



RAHMAN ENGINEERING SERVICES INC.

A Civil / Structural Engineering Services Company (P.E. License C69263)



STRUCTURAL CALCULATIONS

Project Name & Address

PROPOSED REMODEL
2829 GOLFBVIEW DR, FALLBROOK



Date: 10-Jul-26

by - Moksud Rahman, PE



RAHMAN ENGINEERING SERVICES INC.

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Design Criteria

1. Codes and Loads: All Design & Construction work for this project will conform to CBC 2022, IBC 2021, ASCE 7-16, ACI 318-19, NDS 2018.
2. Seismic: Site Class: D, S_{DS} : (see p-5), S_{D1} : (see p-4), $I_E = 1.0$, $\rho = 1.3$ (Redundancy Factor)
3. Wind: Basic wind speed: 96 mph, Exposure: C
4. Loads: Roof: $DL = 20$, $L_r = 20$, $S = 75$; Floor: $DL = 15$, $LL = 40$; Deck: $DL = 15$, $LL = 60$ (in psf)
5. Soil: Allowable soil bearing capacity 1500 psf
6. Reinforcement: ASTM A615 Grade 60 (#4 & larger), Grade 40 for #3
7. Structural Steel: ASTM A-36, ASTM A-992
8. Pipe Columns: ASTM A-53, Grade B
9. Welding: Electric arc process by certified welders in approved licensed Fabrication Shop
10. Concrete Masonry: ASTM C-90, Grade N, $f'_m = 1500$ psi
11. Mortar: Type M, 1:3:1/4 Mix = Cement : Sand : Lime Putty
12. Grout: 1:3:2 Mix = Cement : Sand : 3/8" pea gravel, $f'_c = 2000$ psi
13. Concrete: ASTM C150. $f'_c = 2500$ psi @28 days, Ready-mixed, ASTM C94, Aggregate ASTM C33, Cement ASTM C150, Type II or V U.N.O.
14. Wood Framing: WCLIB or WWPA Grading Rules Agency
 - a) Studs: Douglas Fir-Larch #2, DOC PS 20
 - b) Joist, Rafter: Douglas Fir-Larch #2, DOC PS 20
 - c) 6x Beam/Post: Douglas Fir-Larch #1, DOC PS 20
 - d) 4x Beam/Post: Douglas Fir-Larch #2, DOC PS 20
 - e) Glulam: 24F-V4 or 24F-V8 DF/DF, ASTM D3737, AITC A190.1
 - f) Parallam 2.0 PSL: ICC ESR-1387/Dry Condition (16% moisture)
 - g) Plywood: APA rated sheathing, or structural 1 per DOC PS1 AND DOC PS2, Exposure 1
 - h) Simpson Epoxy: RR25279, ICC ESR 1772 FOR CMU, ICC ESR 2508 for concrete (Set Epoxy)
 - i) TJI: ICC ESR 1153, ASTM D5055



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LATERAL ANALYSIS / DESIGN

LATERAL CHECK:

FOR GRID LINE:1

ORIGINAL SHEAR WALL LENGTH = 40'

NEW SHEAR WALL LENGTH = 37.5'

CHANGED IN SHEAR WALL = $((40-37.5)/34.5) \times 100 = 6.25\% < 10\%$

LATERAL SYSTEM DOESN'T NEED TO BE RETROFITTED

WE ADDED HOLDDOWN EITHER END OF THE OPENING

SEE RETROFIT DETAIL 17,18 & 20/SD1

FOR GRID LINE:2

ORIGINAL SHEAR WALL LENGTH = 25.25'

NEW SHEAR WALL LENGTH = 23'

CHANGED IN SHEAR WALL = $((25.25-23)/25.25) \times 100 = 8.91\% < 10\%$

LATERAL SYSTEM DOESN'T NEED TO BE RETROFITTED

WE ADDED HOLDDOWN EITHER END OF THE OPENING

SEE RETROFIT DETAIL 17,18 & 20/SD1

FOR GRID LINE:A

ORIGINAL SHEAR WALL LENGTH = 35.25'

NEW SHEAR WALL LENGTH = 32.25'

CHANGED IN SHEAR WALL = $(3/32.5) \times 100 = 9\% < 10\%$

LATERAL SYSTEM DOESN'T NEED TO BE RETROFITTED

WE ADDED HOLDDOWN EITHER END OF THE OPENING

SEE RETROFIT DETAIL 17,18 & 20/SD1



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ROOF FRAMING DESIGN

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

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DESCRIPTION: HDR (H1)

