

SECTION A

LATERAL LOADS

ROOF

	<u>GRAVITY</u>	<u>SEISMIC</u>
PLYWOOD SHEATHING	2.0 PSF	2.0 PSF
2x JOISTS & FRAMING	3.0 PSF	3.0 PSF
CEIL. & MISC.	3.0 PSF	3.0 PSF
CEILING FRAMING	2.0 PSF	2.0 PSF
ROOFING	3.0 PSF	3.0 PSF
PARTITIONS		
EXTERIOR WALL		10.0 PSF
OTHER (M.E.P.)	1.0 PSF	1.0 PSF
	DL = 14.0 PSF	24 PSF
	LL = 20.0 PSF	

ROOF WITH SOLAR PANEL

	<u>GRAVITY</u>	<u>SEISMIC</u>
PLYWOOD SHEATHING	2.0 PSF	2.0 PSF
2x JOISTS & FRAMING	4.0 PSF	4.0 PSF
CEIL. & MISC.	4.0 PSF	4.0 PSF
CEILING FRAMING	2.0 PSF	2.0 PSF
ROOFING	3.0 PSF	3.0 PSF
PARTITIONS		
EXTERIOR WALL		10.0 PSF
OTHER (SOLAR PANEL AND M.E.P.)	4.0 PSF	4.0 PSF
	DL = 19.0 PSF	29 PSF
	LL = 20.0 PSF	

ROOF DECK

	<u>GRAVITY</u>	<u>SEISMIC</u>
PLYWOOD SHEATHING	2.0 PSF	2.0 PSF
2x JOISTS & FRAMING	3.0 PSF	3.0 PSF
CEIL. & MISC.	4.0 PSF	4.0 PSF
CEILING FRAMING	2.0 PSF	2.0 PSF
DECKING	5.0 PSF	5.0 PSF
PARTITIONS		9.0 PSF
EXTERIOR WALL		18.0 PSF
OTHER (M.E.P)	3.0 PSF	3.0 PSF
	DL = 19.0 PSF	46 PSF
	LL = 60.0 PSF	

SECOND FLOOR

	<u>GRAVITY</u>	<u>SEISMIC</u>
PLYWOOD SHEATHING	2.0 PSF	2.0 PSF
2x JOISTS & FRAMING	4.0 PSF	4.0 PSF
CEIL. & MISC.	4.0 PSF	4.0 PSF
FLOORING	5.0 PSF	5.0 PSF
PARTITIONS		4.0 PSF
EXTERIOR WALL		7.0 PSF
OTHER (M.E.P)	2.0 PSF	2.0 PSF
	DL = 17.0 PSF	28 PSF
	LL = 40.0 PSF	

BALCONIES

	<u>GRAVITY</u>	<u>SEISMIC</u>
PLYWOOD SHEATHING	2.0 PSF	2.0 PSF
2x JOISTS & FRAMING	4.0 PSF	4.0 PSF
CEIL. & MISC.	4.0 PSF	4.0 PSF
DECKING	5.0 PSF	5.0 PSF
PARTITIONS		
EXTERIOR WALL		40.0 PSF
OTHER (M.E.P)	7 PSF	7 PSF
	DL = 22.0 PSF	62 PSF
	LL = 60.0 PSF	

BUILDING SEISMIC MASS (CHECK EXISING PSF REFERENCES)

ROOF:	ROOF W/ SOLAR ROOF	127.0	S.F. x	29.0	=	3.7 KIPS	13.4	Psf
		127.0	S.F. x	24.0	=	3.0 KIPS		
						<u>6.73 KIPS</u>		
ROOF DECK:	ROOF DECK ROOF jacuzzi with 3'-6" water	406.0	S.F. x	46.0	=	18.7 KIPS	23.7	Psf
		44.0	S.F. x	24.0		1.1 KIPS		
		32.0	S.F. x	283.0		9.1 KIPS		
						<u>28.79 KIPS</u>		
2ND:	FLOOR: ROOF BALCONIES	541.0	S.F. x	28.0	=	15.1 KIPS	6.2	Psf
		141.0	S.F. x	24.0	=	3.4 KIPS		
		76.0	S.F. x	62.0	=	4.7 KIPS		
						<u>23.244 KIPS</u>		

BUILDING WIND LOADS DESIGN - LONG DIRECTION

Zone 1(psf)	Zone 2(psf)	Zone 3(psf)	Zone 4(psf)	Zone 1 + Zone 4(psf)
12.06	-10.5	-3.95	-2.29	18

BUILDING WIND LOADS DESIGN- TRANS DIRECTION

Zone 1(psf)	Zone 2(psf)	Zone 3(psf)	Zone 4(psf)	Zone 1 + Zone 4(psf)
14.45	-10.6	-5.97	-4.86	19.31

BUILDING WIND LOADS - LONG DIRECTION

ROOF:	ROOF W/ SOLAR ROOF	41.32	S.F. x	18.0	=	0.7 KIPS	72	LBS/FT
		41	S.F. x	18.0	=	0.7 KIPS	71	LBS/FT
						<u>1.5 KIPS</u>	143.4	LBS/FT
ROOF DECK:		535.8	S.F. x	18.0	=	9.6 KIPS	273.6	LBS/FT
2ND:	FLOOR:	352.5	S.F. x	18.0	=	6.3 KIPS	180	LBS/FT
						<u>17.5 KIPS</u>	<18 Kips SEISMIC CONTROLS	

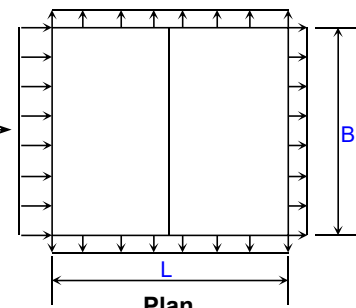
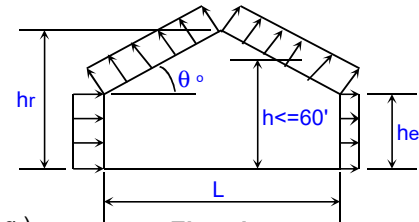
BUILDING WIND LOADS - TRANS DIRECTION

ROOF:	ROOF W/ SOLAR ROOF	33	S.F. x	19.3	=	0.6 KIPS	77.24	LBS/FT
		32	S.F. x	19.3	=	0.6 KIPS	77.24	LBS/FT
						<u>1.3 KIPS</u>	154.5	LBS/FT
ROOF DECK:		400.2	S.F. x	19.3	=	7.7 KIPS	293.5	LBS/FT
2ND:	FLOOR:	263.3	S.F. x	19.3	=	5.1 KIPS	193.1	LBS/FT
						<u>14.1 KIPS</u>	<18 Kips SEISMIC CONTROLS	

Input Data:

Wind Speed, V = 100 mph (Wind Map, Figure 26.5-1A-C)
 Bldg. Classification = II (Table 1.5-1 Risk Category)
 Exposure Category = C (Sect. 26.7)
 Ridge Height, hr = 28.00 ft. (hr >= he)
 Eave Height, he = 24.58 ft. (he <= hr)
 Building Width = 26.33 ft. (Normal to Building Ridge)
 Building Length = 35.25 ft. (Parallel to Building Ridge)
 Roof Type = Monoslope (Gable or Monoslope)
 Topo. Factor, Kzt = 1.00 (Sect. 26.8 & Figure 26.8-1)
 Direct. Factor, Kd = 0.85 (Table 26.6)
 Enclosed? (Y/N) = Y (Sect. 26.2 & Table 26.11-1)
 Hurricane Region? = N

Wind →

**Plan****Elevation****Resulting Parameters and Coefficients:**

Roof Angle, θ = 18.26 deg.
 Mean Roof Ht., h = 26.29 ft. (h = (hr+he)/2, for angle >10 deg.)

Check Criteria for a Low-Rise Building:

1. Is h <= 60' ? Yes, O.K. 2. Is h <= Lesser of L or B? Yes, O.K.

External Pressure Coeff's., GCpf (Fig. 28.4-1):

(For values, see following wind load tabulations.)

Positive & Negative Internal Pressure Coefficients, GCpi (Table 26.11-1):

+GCpi Coef. = 0.18 (positive internal pressure)

-GCpi Coef. = -0.18 (negative internal pressure)

If h < 15 then: $K_h = 2.01 \cdot (15/z_g)^{2/\alpha}$ (Table 28.3-1)If h >= 15 then: $K_h = 2.01 \cdot (z/z_g)^{2/\alpha}$ (Table 28.3-1) α = 9.50 (Table 26.9-1) z_g = 900 (Table 26.9-1) K_h = 0.96 ($K_h = K_z$ evaluated at z = h)Velocity Pressure: $q_z = 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2$ (Sect. 28.3.2, Eq. 28.3-1) q_h = 20.79 psf $q_h = 0.00256 \cdot K_h \cdot K_{zt} \cdot K_d \cdot V^2$ (q_z evaluated at z = h)

Design Net External Wind Pressures (Sect. 28.4.1):

 $p = q_h \cdot [(GCpf) - (+/-GCpi)]$ (psf, Eq. 28.4-1)

Wall and Roof End Zone Widths 'a' and '2*a' (Fig. 28.4-1):

a = 3.00 ft.

