



Project Narrative

The scope of this project consists of the design of new beams, columns, and footings to support two new openings.

Design Criteria

Location:	Klamath Falls, Oregon
Governing Code:	2022 Oregon Structural Specialty Code
Category II Building:	Importance Factors 1.0(E), 1.0(S) & 1.0(W)

Dead Loads

Upper Roof:	18.6 psf
Lower Roof:	16.6 psf

Snow Load:	25 psf
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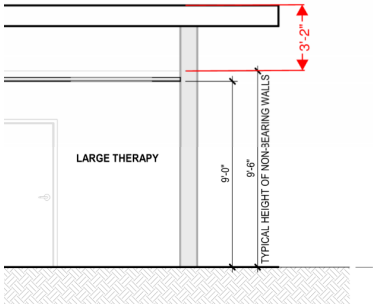
ZCS
Inc.

Load Development			
Load Summary			
	Value [lb/ft ²]	Reference	Notes
P _{min} [lb/ft ²]	25		
Snow Drift	11		
P _f	14.5	SEAO Snow Loading	Flat Roof Snow Load
Dead Load _{Lower}	16.6		
Dead Load _{Upper}	18.6		
Wall DL [lb/ft]	39		

Dead Load			
	Value [lb/ft ²]	Reference	Notes
Upper Roof (Old)			
Susp. Acoustic Ceiling Tile	2		
2x10 Rafters	6		16 in o.c., double rafters
5/8" Plywood	2		
Built up Roof	5		
Insulation	0.62		
MEP	3		
Total	18.62		
Lower Roof (New)			
TPO	0.75		Roofing
Susp. Acoustic Ceiling Tile	2		
2x10 Rafters	6		
5/8" Plywood	2		
Coverboard	2.2		
Insulation	0.62		
MEP	3		
Total	16.57		
Roof Step Wall Dead Load			
Height of Wall Above [ft]	3.25		
Wall above beam [lb/ft]	39		12 psf · height

Snow Load			
	Value	Reference	Notes
C _e	0.9		Assume Surface Roughness B & Partially Exposed
C _t	1		
I _s	1		
P _g [lb/ft ²]	23		
P _f [lb/ft ²]	14.49		Flat roof snow load
Rain on snow surcharge	5		
P _{f,min} [lb/ft ²]	25		Evenly distributed

DOUBLE WOOD FLOOR		
Joint sizes (in.)	12-in. spacing (psf)	16-in. spacing (psf)
2 × 6	6	5
2 × 8	6	6
2 × 10	7	6
2 × 12	8	7



Minimum snow load controls over snow drift. Use 25 psf of snow load evenly distributed for design.

$$P_g = 23 \text{ PSF Snow Drift} \quad \text{Long Direction} \quad \gamma = 0.13(23 \text{ PSF}) + 14 = 16.99 \text{ PCF}$$

$$I_s = 1 \quad h_b = \frac{P_g}{\gamma} = \frac{14.5 \text{ PSF}}{16.99 \text{ PCF}}$$

$$P_g = 0.7 C_e C_t I_s P_g$$

$$= 0.7(0.9)(1)(1)23 \text{ PSF}$$

$$= 14.5 \text{ PSF}$$

$$\text{height of roof slab} = 1.5 \text{ ft} = 0.85 \text{ ft}$$

$$h_c = 1.5 \text{ ft} - 0.85 \text{ ft} = 0.65 \text{ ft}$$

$$h_c/h_b = 0.65 \text{ ft} / 0.85 = 0.76 < \text{Need snow drift. use figure}$$

$$L_n = 69.5 \text{ ft}$$

$$\text{Windward}$$

$$L_n = 26 \text{ ft}$$

$$h_d = 3/4 h_c \text{ from figure}$$

Lee Ward controls.

$$h_d = [(0.433 \sqrt{L_n} \sqrt{P_g + 10}) - 1.5] \sqrt{I_s}$$

$$= [(0.433 \sqrt{69.5} \sqrt{23 + 10}) - 1.5] \sqrt{1} = 2.74 \text{ ft}$$

$$h_c = 0.65 \text{ ft} < 2.74 \text{ ft} \therefore h_d = 0.65 \text{ ft} = 0.65 \text{ ft}$$

$$W = \frac{4 h_d^2}{h_c} = \frac{4(2.74 \text{ ft})^2}{0.65 \text{ ft}} = 46 \text{ ft}$$

$$W \leq 8 h_c = 8(0.65) = 5.2 \text{ ft}$$

$$h_b = 0.85 \text{ ft}$$

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

ZCS, INC.

