PCS Structural Solutions

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STRUCTURAL CALCULATIONS

FOR

MERCER MODERN
8621 SE 63RD ST
MERCER ISLAND, WA 98040

PREPARED BY
PCS STRUCTURAL *SOLUTIONS*

OCTOBER 17, 2025
25-348

DESIGN CRITERIA

Project: MERCER MODERN | Job Number: 24-348

Sheet: of | Name: AJW

Originating Office: Seattle | Date: 10/16/2025

DESIGN CRITERIA CHECKLIST

CODE: IBC 2021, ASCE 7-16 | LOCATION: SEATTLE, WA

RISK CATEGORY: II (Per ASCE 7-16 Table 1.5-1 & IBC Table 1604.5)

VERTICAL DESIGN CRITERIA

	DEAD	LIVE	PARTITION	CONCENTRATED
ROOF:	20 PSF	25 PSF		

WIND DESIGN CRITERIA

BASIC WIND SPEED (V) =	98 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_d):	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:	Mapped	(See ASCE 7-16 Figure 26.8-1)	Mapped Kzt = 1.30
HILL HEIGHT (H):	300 FT	(See ASCE 7-16 Figure 26.8-1)	
UPWIND DISTANCE TO HALF HILL (Lh):	4000 FT	(See ASCE 7-16 Figure 26.8-1)	
DISTANCE FROM CREST TO SITE (x):	100 FT	UPWIND (See ASCE 7-16 Figure 26.8-1)	
MEAN ROOF HEIGHT:	0-15 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 Secion 26.2 & Table 26.13-1)	
ROOF TYPE:	Hip (h/B≥0.8)	(See ASCE 7-16 Figure 27.3-1)	
ROOF SLOPE (__:12):	3.61:12	(Enter vertical rise in 12 horizontal units)	θ (degrees): 16.74

SEISMIC DESIGN CRITERIA

SITE CLASS:	D	(Per IBC Section 1613.2.2, Assumed as "D" or per Geotech.)			
IMPORTANCE FACTOR (I_E):	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_o):	3.0	(Per ASCE 7-16 Table 12.2-1)			
INFORMATION BELOW FROM "ASCE HAZARD TOOL"					
LATITUDE:	47.546		S_S = 1.460		F_a = 1.200
LONGITUDE:	-122.223		S_1 = 0.759		F_v = 1.800

DEFLECTION CRITERIA

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

SOIL DESIGN CRITERIA

REPORT: NO

SEE SOILS REPORT FOR ACTIVE, PASSIVE PRESSURES AND FRICTION COEFFICIENT

BEARING: 1500 PSF
ACTIVE: 35 PCF
PASSIVE: 100 PCF
COEFFICIENT OF FRICTION: 0.25

MINIMUM FOOTING DIMENSIONS:
CONTINUOUS: 1'-4"
SPREAD: 1'-6"
FROST DEPTH: 1'-6"

PILE TYPE: NONE
VERTICAL CAPACITY : N/A
UPLIFT CAPACITY: N/A

LATERAL CAPACITY: N/A
SIZE: N/A

Project: MERCER MODERN | Job Number: 24-348

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DESIGN CRITERIA - WIND

BASIC WIND SPEED (V):	98 MPH	MEAN ROOF HEIGHT:	15 FT
RISK CATEGORY:	II	GROUND ELEVATION FACTOR (Ke):	1.00
EXPOSURE CATEGORY:	B	ENCLOSURE CLASSIFICATION:	Enclosed
DIRECTIONALITY FACTOR (K_d):	0.85	ROOF TYPE:	Hip (h/B≥0.8)
GUST EFFECT FACTOR (G):	0.85	ROOF SLOPE (__:12):	3.6:12
		θ (degrees):	16.74

ROOF PRESSURES (Figure 27.3-1)

		External Pressures (q_h*(GC_p)):			Internal Pressures (±q_i*(GC_{pi}))
Wind Direction:	h/L:	Windward (Positive)	Windward (Negative)	Leeward	All Roofs
Normal to Ridge for θ ≥ 10°	≤0.25	0.9	-5.7	-7.0	2.8
	0.50	-1.5	-7.8	-7.0	
	≥1.0	-2.4	-11.8	-7.9	
Normal to Ridge for θ < 10° and Parallel to Ridge for All θ	h/L:	Horizontal Distance from Windward Edge	External Pressures (q*(GC_p)): Positive Pressure	External Pressures (q*(GC_p)): Negative Pressure	Internal Pressures (±q_i*(GC_{pi})) All Roofs
	≤0.5	0 to h	-2.4	-11.8	2.8
		h to 2h		-6.6	
		>2h		-3.9	
			-2.4	-17.1	
		>h/2		-9.2	

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_z*(GC_p)):			Leeward & Sidewall External Pressures (q_h*(GC_p)):			Internal Pressures (±q_i*(GC_{pi}))
Height Above Ground Level, z	K_{zt}	Windward wall	L/B:	Leeward wall	Sidewall	All walls
15	1.30	10.5	0-1	-6.6	-9.2	2.8
20	1.30	11.5	2	-3.9		
25	1.30	12.2	≥4	-2.6		
30	1.30	12.9				
40	1.30	14.0				
50	1.30	15.0				
60	1.30	15.7				
70	1.30	16.4				
80	1.30	17.2				
90	1.30	17.7				
100	1.30	18.3				
120	1.30	19.2				
140	1.30	20.1				
160	1.30	20.9				
180	1.30	21.6				
200	1.30	22.2				
250	1.30	23.6				
300	1.30	24.9				
350	1.30	26.0				
400	1.30	27.2				
450	1.30	28.1				
500	1.30	28.8				

NOTES:

1) 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.

2) q_i has conservatively been taken equal to q_h

K_{ht} = 1.30

q_h = 15.5 PSF

Project: MERCER MODERN Job Number: 24-348

Sheet: of Name: AJW

Originating Office: Seattle Date: 10/16/25

DESIGN CRITERIA - WIND

BASIC WIND SPEED (V): 98 MPH
RISK CATEGORY: II
EXPOSURE CATEGORY: B
DIRECTIONALITY FACTOR (K_d): 0.85
GUST EFFECT FACTOR (G): 0.85

MEAN ROOF HEIGHT: 15 FT
GROUND ELEVATION FACTOR (Ke): 1.00
ENCLOSURE CLASSIFICATION: Enclosed
ROOF TYPE: Hip (h/B≥0.8)
ROOF SLOPE (__:12): 3.6:12
θ (degrees): 16.74

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	2r	2e	3	N/A	N/A
10 SF	16.0	-30.7	-40.0	-43.1	-43.1	N/A	N/A
20 SF	16.0	-30.7	-36.0	-38.8	-38.8	N/A	N/A
50 SF	16.0	-23.6	-30.8	-33.1	-33.1	N/A	N/A
100 SF	16.0	-18.3	-26.9	-28.8	-28.8	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	2r	2e	3	N/A	N/A
10 SF	18.3	18.3	-19.8	-24.5	-35.6	-44.9	-48.0	-57.3	N/A	N/A
20 SF	17.4	17.4	-19.0	-22.8	-35.6	-42.8	-45.5	-50.8	N/A	N/A
50 SF	16.4	16.4	-17.9	-20.6	-33.0	-39.9	-42.2	-42.3	N/A	N/A
100 SF	16.0	16.0	-17.1	-19.0	-31.0	-37.8	-39.7	-35.9	N/A	N/A
500 SF	16.0	16.0	-16.0	-16.0	-31.0	-35.6	-37.2	-29.4	N/A	N/A

NOTES:

1) 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.
2) q_i has conservatively been taken equal to q_h

K_{ht} = 1.30
q_h = 15.5 PSF

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DESIGN CRITERIA - SEISMIC

ASCE 7-16 SECTION 12.8 - EQUIVALENT LATERAL FORCE PROCEDURE

RISK CATEGORY:	II	LATITUDE:	47.546
SITE CLASS:	D	LONGITUDE:	-122.223
IMPORTANCE FACTOR (I_E):	1	S_S =	1.460
STRUCTURAL SYSTEM (R):	6.5	S_1 =	0.759
OVERSTRENGTH FACTOR (Ω_o):	3	F_a =	1.200
		F_v =	1.800

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

$S_{MS} = F_a*S_S$ = 1.752 SM1 = 1.5*Fv*S1 = 2.049

Section 11.4.5 - Design Spectral Response Acceleration Parameters

$S_{DS} = 2/3*S_{MS}$ = 1.168 $S_{D1} = 2/3*S_{M1}$ = 1.366

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_{DS}

	RISK CATEGORY:		
	I & II	III	IV
< 0.167g	A	A	A
< 0.33g	B	B	C
< 0.50g	C	C	D
>= 0.50g	E	E	F
	E		

ASCE 7-16 TABLE 11.6-2

SEISMIC DESIGN CATEGORY BASED ON S_{D1}

	RISK CATEGORY:		
	I & II	III	IV
< 0.067g	A	A	A
< 0.133g	B	B	C
< 0.20g	C	C	D
>= 0.20g	E	E	F
	E		

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.