2*a = 6.00 ft.

MWFRS Wind Load for Load Case A				MWFRS Wind Load for Load Case B			
Surface	GCpf	p = Net Pressures (psf)		Surface	*GCpf	p = Net Pressures (psf)	
		(w/ +GCpi)	(w/ -GCpi)			(w/ +GCpi)	(w/ -GCpi)
Zone 1	0.51	6.96	14.45	Zone 1	0.40	4.57	12.06
Zone 2	-0.69	-18.09	-10.60	Zone 2	-0.69	-18.09	-10.60
Zone 3	-0.47	-13.45	-5.97	Zone 3	-0.37	-11.43	-3.95
Zone 4	-0.41	-12.34	-4.86	Zone 4	-0.29	-9.77	-2.29
Zone 5	---	---	---	Zone 5	-0.45	-13.10	-5.61
Zone 6	---	---	---	Zone 6	-0.45	-13.10	-5.61
Zone 1E	0.78	12.43	19.91	Zone 1E	0.61	8.94	16.42
Zone 2E	-1.07	-25.98	-18.50	Zone 2E	-1.07	-25.98	-18.50
Zone 3E	-0.67	-17.70	-10.22	Zone 3E	-0.53	-14.76	-7.28
Zone 4E	-0.62	-16.54	-9.06	Zone 4E	-0.43	-12.68	-5.20
Zone 5E	---	---	---	Zone 5E	0.61	8.94	16.42
Zone 6E	---	---	---	Zone 6E	-0.43	-12.68	-5.20

*Note: Use roof angle $\theta = 0$ degrees for Longitudinal Direction.

For Case A when GCpf is neg. in Zones 2/2E:

Zones 2/2E dist. = 13.17 ft.

For Case B when GCpf is neg. in Zones 2/2E:

Zones 2/2E dist. = 17.63 ft.

Remainder of roof Zones 2/2E extending to ridge line shall use roof Zones 3/3E pressure coefficients.

MWFRS Wind Load for Load Case A, Torsional Case				MWFRS Wind Load for Case B, Torsional Case			
Surface	GCpf	p = Net Pressure (psf)		Surface	GCpf	p = Net Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)			(w/ +GCpi)	(w/ -GCpi)
Zone 1T	---	1.74	3.61	Zone 1T	---	1.14	3.01
Zone 2T	---	-4.52	-2.65	Zone 2T	---	-4.52	-2.65
Zone 3T	---	-3.36	-1.49	Zone 3T	---	-2.86	-0.99
Zone 4T	---	-3.09	-1.21	Zone 4T	---	-2.44	-0.57
Zone 5T	---	---	---	Zone 5T	---	-3.27	-1.40
Zone 6T	---	---	---	Zone 6T	---	-3.27	-1.40

Notes: 1. For Load Case A (Transverse), Load Case B (Longitudinal), and Torsional Cases:

Zone 1 is windward wall for interior zone.

Zone 2 is windward roof for interior zone.

Zone 3 is leeward roof for interior zone.

Zone 4 is leeward wall for interior zone.

Zones 5 and 6 are sidewalls.

Zone 1T is windward wall for torsional case

Zone 3T is leeward roof for torsional case

Zones 5T and 6T are sidewalls for torsional case.

Zone 1E is windward wall for end zone.

Zone 2E is windward roof for end zone.

Zone 3E is leeward roof for end zone.

Zone 4E is leeward wall for end zone.

Zone 5E & 6E is sidewalls for end zone.

Zone 2T is windward roof for torsional case.

Zone 4T is leeward wall for torsional case.

2. (+) and (-) signs signify wind pressures acting toward & away from respective surfaces.

3. Building must be designed for all wind directions using the 8 load cases shown below. The load cases are applied to each building corner in turn as the reference corner.

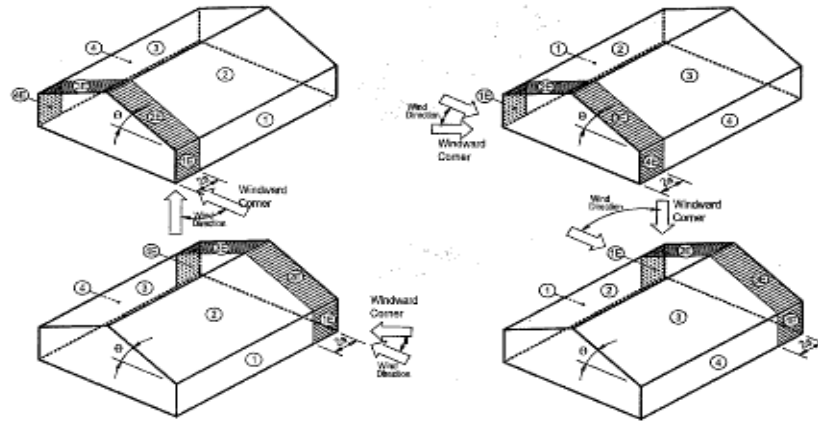
4. Wind loads for torsional cases are 25% of respective transverse or longitudinal zone load values.

Torsional loading shall apply to all 8 basic load cases applied at each reference corner.

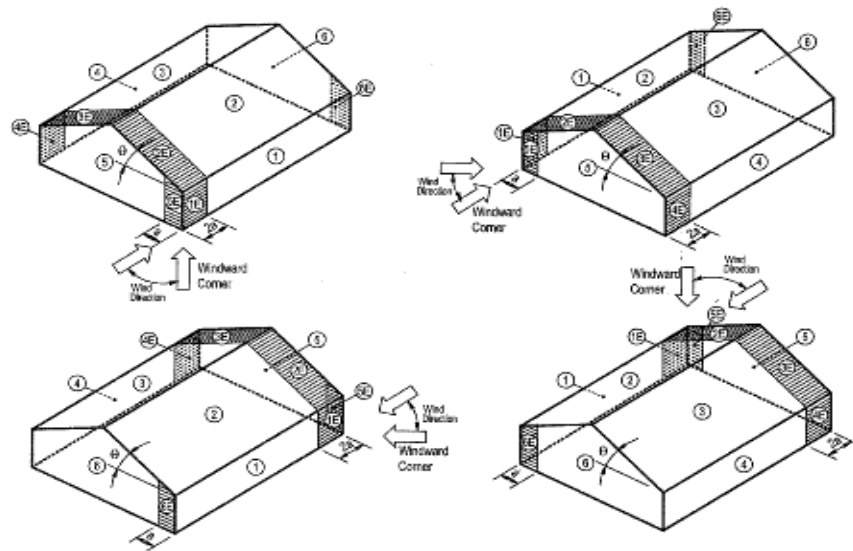
Exception: One-story buildings with "h" $\leq 30'$, buildings ≤ 2 stories framed with light frame construction, and buildings ≤ 2 stories designed with flexible diaphragms need not be designed for torsional load cases.

5. Per Code Section 28.4.4, the minimum wind load for MWFRS shall not be less than 16 psf.

**Low-Rise
Buildings
 $h \leq 60'$**

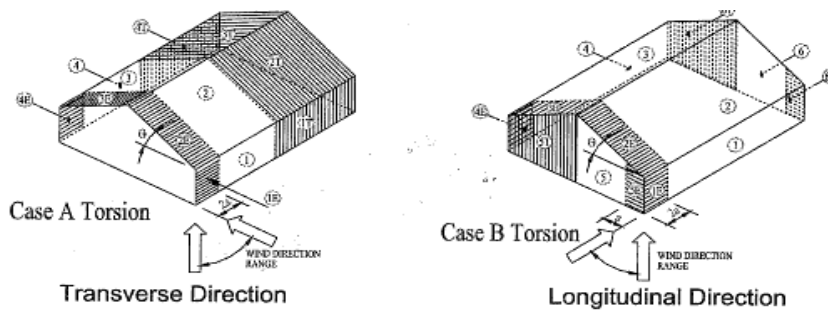


Load Case A



Load Case B

Basic Load Cases



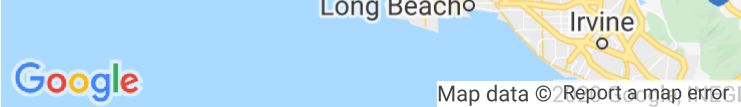
Torsional Load Cases

Hazard Type: Seismic

Reference Document: ASCE7-16

Risk Category: II

Site Class: D-default



Basic Parameters

Name	Value	Description
S _S	1.876	MCE _R ground motion (period=0.2s)
S ₁	0.666	MCE _R ground motion (period=1.0s)
S _{MS}	2.251	Site-modified spectral acceleration value
S _{M1}	* null	Site-modified spectral acceleration value
S _{DS}	1.5	Numeric seismic design value at 0.2s SA
S _{D1}	* null	Numeric seismic design value at 1.0s SA

* See Section 11.4.8

▼Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F _a	1.2	Site amplification factor at 0.2s
F _v	* null	Site amplification factor at 1.0s
CR _S	0.91	Coefficient of risk (0.2s)
CR ₁	0.903	Coefficient of risk (1.0s)
PGA	0.801	MCE _G peak ground acceleration
F _{PGA}	1.2	Site amplification factor at PGA
PGA _M	0.961	Site modified peak ground acceleration

T _L	8	Long-period transition period (s)
SsRT	1.876	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.062	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.463	Factored deterministic acceleration value (0.2s)
S1RT	0.666	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.737	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.834	Factored deterministic acceleration value (1.0s)
PGAd	0.997	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey [Seismic Design Web Services](#).

