



Antigo Peaceful Valley Pavilion

Project Address:

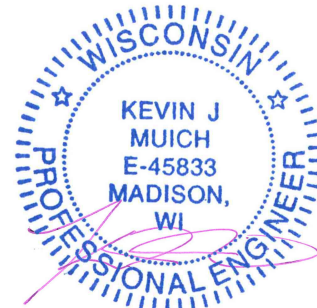
420 Field St.
Antigo, WI 54409

Prepared for Client:

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August 04, 2022

Report Date: August 5, 2022

Project Number: 22-048



Design Criteria

Geometry

Building Length (Parallel to Ridge), L	36 ft
Building Width (Perpendicular to Ridge), B	15 ft
Roof Slope	3 /12
Mean Roof Height, h	12 ft

General

Building Risk Category	2
Building Code	2015 IBC
Wisconsin Commercial Code Amendments	Yes

Wind

Building Exposure Category	B
Wind Speed (V_{ult})	115 mph
Wind Speed (V_{asd})	90 mph
Directionality Factor, K_d	0.85
Topographic Factor, K_{zt}	1.00
Enclosure Classification	Open
Roof Type	Monslope

C&C Strength (Ultimate) Loads

Zone 1 - Roof Field	-22 / 16 psf
Zone 2 - Roof Edge	-24 / 16 psf
Zone 3 - Roof Corner	-40 / 16 psf
Zone 4 - Wall Field	-19 / 17 psf
Zone 5 - Wall Corner	-21 / 17 psf

Snow Loads

Ground Snow Load, P_g	50 psf
Roof Exposure	Partially Exposed
Thermal Factor, C_t	1.2
Roof Surface	All Other Surfaces
Flat Roof Snow Load	42 psf
Sloped Roof Snow Load	42 psf

Dead Loads

Roof	10 psf
Glulams	Self Weight

Soils

Presumed Allowable Soil Bearing Pressure	1500 psf
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Delegated Structural Design

Manufactured Roof Trusses
Glulamated Beams

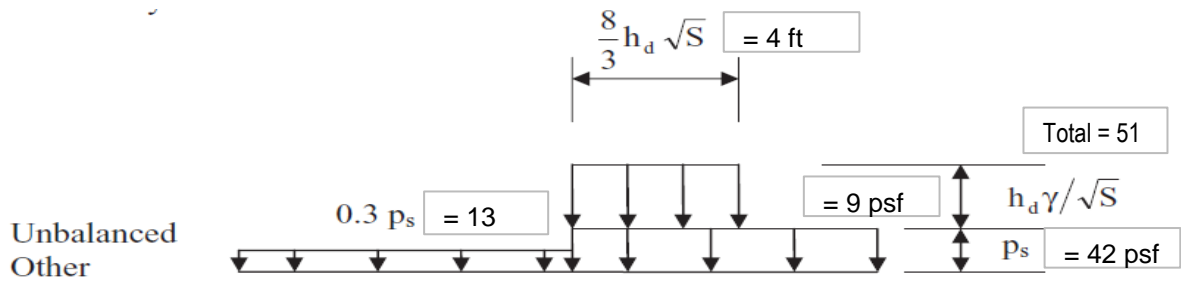
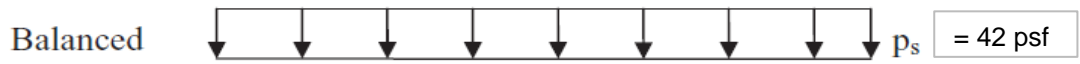
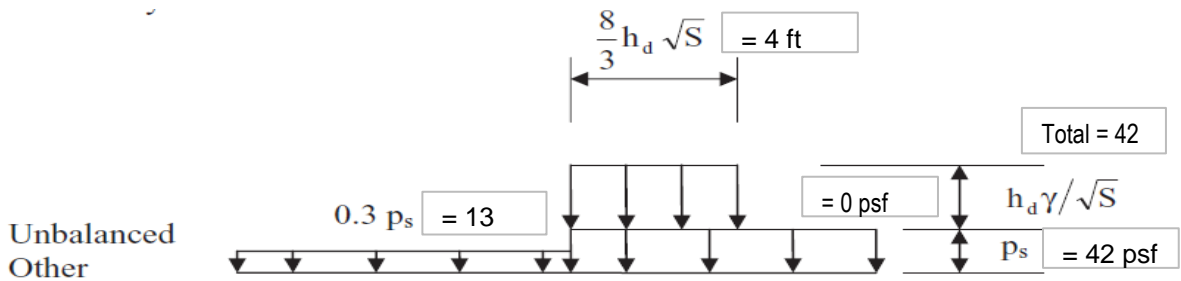
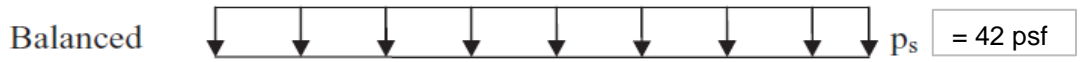


ASCE 7-10 Snow Loading		
Cover Sheet Inputs	Building Risk Category (--)	2
	Building Width (Perpendicular to Ridge), B (ft)	15 ft
	Terrain Category (--)	B
	Roof Slope (#/12)	3/12
	Roof Slope, (deg)	14.04 deg
	Roof Slope, (Rad)	0.2450 Rad
	Ground Snow Load, P _g (psf)	50 psf
	Roof Exposure (--)	Partially Exposed
	Thermal Factor, C _t (--)	1.2
	Roof Surface (--)	All Other Surfaces
Flat Roof	Exposure Factor, C _e (--)	1.0
	Snow Importance Factor, I _s (--)	1.0
	Flat Roof Snow Load, P _f (psf)	42 psf
Min.	Roof Slope (Deg)	14.04 Deg
	Roof Slope (rad)	0.24 rad
	Is Roof Low-Slope?	YES
	Minimum Snow Load, P _m (psf)	20 psf
Sloped	Slope Factor (--)	1.0000
	Sloped Roof Snow Load, P _s (psf)	42 psf
Unbalanced WI (SPS 362.1608)	Unbalanced Loads Considered?	YES
	Ground Snow Load, P _g (psf)	50 psf
	Importance Factor, I _s	1.0
	Slope Factor C _s	1.00
	Accumulation Factor, C _a	0.00
	Basic Roof Snow Load Factor, C _b	0.80
	Wind Exposure Factor, C _w	1.00
	Alternate Unbalanced Roof Snow Load Drift + Balanced (psf)	0 psf 42 psf
Unbalanced	Unbalanced Loads Considered?	YES
	Snow Density, g (pcf)	20.50 pcf
	Fetch Distance, W (ft)	7.50 ft
	Height, h _d (ft)	0.84 ft
	Roof Slope (Run for Rise of One), S	4.00
	Leeward Drift (psf)	9 psf
	Leeward Drift + Balanced (psf)	51 psf
	Leeward Extent (ft)	4 ft
Windward (psf)	13 psf	



Unbalanced
 WI (SPS 362.1608)

 ASCE 7 Unbalanced Loads





Inputs	
Mean Roof Height, h (ft)	12
Terrain Category	B
Wind Speed (V_{ult})	115
Wind Speed (V_{asd})	90
Directionality Factor, K_d	0.85
Topographic Factor, K_{zt}	1
Building Exposure Category	B
Roof Slope (/12)	3
Roof Slope, Deg.	14.04
Roof Slope, Rad.	0.2450
Enclosure Classification	Open
Internal Pressure Coefficient, GC_{pi}	0
Min. Wind Load Pressure, (psf)	16
Roof Type	Monslope

Velocity Pressure Coefficient	
Terrain Exposure Constant, Alpha	7
Terrain Exposure Constant, z_g	1200
Adjusted Mean Roof Height, h (ft)	30
Velocity Pressure Coefficient, K_z	0.70

Velocity Pressure	
Velocity Pressure, q_z (psf)	20

Element Effective Area	
Effective Area, ft^2	100

C&C Pressures (psf)			
By Roof Type	Zone	Strength	ASD
Suction	1	-22	-13
	2	-24	-15
	3	-40	-24
	4	-19	-11
	5	-21	-13
Pressure	1	16	10
	2	16	10
	3	16	10
	4	17	10
	5	17	10

C&C Pressures				
By Roof Type	Zone	GC_p	$q(GC_p + GC_{pi})$ (psf)	$q(GC_p - GC_{pi})$ (psf)
Suction	1	-1.1000	-22	-22
	2	-1.2000	-24	-24
	3	-2.0000	-40	-40
	4	-0.9234	-19	-19
	5	-1.0468	-21	-21
Pressure	1	0.3000	6	6
	2	0.3000	6	6
	3	0.3000	6	6
	4	0.8234	17	17
	5	0.8234	17	17