PERIOD DETERMINATION:	
C_t =	0.02
h_n =	11 FT
x =	0.75
$T_a = C_t*h_n^x$ =	0.117

ASCE 7-16 SECTION 12.8.1.1 - SEISMIC RESPONSE COEFFICIENT

GENERAL EQUATION:	$C_S = S_{DS}/(R/I)$ =	0.180	<--CONTROLS	EQ. 12.8-2
MAXIMUM:	$C_S = S_{D1}/(T*(R/I))$ =	1.802		EQ. 12.8-3
MINIMUM:	$C_S = 0.044*S_{DS}*I > 0.01$ =	0.051		EQ. 12.8-5
For structures located where S1 > 0.6g	$C_S = 0.5*S_1/(R/I)$ =	0.058		EQ. 12.8-6

ASCE 7-16 SECTION 12.8.1 - SEISMIC BASE SHEAR

$V = C_S*W$ = **0.180*W**

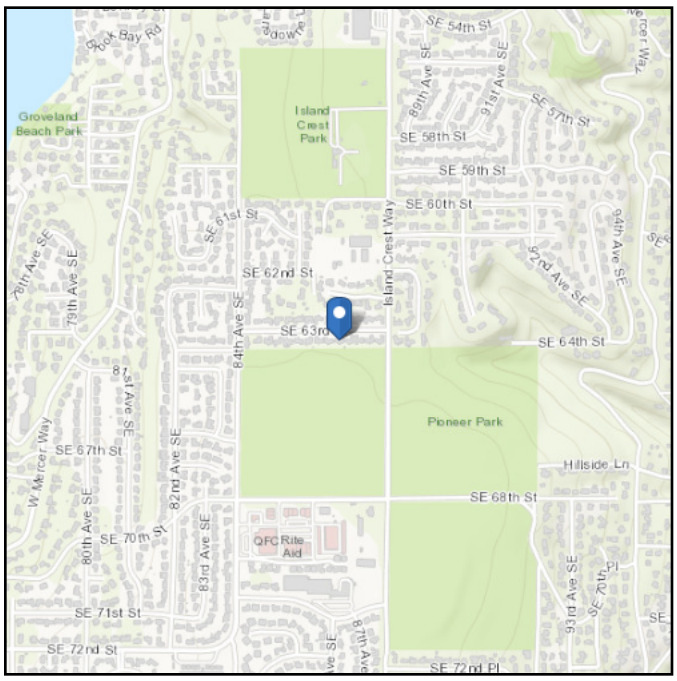
W = the total dead load and applicable portion of other loads as indicated in Section 12.7.2

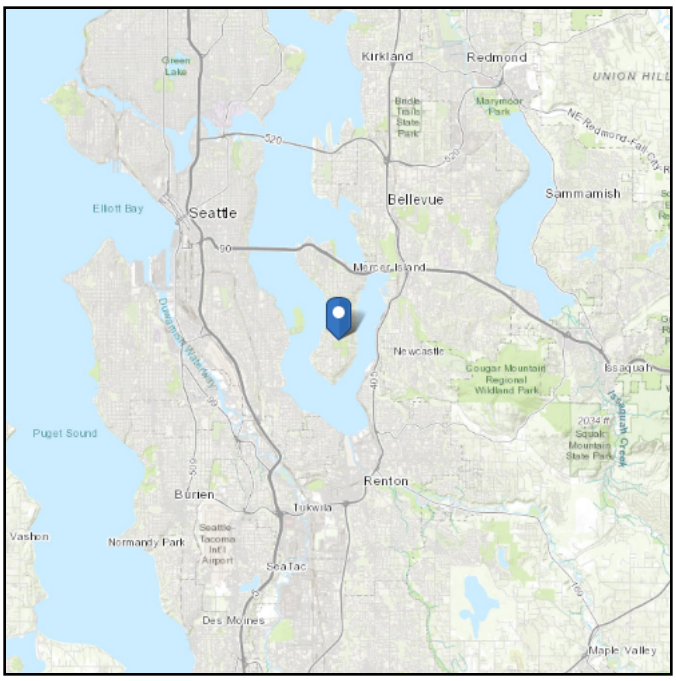
ASCE Hazards Report

Address:
8621 SE 63rd St
Mercer Island, Washington
98040

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

Latitude: 47.545876
Longitude: -122.22343
Elevation: 314.1420820341736 ft (NAVD 88)





Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	74 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: Mon Oct 13 2025

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.

Seismic

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

Results:

S_S :	1.46	S_{D1} :	N/A
S_1 :	0.506	T_L :	6
F_a :	1.2	PGA :	0.625
F_v :	N/A	PGA_M :	0.75
S_{MS} :	1.752	F_{PGA} :	1.2
S_{M1} :	N/A	I_e :	1
S_{DS} :	1.168	C_v :	1.392

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

Data Accessed: Mon Oct 13 2025

Date Source: USGS Seismic Design Maps

TABLE R301.2(1)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

ROOF SNOW LOAD [a] (psf)	WIND DESIGN				SEISMIC DESIGN CATEGORY	SUBJECT TO DAMAGE FROM			OUTDOOR DESIGN TEMP (F) - Heat/Cool	ICE BARRIER UNDERLAYMENT REQUIRED	FLOOD HAZARD[e]	AIR FREZING INDEX	MEAN ANNUAL TEMP
	Speed [b] (mph)	Topographic effects[c]	Special wind region	Windborne debris zone		Weathering[d]	Frost line depth	Termite					
25	110	Yes	No	No	D2	Moderate	12”	Slight to Moderate	83/24	No	N.A.	113	53

MANUAL J DESIGN CRITERIA							
Elevation	**Latitude**	**Winter heating**	**Summer cooling**	**Altitude correction factor**	**Indoor design temperature**	**Design temperature cooling**	**Heating temperature difference**
338 feet	**47°34’39’’**	**72°F max**	**75°F min**	**0.99**	**72°F**	**75°F**	**48°F**
Cooling temperature difference	**Wind velocity heating**	**Wind velocity cooling**	**Coincident wet bulb**	**Daily range**	**Winter humidity**	**Summer humidity**	
8°F	**N.A.**	**N.A.**	**66**	**Medium**	**75%**	**68%**	

a. This is the minimum roof snow load. When using this snow load it will be left to the engineer’s judgment whether to consider drift or sliding snow. However, rain on snow surcharge of 5 psf must be considered for roof slopes less than 5 degrees.

b. The 110 mph Ultimate Design Wind Speed (3-second gust) as adopted by the 2018 IRC/ASCE 7-10 (or if using the IBC for structural design, the 98 mph Basic Design Wind Speed as adopted by the 2018 IBC/ASCE 7-16 may be used).

c. Wind exposure category and Topographic effects (Wind Speed-up Kzt factor) shall be determined on a site-specific basis by the Engineer of Record (components and cladding need not consider topographic effects unless otherwise determined by the engineer of record).

d. Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.

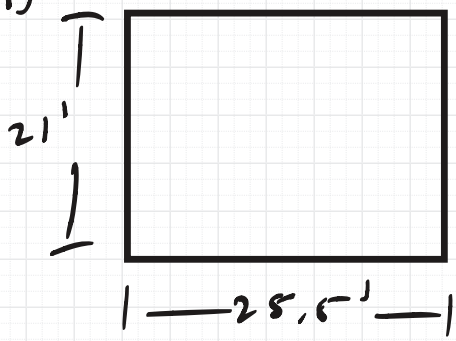
e. The City of Mercer Island participates in the National Flood Insurance Program (NFIP); Regular Program (No Special Flood Hazard Area). Further NFIP participation information: CID 530083, Initial FHBM Identified 06/28/74, Initial FIRM Identified 05/16/95, Current Effective Map Date (NSFHA), Reg-Emer Date 06/30/97, 53033C0654G effective 8/19/2020.

WOOD SHEAR WALL

Seismic Weight

$SW = 20\ psf\ (21')(25.5') + 10\ psf\ (7.35'/2)(2 \cdot 21' + 2 \cdot 25.5')$

$= 14.1\ kips$



$C_s = 0.18$

$V_s = C_s W = 0.18(14.1) = \underline{2.54\ kip}$

Wind

$\frac{h}{L_h} = \frac{300'}{4000'} = 0.075 \neq 0.2$ (26.8.1)

$\frac{h}{L} = 0.5$

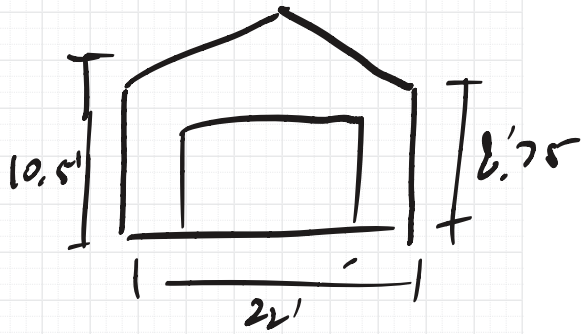
$p = q G C_p - q_i (G C_{pi})$

Windward

10.5 psf

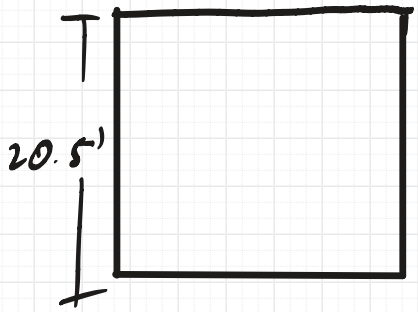
Leeward

-5.1 psf



Roof windward

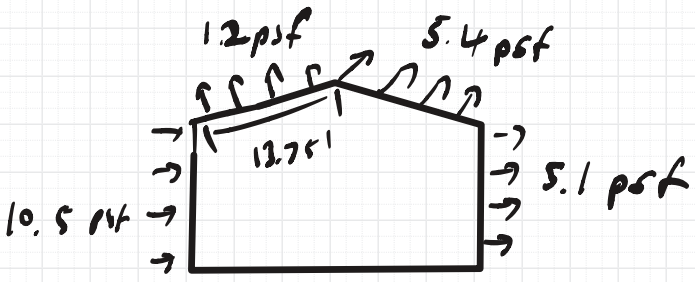
-1.2 psf

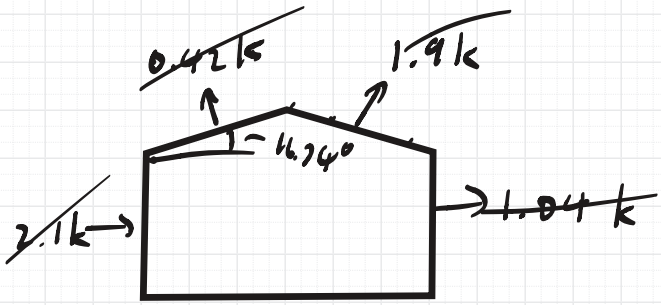


Roof leeward

-5.4 psf

$\frac{L}{b} = \frac{21}{25.5} = 0.82$

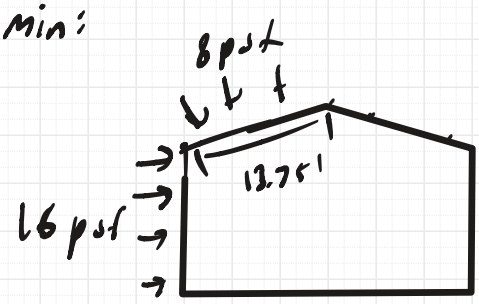




$$V_w = (10.5 + 5.1)\left(20.5 \cdot \frac{8}{8.75}\right) + \sin(16.74)(5.4 - 1.2)(20.5)(13.75)$$

$$= 3.14 \text{ k}$$

ASCE min:

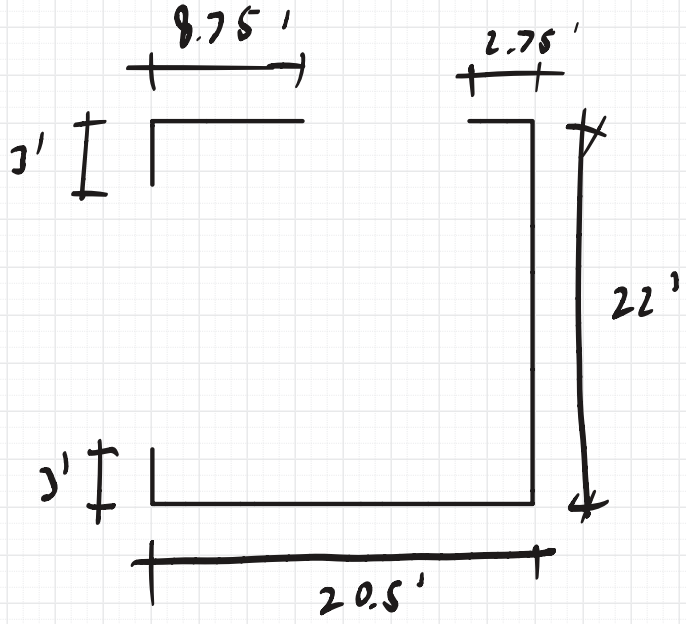


$$V_w = (16)\left(\frac{20.5}{2}\right)\left(\frac{8}{8.75}\right) + \sin(16.74)(8)(20.5)(13.75)$$

$$= \underline{3.52 \text{ kip}} \text{ controls}$$

$$\not\gg 1.6\, V_s = 4.1 \text{ k}$$ (use V_s for shear wall design)

- Worst case wind in NS direction east shear walls



- Assume flexible diaphragm
  - half Vs to east walls (1.27 kips)

Try 15/32", 8d, 6" o.c., 2x edge framing - Seismic LRFD

Capacity = 365 plf

SDPWS 4.3.3 Aspect ratio factor

$$W_{sp} = 1.25 - 0.125\,\frac{h}{b}$$

3' width: $W_{sp} = 1.25 - 0.125\,\frac{8.75}{3} = 0.885$

2.75' width: $W_{sp} = 0.852$

East wall: 2x 3' walls

$2 \times (0.885)(365\,plf)(3') = 1.94\,k > 1.27\,k$ ✓

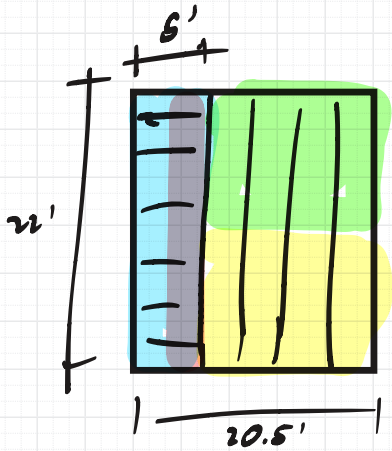
-other sides > wall length ok

Stud Design: ASD

D = 20psf L(S) = 25 psf

-Design per ft DF #2 / HF #1

-Largest trib width = 11'



Loads

$P_{dead} = 20psf(11')(1') = 220\,lb$

$P_{snow} = 25\,sf(11')(1') = 275\,lb$

$P_{wind} = 8psf\cos(16.74)(13.75')(1') = 105.3\,lb$

$P_{seismic} = 0.2\,S_{DS}\,P_D = 0.2(1.168)(220) = 51.4\,lb$

Out of plane:

$W_{wind} = 30psf$ EWA: $(16")(8.25') = 11.7\,ft^2$

$W_{seismic} = 0.4\,S_{DS}\,I_e\,W = 0.4(1.168)(1)(10) = 4.672\,psf$

ok per stud wall excel ✓ Use 2x6 @ 16" O.C.

PCS Structural Solutions

Project: Mercer Modern | Job Number: 24-348

Sheet: of | Name: AJW

Originating Office: Seattle | Date: 10/16/2025

WOOD SHEATHED SHEAR WALLS - 2021 SDPWS TABLE 4.3A

SEISMIC OR WIND:	SEISMIC
DESIGN METHODOLOGY:	LRFD
SHEAR CAPACITY FACTOR:	0.5
FRAMING SPECIES:	DFL
FRAMING SPACING ≤ 16" O.C.:	YES
SHEATHING MATERIAL:	SHEATHING
PANEL THICKNESS:	15/32"
S.G. ADJUSTMENT FACTOR:	1.00

SHEATHING NAILS:	8d
SILL PLATE ANCHOR DIAMETER:	5/8"
RIM MATERIAL:	DFL
TREATED MATERIAL FACTOR:	1.00

SHEAR WALL CAPACITIES

WALL MARK	WALL SHEATHING	SIDES	SHEATHING NAILS	EDGE NAILING	EDGE FRAMING	BOTTOM PLATE	NOMINAL CAPACITY (PLF)	**ADJUSTED CAPACITY (PLF)**
A	15/32"	(1)	8d	6" o.c.	2x	2x	730	**365**
B	15/32"	(1)	8d	4" o.c.	3x	2x	1065	**533**
C	15/32"	(1)	8d	3" o.c.	3x	2x	1370	**685**
D	15/32"	(1)	8d	2" o.c.	3x	2x	1790	**895**
E	15/32"	(2)	8d	6" o.c.	3x	2x	1460	**730**
F	15/32"	(2)	8d	4" o.c.	3x	2x	2130	**1065**
G	15/32"	(2)	8d	3" o.c.	3x	2x	2740	**1370**
H	15/32"	(2)	8d	2" o.c.	3x	2x	3580	**1790**

CONNECTION CALCULATOR

	SOLE PLATE					SILL PLATE			RIM CONNECTOR		
MARK	FASTENER	ROWS	SPACING	RIM	CHECK	ANCHOR	SPACING	CHECK	CLIP	SPACING	CHECK
A	16d	(1)	4" o.c.	1-1/2"	OK	5/8"	48" o.c.	OK	A35	16" o.c.	OK
B	16d	(2)	6" o.c.	1-1/2"	OK	5/8"	32" o.c.	OK	A35	12" o.c.	OK
C	16d	(2)	4" o.c.	1-1/2"	OK	5/8"	32" o.c.	OK	A35	12" o.c.	OK
D	16d	(3)	5" o.c.	3-1/2"	OK	5/8"	24" o.c.	OK	A35	9" o.c.	OK
E	16d	(2)	4" o.c.	1-1/2"	OK	5/8"	32" o.c.	OK	A35	9" o.c.	OK
F	SDWS	(1)	6" o.c.	1-1/2"	OK	5/8"	20" o.c.	OK	A35	6" o.c.	OK
G	SDWS	(2)	9" o.c.	3-1/2"	OK	5/8"	16" o.c.	OK	A35	6" o.c.	OK
H	SDWS	(2)	6" o.c.	3-1/2"	OK	5/8"	12" o.c.	OK	N/A		

CONNECTION CALCULATOR - REFERENCE VALUES

CONNECTION CAPACITIES				
SOLE PLATE:	**16d**	**172 lbs**	**SDWS**	**869 lbs**
5/8" ANCHOR:	**2x**	**2007 lbs**	**3x**	**2546 lbs**
RIM:	**A35**	**1050 lbs**	**A35/LTP**	**913 lbs**

NDS Table 11.3.1 Adjustment Factors			
ASD	**LRFD Adjustment Factors**		
C_D	K_F	Φ	λ
N/A	**3.32**	**0.65**	**1.0**

PCS Structural Solutions

Project: Mercer Modern | Job Number: 24-348

Sheet: of | Name: AJW

Originating Office: Seattle | Date: 10/16/2025

WOOD SHEATHED SHEAR WALLS - 2021 SDPWS TABLE 4.3A

SEISMIC OR WIND:	SEISMIC	SHEATHING NAILS:	10d
DESIGN METHODOLOGY:	LRFD	HOLDOWN SYSTEM:	INSIDE POST
SHEAR CAPACITY FACTOR:	0.5	10d NAIL CAPACITY REDUCTION:	0.92
FRAMING SPECIES:	DFL	SILL PLATE ANCHOR DIAMETER:	5/8"
SHEATHING MATERIAL:	SHEATHING	RIM MATERIAL:	DFL
PANEL THICKNESS:	15/32"	TREATED MATERIAL FACTOR:	1.00
S.G. ADJUSTMENT FACTOR:	1.00		

SHEAR WALL CAPACITIES

WALL MARK	WALL SHEATHING	SIDES	SHEATHING NAILS	EDGE NAILING	EDGE FRAMING	BOTTOM PLATE	NOMINAL CAPACITY (PLF)	**ADJUSTED CAPACITY (PLF)**
A	15/32"	(1)	10d	6" o.c.	2x	2x	870	**435**
B	15/32"	(1)	10d	4" o.c.	3x	2x	1290	**645**
C	15/32"	(1)	10d	3" o.c.	3x	2x	1680	**840**
D	15/32"	(1)	10d	2" o.c.	3x	2x	2155	**1078**
E	15/32"	(2)	10d	6" o.c.	3x	2x	1740	**870**
F	15/32"	(2)	10d	4" o.c.	3x	2x	2580	**1290**
G	15/32"	(2)	10d	3" o.c.	3x	2x	3360	**1680**
H	15/32"	(2)	10d	2" o.c.	3x	2x	4310	**2155**

