KBT ENGINEERS
Structural Consulting
plan review consultant . seismic brace . stuctural design . structural evaluation

1819 SW 5TH AVE #266
PORTLAND, OR 97201
TEL: 503-739-2401
www.kbtengineers.com

STRUCTURAL CALCULATION

Project: **Market St Store**

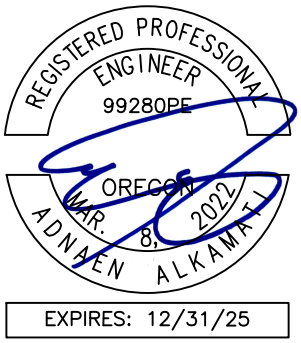
Re: **Design for Walls Openings**

Client: **3170 Market St NE,**
Salem, OR

Job No.: **24-1052**

Date: **Aug 25th , 2024**

Pages 1 thru 8 contain the calculations for the above-mentioned project located at Salem, OR.
This set of calculations is based on the loads and assumptions stated within the set. If these loads and assumptions are different, this set should be revised. The adequacy of the existing structure is the responsibility of others.



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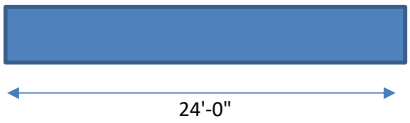
JOB:	3170 MARKET ST, SALEM		
SHEET NO.:		OF	
CALCULATED BY:	AK2	DATE	7/2/24
CHECKED BY:		DATE	
PROJECT NO.:	24-1052		

Gravity Design :

BEAM 1 : (TRIB.= 10 ft)

DL = 15 psf
SL = 25 psf

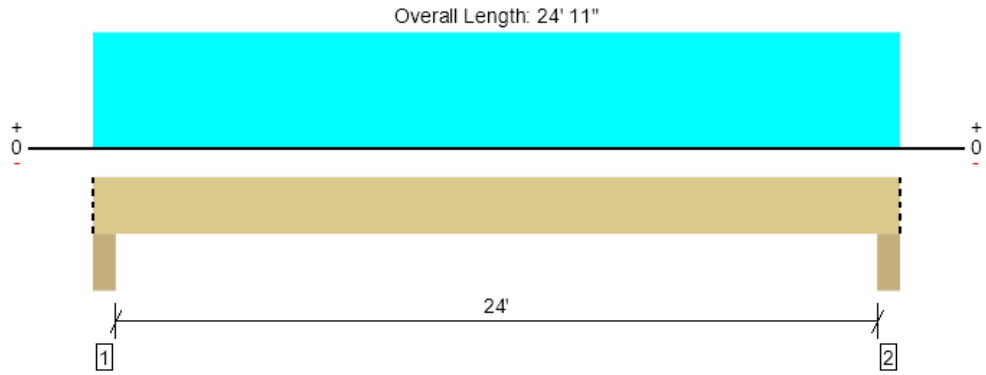


Use : 5 1/2" x 18" 24F-V4 DF Glulam

(SEE FORTE REPOT)

Level, Roof: Drop Beam

1 piece(s) 5 1/2" x 18" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	6280 @ 4"	19663 (5.50")	Passed (32%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	5293 @ 1' 11 1/2"	20114	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	37053 @ 12' 5 1/2"	64204	Passed (58%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.485 @ 12' 5 1/2"	1.212	Passed (L/600)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.815 @ 12' 5 1/2"	1.617	Passed (L/357)	--	1.0 D + 1.0 S (All Spans)

Member Length : 24' 11"
System : Roof
Member Type : Drop Beam
Building Use : Residential
Building Code : IBC 2021
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Critical positive moment adjusted by a volume/size factor of 0.94 that was calculated using length L = 24' 3".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Factored	
1 - Column - DF	5.50"	5.50"	1.76"	2542	3738	6280	Blocking
2 - Column - DF	5.50"	5.50"	1.76"	2542	3738	6280	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	24' 11" o/c	
Bottom Edge (Lu)	24' 11" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 24' 11"	N/A	24.1	--	
1 - Uniform (PSF)	0 to 24' 11" (Front)	12'	15.0	25.0	Default Load

• Side loads are assumed to not induce cross-grain tension.