Inputs	
Mean Roof Height, h (ft)	12
Terrain Category	B
Wind Speed (V_{ult})	115
Wind Speed (V_{asd})	90
Directionality Factor, K_d	0.85
Topographic Factor, K_{zt}	1
Building Exposure Category	B
Roof Slope (/12)	3
Roof Slope, Deg.	14.04
Roof Slope, Rad.	0.2450
Enclosure Classification	Open
Internal Pressure Coefficient, GC_{pi}	0
Min. Wind Load Pressure, (psf)	16
Roof Type	Monslope

Velocity Pressure Coefficient	
Terrain Exposure Constant, Alpha	7
Terrain Exposure Constant, z_g	1200
Adjusted Mean Roof Height, h (ft)	30
Velocity Pressure Coefficient, K_z	0.70

Velocity Pressure	
Velocity Pressure, q_z (psf)	20

Element Effective Area	
Effective Area, ft^2	8

C&C Pressures (psf)			
By Roof Type	Zone	Strength	ASD
Suction	1	-26	-16
	2	-32	-19
	3	-58	-35
	4	-22	-13
	5	-28	-17
Pressure	1	16	10
	2	16	10
	3	16	10
	4	20	12
	5	20	12

C&C Pressures				
By Roof Type	Zone	GC_p	$q(GC_p + GC_{pi})$ (psf)	$q(GC_p - GC_{pi})$ (psf)
Suction	1	-1.3000	-26	-26
	2	-1.6000	-32	-32
	3	-2.9000	-58	-58
	4	-1.1000	-22	-22
	5	-1.4000	-28	-28
Pressure	1	0.4000	8	8
	2	0.4000	8	8
	3	0.4000	8	8
	4	1.0000	20	20
	5	1.0000	20	20

Axial & Bending Member Check													
Member	Species	SPF	Depth	d ₁ (in)	3.50	Plates	Species	SPF	Design Values Reference Standard	Standard		NDS Table 4A	
	Grade	No. 1/No. 2		Thickness	d ₂ (in)		1.50	Wet Use		No			
Length	Member Length (ft)	4.0	Geometric Properties	Area (in ²)	5.2500	Flatwise Column Stability Factor	F _{c, perp plank}	425	Beam Stability Factor Simply Supported	l ₁₂ (in)	48.00		
	l ₁₁ (ft)	2.0		S ₁ (in ³)	3.0625		C ₁	1.00		l ₁₂ /d ₂ (-)	48.00		
	l ₁₂ (ft)	4.0		S ₂ (in ³)	1.3125		Adjusted F _{c, perp plank}	425		d (in)	3.50		
Ply	Depth d ₁ (in)	3.50	l ₁ (in ²)	5.3594	Edge-wise Column Stability Factor	Edge-wise Buckling	l ₁₂ (in)	48.00	Column Stability Factor	l ₁₂ /d (-)	13.71		
	Width d ₂ (in)	1.50	l ₂ (in ²)	0.9844			K ₁ (-)	1.00		l ₁₂ (in)	48.00	l ₁₂ (in)	88.74
	Number of Plies	1	l ₁₁ (in)	24.00			l ₁₂ (in)	48.00		R ₁ (-)	11.75	F _{1E} (psi)	4433.50
Edge-wise Inputs	Loading Length, ft	4.0	K ₂ (-)	1.00	Flatwise Column Stability Factor	Flatwise Buckling	K ₂ (-)	1.00	Column Stability Factor	F _{1E} (psi)	1006.25		
	Spacing, in o.c.	24	l ₁₁ (in)	24.00			l ₁₂ (in)	48.00		F _{1E} (psi)	4.41	F _{1E} (psi)	1322.50
	Bearing Length, in	1.50	d ₁ (in)	3.50			d ₂ (in)	1.50		C ₁ (-)	0.9858	F _{1E} (psi)	409.39
	Repetitive Member	Yes	l ₁₁ /d ₁ (-)	6.86			l ₁₂ /d ₂ (-)	32.00		F _{1E} (psi)	0.80	C ₂ (-)	0.1719
Flatwise Inputs	Loading Length, ft	4.0	F _{1E1} (psi)	8915.70	Member Design Values	Member Design Values	F _{1E2} (psi)	409.39	Member Design Values	Member Design Values	Member Design Values		
	Spacing, in o.c.	24	Built Up Column Factor, K ₁	1.00			Built Up Column Factor, K ₂	0.60				E	1,400,000
	Bearing Length, in	1.50	F _{1E} /F _{1E} * (-)	6.7416			F _{1E} /F _{1E} * (-)	0.3096				E _{min}	510,000
	Repetitive Member	Yes	C ₁ (-)	0.9676			C ₂ (-)	0.1719				G	0.42
Reference Design Values (psi)													
	F _{b, beam}	F _{b, plank}	F _t	F _{c, beam}	F _{c, plank}	F _c	F _{c, perp beam}	F _{c, perp plank}	E	E _{min}	G		
C ₁	by Load Case	x	x	x	x	x	--	--	--	--	--		
C ₂	by Function	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	--		
C ₃	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	--		
C ₄	0.99	--	--	--	--	--	--	--	--	--	--		
C ₅	by Function	1.50	1.50	1.50	--	1.15	--	--	--	--	--		
C ₆	by Function	--	1.10	--	--	--	--	--	--	--	--		
C ₇	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	--		
C ₈	by Function	1.15	1.15	--	--	--	--	--	--	--	--		
C ₉	0.17	--	--	--	--	0.17	--	--	--	--	--		
C ₁₀	1.00	--	--	--	--	--	--	--	--	1.00	--		
C ₁₁	1.00	--	--	--	--	--	1.00	1.00	--	--	--		
Adjusted Design Values (psi)													
	F _{b1} *	F _{b2} *	F _t *	F _{c1} *	F _{c2} *	F _c *	F _{c, perp1} *	F _{c, perp2} *	E'	E _{min} '	G		
	1,488	1,660	675	135	135	227	425	425	1,400,000	510,000	0.42		
Other Design Values (psi)													
	F _b *	--	--	--	--	F _c *	--	--	--	--	--		
	1006.25	--	--	--	--	1322.5	--	--	--	--	--		



Orientation	Parallel
C_d	1.60
D (in)	1.000
L_m (in)	9.25
L_s (in)	9.25
F_{yb} (psi)	45,000
G_m	0.42
G_s	0.42
F_{em} (psi)	4704
F_{es} (psi)	4704
R_e	1.00
R_t	1.00
k₁	0.50
k₂	1.06
k₃	1.06
Theta	0.00
K_{theta}	1.00

Table I1 Fastener Bending Yield Strengths, F_{yb}

Fastener Type	F _{yb} (psi)
Bolt, lag screw (with D ≥ 3/8"), drift pin (SAE J429 Grade 1 - F _y = 36,000 psi and F _u = 60,000 psi)	45,000
Common, box, or sinker nail, spike, lag screw, wood screw (low to medium carbon steel)	
0.099" ≤ D ≤ 0.142"	100,000
0.142" < D ≤ 0.177"	90,000
0.177" < D ≤ 0.236"	80,000
0.236" < D ≤ 0.273"	70,000
0.273" < D ≤ 0.344"	60,000
0.344" < D ≤ 0.375"	45,000
Hardened steel nail (medium carbon steel) including post-frame ring shank nails	
0.120" ≤ D ≤ 0.142"	130,000
0.142" < D ≤ 0.192"	115,000
0.192" < D ≤ 0.207"	100,000

	R _d 0.25 ≤ D ≤ 1	0.17" < D < 0.25"	D ≤ 0.17"	R _d	Single Shear	Double Shear
I _m	4.00	10.50	2.20	4.00	10878	10878
I _s	4.00	10.50	2.20	4.00	10878	21756
II	3.60	10.50	2.20	3.60	6043	
III _m	3.20	10.50	2.20	3.20	4782	
III _s	3.20	10.50	2.20	3.20	4782	9565
IV	3.20	10.50	2.20	3.20	2625	5250
				Reference Values	2625	5250
				Adjusted Values	4200	8400