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DESCRIPTION: E/W Beam

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

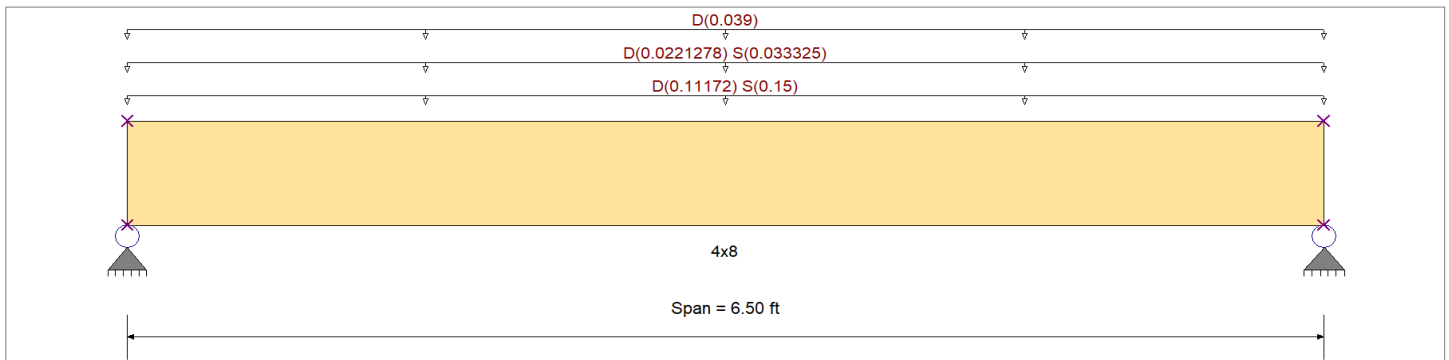
Analysis Method : Allowable Stress Design
Load Combination ASCE 7-16

Fb + 900 psi
Fb - 900 psi
Fc - Prll 1350 psi
Fc - Perp 625 psi
Fv 180 psi
Ft 575 psi

E : Modulus of Elasticity
Ebend- xx 1600ksi
Eminbend - xx 580ksi
Density 31.21pcf

Wood Species : Douglas Fir-Larch
Wood Grade : No.2

Beam Bracing : Completely Unbraced



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.01862, S = 0.0250 ksf, Tributary Width = 6.0 ft, (Upper Roof)

Uniform Load : D = 0.01660, S = 0.0250 ksf, Tributary Width = 1.333 ft, (Lower Roof)

Uniform Load : D = 0.0390, Tributary Width = 1.0 ft, (Wall above Beam)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.561	1	Maximum Shear Stress Ratio	=	0.274	1
Section used for this span		4x8		Section used for this span		4x8	
fb: Actual	=	747.55	psi	fv: Actual	=	56.80	psi
F'b	=	1,331.99	psi	F'v	=	207.00	psi
Load Combination		+D+S		Load Combination		+D+S	
Location of maximum on span	=	3.250	ft	Location of maximum on span	=	5.907	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.042	in	Ratio =	1872	>=240	Span: 1 : S Only
Max Upward Transient Deflection		0	in	Ratio =	0	<240	n/a
Max Downward Total Deflection		0.082	in	Ratio =	949	>=180	Span: 1 : +D+S
Max Upward Total Deflection		0	in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 6.50 ft	1	0.353	0.173	0.90	1.00	1.00	0.99	1.300	1.00	1.00	1.00	0.94	368.6	1,045.0	0.47	28.0	162.0
+D+S					1.00	1.00	0.99	1.300	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.50 ft	1	0.561	0.274	1.15	1.00	1.00	0.99	1.300	1.00	1.00	1.00	1.91	747.6	1,332.0	0.96	56.8	207.0
+D+0.750S					1.00	1.00	0.99	1.300	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.50 ft	1	0.490	0.240	1.15	1.00	1.00	0.99	1.300	1.00	1.00	1.00	1.67	652.8	1,332.0	0.84	49.6	207.0
+0.60D					1.00	1.00	0.99	1.300	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.50 ft	1	0.120	0.058	1.60	1.00	1.00	0.99	1.300	1.00	1.00	1.00	0.57	221.2	1,843.9	0.28	16.8	288.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