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DESCRIPTION:

le	R	TL			Ta	hn	Ct	x
1.0	6.5	8			0.243	28.00	0.02	0.750
Site Class	Ss	S1	Sds	Sd1	k			TOTAL WT
D (Default)	0.666	1.876	1.500	0.755	1.00			58.8
Allowable Story Drift Coef.			Deflection Amplif. Factor Cd					
0.020			4					
Reliability/Redun.Factor			ASD Reduction Factor RASD					
1.30			0.70					

Reliability/Redun.Factor r = 1.3
ASD Reduction Factor RASD 0.70
T = 0.243 sec

		STRENGTH	ASD
Basic	Eq 12.8-2 $V = Sds / (R/le) * W * r =$	0.300 * W	0.210 * W
Upper Limit	Eq 12.8-3 $V = Sd1 / Ta / (R/le) * W * r =$	0.620 * W	0.434 * W
Lower Limit	Eq 12.8-5 $V = 0.044 * Sds * le * W * r =$	0.086 * W	0.060 * W
Lower Limit	Eq 12.8-6 $V = 0.5 * S1 / (R/le) * W * r =$	0.188 * W	0.131 * W

Static Force Coefficient 0.300 * W
Static Force Base Shear 17.6 kip 0.210 * W
12.3 kip

LEVEL	STORY HEIGHT	hx ft	Wx kip	Wx(hx)^k	Wx(hx)^k/ Σ(Wihi^k)	Fx kip	Fx/Wx (Strength)	Vi kip	Diaph. Fpx	Diaph. Fpx/Wx	Max Story Drift
1 HIGH ROO	8.00	28.00	6.7	188	0.194	3.4	0.507		3.4	0.507	1.68
2 OOF DEC	11.00	20.00	28.8	576	0.592	10.4	0.362	3.4	11.2	0.390	1.20
3 2ND	9.00	9.00	23.2	209	0.215	3.8	0.163	13.8	5.6	0.240	0.54
4				0				17.6			
5				0							
6				0							
7				0							
8				0							
9				0							
10				0							
11				0							
12				0							
13				0							
14				0							
15				0							
16				0							
17				0							
18				0							
19				0							
20				0							
21				0							
22				0							
			58.8	973		17.6					

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SECOND FLOOR SHEAR WALLS

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SECTION B

DESIGN

S-2.1

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
f _y : Rebar Yield	=	60.0	ksi
E _c : 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	=	1.50	: 1
Min. Sliding Safety Factor	=	1.50	: 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
Increase Bearing By Footing Weight	=	Yes	
Soil Passive Resistance (for Sliding)	=	100.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	1.50	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

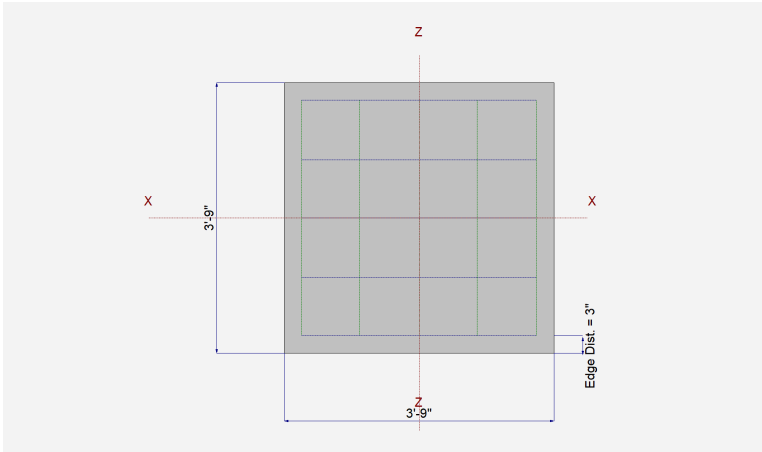
Width parallel to X-X Axis	=	3.750	ft
Length parallel to Z-Z Axis	=	3.750	ft
Footing Thickness	=	18.0	in

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

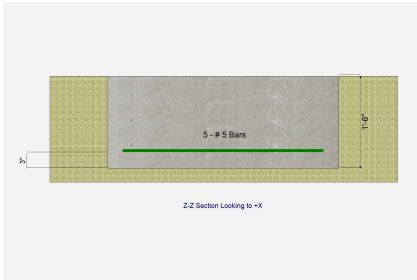
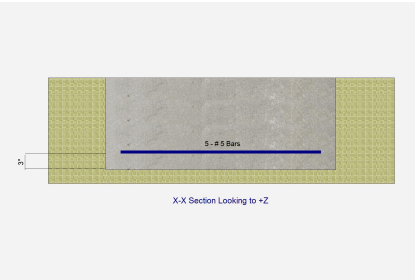
3.0 in



Reinforcing

Bars parallel to X-X Axis	=		
Number of Bars	=	5.0	
Reinforcing Bar Size	=	# 5	
Bars parallel to Z-Z Axis	=		
Number of Bars	=	5.0	
Reinforcing Bar Size	=	# 5	
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			

# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Applied Loads

	D	L _r	L	S	W	E	H
P : Column Load	=	8.0	1.050	2.930		15.350	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9025	Soil Bearing	1.550 ksf	1.718 ksf	+D+0.70E+0.60H 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	0.1291	Z Flexure (+X)	3.485 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1291	Z Flexure (-X)	3.485 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1291	X Flexure (+Z)	3.485 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1291	X Flexure (-Z)	3.485 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.09362	1-way Shear (+X)	7.022 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.09362	1-way Shear (-X)	7.022 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.09362	1-way Shear (+Z)	7.022 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.09362	1-way Shear (-Z)	7.022 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1826	2-way Punching	27.397 psi	150.0 psi	+1.20D+L+0.20S+E+1.90H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location		Left, -X		Right, +X	Actual / Allow Ratio
				Bottom, -Z	Top, +Z				
X-X, +D+H	1.718	n/a	0.0	0.7864	0.7864	n/a	n/a		0.458
X-X, +D+L+H	1.718	n/a	0.0	0.9947	0.9947	n/a	n/a		0.579
X-X, +D+Lr+H	1.718	n/a	0.0	0.8611	0.8611	n/a	n/a		0.501
X-X, +D+S+H	1.718	n/a	0.0	0.7864	0.7864	n/a	n/a		0.458
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	0.9987	0.9987	n/a	n/a		0.582
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	0.9427	0.9427	n/a	n/a		0.549
X-X, +D+0.60W+H	1.718	n/a	0.0	0.7864	0.7864	n/a	n/a		0.458
X-X, +D+0.750Lr+0.450W+H	1.718	n/a	0.0	0.8424	0.8424	n/a	n/a		0.491
X-X, +D+0.750S+0.450W+H	1.718	n/a	0.0	0.7864	0.7864	n/a	n/a		0.458
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.4718	0.4718	n/a	n/a		0.275
X-X, +D+0.70E+0.60H	1.718	n/a	0.0	1.550	1.550	n/a	n/a		0.903
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	0.0	1.516	1.516	n/a	n/a		0.883
X-X, +0.60D+0.70E+H	1.718	n/a	0.0	1.236	1.236	n/a	n/a		0.720
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	0.7864	0.7864		0.458
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	0.9947	0.9947		0.579
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	0.8611	0.8611		0.501
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	0.7864	0.7864		0.458
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	0.9987	0.9987		0.582
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	0.9427	0.9427		0.549
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	0.7864	0.7864		0.458
Z-Z, +D+0.750Lr+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.8424	0.8424		0.491
Z-Z, +D+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.7864	0.7864		0.458
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.4718	0.4718		0.275
Z-Z, +D+0.70E+0.60H	1.718	0.0	n/a	n/a	n/a	1.550	1.550		0.903
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	0.0	n/a	n/a	n/a	1.516	1.516		0.883
Z-Z, +0.60D+0.70E+H	1.718	0.0	n/a	n/a	n/a	1.236	1.236		0.720

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
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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+1.60H	1.40	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.40D+1.60H	1.40	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.852	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.852	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