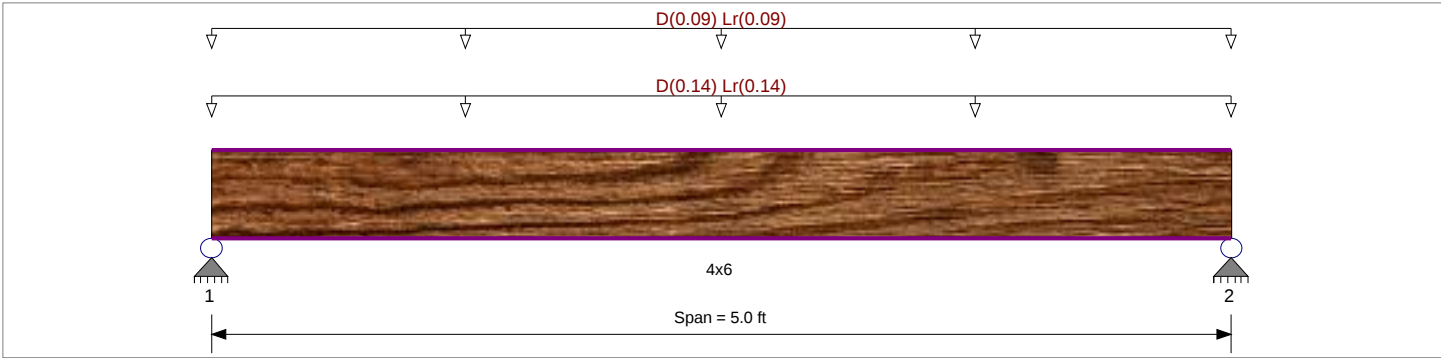
Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : NDS 2024
Load Combination Set : IBC 2021

Rho (or Omega) = 1.00

Material Properties

Analysis Method : Allowable Stress Design	Fb + 900.0 psi	E : Modulus of Elasticity
Load Combination : IBC 2021	Fb - 900.0 psi	Ebend- xx 1,600.0ksi
	Fc - Prll 1,350.0 psi	Eminbend - xx 580.0ksi
Wood Species : Douglas Fir-Larch	Fc - Perp 625.0 psi	
Wood Grade : No.2	Fv 180.0 psi	
	Ft 575.0 psi	Density 31.210pcf
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
Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 7.0 ft, (ROOF)
Uniform Load : D = 0.010, Lr = 0.010 ksf, Tributary Width = 9.0 ft, (CEILING JOIST)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.674 : 1	Maximum Shear Stress Ratio	=	0.329 : 1
Section used for this span		4x6	Section used for this span		4x6
		NDS2018			NDS2018
fb: Actual	=	986.43psi	fv: Actual	=	73.92 psi
F'b	=	1,462.50psi	F'v	=	225.00 psi
Load Combination			Load Combination		
		+D+Lr			+D+Lr
Location of maximum on span	=	2.500ft	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	0.042 in	Ratio = 1431 >=360	Span: 1 : Lr Only		
Max Upward Transient Deflection	0 in	Ratio = 0 >=360	n/a		
Max Downward Total Deflection	0.085 in	Ratio = 709 >=180	Span: 1 : +D+Lr		
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 = 5.0 ft	1	0.473	0.230	0.90	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.73	497.7	1,053.0	0.48	37.3	162.0
+D+Lr					1.00	1.00	1.00	1.300	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.674	0.329	1.25	1.00	1.00	1.00	1.300	1.00	1.00	1.00	1.45	986.4	1,462.5	0.95	73.9	225.0
+D+0.750Lr					1.00	1.00	1.00	1.300	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft	1	0.591	0.288	1.25	1.00	1.00	1.00	1.300	1.00	1.00	1.00	1.27	864.2	1,462.5	0.83	64.8	225.0

Wood Beam

Project File: EC.ec6

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DESCRIPTION: HDR (H1)

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios		CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	Moment Values			Shear Values		
			M	V									M	fb	F'b	V	fv	F'v
+0.60D						1.00	1.00	1.00	1.300	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 5.0 ft		1	0.160	0.078	1.60	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.44	298.6	1,872.0	0.29	22.4	288.0

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.0846	2.518		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	1.160	1.160
Max Upward from Load Combinations	1.160	1.160
Max Upward from Load Cases	0.585	0.585
D Only	0.585	0.585
+D+Lr	1.160	1.160
+D+0.750Lr	1.017	1.017
+0.60D	0.351	0.351
Lr Only	0.575	0.575

Extreme Reactions

Values in KIPS

Support	D	Lr	L	S	W	E	H
Support #1	0.585	0.575					
Support #2	0.585	0.575					

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

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DESCRIPTION: HDR (H2)

