.185				
+0.60D	-0.014	0.014		-0.014	0.014	4.568				
Lr Only	-0.018	0.018		-0.018	0.018	5.940				
S Only	-0.023	0.023		-0.023	0.023	7.430				

**Maximum Deflections for Load Combinations**

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	-0.0301 in	7.883 ft	-0.010 in	7.883 ft
+D+Lr	-0.0540 in	7.883 ft	-0.018 in	7.883 ft
+D+S	-0.0600 in	7.883 ft	-0.020 in	7.883 ft
+D+0.750Lr	-0.0480 in	7.883 ft	-0.016 in	7.883 ft
+D+0.750S	-0.0525 in	7.883 ft	-0.018 in	7.883 ft
+0.60D	-0.0180 in	7.883 ft	-0.006 in	7.883 ft
Lr Only	-0.0239 in	7.883 ft	-0.008 in	7.883 ft
S Only	-0.0299 in	7.883 ft	-0.010 in	7.883 ft

**Sketches**





**Wood Column**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: C2**

**Maximum Reactions**

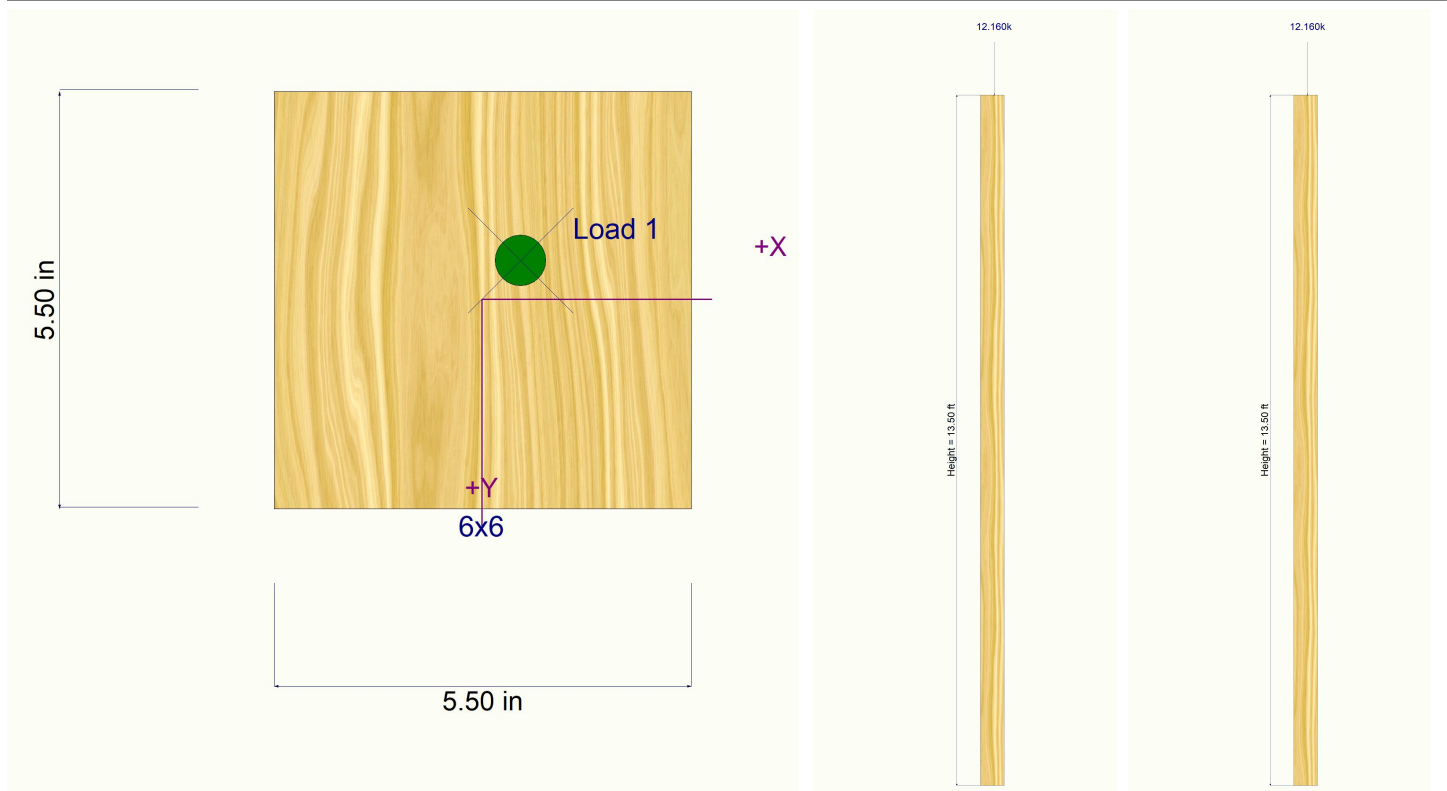
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
+D+Lr	-0.024	0.024		-0.024	0.024	7.969				
+D+S	-0.027	0.027		-0.027	0.027	8.829				
+D+0.750Lr	-0.022	0.022		-0.022	0.022	7.114				
+D+0.750S	-0.024	0.024		-0.024	0.024	7.759				
+0.60D	-0.008	0.008		-0.008	0.008	2.729				
Lr Only	-0.011	0.011		-0.011	0.011	3.420				
S Only	-0.013	0.013		-0.013	0.013	4.280				

**Maximum Deflections for Load Combinations**

Load Combination	Max. X-X Deflection		Max. Y-Y Deflection	Distance	
	Distance	Distance		Distance	Distance
D Only	-0.0310 in	7.883ft	-0.031 in	7.883ft	
+D+Lr	-0.0548 in	7.883ft	-0.055 in	7.883ft	
+D+S	-0.0608 in	7.883ft	-0.061 in	7.883ft	
+D+0.750Lr	-0.0489 in	7.883ft	-0.049 in	7.883ft	
+D+0.750S	-0.0534 in	7.883ft	-0.053 in	7.883ft	
+0.60D	-0.0186 in	7.883ft	-0.019 in	7.883ft	
Lr Only	-0.0238 in	7.883ft	-0.024 in	7.883ft	
S Only	-0.0298 in	7.883ft	-0.030 in	7.883ft	

**Sketches**



## Wood Column

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

DESCRIPTION: C3

### Code References

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combinations Used : ASCE 7-16

### General Information

Analysis Method	Allowable Stress Design			Wood Section Name	<b>6x6</b>
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber
Overall Column Height	12 ft			Wood Member Type	Sawn
<i>( Used for non-slender calculations )</i>					
Wood Species	Douglas Fir-Larch			Exact Width	<b>5.50</b> in
Wood Grade	No.1			Exact Depth	<b>5.50</b> in
Fb +	1,200.0 psi	Fv	170.0 psi	Area	30.250 in <sup>2</sup>
Fb -	1,200.0 psi	Ft	825.0 psi	Ix	76.255 in <sup>4</sup>
Fc - Prll	1,000.0 psi	Density	31.210 pcf	Iy	76.255 in <sup>4</sup>
Fc - Perp	625.0 psi			Allow Stress Modification Factors	
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial	Cf or Cv for Bending 1.0	
	Basic	1,600.0	1,600.0	1,600.0 ksi	Cf or Cv for Compression 1.0
	Minimum	580.0	580.0		Cf or Cv for Tension 1.0
					Cm : Wet Use Factor 1.0
					Ct : Temperature Fact 1.0
					Cfu : Flat Use Factor 1.0
					Kf : Built-up columns 1.0 <i>NDS 15.3.2</i>
					Use Cr : Repetitive ? No
Brace condition for deflection (buckling) along columns :					
X-X (width) axis : Unbraced Length for buckling ABOUT Y-Y Axis = 12 ft, k					
Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 12 ft, k					

### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 78.675 lbs \* Dead Load Factor

AXIAL LOADS . . .

B2 Reaction: Axial Load at 12.0 ft, Xecc = 0.50 in, Yecc = 0.50 in, D = 2.90, Lr = 2.40, S = 3.0 k

### DESIGN SUMMARY

#### Bending & Shear Check Results

**PASS** Max. Axial+Bending Stress Ratio = **0.3417 : 1**  
 Load Combination +D+S  
 Governing NDS Formula Comp Only, fc/Fc'  
 Location of max.above base 0.0 ft  
 At maximum location values are .  
 Applied Axial 5.979 k  
 Applied Mx 0.0 k-ft  
 Applied My 0.0 k-ft  
 Fc : Allowable 578.43 psi

**Maximum SERVICE Lateral Load Reactions . .**  
 Top along Y-Y 0.02049 k Bottom along Y-Y 0.02049 k  
 Top along X-X 0.02049 k Bottom along X-X 0.02049 k

**Maximum SERVICE Load Lateral Deflections . . .**  
 Along Y-Y -0.03244 in at 7.007 ft above base  
 for load combination : +D+S  
 Along X-X -0.03244 in at 7.007 ft above base  
 for load combination : +D+S

**PASS** Maximum Shear Stress Ratio = **0.005196 : 1**  
 Load Combination +D+S  
 Location of max.above base 12.0 ft  
 Applied Design Shear 1.524 psi  
 Allowable Shear 195.50 psi

**Other Factors used to calculate allowable stresses . . .**  
Bending Compression Tension

### Load Combination Results

Load Combination	C <sub>D</sub>	C <sub>P</sub>	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
D Only	0.900	0.596	0.1834	PASS	0.0 ft	0.003263	PASS	12.0 ft
+D+Lr	1.250	0.472	0.3014	PASS	0.0 ft	0.004294	PASS	12.0 ft
+D+S	1.150	0.503	0.3417	PASS	0.0 ft	0.005196	PASS	12.0 ft
+D+0.750Lr	1.250	0.472	0.2677	PASS	0.0 ft	0.003808	PASS	12.0 ft
+D+0.750S	1.150	0.503	0.2988	PASS	0.0 ft	0.004536	PASS	12.0 ft
+0.60D	1.600	0.386	0.09563	PASS	0.0 ft	0.001101	PASS	12.0 ft

### Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k		Y-Y Axis Reaction k		Axial Reaction @ Base	My - End Moments k-ft		Mx - End Moments	
	@ Base	@ Top	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
D Only	-0.010	0.010	-0.010	0.010	2.979				



**Wood Column**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: C3**

**Maximum Reactions**

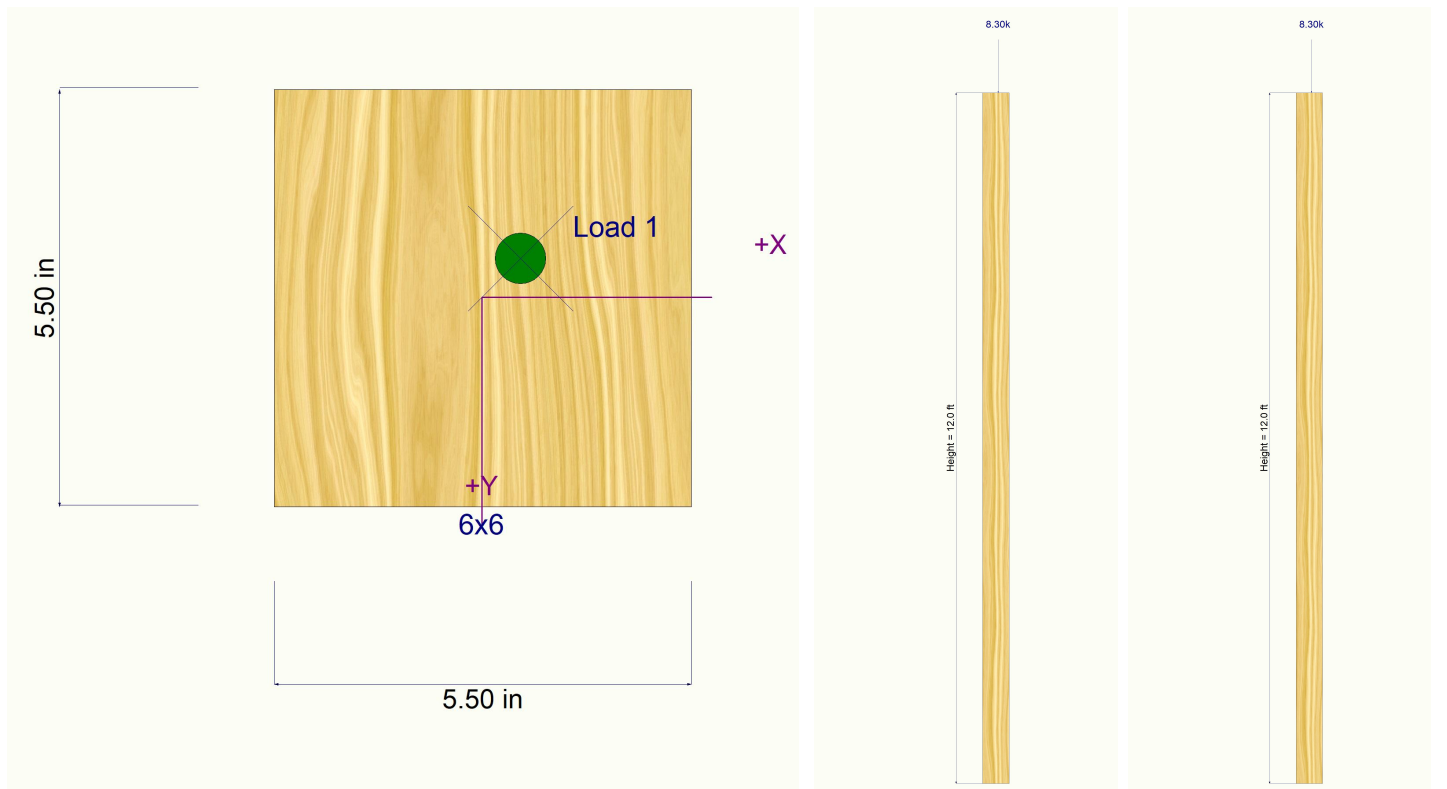
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
+D+Lr	-0.018	0.018		-0.018	0.018	5.379				
+D+S	-0.020	0.020		-0.020	0.020	5.979				
+D+0.750Lr	-0.016	0.016		-0.016	0.016	4.779				
+D+0.750S	-0.018	0.018		-0.018	0.018	5.229				
+0.60D	-0.006	0.006		-0.006	0.006	1.787				
Lr Only	-0.008	0.008		-0.008	0.008	2.400				
S Only	-0.010	0.010		-0.010	0.010	3.000				