CONNECTION CALCULATOR

	SOLE PLATE					SILL PLATE			RIM CONNECTOR		
MARK	FASTENER	ROWS	SPACING	RIM	CHECK	ANCHOR	SPACING	CHECK	CLIP	SPACING	CHECK
A	16d	(1)	4" o.c.	1-1/2"	OK	5/8"	48" o.c.	OK	A35	16" o.c.	OK
B	16d	(1)	2" o.c.	1-1/2"	NG	5/8"	32" o.c.	OK	A35	12" o.c.	OK
C	16d	(2)	4" o.c.	1-1/2"	OK	5/8"	24" o.c.	OK	A35	9" o.c.	OK
D	16d	(3)	5" o.c.	3-1/2"	OK	5/8"	16" o.c.	OK	A35	8" o.c.	OK
E	16d	(2)	4" o.c.	1-1/2"	OK	5/8"	24" o.c.	OK	A35	9" o.c.	OK
F	SDWS	(2)	5" o.c.	3-1/2"	OK	5/8"	16" o.c.	OK	A35	6" o.c.	OK
G	SDWS	(2)	8" o.c.	3-1/2"	OK	5/8"	12" o.c.	OK	A35	5" o.c.	OK
H	SDWS	(2)	6" o.c.	3-1/2"	OK	5/8"	10" o.c.	OK	N/A		

CONNECTION CALCULATOR - REFERENCE VALUES

CONNECTION CAPACITIES				
SOLE PLATE:	**16d**	**172 lbs**	**SDWS**	**869 lbs**
5/8" ANCHOR:	**2x**	**2007 lbs**	**3x**	**2546 lbs**
RIM:	**A35**	**1050 lbs**	**A35/LTP**	**913 lbs**

NDS Table 11.3.1 Adjustment Factors			
ASD	**LRFD Adjustment Factors**		
C_D	K_F	Φ	λ
N/A	**3.32**	**0.65**	**1.0**

PCS Structural Solutions

Project: Mercer Modern | Job Number: 25-348

Sheet: ____ of ____ | Name: AJW

Originating Office: Seattle | WALL (W1) | Date: 10/16/25

STUD WALL DESIGN — WALL (W1) — 2018 NDS/2021 IBC

WALL DATA

LUMBER TYPE:	DF#2/HF#1		APPLIED LOADS:		P_{DEAD} =	220	LBS
F_b =	900 PSI		W_{WIND} =	30.0 PSF	P_{LIVE} =	220	LBS
F_c =	1350 PSI		$W_{SEISMIC}$ =	4.7 PSF	P_{SNOW} =	275	LBS
$F_{c\perp}$ =	405 PSI		S_{DS} =	1.17	P_{WIND} =	105	LBS
E =	1.50E+06 PSI				$P_{SEISMIC}$ =	51	LBS
STUD SIZE:	(1) 2x6		MISCELLANEOUS:		HEIGHT =	8.75	FT
A_X =	8.25 IN^2				SPACING =	16	IN
S_X =	7.56 IN^3				ECCENTRICITY =	0.10	IN
I_X =	20.80 IN^4				$C_{F(COMPRESSION)}$ =	1.10	(NDS 4.3.6)
$C_{F(BENDING)}$ =	1.3 (NDS 4.3.6)					APPLY?	
F_{cE} =	1234.7 PSI			$C_{SYS(BENDING)}$ =	1.35	YES	(SDPWS T3.1.1.1)
C_b =	1.25 (NDS 3.10.4)			$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9)

LOAD CASES - ASCE 7-16 2.4.1 & 2.4.5 REFERENCED IBC 1605.2

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 + 0.7SEISMIC
		CASE 7	DEAD + 0.525SEISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1485	0.83	0.624	927	1346	506
2 & 3	1.15	1708	0.72	0.571	975	1547	506
4 & 5	1.60	2376	0.52	0.447	1063	2527	506
6 & 7	1.60	2376	0.52	0.447	1063	2153	506

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	440	53	64	4	66	105
2	495	60	64	4	66	105
3	591	72	64	5	67	106
4	639	77	172	5	176	279
5	283	34	230	2	231	367
6	256	31	42	2	43	68
7	618	75	32	5	35	55

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	0.06	0.08	0.11	0.08	0.04	0.03	L/3596
2	0.06	0.07	0.12	0.08	0.05	0.03	L/3581
3	0.07	0.07	0.14	0.08	0.06	0.03	L/3554
4*	0.07	0.11	0.15	0.12	0.06	0.04	L/2610
5*	0.03	0.15	0.07	0.15	0.03	0.05	L/1983
6	0.03	0.03	0.06	0.03	0.03	0.02	L/5519
7	0.07	0.03	0.15	0.03	0.06	0.02	L/6826
MAX.	0.07	0.15	0.15	0.15	0.06	0.05	L/1983
CHECK	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.

STUD REACTION (OUT OF PLANE) = **175 LB**

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

CHECK TOP PLATES: YES (WORST CASE REACTION APPLIED MIDSPAN DBL TOP PLATE)

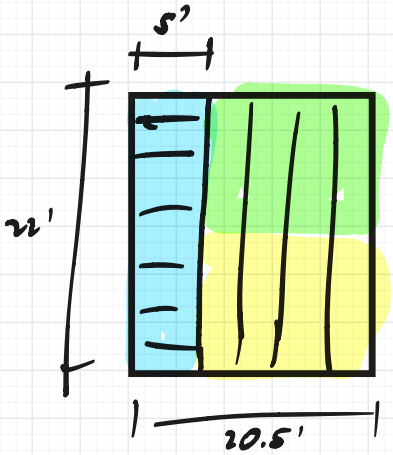
MISCELLANEOUS:			ALLOWABLE STRESSES:		
C_{fu} =	1.15 (NDS 4.3.7)		F_v' =	173 PSI	
F_V =	150 PSI		F_b' =	1547 PSI	
DBL TOP PLATE PROPERTIES:			APPLIED STRESSES:		
A_X =	16.50 IN^2		f_v =	39 PSI	D.C.R. = 0.22
S_X =	4.13 IN^3		f_b =	619 PSI	D.C.R. = 0.40
I_X =	3.09 IN^4		Δ_{MAX} =	0.012 IN	Δ L/? = L/1362

WOOD HEADER

2 Cases:

1) West wall 16' span, less gravity load (2.5' trib), (1'-3")

2) north wall 6' span, (1' height)



Dbl top plate - (2) 2x6
(3")

1) Loading, unbraced

D = 20psf (2.5') = 50 plf

S+R = 25 psf (2.5') = 62.5 plf

W = 16 psf (2.5') = 40 plf

(1) 6x10 Item Fir #1

2) Loading

D = 20 psf (11') = 220 plf

S+R = 25 psf (11') = 275 plf

W = 16 psf (11') = 176 plf

(3) 2x8

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 25438 Mercer Modern.ec6

DESCRIPTION: -West Wall Header

Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : NDS 2024
Load Combination Set : IBC 2021

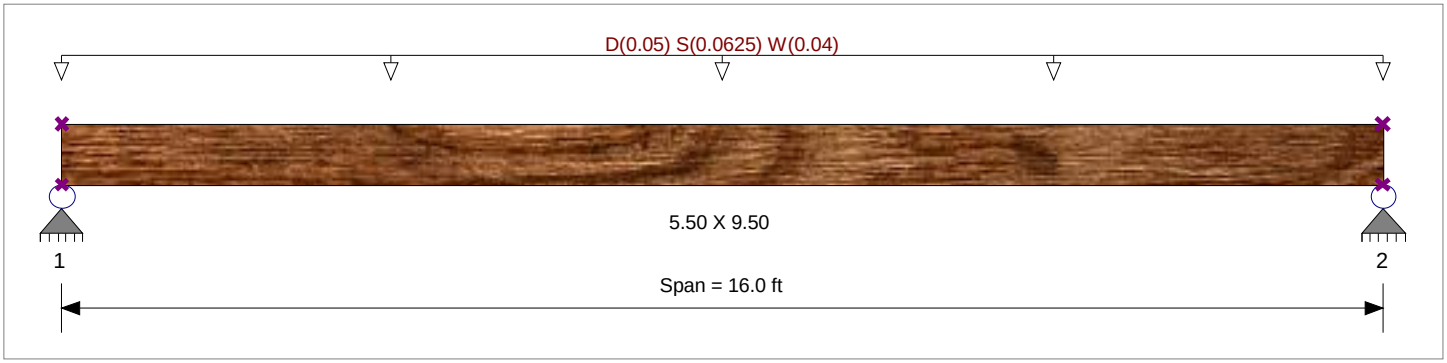
Material Properties

Analysis Method :	Load Resistance Factor D
Load Combination :	IBC 2021
Wood Species :	Hem-Fir
Wood Grade :	No.1
Beam Bracing :	Completely Unbraced

Fb +	1050 psi
Fb -	1050 psi
Fc - Prll	750 psi
Fc - Perp	405 psi
Fv	140 psi
Ft	525 psi