ZCS, INC.

(c) ENERCALC INC 1983-2023

DESCRIPTION: E/W Beam

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0822	3.274		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	1.175	1.175
Max Upward from Load Combinations	1.175	1.175
Max Upward from Load Cases	0.596	0.596
D Only	0.580	0.580
+D+S	1.175	1.175
+D+0.750S	1.026	1.026
+0.60D	0.348	0.348
S Only	0.596	0.596

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Wood Beam

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

ZCS, INC.

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DESCRIPTION: N/S Beam

CODE REFERENCES

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

Load Combination Set : IBC 2021

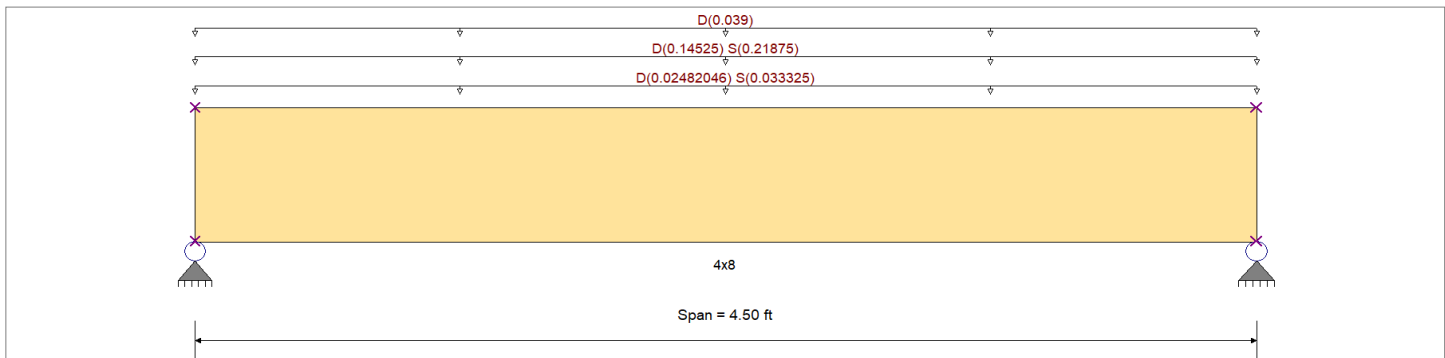
Material Properties

Analysis Method : Allowable Stress Design
Load Combination IBC 2021

Wood Species : Douglas Fir-Larch
Wood Grade : No.2

Beam Bracing : Completely Unbraced

Fb + 900 psi E : Modulus of Elasticity
Fb - 900 psi Ebend- xx 1600ksi
Fc - Prll 1350 psi Eminbend - xx 580ksi
Fc - Perp 625 psi
Fv 180 psi
Ft 575 psi Density 31.21pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.01862, S = 0.0250 ksf, Tributary Width = 1.333 ft, (Upper Roof)

Uniform Load : D = 0.01660, S = 0.0250 ksf, Tributary Width = 8.750 ft, (Lower Roof)