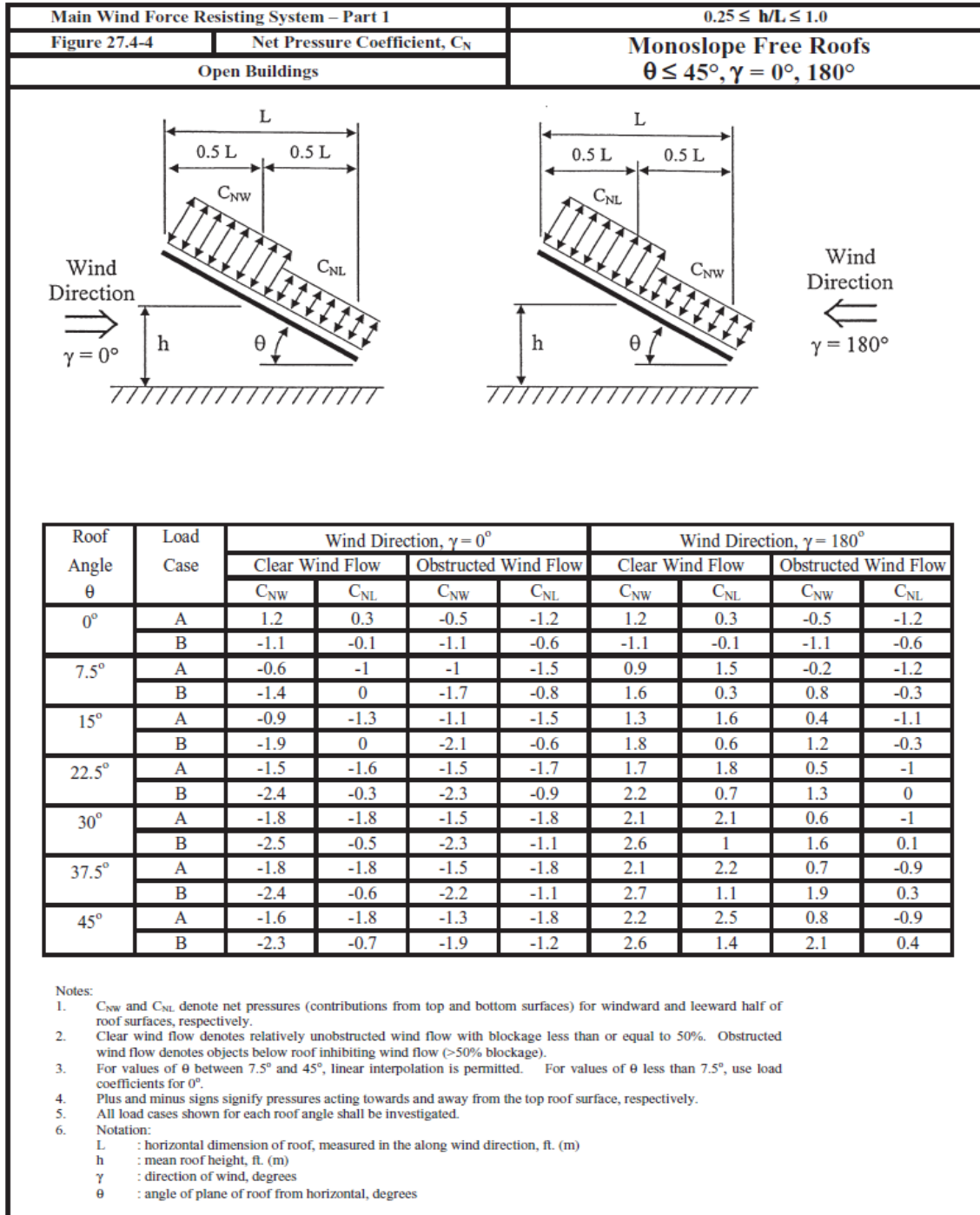
Orientation	Perpendicular
C_d	1.60
D (in)	1.000
L_m (in)	9.25
L_s (in)	9.25
F_{yb} (psi)	45,000
G_m	0.42
G_s	0.42
F_{em} (psi)	1734
F_{es} (psi)	1734
R_e	1.00
R_t	1.00
k₁	0.50
k₂	1.15
k₃	1.15
Theta	90.00
K_{theta}	1.25

Table I1 Fastener Bending Yield Strengths, F_{yb}

Fastener Type	F _{yb} (psi)
Bolt, lag screw (with D ≥ 3/8"), drift pin (SAE J429 Grade 1 - F _y = 36,000 psi and F _u = 60,000 psi)	45,000
Common, box, or sinker nail, spike, lag screw, wood screw (low to medium carbon steel)	
0.099" ≤ D ≤ 0.142"	100,000
0.142" < D ≤ 0.177"	90,000
0.177" < D ≤ 0.236"	80,000
0.236" < D ≤ 0.273"	70,000
0.273" < D ≤ 0.344"	60,000
0.344" < D ≤ 0.375"	45,000
Hardened steel nail (medium carbon steel) including post-frame ring shank nails	
0.120" ≤ D ≤ 0.142"	130,000
0.142" < D ≤ 0.192"	115,000
0.192" < D ≤ 0.207"	100,000

	R _d 0.25 ≤ D ≤ 1	0.17" < D < 0.25"	D ≤ 0.17"	R _d	Single Shear	Double Shear
I _m	5.00	10.50	2.20	5.00	3208	3208
I _s	5.00	10.50	2.20	5.00	3208	6416
II	4.50	10.50	2.20	4.50	1782	
III _m	4.00	10.50	2.20	4.00	1532	
III _s	4.00	10.50	2.20	4.00	1532	3064
IV	4.00	10.50	2.20	4.00	1275	2550
				Reference Values	1275	2550
				Adjusted Values	2040	4080

MINIMUM DESIGN LOADS





CHAPTER 27 WIND LOADS ON BUILDINGS—MWFRS (DIRECTIONAL PROCEDURE)

Main Wind Force Resisting System – Part 1		$0.25 \leq h/L \leq 1.0$
Figure 27.4-7	Net Pressure Coefficient, C_N	Free Roofs
Open Buildings		$\theta \leq 45^\circ, \gamma = 90^\circ, 270^\circ$

Monoslope

Pitched

Trough

Horizontal Distance from Windward Edge	Roof Angle θ	Load Case	Clear Wind Flow	Obstructed Wind Flow
			C_N	C_N
$\leq h$	All Shapes	A	-0.8	-1.2
	$\theta \leq 45^\circ$	B	0.8	0.5
$> h, \leq 2h$	All Shapes	A	-0.6	-0.9
	$\theta \leq 45^\circ$	B	0.5	0.5
$> 2h$	All Shapes	A	-0.3	-0.6
	$\theta \leq 45^\circ$	B	0.3	0.3

Notes:

- C_N denotes net pressures (contributions from top and bottom surfaces).
- Clear wind flow denotes relatively unobstructed wind flow with blockage less than or equal to 50%. Obstructed wind flow denotes objects below roof inhibiting wind flow (>50% blockage).
- Plus and minus signs signify pressures acting towards and away from the top roof surface, respectively.
- All load cases shown for each roof angle shall be investigated.
- For monoslope roofs with theta less than 5 degrees, C_N values shown apply also for cases where gamma = 0 degrees and 0.05 less than or equal to h/L less than or equal to 0.25. See Figure 27.4-4 for other h/L values.
- Notation:
 - L : horizontal dimension of roof, measured in the along wind direction, ft. (m)
 - h : mean roof height, ft. (m). See Figures 27.4-4, 27.4-5 or 27.4-6 for a graphical depiction of this dimension.
 - γ : direction of wind, degrees
 - θ : angle of plane of roof from horizontal, degrees