Footings 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+1.60L+0.50S+1.60H	1.786	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.786	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.776	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.776	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.410	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.410	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	1.566	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	1.566	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.20	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.20	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	1.632	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	1.632	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.566	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.566	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	0.90	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	0.90	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	3.485	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	3.485	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	2.819	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	2.819	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	1.40	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	1.40	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.852	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.852	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.786	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.786	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.776	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.776	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.410	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.410	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	1.566	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	1.566	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.20	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.20	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	1.632	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	1.632	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.566	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.566	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	0.90	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	0.90	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	3.485	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	3.485	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	2.819	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	2.819	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	2.82 psi	2.82 psi	2.82 psi	2.82 psi	2.82 psi	75.00 psi	0.04	OK
+1.20D+0.50Lr+1.60L+1.60H	3.73 psi	3.73 psi	3.73 psi	3.73 psi	3.73 psi	75.00 psi	0.05	OK
+1.20D+1.60L+0.50S+1.60H	3.60 psi	3.60 psi	3.60 psi	3.60 psi	3.60 psi	75.00 psi	0.05	OK
+1.20D+1.60Lr+L+1.60H	3.58 psi	3.58 psi	3.58 psi	3.58 psi	3.58 psi	75.00 psi	0.05	OK
+1.20D+1.60Lr+0.50W+1.60H	2.84 psi	2.84 psi	2.84 psi	2.84 psi	2.84 psi	75.00 psi	0.04	OK
+1.20D+L+1.60S+1.60H	3.16 psi	3.16 psi	3.16 psi	3.16 psi	3.16 psi	75.00 psi	0.04	OK
+1.20D+1.60S+0.50W+1.60H	2.42 psi	2.42 psi	2.42 psi	2.42 psi	2.42 psi	75.00 psi	0.03	OK
+1.20D+0.50Lr+L+W+1.60H	3.29 psi	3.29 psi	3.29 psi	3.29 psi	3.29 psi	75.00 psi	0.04	OK
+1.20D+L+0.50S+W+1.60H	3.16 psi	3.16 psi	3.16 psi	3.16 psi	3.16 psi	75.00 psi	0.04	OK
+0.90D+W+1.60H	1.81 psi	1.81 psi	1.81 psi	1.81 psi	1.81 psi	75.00 psi	0.02	OK
+1.20D+L+0.20S+E+1.90H	7.02 psi	7.02 psi	7.02 psi	7.02 psi	7.02 psi	75.00 psi	0.09	OK
+0.90D+E+0.90H	5.68 psi	5.68 psi	5.68 psi	5.68 psi	5.68 psi	75.00 psi	0.08	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	11.01 psi	150.00psi	0.07337	OK
+1.20D+0.50Lr+1.60L+1.60H	14.56 psi	150.00psi	0.09704	OK
+1.20D+1.60L+0.50S+1.60H	14.04 psi	150.00psi	0.0936	OK
+1.20D+1.60Lr+L+1.60H	13.96 psi	150.00psi	0.09309	OK
+1.20D+1.60Lr+0.50W+1.60H	11.08 psi	150.00psi	0.0739	OK
+1.20D+L+1.60S+1.60H	12.31 psi	150.00psi	0.08209	OK
+1.20D+1.60S+0.50W+1.60H	9.43 psi	150.00psi	0.06289	OK
+1.20D+0.50Lr+L+W+1.60H	12.83 psi	150.00psi	0.08553	OK
+1.20D+L+0.50S+W+1.60H	12.31 psi	150.00psi	0.08209	OK
+0.90D+W+1.60H	7.08 psi	150.00psi	0.04717	OK
+1.20D+L+0.20S+E+1.90H	27.40 psi	150.00psi	0.1826	OK
+0.90D+E+0.90H	22.16 psi	150.00psi	0.1477	OK

Code References

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

General Information

Material Properties

fc : 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	

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Increase Bearing By Footing Weight	=	Yes	
Soil Passive Resistance (for Sliding)	=	100.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Analysis Settings

Min Steel % Bending Reinf.	=		
Min Allow % Temp Reinf.	=	0.00180	
Min. Overturning Safety Factor	=	1.50	: 1
Min. Sliding Safety Factor	=	1.50	: 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	

Increases based on footing Depth

Footing base depth below soil surface	=	1.50	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

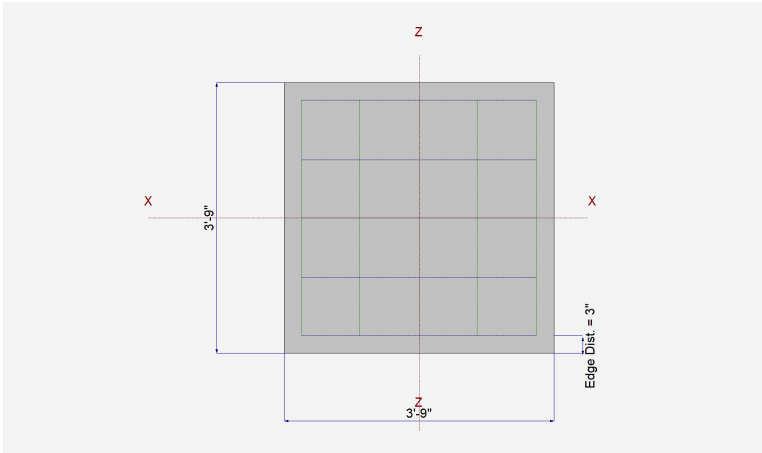
Width parallel to X-X Axis	=	3.750	ft
Length parallel to Z-Z Axis	=	3.750	ft
Footing Thickness	=	18.0	in

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	=	5.0	
Number of Bars	=	#	5
Reinforcing Bar Size	=		
Bars parallel to Z-Z Axis	=	5.0	
Number of Bars	=	#	5
Reinforcing Bar Size	=		

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation

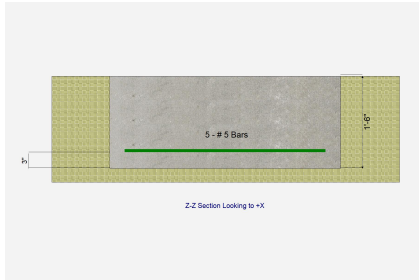
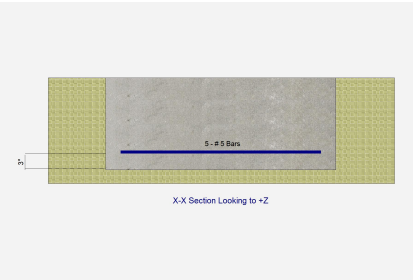
n/a

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	=	14.390	1.010	5.080		3.470	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9555	Soil Bearing	1.641 ksf	1.718 ksf	+D+0.750L+0.750S+0.5250E+H about Z-
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	0.1199	Z Flexure (+X)	3.238 k-ft/ft	26.996 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1199	Z Flexure (-X)	3.238 k-ft/ft	26.996 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1199	X Flexure (+Z)	3.238 k-ft/ft	26.996 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1199	X Flexure (-Z)	3.238 k-ft/ft	26.996 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.08698	1-way Shear (+X)	6.523 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.08698	1-way Shear (-X)	6.523 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.08698	1-way Shear (+Z)	6.523 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.08698	1-way Shear (-Z)	6.523 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.1697	2-way Punching	25.452 psi	150.0 psi	+1.20D+0.50Lr+1.60L+1.60H

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+H	1.718	n/a	0.0	1.241	1.241	n/a	n/a	0.723
X-X, +D+L+H	1.718	n/a	0.0	1.602	1.602	n/a	n/a	0.933
X-X, +D+Lr+H	1.718	n/a	0.0	1.313	1.313	n/a	n/a	0.765
X-X, +D+S+H	1.718	n/a	0.0	1.241	1.241	n/a	n/a	0.723
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	1.566	1.566	n/a	n/a	0.912
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	1.512	1.512	n/a	n/a	0.880
X-X, +D+0.60W+H	1.718	n/a	0.0	1.241	1.241	n/a	n/a	0.723
X-X, +D+0.750Lr+0.450W+H	1.718	n/a	0.0	1.295	1.295	n/a	n/a	0.754
X-X, +D+0.750S+0.450W+H	1.718	n/a	0.0	1.241	1.241	n/a	n/a	0.723
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.7445	0.7445	n/a	n/a	0.434
X-X, +D+0.70E+0.60H	1.718	n/a	0.0	1.414	1.414	n/a	n/a	0.823
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	0.0	1.641	1.641	n/a	n/a	0.956
X-X, +0.60D+0.70E+H	1.718	n/a	0.0	0.9172	0.9172	n/a	n/a	0.534
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	1.241	1.241	0.723
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	1.602	1.602	0.933
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	1.313	1.313	0.765
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	1.241	1.241	0.723
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	1.566	1.566	0.912
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	1.512	1.512	0.880
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	1.241	1.241	0.723
Z-Z, +D+0.750Lr+0.450W+H	1.718	0.0	n/a	n/a	n/a	1.295	1.295	0.754
Z-Z, +D+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	1.241	1.241	0.723
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.7445	0.7445	0.434
Z-Z, +D+0.70E+0.60H	1.718	0.0	n/a	n/a	n/a	1.414	1.414	0.823
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	0.0	n/a	n/a	n/a	1.641	1.641	0.956
Z-Z, +0.60D+0.70E+H	1.718	0.0	n/a	n/a	n/a	0.9172	0.9172	0.534

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+1.60H	2.518	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.40D+1.60H	2.518	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	3.238	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	3.238	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