**Maximum Deflections for Load Combinations**

Load Combination	Max. X-X Deflection		Max. Y-Y Deflection	Distance	
	Distance	Distance		Distance	Distance
D Only	-0.0159 in	7.007ft	-0.016 in	7.007ft	7.007ft
+D+Lr	-0.0291 in	7.007ft	-0.029 in	7.007ft	7.007ft
+D+S	-0.0324 in	7.007ft	-0.032 in	7.007ft	7.007ft
+D+0.750Lr	-0.0258 in	7.007ft	-0.026 in	7.007ft	7.007ft
+D+0.750S	-0.0283 in	7.007ft	-0.028 in	7.007ft	7.007ft
+0.60D	-0.0096 in	7.007ft	-0.010 in	7.007ft	7.007ft
Lr Only	-0.0132 in	7.007ft	-0.013 in	7.007ft	7.007ft
S Only	-0.0165 in	7.007ft	-0.016 in	7.007ft	7.007ft

**Sketches**





Project: Taco Time NW Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB

Originating Office: Tacoma Date: 07-19-23

## STUD WALL DESIGN - W1

2018 NDS/2018 IBC

### WALL DATA

<b>LUMBER TYPE:</b>	DF#2/HF#1	<b>APPLIED LOADS:</b>	$P_{DEAD} =$	<b>400</b>	<b>LBS</b>
$F_b =$	900 PSI	$W_{WIND} =$	<b>19.9 PSF</b>	$P_{LIVE} =$	<b>LBS</b>
$F_c =$	1350 PSI	$W_{SEISMIC} =$	<b>5.0 PSF</b>	$P_{SNOW} =$	<b>375</b>
$F_{c\perp} =$	405 PSI			$P_{WIND} =$	<b>LBS</b>
$E =$	1.50E+06 PSI			$P_{SEISMIC} =$	<b>LBS</b>
<b>STUD SIZE:</b>	(1) 2x6	<b>MISCELLANEOUS:</b>	<b>HEIGHT =</b>	<b>13.5</b>	<b>FT</b>
$A_x =$	8.25 IN <sup>2</sup>		<b>SPACING =</b>	<b>16</b>	<b>IN</b>
$S_x =$	7.56 IN <sup>3</sup>		<b>ECCENTRICITY =</b>	<b>1</b>	<b>IN</b>
$I_x =$	20.80 IN <sup>4</sup>		$C_{F(Compression)} =$	<b>1.10</b>	<b>(NDS 4.3.6)</b>
$C_{F(BENDING)} =$	1.3 (NDS 4.3.6)		<b>APPLY?</b>		
$F_{cE} =$	518.7 PSI	$C_{SYS(BENDING)} =$	<b>1.35</b>	<b>YES</b>	<b>(SDPWS T3.1.1.1)</b>
$C_b =$	1.25 (NDS 3.10.4)	$C_{F(BENDING)} =$	<b>1.15</b>	<b>YES</b>	<b>(NDS 4.3.9)</b>

### LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75SEISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

### ALLOWABLE STRESSES - $C_d$ PER NDS T2.3.2, $C_p$ PER NDS 3.7.1, ASSUME $C_m, C_t, C_i, C_L = 1.0$

CASE	$C_D$	$F_c^*$	$F_{cE}/F_c^*$	$C_P$	$F_c'$	$F_b'$	$F_{c\perp}$
1	1.00	1485	0.35	0.319	474	1346	506
2 & 3	1.15	1708	0.30	0.282	481	1547	506
4 & 5	1.60	2376	0.22	0.207	493	2527	506
6 & 7	1.60	2376	0.22	0.207	493	2153	506

### APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	$F_c$	$M_{LAT. LOAD}$	$M_{ECC.}$	$M_{TOTAL}$	$F_b$
1	400	48	152	33	173	274
2	775	94	152	65	192	305
3	681	83	152	57	187	297
4	681	83	272	57	307	488
5	400	48	363	33	384	609
6	400	48	106	33	127	202
7	681	83	80	57	116	184

### DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	$F_c/F_c'$	$F_b/F_b'$	$F_c/F_{c\perp}$	Combined	$F_c/F_{cE}$	Deflection	L/?
1	0.10	0.20	0.10	0.24	0.09	0.18	L/892
2	0.20	0.20	0.19	0.28	0.18	0.20	L/801
3	0.17	0.19	0.16	0.26	0.16	0.20	L/822
4*	0.17	0.19	0.16	0.26	0.16	0.17	L/966
5*	0.10	0.24	0.10	0.28	0.09	0.21	L/775
6	0.10	0.09	0.10	0.11	0.09	0.13	L/1212
7	0.17	0.09	0.16	0.13	0.16	0.12	L/1328
MAX. ---->	<b>0.20</b>	<b>0.24</b>	<b>0.19</b>	<b>0.28</b>	<b>0.18</b>	<b>0.21</b>	<b>L/775</b>
	<b>O.K.</b>	<b>O.K.</b>	<b>O.K.</b>	<b>O.K.</b>	<b>O.K.</b>		

\* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

### PLATE BENDING - \*ALIGN STUDS WITH JOISTS WHERE POSSIBLE\*

#### MISCELLANEOUS:

$C_{Fu} =$  1.15 (NDS 4.3.7)  
 $F_v =$  **150** PSI

#### ALLOWABLE STRESSES:

$F_v' =$  173 PSI  
 $F_b' =$  1547 PSI

#### STUD REACTIONS (OUT - OF - PLANE)

**179 LB**

#### DBL TOP PLATE PROPERTIES:

$A_x =$  16.50 IN<sup>2</sup>  
 $S_x =$  4.13 IN<sup>3</sup>  
 $I_x =$  3.09 IN<sup>4</sup>

#### APPLIED STRESSES:

$F_v =$  **47** PSI <--- O.K.  
 $F_b =$  **752** PSI <--- O.K.  
 $\Delta_{MAX} =$  **0.014** IN





Project: Taco Time NW Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB

Originating Office: Tacoma Date: 07-19-23

## STUD WALL DESIGN - W2

2018 NDS/2018 IBC

### WALL DATA

<b>LUMBER TYPE:</b>		DF#2/HF#1 ▼	<b>APPLIED LOADS:</b>		$P_{DEAD} =$	<b>480</b>	LBS
$F_b =$	900	PSI	$W_{WIND} =$	19.9	PSF	$P_{LIVE} =$	LBS
$F_c =$	1350	PSI	$W_{SEISMIC} =$	5.0	PSF	$P_{SNOW} =$	600 LBS
$F_{c\perp} =$	405	PSI				$P_{WIND} =$	LBS
$E =$	1.50E+06	PSI				$P_{SEISMIC} =$	LBS
<b>STUD SIZE:</b>		(2) 2x6 ▼	<b>MISCELLANEOUS:</b>		HEIGHT =	22.5	FT
$A_x =$	16.50	IN <sup>2</sup>			SPACING =	12	IN
$S_x =$	15.13	IN <sup>3</sup>			ECCENTRICITY =	1	IN
$I_x =$	41.59	IN <sup>4</sup>			$C_{F(Compression)} =$	1.10	(NDS 4.3.6)
$C_{F(BENDING)} =$	1.3	(NDS 4.3.6)			APPLY?		
$F_{cE} =$	186.7	PSI	$C_{SYS(BENDING)} =$	1.35	YES	(SDPWS T3.1.1.1)	
$C_b =$	1.13	(NDS 3.10.4)	$C_{F(BENDING)} =$	1.15	YES	(NDS 4.3.9)	

### LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75SEISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

### ALLOWABLE STRESSES - $C_d$ PER NDS T2.3.2, $C_p$ PER NDS 3.7.1, ASSUME $C_m, C_t, C_i, C_L = 1.0$

CASE	$C_D$	$F_c^*$	$F_{cE}/F_c^*$	$C_P$	$F_c'$	$F_b'$	$F_{c\perp}$
1	1.00	1485	0.13	0.122	182	1346	456
2 & 3	1.15	1708	0.11	0.107	182	1547	456
4 & 5	1.60	2376	0.08	0.077	184	2527	456
6 & 7	1.60	2376	0.08	0.077	184	2153	456

### APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	$f_c$	$M_{LAT. LOAD}$	$M_{ECC.}$	$M_{TOTAL}$	$f_b$
1	480	29	316	40	341	271
2	1080	65	316	90	373	296
3	930	56	316	78	365	289
4	930	56	567	78	615	488
5	480	29	756	40	781	619
6	480	29	221	40	246	196
7	930	56	168	78	216	171

### DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	$f_c/F_c'$	$f_b/F_b'$	$f_c/F_{c\perp}$	Combined	$f_c/F_{cE}$	Deflection	L/?
1	0.16	0.20	0.06	0.26	0.16	0.50	L/541
2	0.36	0.19	0.14	0.42	0.35	0.54	L/496
3	0.31	0.19	0.12	0.36	0.30	0.53	L/507
4*	0.31	0.19	0.12	0.37	0.30	0.47	L/580
5*	0.16	0.25	0.06	0.32	0.16	0.59	L/457
6	0.16	0.09	0.06	0.13	0.16	0.36	L/750
7	0.31	0.08	0.12	0.21	0.30	0.32	L/855
MAX. ---->	0.36	0.25	0.14	0.42	0.35	0.59	L/457
	O.K.	O.K.	O.K.	O.K.	O.K.		

\* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

### PLATE BENDING - \*ALIGN STUDS WITH JOISTS WHERE POSSIBLE\*

#### MISCELLANEOUS:

$C_{Fu} =$  1.15 (NDS 4.3.7)  
 $F_v =$  150 PSI

#### ALLOWABLE STRESSES:

$F_v' =$  173 PSI  
 $F_b' =$  1547 PSI

#### STUD REACTIONS (OUT - OF - PLANE)

224 LB

#### DBL TOP PLATE PROPERTIES:

$A_x =$  16.50 IN<sup>2</sup>  
 $S_x =$  4.13 IN<sup>3</sup>  
 $I_x =$  3.09 IN<sup>4</sup>

#### APPLIED STRESSES:

$F_v =$  65 PSI <--- O.K.  
 $F_b =$  785 PSI <--- O.K.  
 $\Delta_{MAX} =$  0.008 IN



Project: Taco Time NW Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB

Originating Office: Tacoma Date: 07-19-23

## STUD WALL DESIGN - W3

2018 NDS/2018 IBC

### WALL DATA

<b>LUMBER TYPE:</b>		DF#2/HF#1 ▼	<b>APPLIED LOADS:</b>		$P_{DEAD} =$ <b>480</b> LBS
$F_b =$	900 PSI		$W_{WIND} =$	19.9 PSF	$P_{LIVE} =$ LBS
$F_c =$	1350 PSI		$W_{SEISMIC} =$	5.0 PSF	$P_{SNOW} =$ <b>600</b> LBS
$F_{c\perp} =$	405 PSI				$P_{WIND} =$ LBS
$E =$	1.50E+06 PSI				$P_{SEISMIC} =$ LBS
<b>STUD SIZE:</b>		(1) 2x6 ▼	<b>MISCELLANEOUS:</b>		HEIGHT = <b>17.5</b> FT
$A_x =$	8.25 IN <sup>2</sup>			SPACING =	<b>12</b> IN
$S_x =$	7.56 IN <sup>3</sup>			ECCENTRICITY =	<b>1</b> IN
$I_x =$	20.80 IN <sup>4</sup>			$C_{F(Compression)} =$	1.10 (NDS 4.3.6)
$C_{F(BENDING)} =$	1.3 (NDS 4.3.6)			<b>APPLY?</b>	
$F_{cE} =$	308.7 PSI		$C_{SYS(BENDING)} =$	1.35	<b>YES</b> (SDPWS T3.1.1.1)
$C_b =$	1.25 (NDS 3.10.4)		$C_{F(BENDING)} =$	1.15	<b>YES</b> (NDS 4.3.9)

### LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75SEISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

### ALLOWABLE STRESSES - $C_d$ PER NDS T2.3.2, $C_p$ PER NDS 3.7.1, ASSUME $C_m, C_t, C_i, C_L = 1.0$

CASE	$C_D$	$F_c^*$	$F_{cE}/F_c^*$	$C_P$	$F_c'$	$F_b'$	$F_{c\perp}$
1	1.00	1485	0.21	0.198	294	1346	506
2 & 3	1.15	1708	0.18	0.173	296	1547	506
4 & 5	1.60	2376	0.13	0.126	300	2527	506
6 & 7	1.60	2376	0.13	0.126	300	2153	506

### APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	$f_c$	$M_{LAT. LOAD}$	$M_{ECC.}$	$M_{TOTAL}$	$f_b$
1	480	58	191	40	216	343
2	1080	131	191	90	248	393
3	930	113	191	78	240	381
4	930	113	343	78	391	621
5	480	58	457	40	482	765
6	480	58	134	40	159	252
7	930	113	101	78	150	238

### DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	$f_c/F_c'$	$f_b/F_b'$	$f_c/F_{c\perp}$	Combined	$f_c/F_{cE}$	Deflection	L/?
1	0.20	0.26	0.11	0.35	0.19	0.38	L/549
2	0.44	0.25	0.26	0.64	0.42	0.44	L/480
3	0.38	0.25	0.22	0.53	0.37	0.42	L/495
4*	0.38	0.25	0.22	0.53	0.37	0.36	L/586
5*	0.19	0.30	0.11	0.41	0.19	0.44	L/475
6	0.19	0.12	0.11	0.18	0.19	0.28	L/747
7	0.38	0.11	0.22	0.32	0.37	0.26	L/793
MAX. ---->	<b>0.44</b>	<b>0.30</b>	<b>0.26</b>	<b>0.64</b>	<b>0.42</b>	<b>0.44</b>	<b>L/475</b>
	O.K.	O.K.	O.K.	O.K.	O.K.		

\* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

### PLATE BENDING - \*ALIGN STUDS WITH JOISTS WHERE POSSIBLE\*

<b>MISCELLANEOUS:</b>		<b>ALLOWABLE STRESSES:</b>		<b>STUD REACTIONS</b> (OUT - OF - PLANE) <hr/> <b>174 LB</b>
$C_{Fu} =$	1.15 (NDS 4.3.7)	$F_v' =$	173 PSI	
$F_v =$	<b>150</b> PSI	$F_b' =$	1547 PSI	

<b>DBL TOP PLATE PROPERTIES:</b>		<b>APPLIED STRESSES:</b>		
$A_x =$	16.50 IN <sup>2</sup>	$F_v =$	<b>65</b> PSI	---- O.K.
$S_x =$	4.13 IN <sup>3</sup>	$f_b =$	<b>785</b> PSI	---- O.K.
$I_x =$	3.09 IN <sup>4</sup>	$\Delta_{MAX} =$	<b>0.008</b> IN	



Project: Taco Time NW Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB

Originating Office: Tacoma Date: 07-19-23

## STUD WALL DESIGN - W4

2018 NDS/2018 IBC

### WALL DATA

<b>LUMBER TYPE:</b>		DF#2/HF#1 ▼	<b>APPLIED LOADS:</b>		$P_{DEAD} =$ <b>200</b> LBS
$F_b =$	900 PSI		$W_{WIND} =$	19.9 PSF	$P_{LIVE} =$ LBS
$F_c =$	1350 PSI		$W_{SEISMIC} =$	5.0 PSF	$P_{SNOW} =$ <b>250</b> LBS
$F_{c\perp} =$	405 PSI				$P_{WIND} =$ LBS
$E =$	1.50E+06 PSI				$P_{SEISMIC} =$ LBS
<b>STUD SIZE:</b>		(2) 2x6 ▼	<b>MISCELLANEOUS:</b>		HEIGHT = <b>22.5</b> FT
$A_x =$	16.50 IN <sup>2</sup>				SPACING = <b>12</b> IN
$S_x =$	15.13 IN <sup>3</sup>				ECCENTRICITY = <b>1</b> IN
$I_x =$	41.59 IN <sup>4</sup>				$C_{F(Compression)} =$ 1.10 (NDS 4.3.6)
$C_{F(BENDING)} =$	1.3 (NDS 4.3.6)				<b>APPLY?</b>
$F_{cE} =$	186.7 PSI		$C_{SYS(BENDING)} =$	1.35	<b>YES</b> (SDPWS T3.11.1)
$C_b =$	1.13 (NDS 3.10.4)		$C_{F(BENDING)} =$	1.15	<b>YES</b> (NDS 4.3.9)

### LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75SEISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

### ALLOWABLE STRESSES - $C_d$ PER NDS T2.3.2, $C_p$ PER NDS 3.7.1, ASSUME $C_m, C_t, C_i, C_L = 1.0$

CASE	$C_D$	$F_c^*$	$F_{cE}/F_c^*$	$C_P$	$F_c'$	$F_b'$	$F_{c\perp}$
1	1.00	1485	0.13	0.122	182	1346	456
2 & 3	1.15	1708	0.11	0.107	182	1547	456
4 & 5	1.60	2376	0.08	0.077	184	2527	456
6 & 7	1.60	2376	0.08	0.077	184	2153	456

### APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	$f_c$	$M_{LAT. LOAD}$	$M_{ECC.}$	$M_{TOTAL}$	$f_b$
1	200	12	316	17	327	259
2	450	27	316	38	340	270
3	388	23	316	32	337	267
4	388	23	567	32	587	466
5	200	12	756	17	766	608
6	200	12	221	17	232	184
7	388	23	168	32	188	149

### DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	$f_c/F_c'$	$f_b/F_b'$	$f_c/F_{c\perp}$	Combined	$f_c/F_{cE}$	Deflection	L/?
1	0.07	0.19	0.03	0.21	0.06	0.48	L/566
2	0.15	0.17	0.06	0.23	0.15	0.50	L/544
3	0.13	0.17	0.05	0.21	0.13	0.49	L/549
4*	0.13	0.18	0.05	0.23	0.13	0.44	L/607
5*	0.07	0.24	0.03	0.26	0.06	0.58	L/465
6	0.07	0.09	0.03	0.10	0.06	0.34	L/797
7	0.13	0.07	0.05	0.10	0.13	0.27	L/984
MAX. ---->	<b>0.15</b>	<b>0.24</b>	<b>0.06</b>	<b>0.26</b>	<b>0.15</b>	<b>0.58</b>	<b>L/465</b>
	O.K.	O.K.	O.K.	O.K.	O.K.		

\* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

### PLATE BENDING - \*ALIGN STUDS WITH JOISTS WHERE POSSIBLE\*

#### MISCELLANEOUS:

$C_{Fu} =$	1.15 (NDS 4.3.7)
$F_v =$	<b>150</b> PSI

#### ALLOWABLE STRESSES:

$F_v' =$	173 PSI
$F_b' =$	1547 PSI

#### STUD REACTIONS (OUT - OF - PLANE)

**224 LB**

#### DBL TOP PLATE PROPERTIES:

$A_x =$	16.50 IN <sup>2</sup>
$S_x =$	4.13 IN <sup>3</sup>
$I_x =$	3.09 IN <sup>4</sup>

#### APPLIED STRESSES:

$F_v =$	<b>27</b> PSI	<--- O.K.
$f_b =$	<b>327</b> PSI	<--- O.K.
$\Delta_{MAX} =$	<b>0.003</b> IN	



Project: Taco Time NW Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB

Originating Office: Tacoma Date: 07-19-23

## STUD WALL DESIGN - W5

2018 NDS/2018 IBC

### WALL DATA

<b>LUMBER TYPE:</b>		DF#2/HF#1 ▼	<b>APPLIED LOADS:</b>		$P_{DEAD} =$ <b>780</b> LBS
$F_b =$	900 PSI		$W_{WIND} =$	0.0 PSF	$P_{LIVE} =$ LBS
$F_c =$	1350 PSI		$W_{SEISMIC} =$	5.0 PSF	$P_{SNOW} =$ <b>975</b> LBS
$F_{c\perp} =$	405 PSI				$P_{WIND} =$ LBS
$E =$	1.50E+06 PSI				$P_{SEISMIC} =$ LBS
<b>STUD SIZE:</b>		(1) 2x6 ▼	<b>MISCELLANEOUS:</b>		HEIGHT = <b>14.5</b> FT
$A_x =$	8.25 IN <sup>2</sup>				SPACING = <b>12</b> IN
$S_x =$	7.56 IN <sup>3</sup>				ECCENTRICITY = <b>1</b> IN
$I_x =$	20.80 IN <sup>4</sup>				$C_{F(Compression)} =$ 1.10 (NDS 4.3.6)
$C_{F(BENDING)} =$	1.3 (NDS 4.3.6)				<b>APPLY?</b>
$F_{cE} =$	449.6 PSI		$C_{SYS(BENDING)} =$	1.35	<b>YES</b> (SDPWS T3.1.1.1)
$C_b =$	1.25 (NDS 3.10.4)		$C_{F(BENDING)} =$	1.15	<b>YES</b> (NDS 4.3.9)

### LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75SEISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

### ALLOWABLE STRESSES - $C_d$ PER NDS T2.3.2, $C_p$ PER NDS 3.7.1, ASSUME $C_m, C_t, C_i, C_L = 1.0$

CASE	$C_D$	$F_c^*$	$F_{cE}/F_c^*$	$C_p$	$F_c'$	$F_b'$	$F_{c\perp}$
1	1.00	1485	0.30	0.281	417	1346	506
2 & 3	1.15	1708	0.26	0.247	422	1547	506
4 & 5	1.60	2376	0.19	0.181	431	2527	506
6 & 7	1.60	2376	0.19	0.181	431	2153	506

### APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	$f_c$	$M_{LAT. LOAD}$	$M_{ECC.}$	$M_{TOTAL}$	$f_b$
1	780	95	131	65	172	273
2	1755	213	131	146	223	354
3	1511	183	131	126	210	333
4	1511	183	0	126	79	125
5	780	95	0	65	41	64
6	780	95	92	65	133	210
7	1511	183	70	126	148	235

### DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	$f_c/F_c'$	$f_b/F_b'$	$f_c/F_{c\perp}$	Combined	$f_c/F_{cE}$	Deflection	L/?
1	0.23	0.20	0.19	0.31	0.21	0.21	L/834
2	0.50	0.23	0.42	0.69	0.47	0.27	L/644
3	0.43	0.22	0.36	0.55	0.41	0.25	L/683
4*	0.43	0.05	0.36	0.26	0.41	0.05	L/3514
5*	0.22	0.03	0.19	0.08	0.21	0.03	L/6809
6	0.22	0.10	0.19	0.17	0.21	0.16	L/1082
7	0.43	0.11	0.36	0.37	0.41	0.18	L/967
MAX. ---->	<b>0.50</b>	<b>0.23</b>	<b>0.42</b>	<b>0.69</b>	<b>0.47</b>	<b>0.27</b>	<b>L/644</b>
	O.K.	O.K.	O.K.	O.K.	O.K.		

\* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

### PLATE BENDING - \*ALIGN STUDS WITH JOISTS WHERE POSSIBLE\*

<b>MISCELLANEOUS:</b>		<b>ALLOWABLE STRESSES:</b>		<b>STUD REACTIONS</b> (OUT - OF - PLANE) <b>36 LB</b>
$C_{Fu} =$	1.15 (NDS 4.3.7)	$F_v' =$	173 PSI	
$F_v =$	<b>150</b> PSI	$F_b' =$	1547 PSI	

<b>DBL TOP PLATE PROPERTIES:</b>		<b>APPLIED STRESSES:</b>		
$A_x =$	16.50 IN <sup>2</sup>	$F_v =$	<b>106</b> PSI	---- O.K.
$S_x =$	4.13 IN <sup>3</sup>	$f_b =$	<b>1276</b> PSI	---- O.K.
$I_x =$	3.09 IN <sup>4</sup>	$\Delta_{MAX} =$	<b>0.014</b> IN	



Project: Taco Time NW Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB

Originating Office: Tacoma Date: 07-19-23

## STUD WALL DESIGN - W6

2018 NDS/2018 IBC

### WALL DATA

<b>LUMBER TYPE:</b>		DF#2/HF#1 ▼	<b>APPLIED LOADS:</b>		$P_{DEAD} =$ <b>200</b> LBS
$F_b =$	900 PSI		$W_{WIND} =$	0.0 PSF	$P_{LIVE} =$ LBS
$F_c =$	1350 PSI		$W_{SEISMIC} =$	5.0 PSF	$P_{SNOW} =$ <b>250</b> LBS
$F_{c\perp} =$	405 PSI				$P_{WIND} =$ LBS
$E =$	1.50E+06 PSI				$P_{SEISMIC} =$ LBS
<b>STUD SIZE:</b>		(2) 2x6 ▼	<b>MISCELLANEOUS:</b>		HEIGHT = <b>22.5</b> FT
$A_x =$	16.50 IN <sup>2</sup>			SPACING =	<b>12</b> IN
$S_x =$	15.13 IN <sup>3</sup>			ECCENTRICITY =	<b>1</b> IN
$I_x =$	41.59 IN <sup>4</sup>			$C_{F(Compression)} =$	1.10 (NDS 4.3.6)
$C_{F(BENDING)} =$	1.3 (NDS 4.3.6)			<b>APPLY?</b>	
$F_{cE} =$	186.7 PSI		$C_{SYS(BENDING)} =$	1.35	<b>YES</b> (SDPWS T3.11.1)
$C_b =$	1.13 (NDS 3.10.4)		$C_{F(BENDING)} =$	1.15	<b>YES</b> (NDS 4.3.9)

### LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75SEISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

### ALLOWABLE STRESSES - $C_d$ PER NDS T2.3.2, $C_p$ PER NDS 3.7.1, ASSUME $C_m, C_t, C_i, C_L = 1.0$

CASE	$C_D$	$F_c^*$	$F_{cE}/F_c^*$	$C_P$	$F_c'$	$F_b'$	$F_{c\perp}$
1	1.00	1485	0.13	0.122	182	1346	456
2 & 3	1.15	1708	0.11	0.107	182	1547	456
4 & 5	1.60	2376	0.08	0.077	184	2527	456
6 & 7	1.60	2376	0.08	0.077	184	2153	456

### APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	$f_c$	$M_{LAT. LOAD}$	$M_{ECC.}$	$M_{TOTAL}$	$f_b$
1	200	12	316	17	327	259
2	450	27	316	38	340	270
3	388	23	316	32	337	267
4	388	23	0	32	20	16
5	200	12	0	17	10	8
6	200	12	221	17	232	184
7	388	23	168	32	188	149

### DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	$f_c/F_c'$	$f_b/F_b'$	$f_c/F_{c\perp}$	Combined	$f_c/F_{cE}$	Deflection	L/?
1	0.07	0.19	0.03	0.21	0.06	0.48	L/566
2	0.15	0.17	0.06	0.23	0.15	0.50	L/544
3	0.13	0.17	0.05	0.21	0.13	0.49	L/549
4*	0.13	0.01	0.05	0.02	0.13	0.02	L/17665
5*	0.07	0.00	0.03	0.01	0.06	0.01	L/34226
6	0.07	0.09	0.03	0.10	0.06	0.34	L/797
7	0.13	0.07	0.05	0.10	0.13	0.27	L/984
MAX. ---->	<b>0.15</b>	<b>0.19</b>	<b>0.06</b>	<b>0.23</b>	<b>0.15</b>	<b>0.50</b>	<b>L/544</b>
	O.K.	O.K.	O.K.	O.K.	O.K.		

\* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

### PLATE BENDING - \*ALIGN STUDS WITH JOISTS WHERE POSSIBLE\*

<b>MISCELLANEOUS:</b>		<b>ALLOWABLE STRESSES:</b>		<b>STUD REACTIONS</b> (OUT - OF - PLANE) <b>56 LB</b>
$C_{Fu} =$	1.15 (NDS 4.3.7)	$F_v' =$	173 PSI	
$F_v =$	<b>150</b> PSI	$F_b' =$	1547 PSI	

<b>DBL TOP PLATE PROPERTIES:</b>		<b>APPLIED STRESSES:</b>		
$A_x =$	16.50 IN <sup>2</sup>	$F_v =$	<b>27</b> PSI	<b>&lt;--- O.K.</b>
$S_x =$	4.13 IN <sup>3</sup>	$F_b =$	<b>327</b> PSI	<b>&lt;--- O.K.</b>
$I_x =$	3.09 IN <sup>4</sup>	$\Delta_{MAX} =$	<b>0.003</b> IN	



Project: Taco Time NW Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB

Originating Office: Tacoma Date: 07-19-23

## STUD WALL DESIGN - W1 Jamb

2018 NDS/2018 IBC

### WALL DATA

<b>LUMBER TYPE:</b>		DF#2/HF#1 ▼	<b>APPLIED LOADS:</b>		$P_{DEAD} =$	<b>100</b>	LBS
$F_b =$	900	PSI	$W_{WIND} =$	<b>18.0</b>	PSF	$P_{LIVE} =$	LBS
$F_c =$	1350	PSI	$W_{SEISMIC} =$	<b>5.0</b>	PSF	$P_{SNOW} =$	<b>100</b> LBS
$F_{c\perp} =$	405	PSI				$P_{WIND} =$	LBS
$E =$	1.50E+06	PSI				$P_{SEISMIC} =$	LBS
<b>STUD SIZE:</b>		(2) 2x6 ▼	<b>MISCELLANEOUS:</b>		HEIGHT =	<b>13.5</b>	FT
$A_x =$	16.50	IN <sup>2</sup>			SPACING =	<b>56</b>	IN
$S_x =$	15.13	IN <sup>3</sup>			ECCENTRICITY =	<b>1</b>	IN
$I_x =$	41.59	IN <sup>4</sup>			$C_{F(Compression)} =$	<b>1.10</b>	(NDS 4.3.6)
$C_{F(BENDING)} =$	1.3	(NDS 4.3.6)			<b>APPLY?</b>		
$F_{cE} =$	518.7	PSI	$C_{SYS(BENDING)} =$	1.00	<b>NO</b>	(SDPWS T3.1.1.1)	
$C_b =$	1.13	(NDS 3.10.4)	$C_{F(BENDING)} =$	1.00	<b>NO</b>	(NDS 4.3.9)	

### LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75SEISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

### ALLOWABLE STRESSES - $C_d$ PER NDS T2.3.2, $C_p$ PER NDS 3.7.1, ASSUME $C_m, C_t, C_i, C_L = 1.0$

CASE	$C_D$	$F_c^*$	$F_{cE}/F_c^*$	$C_P$	$F_c'$	$F_b'$	$F_{c\perp}$
1	1.00	1485	0.35	0.319	474	1170	456
2 & 3	1.15	1708	0.30	0.282	481	1346	456
4 & 5	1.60	2376	0.22	0.207	493	1872	456
6 & 7	1.60	2376	0.22	0.207	493	1872	456

### APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	$f_c$	$M_{LAT. LOAD}$	$M_{ECC.}$	$M_{TOTAL}$	$f_b$
1	100	6	532	8	537	426
2	200	12	532	17	542	430
3	175	11	532	15	541	429
4	175	11	861	15	870	690
5	100	6	1148	8	1153	915
6	100	6	372	8	377	299
7	175	11	282	15	291	231

### DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	$f_c/F_c'$	$f_b/F_b'$	$f_c/F_{c\perp}$	Combined	$f_c/F_{cE}$	Deflection	L/?
1	0.01	0.36	0.01	0.37	0.01	0.28	L/574
2	0.03	0.32	0.03	0.33	0.02	0.28	L/568
3	0.02	0.32	0.02	0.33	0.02	0.28	L/570
4*	0.02	0.37	0.02	0.38	0.02	0.32	L/506
5*	0.01	0.49	0.01	0.49	0.01	0.42	L/382
6	0.01	0.16	0.01	0.16	0.01	0.20	L/817
7	0.02	0.12	0.02	0.13	0.02	0.15	L/1059
MAX. ---->	<b>0.03</b>	<b>0.49</b>	<b>0.03</b>	<b>0.49</b>	<b>0.02</b>	<b>0.42</b>	<b>L/382</b>
	O.K.	O.K.	O.K.	O.K.	O.K.		

\* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

### PLATE BENDING - \*ALIGN STUDS WITH JOISTS WHERE POSSIBLE\*

<b>MISCELLANEOUS:</b>		<b>ALLOWABLE STRESSES:</b>		<b>STUD REACTIONS</b> (OUT - OF - PLANE) <b>567 LB</b>
$C_{Fu} =$	1.15 (NDS 4.3.7)	$F_v' =$	173 PSI	
$F_v =$	<b>150</b> PSI	$F_b' =$	1547 PSI	

<b>DBL TOP PLATE PROPERTIES:</b>		<b>APPLIED STRESSES:</b>		
$A_x =$	16.50 IN <sup>2</sup>	$F_v =$	<b>12</b> PSI	---- O.K.
$S_x =$	4.13 IN <sup>3</sup>	$f_b =$	<b>679</b> PSI	---- O.K.
$I_x =$	3.09 IN <sup>4</sup>	$\Delta_{MAX} =$	<b>0.158</b> IN	



Project: Taco Time NW Job Number: 23-514

Sheet: \_\_\_\_\_ of \_\_\_\_\_ Name: JMB

Originating Office: Tacoma Date: 07-19-23

## STUD WALL DESIGN - W4 Jamb (5'-0" Opening)

2018 NDS/2018 IBC

### WALL DATA

LUMBER TYPE:		DF#2/HF#1	APPLIED LOADS:		$P_{DEAD} = 100$	LBS
$F_b = 900$	PSI		$W_{WIND} = 18.0$	PSF	$P_{LIVE} =$	LBS
$F_c = 1350$	PSI		$W_{SEISMIC} = 5.0$	PSF	$P_{SNOW} = 100$	LBS
$F_{c\perp} = 405$	PSI				$P_{WIND} =$	LBS
$E = 1.50E+06$	PSI				$P_{SEISMIC} =$	LBS
STUD SIZE:		(3) 2x6	MISCELLANEOUS:		HEIGHT = 19	FT
$A_x = 24.75$	IN <sup>2</sup>			SPACING = 36	IN	
$S_x = 22.69$	IN <sup>3</sup>			ECCENTRICITY = 1	IN	
$I_x = 62.39$	IN <sup>4</sup>			$C_{F(COMPRESSION)} = 1.10$	(NDS 4.3.6)	
$C_{F(BENDING)} = 1.3$	(NDS 4.3.6)			APPLY?		
$F_{cE} = 261.9$	PSI		$C_{SYS(BENDING)} = 1.00$	NO	(SDPWS T3.1.1.1)	
$C_b = 1.08$	(NDS 3.10.4)		$C_{F(BENDING)} = 1.00$	NO	(NDS 4.3.9)	

### LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75SEISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

### ALLOWABLE STRESSES - $C_d$ PER NDS T2.3.2, $C_p$ PER NDS 3.7.1, ASSUME $C_m, C_t, C_i, C_L = 1.0$

CASE	$C_D$	$F_c^*$	$F_{cE}/F_c^*$	$C_F$	$F_c'$	$F_b'$	$F_{c\perp}$
1	1.00	1485	0.18	0.169	252	1170	439
2 & 3	1.15	1708	0.15	0.148	253	1346	439
4 & 5	1.60	2376	0.11	0.108	256	1872	439
6 & 7	1.60	2376	0.11	0.108	256	1872	439

### APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	$F_c$	$M_{LAT. LOAD}$	$M_{ECC.}$	$M_{TOTAL}$	$F_b$
1	100	4	677	8	682	361
2	200	8	677	17	687	364
3	175	7	677	15	686	363
4	175	7	1097	15	1106	585
5	100	4	1462	8	1467	776
6	100	4	474	8	479	253
7	175	7	359	15	368	195

### DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	$f_c/F_c'$	$F_b/F_b'$	$f_c/F_{c\perp}$	Combined	$F_c/F_{cE}$	Deflection	L/?
1	0.02	0.31	0.01	0.31	0.02	0.47	L/481
2	0.03	0.27	0.02	0.28	0.03	0.48	L/478
3	0.03	0.27	0.02	0.28	0.03	0.48	L/479
4*	0.03	0.31	0.02	0.32	0.03	0.54	L/424
5*	0.02	0.41	0.01	0.42	0.02	0.71	L/320
6	0.02	0.14	0.01	0.14	0.02	0.33	L/686
7	0.03	0.10	0.02	0.11	0.03	0.26	L/893
MAX. ---->	0.03	0.41	0.02	0.42	0.03	0.71	L/320
	O.K.	O.K.	O.K.	O.K.	O.K.		

\* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

### PLATE BENDING - \*ALIGN STUDS WITH JOISTS WHERE POSSIBLE\*

MISCELLANEOUS:	ALLOWABLE STRESSES:	STUD REACTIONS
$C_{Fu} = 1.15$ (NDS 4.3.7)	$F_v' = 173$ PSI	(OUT - OF - PLANE)
$F_v = 150$ PSI	$F_b' = 1547$ PSI	<b>513 LB</b>

DBL TOP PLATE PROPERTIES:	APPLIED STRESSES:	
$A_x = 16.50$ IN <sup>2</sup>	$F_v = 12$ PSI	---- O.K.
$S_x = 4.13$ IN <sup>3</sup>	$F_b = 436$ PSI	---- O.K.
$I_x = 3.09$ IN <sup>4</sup>	$\Delta_{MAX} = 0.042$ IN	

Typical Continuous Footings

$P_{allow} = 1500 \text{ psf}$  (assumed)  
per Design Criteria

2'-0" wide  $\Rightarrow W_{allow} = 2' \times 1.5 \text{ ksf} = 3 \text{ klf}$

1'-6" wide  $\Rightarrow W_{allow} = 1.5' \times 1.5 \text{ ksf} = 2.25 \text{ klf}$

Typical Spread Footings

2'-0"  $\boxtimes$   $\Rightarrow P_{allow} = 2' \times 2' \times 1.5 \text{ ksf} = 6 \text{ k}$

2'-6"  $\boxtimes$   $\Rightarrow P_{allow} = 9.4 \text{ k}$

3'-0"  $\boxtimes$  " " = 13.5 k

3'-6"  $\boxtimes$  " " = 18.4 k

4'-0"  $\boxtimes$  " " = 24 k

If needed

4'-6"  $\boxtimes$  " " = 30.4 k

• Compare to Exercise Reactions

1'-4" DIA  $\rightarrow P_{allow} = 2.1 \text{ K}$

1'-6" DIA  $\rightarrow P_{allow} = 2.7 \text{ K}$

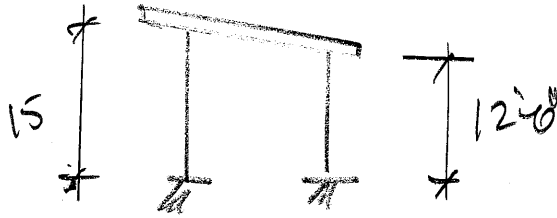
2'-0" DIA  $\rightarrow P_{allow} = 4.7 \text{ K}$

2'-6" DIA  $\rightarrow P_{allow} = 7.4 \text{ K}$

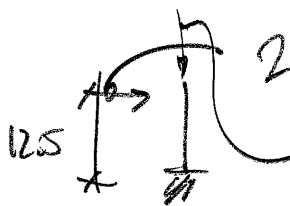


Review canopy at truck enclosure

$R = 2.5$   
 $\Omega = 1.25$



$V = 0.45 [15 \text{ kft} \times 14 \times 30] = 2.83 \text{ k}$

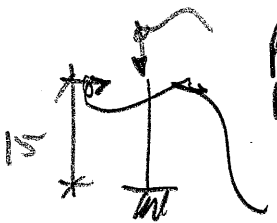


$2.83 \text{ k} \times 1.25 \times 1.3$

$P = \frac{D}{S} = \frac{15}{25} \left\{ 7' (15) = \frac{1.6 \text{ k}}{2.6 \text{ k}} \right.$

$\phi \frac{P_u}{\phi_{all}} = \frac{1.6 \text{ k}}{7.3} = .08 < .15$  , okay

$\Delta = 1.838'' \times 2.5 = 4.10''$   
 $\therefore$  HSS 6x6x1/2 No. good Allowable =  $.025 \times 12.5 \times 12 = 3.75''$



$P_u = 1.1 \text{ k}$   
 $P_s = 2.6 \text{ k}$

$V = \frac{2.83 (12.5) 1.25 (1.3)}{2}$

Try HSS 7x7x1/2  
 $\Delta = 1.1 (2.5) = 2.75''$   
 okay

$\Delta = .38'' \rightarrow \Delta_{ie} = .38 (2.5) = .95''$  okay

$\therefore$  HSS 7x7x1/2



Project Title:  
Engineer:  
Project ID:  
Project Descr:

## Building Code Information

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

Governing Code : IBC 2018, ASCE 7-16, CBC 2019, AISC 360-16, NDS 2018, ACI 318-14, TMS 402-16

City Jurisdiction :

Contact Name :

Alternate Contact :

Building Official :

Address : , ,

Phone :

Fax :

eMail :

Notes :



Project Title: Taco Time NW  
Engineer: JMB  
Project ID: 23514  
Project Descr:

## Project Information

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.05.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

Project Title : Taco Time NW

Description :

I.D. : 23514

Address : , Puyallup, WA

Project Leader : JMB

Phone :

Fax :

eMail :

Project Notes

## Steel Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Trash Enclosure Roof Beam

## CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2021

## Material Properties

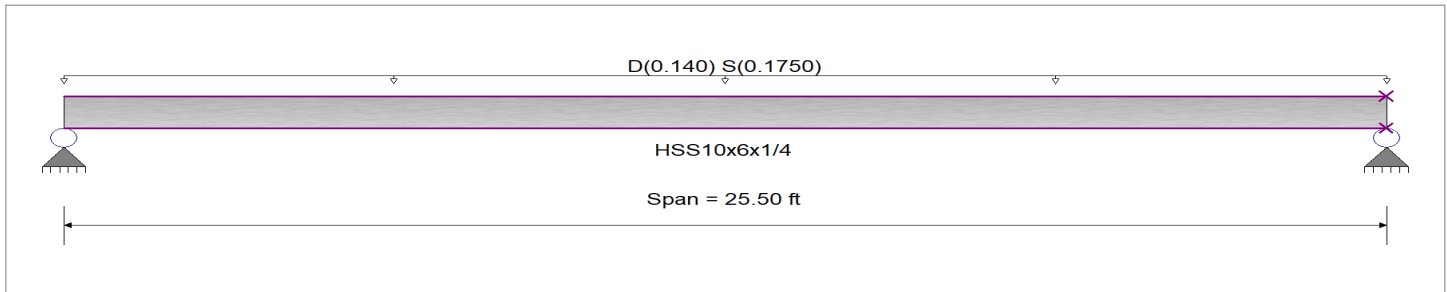
Analysis Method : Allowable Strength Design

Fy : Steel Yield : 50.0 ksi

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

E: Modulus : 29,000.0 ksi

Bending Axis : Major Axis Bending



## Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, S = 0.0250 ksf, Tributary Width = 7.0 ft

## DESIGN SUMMARY

**Design OK**

Maximum Bending Stress Ratio =	<b>0.470 : 1</b>	Maximum Shear Stress Ratio =	<b>0.056 : 1</b>
Section used for this span	<b>HSS10x6x1/4</b>	Section used for this span	<b>HSS10x6x1/4</b>
Ma : Applied	27.702 k-ft	Va : Applied	4.345 k
Mn / Omega : Allowable	58.882 k-ft	Vn/Omega : Allowable	77.861 k
Load Combination	+D+S	Load Combination	+D+S
Span # where maximum occurs	Span # 1	Location of maximum on span	0.000 ft
		Span # where maximum occurs	Span # 1
<b>Maximum Deflection</b>			
Max Downward Transient Deflection	0.594 in	Ratio =	514 >=360
Max Upward Transient Deflection	0 in	Ratio =	0 <360
Max Downward Total Deflection	1.159 in	Ratio =	264 >=180
Max Upward Total Deflection	0 in	Ratio =	0 <180
		Span: 1 : S Only	
		Span: 1 : +D+S	
		n/a	
		n/a	

## Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values				
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega	
D Only															
Dsgn. L =	25.50 ft	1	0.229	0.027	13.48		13.48	98.33	58.88	1.00	1.00	2.11	130.03	77.86	
+D+S															
Dsgn. L =	25.50 ft	1	0.470	0.056	27.70		27.70	98.33	58.88	1.00	1.00	4.35	130.03	77.86	
+D+0.750S															
Dsgn. L =	25.50 ft	1	0.410	0.049	24.15		24.15	98.33	58.88	1.00	1.00	3.79	130.03	77.86	
+0.60D															
Dsgn. L =	25.50 ft	1	0.137	0.016	8.09		8.09	98.33	58.88	1.00	1.00	1.27	130.03	77.86	

## Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	1.1591	12.823		0.0000	0.000

## Vertical Reactions

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	4.345	4.345
Max Upward from Load Combinations	4.345	4.345
Max Upward from Load Cases	2.231	2.231
D Only	2.114	2.114
+D+S	4.345	4.345
+D+0.750S	3.788	3.788
+0.60D	1.269	1.269

Project Title: Taco Time NW  
Engineer: JMB  
Project ID: 23514  
Project Descr:

## Steel Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Trash Enclosure Roof Beam

### Vertical Reactions

Support notation : Far left is #

Values in KIPS

Load Combination	Support 1	Support 2
S Only	2.231	2.231

## Steel Column

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Trash Enclosure Steel Column (12.5')

### Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combinations Used : IBC 2021

### General Information

Steel Section Name : <b>HSS7x7x1/2</b>	Overall Column Height	12.50 ft
Analysis Method : Load Resistance Factor	Top & Bottom Fixity	Top Free, Bottom Fixed
Steel Stress Grade	Brace condition :	
Fy : Steel Yield 50.0 ksi	Unbraced Length for buckling ABOUT X-X Axis = 12.50 ft, K = 2.1	
E : Elastic Bending Modulus 29,000.0 ksi	Unbraced Length for buckling ABOUT Y-Y Axis = 12.50 ft, K = 2.1	

### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 525.63 lbs \* Dead Load Factor

AXIAL LOADS . . .

Axial Load at 12.50 ft, D = 1.60, S = 2.60 k

BENDING LOADS . . .

Lat. Point Load at 12.50 ft creating Mx-x, E = 2.30 k

### DESIGN SUMMARY

#### Bending & Shear Check Results

**PASS** Max. Axial+Bending Stress Ratio = **0.3566** : 1  
 Load Combination +1.402D+0.70S+1.250E  
 Location of max.above base 0.0 ft  
 At maximum location values are . . .

Pu	4.80 k
0.9 * Pn	182.679 k
Mu-x	-35.938 k-ft
0.9 * Mn-x :	104.625 k-ft
Mu-y	0.0 k-ft
0.9 * Mn-y :	104.625 k-ft

**Maximum Load Reactions . .**

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	0.0 k
Bottom along Y-Y	2.30 k

**Maximum Load Deflections . . .**

Along Y-Y	1.103 in at	12.50ft	above base
for load combination : E Only			
Along X-X	0.0 in at	0.0ft	above base
for load combination :			

**PASS** Maximum Shear Stress Ratio = **0.02451** : 1  
 Load Combination +1.402D+0.70S+1.250E  
 Location of max.above base 0.0 ft  
 At maximum location values are . . .

