CK Engineering LLC.

19229 38th PL NE
Lake Forest Park, WA 98155

Phone: (206) 417-0670

STRUCTURAL CALCULATIONS

Partial Gravity Design
22-007

6/30/2022

ANDERSON RESIDENCE
14 WEMBLEY LANE
MERCER ISLAND, WA 98040
June 30, 2022

Design Criteria

Scope of Work:	Partial Gravity Design		
Site Address:	14 WEMBLEY LANE MERCER ISLAND, WA 98040		
Number of Stories:	2	Engineer:	PK

Roof Loading

Roofing	Composition	3.0
Sheathing	5/8" Plywood	1.8
Insulation	Roll/Batt	3.0
Ceiling	5/8" GWB	2.8
Framing	Trusses	2.2
Miscellaneous	fixtures, mechanical, electrical, etc.	2.2
	TOTAL DEAD LOAD:	15.0 psf
	ROOF SNOW LOAD:	25.0 psf

Upper Floor Loading

Floor Covering	Carpet/Hardwood/Tile	3.0
Sheathing	3/4" T&G	2.3
Ceiling	1/2" GWB	2.2
Joists	Solid Sawn @ 16" o/c	3.3
Beams		2.8
Miscellaneous	fixtures, mechanical, electrical, etc.	1.4
	TOTAL DEAD LOAD:	15.0 psf
	FLOOR LIVE LOAD:	40.0 psf

Main Floor Loading

Floor Covering	Carpet/Hardwood/Tile	3.0
Sheathing	3/4" T&G	2.3
Ceiling	5/8" GWB	2.8
Joists	I-Joists	2.1
Beams		4.2
Miscellaneous	fixtures, mechanical, electrical, etc.	0.6
	TOTAL DEAD LOAD:	15.0 psf
	FLOOR LIVE LOAD:	40.0 psf