Footings 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+1.60L+0.50S+1.60H	3.175	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60L+0.50S+1.60H	3.175	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.996	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.996	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	2.361	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	2.361	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	2.794	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	2.794	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	2.159	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	2.159	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.857	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.857	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.794	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.794	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	1.619	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	1.619	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	3.227	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	3.227	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	2.053	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	2.053	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	2.518	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	2.518	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	3.238	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	3.238	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	3.175	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	3.175	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.996	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.996	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	2.361	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	2.361	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.794	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.794	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	2.159	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	2.159	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.857	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.857	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.794	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.794	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	1.619	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	1.619	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	3.227	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	3.227	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	2.053	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	2.053	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	5.07 psi	5.07 psi	5.07 psi	5.07 psi	5.07 psi	75.00 psi	0.07	OK
+1.20D+0.50Lr+1.60L+1.60H	6.52 psi	6.52 psi	6.52 psi	6.52 psi	6.52 psi	75.00 psi	0.09	OK
+1.20D+1.60L+0.50S+1.60H	6.40 psi	6.40 psi	6.40 psi	6.40 psi	6.40 psi	75.00 psi	0.09	OK
+1.20D+1.60Lr+L+1.60H	6.04 psi	6.04 psi	6.04 psi	6.04 psi	6.04 psi	75.00 psi	0.08	OK
+1.20D+1.60Lr+0.50W+1.60H	4.76 psi	4.76 psi	4.76 psi	4.76 psi	4.76 psi	75.00 psi	0.06	OK
+1.20D+L+1.60S+1.60H	5.63 psi	5.63 psi	5.63 psi	5.63 psi	5.63 psi	75.00 psi	0.08	OK
+1.20D+1.60S+0.50W+1.60H	4.35 psi	4.35 psi	4.35 psi	4.35 psi	4.35 psi	75.00 psi	0.06	OK
+1.20D+0.50Lr+L+W+1.60H	5.76 psi	5.76 psi	5.76 psi	5.76 psi	5.76 psi	75.00 psi	0.08	OK
+1.20D+L+0.50S+W+1.60H	5.63 psi	5.63 psi	5.63 psi	5.63 psi	5.63 psi	75.00 psi	0.08	OK
+0.90D+W+1.60H	3.26 psi	3.26 psi	3.26 psi	3.26 psi	3.26 psi	75.00 psi	0.04	OK
+1.20D+L+0.20S+E+1.90H	6.50 psi	6.50 psi	6.50 psi	6.50 psi	6.50 psi	75.00 psi	0.09	OK
+0.90D+E+0.90H	4.14 psi	4.14 psi	4.14 psi	4.14 psi	4.14 psi	75.00 psi	0.06	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	19.80 psi	150.00psi	0.132	OK
+1.20D+0.50Lr+1.60L+1.60H	25.45 psi	150.00psi	0.1697	OK
+1.20D+1.60L+0.50S+1.60H	24.96 psi	150.00psi	0.1664	OK
+1.20D+1.60Lr+L+1.60H	23.55 psi	150.00psi	0.157	OK
+1.20D+1.60Lr+0.50W+1.60H	18.56 psi	150.00psi	0.1237	OK
+1.20D+L+1.60S+1.60H	21.96 psi	150.00psi	0.1464	OK
+1.20D+1.60S+0.50W+1.60H	16.97 psi	150.00psi	0.1131	OK
+1.20D+0.50Lr+L+W+1.60H	22.46 psi	150.00psi	0.1497	OK
+1.20D+L+0.50S+W+1.60H	21.96 psi	150.00psi	0.1464	OK
+0.90D+W+1.60H	12.73 psi	150.00psi	0.08484	OK
+1.20D+L+0.20S+E+1.90H	25.37 psi	150.00psi	0.1691	OK
+0.90D+E+0.90H	16.14 psi	150.00psi	0.1076	OK

Code References

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

General Information

Material Properties

fc : 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	

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Increase Bearing By Footing Weight	=	Yes	
Soil Passive Resistance (for Sliding)	=	100.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Analysis Settings

Min Steel % Bending Reinf.	=		
Min Allow % Temp Reinf.	=	0.00180	
Min. Overturning Safety Factor	=	1.50	: 1
Min. Sliding Safety Factor	=	1.50	: 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	

Increases based on footing Depth

Footing base depth below soil surface	=	1.50	ft
Allow press. increase per foot of depth when footing base is below	=		ksf

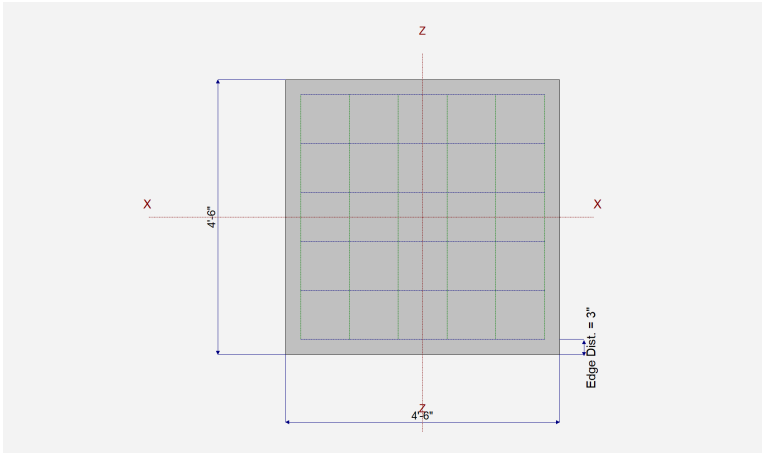
Increases based on footing plan dimension

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

Dimensions

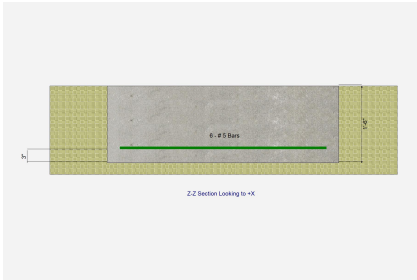
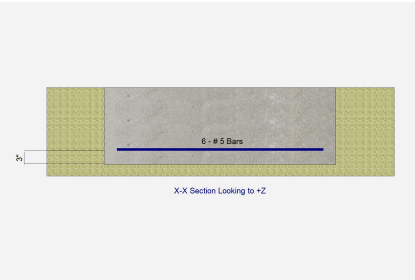
Width parallel to X-X Axis	=	4.50	ft
Length parallel to Z-Z Axis	=	4.50	ft
Footing Thickness	=	18.0	in

Pedestal dimensions...	=		in
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	=	6.0	
Number of Bars	=	#	5
Reinforcing Bar Size	=		
Bars parallel to Z-Z Axis	=	6.0	
Number of Bars	=	#	5
Reinforcing Bar Size	=		
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			
# 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	=	12.120	0.890	5.990		15.290	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.8349	Soil Bearing	1.434 ksf	1.718 ksf	+D+0.750L+0.750S+0.5250E+H about Z-
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	0.1659	Z Flexure (+X)	4.478 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1659	Z Flexure (-X)	4.478 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1659	X Flexure (+Z)	4.478 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1659	X Flexure (-Z)	4.478 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1297	1-way Shear (+X)	9.730 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1297	1-way Shear (-X)	9.730 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1297	1-way Shear (+Z)	9.730 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1297	1-way Shear (-Z)	9.730 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.2446	2-way Punching	36.684 psi	150.0 psi	+1.20D+L+0.20S+E+1.90H

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+H	1.718	n/a	0.0	0.8160	0.8160	n/a	n/a	0.475
X-X, +D+L+H	1.718	n/a	0.0	1.112	1.112	n/a	n/a	0.648
X-X, +D+Lr+H	1.718	n/a	0.0	0.860	0.860	n/a	n/a	0.501
X-X, +D+S+H	1.718	n/a	0.0	0.8160	0.8160	n/a	n/a	0.475
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	1.071	1.071	n/a	n/a	0.624
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	1.038	1.038	n/a	n/a	0.604
X-X, +D+0.60W+H	1.718	n/a	0.0	0.8160	0.8160	n/a	n/a	0.475
X-X, +D+0.750Lr+0.450W+H	1.718	n/a	0.0	0.8490	0.8490	n/a	n/a	0.494
X-X, +D+0.750S+0.450W+H	1.718	n/a	0.0	0.8160	0.8160	n/a	n/a	0.475
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.4896	0.4896	n/a	n/a	0.285
X-X, +D+0.70E+0.60H	1.718	n/a	0.0	1.345	1.345	n/a	n/a	0.783
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	0.0	1.434	1.434	n/a	n/a	0.835
X-X, +0.60D+0.70E+H	1.718	n/a	0.0	1.018	1.018	n/a	n/a	0.593
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	0.8160	0.8160	0.475
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	1.112	1.112	0.648
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	0.860	0.860	0.501
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	0.8160	0.8160	0.475
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	1.071	1.071	0.624
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	1.038	1.038	0.604
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	0.8160	0.8160	0.475
Z-Z, +D+0.750Lr+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.8490	0.8490	0.494
Z-Z, +D+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.8160	0.8160	0.475
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.4896	0.4896	0.285
Z-Z, +D+0.70E+0.60H	1.718	0.0	n/a	n/a	n/a	1.345	1.345	0.783
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	0.0	n/a	n/a	n/a	1.434	1.434	0.835
Z-Z, +0.60D+0.70E+H	1.718	0.0	n/a	n/a	n/a	1.018	1.018	0.593