Vu : Applied	2.875 k
Vn * Phi : Allowable	117.285 k

### Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios				Cb <sub>x</sub>	Cb <sub>y</sub>	K <sub>x</sub> L <sub>x</sub> /R <sub>y</sub>	K <sub>y</sub> L <sub>y</sub> /R <sub>x</sub>	Maximum Shear Ratios		
	Stress Ratio	Status	Location	Stress Ratio					Status	Location	
+1.40D	0.016	PASS	0.00 ft	1.67	1.00	119.77	119.77	0.000	PASS	0.00 ft	
+1.20D	0.014	PASS	0.00 ft	1.67	1.00	119.77	119.77	0.000	PASS	0.00 ft	
+1.20D+0.50S	0.021	PASS	0.00 ft	1.67	1.00	119.77	119.77	0.000	PASS	0.00 ft	
+1.20D+1.60S	0.037	PASS	0.00 ft	1.67	1.00	119.77	119.77	0.000	PASS	0.00 ft	
+1.402D+0.70S+1.250E	0.357	PASS	0.00 ft	1.67	1.00	119.77	119.77	0.025	PASS	0.00 ft	
+0.90D	0.010	PASS	0.00 ft	1.67	1.00	119.77	119.77	0.000	PASS	0.00 ft	
+0.6980D+1.250E	0.348	PASS	0.00 ft	1.67	1.00	119.77	119.77	0.025	PASS	0.00 ft	

### Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top		k	Y-Y Axis Reaction @ Base @ Top		M <sub>x</sub> - End Moments @ Base @ Top		M <sub>y</sub> - End Moments @ Base @ Top	
D Only	2.126									
+D+S	4.726									
+D+0.750S	4.076									
+D+0.70E	2.126				1.610			-20.125		
+D+0.750S+0.5250E	4.076				1.208			-15.094		
+0.60D	1.275									
+0.60D+0.70E	1.275				1.610			-20.125		

**Steel Column**

**DESCRIPTION: Trash Enclosure Steel Column (12.5')**

**Maximum Reactions**

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		My - End Moments	
	@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
S Only	2.600									
E Only					2.300		-28.750			

**Extreme Reactions**

Item	Extreme Value	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		My - End Moments	
		@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
Axial @ Base	Maximum	4.726									
"	Minimum					2.300		-28.750			
Reaction, X-X Axis Base	Maximum	2.126									
"	Minimum	2.126									
Reaction, Y-Y Axis Base	Maximum					2.300		-28.750			
"	Minimum	2.126									
Reaction, X-X Axis Top	Maximum	2.126									
"	Minimum	2.126									
Reaction, Y-Y Axis Top	Maximum	2.126									
"	Minimum	2.126									
Moment, X-X Axis Base	Maximum	2.126									
"	Minimum		-28.750			2.300		-28.750			
Moment, Y-Y Axis Base	Maximum	2.126									
"	Minimum	2.126									
Moment, X-X Axis Top	Maximum	2.126									
"	Minimum	2.126									
Moment, Y-Y Axis Top	Maximum	2.126									
"	Minimum	2.126									

**Maximum Deflections for Load Combinations**

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.70E	0.0000 in	0.000 ft	0.772 in	12.500 ft
+D+0.750S+0.5250E	0.0000 in	0.000 ft	0.579 in	12.500 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.70E	0.0000 in	0.000 ft	0.772 in	12.500 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	1.092 in	12.416 ft

**Steel Section Properties : HSS7x7x1/2**

Depth	=	7.000 in	I xx	=	80.50 in^4	J	=	133.000 in^4
Design Thick	=	0.465 in	S xx	=	23.00 in^3			
Width	=	7.000 in	R xx	=	2.630 in			
Wall Thick	=	0.500 in	Zx	=	27.900 in^3			
Area	=	11.600 in^2	I yy	=	80.500 in^4	C	=	39.300 in^3
Weight	=	42.050 plf	S yy	=	23.000 in^3			
			R yy	=	2.630 in			

Ycg = 0.000 in

## Steel Column

Project File: 23514 enercalc 2023-06-17 jmb.ec6

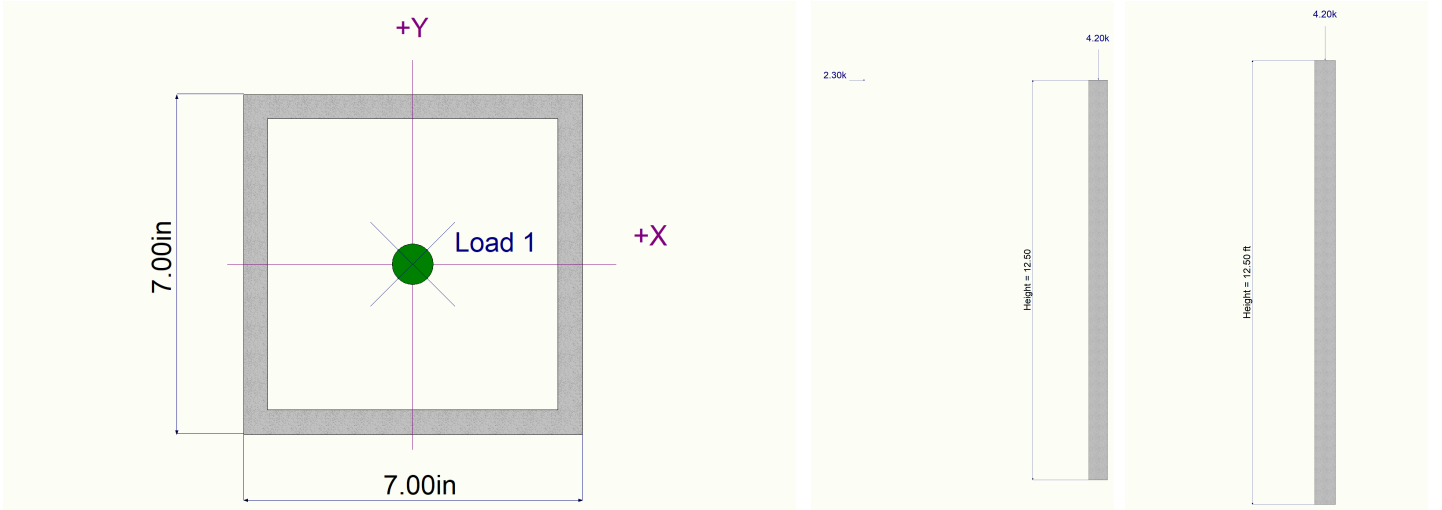
LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Trash Enclosure Steel Column (12.5')

### Sketches





## Steel Column

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Trash Enclosure Steel Column (15')

### Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combinations Used : IBC 2021

### General Information

Steel Section Name :	<b>HSS7x7x1/2</b>	Overall Column Height	15.0 ft
Analysis Method :	Load Resistance Factor	Top & Bottom Fixity	Top Free, Bottom Fixed
Steel Stress Grade		Brace condition :	
Fy : Steel Yield	50.0 ksi	Unbraced Length for buckling ABOUT X-X Axis =	15.0 ft, K = 2.1
E : Elastic Bending Modulus	29,000.0 ksi	Unbraced Length for buckling ABOUT Y-Y Axis =	15.0 ft, K = 2.1

### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 630.75 lbs \* Dead Load Factor

AXIAL LOADS . . .

Axial Load at 15.0 ft, D = 1.60, S = 2.60 k

BENDING LOADS . . .

Lat. Point Load at 12.50 ft creating Mx-x, E = 0.60 k

### DESIGN SUMMARY

#### Bending & Shear Check Results

**PASS** Max. Axial+Bending Stress Ratio = **0.1091** : 1  
 Load Combination +1.402D+0.70S+1.250E  
 Location of max.above base 0.0 ft  
 At maximum location values are . . .

Pu	4.948 k
0.9 * Pn	126.860 k
Mu-x	-9.375 k-ft
0.9 * Mn-x :	104.625 k-ft
Mu-y	0.0 k-ft
0.9 * Mn-y :	104.625 k-ft

#### Maximum Load Reactions . .

Top along X-X	0.0 k
Bottom along X-X	0.0 k
Top along Y-Y	0.0 k
Bottom along Y-Y	0.60 k

#### Maximum Load Deflections . . .

Along Y-Y	0.3741 in at	15.0ft	above base
for load combination : E Only			
Along X-X	0.0 in at	0.0ft	above base
for load combination :			

**PASS** Maximum Shear Stress Ratio **0.006395** : 1

Load Combination +1.402D+0.70S+1.250E  
 Location of max.above base 0.0 ft  
 At maximum location values are . . .

Vu : Applied	0.750 k
Vn * Phi : Allowable	117.285 k

### Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios				Cb <sub>x</sub>	Cb <sub>y</sub>	K <sub>x</sub> L <sub>x</sub> /R <sub>y</sub>	K <sub>y</sub> L <sub>y</sub> /R <sub>x</sub>	Maximum Shear Ratios		
	Stress Ratio	Status	Location	Stress Ratio					Status	Location	
+1.40D	0.025	PASS	0.00 ft	1.93	1.00	143.73	143.73	0.000	PASS	0.00 ft	
+1.20D	0.021	PASS	0.00 ft	1.93	1.00	143.73	143.73	0.000	PASS	0.00 ft	
+1.20D+0.50S	0.031	PASS	0.00 ft	1.93	1.00	143.73	143.73	0.000	PASS	0.00 ft	
+1.20D+1.60S	0.054	PASS	0.00 ft	1.93	1.00	143.73	143.73	0.000	PASS	0.00 ft	
+1.402D+0.70S+1.250E	0.109	PASS	0.00 ft	1.93	1.00	143.73	143.73	0.006	PASS	0.00 ft	
+0.90D	0.016	PASS	0.00 ft	1.93	1.00	143.73	143.73	0.000	PASS	0.00 ft	
+0.6980D+1.250E	0.096	PASS	0.00 ft	1.93	1.00	143.73	143.73	0.006	PASS	0.00 ft	

### Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base @ Top		k	Y-Y Axis Reaction @ Base @ Top		Mx - End Moments k-ft @ Base @ Top		My - End Moments @ Base @ Top	
		D Only	2.231							
+D+S	4.831									
+D+0.750S	4.181									
+D+0.70E	2.231				0.420		-5.250			
+D+0.750S+0.5250E	4.181				0.315		-3.938			
+0.60D	1.338									
+0.60D+0.70E	1.338				0.420		-5.250			

**Steel Column**

LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Trash Enclosure Steel Column (15')**

**Maximum Reactions**

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		My - End Moments	
	@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
S Only	2.600									
E Only					0.600		-7.500			

**Extreme Reactions**

Item	Extreme Value	Axial Reaction	X-X Axis Reaction		k	Y-Y Axis Reaction		Mx - End Moments		My - End Moments	
		@ Base	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top	@ Base	@ Top
Axial @ Base	Maximum	4.831									
"	Minimum					0.600		-7.500			
Reaction, X-X Axis Base	Maximum	2.231									
"	Minimum	2.231									
Reaction, Y-Y Axis Base	Maximum					0.600		-7.500			
"	Minimum	2.231									
Reaction, X-X Axis Top	Maximum	2.231									
"	Minimum	2.231									
Reaction, Y-Y Axis Top	Maximum	2.231									
"	Minimum	2.231									
Moment, X-X Axis Base	Maximum	2.231									
"	Minimum		-7.500			0.600		-7.500			
Moment, Y-Y Axis Base	Maximum	2.231									
"	Minimum	2.231									
Moment, X-X Axis Top	Maximum	2.231									
"	Minimum	2.231									
Moment, Y-Y Axis Top	Maximum	2.231									
"	Minimum	2.231									

**Maximum Deflections for Load Combinations**

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.70E	0.0000 in	0.000 ft	0.262 in	15.000 ft
+D+0.750S+0.5250E	0.0000 in	0.000 ft	0.196 in	15.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.70E	0.0000 in	0.000 ft	0.262 in	15.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.371 in	14.899 ft