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
ADEL AL-KOMATI KBT ENGINEERS (845) 300-4738 Adel@kbtengineers.com	

Weyerhaeuser

7/3/2024 12:03:07 AM UTC
ForteWEB v3.8, Engine: V8.4.1.22, Data: V8.1.6.2
File Name: 24-1052

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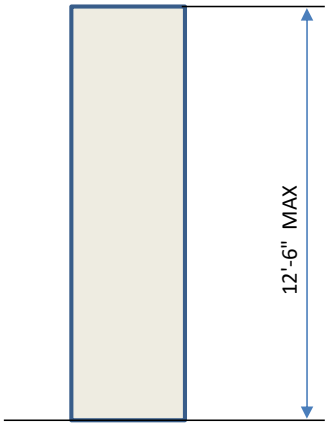
JOB: 3170 MARKET ST, SALEM
SHEET NO.: OF
CALCULATE AK2 DATE 7/2/24
CHECKED BY: DATE
PROJECT N(24-1052

Gravity Design :

POST :



Loads From Deck Beam : Post Hieght = 12.5 ft

DL = 2542 lbs
SL = 3738 lbs

use: 6x6 DF#2 post
(SEE ENERCALC REPOT)

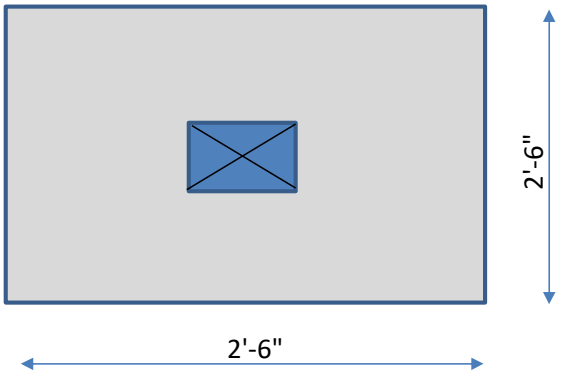
use: Simpson Moment Post Base Connection ABW66Z

OK

PAD FOOTING :

DL = 2626 lbs
SL = 3738 lbs

use: 2'-6" X 2'-6" X 12" W/ (4) #4 Rebars Each Way .
(SEE ENERCALC REPOT)



Wood Column

Project File: foundation and post.ec6

DESCRIPTION: 6x6 POST

Code References

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

General Information

Analysis Method	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height	13 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir-Larch (North)		
Wood Grade	No. 1/No. 2		
Fb +	850 psi	Fv	180 psi
Fb -	850 psi	Ft	500 psi
Fc - Prll	1400 psi	Density	30.59 pcf
Fc - Perp	625 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1600	1600	1600 ksi
Minimum	580	580	

Wood Section Name	**6x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**5.50** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.0
Area	30.250 in^2	Cf or Cv for Compressio	1.0
Ix	76.255 in^4	Cf or Cv for Tension	1.0
Iy	76.255 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Fact	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for buckling ABOUT Y-Y Axis = 13 ft, k
Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 13 ft, k

Applied Loads

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

Column self weight included : 83.538 lbs * Dead Load Factor
AXIAL LOADS . . .
Roof drop beam: Axial Load at 13.0 ft, D = 2.542, S = 3.738 k
BENDING LOADS . . .
Lat. Point Load at 8.50 ft creating My-y, E = 0.1060 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.5435 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are .	
Applied Axial	6.364 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	387.043 psi

PASS Maximum Shear Stress Ratio = **0.008353 : 1**

Load Combination	+D+0.70E
Location of max.above base	13.0 ft
Applied Design Shear	2.406 psi
Allowable Shear	288.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.06931 k	Bottom along X-X	0.03669 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 0.06104 in at 7.067 ft above base
for load combination : E Only

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.301	0.2290	PASS	0.0 ft	0.0	PASS	13.0 ft
+D+S	1.150	0.240	0.5435	PASS	0.0 ft	0.0	PASS	13.0 ft
+D+0.750S	1.150	0.240	0.4637	PASS	0.0 ft	0.0	PASS	13.0 ft
+0.60D	1.600	0.176	0.1320	PASS	0.0 ft	0.0	PASS	13.0 ft
+D+0.70E	1.600	0.176	0.2199	PASS	0.0 ft	0.008353	PASS	13.0 ft
+D+0.750S+0.5250E	1.600	0.176	0.4548	PASS	0.0 ft	0.006265	PASS	13.0 ft
+0.60D+0.70E	1.600	0.176	0.1320	PASS	0.0 ft	0.008353	PASS	13.0 ft