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+1.60H	2.121	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.40D+1.60H	2.121	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	3.072	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	3.072	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

Footring 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+1.60L+0.50S+1.60H	3.016	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60L+0.50S+1.60H	3.016	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.745	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.745	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.996	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.996	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	2.567	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	2.567	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.818	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.818	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.622	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.622	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.567	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.567	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	1.364	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	1.364	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	4.478	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	4.478	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	3.275	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	3.275	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	2.121	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	2.121	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	3.072	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	3.072	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	3.016	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	3.016	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.745	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.745	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.996	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.996	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.567	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.567	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.818	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.818	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.622	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.622	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.567	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.567	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	1.364	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	1.364	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	4.478	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	4.478	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	3.275	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	3.275	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	4.61 psi	4.61 psi	4.61 psi	4.61 psi	4.61 psi	75.00 psi	0.06	OK
+1.20D+0.50Lr+1.60L+1.60H	6.67 psi	6.67 psi	6.67 psi	6.67 psi	6.67 psi	75.00 psi	0.09	OK
+1.20D+1.60L+0.50S+1.60H	6.55 psi	6.55 psi	6.55 psi	6.55 psi	6.55 psi	75.00 psi	0.09	OK
+1.20D+1.60Lr+L+1.60H	5.96 psi	5.96 psi	5.96 psi	5.96 psi	5.96 psi	75.00 psi	0.08	OK
+1.20D+1.60Lr+0.50W+1.60H	4.34 psi	4.34 psi	4.34 psi	4.34 psi	4.34 psi	75.00 psi	0.06	OK
+1.20D+L+1.60S+1.60H	5.58 psi	5.58 psi	5.58 psi	5.58 psi	5.58 psi	75.00 psi	0.07	OK
+1.20D+1.60S+0.50W+1.60H	3.95 psi	3.95 psi	3.95 psi	3.95 psi	3.95 psi	75.00 psi	0.05	OK
+1.20D+0.50Lr+L+W+1.60H	5.70 psi	5.70 psi	5.70 psi	5.70 psi	5.70 psi	75.00 psi	0.08	OK
+1.20D+L+0.50S+W+1.60H	5.58 psi	5.58 psi	5.58 psi	5.58 psi	5.58 psi	75.00 psi	0.07	OK
+0.90D+W+1.60H	2.96 psi	2.96 psi	2.96 psi	2.96 psi	2.96 psi	75.00 psi	0.04	OK
+1.20D+L+0.20S+E+1.90H	9.73 psi	9.73 psi	9.73 psi	9.73 psi	9.73 psi	75.00 psi	0.13	OK
+0.90D+E+0.90H	7.12 psi	7.12 psi	7.12 psi	7.12 psi	7.12 psi	75.00 psi	0.09	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	17.38 psi	150.00psi	0.1158	OK
+1.20D+0.50Lr+1.60L+1.60H	25.16 psi	150.00psi	0.1678	OK
+1.20D+1.60L+0.50S+1.60H	24.71 psi	150.00psi	0.1647	OK
+1.20D+1.60Lr+L+1.60H	22.49 psi	150.00psi	0.1499	OK
+1.20D+1.60Lr+0.50W+1.60H	16.35 psi	150.00psi	0.109	OK
+1.20D+L+1.60S+1.60H	21.03 psi	150.00psi	0.1402	OK
+1.20D+1.60S+0.50W+1.60H	14.89 psi	150.00psi	0.09929	OK
+1.20D+0.50Lr+L+W+1.60H	21.48 psi	150.00psi	0.1432	OK
+1.20D+L+0.50S+W+1.60H	21.03 psi	150.00psi	0.1402	OK
+0.90D+W+1.60H	11.17 psi	150.00psi	0.07447	OK
+1.20D+L+0.20S+E+1.90H	36.68 psi	150.00psi	0.2446	OK
+0.90D+E+0.90H	26.83 psi	150.00psi	0.1788	OK

Code References

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

General Information

Material Properties

fc : 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	=	1.50	: 1
Min. Sliding Safety Factor	=	1.50	: 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
Increase Bearing By Footing Weight	=	Yes	
Soil Passive Resistance (for Sliding)	=	100.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	1.50	ft
Allow press. increase per foot of depth when footing base is below	=		ksf

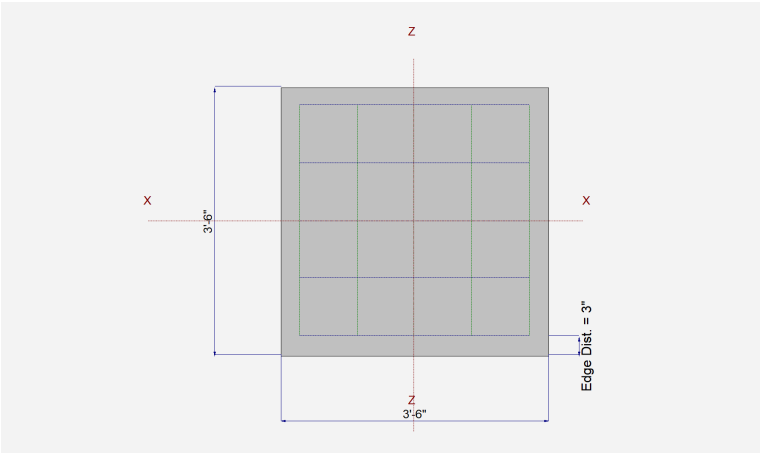
Increases based on footing plan dimension

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

Dimensions

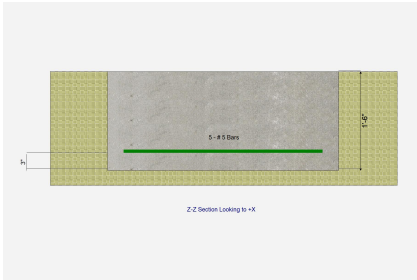
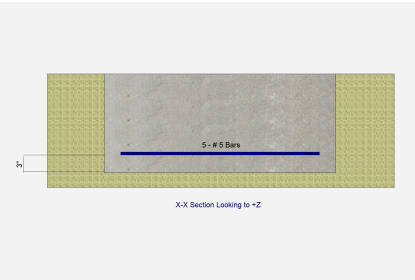
Width parallel to X-X Axis	=	3.50	ft
Length parallel to Z-Z Axis	=	3.50	ft
Footing Thickness	=	18.0	in

Pedestal dimensions...	=		in
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	=	5	
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis	=		
Number of Bars	=	5	
Reinforcing Bar Size	=	#	5
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			
# 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	=	3.430	0.40	3.080		18.220	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.8961	Soil Bearing	1.539 ksf	1.718 ksf	+D+0.70E+0.60H 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	0.1101	Z Flexure (+X)	3.177 k-ft/ft	28.855 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1101	Z Flexure (-X)	3.177 k-ft/ft	28.855 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1101	X Flexure (+Z)	3.177 k-ft/ft	28.855 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1101	X Flexure (-Z)	3.177 k-ft/ft	28.855 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.07531	1-way Shear (+X)	5.648 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.07531	1-way Shear (-X)	5.648 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.07531	1-way Shear (+Z)	5.648 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.07531	1-way Shear (-Z)	5.648 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1639	2-way Punching	24.580 psi	150.0 psi	+1.20D+L+0.20S+E+1.90H

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+H	1.718	n/a	0.0	0.4975	0.4975	n/a	n/a	0.290
X-X, +D+L+H	1.718	n/a	0.0	0.7489	0.7489	n/a	n/a	0.436
X-X, +D+Lr+H	1.718	n/a	0.0	0.5302	0.5302	n/a	n/a	0.309
X-X, +D+S+H	1.718	n/a	0.0	0.4975	0.4975	n/a	n/a	0.290
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	0.7106	0.7106	n/a	n/a	0.414
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	0.6861	0.6861	n/a	n/a	0.400
X-X, +D+0.60W+H	1.718	n/a	0.0	0.4975	0.4975	n/a	n/a	0.290
X-X, +D+0.750Lr+0.450W+H	1.718	n/a	0.0	0.5220	0.5220	n/a	n/a	0.304
X-X, +D+0.750S+0.450W+H	1.718	n/a	0.0	0.4975	0.4975	n/a	n/a	0.290
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.2985	0.2985	n/a	n/a	0.174
X-X, +D+0.70E+0.60H	1.718	n/a	0.0	1.539	1.539	n/a	n/a	0.896
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	0.0	1.467	1.467	n/a	n/a	0.854
X-X, +0.60D+0.70E+H	1.718	n/a	0.0	1.340	1.340	n/a	n/a	0.780
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	0.4975	0.4975	0.290
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	0.7489	0.7489	0.436
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	0.5302	0.5302	0.309
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	0.4975	0.4975	0.290
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	0.7106	0.7106	0.414
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	0.6861	0.6861	0.400
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	0.4975	0.4975	0.290
Z-Z, +D+0.750Lr+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.5220	0.5220	0.304
Z-Z, +D+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.4975	0.4975	0.290
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.2985	0.2985	0.174
Z-Z, +D+0.70E+0.60H	1.718	0.0	n/a	n/a	n/a	1.539	1.539	0.896
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	0.0	n/a	n/a	n/a	1.467	1.467	0.854
Z-Z, +0.60D+0.70E+H	1.718	0.0	n/a	n/a	n/a	1.340	1.340	0.780