Design Wind Loads		All Heights																		
Figure 29.4-1	Force Coefficients, C_f	Solid Freestanding Walls & Solid Freestanding Signs																		
Other Structures																				
C_f, CASE A & CASE B																				
Clearance Ratio, s/h	Aspect Ratio, B/s																			
1	≤ 0.05	0.1	0.2	0.5	1	2	4	5	10	20	30	≥ 45								
0.9	1.80	1.70	1.65	1.55	1.45	1.40	1.35	1.35	1.30	1.30	1.30	1.30								
0.7	1.85	1.75	1.70	1.60	1.55	1.50	1.45	1.45	1.40	1.40	1.40	1.40								
0.5	1.90	1.85	1.75	1.70	1.65	1.60	1.60	1.55	1.55	1.55	1.55	1.55								
0.3	1.95	1.85	1.80	1.75	1.75	1.70	1.70	1.70	1.70	1.70	1.70	1.75								
0.2	1.95	1.90	1.85	1.80	1.80	1.80	1.80	1.80	1.80	1.85	1.85	1.85								
≤ 0.16	1.95	1.90	1.85	1.85	1.80	1.80	1.80	1.80	1.85	1.85	1.90	1.95								
C_f, CASE C																				
Region (horizontal distance from windward edge)	Aspect Ratio, B/s										Region (horizontal distance from windward edge)	Aspect Ratio, B/s								
0 to s	2	3	4	5	6	7	8	9	10	10	13	≥ 45								
s to $2s$	2.25	2.60	2.90	3.10*	3.30*	3.40*	3.55*	3.65*	3.75*	3.75*	4.00*	4.30*								
$2s$ to $3s$	1.50	1.70	1.90	2.00	2.15	2.25	2.30	2.35	2.45	2.45	2.60	2.55								
$3s$ to $10s$		1.15	1.30	1.45	1.55	1.65	1.70	1.75	1.85	1.85	2.00	1.95								
			1.10	1.05	1.05	1.05	1.05	1.00	0.95	0.95	1.50	1.85								
											4s to 5s	1.35	1.85							
											5s to 10s	0.90	1.10							
											>10s	0.55	0.55							
<p>*Values shall be multiplied by the following reduction factor when a return corner is present:</p> <table border="1"> <thead> <tr> <th>L_r/s</th> <th>Reduction Factor</th> </tr> </thead> <tbody> <tr> <td>0.3</td> <td>0.90</td> </tr> <tr> <td>1.0</td> <td>0.75</td> </tr> <tr> <td>≥ 2</td> <td>0.60</td> </tr> </tbody> </table> <p>PLAN VIEW OF WALL OR SIGN WITH A RETURN CORNER</p>													L_r/s	Reduction Factor	0.3	0.90	1.0	0.75	≥ 2	0.60
L_r/s	Reduction Factor																			
0.3	0.90																			
1.0	0.75																			
≥ 2	0.60																			
<p>Notes:</p> <ol style="list-style-type: none"> The term "signs" in notes below also applies to "freestanding walls". Signs with openings comprising less than 30% of the gross area are classified as solid signs. Force coefficients for solid signs with openings shall be permitted to be multiplied by the reduction factor $(1 - (1 - e)^{1.5})$. To allow for both normal and oblique wind directions, the following cases shall be considered: <ul style="list-style-type: none"> For $s/h < 1$: <ul style="list-style-type: none"> CASE A: resultant force acts normal to the face of the sign through the geometric center. CASE B: resultant force acts normal to the face of the sign at a distance from the geometric center toward the windward edge equal to 0.2 times the average width of the sign. For $B/s ≥ 2$, CASE C must also be considered: <ul style="list-style-type: none"> CASE C: resultant forces act normal to the face of the sign through the geometric centers of each region. For $s/h = 1$: <ul style="list-style-type: none"> The same cases as above except that the vertical locations of the resultant forces occur at a distance above the geometric center equal to 0.05 times the average height of the sign. For CASE C where $s/h > 0.8$, force coefficients shall be multiplied by the reduction factor $(1.8 - s/h)$. Linear interpolation is permitted for values of s/h, B/s and L_r/s other than shown. Notation: <ul style="list-style-type: none"> B: horizontal dimension of sign, in feet (meters); h: height of the sign, in feet (meters); s: vertical dimension of the sign, in feet (meters); e: ratio of solid area to gross area; L_r: horizontal dimension of return corner, in feet (meters) 																				

ASCE 27.4.3 - Open Buildings with Mon Slope Roofs

$$P = q_n G C_n$$

$$q_n = 0.00256 K_z K_{zt} K_d V^2$$

$$V = 115 \text{ mph}$$

$$K_d = 0.85$$

$$K_{zt} = 1.0$$

$$K_z = 0.57$$

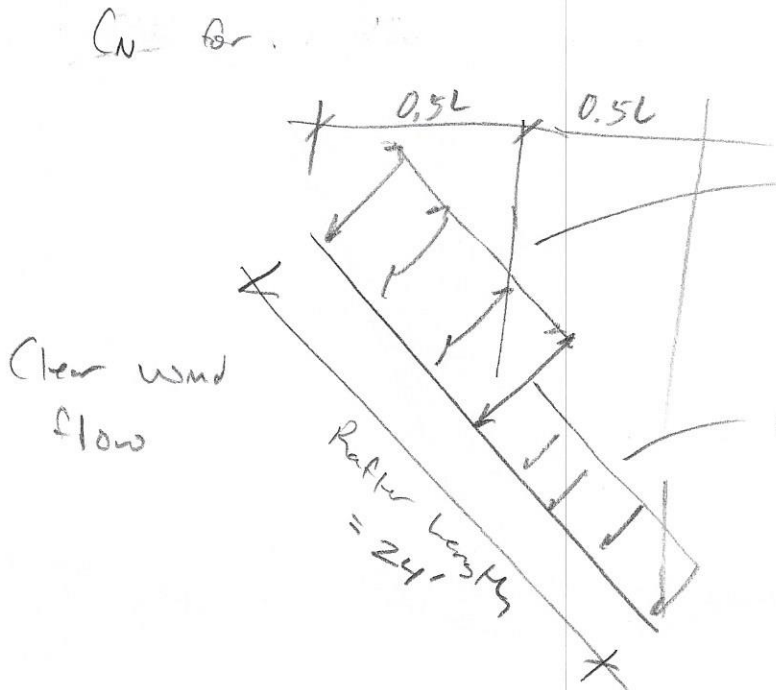
Exposure B

$$h = z = 13'$$

$$q_n = 0.00256 (0.57) 1.0 (0.85) 115^2 = 16,40 \text{ psf}$$

$G = 0.85$ for Low Rise Building

C_n for



for $\theta = 15^\circ$

	$\gamma = 0$	$\gamma = 180^\circ$
C_{nw}	A -0.9	A 1.3
	B -1.9	B 1.8
C_{nl}	A -1.3	A 1.6
	B 0	B 0.6

$$\xi_n G = 16.40 (0.85) = 13.94 \text{ psf}$$

	$\gamma = 0^\circ$	$\gamma = 180^\circ$
C_{NW}	A -1.1 B -2.1	A 0.4 B 1.2
C_{NE}	A -1.5 B -0.6	A -1.1 B -0.3

Assume ± 2.01 is max \neq

$$\left. \begin{array}{l} p = \pm 29 \text{ psf} \\ \text{or} \\ 0.6 p = 18 \text{ psf} \end{array} \right\} \text{ MWFRS Loads}$$

Conservatively applies in both directions.

29.4 As free standing wall

$$F = q_n G C_f A_s$$

$\hookrightarrow q_n G = 13.94 \text{ psf}$ From Before

Figure 29.4-1 for C_f

$$S/m = 9/17 = 0.53$$

$$B/s = 36/9 = 4$$

Case A \neq B = 1.7

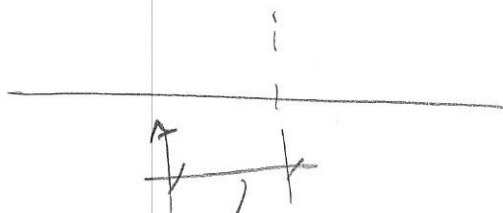
$\Rightarrow q_n G C_f = 13.94 \text{ psf} (1.7) = 24 \text{ psf}$

$$A_s = 9' (36)' =$$

$$F = 7776 \text{ lb}$$

$0.6 F = 4666 \text{ lb}$

Perp. to Ridge



$0.2 B = 0.2 (36) = 7.2'$

$$S/n = 7' / 17' = 0.4$$

$$B/s = 24' / 7' = 4$$

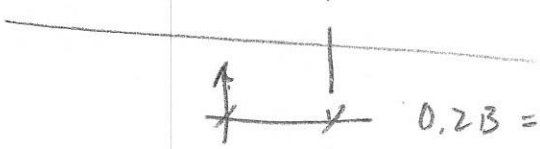
$$\text{Case A} \quad B = 1.0$$

$$\gamma_n GCF = 13.94 \text{ psf} (1.8) = 25 \text{ psf}$$

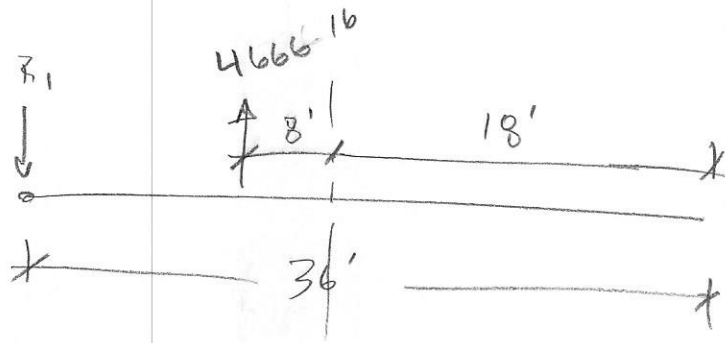
$$A_g = 84 \text{ ft}^2$$

$$F = 2100 \text{ lb}$$

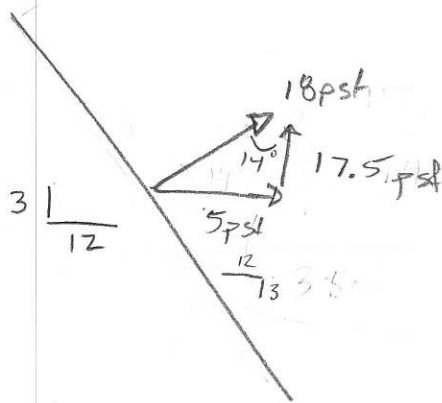
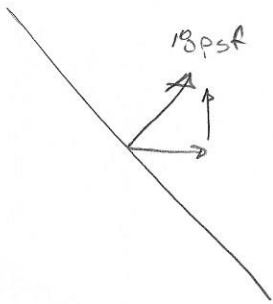
$$0.6 F = 1260 \text{ lb}$$