Soil Bearing Capacity:	1500 psf
Frost Depth:	18 in

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22-007.ec6

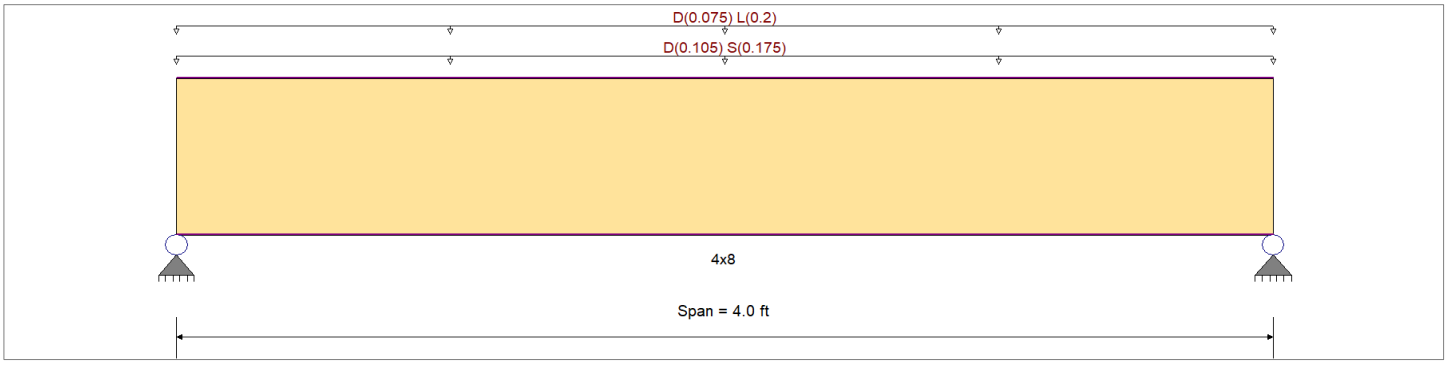
DESCRIPTION: BM#2

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	Fb +	875 psi	*E : Modulus of Elasticity*	
Load Combination	ASCE 7-16	Fb -	875 psi	Ebend- xx	1300 ksi
		Fc - Prll	600 psi	Eminbend - xx	470 ksi
Wood Species	: Douglas Fir-Larch (North)	Fc - Perp	625 psi		
Wood Grade	: No.2	Fv	170 psi		
		Ft	425 psi	Density	30.59 pcf
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 : D = 0.0150, S = 0.0250 ksf, Tributary Width = 7.0 ft, (ROOF)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 5.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.276 : 1	Maximum Shear Stress Ratio	=	0.195 : 1
Section used for this span		4x8	Section used for this span		4x8
fb: Actual	=	361.04 psi	fv: Actual	=	38.21 psi
Fb: Allowable	=	1,308.13 psi	Fv: Allowable	=	195.50 psi
Load Combination		+D+0.750L+0.750S	Load Combination		+D+0.750L+0.750S
Location of maximum on span	=	2.000 ft	Location of maximum on span	=	3.401 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.008 in	Ratio =	5985 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.018 in	Ratio =	2595 >=240	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

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	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.138	0.097	0.90	1.300	1.00	1.00	1.00	1.00	1.00	0.36	140.89	1023.75	0.25	14.91	153.00
+D+L					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.261	0.185	1.00	1.300	1.00	1.00	1.00	1.00	1.00	0.76	297.44	1137.50	0.53	31.48	170.00
+D+S					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.212	0.150	1.15	1.300	1.00	1.00	1.00	1.00	1.00	0.71	277.87	1308.13	0.50	29.41	195.50
+D+0.750L					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.182	0.129	1.25	1.300	1.00	1.00	1.00	1.00	1.00	0.66	258.30	1421.88	0.46	27.34	212.50
+D+0.750L+0.750S					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.276	0.195	1.15	1.300	1.00	1.00	1.00	1.00	1.00	0.92	361.04	1308.13	0.65	38.21	195.50
+0.60D					1.300	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.0 ft	1	0.046	0.033	1.60	1.300	1.00	1.00	1.00	1.00	1.00	0.22	84.54	1820.00	0.15	8.95	272.00

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22-007.ec6

DESCRIPTION: BM#2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0185	2.015		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.923	0.923
Overall MINimum	0.350	0.350
D Only	0.360	0.360
+D+L	0.760	0.760
+D+S	0.710	0.710
+D+0.750L	0.660	0.660
+D+0.750L+0.750S	0.923	0.923
+0.60D	0.216	0.216
L Only	0.400	0.400
S Only	0.350	0.350

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22-007.ec6

DESCRIPTION: BM#3

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

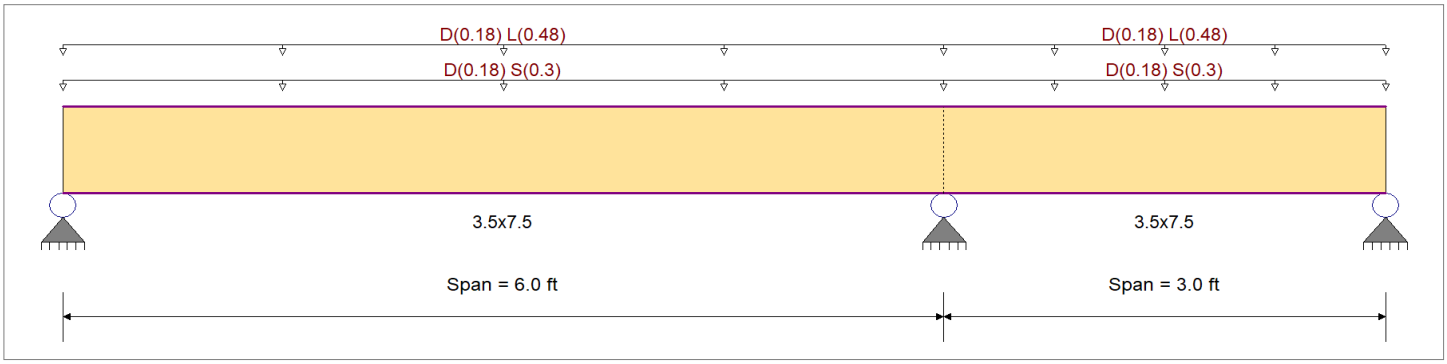
Material Properties

Analysis Method :	Allowable Stress Design
Load Combination	ASCE 7-16
Wood Species	: DF/DF
Wood Grade	: 24F-V4
Beam Bracing	: Beam is Fully Braced against lateral-torsional buckling