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+1.60H	0.6003	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.40D+1.60H	0.6003	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.156	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.156	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK

Footings 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+1.60L+0.50S+1.60H	1.131	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.131	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.9795	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.9795	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.5945	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.5945	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+L+1.60S+1.60H	0.8995	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+L+1.60S+1.60H	0.8995	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.5145	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.5145	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.9245	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.9245	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.8995	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.8995	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +0.90D+W+1.60H	0.3859	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +0.90D+W+1.60H	0.3859	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+L+0.20S+E+1.90H	3.177	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +1.20D+L+0.20S+E+1.90H	3.177	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +0.90D+E+0.90H	2.663	+Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
X-X, +0.90D+E+0.90H	2.663	-Z	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.40D+1.60H	0.6003	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.40D+1.60H	0.6003	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.156	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.156	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.131	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.131	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.9795	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.9795	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.5945	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.5945	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.8995	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.8995	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.5145	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.5145	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.9245	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.9245	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.8995	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.8995	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +0.90D+W+1.60H	0.3859	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +0.90D+W+1.60H	0.3859	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	3.177	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	3.177	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +0.90D+E+0.90H	2.663	-X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK
Z-Z, +0.90D+E+0.90H	2.663	+X	Bottom	0.3888	Min Temp %	0.4429	28.855	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	1.07 psi	1.07 psi	1.07 psi	1.07 psi	1.07 psi	75.00 psi	0.01	OK
+1.20D+0.50Lr+1.60L+1.60H	2.05 psi	2.05 psi	2.05 psi	2.05 psi	2.05 psi	75.00 psi	0.03	OK
+1.20D+1.60L+0.50S+1.60H	2.01 psi	2.01 psi	2.01 psi	2.01 psi	2.01 psi	75.00 psi	0.03	OK
+1.20D+1.60Lr+L+1.60H	1.74 psi	1.74 psi	1.74 psi	1.74 psi	1.74 psi	75.00 psi	0.02	OK
+1.20D+1.60Lr+0.50W+1.60H	1.06 psi	1.06 psi	1.06 psi	1.06 psi	1.06 psi	75.00 psi	0.01	OK
+1.20D+L+1.60S+1.60H	1.60 psi	1.60 psi	1.60 psi	1.60 psi	1.60 psi	75.00 psi	0.02	OK
+1.20D+1.60S+0.50W+1.60H	0.91 psi	0.91 psi	0.91 psi	0.91 psi	0.91 psi	75.00 psi	0.01	OK
+1.20D+0.50Lr+L+W+1.60H	1.64 psi	1.64 psi	1.64 psi	1.64 psi	1.64 psi	75.00 psi	0.02	OK
+1.20D+L+0.50S+W+1.60H	1.60 psi	1.60 psi	1.60 psi	1.60 psi	1.60 psi	75.00 psi	0.02	OK
+0.90D+W+1.60H	0.69 psi	0.69 psi	0.69 psi	0.69 psi	0.69 psi	75.00 psi	0.01	OK
+1.20D+L+0.20S+E+1.90H	5.65 psi	5.65 psi	5.65 psi	5.65 psi	5.65 psi	75.00 psi	0.08	OK
+0.90D+E+0.90H	4.74 psi	4.74 psi	4.74 psi	4.74 psi	4.74 psi	75.00 psi	0.06	OK

DESCRIPTION: FTG4 (FBM14)

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	4.64 psi	150.00psi	0.03096	OK
+1.20D+0.50Lr+1.60L+1.60H	8.94 psi	150.00psi	0.0596	OK
+1.20D+1.60L+0.50S+1.60H	8.75 psi	150.00psi	0.05831	OK
+1.20D+1.60Lr+L+1.60H	7.58 psi	150.00psi	0.05052	OK
+1.20D+1.60Lr+0.50W+1.60H	4.60 psi	150.00psi	0.03066	OK
+1.20D+L+1.60S+1.60H	6.96 psi	150.00psi	0.0464	OK
+1.20D+1.60S+0.50W+1.60H	3.98 psi	150.00psi	0.02654	OK
+1.20D+0.50Lr+L+W+1.60H	7.15 psi	150.00psi	0.04769	OK
+1.20D+L+0.50S+W+1.60H	6.96 psi	150.00psi	0.0464	OK
+0.90D+W+1.60H	2.99 psi	150.00psi	0.0199	OK
+1.20D+L+0.20S+E+1.90H	24.58 psi	150.00psi	0.1639	OK
+0.90D+E+0.90H	20.61 psi	150.00psi	0.1374	OK

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	=	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	=	1.50	: 1
Min. Sliding Safety Factor	=	1.50	: 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
Increase Bearing By Footing Weight	=	Yes	
Soil Passive Resistance (for Sliding)	=	100.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	1.50	ft
Allow press. increase per foot of depth when footing base is below	=		ksf

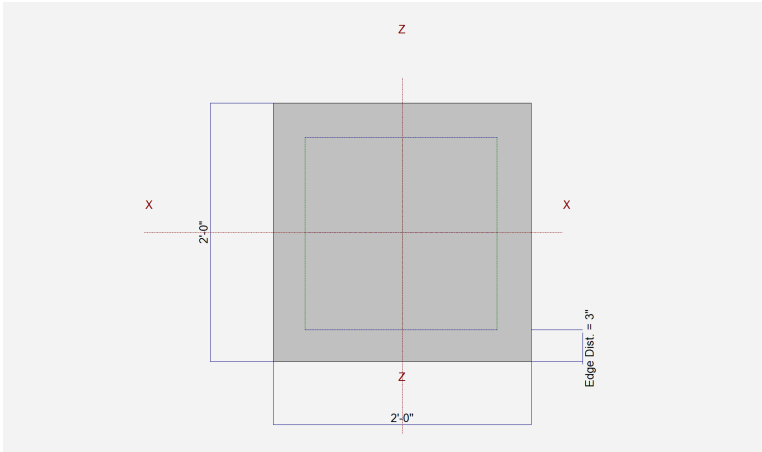
Increases based on footing plan dimension

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

Dimensions

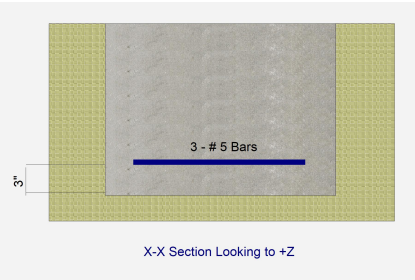
Width parallel to X-X Axis	=	2.0	ft
Length parallel to Z-Z Axis	=	2.0	ft
Footing Thickness	=	18.0	in

Pedestal dimensions...	=		in
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	=	3.0	
Reinforcing Bar Size	=	# 5	
Bars parallel to Z-Z Axis	=		
Number of Bars	=	3.0	
Reinforcing Bar Size	=	# 5	
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			
# 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	=	0.430	0.050	1.460		5.70	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.7843	Soil Bearing	1.347 ksf	1.718 ksf	+D+0.750L+0.750S+0.5250E+H about Z:
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	0.03173	Z Flexure (+X)	0.9595 k-ft/ft	30.243 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.03173	Z Flexure (-X)	0.9595 k-ft/ft	30.243 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.03173	X Flexure (+Z)	0.9595 k-ft/ft	30.243 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.03173	X Flexure (-Z)	0.9595 k-ft/ft	30.243 k-ft/ft	+1.20D+L+0.20S+E+1.90H
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	5.250 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location		Left, -X		Right, +X	Actual / Allow Ratio
				Bottom, -Z	Top, +Z				
X-X, +D+H	1.718	n/a	0.0	0.3250	0.3250	n/a	n/a		0.189
X-X, +D+L+H	1.718	n/a	0.0	0.690	0.690	n/a	n/a		0.402
X-X, +D+Lr+H	1.718	n/a	0.0	0.3375	0.3375	n/a	n/a		0.197
X-X, +D+S+H	1.718	n/a	0.0	0.3250	0.3250	n/a	n/a		0.189
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	0.6081	0.6081	n/a	n/a		0.354
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	0.5988	0.5988	n/a	n/a		0.349
X-X, +D+0.60W+H	1.718	n/a	0.0	0.3250	0.3250	n/a	n/a		0.189
X-X, +D+0.750Lr+0.450W+H	1.718	n/a	0.0	0.3344	0.3344	n/a	n/a		0.195
X-X, +D+0.750S+0.450W+H	1.718	n/a	0.0	0.3250	0.3250	n/a	n/a		0.189
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.1950	0.1950	n/a	n/a		0.114
X-X, +D+0.70E+0.60H	1.718	n/a	0.0	1.323	1.323	n/a	n/a		0.770
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	0.0	1.347	1.347	n/a	n/a		0.784
X-X, +0.60D+0.70E+H	1.718	n/a	0.0	1.193	1.193	n/a	n/a		0.695
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	0.3250	0.3250		0.189
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	0.690	0.690		0.402
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	0.3375	0.3375		0.197
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	0.3250	0.3250		0.189
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	0.6081	0.6081		0.354
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	0.5988	0.5988		0.349
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	0.3250	0.3250		0.189
Z-Z, +D+0.750Lr+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.3344	0.3344		0.195
Z-Z, +D+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.3250	0.3250		0.189
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.1950	0.1950		0.114
Z-Z, +D+0.70E+0.60H	1.718	0.0	n/a	n/a	n/a	1.323	1.323		0.770
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	0.0	n/a	n/a	n/a	1.347	1.347		0.784
Z-Z, +0.60D+0.70E+H	1.718	0.0	n/a	n/a	n/a	1.193	1.193		0.695

