

STRONGBACK COLUMNS AT NEW MAIN DOOR OPENING

$$h = 12.0'$$

$$TRIB = 2.67' (1/2) + 4' = 6.67' \quad \langle \text{CONSERVATIVE} \rangle$$

WIND LOAD:

$$P = 24.7 \text{ psf}$$

$$W_{WL} = P (TRIB) = \underline{165 \text{ plf}}$$

SEISMIC LOAD:

$$F_p = 0.4 S_{DS} I_p W$$

$$S_{DS} = 0.724$$

$$I_p = 1.0$$

$$W = 78 \text{ psf} \quad \langle \text{CONSERVATIVE} \rangle$$

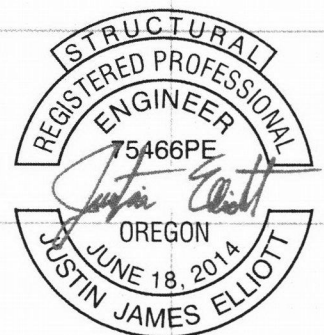
$$F_p = 21.4 \text{ psf}$$

$$W_{EL} = F_p (TRIB) = \underline{143 \text{ plf}}$$

[SEE PRINTOUT]

USE HSS 4x4x 3/16

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EXP. 12/31/2017



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Wind Loads - Components and Cladding

Based on the 2012 International Building Code and ASCE 7-10, 30.5 (Part 2: Low-Rise Buildings - Simplified)

$V_{ult} =$	120 mph	Ultimate Wind Speed 3-Second Gust	[Figure 26.5-1A, B, & C]
	B	Exposure Category	[Section 26.7.3]
	II	Risk Category (II), (I), or (III and IV)	[IBC Table 1604.5]
$K_{zt} =$	1.00	Topographic Factor	[Figure 26.8-1]
Roof Slope =	0 to 7	Degrees	
Effective Area =	20 sf	Span Length x Eff. Width (not less than Span Length/3)	
Load Factor =	1.0	Ultimate = 1.0W, ASD = 0.6W	

Design Wind Pressure: $p_{net} = \lambda K_{zt} p_{net30}$

[Equation 30.5-1]

Wall Loads:		(1.0W ULTIMATE LEVEL)			
Height (ft)	Adjustment λ	Wall - Interior Zone 4 (psf)		Wall - End Zone 5 (psf)	
15	1.00	24.7	-26.9	24.7	-32.4
20	1.00	24.7	-26.9	24.7	-32.4
25	1.00	24.7	-26.9	24.7	-32.4
30	1.00	24.7	-26.9	24.7	-32.4
35	1.05	25.9	-28.2	25.9	-34.0
40	1.09	26.9	-29.3	26.9	-35.3
45	1.12	27.7	-30.1	27.7	-36.3
50	1.16	28.7	-31.2	28.7	-37.6
55	1.19	29.4	-32.0	29.4	-38.6
60	1.22	30.1	-32.8	30.1	-39.5

Roof Loads:		(1.0W ULTIMATE LEVEL)					
Height (ft)	Adjustment λ	Roof - Interior Zone 1 (psf)		Roof - End Zone 2 (psf)		Roof - Corner Zone 3 (psf)	
15	1.00	16.0	-25.2	16.0	-38.8	16.0	-54.2
20	1.00	16.0	-25.2	16.0	-38.8	16.0	-54.2
25	1.00	16.0	-25.2	16.0	-38.8	16.0	-54.2
30	1.00	16.0	-25.2	16.0	-38.8	16.0	-54.2
35	1.05	16.0	-26.5	16.0	-40.7	16.0	-56.9
40	1.09	16.0	-27.5	16.0	-42.3	16.0	-59.1
45	1.12	16.0	-28.2	16.0	-43.5	16.0	-60.7
50	1.16	16.0	-29.2	16.0	-45.0	16.0	-62.9
55	1.19	16.0	-30.0	16.0	-46.2	16.0	-64.5
60	1.22	16.0	-30.7	16.0	-47.3	16.0	-66.1

- Notes:**
- 1.) Loads shown may be governed by Minimum Wind Design Loads per Section 30.2.2.
 - 2.) Pressures shown are applied normal to their respective surfaces.
 - 3.) Plus and minus signs signify pressures acting toward (+) and away (-) from the surfaces.



Steel Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.30

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Description : Strongback Column

Code References

Calculations per AISC 360-10, IBC 2012, CBC 2013, ASCE 7-10

Load Combinations Used : ASCE 7-10

General Information

Steel Section Name : **HSS4x4x3/16**
 Analysis Method : Allowable Strength
 Steel Stress Grade
 Fy : Steel Yield 46 ksi
 E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 12.0 ft
 Top & Bottom Fixity Top & Bottom Pinned
 Brace condition for deflection (buckling) along columns :
 X-X (width) axis :
 Unbraced Length for X-X Axis buckling = 12.0 ft, K = 1.0
 Y-Y (depth) axis :
 Unbraced Length for Y-Y Axis buckling = 12.0 ft, K = 1.0

Applied Loads

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

BENDING LOADS . . .

Lat. Uniform Load creating Mx-x, W = 0.1650, E = 0.1430 k/ft

DESIGN SUMMARY**Bending & Shear Check Results**

PASS Max. Axial+Bending Stress Ratio = **0.2139** : 1
 Load Combination E Only * 0.70
 Location of max. above base 5.960 ft
 At maximum location values are . . .
 Pa : Axial 0.0 k
 Pn / Omega : Allowable 39.766 k
 Ma-x : Applied 1.802 k-ft
 Mn-x / Omega : Allowable 8.424 k-ft
 Ma-y : Applied 0.0 k-ft
 Mn-y / Omega : Allowable 8.424 k-ft

PASS Maximum Shear Stress Ratio = **0.03003** : 1
 Load Combination E Only * 0.70
 Location of max. above base 0.0 ft
 At maximum location values are . . .
 Va : Applied 0.6006 k
 Vn / Omega : Allowable 20.003 k

Maximum Load Reactions . .

Top along X-X 0.0 k
 Bottom along X-X 0.0 k
 Top along Y-Y 0.990 k
 Bottom along Y-Y 0.990 k

Maximum Load Deflections . . .

Along Y-Y 0.4321 in at 6.040 ft above base
 for load combination : W Only
 Along X-X 0.0 in at 0.0 ft above base
 for load combination :