Uniform Load : D = 0.0390, Tributary Width = 1.0 ft, (Wall above beam)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.346	1	Maximum Shear Stress Ratio	=	0.221	: 1
Section used for this span		4x8		Section used for this span		4x8	
fb: Actual	=	462.29	psi	fv: Actual	=	45.76	psi
F'b	=	1,335.98	psi	F'v	=	207.00	psi
Load Combination		+D+S		Load Combination		+D+S	
Location of maximum on span	=	2.250	ft	Location of maximum on span	=	3.909	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.013 in	Ratio =	4105	>=240	Span: 1 : S Only		
Max Upward Transient Deflection	0 in	Ratio =	0	<240	n/a		
Max Downward Total Deflection	0.024 in	Ratio =	2217	>=180	Span: 1 : +D+S		
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a		

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only														0.0		0.0	0.0
Length = 4.50 ft	1	0.203	0.130	0.90	1.00	1.00	0.99	1.300	1.00	1.00	1.00	0.54	212.6	1,047.3	0.36	21.0	162.0
+D+S					1.00	1.00	0.99	1.300	1.00	1.00	1.00			0.0		0.0	0.0
Length = 4.50 ft	1	0.346	0.221	1.15	1.00	1.00	0.99	1.300	1.00	1.00	1.00	1.18	462.3	1,336.0	0.77	45.8	207.0
+D+0.750S					1.00	1.00	0.99	1.300	1.00	1.00	1.00			0.0		0.0	0.0
Length = 4.50 ft	1	0.299	0.191	1.15	1.00	1.00	0.99	1.300	1.00	1.00	1.00	1.02	399.9	1,336.0	0.67	39.6	207.0
+0.60D					1.00	1.00	0.99	1.300	1.00	1.00	1.00			0.0		0.0	0.0
Length = 4.50 ft	1	0.069	0.044	1.60	1.00	1.00	0.99	1.300	1.00	1.00	1.00	0.33	127.5	1,852.6	0.21	12.6	288.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

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DESCRIPTION: N/S Beam

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0244	2.266		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	1.050	1.050
Max Upward from Load Combinations	1.050	1.050
Max Upward from Load Cases	0.567	0.567
D Only	0.483	0.483
+D+S	1.050	1.050
+D+0.750S	0.908	0.908
+0.60D	0.290	0.290
S Only	0.567	0.567

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Column

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

ZCS, INC.

(c) ENERCALC INC 1983-2023

DESCRIPTION: Typ. Column

Code References

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

General Information

Analysis Method	Allowable Stress Design			Wood Section Name	4x6	
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber	
Overall Column Height	9.5 ft			Wood Member Type	Sawn	
(Used for non-slender calculations)						
Wood Species	Douglas Fir-Larch			Exact Width	3.50 in	Allow Stress Modification Factors
Wood Grade	No.2			Exact Depth	5.50 in	
Fb +	900 psi	Fv	180 psi	Area	19.250 in^2	Cf or Cv for Bending 1.30
Fb -	900 psi	Ft	575 psi	Ix	48.526 in^4	Cf or Cv for Compression 1.10
Fc - Prll	1350 psi	Density	31.21 pcf	Iy	19.651 in^4	Cf or Cv for Tension 1.30
Fc - Perp	625 psi					Cm : Wet Use Factor 1.0
						Ct : Temperature Fact 1.0
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial			Cfu : Flat Use Factor 1.0
	Basic	1600	1600	1600 ksi		Kf : Built-up columns 1.0
	Minimum	580	580			Use Cr : Repetitive ? No
Column Buckling Condition:						
ABOUT X-X Axis: Lux = 9.5 ft, Kx = 1.0						
ABOUT Y-Y Axis: Luy = 9.5 ft, Ky = 1.0						

Applied Loads

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

Column self weight included : 39.636 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 9.50 ft, D = 0.580, S = 0.5960 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.1497 : 1**
Load Combination +D+S
Governing NDS Formula Comp Only, f_c/F_c'
Location of max.above base 0.0 ft
At maximum location values are .
Applied Axial 1.216 k
Applied Mx 0.0 k-ft
Applied My 0.0 k-ft
Fc : Allowable 421.733 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