Fb +	2,400.0 psi
Fb -	1,850.0 psi
Fc - Prll	1,650.0 psi
Fc - Perp	650.0 psi
Fv	265.0 psi
Ft	1,100.0 psi

E : Modulus of Elasticity

Ebend- xx	1,800.0 ksi
Eminbend - xx	950.0 ksi
Ebend- yy	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 12.0 ft, (ROOF)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 12.0 ft, (FLOOR)
Load for Span Number 2
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 12.0 ft, (ROOF)
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 12.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.560 : 1	Maximum Shear Stress Ratio	=	0.536 : 1
Section used for this span		3.5x7.5	Section used for this span		3.5x7.5
fb: Actual	=	1,036.80 psi	fv: Actual	=	142.04 psi
Fb: Allowable	=	1,850.00 psi	Fv: Allowable	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	6.000 ft	Location of maximum on span	=	5.397 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.036 in	Ratio =	2023	>=360	Span: 1 : L Only
Max Upward Transient Deflection	-0.004 in	Ratio =	9834	>=360	Span: 2 : L Only
Max Downward Total Deflection	0.070 in	Ratio =	1027	>=240	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection	-0.007 in	Ratio =	4995	>=240	Span: 2 : +D+0.750L+0.750S

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	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.267	0.255	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.21	444.34	1665.00	1.07	60.87	238.50
Length = 3.0 ft	2	0.267	0.255	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.21	444.34	1665.00	0.72	60.87	238.50
+D+L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.560	0.536	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.83	1,036.80	1850.00	2.49	142.04	265.00
Length = 3.0 ft	2	0.560	0.536	1.00	1.000	1.00	1.00	1.00	1.00	1.00	2.83	1,036.80	1850.00	1.68	142.04	265.00
+D+S					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.383	0.366	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.23	814.63	2127.50	1.95	111.60	304.75

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22-007.ec6

DESCRIPTION: BM#3

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	fv	F'v
Length = 3.0 ft	**2**	0.383	0.366	1.15	1.000	1.00	1.00	1.00	1.00	1.00	2.23	814.63	2127.50	1.32	111.60	304.75
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.384	0.368	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.43	888.69	2312.50	2.13	121.75	331.25
Length = 3.0 ft	**2**	0.384	0.368	1.25	1.000	1.00	1.00	1.00	1.00	1.00	2.43	888.69	2312.50	1.44	121.75	331.25
+D+0.750L+0.750S					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.548	0.524	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.19	1,166.40	2127.50	2.80	159.79	304.75
Length = 3.0 ft	**2**	0.548	0.524	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.19	1,166.40	2127.50	1.89	159.79	304.75
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	**1**	0.090	0.086	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.73	266.61	2960.00	0.64	36.52	424.00
Length = 3.0 ft	**2**	0.090	0.086	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.73	266.61	2960.00	0.43	36.52	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0700	2.715		0.0000	0.000
	2	0.0000	2.715	+D+0.750L+0.750S	-0.0072	1.022

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	2.303	5.847	0.354
Overall MINimum	0.731	1.856	0.113
D Only	0.878	2.227	0.135
+D+L	2.048	5.197	0.315
+D+S	1.609	4.084	0.248
+D+0.750L	1.755	4.455	0.270
+D+0.750L+0.750S	2.303	5.847	0.354
+0.60D	0.527	1.336	0.081
L Only	1.170	2.970	0.180
S Only	0.731	1.856	0.113

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22-007.ec6

LIC# : KW-06016495, Build:20.22.2.9 | CK Engineering LLC | (c) ENERCALC INC 1983-2022