**Steel Section Properties : HSS7x7x1/2**

Depth	=	7.000 in	I xx	=	80.50 in^4	J	=	133.000 in^4
Design Thick	=	0.465 in	S xx	=	23.00 in^3			
Width	=	7.000 in	R xx	=	2.630 in			
Wall Thick	=	0.500 in	Zx	=	27.900 in^3			
Area	=	11.600 in^2	I yy	=	80.500 in^4	C	=	39.300 in^3
Weight	=	42.050 plf	S yy	=	23.000 in^3			
			R yy	=	2.630 in			
Ycg	=	0.000 in						

## Steel Column

Project File: 23514 enercalc 2023-06-17 jmb.ec6

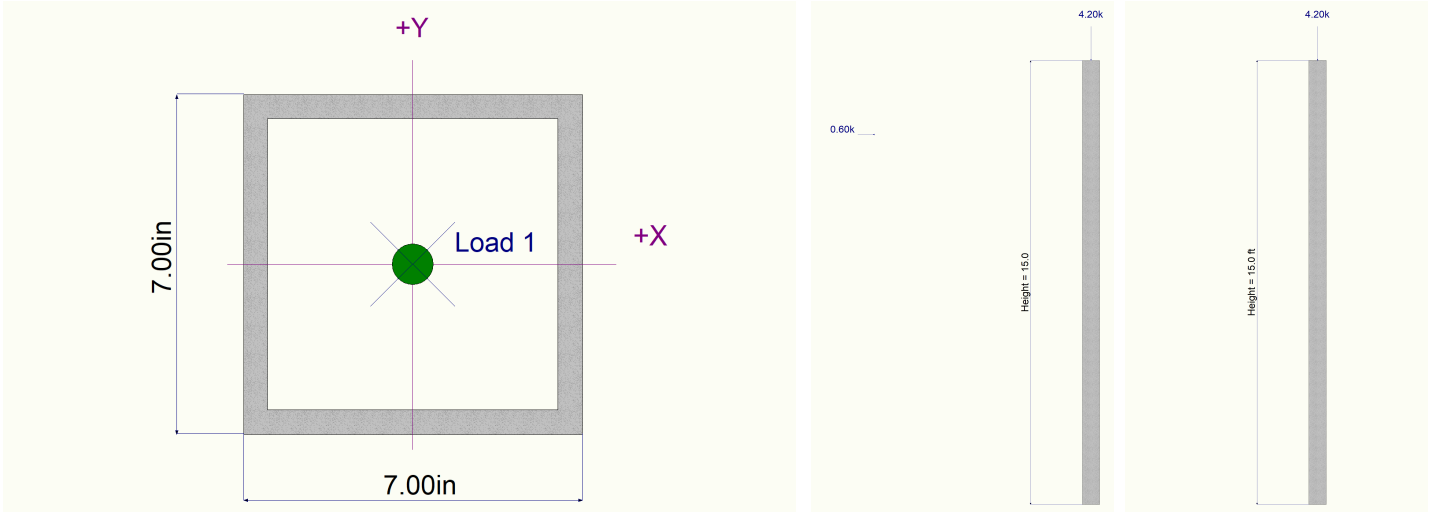
LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Trash Enclosure Steel Column (15')

### Sketches



## General Footing

LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

### DESCRIPTION: Footing at 12.5 Tall Columns

### Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16  
 Load Combinations Used : IBC 2021

### General Information

#### Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

#### Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.350

#### Increases based on footing depth

Footing base depth below soil surface	=	3.0 ft
Allow press. increase per foot of depth when footing base is below	=	ksf ft

#### Increases based on footing plan dimension

Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf ft
---	---	--------

#### Analysis Settings

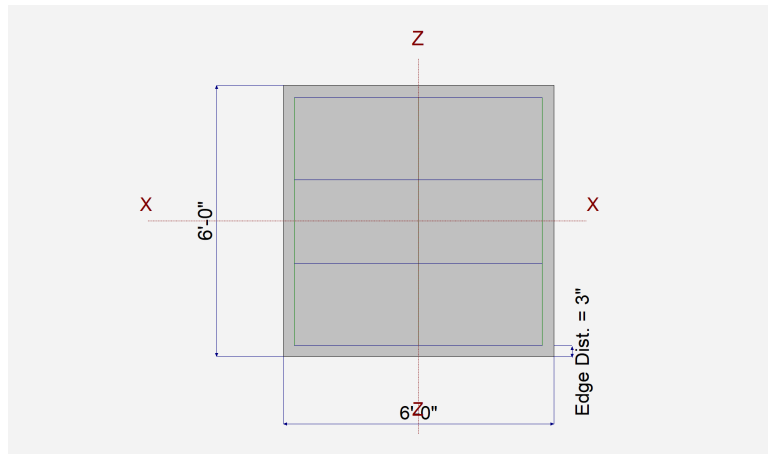
Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

### Dimensions

Width parallel to X-X Axis	=	6.0 ft
Length parallel to Z-Z Axis	=	6.0 ft
Footing Thickness	=	18.0 in

#### Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



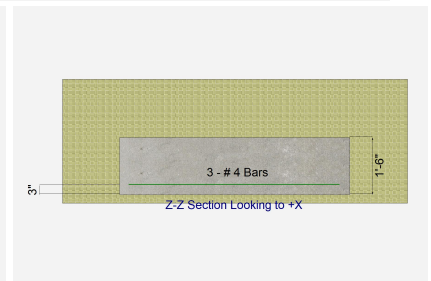
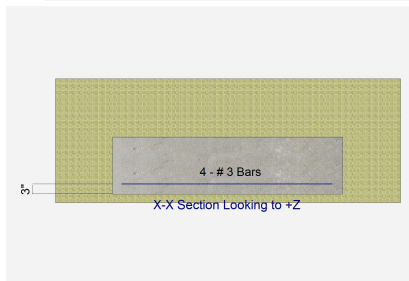
### Reinforcing

Bars parallel to X-X Axis	=	
Number of Bars	=	4.0
Reinforcing Bar Size	=	# 3

Bars parallel to Z-Z Axis	=	
Number of Bars	=	3.0
Reinforcing Bar Size	=	# 4

#### Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



### Applied Loads

	D	Lr	L	S	W	E	H
P : Column Load	=	58.0		2.20			k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=					27.60	k-ft
V-x	=						k
V-z	=						k

## Steel Base Plate

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC#: KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Trash Enclosure Bearing Plate

### Code Reference:

Calculations per AISC Design Guide # 1, IBC 2018, CBC 2019, ASCE 7-16, AISC 360-16  
 Load Combination Set : IBC 2021

### General Information

#### Material Properties

AISC Design Method	Load Resistance Factor Design	$\phi_c$ : LRFD Resistance Factor	0.65
Steel Plate Fy	= 36 ksi		
Concrete Support f'c	= 3 ksi		
Assumed Bearing Area	Full Bearing	Nominal Bearing Fp per J8	2.550 ksi

### Column & Plate

#### Column Properties

Steel Section	HSS7x7x1/2		
Depth	7 in	Area	11.6 in <sup>2</sup>
Width	7 in	Ixx	80.5 in <sup>4</sup>
Flange Thickness	0.465 in	Iyy	80.5 in <sup>4</sup>
Web Thickness	0 in		

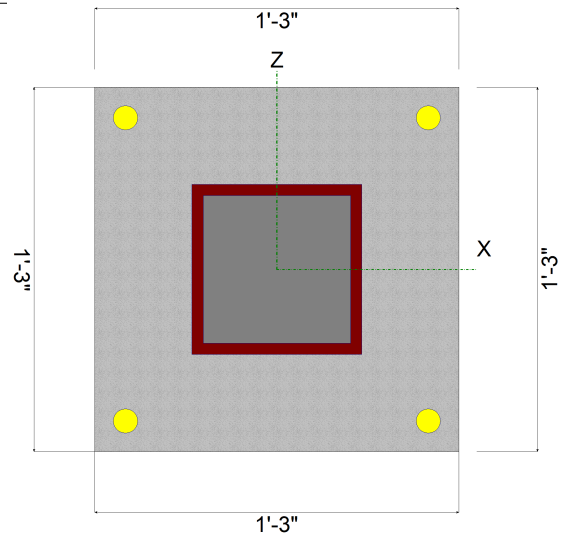
#### Plate Dimensions

N : Length	15.0 in
B : Width	15.0 in
Thickness	1.50 in

#### Support Dimensions

Width along "X"	15.0 in
Length along "Z"	15.0 in

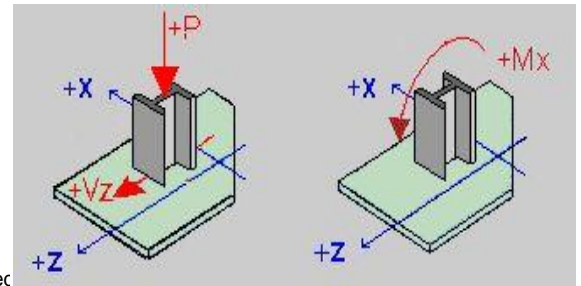
Column assumed welded to base plate



### Applied Loads

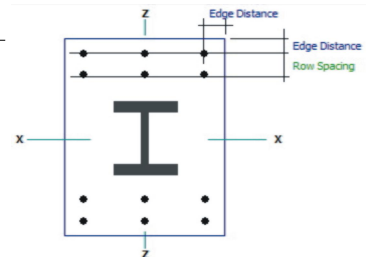
	P-Y	V-Z	M-X
D : Dead Load	2.20 k	k	k-ft
L : Live	k	k	k-ft
Lr : Roof Live	k	k	k-ft
S : Snow	2.20 k	k	k-ft
W : Wind	k	k	k-ft
E : Earthquake	k	k	27.60 k-ft
H : Lateral Earth	k	k	k-ft

" P " = Gravity load, "+" sign is downward  
 "+" Moments create higher soil pressure at +Z edge  
 "+" Shears push plate towards +Z edge



### Anchor Bolts

Anchor Bolt or Rod Description 1	
Max of Tension or Pullout Capacity.....	k
Shear Capacity.....	k
Edge distance : bolt to plate.....	1.25 in
Number of Bolts in each Row.....	2
Number of Bolt Rows.....	1



Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Steel Base Plate**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Trash Enclosure Bearing Plate**

**GOVERNING DESIGN LOAD CASE SUMMARY**

**Plate Design Summary**

Design Method **Load Resistance Factor Design**  
 Governing Load Combinat **+1.20D+0.70S+E**  
 Governing Load Case Typ **Axial + Moment, L/2 < Eccentricity, Tension**  
 Governing STRESS RATIO **1.0**  
 Design Plate Size **1'-3" x 1'-3" x 1 -1/2"**  
 Pu : Axial ..... 0.000 k  
 Mu : Moment ..... 0.000 k-ft

Mu : Max. Moment ..... 7.256 k-in  
 fb : Max. Bending Stress ..... 19.348 ksi  
 Fb : Allowable : 32.400 ksi  
 Fy \* Phi  
 Bending Stress Ratio **0.597**  
**Bending Stress OK**  
 fu : Max. Plate Bearing Stress .... 1.658 ksi  
 Fp : Allowable : 1.658 ksi  
 Bearing Stress Ratio **1.000**  
**Bearing Stress OK**

Load Comb. : +1.40D

***Axial Load Only, No Moment***

Loading

Pu : Axial ..... 3.080 k  
 Design Plate Height ..... 15.000 in  
 Design Plate Width ..... 15.000 in  
*Will be different from entry if partial bearing used.*  
 A1 : Plate Area ..... 225.000 in^2  
 A2: Support Area ..... 225.000 in^2  
 sqrt( A2/A1 ) 1.000

Bearing Stresses

Fp : Allowable ..... 1.658 ksi  
 fu : Max. Bearing Pressure 0.014 ksi  
**Stress Ratio ..... 0.008**

Plate Bending Stresses

Mmax = Fu \* L^2 / 2 ..... 0.119 k-in on 1" strip  
 fb : Actual ..... 0.212 ksi  
 Fb : Allowable ..... 32.400 ksi  
**Stress Ratio ..... 0.007**

Distance for Moment Calculation

" m " ..... 4.175 in  
 " n " ..... 4.175 in  
 X ..... 0.000 in^2  
 Lambda ..... 0.000  
 n' ..... 0.000 in  
 n' \* Lambda ..... 0.000 in  
 L = max(m, n, n') ..... 4.175 in