PASS Maximum Shear Stress Ratio = **0.0 : 1**
Load Combination +0.60D
Location of max.above base 9.50 ft
Applied Design Shear 0.0 psi
Allowable Shear 288.0 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	0.309	0.07802	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+S	1.150	0.247	0.1497	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750S	1.150	0.247	0.1314	PASS	0.0 ft	0.0	PASS	9.50 ft
+0.60D	1.600	0.181	0.04488	PASS	0.0 ft	0.0	PASS	9.50 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction	My - End Moments		Mx - End Moments	
	@ Base	@ Top	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
D Only					0.620				
+D+S					1.216				
+D+0.750S					1.067				

Wood Column

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

ZCS, INC.

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DESCRIPTION: Typ. Column

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k		Y-Y Axis Reaction k		Axial Reaction @ Base	My - End Moments k-ft		Mx - End Moments	
	@ Base	@ Top	@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
+0.60D					0.372				
S Only					0.596				

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000in	0.000ft	0.000 in	0.000ft
+D+S	0.0000in	0.000ft	0.000 in	0.000ft
+D+0.750S	0.0000in	0.000ft	0.000 in	0.000ft
+0.60D	0.0000in	0.000ft	0.000 in	0.000ft
S Only	0.0000in	0.000ft	0.000 in	0.000ft

Sketches



Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

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DESCRIPTION: Typ. Footing

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16

Load Combinations Used : IBC 2021

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	2,850.0 ksi
Concrete Density	=	150.0 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

Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	Yes
Use Pedestal wt for stability, mom & shear	:	Yes

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	=	0.8333 ft
Allow press. increase per foot of depth when footing base is below	=	ksf

Increases based on footing plan dimension

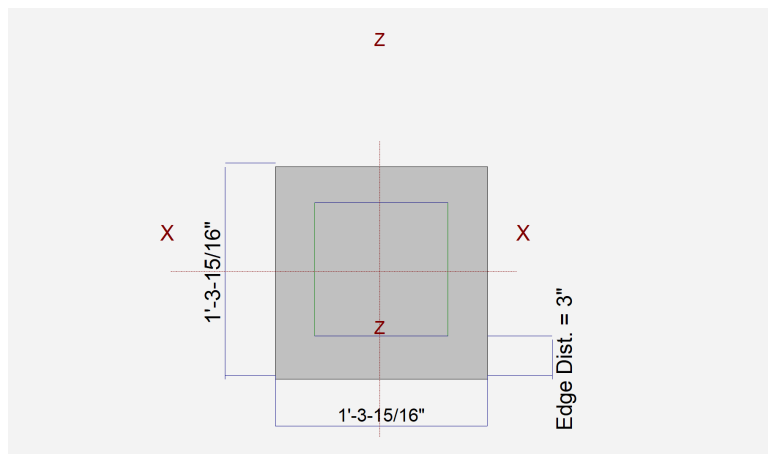
Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf
	=	ft

Dimensions

Width parallel to X-X Axis	=	1.330 ft
Length parallel to Z-Z Axis	=	1.330 ft
Footing Thickness	=	10.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	3.50 in
pz : parallel to Z-Z Axis	=	5.50 in
Height	=	in
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in



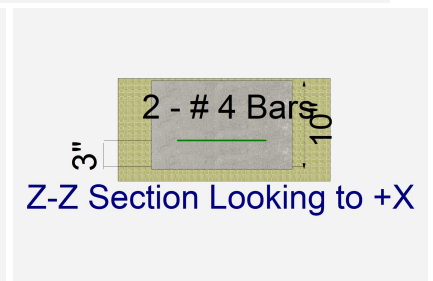
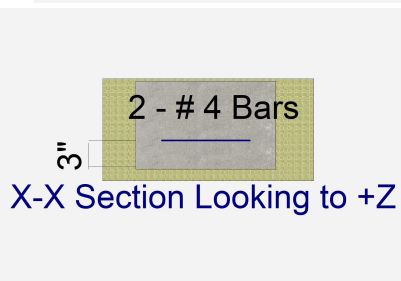
Reinforcing

Bars parallel to X-X Axis	=	2.0
Number of Bars	=	# 4
Reinforcing Bar Size	=	# 4

Bars parallel to Z-Z Axis	=	2.0
Number of Bars	=	# 4
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	=	0.620		0.5960			k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

ZCS, INC.