Wood Column

Project File: foundation and post.ec6

LIC# : KW-06013368, Build:20.22.7.25 KBT ENGINEERS

DESCRIPTION: 6x6 POST

Maximum Reactions

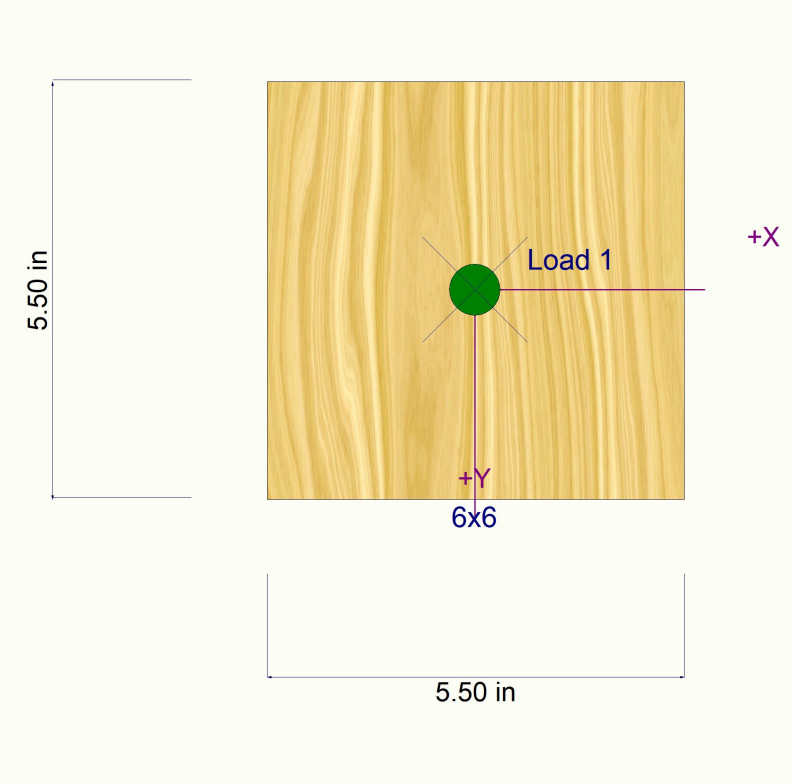
Note: Only non-zero reactions are listed.

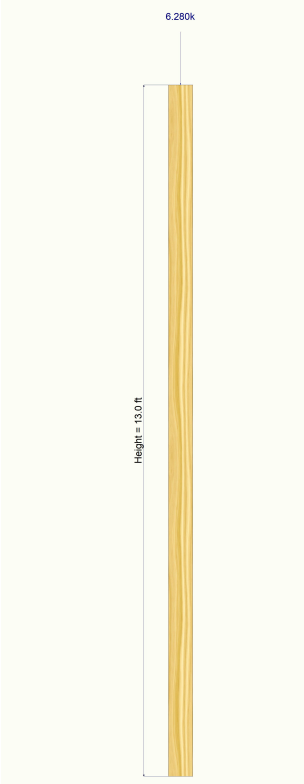
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
D Only						2.626					
+D+S						6.364					
+D+0.750S						5.429					
+0.60D						1.575					
+D+0.70E	0.026	0.049				2.626					
+D+0.750S+0.5250E	0.019	0.036				5.429					
+0.60D+0.70E	0.026	0.049				1.575					
S Only						3.738					
E Only	0.037	0.069									