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : NDS 2024

Load Combination Set : IBC 2021

Rho (or Omega) = 1.00

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2021

Wood Species : Douglas Fir-Larch

Wood Grade : No.2

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 900.0 psi

Fb - 900.0 psi

Fc - Prll 1,350.0 psi

Fc - Perp 625.0 psi

Fv 180.0 psi

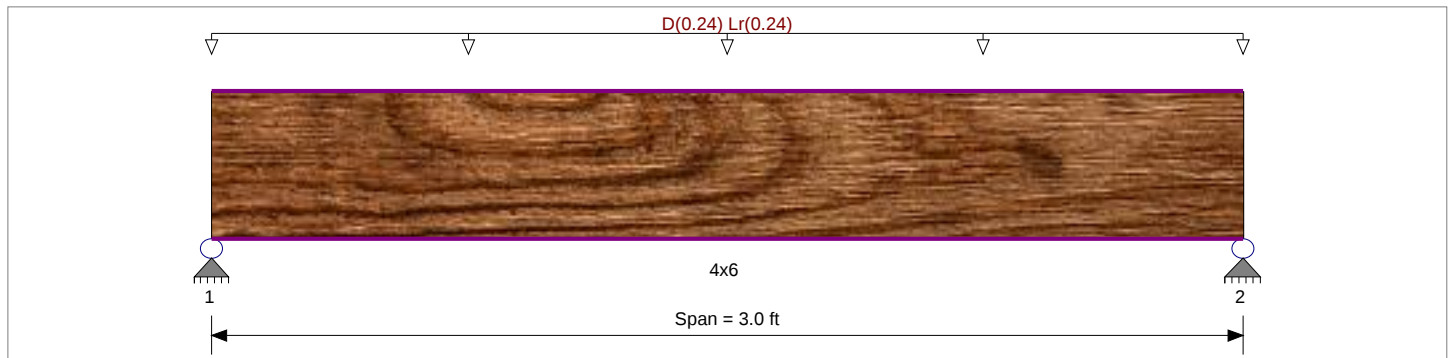
Ft 575.0 psi

E : Modulus of Elasticity

Ebend- xx 1,600.0ksi

Eminbend - xx 580.0ksi

Density 31.210pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 12.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.253 : 1	Maximum Shear Stress Ratio	=	0.176 : 1
Section used for this span		4x6	Section used for this span		4x6
		NDS2018			NDS2018
fb: Actual	=	370.42psi	fv: Actual	=	39.66 psi
F'b	=	1,462.50psi	F'v	=	225.00 psi
Load Combination			Load Combination		
Location of maximum on span	=	+D+Lr 1.500ft	Location of maximum on span	=	+D+Lr 0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.006 in	Ratio = 6353 >=360	Span: 1 : Lr Only		
Max Upward Transient Deflection	0 in	Ratio = 0 >=360	n/a		
Max Downward Total Deflection	0.011 in	Ratio = 3149 >=180	Span: 1 : +D+Lr		
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			
Length = 3.0 ft	1	0.177	0.123	0.90	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.27	186.8	1,053.0	0.26	20.0	162.0
+D+Lr														0.0			
Length = 3.0 ft	1	0.253	0.176	1.25	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.54	370.4	1,462.5	0.51	39.7	225.0
+D+0.750Lr														0.0			
Length = 3.0 ft	1	0.222	0.154	1.25	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.48	324.5	1,462.5	0.45	34.7	225.0
+0.60D														0.0			
														0.0			

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

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DESCRIPTION: HDR (H2)

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
Length = 3.0 ft	1	0.060	0.042	1.60	1.00	1.00	1.00	1.300	1.00	1.00	1.00	0.16	112.1	1,872.0	0.15	12.0	288.0

Overall Maximum Deflections

Span	Load Combination	Max. "." Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.0114	1.511		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	0.726	0.726
Max Upward from Load Combinations	0.726	0.726
Max Upward from Load Cases	0.366	0.366
D Only	0.366	0.366
+D+Lr	0.726	0.726
+D+0.750Lr	0.636	0.636
+0.60D	0.220	0.220
Lr Only	0.360	0.360

Extreme Reactions

Values in KIPS

Support	D	Lr	L	S	W	E	H
Support #1	0.366	0.360					
Support #2	0.366	0.360					

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

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DESCRIPTION: HDR (H3)

Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : NDS 2024
Load Combination Set : IBC 2021

Rho (or Omega) = 1.00

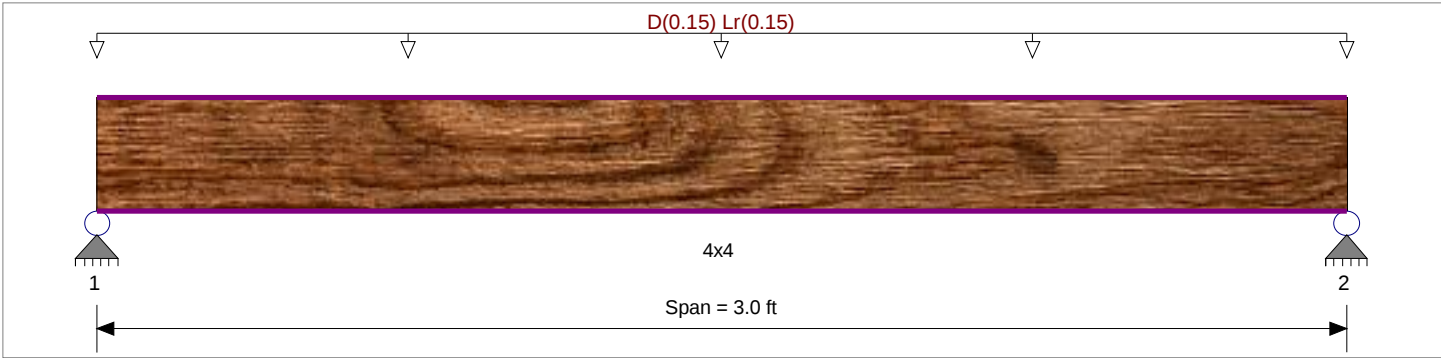
Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