E : Modulus of Elasticity

Ebend- xx	1300 ksi
Eminbend - xx	470 ksi
Density	26.84 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.050, S = 0.06250, W = 0.040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.468** : 1	Maximum Shear Stress Ratio	=	**0.155** : 1
Section used for this span		**5.50 X 9.50**	Section used for this span		**5.50 X 9.50**
fb: Actual	=	835.50 psi	fv: Actual	=	37.42 psi
F'b	=	1,786.96 psi	F'v	=	241.92 psi
Load Combination		+1.20D+1.60S+0.50W	Load Combination		+1.20D+1.60S+0.50W
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	15.241 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.181 in	Ratio =	1058	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio =	0	>=360	n/a
Max Downward Total Deflection	0.334 in	Ratio =	575	>=180	Span: 1 : +D+0.750S+0.450W
Max Upward Total Deflection	0 in	Ratio =	0	>=180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	λ	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values Mu	fb	Fb	Shear Values Vu	fv	Fv
+1.40D														0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.241	0.080	0.60	1.00	1.00	0.99	1.000	1.00	1.00	1.00	2.24	324.9	1,346.3	0.51	14.6	181.4
+1.20D					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	0.156	0.052	0.80	1.00	1.00	0.98	1.000	1.00	1.00	1.00	1.92	278.5	1,787.0	0.43	12.5	241.9
+1.20D+0.50S					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.237	0.078	0.80	1.00	1.00	0.98	1.000	1.00	1.00	1.00	2.92	423.6	1,787.0	0.66	19.0	241.9
+1.20D+0.50W					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.208	0.069	0.80	1.00	1.00	0.98	1.000	1.00	1.00	1.00	2.56	371.3	1,787.0	0.58	16.6	241.9

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 25438 Mercer Modern.ec6

DESCRIPTION: -West Wall Header

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	λ	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values Mu	fb	Fb	Shear Values Vu	fv	Fv
+1.20D+1.60S					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.416	0.137	0.80	1.00	1.00	0.98	1.000	1.00	1.00	1.00	5.12	742.7	1,787.0	1.16	33.3	241.9
+1.20D+1.60S+0.50W					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.468	0.155	0.80	1.00	1.00	0.98	1.000	1.00	1.00	1.00	5.76	835.5	1,787.0	1.30	37.4	241.9
+1.20D+W					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.209	0.069	1.00	1.00	1.00	0.98	1.000	1.00	1.00	1.00	3.20	464.2	2,222.1	0.72	20.8	302.4
+1.20D+0.50S+W					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.274	0.090	1.00	1.00	1.00	0.98	1.000	1.00	1.00	1.00	4.20	609.2	2,222.1	0.95	27.3	302.4
+1.434D+0.20S					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.176	0.058	1.00	1.00	1.00	0.98	1.000	1.00	1.00	1.00	2.69	390.7	2,222.1	0.61	17.5	302.4
+0.90D+W					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.178	0.058	1.00	1.00	1.00	0.98	1.000	1.00	1.00	1.00	2.72	394.5	2,222.1	0.62	17.7	302.4
+0.6664D					1.00	1.00	0.98	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.070	0.023	1.00	1.00	1.00	0.98	1.000	1.00	1.00	1.00	1.07	154.7	2,222.1	0.24	6.9	302.4

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+0.750S+0.450W	0.3335	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	0.919	0.919
Max Upward from Load Combinations	0.919	0.919
Max Upward from Load Cases	0.500	0.500
D Only	0.400	0.400
+D+S	0.900	0.900
+D+0.750S	0.775	0.775
+D+0.60W	0.592	0.592
+D+0.450W	0.544	0.544
+D+0.750S+0.450W	0.919	0.919
+0.60D+0.60W	0.432	0.432
+0.60D	0.240	0.240
S Only	0.500	0.500
W Only	0.320	0.320

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 25438 Mercer Modern.ec6

DESCRIPTION: -North Wall Header

Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : NDS 2024
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Load Resistance Factor D
Load Combination : IBC 2021

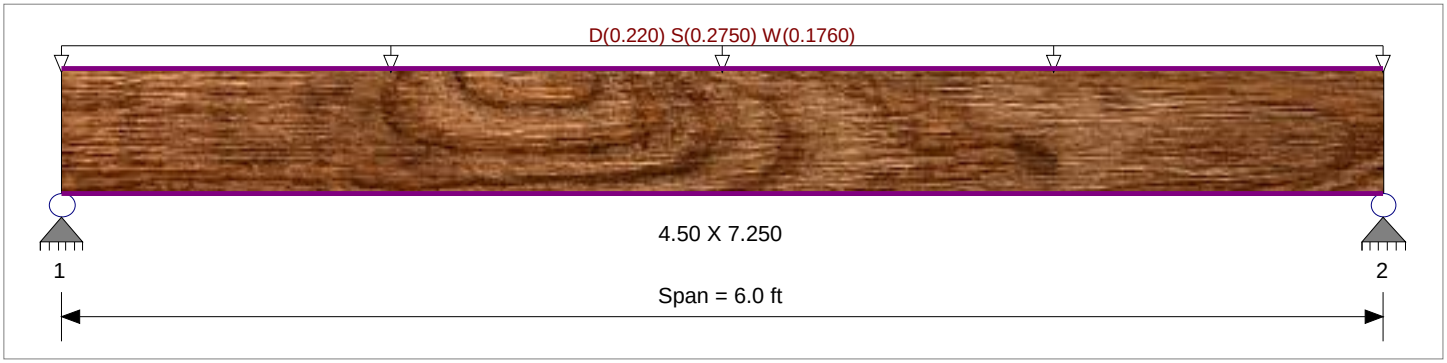
Wood Species : Eastern Hemlock-Balsam Fir
Wood Grade : No.1

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

Fb +	775.0 psi
Fb -	775.0 psi
Fc - Prll	1,000.0 psi
Fc - Perp	335.0 psi
Fv	140.0 psi
Ft	350.0 psi

E : Modulus of Elasticity

Ebend- xx	1,100.0 ksi
Eminbend - xx	400.0 ksi
Density	22.470 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.220, S = 0.2750, W = 0.1760 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.675** : 1	Maximum Shear Stress Ratio	=	**0.363** : 1
Section used for this span		**4.50 X 7.250**	Section used for this span		**4.50 X 7.250**
fb: Actual	=	1,084.88 psi	fv: Actual	=	87.71 psi
F'b	=	1,607.04 psi	F'v	=	241.92 psi
Load Combination		+1.20D+1.60S+0.50W	Load Combination		+1.20D+1.60S+0.50W
Location of maximum on span	=	3.000 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.051 in	Ratio = 1403	>=360	Span: 1 : S Only
Max Upward Transient Deflection	0 in	Ratio = 0	>=360	n/a
Max Downward Total Deflection	0.094 in	Ratio = 763	>=240	Span: 1 : +D+0.750S+0.450W
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 M	V	λ	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values Mu	fb	Fb	Shear Values Vu	fv	Fv
+1.40D														0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.350	0.188	0.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.39	421.9	1,205.3	0.74	34.1	181.4
+1.20D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.225	0.121	0.80	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.19	361.6	1,607.0	0.64	29.2	241.9
+1.20D+0.50S					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	1	0.342	0.184	0.80	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.81	550.0	1,607.0	0.97	44.5	241.9
+1.20D+0.50W					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 25438 Mercer Modern.ec6

DESCRIPTION: -North Wall Header

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	λ	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Mu	fb	Fb	Vu	fv	Fv
Length = 6.0 ft	**1**	0.300	0.161	0.80	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.58	482.2	1,607.0	0.85	39.0	241.9
+1.20D+1.60S					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.600	0.322	0.80	1.00	1.00	1.00	1.200	1.00	1.00	1.00	3.17	964.3	1,607.0	1.70	78.0	241.9
+1.20D+1.60S+0.50W					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.675	0.363	0.80	1.00	1.00	1.00	1.200	1.00	1.00	1.00	3.56	1,084.9	1,607.0	1.91	87.7	241.9
+1.20D+W					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.300	0.161	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.98	602.7	2,008.8	1.06	48.7	302.4
+1.20D+0.50S+W					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.394	0.211	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	2.60	791.1	2,008.8	1.39	64.0	302.4
+1.434D+0.20S					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.253	0.136	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.67	507.4	2,008.8	0.89	41.0	302.4
+0.90D+W					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.255	0.137	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.68	512.3	2,008.8	0.90	41.4	302.4
+0.6664D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	**1**	0.100	0.054	1.00	1.00	1.00	1.00	1.200	1.00	1.00	1.00	0.66	200.8	2,008.8	0.35	16.2	302.4

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+0.750S+0.450W	0.0943	3.022		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	1.516	1.516
Max Upward from Load Combinations	1.516	1.516
Max Upward from Load Cases	0.825	0.825
D Only	0.660	0.660
+D+S	1.485	1.485
+D+0.750S	1.279	1.279
+D+0.60W	0.977	0.977
+D+0.450W	0.898	0.898
+D+0.750S+0.450W	1.516	1.516
+0.60D+0.60W	0.713	0.713
+0.60D	0.396	0.396
S Only	0.825	0.825
W Only	0.528	0.528

DIAPHRAGM

- Assume flexible diaphragm (ASCE 26.2)

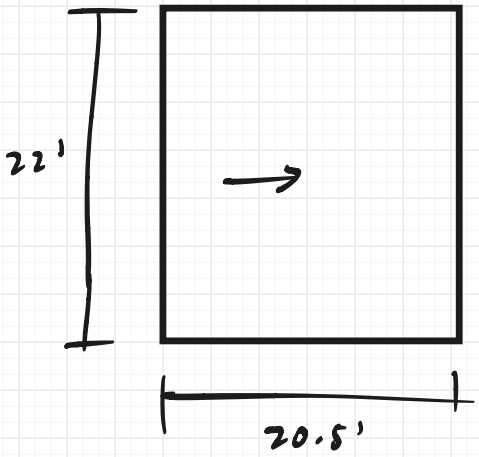
- $F_{px} = V = 3.52\,k$ (12.10.1.1)

- $F_{pmin} = 0.2 S_{DS} I_e W_{px}$

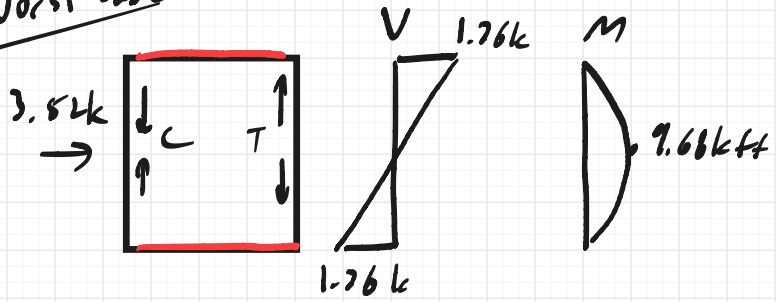
$= 0.2(1.168)(1)(14.1) = 3.29\,k$

- $F_{pmax} = 0.4 S_{DS} I_e W_{px}$

$= 6.587\ kip$



Worst case



Chord force:

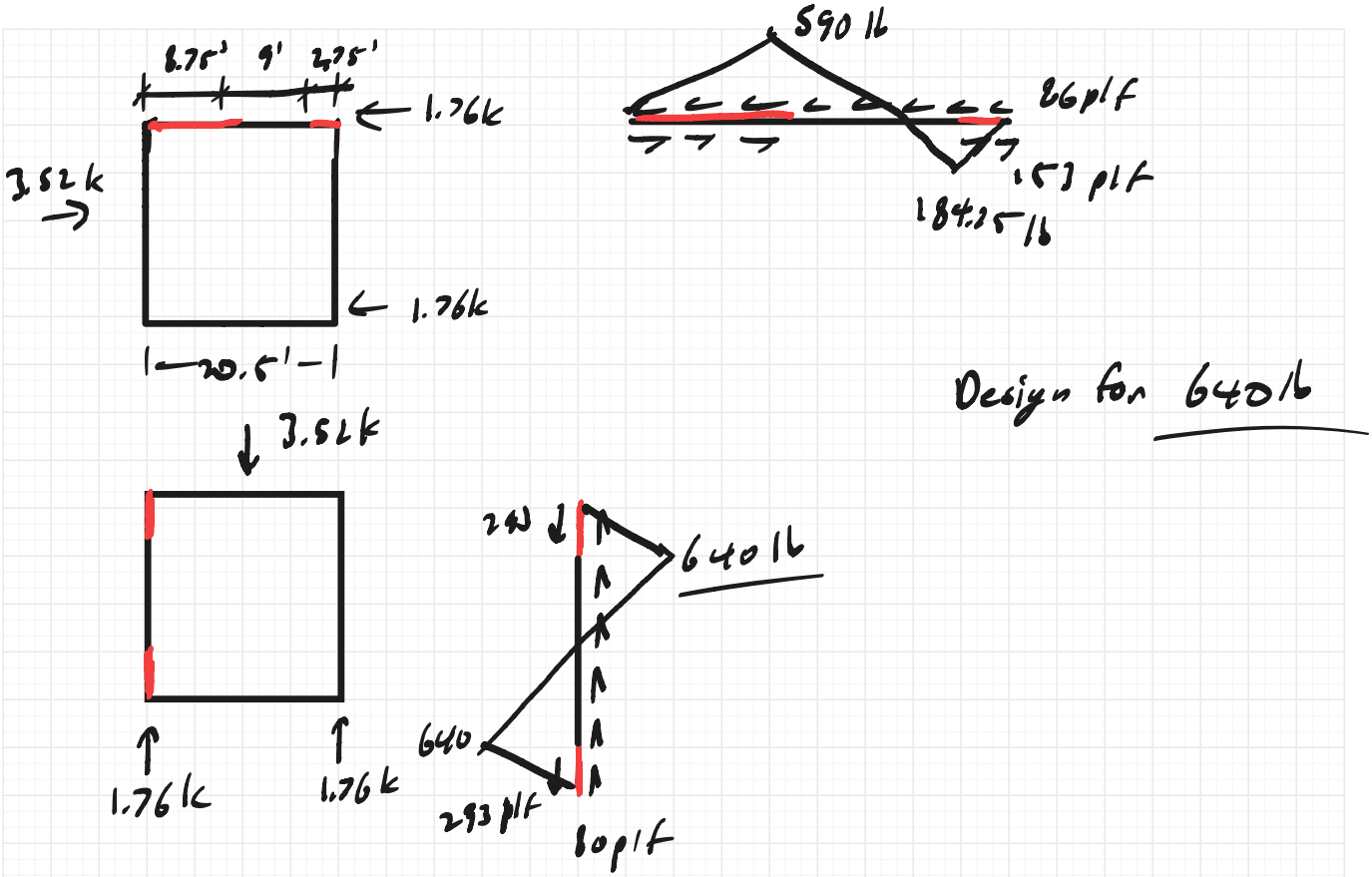
$T = C = \frac{M}{h} = \frac{9.68\,k\text{-}ft}{20.5'} = 472\,lb$

Design both directions w/ worst-case chord force.

Collector force:

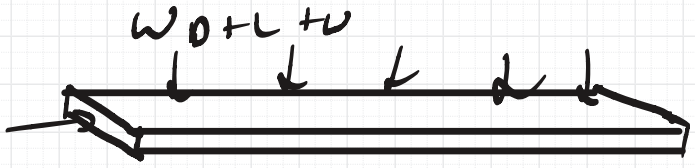
$F_{px} = 3.52\,k$

No Ω per ASCE 12.10.2.1


8.75'
9'
2.75'
1.76k
3.52k
1.76k
20.5'
3.52k
1.76k
1.76k
590 lb
86plf
153 plf
184.25 lb
Design for 640lb
24"
640 lb
640
293 plf
80plf

Top plate acts as diaphragm chord + collector

- 2x6
- -7541b axial
- -16" unbraced length



Loads

Paxial = 7541b

trib width = 11'

EWA = 22'(22/5) = 161.7

olc per ewrcalc and excel

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 25438 Mercer Modern.ec6

DESCRIPTION: 2x6 Top Plate

Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : NDS 2024
Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

Analysis Method	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height	22 ft		
(Used for non-slender calculations)			
Wood Species	Eastern Hemlock-Balsam Fir		
Wood Grade	No.1		
Fb +	775.0 psi	Fv	140.0 psi
Fb -	775.0 psi	Ft	350.0 psi
Fc - Prll	1,000.0 psi	Density	22.470 pcf
Fc - Perp	335.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,100.0	1,100.0	1,100.0 ksi
Minimum	400.0	400.0	

Column Buckling Condition:
ABOUT X-X Axis: Lux = 1.333 ft, Kx = 0.65
ABOUT Y-Y Axis: Luy = 1.333 ft, Ky = 0.65

Wood Section Name	**2x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**1.50** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.30
Area	8.250 in^2	Cf or Cv for Compressio	1.10
Ix	20.797 in^4	Cf or Cv for Tension	1.30
Iy	1.547 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf about Y	1.0
		Kf about X	1.0
		Use Cr : Repetitive ?	No

Applied Loads

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

Column self weight included : 28.322 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 22.0 ft, W = 0.7540 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.03522 : 1**

Load Combination	+D+0.60W
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	0.4807 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	1,654.49 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.60D
Location of max.above base	22.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	224.0 psi

Maximum SERVICE Lateral Load Reactions . .

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

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors

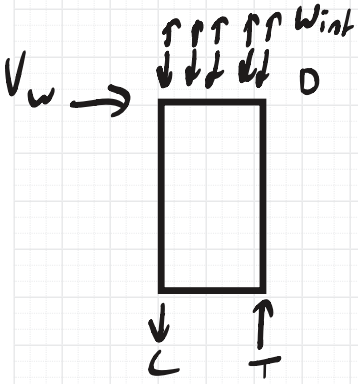
	Bending	Compression	Shear

Load Combination Results

Load Combination	C_D	Controlling Cp Value	Controlling Cp About	Max Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Max Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.968	Y Axis	0.003581	PASS	0.0 ft	0.0	PASS	22.0 ft
+D+0.60W	1.600	0.940	Y Axis	0.03522	PASS	0.0 ft	0.0	PASS	22.0 ft
+D+0.450W	1.600	0.940	Y Axis	0.02693	PASS	0.0 ft	0.0	PASS	22.0 ft
+0.60D+0.60W	1.600	0.940	Y Axis	0.03439	PASS	0.0 ft	0.0	PASS	22.0 ft
+0.60D	1.600	0.940	Y Axis	0.001245	PASS	0.0 ft	0.0	PASS	22.0 ft

HOLDOWN

Wind internal + Wind V - Gravity



Hold-down design for 3' width wall (half 1.27)

$V_w = 0.635k$

$Wint = 43.1\ psf\ (3)(2.5) = 323.3\ lb$ EWA = 10sf

$D = 20psf\ (3)(2.5) = 150\ lb$

$C = T = \frac{Vh}{Lob} = \frac{635^{plf}(8.75')}{(1)(3')} = 1852\ lb$

Allowable: 0.6D + 0.6W

Chord: $= 0.6\left(\frac{150}{2}\right) + 0.6\left(\frac{-323.3}{2} + -1852\right) = \underline{1167\ lb}$

Use HDU 4

HDU/DTT™

Holdowns (cont.)

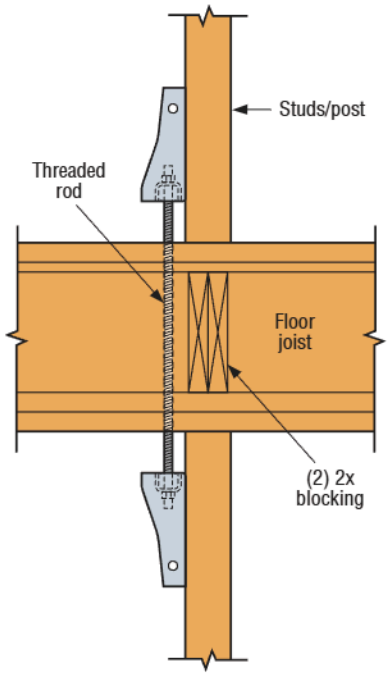
These products are available with additional corrosion protection. For more information, see p. 16.

SS For stainless-steel fasteners, see p. 23.