$$0.2B = 0.2(24) = 5'$$

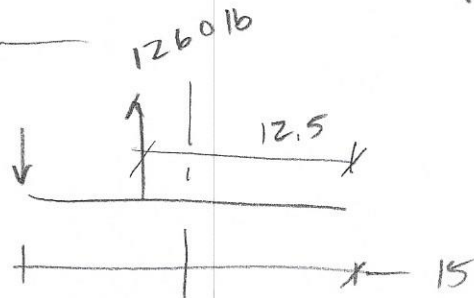
Pepp



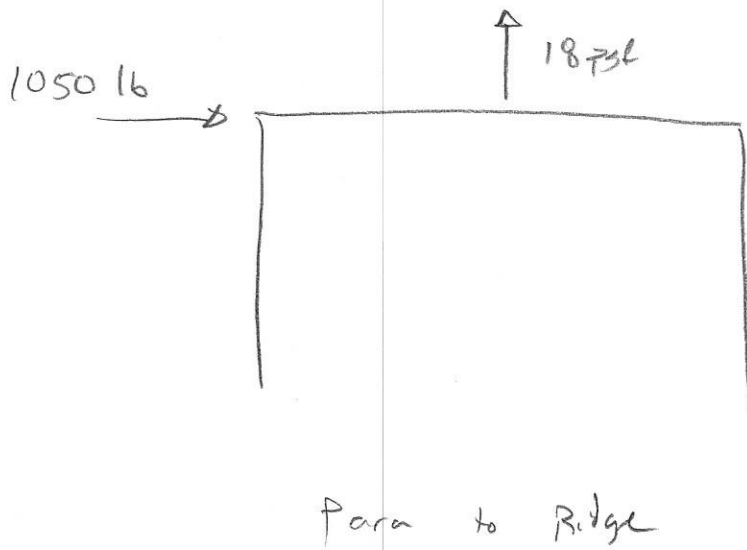
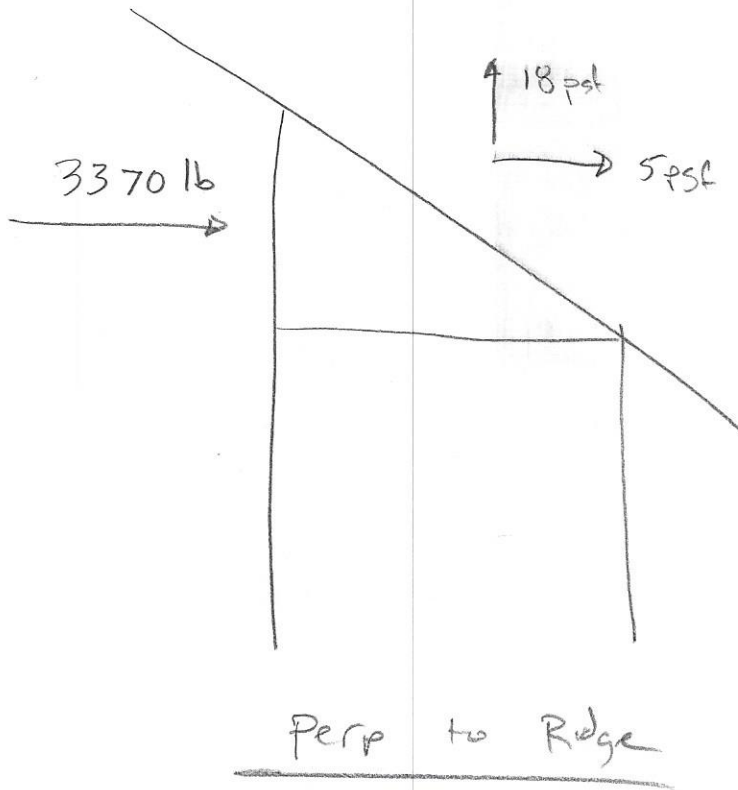
$$R_1 = 3370 \text{ lb} / 2 = 1685 \text{ lb} / \text{post}$$



Para



$$R_1 = 1050 \text{ lb} / 525 \text{ lb} / \text{post}$$



Wood Beam

Project File: 22-048 Antigo - Peaceful Valley Pavilion.ec6

LIC# : KW-06017044, Build:20.22.7.25

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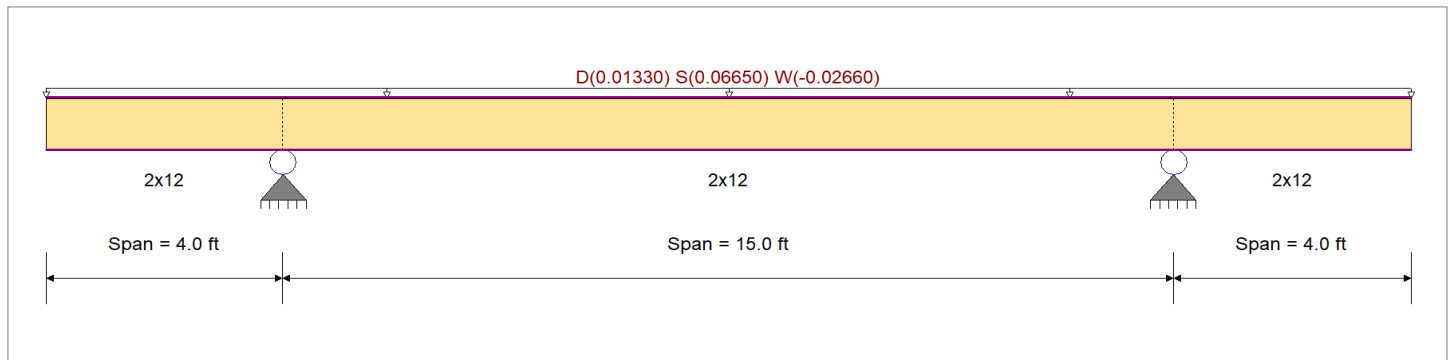
DESCRIPTION: Rafter

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-05

Material Properties

Analysis Method : Allowable Stress Design	Fb +	875.0 psi	E : Modulus of Elasticity	
Load Combination : ASCE 7-05	Fb -	875.0 psi	Ebend- xx	1,400.0ksi
	Fc - Prll	1,150.0 psi	Eminbend - xx	510.0ksi
Wood Species : Spruce - Pine - Fir	Fc - Perp	425.0 psi		
Wood Grade : No. 1/No. 2	Fv	135.0 psi		
	Ft	450.0 psi	Density	26.220pcf
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
Loads on all spans...

Uniform Load on ALL spans : D = 0.010, S = 0.050, W = -0.020 ksf, Tributary Width = 1.330 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.629	1	Maximum Shear Stress Ratio	=	0.356	: 1
Section used for this span		2x12		Section used for this span		2x12	
fb: Actual	=	632.47 psi		fv: Actual	=	55.25 psi	
Fb: Allowable	=	1,006.25 psi		Fv: Allowable	=	155.25 psi	
Load Combination		+D+S		Load Combination		+D+S	
Location of maximum on span	=	7.563ft		Location of maximum on span	=	4.000ft	
Span # where maximum occurs	=	Span # 2		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.203 in	Ratio =	888	>=	360	Span: 3 : W Only
Max Upward Transient Deflection		-0.134 in	Ratio =	716	>=	360	Span: 3 : S Only
Max Downward Total Deflection		0.252 in	Ratio =	712	>=	180	Span: 3 : +0.60D+W
Max Upward Total Deflection		-0.167 in	Ratio =	574	>=	180	Span: 3 : +D+S

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values			
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
D Only																	
	Length = 4.0 ft	1	0.063	0.090	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.13	49.68	787.50	0.00	0.00	0.00
	Length = 15.0 ft	2	0.159	0.090	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.33	124.95	787.50	0.12	10.92	121.50
	Length = 4.0 ft	3	0.063	0.090	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.13	49.68	787.50	0.07	10.92	121.50
+D+S																	
	Length = 4.0 ft	1	0.250	0.356	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.66	251.44	1006.25	0.62	55.25	155.25
	Length = 15.0 ft	2	0.629	0.356	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.67	632.47	1006.25	0.62	55.25	155.25
	Length = 4.0 ft	3	0.250	0.356	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.66	251.44	1006.25	0.33	55.25	155.25
+D+0.750S																	
	Length = 4.0 ft	1	0.200	0.284	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.53	201.00	1006.25	0.50	44.17	155.25
	Length = 15.0 ft	2	0.502	0.284	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.33	505.59	1006.25	0.50	44.17	155.25
	Length = 4.0 ft	3	0.200	0.284	1.15	1.000	1.00	1.00	1.00	1.00	1.00	0.53	201.00	1006.25	0.26	44.17	155.25