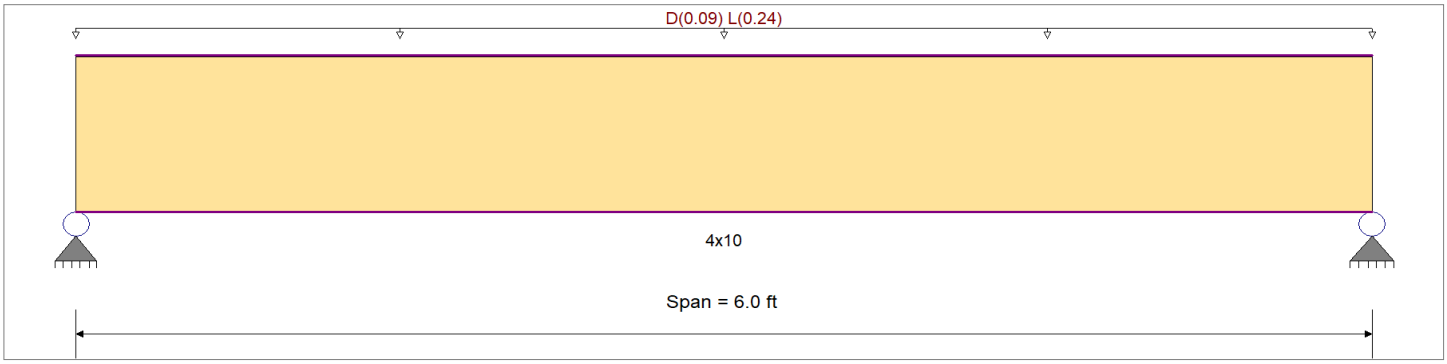
DESCRIPTION: BM#4

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	Fb +	875 psi	*E : Modulus of Elasticity*	
Load Combination	ASCE 7-16	Fb -	875 psi	Ebend- xx	1300 ksi
		Fc - Prll	600 psi	Eminbend - xx	470 ksi
Wood Species	: Douglas Fir-Larch (North)	Fc - Perp	625 psi		
Wood Grade	: No.2	Fv	170 psi		
		Ft	425 psi	Density	30.59 pcf
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 : D = 0.0150, L = 0.040 ksf, Tributary Width = 6.0 ft, (FLOOR)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.340 : 1	Maximum Shear Stress Ratio	=	0.201 : 1
Section used for this span		4x10	Section used for this span		4x10
fb: Actual	=	357.03 psi	fv: Actual	=	34.15 psi
Fb: Allowable	=	1,050.00 psi	Fv: Allowable	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
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	0.023 in	Ratio =	3069 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.032 in	Ratio =	2232 >=240	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <240	n/a

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	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.103	0.061	0.90	1.200	1.00	1.00	1.00	1.00	1.00	0.41	97.37	945.00	0.20	9.31	153.00
+D+L					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.340	0.201	1.00	1.200	1.00	1.00	1.00	1.00	1.00	1.49	357.03	1050.00	0.74	34.15	170.00
+D+0.750L					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.223	0.131	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.22	292.12	1312.50	0.60	27.94	212.50
+0.60D					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.035	0.021	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.24	58.42	1680.00	0.12	5.59	272.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0323	3.022		0.0000	0.000

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: 22-007.ec6

DESCRIPTION: BM#4

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.990	0.990
Overall MINimum	0.720	0.720
D Only	0.270	0.270
+D+L	0.990	0.990
+D+0.750L	0.810	0.810
+0.60D	0.162	0.162
L Only	0.720	0.720

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 22-007.ec6

DESCRIPTION: FTNG#1

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	=	2.50	ksi
fy : Rebar Yield	=	40.0	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)	=	150.0	pcf
Soil/Concrete Friction Coeff.	=	0.250	