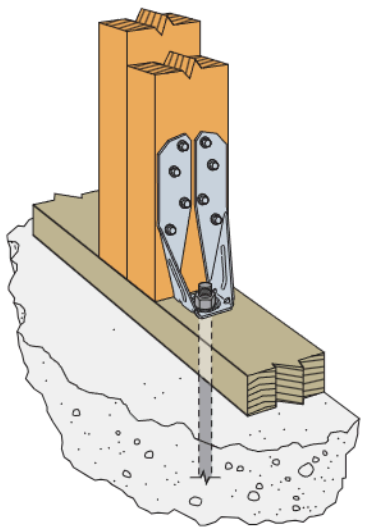
SD Many of these products are approved for installation with Strong-Drive® SD Connector screws. See pp. 362–366 for more information.

Model No.	Ga.	Dimensions (in.)					Fasteners (in.)		Minimum Wood Member Size (in.)	Allowable Tension Loads (160)			Code Ref.
		W	H	B	CL	SO	Anchor Bolt Dia. (in.)	Wood Fasteners		DF/SP	SPF/HF	Deflection at Allowable Load (in.)	
DTT1Z	14	1½	7⅛	1⅞	¾	⅜	⅜	(6) #9 x 1½" SD	1½ x 3½	840	840	0.17	
								(6) 0.148 x 1½		910	640	0.167	
								(8) 0.148 x 1½		910	850	0.167	
SS DTT2Z	14	3¼	6⁵⁄₁₆	1⅝	¹³⁄₁₆	⅜	½	(8) ¼ x 1½ SDS	1½ x 3½	1,825	1,800	0.105	
								(8) ¼ x 1½ SDS	3 x 3½	2,145	1,835	0.128	
SS DTT2Z-SDS2.5								(8) ¼ x 2½ SDS	3 x 3½	2,145	2,105	0.128	
HDU2-SDS2.5	14	3	8¹⁄₁₆	3¼	1⁵⁄₁₆	1⅜	⅝	(6) ¼ x 2½ SDS	3 x 3½	3,075	2,215	0.088	IBC®, FL, LA
HDU4-SDS2.5	14	3	10¹⁵⁄₁₆	3¼	1⁵⁄₁₆	1⅜	⅝	(10) ¼ x 2½ SDS	3 x 3½	4,565	3,285	0.114	
HDU5-SDS2.5	14	3	13³⁄₁₆	3¼	1⁵⁄₁₆	1⅜	⅝	(14) ¼ x 2½ SDS	3 x 3½	5,645	4,340	0.115	
HDU8-SDS2.5	10	3	16⅝	3½	1⅜	1½	⅞	(20) ¼ x 2½ SDS	3 x 3½	6,765	5,820	0.11	
									3½ x 3½	6,970	5,995	0.116	
									3½ x 4½	7,870	6,580	0.113	
HDU11-SDS2.5	10	3	22¼	3½	1⅜	1½	1	(30) ¼ x 2½ SDS	3½ x 5½	9,535	8,030	0.137	
									3½ x 7¼	11,175	9,610	0.137	
HDU14-SDS2.5	7	3	25¹⁄₁₆	3½	1⁹⁄₁₆	1⁹⁄₁₆	1	(36) ¼ x 2½ SDS	3½ x 5½	10,770	9,260	0.122	—
									3½ x 7¼	14,390	12,375	0.177	IBC, FL, LA
									5½ x 5½	14,445	12,425	0.172	

1. HDU14 requires heavy-hex anchor nut to achieve tabulated loads (supplied with holdown).
2. HDU11 and HDU14 loads on 4x6 post are applicable to installation on either the narrow or the wide face of the post.
3. **Fasteners:** Nail dimensions are listed diameter by length. SD and SDS screws are Simpson Strong-Tie Strong-Drive SD Connector and SDS Heavy-Duty Connector screws. See pp. 23–24 for fastener information.



Typical HDU Tie Between Floors



Typical DTT2Z Installation

Hurricane ties

22' truss @ 24" O.C

EWA = $22' \cdot \frac{22'}{3} = 161.3\ ft^2$

Wind C&C: -28.8 psf (Fully enclosed)

uplift = $22'(2')(28.8) = 1267$ lb

Allowable $0.60 + 0.6W = -880 + 1267 = 387.2$ (-20psf)

2x holdown = $\frac{387.2}{2} = \underline{193.6\ lb}$

Use HIA (470 lb)

Seismic and Hurricane Ties (cont.)

These products are available with additional corrosion protection. For more information, see p. 16.

SS For stainless-steel fasteners, see p. 23.

SD Many of these products are approved for installation with Strong-Drive® SD Connector screws. See pp. 362–366 for more information.

Model No.	Ga.	Fasteners (in.)			DF/SP Allowable Loads			Uplift with 0.131" x 1½" Nails (160)	SPF/HF Allowable Loads			Uplift with 0.131" x 1½" Nails (160)	Code Ref.
		To Rafters/Truss	To Plates	To Studs	Uplift (160)	Lateral (160) F_1	Lateral (160) F_2		Uplift (160)	Lateral (160) F_1	Lateral (160) F_2		
H1A	18	(4) 0.131 x 1½	(4) 0.131 x 1½	—	545	420	265	—	470	360	205	—	IBC®, FL, LA
H1.81Z	18	(6) 0.131 x 1½	(4) 0.131 x 2½	—	540	440	170	460	465	380	130	395	—
H2A	18	(5) 0.131 x 1½	(2) 0.131 x 1½	(5) 0.131 x 1½	525	130	55	—	495	130	55	—	IBC, FL, LA
H2ASS	18	(5) 0.131 x 1½	(2) 0.131 x 1½	(5) 0.131 x 1½	400	130	55	400	345	130	55	345	—
H2.5A	18	(5) 0.131 x 2½	(5) 0.131 x 2½	—	700	110	110	625	615	110	110	540	IBC, FL, LA
H2.5ASS	18	(5) 0.131 x 2½	(5) 0.131 x 2½	—	440	75	70	365	380	75	70	310	—
H2.5T	18	(5) 0.131 x 2½	(5) 0.131 x 2½	—	590	135	145	480	565	135	145	475	IBC, FL, LA
H3	18	(4) 0.131 x 2½	(4) 0.131 x 2½	—	400	210	170	400	365	180	145	290	
H3SS	18	(4) 0.131 x 2½	(4) 0.131 x 2½	—	280	145	120	275	225	100	85	210	—
H6 (to Plates)	16	—	(8) 0.131 x 2½	(8) 0.131 x 2½	930	—	—	—	800	—	—	—	IBC, FL, LA
H6 (to Rim)	16	(8) 0.131 x 2½	—	(8) 0.131 x 2½	1,230	—	—	—	1,065	—	—	—	
H7Z	16	(4) 0.131 x 2½	(2) 0.131 x 1½	(8) 0.131 x 2½	830	410	—	—	715	355	—	—	
H8	18	(5) 0.148 x 1½	(5) 0.148 x 1½	—	780	95	90	630	710	95	90	510	
H8SS	18	(5) 0.148 x 1½	(5) 0.148 x 1½	—	610	90	120	440	370	90	55	335	—
H10A Field Bent	18	(9) 0.148 x 1½	(9) 0.148 x 1½	—	780	565	285	—	760	485	285	—	IBC, FL, LA
H10A	18	(9) 0.148 x 1½	(9) 0.148 x 1½	—	1,040	565	285	—	1,015	485	285	—	
H10ASS	18	(9) 0.148 x 1½	(9) 0.148 x 1½	—	970	565	170	—	835	485	170	—	—
H10AR	18	(9) 0.148 x 1½	(9) 0.148 x 1½	—	1,050	490	285	—	905	420	285	—	
H10S	18	(8) 0.131 x 1½	(8) 0.131 x 1½	(8) 0.131 x 2½	910	660	215	550	785	570	185	475	IBC, FL, LA
H10A-2	18	(9) 0.148 x 1½	(9) 0.148 x 1½	—	1,080	680	260	—	930	585	225	—	
H11Z	18	(6) 0.162 x 2½	(6) 0.162 x 2½	—	830	525	760	—	715	450	655	—	—
H14	18	(12) 0.131 x 1½	(13) 0.131 x 2½	—	1,275	725	285	—	1,050	480	245	—	IBC, FL, LA
		(12) 0.131 x 1½	(15) 0.131 x 2½	—	1,340	670	230	—	1,050	480	245	—	
TSP	16	(9) 0.148 x 1½	(6) 0.148 x 1½	—	755	310	190	—	650	265	160	—	
		(9) 0.148 x 1½	(6) 0.148 x 3	—	1,015	310	190	—	875	265	160	—	

1. See pp. 276–277 for Straps and Ties General Notes.
2. Allowable loads are for one anchor. A minimum rafter thickness of 2½" must be used when framing anchors are used on each side of the joist and on the same side of the plate (exception: connectors installed such that nails on opposite side don't interfere).
3. Allowable DF/SP uplift load for stud-to-bottom plate installation (see detail 12) is 390 lb. (H2.5A); 265 lb. (H2.5ASS); and 310 lb. (H8). For SPF/HF values, multiply these values by 0.86.
4. Allowable loads in the F_1 direction are not intended to replace diaphragm boundary members and do not account for possible cross-grain bending of the truss or rafter members.
5. When cross-grain bending or cross-grain tension cannot be avoided in the members, mechanical reinforcement to resist such forces shall be considered by the designer.
6. Southern pine allowable uplift loads for H10A = 1,105 lb. (160), H2.5A with 0.131" x 1½" nails = 635 lb. (160) and H2.5A with 0.131" x 2½" nails = 730 lb. (160).
7. H10S can have the stud offset a maximum of 1" from the rafter (center to center) for a reduced uplift of 890 lb. (DF/SP) and 765 lb. (SPF).
8. H10S nails to plates are optional for uplift but required for lateral loads.
9. Some load values for the stainless-steel connectors shown here are lower than those for the carbon-steel versions. Ongoing test programs have shown this also to be the case with other stainless-steel connectors in the product line that are installed with nails. Visit **strongtie.com/corrosion** for updated information.
10. The allowable loads of stainless-steel connectors match carbon-steel connectors when installed with stainless-steel Strong-Drive SCNR Ring-Shank Connector nails. For more information, refer to engineering letter L-F-SSNAILS at **strongtie.com**.
11. Simpson Strong-Tie offers stainless-steel Strong-Drive SCNR Ring-Shank Connector nails. For bulk SCNR nails, see p. 359; for collated SCNR nails, see p. 360. For general fastener information, see pp. 23–24.
12. Allowable DF/SP/SPF uplift load for the H2.5A fastened to a 2x4 truss bottom chord and double top plates using five 0.131" x 1½" nails in the top plates and three 0.131" x 1½" nails in the lowest three flange holes into the truss bottom chord is 260 lb. (160).
13. For TSP installed stud to single plate see pp. 291–293.
14. **Fasteners:** Nail dimensions are listed diameter by length. See pp. 23–24 for fastener information.
15. Using Strong-Drive SD Connector (SD9112) for 0.131" x 1½" and 0.148" x 1½", Strong-Drive SD Connector (SD9212) for 0.131" x 2½" (and longer) and 0.148" x 2½" (and longer), Strong-Drive SD Connector (SD10212) for 0.162" x 2½" (and longer) will get the same load as nails.