Wood Beam

Project File: 22-048 Antigo - Peaceful Valley Pavilion.ec6

LIC# : KW-06017044, Build:20.22.7.25

Vilas Engineering LLC

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DESCRIPTION: Rafter

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values				
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	f _v	F'v	
+D+W						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.022	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.08	31.03	1400.00	0.08	6.82	216.00	
Length = 15.0 ft	2	0.056	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.21	78.05	1400.00	0.08	6.82	216.00	
Length = 4.0 ft	3	0.022	0.032	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.08	31.03	1400.00	0.04	6.82	216.00	
+D+0.750W						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 4.0 ft	1	0.008	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.03	10.85	1400.00	0.03	2.38	216.00	
Length = 15.0 ft	2	0.020	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.07	27.30	1400.00	0.03	2.38	216.00	
Length = 4.0 ft	3	0.008	0.011	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.03	10.85	1400.00	0.01	2.38	216.00	
+D+0.750S+0.750W						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 4.0 ft	1	0.100	0.143	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.37	140.47	1400.00	0.35	30.87	216.00	
Length = 15.0 ft	2	0.252	0.143	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.93	353.34	1400.00	0.35	30.87	216.00	
Length = 4.0 ft	3	0.100	0.143	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.37	140.47	1400.00	0.19	30.87	216.00	
+0.60D+W						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 4.0 ft	1	0.036	0.052	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.13	50.90	1400.00	0.13	11.18	216.00	
Length = 15.0 ft	2	0.091	0.052	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.34	128.03	1400.00	0.13	11.18	216.00	
Length = 4.0 ft	3	0.036	0.052	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.13	50.90	1400.00	0.07	11.18	216.00	
+0.60D						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	
Length = 4.0 ft	1	0.021	0.030	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.08	29.81	1400.00	0.07	6.55	216.00	
Length = 15.0 ft	2	0.054	0.030	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.20	74.97	1400.00	0.07	6.55	216.00	
Length = 4.0 ft	3	0.021	0.030	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.00	0.08	29.81	1400.00	0.04	6.55	216.00	

Wood Beam

Project File: 22-048 Antigo - Peaceful Valley Pavilion.ec6

LIC# : KW-06017044, Build:20.22.7.25

Vilas Engineering LLC

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DESCRIPTION: Treated Glulam**Maximum Forces & Stresses for Load Combinations**

Load Combination		Max Stress Ratios									Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	f _v	F'v
Length = 36.0 ft	1	0.089	0.030	1.60	0.909	1.00	1.00	0.80	1.00	1.00	21.62	180.47	2036.38	2.02	12.54	420.00
+0.60D					0.909	1.00	1.00	0.80	1.00	1.00			0.00	0.00	0.00	0.00
Length = 36.0 ft	1	0.052	0.024	1.60	0.909	1.00	1.00	0.80	1.00	1.00	17.26	144.02	2792.75	1.61	10.00	420.00

Wood Beam

Project File: 22-048 Antigo - Peaceful Valley Pavilion.ec6

LIC# : KW-06017044, Build:20.22.7.25

Vilas Engineering LLC

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DESCRIPTION: Treated Glulam - Flatwise

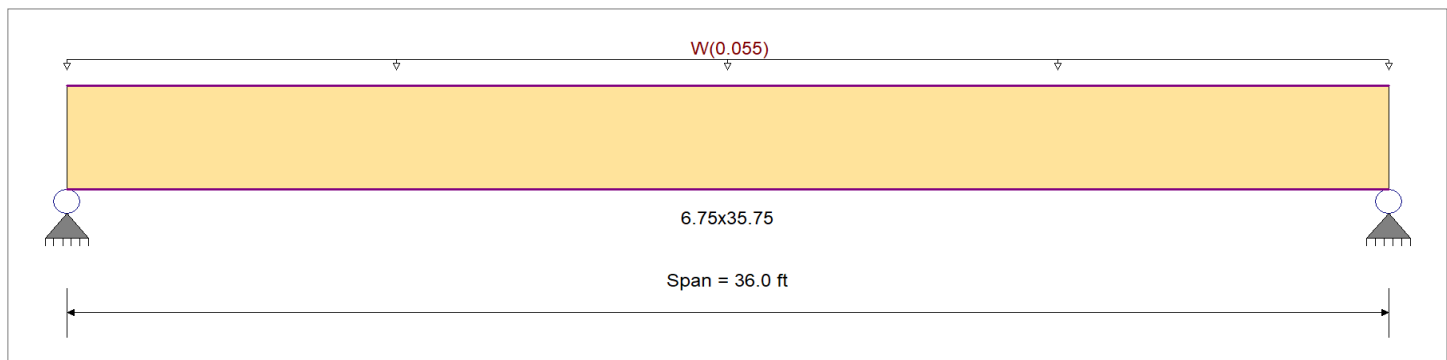
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Load Combination Set : ASCE 7-05

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,400.0 psi	<i>E : Modulus of Elasticity</i>	
Load Combination : ASCE 7-05	Fb -	1,750.0 psi	Ebend- xx	1,700.0ksi
	Fc - Prll	1,500.0 psi	Eminbend - xx	900.0ksi
Wood Species : SP/SP	Fc - Perp	650.0 psi	Ebend- yy	1,500.0ksi
Wood Grade : 24F - V1	Fv	300.0 psi	Eminbend - yy	790.0ksi
	Ft	1,100.0 psi	Density	34.330pcf
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 : $W = 0.0550$, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.141 : 1	Maximum Shear Stress Ratio	=	0.012 : 1
Section used for this span	=	6.75x35.75	Section used for this span	=	6.75x35.75
fb: Actual	=	393.85psi	fv: Actual	=	5.17 psi
Fb: Allowable	=	2,792.75psi	Fv: Allowable	=	420.00 psi
Load Combination	=	W Only	Load Combination	=	W Only
Location of maximum on span	=	18.000ft	Location of maximum on span	=	33.109 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0 in	Ratio =	0 < 240	n/a	
Max Upward Transient Deflection	0 in	Ratio =	0 < 240	n/a	
Max Downward Total Deflection	1.611 in	Ratio =	268 >= 120	Span: 1 : W Only	
Max Upward Total Deflection	0 in	Ratio =	0 < 120	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F ^b	V	fv	F ^v		
	Length = 36.0 ft	1			0.90	0.909	1.00	1.00	0.80	1.00	1.00			0.00	0.00	0.00	0.00	0.00	236.25
W Only						0.909	1.00	1.00	0.80	1.00	1.00			0.00	0.00	0.00	0.00	0.00	0.00
	Length = 36.0 ft	1	0.141	0.012	1.60	0.909	1.00	1.00	0.80	1.00	1.00	8.91	393.85	2792.75	0.83	5.17	420.00		
+0.750W						0.909	1.00	1.00	0.80	1.00	1.00			0.00	0.00	0.00	0.00		
	Length = 36.0 ft	1	0.106	0.009	1.60	0.909	1.00	1.00	0.80	1.00	1.00	6.68	295.38	2792.75	0.62	3.87	420.00		

Wood Column

Project File: 22-048 Antigo - Peaceful Valley Pavilion.ec6

LIC# : KW-06017044, Build:20.22.7.25

Vilas Engineering LLC

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DESCRIPTION: Post

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-05

General Information

Analysis Method	Allowable Stress Design			Wood Section Name	10x10
End Fixities	Top Free, Bottom Fixed			Wood Grading/Manuf.	Graded Lumber
Overall Column Height	15 ft			Wood Member Type	Sawn
<i>(Used for non-slender calculations)</i>					
Wood Species	Southern Pine			Exact Width	9.50 in
Wood Grade	No.2 SR			Exact Depth	9.50 in
Fb +	850.0 psi	Fv	165.0 psi	Area	90.250 in ²
Fb -	850.0 psi	Ft	550.0 psi	Ix	678.76 in ⁴
Fc - Prll	525.0 psi	Density	34.330 pcf	Iy	678.76 in ⁴
Fc - Perp	375.0 psi			Allow Stress Modification Factors	
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial	Cf or Cv for Bending 1.0	
	Basic	1,200.0	1,200.0	1,200.0 ksi	Cf or Cv for Compression 1.0
	Minimum	440.0	440.0		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 = 10 ft, k					
Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 10 ft, k					

Applied Loads

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

Column self weight included : 322.738 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 15.0 ft, D = 3.80, S = 10.80 k

BENDING LOADS . . .