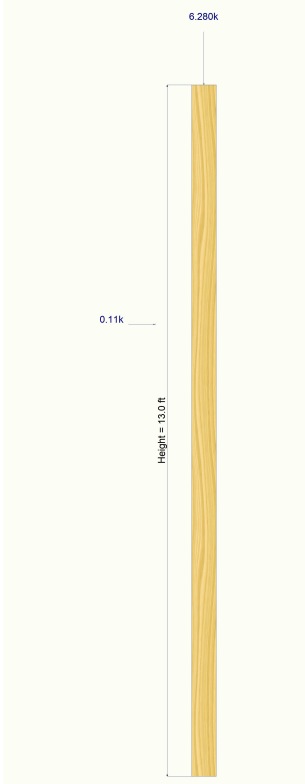
Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000ft	0.000 in	0.000 ft
+D+0.750S	0.0000 in	0.000ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000ft	0.000 in	0.000 ft
+D+0.70E	0.0427 in	7.067ft	0.000 in	0.000 ft
+D+0.750S+0.5250E	0.0320 in	7.067ft	0.000 in	0.000 ft
+0.60D+0.70E	0.0427 in	7.067ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000ft	0.000 in	0.000 ft
E Only	0.0610 in	7.067ft	0.000 in	0.000 ft

Sketches







General Footing

Project File: foundation and post.ec6

DESCRIPTION: PAD FOOTING

Code References

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

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

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Soil Density	=	110.0	pcf
Increase Bearing By Footing Weight	=	No	
Soil Passive Resistance (for Sliding)	=	250.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

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

Increases based on footing plan dimension

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

Dimensions

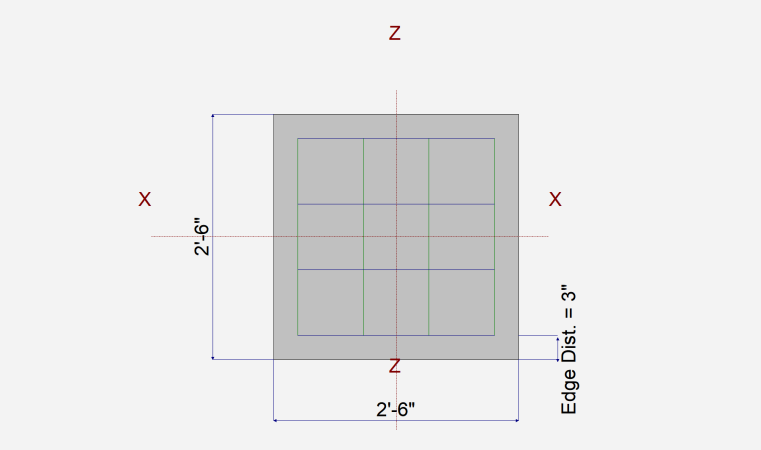
Width parallel to X-X Axis	=	2.50 ft
Length parallel to Z-Z Axis	=	2.50 ft
Footing Thickness	=	12.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	in
pz : parallel to Z-Z Axis	=	in
Height	=	in

Rebar Centerline to Edge of Concrete...

at Bottom of footing	=	3.0 in

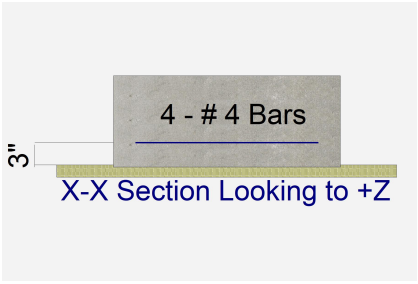


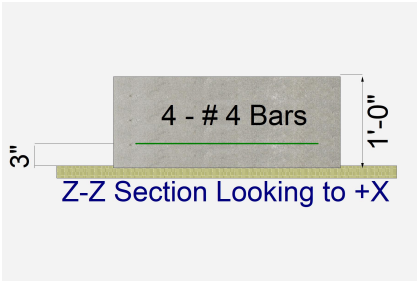
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		4
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		4.0
Reinforcing Bar Size	=	#	4

Bandwidth Distribution Check (ACI 15.4.4.2)

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





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=	2.626			3.738				k
OB : Overburden	=								ksf
M-xx	=								k-ft
M-zz	=						0.0		k-ft
V-x	=								k
V-z	=						0.0		k