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

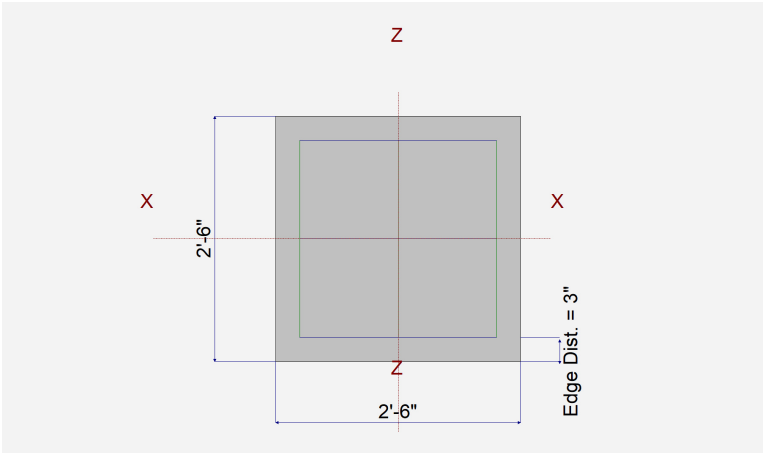
Width parallel to X-X Axis	=	2.50 ft
Length parallel to Z-Z Axis	=	2.50 ft
Footing Thickness	=	10.0 in

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

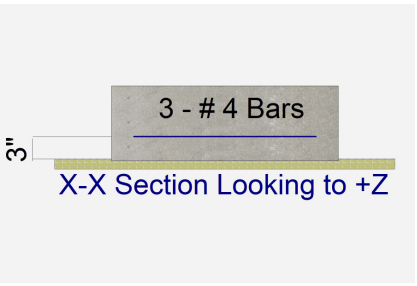


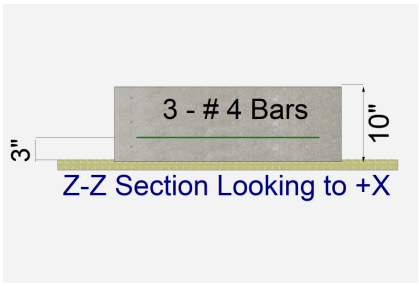
Reinforcing

Bars parallel to X-X Axis			
Number of Bars	=		3
Reinforcing Bar Size	=	#	4
Bars parallel to Z-Z Axis			
Number of Bars	=		3.0
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	=	2.230		2.970	1.860				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: 22-007.ec6

DESCRIPTION: FTNG#1

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7047	Soil Bearing	1.057 ksf	1.50 ksf	+D+0.750L+0.750S 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	0.2197	Z Flexure (+X)	1.078 k-ft/ft	4.904 k-ft/ft	+1.20D+L+1.60S
PASS	0.2197	Z Flexure (-X)	1.078 k-ft/ft	4.904 k-ft/ft	+1.20D+L+1.60S
PASS	0.2197	X Flexure (+Z)	1.078 k-ft/ft	4.904 k-ft/ft	+1.20D+L+1.60S
PASS	0.2197	X Flexure (-Z)	1.078 k-ft/ft	4.904 k-ft/ft	+1.20D+L+1.60S
PASS	0.1478	1-way Shear (+X)	11.085 psi	75.0 psi	+1.20D+L+1.60S
PASS	0.1478	1-way Shear (-X)	11.085 psi	75.0 psi	+1.20D+L+1.60S
PASS	0.1478	1-way Shear (+Z)	11.085 psi	75.0 psi	+1.20D+L+1.60S
PASS	0.1478	1-way Shear (-Z)	11.085 psi	75.0 psi	+1.20D+L+1.60S
PASS	0.2764	2-way Punching	41.456 psi	150.0 psi	+1.20D+L+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	0.4776	0.4776	n/a	n/a	0.318
X-X, +D+L	1.50	n/a	0.0	0.9528	0.9528	n/a	n/a	0.635
X-X, +D+S	1.50	n/a	0.0	0.7752	0.7752	n/a	n/a	0.517
X-X, +D+0.750L	1.50	n/a	0.0	0.8340	0.8340	n/a	n/a	0.556
X-X, +D+0.750L+0.750S	1.50	n/a	0.0	1.057	1.057	n/a	n/a	0.705
X-X, +0.60D	1.50	n/a	0.0	0.2866	0.2866	n/a	n/a	0.191
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.4776	0.4776	0.318
Z-Z, +D+L	1.50	0.0	n/a	n/a	n/a	0.9528	0.9528	0.635
Z-Z, +D+S	1.50	0.0	n/a	n/a	n/a	0.7752	0.7752	0.517
Z-Z, +D+0.750L	1.50	0.0	n/a	n/a	n/a	0.8340	0.8340	0.556
Z-Z, +D+0.750L+0.750S	1.50	0.0	n/a	n/a	n/a	1.057	1.057	0.705
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.2866	0.2866	0.191