FOUNDATION

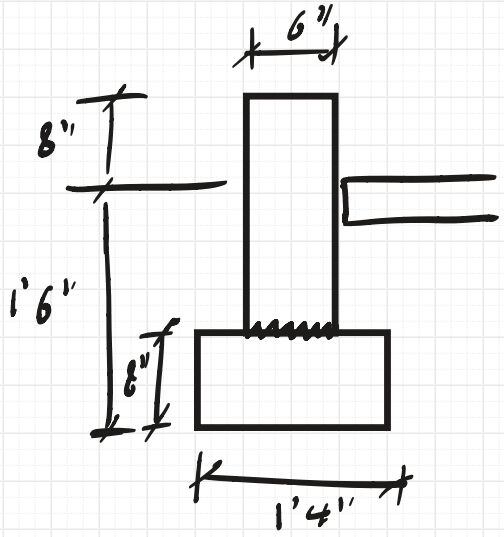
- 1'4" footing w/ 6" stem

- IBC presumptive load bearing (Table 1806.2)

bearing = 1500 psf

lateral = 100 psf

coefficient of friction = 0.25



Loads

gravity

D = 150pcf(6/12)(1')(1'6/12) + 20 psf(11')(1') = 332.5 lb

S = 25 psf(11') = 275 lb

W = 16psf cos(16.74)(13.75')(1') = 210.7 lb

lateral W = 20.6 psf (1')(4.4') = 90.64 lb EWA = 90 sf

Ok per ene-calc

Project Title:
Engineer:
Project ID:
Project Descr:

Wall Footing

Project File: 25438 Mercer Modern.ec6

DESCRIPTION: --None--

Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : ACI 318-19
Load Combinations Used : ASCE 7-22 / IBC 2024

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

Analysis Settings

Min Steel % Bending Reinf.	=	0.0018
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL :		Yes

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	100.0 pcf
Soil/Concrete Friction Coeff.	=	0.250

Increases based on footing Depth

Reference Depth below Surface	=	1.50 ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

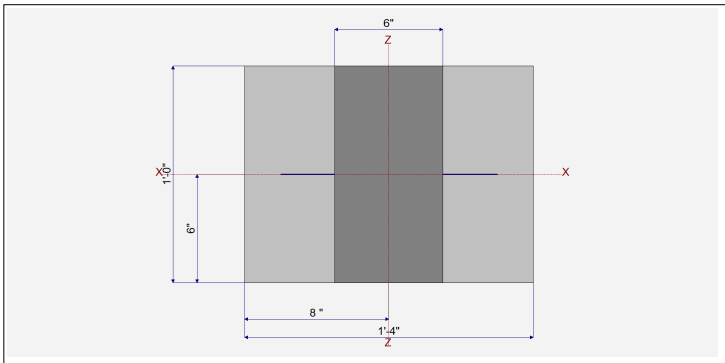
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

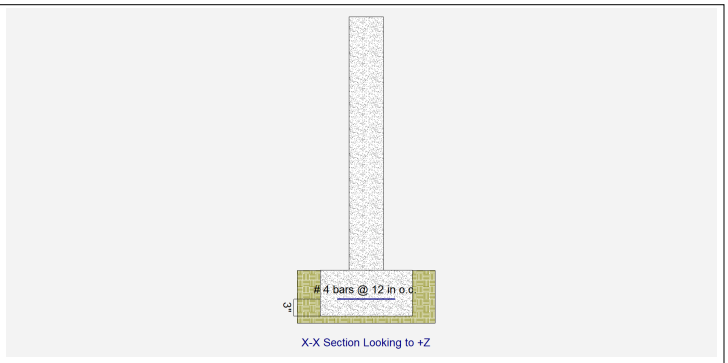
Adjusted Allowable Bearing Pressure = 1.50 ksf

Dimensions

Footing Width	=	1.333 ft	Footing Thickness	=	8.0 in	Bars along X-X Axis	
Wall Thickness	=	6.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 4

Reinforcing





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	0.3325			0.2750	0.2107			k
OB : Overburden	=								ksf
V-x	=					0.0910			k
M-zz	=					0.1990			k-ft
Vx applied	=	in above top of footing							

Project Title:
Engineer:
Project ID:
Project Descr:

Wall Footing

Project File: 25438 Mercer Modern.ec6

DESCRIPTION: --None--

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	1.725	Overturning - Z-Z	0.1558 k-ft	0.2688 k-ft	+0.60D+0.60W
PASS	3.271	Sliding - X-X	0.05460 k	0.1786 k	+0.60D+0.60W
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.6505	Soil Bearing	0.9758 ksf	1.50 ksf	+D+0.60W
PASS	0.02743	Z Flexure (+X)	0.1186 k-ft	4.324 k-ft	+1.20D+0.30S+W
PASS	0.006249	Z Flexure (-X)	0.02702 k-ft	4.324 k-ft	+0.90D
PASS	N/A	1-way Shear (+X)	N/A psi	49.091 psi	N/A
PASS	N/A	1-way Shear (-X)	N/A psi	49.091 psi	N/A

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
D Only	1.50 ksf	0.0 in	0.3461 ksf	0.3461 ksf	0.231
+D+0.70S	1.50 ksf	0.0 in	0.4905 ksf	0.4905 ksf	0.327
+D+0.5250S	1.50 ksf	0.0 in	0.4544 ksf	0.4544 ksf	0.303
+D+0.60W	1.50 ksf	3.181 in	0.0 ksf	0.9758 ksf	0.651
+D+0.450W	1.50 ksf	2.521 in	0.02293 ksf	0.8115 ksf	0.541
+D+0.5250S+0.450W	1.50 ksf	2.002 in	0.1312 ksf	0.9198 ksf	0.613
+0.60D+0.60W	1.50 ksf	4.637 in	0.0 ksf	0.9591 ksf	0.639
+D+0.10S	1.50 ksf	0.0 in	0.3667 ksf	0.3667 ksf	0.245
+0.60D	1.50 ksf	0.0 in	0.2077 ksf	0.2077 ksf	0.138

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
D Only	None	0.0 k-ft	Infinity	OK
+D+0.70S	None	0.0 k-ft	Infinity	OK
+D+0.5250S	None	0.0 k-ft	Infinity	OK
+D+0.60W	0.1558 k-ft	0.3918 k-ft	2.514	OK
+D+0.450W	0.1169 k-ft	0.3707 k-ft	3.172	OK
+D+0.5250S+0.450W	0.1169 k-ft	0.4669 k-ft	3.996	OK
+0.60D+0.60W	0.1558 k-ft	0.2688 k-ft	1.725	OK
+D+0.10S	None	0.0 k-ft	Infinity	OK
+0.60D	None	0.0 k-ft	Infinity	OK

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding Safety Ratio	Status
D Only	0.0 k	0.1931 k	No Sliding	OK
+D+0.70S	0.0 k	0.2412 k	No Sliding	OK
+D+0.5250S	0.0 k	0.2292 k	No Sliding	OK
+D+0.60W	0.05460 k	0.2247 k	4.116	OK
+D+0.450W	0.04095 k	0.2168 k	5.295	OK
+D+0.5250S+0.450W	0.04095 k	0.2529 k	6.176	OK
+0.60D+0.60W	0.05460 k	0.1786 k	3.271	OK
+D+0.10S	0.0 k	0.20 k	No Sliding	OK
+0.60D	0.0 k	0.1470 k	No Sliding	OK

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
+1.40D	0.04203	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.40D	0.04203	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D	0.03602	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D	0.03602	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+0.30S	0.04139	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+0.30S	0.04139	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+0.50W	0.01277	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK

Project Title:
Engineer:
Project ID:
Project Descr:

Wall Footing

Project File: 25438 Mercer Modern.ec6

DESCRIPTION: --None--

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
+1.20D+0.50W	0.07298	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+S	0.05392	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+S	0.05392	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+S+0.50W	0.03067	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+S+0.50W	0.09088	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+W	6.9e-05	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+W	0.1161	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+0.30S+W	0.001051	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+0.30S+W	0.1186	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+0.90D+W	0	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+0.90D+W	0.1174	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+0.150S	0.03871	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+1.20D+0.150S	0.03871	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+0.90D	0.02702	-X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK
+0.90D	0.02702	+X	Bottom	0.1728	ACI 7.6.1.1	0.2	4.324	OK

One Way Shear

Units : k

Load Combination...	vu @ -X	vu @ +X	vu:Max	Φ vn	vu / Φ vn	Status
+1.40D	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+1.20D	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+1.20D+0.30S	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+1.20D+0.50W	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+1.20D+S	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+1.20D+S+0.50W	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+1.20D+W	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+1.20D+0.30S+W	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+0.90D+W	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+1.20D+0.150S	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK
+0.90D	0.0 psi	0.0 psi	0.0 psi	49.1 psi	0.000	OK