Fb +	900.0 psi	E : Modulus of Elasticity	
Fb -	900.0 psi	Ebend- xx	1,600.0ksi
Fc - Prll	1,350.0 psi	Eminbend - xx	580.0ksi
Fc - Perp	625.0 psi		
Fv	180.0 psi		
Ft	575.0 psi	Density	31.210pcf

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

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
Uniform Load : D = 0.010, Lr = 0.010 ksf, Tributary Width = 15.0 ft, (CEILING)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.339 : 1	Maximum Shear Stress Ratio	=	0.200 : 1
Section used for this span		4x4	Section used for this span		4x4
		NDS2018			NDS2018
fb: Actual	=	571.78psi	fv: Actual	=	45.04 psi
F'b	=	1,687.50psi	F'v	=	225.00 psi
Load Combination			Load Combination		
Location of maximum on span	=	+D+Lr 1.500ft	Location of maximum on span	=	+D+Lr 0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.014 in	Ratio = 2619 >=360	Span: 1 : Lr Only		
Max Upward Transient Deflection	0 in	Ratio = 0 >=360	n/a		
Max Downward Total Deflection	0.028 in	Ratio = 1298 >=180	Span: 1 : +D+Lr		
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			
Length = 3.0 ft	1	0.237	0.140	0.90	1.00	1.00	1.00	1.500	1.00	1.00	1.00	0.17	288.4	1,215.0	0.19	22.7	162.0
+D+Lr														0.0			
Length = 3.0 ft	1	0.339	0.200	1.25	1.00	1.00	1.00	1.500	1.00	1.00	1.00	0.34	571.8	1,687.5	0.37	45.0	225.0
+D+0.750Lr														0.0			
Length = 3.0 ft	1	0.297	0.175	1.25	1.00	1.00	1.00	1.500	1.00	1.00	1.00	0.30	500.9	1,687.5	0.32	39.5	225.0
+0.60D														0.0			
														0.0			

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

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DESCRIPTION: HDR (H3)

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CL _x	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 3.0 ft	1	0.080	0.047	1.60	1.00	1.00	1.00	1.500	1.00	1.00	1.00	0.10	173.0	2,160.0	0.11	13.6	288.0

Overall Maximum Deflections

Span	Load Combination	Max. "." Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.0277	1.511		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	0.454	0.454
Max Upward from Load Combinations	0.454	0.454
Max Upward from Load Cases	0.229	0.229
D Only	0.229	0.229
+D+Lr	0.454	0.454
+D+0.750Lr	0.398	0.398
+0.60D	0.137	0.137
Lr Only	0.225	0.225

Extreme Reactions

Values in KIPS

Support	D	Lr	L	S	W	E	H
Support #1	0.229	0.225					
Support #2	0.229	0.225					

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

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DESCRIPTION: CEILING BEAM (B1)