General Footing

Project File: foundation and post.ec6

DESCRIPTION: PAD FOOTING

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7753	Soil Bearing	1.163 ksf	1.50 ksf	+D+S about Z-Z axis
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Sliding - Z-Z	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.09126	Z Flexure (+X)	1.142 k-ft/ft	12.508 k-ft/ft	+1.20D+1.60S
PASS	0.09126	Z Flexure (-X)	1.142 k-ft/ft	12.508 k-ft/ft	+1.20D+1.60S
PASS	0.09126	X Flexure (+Z)	1.142 k-ft/ft	12.508 k-ft/ft	+1.20D+1.60S
PASS	0.09126	X Flexure (-Z)	1.142 k-ft/ft	12.508 k-ft/ft	+1.20D+1.60S
PASS	0.08233	1-way Shear (+X)	6.764 psi	82.158 psi	+1.20D+1.60S
PASS	0.08233	1-way Shear (-X)	6.764 psi	82.158 psi	+1.20D+1.60S
PASS	0.08233	1-way Shear (+Z)	6.764 psi	82.158 psi	+1.20D+1.60S
PASS	0.08233	1-way Shear (-Z)	6.764 psi	82.158 psi	+1.20D+1.60S
PASS	0.1561	2-way Punching	25.649 psi	164.317 psi	+1.20D+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc (in)	Zecc (in)	Actual Soil Bearing Stress @ Location Bottom, -Z	Top, +Z	Left, -X	Right, +X	Actual / Allow Ratio
X-X, D Only	1.50	n/a	0.0	0.5652	0.5652	n/a	n/a	0.377
X-X, +D+S	1.50	n/a	0.0	1.163	1.163	n/a	n/a	0.775
X-X, +D+0.750S	1.50	n/a	0.0	1.014	1.014	n/a	n/a	0.676
X-X, +0.60D	1.50	n/a	0.0	0.3391	0.3391	n/a	n/a	0.226
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.5652	0.5652	0.377
Z-Z, +D+S	1.50	0.0	n/a	n/a	n/a	1.163	1.163	0.775
Z-Z, +D+0.750S	1.50	0.0	n/a	n/a	n/a	1.014	1.014	0.676
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.3391	0.3391	0.226

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

All units k

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Stability Ratio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
X-X, +1.40D	0.4596	+Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.40D	0.4596	-Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.20D	0.3939	+Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.20D	0.3939	-Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.20D+0.50S	0.6275	+Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.20D+0.50S	0.6275	-Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.20D+1.60S	1.142	+Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.20D+1.60S	1.142	-Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +0.90D	0.2954	+Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +0.90D	0.2954	-Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.20D+0.20S	0.4874	+Z	Bottom	0.2592	AsMin	0.320	12.508	OK
X-X, +1.20D+0.20S	0.4874	-Z	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.40D	0.4596	-X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.40D	0.4596	+X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.20D	0.3939	-X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.20D	0.3939	+X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.20D+0.50S	0.6275	-X	Bottom	0.2592	AsMin	0.320	12.508	OK

General Footing

Project File: foundation and post.ec6

DESCRIPTION: PAD FOOTING

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Side	Tension Surface	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
Z-Z, +1.20D+0.50S	0.6275	+X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.20D+1.60S	1.142	-X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.20D+1.60S	1.142	+X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +0.90D	0.2954	-X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +0.90D	0.2954	+X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.20D+0.20S	0.4874	-X	Bottom	0.2592	AsMin	0.320	12.508	OK
Z-Z, +1.20D+0.20S	0.4874	+X	Bottom	0.2592	AsMin	0.320	12.508	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	2.72 psi	2.72 psi	2.72 psi	2.72 psi	2.72 psi	82.16 psi	0.03	OK
+1.20D	2.33 psi	2.33 psi	2.33 psi	2.33 psi	2.33 psi	82.16 psi	0.03	OK
+1.20D+0.50S	3.72 psi	3.72 psi	3.72 psi	3.72 psi	3.72 psi	82.16 psi	0.05	OK
+1.20D+1.60S	6.76 psi	6.76 psi	6.76 psi	6.76 psi	6.76 psi	82.16 psi	0.08	OK
+0.90D	1.75 psi	1.75 psi	1.75 psi	1.75 psi	1.75 psi	82.16 psi	0.02	OK
+1.20D+0.20S	2.89 psi	2.89 psi	2.89 psi	2.89 psi	2.89 psi	82.16 psi	0.04	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	10.33 psi	164.32 psi	0.06284	OK
+1.20D	8.85 psi	164.32 psi	0.05386	OK
+1.20D+0.50S	14.10 psi	164.32 psi	0.08581	OK
+1.20D+1.60S	25.65 psi	164.32 psi	0.1561	OK
+0.90D	6.64 psi	164.32 psi	0.0404	OK
+1.20D+0.20S	10.95 psi	164.32 psi	0.06664	OK