Load Comb. : +1.20D

***Axial Load Only, No Moment***

Loading

Pu : Axial ..... 2.640 k  
 Design Plate Height ..... 15.000 in  
 Design Plate Width ..... 15.000 in  
*Will be different from entry if partial bearing used.*  
 A1 : Plate Area ..... 225.000 in^2  
 A2: Support Area ..... 225.000 in^2  
 sqrt( A2/A1 ) 1.000

Bearing Stresses

Fp : Allowable ..... 1.658 ksi  
 fu : Max. Bearing Pressure 0.012 ksi  
**Stress Ratio ..... 0.007**

Plate Bending Stresses

Mmax = Fu \* L^2 / 2 ..... 0.102 k-in on 1" strip  
 fb : Actual ..... 0.182 ksi  
 Fb : Allowable ..... 32.400 ksi  
**Stress Ratio ..... 0.006**

Distance for Moment Calculation

" m " ..... 4.175 in  
 " n " ..... 4.175 in  
 X ..... 0.000 in^2  
 Lambda ..... 0.000  
 n' ..... 0.000 in  
 n' \* Lambda ..... 0.000 in  
 L = max(m, n, n') ..... 4.175 in

Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Steel Base Plate**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Trash Enclosure Bearing Plate**

Load Comb. : +1.20D+0.50S

**Axial Load Only, No Moment**

Loading

Pu : Axial ..... 3.740 k  
 Design Plate Height ..... 15.000 in  
 Design Plate Width ..... 15.000 in  
*Will be different from entry if partial bearing used.*  
 A1 : Plate Area ..... 225.000 in<sup>2</sup>  
 A2: Support Area ..... 225.000 in<sup>2</sup>  
 sqrt( A2/A1 ) ..... 1.000

Distance for Moment Calculation

" m " ..... 4.175 in  
 " n " ..... 4.175 in  
 X ..... 0.000 in<sup>2</sup>  
 Lambda ..... 0.000  
 n' ..... 0.000 in  
 n' \* Lambda ..... 0.000 in  
 L = max(m, n, n") ..... 4.175 in

Bearing Stresses

Fp : Allowable ..... 1.658 ksi  
 fu : Max. Bearing Pressure ..... 0.017 ksi  
**Stress Ratio ..... 0.010**

Plate Bending Stresses

Mmax = Fu \* L<sup>2</sup> / 2 ..... 0.145 k-in on 1" strip  
 fb : Actual ..... 0.258 ksi  
 Fb : Allowable ..... 32.400 ksi  
**Stress Ratio ..... 0.008**

Load Comb. : +1.20D+1.60S

**Axial Load Only, No Moment**

Loading

Pu : Axial ..... 6.160 k  
 Design Plate Height ..... 15.000 in  
 Design Plate Width ..... 15.000 in  
*Will be different from entry if partial bearing used.*  
 A1 : Plate Area ..... 225.000 in<sup>2</sup>  
 A2: Support Area ..... 225.000 in<sup>2</sup>  
 sqrt( A2/A1 ) ..... 1.000

Distance for Moment Calculation

" m " ..... 4.175 in  
 " n " ..... 4.175 in  
 X ..... 0.000 in<sup>2</sup>  
 Lambda ..... 0.000  
 n' ..... 0.000 in  
 n' \* Lambda ..... 0.000 in  
 L = max(m, n, n") ..... 4.175 in

Bearing Stresses

Fp : Allowable ..... 1.658 ksi  
 fu : Max. Bearing Pressure ..... 0.027 ksi  
**Stress Ratio ..... 0.017**

Plate Bending Stresses

Mmax = Fu \* L<sup>2</sup> / 2 ..... 0.239 k-in on 1" strip  
 fb : Actual ..... 0.424 ksi  
 Fb : Allowable ..... 32.400 ksi  
**Stress Ratio ..... 0.013**

Load Comb. : +1.20D+0.70S+E

**Axial Load + Moment, Ecc. > L/2**

Loading

Pu : Axial ..... 4.180 k  
 Mu : Moment ..... 27.600 k-ft  
 Eccentricity ..... 79.234 in  
 A1 : Plate Area ..... 225.000 in<sup>2</sup>  
 A2 : Support Area ..... 225.000 in<sup>2</sup>  
 sqrt( A2/A1 ) ..... 1.000

Calculate plate moment from bearing ...

max(m, n) ..... 4.700 in  
 "A" : Bearing Length ..... 2.209 in  
 Mpl : Plate Moment ..... 0.605 k-in

Calculate plate moment from bolt tension ...

Tension per Bolt ..... 11.639 k  
 Tension : Allowable ..... 0.000 k  
**Stress Ratio ..... 0.000**  
 Dist. from Bolt to Col. Edge ..... 2.925 in  
 Effective Bolt Width for Bending ..... 11.700 in  
 Plate Moment from Bolt Tension ..... 5.819 k-in

Bearing Stresses

Fp : Allowable ..... 1.658 ksi  
 fu : Max. Bearing Pressure ( set equal to Fp ) .....  
**Stress Ratio ..... 1.000**

Plate Bending Stresses

Mmax ..... 7.256 k-in on 1" strip  
 fb : Actual ..... 19.348 ksi  
 Fb : Allowable ..... 32.400 ksi  
**Stress Ratio ..... 0.597**

Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Steel Base Plate**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION: Trash Enclosure Bearing Plate**

Load Comb. : +0.90D

**Axial Load Only, No Moment**

Loading

Pu : Axial ..... 1.980 k  
 Design Plate Height ..... 15.000 in  
 Design Plate Width ..... 15.000 in  
*Will be different from entry if partial bearing used.*  
 A1 : Plate Area ..... 225.000 in<sup>2</sup>  
 A2: Support Area ..... 225.000 in<sup>2</sup>  
 sqrt( A2/A1 ) ..... 1.000

Distance for Moment Calculation

" m " ..... 4.175 in  
 " n " ..... 4.175 in  
 X ..... 0.000 in<sup>2</sup>  
 Lambda ..... 0.000  
 n' ..... 0.000 in  
 n' \* Lambda ..... 0.000 in  
 L = max(m, n, n') ..... 4.175 in

Bearing Stresses

Fp : Allowable ..... 1.658 ksi  
 fu : Max. Bearing Pressure ..... 0.009 ksi  
**Stress Ratio ..... 0.005**

Plate Bending Stresses

Mmax = Fu \* L<sup>2</sup> / 2 ..... 0.077 k-in on 1" strip  
 fb : Actual ..... 0.136 ksi  
 Fb : Allowable ..... 32.400 ksi  
**Stress Ratio ..... 0.004**

Load Comb. : +0.90D+E

**Axial Load + Moment, Ecc. > L/2**

Loading

Pu : Axial ..... 1.980 k  
 Mu : Moment ..... 27.600 k-ft  
 Eccentricity ..... 167.273 in  
 A1 : Plate Area ..... 225.000 in<sup>2</sup>  
 A2 : Support Area ..... 225.000 in<sup>2</sup>  
 sqrt( A2/A1 ) ..... 1.000

Calculate plate moment from bearing ...

max(m, n) ..... 4.700 in  
 "A" : Bearing Length ..... 2.119 in  
 Mpl : Plate Moment ..... 0.584 k-in

Calculate plate moment from bolt tension ...

Tension per Bolt ..... 12.180 k  
 Tension : Allowable ..... 0.000 k  
**Stress Ratio ..... 0.000**  
 Dist. from Bolt to Col. Edge ..... 2.925 in  
 Effective Bolt Width for Bending ..... 11.700 in  
 Plate Moment from Bolt Tension ..... 6.090 k-in

Bearing Stresses

Fp : Allowable ..... 1.658 ksi  
 fu : Max. Bearing Pressure ( set equal to Fp ) .....  
**Stress Ratio ..... 1.000**

Plate Bending Stresses

Mmax ..... 7.013 k-in on 1" strip  
 fb : Actual ..... 18.701 ksi  
 Fb : Allowable ..... 32.400 ksi  
**Stress Ratio ..... 0.577**



## Wood Beam

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Roof Joists

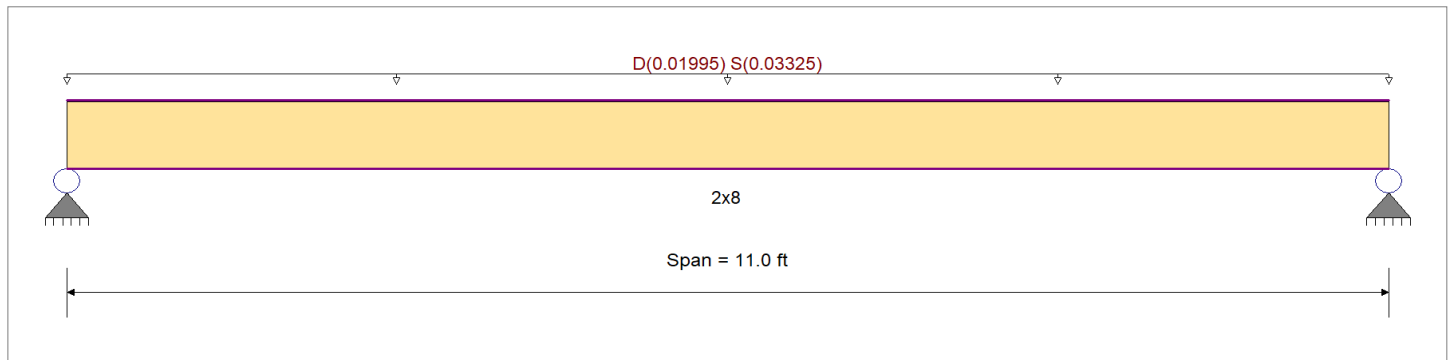
### CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : IBC 2021

### Material Properties

Analysis Method : Allowable Stress Design	Fb +	900 psi	<i>E : Modulus of Elasticity</i>	
Load Combination : IBC 2021	Fb -	900 psi	Ebend- xx	1600ksi
	Fc - Prll	1350 psi	Eminbend - xx	580ksi
Wood Species : Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade : No.2	Fv	180 psi		
	Ft	575 psi	Density	31.21 pcf
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling				



### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 1.330 ft

### DESIGN SUMMARY

**Design OK**

<b>Maximum Bending Stress Ratio</b>	=	<b>0.618</b> < 1	<b>Maximum Shear Stress Ratio</b>	=	<b>0.181</b> < 1
Section used for this span		<b>2x8</b>	Section used for this span		<b>2x8</b>
fb: Actual	=	767.36psi	fv: Actual	=	37.53 psi
F'b	=	1,242.00psi	F'v	=	207.00 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	5.500ft	Location of maximum on span	=	10.398 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
<b>Maximum Deflection</b>					
Max Downward Transient Deflection	0.145 in	Ratio =	<b>913</b> >=360	Span: 1 : S Only	
Max Upward Transient Deflection	0 in	Ratio =	<b>0</b> <360	n/a	
Max Downward Total Deflection	0.242 in	Ratio =	<b>546</b> >=240	Span: 1 : +D+S	
Max Upward Total Deflection	0 in	Ratio =	<b>0</b> <240	n/a	

### Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C <sub>t</sub>	CLx	C <sub>F</sub>	C <sub>fu</sub>	C <sub>i</sub>	C <sub>r</sub>	M	fb	F'b	V	fv	F'v		
D Only																				
Length = 11.0 ft	1		0.317	0.093	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.34	308.1	972.0	0.00	0.00	0.0	0.0	0.0
+D+S																				
Length = 11.0 ft	1		0.618	0.181	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.84	767.4	1,242.0	0.00	0.00	0.0	0.0	0.0
+D+0.750S																				
Length = 11.0 ft	1		0.525	0.154	1.15	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.71	652.5	1,242.0	0.00	0.00	0.0	0.0	0.0
+0.60D																				
Length = 11.0 ft	1		0.107	0.031	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.20	184.9	1,728.0	0.00	0.00	0.0	0.0	0.0

Project Title: Taco Time NW  
 Engineer: JMB  
 Project ID: 23514  
 Project Descr:

**Wood Beam**

Project File: 23514 enercalc 2023-06-17 jmb.ec6

LIC# : KW-06014122, Build:20.23.08.01

PCS STRUCTURAL SOLUTIONS

(c) ENERCALC INC 1983-2023

**DESCRIPTION:** Roof Joists

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.2415	5.540		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.306	0.306
Max Upward from Load Combinations	0.306	0.306
Max Upward from Load Cases	0.183	0.183
D Only	0.123	0.123
+D+S	0.306	0.306
+D+0.750S	0.260	0.260
+0.60D	0.074	0.074
S Only	0.183	0.183