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : NDS 2024

Load Combination Set : IBC 2021

Rho (or Omega) = 1.00

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : IBC 2021

Wood Species : iLevel Truss Joist

Wood Grade : MicroLam LVL 2.0 E

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb + 2,600.0 psi

Fb - 2,600.0 psi

Fc - Prll 2,510.0 psi

Fc - Perp 750.0 psi

Fv 285.0 psi

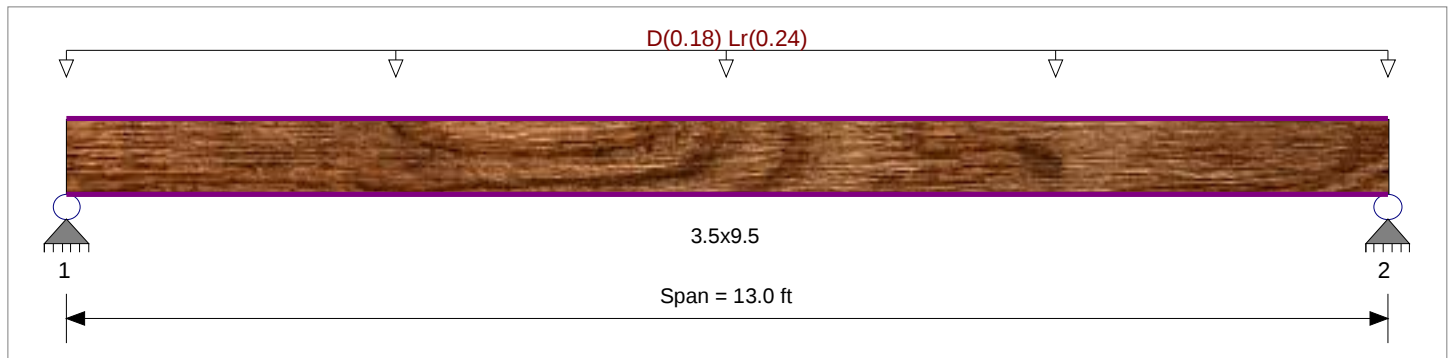
Ft 1,555.0 psi

E : Modulus of Elasticity

Ebend- xx 2,000.0ksi

Eminbend - xx 1,016.54ksi

Density 42.010pcf



Applied Loads

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

Beam self weight calculated and added to loading

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 12.0 ft, (C.J.)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.620 : 1	Maximum Shear Stress Ratio	=	0.312 : 1
Section used for this span		3.5x9.5	Section used for this span		3.5x9.5
		NDS2018			NDS2018
fb: Actual	=	2,069.09psi	fv: Actual	=	111.29 psi
F'b	=	3,335.38psi	F'v	=	356.25 psi
Load Combination			Load Combination		
Location of maximum on span	=	+D+Lr 6.500ft	Location of maximum on span	=	+D+Lr 12.241 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.310 in	Ratio = 502 >= 360	Span: 1 : Lr Only		
Max Upward Transient Deflection	0 in	Ratio = 0 >= 360	n/a		
Max Downward Total Deflection	0.555 in	Ratio = 280 >= 180	Span: 1 : +D+Lr		
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			
Length = 13.0 ft	1	0.380	0.192	0.90	1.00	1.00	1.00	1.026	1.00	1.00	1.00	4.01	913.4	2,401.5	1.09	49.1	256.5
+D+Lr														0.0			
Length = 13.0 ft	1	0.620	0.312	1.25	1.00	1.00	1.00	1.026	1.00	1.00	1.00	9.08	2,069.1	3,335.4	2.47	111.3	356.3
+D+0.750Lr														0.0			
Length = 13.0 ft	1	0.534	0.269	1.25	1.00	1.00	1.00	1.026	1.00	1.00	1.00	7.81	1,780.2	3,335.4	2.12	95.7	356.3
+0.60D														0.0			
														0.0			

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

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DESCRIPTION: CEILING BEAM (B1)

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
Length = 13.0 ft	1	0.128	0.065	1.60	1.00	1.00	1.00	1.026	1.00	1.00	1.00	2.40	548.1	4,269.3	0.65	29.5	456.0

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.5553	6.547		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	2.793	2.793
Max Upward from Load Combinations	2.793	2.793
Max Upward from Load Cases	1.560	1.560
D Only	1.233	1.233
+D+Lr	2.793	2.793
+D+0.750Lr	2.403	2.403
+0.60D	0.740	0.740
Lr Only	1.560	1.560

Extreme Reactions

Values in KIPS

Support	D	Lr	L	S	W	E	H
Support #1	1.233	1.560					
Support #2	1.233	1.560					

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: CEILING BEAM (B2)

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : NDS 2024

Load Combination Set : IBC 2021

Rho (or Omega) = 1.00

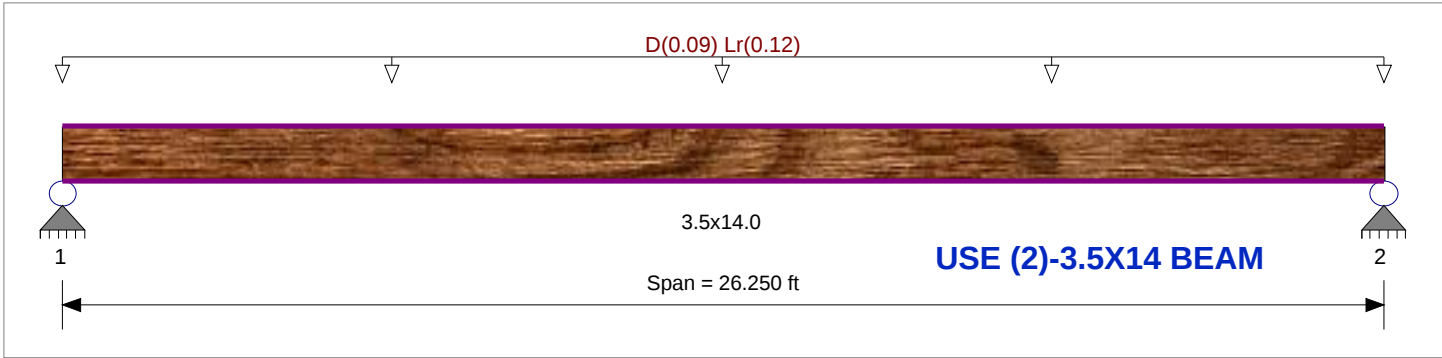
Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

Fb +	2,600.0 psi	E : Modulus of Elasticity	
Fb -	2,600.0 psi	Ebend- xx	2,000.0ksi
Fc - Prll	2,510.0 psi	Eminbend - xx	1,016.54ksi
Fc - Perp	750.0 psi		
Fv	285.0 psi		
Ft	1,555.0 psi	Density	42.010pcf

Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 2.0 E

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

Uniform Load : D = 0.0150, Lr = 0.020 ksf, Tributary Width = 6.0 ft, (C.J.)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.635 : 1	Maximum Shear Stress Ratio	=	0.231 : 1
Section used for this span		3.5x14.0 NDS2018	Section used for this span		3.5x14.0 NDS2018
fb: Actual	=	2,027.67psi	fv: Actual	=	82.22 psi
F'b	=	3,194.86psi	F'v	=	356.25 psi
Load Combination			Load Combination		
Location of maximum on span	=	+D+Lr 13.125ft	Location of maximum on span	=	+D+Lr 25.100 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.806 in	Ratio = 391 >=240	Span: 1 : Lr Only		
Max Upward Transient Deflection	0 in	Ratio = 0 >=240	n/a		
Max Downward Total Deflection	1.506 in	Ratio = 209 >=139	Span: 1 : +D+Lr		
Max Upward Total Deflection	0 in	Ratio = 0 >=139	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 = 26.250 ft	1	0.410	0.149	0.90	1.00	1.00	1.00	0.983	1.00	1.00	1.00	8.98	942.8	2,300.3	1.25	38.2	256.5
+D+Lr														0.0	0.00	0.0	0.0
Length = 26.250 ft	1	0.635	0.231	1.25	1.00	1.00	1.00	0.983	1.00	1.00	1.00	19.32	2,027.7	3,194.9	2.69	82.2	356.3
+D+0.750Lr														0.0	0.00	0.0	0.0
Length = 26.250 ft	1	0.550	0.200	1.25	1.00	1.00	1.00	0.983	1.00	1.00	1.00	16.74	1,756.5	3,194.9	2.33	71.2	356.3
+0.60D														0.0	0.00	0.0	0.0

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DESCRIPTION: CEILING BEAM (B2)

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
Length = 26.250 ft	1	0.138	0.050	1.60	1.00	1.00	1.00	0.983	1.00	1.00	1.00	5.39	565.7	4,089.4	0.75	22.9	456.0

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	1.5057	13.221		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	2.944	2.944
Max Upward from Load Combinations	2.944	2.944
Max Upward from Load Cases	1.575	1.575
D Only	1.369	1.369
+D+Lr	2.944	2.944
+D+0.750Lr	2.550	2.550
+0.60D	0.821	0.821
Lr Only	1.575	1.575

Extreme Reactions

Values in KIPS

Support	D	Lr	L	S	W	E	H
Support #1	1.369	1.575					
Support #2	1.369	1.575					

Wood Beam

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: CEILING BEAM (B3)

Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : NDS 2024
Load Combination Set : ASCE 7-22 / IBC 2024

Rho (or Omega) = 1.00

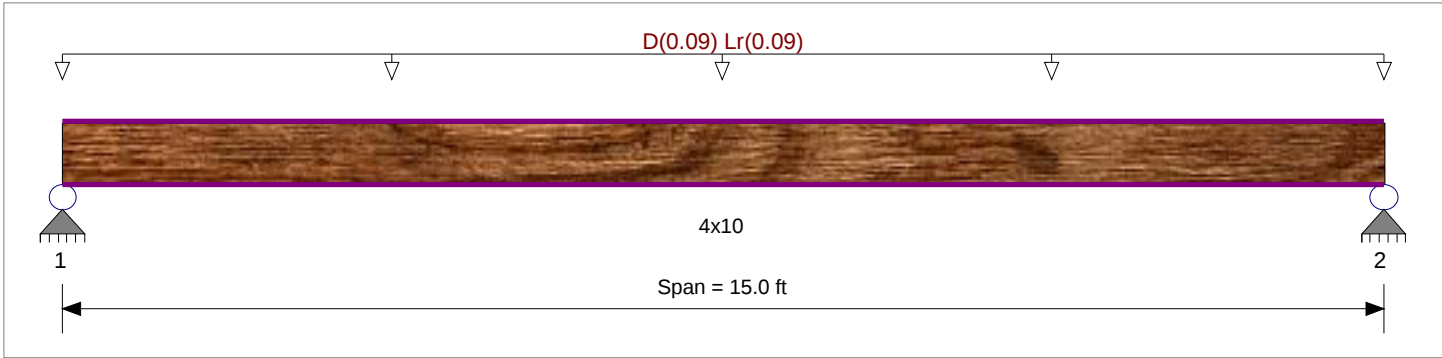
Material Properties

Analysis Method : Allowable Stress Design
Load Combination : ASCE 7-22 / IBC 2024

Fb +	875.0 psi	E : Modulus of Elasticity	
Fb -	875.0 psi	Ebend- xx	1,300.0ksi
Fc - Prll	600.0 psi	Eminbend - xx	470.0ksi
Fc - Perp	625.0 psi		
Fv	170.0 psi		
Ft	425.0 psi	Density	31.210pcf