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DESCRIPTION: Typ. Footing

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.5416	Soil Bearing	0.8124 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	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.01438	Z Flexure (+X)	0.1293 k-ft/ft	8.995 k-ft/ft	+1.20D+1.60S
PASS	0.01438	Z Flexure (-X)	0.1293 k-ft/ft	8.995 k-ft/ft	+1.20D+1.60S
PASS	0.01013	X Flexure (+Z)	0.09114 k-ft/ft	8.995 k-ft/ft	+1.20D+1.60S
PASS	0.01013	X Flexure (-Z)	0.09114 k-ft/ft	8.995 k-ft/ft	+1.20D+1.60S
PASS	n/a	1-way Shear (+X)	0.0 psi	75.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a
PASS	n/a	1-way Shear (+Z)	0.0 psi	75.0 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	75.0 psi	n/a
PASS	n/a	2-way Punching	2.558 psi	75.0 psi	+1.20D+1.60S

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc		Zecc		Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				(in)		Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	1.50	n/a	0.0			0.4755	0.4755	n/a	n/a	0.317
X-X, +D+S	1.50	n/a	0.0			0.8124	0.8124	n/a	n/a	0.542
X-X, +D+0.750S	1.50	n/a	0.0			0.7282	0.7282	n/a	n/a	0.486
X-X, +0.60D	1.50	n/a	0.0			0.2853	0.2853	n/a	n/a	0.190
Z-Z, D Only	1.50	0.0	n/a			n/a	n/a	0.4755	0.4755	0.317
Z-Z, +D+S	1.50	0.0	n/a			n/a	n/a	0.8124	0.8124	0.542
Z-Z, +D+0.750S	1.50	0.0	n/a			n/a	n/a	0.7282	0.7282	0.486
Z-Z, +0.60D	1.50	0.0	n/a			n/a	n/a	0.2853	0.2853	0.190

Overturning Stability

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

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	0.04660	+Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.40D	0.04660	-Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.20D	0.03995	+Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.20D	0.03995	-Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.20D+0.50S	0.05594	+Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.20D+0.50S	0.05594	-Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.20D+1.60S	0.09114	+Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.20D+1.60S	0.09114	-Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.20D+0.70S	0.06234	+Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +1.20D+0.70S	0.06234	-Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +0.90D	0.02996	+Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
X-X, +0.90D	0.02996	-Z	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.40D	0.06613	-X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.40D	0.06613	+X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.20D	0.05668	-X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.20D	0.05668	+X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.20D+0.50S	0.07939	-X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.20D+0.50S	0.07939	+X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.20D+1.60S	0.1293	-X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.20D+1.60S	0.1293	+X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.20D+0.70S	0.08847	-X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +1.20D+0.70S	0.08847	+X	Bottom	0.2160	AsMin	0.3008	8.995	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 200ComercialSt.ec6

LIC# : KW-06014690, Build:20.23.08.30

ZCS, INC.

(c) ENERCALC INC 1983-2023

DESCRIPTION: Typ. 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, +0.90D	0.04251	-X	Bottom	0.2160	AsMin	0.3008	8.995	OK
Z-Z, +0.90D	0.04251	+X	Bottom	0.2160	AsMin	0.3008	8.995	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+0.50S	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+1.60S	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+0.70S	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+0.90D	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK

All units k

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	1.31 psi	150.00psi	0.00872	OK
+1.20D	1.12 psi	150.00psi	0.007474	OK
+1.20D+0.50S	1.57 psi	150.00psi	0.01047	OK
+1.20D+1.60S	2.56 psi	150.00psi	0.01705	OK
+1.20D+0.70S	1.75 psi	150.00psi	0.01167	OK
+0.90D	0.84 psi	150.00psi	0.005605	OK