Overturning Stability

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

All units k

Sliding Stability

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	0.3903	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.40D	0.3903	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+1.60L	0.9285	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+1.60L	0.9285	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+1.60L+0.50S	1.045	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+1.60L+0.50S	1.045	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+L	0.7058	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+L	0.7058	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D	0.3345	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D	0.3345	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+L+1.60S	1.078	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+L+1.60S	1.078	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+1.60S	0.7065	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: 22-007.ec6

DESCRIPTION: FTNG#1

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, +1.20D+1.60S	0.7065	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+L+0.50S	0.8220	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+L+0.50S	0.8220	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +0.90D	0.2509	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +0.90D	0.2509	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+L+0.20S	0.7523	+Z	Bottom	0.2160	AsMin	0.240	4.904	OK
X-X, +1.20D+L+0.20S	0.7523	-Z	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.40D	0.3903	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.40D	0.3903	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+1.60L	0.9285	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+1.60L	0.9285	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+1.60L+0.50S	1.045	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+1.60L+0.50S	1.045	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+L	0.7058	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+L	0.7058	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D	0.3345	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D	0.3345	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+L+1.60S	1.078	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+L+1.60S	1.078	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+1.60S	0.7065	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+1.60S	0.7065	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+L+0.50S	0.8220	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+L+0.50S	0.8220	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +0.90D	0.2509	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +0.90D	0.2509	+X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+L+0.20S	0.7523	-X	Bottom	0.2160	AsMin	0.240	4.904	OK
Z-Z, +1.20D+L+0.20S	0.7523	+X	Bottom	0.2160	AsMin	0.240	4.904	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	4.01 psi	4.01 psi	4.01 psi	4.01 psi	4.01 psi	75.00 psi	0.05	OK
+1.20D+1.60L	9.55 psi	9.55 psi	9.55 psi	9.55 psi	9.55 psi	75.00 psi	0.13	OK
+1.20D+1.60L+0.50S	10.75 psi	10.75 psi	10.75 psi	10.75 psi	10.75 psi	75.00 psi	0.14	OK
+1.20D+L	7.26 psi	7.26 psi	7.26 psi	7.26 psi	7.26 psi	75.00 psi	0.10	OK
+1.20D	3.44 psi	3.44 psi	3.44 psi	3.44 psi	3.44 psi	75.00 psi	0.05	OK
+1.20D+L+1.60S	11.09 psi	11.09 psi	11.09 psi	11.09 psi	11.09 psi	75.00 psi	0.15	OK
+1.20D+1.60S	7.27 psi	7.27 psi	7.27 psi	7.27 psi	7.27 psi	75.00 psi	0.10	OK
+1.20D+L+0.50S	8.46 psi	8.46 psi	8.46 psi	8.46 psi	8.46 psi	75.00 psi	0.11	OK
+0.90D	2.58 psi	2.58 psi	2.58 psi	2.58 psi	2.58 psi	75.00 psi	0.03	OK
+1.20D+L+0.20S	7.74 psi	7.74 psi	7.74 psi	7.74 psi	7.74 psi	75.00 psi	0.10	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	15.01 psi	150.00 psi	0.1001	OK
+1.20D+1.60L	35.72 psi	150.00 psi	0.2381	OK
+1.20D+1.60L+0.50S	40.19 psi	150.00 psi	0.2679	OK
+1.20D+L	27.15 psi	150.00 psi	0.181	OK
+1.20D	12.87 psi	150.00 psi	0.08578	OK
+1.20D+L+1.60S	41.46 psi	150.00 psi	0.2764	OK
+1.20D+1.60S	27.18 psi	150.00 psi	0.1812	OK
+1.20D+L+0.50S	31.62 psi	150.00 psi	0.2108	OK
+0.90D	9.65 psi	150.00 psi	0.06433	OK
+1.20D+L+0.20S	28.94 psi	150.00 psi	0.1929	OK