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

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 = 0.010, Lr = 0.010 ksf, Tributary Width = 9.0 ft, (ROOF)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.927 : 1	Maximum Shear Stress Ratio	=	0.264 : 1
Section used for this span		4x10	Section used for this span		4x10
		NDS2018			NDS2018
fb: Actual	=	1,217.16psi	fv: Actual	=	56.16 psi
F'b	=	1,312.50psi	F'v	=	212.50 psi
Load Combination			Load Combination		
Location of maximum on span	=	+D+Lr 7.500ft	Location of maximum on span	=	+D+Lr 14.234 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.344 in	Ratio = 523 >=360	Span: 1 : Lr Only		
Max Upward Transient Deflection	0 in	Ratio = 0 >=360	n/a		
Max Downward Total Deflection	0.687 in	Ratio = 261 >=180	Span: 1 : +D+Lr		
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 = 15.0 ft	1	0.644	0.184	0.90	1.00	1.00	1.00	1.200	1.00	1.00	1.00	2.53	608.6	945.0	0.61	28.1	153.0
+D+Lr					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.927	0.264	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	5.06	1,217.2	1,312.5	1.21	56.2	212.5
+D+0.750Lr					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 15.0 ft	1	0.811	0.231	1.25	1.00	1.00	1.00	1.200	1.00	1.00	1.00	4.43	1,065.0	1,312.5	1.06	49.1	212.5
+0.60D					1.00	1.00	1.00	1.200	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

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LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

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DESCRIPTION: CEILING BEAM (B3)

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
Length = 15.0 ft	1	0.217	0.062	1.60	1.00	1.00	1.00	1.200	1.00	1.00	1.00	1.52	365.1	1,680.0		0.36	16.8	272.0

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
1	+D+Lr	0.6872	7.555		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	1.350	1.350
Max Upward from Load Combinations	1.350	1.350
Max Upward from Load Cases	0.675	0.675
D Only	0.675	0.675
+D+Lr	1.350	1.350
+D+0.750Lr	1.181	1.181
+0.60D	0.405	0.405
Lr Only	0.675	0.675

Extreme Reactions

Values in KIPS

Support	D	Lr	L	S	W	E	H
Support #1	0.675	0.675					
Support #2	0.675	0.675					



RAHMAN ENGINEERING SERVICES INC.

A Civil / Structural Engineering Services Company (P.E. License C69263)



FOUNDATION DESIGN

General Footing

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: PAD FOOTING (F1)

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : ACI 318-19

Load Combinations Used : IBC 2021

Rho (or Omega) = 1.00

General Information

Material Properties

f'c : Concrete 28 day strength	=	2.50 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 when footing base is below	=	ksf ft

Increases based on footing plan dimension

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

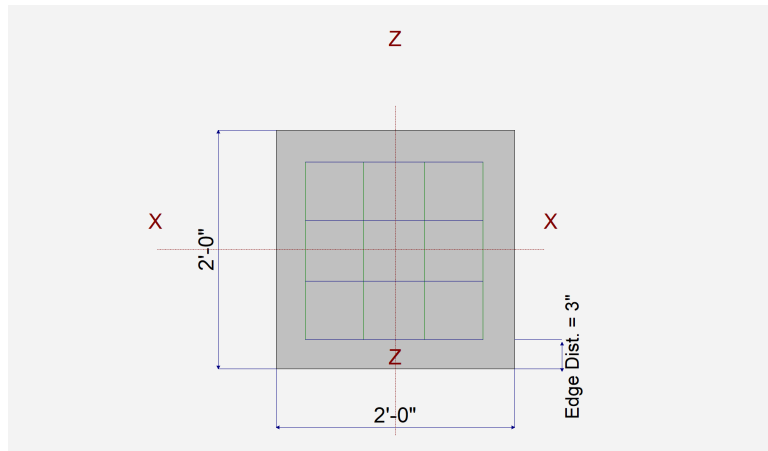
Width parallel to X-X Axis	=	2.0 ft
Length parallel to Z-Z Axis	=	2.0 ft
Footing Thickness	=	18.0 in

Pedestal dimensions...

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

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



Bottom Reinforcing

Bars parallel to X-X Axis (resisting Z Flexure)

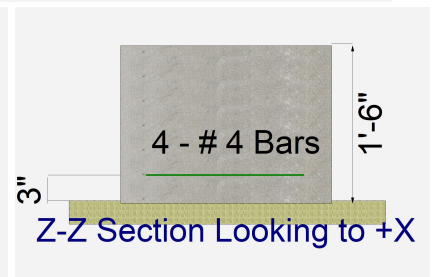
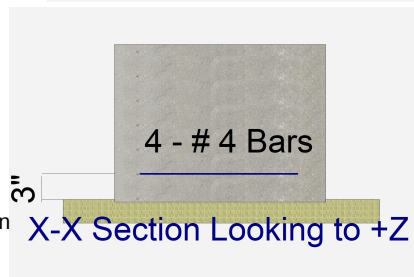
Number of Bars	=	4.0
Reinforcing Bar Size	=	# 4

Bars parallel to Z-Z Axis (resisting X Flexure)

Number of Bars	=	4.0
Reinforcing Bar Size	=	# 4

Rebar Centerline to Edge of Concrete...
at Bottom of footing =

3.0 in



General Footing

Project File: EC.ec6

LIC# : KW-06019670, Build:20.26.04.17

RAHMAN ENGINEERING INC

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DESCRIPTION: PAD FOOTING (F1)