Lat. Point Load at 15.0 ft creating Mx-x, W = 0.70 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.7666 : 1**
 Load Combination +D+0.750S+0.750W
 Governing NDS Formula Comp + Mxx, NDS Eq. 3.9-3
 Location of max.above base 0.0 ft
 At maximum location values are .
 Applied Axial 12.223 k
 Applied Mx -7.875 k-ft
 Applied My 0.0 k-ft
 Fc : Allowable 415.242 psi

Maximum SERVICE Lateral Load Reactions . .
 Top along Y-Y 0.0 k Bottom along Y-Y 0.70 k
 Top along X-X 0.0 k Bottom along X-X 0.0 k

Maximum SERVICE Load Lateral Deflections . . .
 Along Y-Y 1.662 in at 15.0 ft above base
 for load combination : +D+W
 Along X-X 0.0 in at 0.0 ft above base
 for load combination : n/a

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

PASS Maximum Shear Stress Ratio = **0.04407 : 1**
 Load Combination +D+W
 Location of max.above base 15.0 ft
 Applied Design Shear 11.634 psi
 Allowable Shear 264.0 psi

Load Combination Results

Load Combination	C _D	C _P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
D Only	0.900	0.749	0.1419	PASS	0.0 ft	0.0	PASS	15.0 ft
+D+S	1.150	0.668	0.4509	PASS	0.0 ft	0.0	PASS	15.0 ft
+D+0.750S	1.150	0.668	0.3693	PASS	0.0 ft	0.0	PASS	15.0 ft
+D+W	1.600	0.543	0.7237	PASS	0.0 ft	0.04407	PASS	15.0 ft
+D+0.750W	1.600	0.543	0.5458	PASS	0.0 ft	0.03305	PASS	15.0 ft
+D+0.750S+0.750W	1.600	0.543	0.7666	PASS	0.0 ft	0.03305	PASS	15.0 ft
+0.60D+W	1.600	0.543	0.6892	PASS	0.0 ft	0.04407	PASS	15.0 ft
+0.60D	1.600	0.543	0.06601	PASS	0.0 ft	0.0	PASS	15.0 ft

Wood Column

Project File: 22-048 Antigo - Peaceful Valley Pavilion.ec6

LIC# : KW-06017044, Build:20.22.7.25

Vilas Engineering LLC

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DESCRIPTION: Post

Maximum Reactions

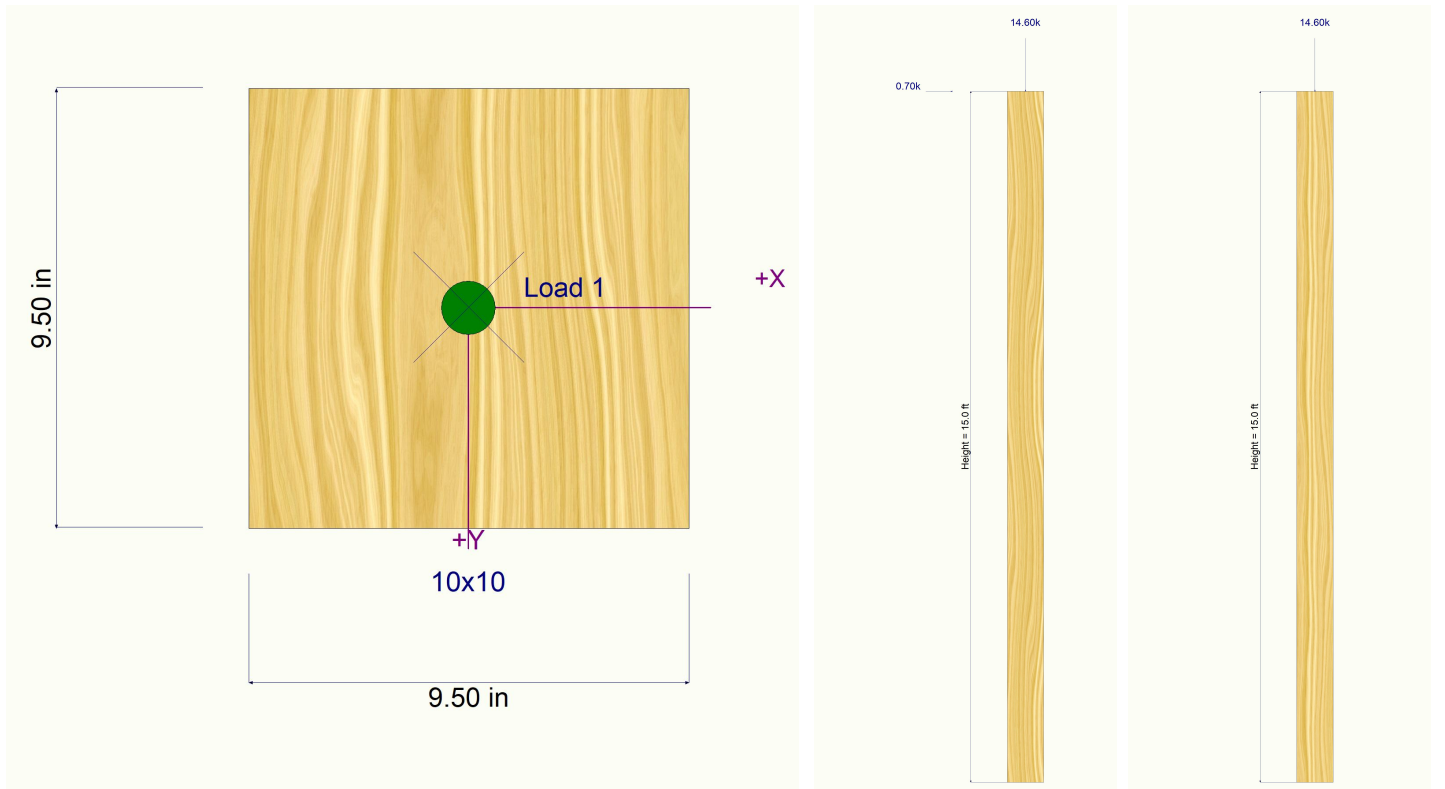
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k		Y-Y Axis Reaction k		Axial Reaction @ Base	My - End Moments k-ft		Mx - End Moments k-ft	
	@ Base	@ Top	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
D Only					4.123				
+D+S					14.923				
+D+0.750S					12.223				
+D+W			0.700		4.123			10.500	
+D+0.750W			0.525		4.123			7.875	
+D+0.750S+0.750W			0.525		12.223			7.875	
+0.60D+W			0.700		2.474			10.500	
+0.60D					2.474				
S Only					10.800				
W Only			0.700					10.500	

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.000 in	0.000ft	0.000 in	0.000ft
+D+S	0.000 in	0.000ft	0.000 in	0.000ft
+D+0.750S	0.000 in	0.000ft	0.000 in	0.000ft
+D+W	0.000 in	0.000ft	1.662 in	15.000ft
+D+0.750W	0.000 in	0.000ft	1.247 in	15.000ft
+D+0.750S+0.750W	0.000 in	0.000ft	1.247 in	15.000ft
+0.60D+W	0.000 in	0.000ft	1.662 in	15.000ft
+0.60D	0.000 in	0.000ft	0.000 in	0.000ft
S Only	0.000 in	0.000ft	0.000 in	0.000ft
W Only	0.000 in	0.000ft	1.645 in	14.899ft

Sketches



Wood Column

Project File: 22-048 Antigo - Peaceful Valley Pavilion.ec6

LIC#: KW-06017044, Build:20.22.7.25

Vilas Engineering LLC

(c) ENERCALC INC 1983-2022

DESCRIPTION: Post - Lateral Only

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-05

General Information

Analysis Method	Allowable Stress Design			Wood Section Name	10x10
End Fixities	Top Free, Bottom Fixed			Wood Grading/Manuf.	Graded Lumber
Overall Column Height	15 ft			Wood Member Type	Sawn
<i>(Used for non-slender calculations)</i>					
Wood Species	Southern Pine			Exact Width	9.50 in
Wood Grade	No.2 SR			Exact Depth	9.50 in
Fb +	850.0 psi	Fv	165.0 psi	Area	90.250 in ²
Fb -	850.0 psi	Ft	550.0 psi	Ix	678.76 in ⁴
Fc - Prll	525.0 psi	Density	34.330 pcf	Iy	678.76 in ⁴
Fc - Perp	375.0 psi			Allow Stress Modification Factors	
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial	Cf or Cv for Bending 1.0	
	Basic	1,200.0	1,200.0	1,200.0 ksi	Cf or Cv for Compression 1.0
	Minimum	440.0	440.0		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 = 10 ft, k					
Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 10 ft, k					

Applied Loads

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

Column self weight included : 322.738 lbs * Dead Load Factor

BENDING LOADS . . .

Lat. Point Load at 15.0 ft creating Mx-x, W = 0.70 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.6530 : 1**
 Load Combination +D+W
 Governing NDS Formula Comp + Mxx, NDS Eq. 3.9-3
 Location of max.above base 0.0 ft
 At maximum location values are .
 Applied Axial 0.3227 k
 Applied Mx -10.50 k-ft
 Applied My 0.0 k-ft
 Fc : Allowable 415.242 psi

Maximum SERVICE Lateral Load Reactions . .
 Top along Y-Y 0.0 k Bottom along Y-Y 0.70 k
 Top along X-X 0.0 k Bottom along X-X 0.0 k

Maximum SERVICE Load Lateral Deflections . . .
 Along Y-Y 1.662 in at 15.0 ft above base
 for load combination : +D+W
 Along X-X 0.0 in at 0.0 ft above base
 for load combination : n/a

PASS Maximum Shear Stress Ratio = **0.04407 : 1**
 Load Combination +D+W
 Location of max.above base 15.0 ft
 Applied Design Shear 11.634 psi
 Allowable Shear 264.0 psi

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

Load Combination Results

Load Combination	C _D	C _P	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
D Only	0.900	0.749	0.01111	PASS	0.0 ft	0.0	PASS	15.0 ft
+D+W	1.600	0.543	0.6530	PASS	0.0 ft	0.04407	PASS	15.0 ft
+D+0.750W	1.600	0.543	0.4897	PASS	0.0 ft	0.03305	PASS	15.0 ft
+0.60D+W	1.600	0.543	0.6511	PASS	0.0 ft	0.04407	PASS	15.0 ft
+0.60D	1.600	0.543	0.005167	PASS	0.0 ft	0.0	PASS	15.0 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 k-ft	
	@ Base	@ Top	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
D Only					0.323				
+D+W			0.700		0.323				10.500

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DESCRIPTION: Post - Lateral Only

Maximum Reactions

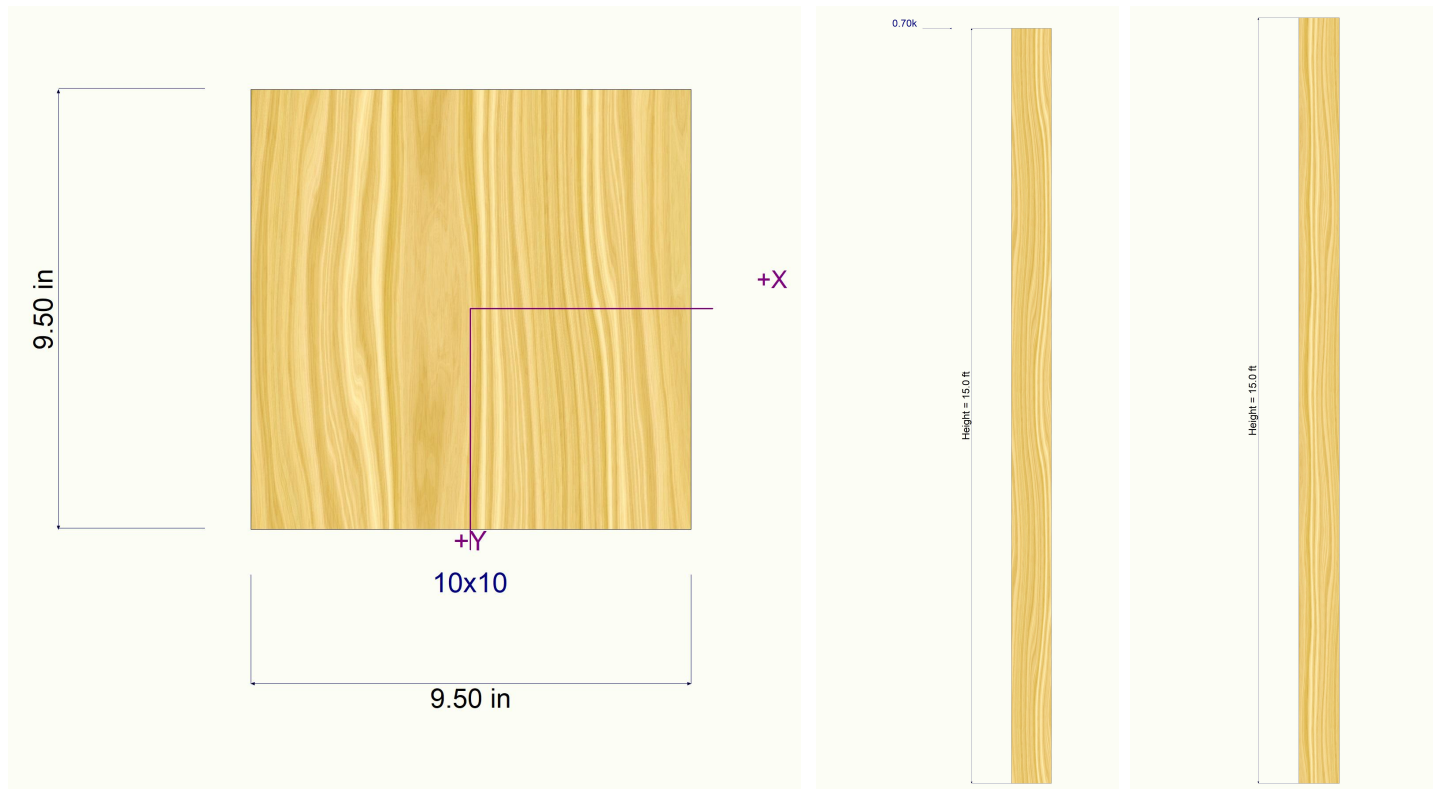
Note: Only non-zero reactions are listed.

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+0.750W				0.525		0.323				7.875
+0.60D+W				0.700		0.194				10.500
+0.60D						0.194				
W Only				0.700						10.500

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000ft	0.000 in	0.000ft
+D+W	0.0000 in	0.000ft	1.662 in	15.000ft
+D+0.750W	0.0000 in	0.000ft	1.247 in	15.000ft
+0.60D+W	0.0000 in	0.000ft	1.662 in	15.000ft
+0.60D	0.0000 in	0.000ft	0.000 in	0.000ft
W Only	0.0000 in	0.000ft	1.645 in	14.899ft

Sketches



Pole Footing Embedded in Soil

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DESCRIPTION: Footing - Parallel to Ridgeline

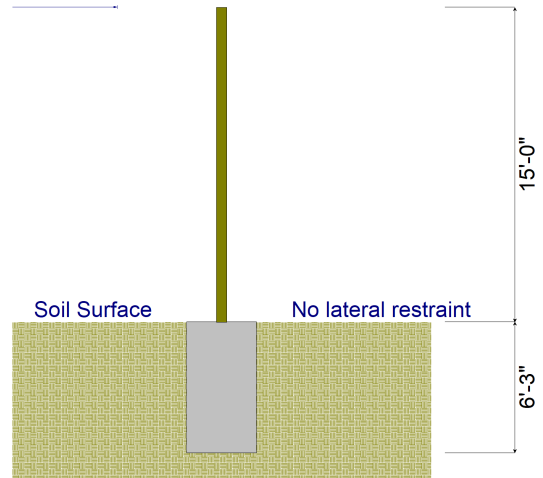
Code References

Calculations per IBC 2015 1807.3, CBC 2016, ASCE 7-10
Load Combinations Used : ASCE 7-05

General Information

Pole Footing Shape	Rectangular
Pole Footing Width	40.0 in
Calculate Min. Depth for Allowable Pressures	
No Lateral Restraint at Ground Surface	
Allow Passive	100.0 psf
Max Passive	1,500.0 psf

Point Load



Controlling Values

Governing Load Combination	D+W
Lateral Load	0.70 k
Moment	10.50 k-ft
NO Ground Surface Restraint	
Pressures at 1/3 Depth	
Actual	205.433 psf
Allowable	206.091 psf

Minimum Required Depth	6.250 ft
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Footing Base Area	11.111 ft ²
Maximum Soil Pressure	1.197 ksf

Applied Loads

Lateral Concentrated Load (k)	Lateral Distributed Loads (k)	Vertical Load (k)
D : Dead Load	k	3.80 k
Lr : Roof Live	k	k
L : Live	k	k
S : Snow	k	9.50 k
W : Wind	0.70 k	k
E : Earthquake	k	k
H : Lateral Earth	k	k
Load distance above ground surface	TOP of Load above ground surface	
	BOTTOM of Load above ground surface	
	15.0 ft	

Load Combination Results

Load Combination	Forces @ Ground Surface		Required Depth - (ft)	Pressure at 1/3 Depth		Soil Increase Factor
	Loads - (k)	Moments - (ft-k)		Actual - (psf)	Allow - (psf)	
D Only	0.000	0.000	0.13	0.0	0.0	1.000
+D+S	0.000	0.000	0.13	0.0	0.0	1.000
+D+0.750S	0.000	0.000	0.13	0.0	0.0	1.000
+D+W	0.700	10.500	6.25	205.4	206.1	1.000
+D+0.750W	0.525	7.875	5.63	185.1	185.4	1.000
+D+0.750S+0.750W	0.525	7.875	5.63	185.1	185.4	1.000
+0.60D+W	0.700	10.500	6.25	205.4	206.1	1.000
+0.60D	0.000	0.000	0.13	0.0	0.0	1.000