Applied Loads

		D	Lr	L	S	W	E	H
P : Vertical Load	=	2.110	2.000	0.000	0.000	0.000	0.000	0.000 k
OB : Overburden	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 ksf
M-xx	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
M-zz	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
V-x	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k
V-z	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.830	Soil Bearing	1.245 ksf	1.50 ksf	+D+Lr 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	999.0	Sliding - X-X	0.0 k	0.8940 k	D Only
PASS	999.0	Sliding - Z-Z	0.0 k	0.8940 k	D Only
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.02740	Z Flexure (+X) Bot Tens	0.7165 k-ft/ft	26.153 k-ft/ft	+1.20D+1.60Lr
PASS	0.02740	Z Flexure (-X) Bot Tens	0.7165 k-ft/ft	26.153 k-ft/ft	+1.20D+1.60Lr
	0.972	Min Steel X Flexure Bottom	0.389 in2/ft	0.400 in2/ft	n/a
PASS	0.02740	X Flexure (+Z) Bot Tens	0.7165 k-ft/ft	26.153 k-ft/ft	+1.20D+1.60Lr
PASS	0.02740	X Flexure (-Z) Bot Tens	0.7165 k-ft/ft	26.153 k-ft/ft	+1.20D+1.60Lr
	0.972	Min Steel Z Flexure Bottom	0.389 in2/ft	0.400 in2/ft	n/a
PASS		Z Flexure (+X) Top Tens	k-ft/ft	k-ft/ft	
PASS		Z Flexure (-X) Top Tens	k-ft/ft	k-ft/ft	
	0.000	Min Steel X Flexure Top	0.000 in2/ft	0.000 in2/ft	n/a
PASS		X Flexure (+Z) Top Tens	k-ft/ft	k-ft/ft	
PASS		X Flexure (-Z) Top Tens	k-ft/ft	k-ft/ft	
	0.000	Min Steel Z Flexure Top	0.000 in2/ft	0.000 in2/ft	n/a
PASS	n/a	1-way Shear (+X)	0.0 psi	39.149 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	39.149 psi	n/a
PASS	n/a	1-way Shear (-Z)	0.0 psi	39.149 psi	n/a
PASS	n/a	2-way Punching	3.921 psi	39.149 psi	+1.20D+1.60Lr

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom, -Z	Top, +Z	Left, -X	Right, +X	
X-X, D Only	1.50	n/a	0.0	0.7450	0.7450	n/a	n/a	0.497
X-X, +D+Lr	1.50	n/a	0.0	1.245	1.245	n/a	n/a	0.830
X-X, +D+0.750Lr	1.50	n/a	0.0	1.120	1.120	n/a	n/a	0.747
X-X, +0.60D	1.50	n/a	0.0	0.4470	0.4470	n/a	n/a	0.298
Z-Z, D Only	1.50	0.0	n/a	n/a	n/a	0.7450	0.7450	0.497
Z-Z, +D+Lr	1.50	0.0	n/a	n/a	n/a	1.245	1.245	0.830
Z-Z, +D+0.750Lr	1.50	0.0	n/a	n/a	n/a	1.120	1.120	0.747
Z-Z, +0.60D	1.50	0.0	n/a	n/a	n/a	0.4470	0.4470	0.298

Overturning Stability

Rotation Axis & Load Combination...	Moment Sum About Negative Edge (k-ft)				Moment Sum About Positive Edge (k-ft)			
	Overturning	Resisting	Ratio	Status	Overturning	Resisting	Ratio	Status

Footing Has NO Overturning

All units k

Sliding Stability

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

General Footing

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RAHMAN ENGINEERING INC

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DESCRIPTION: PAD FOOTING (F1)

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	0.3693	+Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +1.40D	0.3693	-Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +1.20D+0.50Lr	0.4415	+Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +1.20D+0.50Lr	0.4415	-Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +1.20D	0.3165	+Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +1.20D	0.3165	-Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +1.20D+1.60Lr	0.7165	+Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +1.20D+1.60Lr	0.7165	-Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +0.90D	0.2374	+Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
X-X, +0.90D	0.2374	-Z	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +1.40D	0.3693	-X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +1.40D	0.3693	+X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +1.20D+0.50Lr	0.4415	-X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +1.20D+0.50Lr	0.4415	+X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +1.20D	0.3165	-X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +1.20D	0.3165	+X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +1.20D+1.60Lr	0.7165	-X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +1.20D+1.60Lr	0.7165	+X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +0.90D	0.2374	-X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK
Z-Z, +0.90D	0.2374	+X	Bottom	0.3888	ACI 7.6.1.1	0.40	26.153	OK

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK
+1.20D+0.50Lr	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK
+1.20D	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK
+1.20D+1.60Lr	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK
+0.90D	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK
+1.20D+0.50Lr	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK
+1.20D	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK
+1.20D+1.60Lr	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK
+0.90D	0.00 psi	0.00 psi	0.00 psi	39.15 psi	0.00	OK

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	2.02 psi	150.00 psi	0.01	OK
+1.20D+0.50Lr	2.42 psi	150.00 psi	0.02	OK
+1.20D	1.73 psi	150.00 psi	0.01	OK
+1.20D+1.60Lr	3.92 psi	150.00 psi	0.03	OK
+0.90D	1.30 psi	150.00 psi	0.01	OK

All units k