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+1.60H	0.07525	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.40D+1.60H	0.07525	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.3596	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	0.3596	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK

Footings 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+1.60L+0.50S+1.60H	0.3565	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+1.60L+0.50S+1.60H	0.3565	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.2570	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.2570	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.07450	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.07450	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+L+1.60S+1.60H	0.2470	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+L+1.60S+1.60H	0.2470	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.06450	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.06450	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.2501	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.2501	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.2470	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.2470	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +0.90D+W+1.60H	0.04838	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +0.90D+W+1.60H	0.04838	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+L+0.20S+E+1.90H	0.9595	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +1.20D+L+0.20S+E+1.90H	0.9595	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +0.90D+E+0.90H	0.7609	+Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
X-X, +0.90D+E+0.90H	0.7609	-Z	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.40D+1.60H	0.07525	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.40D+1.60H	0.07525	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.3596	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	0.3596	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.3565	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	0.3565	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.2570	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.2570	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.07450	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.07450	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.2470	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.2470	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.06450	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.06450	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.2501	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.2501	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.2470	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.2470	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +0.90D+W+1.60H	0.04838	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +0.90D+W+1.60H	0.04838	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	0.9595	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	0.9595	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +0.90D+E+0.90H	0.7609	-X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK
Z-Z, +0.90D+E+0.90H	0.7609	+X	Bottom	0.3888	Min Temp %	0.4650	30.243	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+0.50Lr+1.60L+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+1.60L+0.50S+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+1.60Lr+L+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+1.60Lr+0.50W+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+L+1.60S+1.60H	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+0.50W+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+0.50Lr+L+W+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+L+0.50S+W+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+0.90D+W+1.60H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+1.20D+L+0.20S+E+1.90H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK
+0.90D+E+0.90H	0.00 psi	0.00 psi	0.00 psi	0.00 psi	0.00 psi	75.00 psi	0.00	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	0.41 psi	150.00psi	0.002745	OK
+1.20D+0.50Lr+1.60L+1.60H	1.97 psi	150.00psi	0.01312	OK
+1.20D+1.60L+0.50S+1.60H	1.95 psi	150.00psi	0.01301	OK
+1.20D+1.60Lr+L+1.60H	1.41 psi	150.00psi	0.009375	OK
+1.20D+1.60Lr+0.50W+1.60H	0.41 psi	150.00psi	0.002718	OK
+1.20D+L+1.60S+1.60H	1.35 psi	150.00psi	0.009011	OK
+1.20D+1.60S+0.50W+1.60H	0.35 psi	150.00psi	0.002353	OK
+1.20D+0.50Lr+L+W+1.60H	1.37 psi	150.00psi	0.009125	OK
+1.20D+L+0.50S+W+1.60H	1.35 psi	150.00psi	0.009011	OK
+0.90D+W+1.60H	0.26 psi	150.00psi	0.001765	OK
+1.20D+L+0.20S+E+1.90H	5.25 psi	150.00psi	0.035	OK
+0.90D+E+0.90H	4.16 psi	150.00psi	0.02776	OK

Code References

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

General Information

Material Properties

fc : 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	=	1.50	: 1
Min. Sliding Safety Factor	=	1.50	: 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
Increase Bearing By Footing Weight	=	Yes	
Soil Passive Resistance (for Sliding)	=	100.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	1.50	ft
Allow press. increase per foot of depth when footing base is below	=		ksf

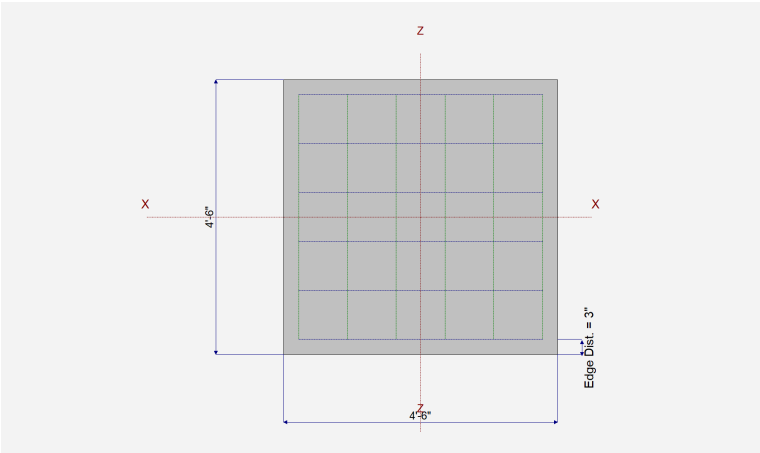
Increases based on footing plan dimension

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

Dimensions

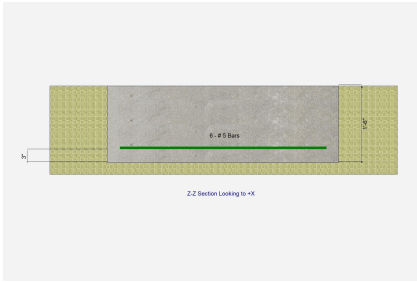
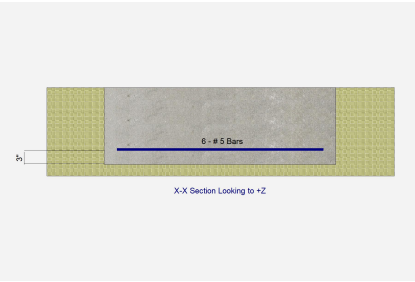
Width parallel to X-X Axis	=	4.50	ft
Length parallel to Z-Z Axis	=	4.50	ft
Footing Thickness	=	18.0	in

Pedestal dimensions...	=		in
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	=	6	
Reinforcing Bar Size	=	# 5	
Bars parallel to Z-Z Axis	=		
Number of Bars	=	6	
Reinforcing Bar Size	=	# 5	
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			
# 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	=	7.44	0.520	8.070		30.020	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9677	Soil Bearing	1.662 ksf	1.718 ksf	+D+0.750L+0.750S+0.5250E+H about Z:
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	0.2177	Z Flexure (+X)	5.877 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.2177	Z Flexure (-X)	5.877 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.2177	X Flexure (+Z)	5.877 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.2177	X Flexure (-Z)	5.877 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1703	1-way Shear (+X)	12.770 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1703	1-way Shear (-X)	12.770 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1703	1-way Shear (+Z)	12.770 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1703	1-way Shear (-Z)	12.770 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.3210	2-way Punching	48.146 psi	150.0 psi	+1.20D+L+0.20S+E+1.90H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location		Left, -X		Right, +X	Actual / Allow Ratio
				Bottom, -Z	Top, +Z				
X-X, +D+H	1.718	n/a	0.0	0.5849	0.5849	n/a	n/a		0.341
X-X, +D+L+H	1.718	n/a	0.0	0.9834	0.9834	n/a	n/a		0.573
X-X, +D+Lr+H	1.718	n/a	0.0	0.6106	0.6106	n/a	n/a		0.356
X-X, +D+S+H	1.718	n/a	0.0	0.5849	0.5849	n/a	n/a		0.341
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	0.9031	0.9031	n/a	n/a		0.526
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	0.8838	0.8838	n/a	n/a		0.515
X-X, +D+0.60W+H	1.718	n/a	0.0	0.5849	0.5849	n/a	n/a		0.341
X-X, +D+0.750Lr+0.450W+H	1.718	n/a	0.0	0.6042	0.6042	n/a	n/a		0.352
X-X, +D+0.750S+0.450W+H	1.718	n/a	0.0	0.5849	0.5849	n/a	n/a		0.341
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.3509	0.3509	n/a	n/a		0.204
X-X, +D+0.70E+0.60H	1.718	n/a	0.0	1.623	1.623	n/a	n/a		0.945
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	0.0	1.662	1.662	n/a	n/a		0.968
X-X, +0.60D+0.70E+H	1.718	n/a	0.0	1.389	1.389	n/a	n/a		0.809
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	0.5849	0.5849		0.341
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	0.9834	0.9834		0.573
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	0.6106	0.6106		0.356
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	0.5849	0.5849		0.341
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	0.9031	0.9031		0.526
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	0.8838	0.8838		0.515
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	0.5849	0.5849		0.341
Z-Z, +D+0.750Lr+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.6042	0.6042		0.352
Z-Z, +D+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.5849	0.5849		0.341
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.3509	0.3509		0.204
Z-Z, +D+0.70E+0.60H	1.718	0.0	n/a	n/a	n/a	1.623	1.623		0.945
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	0.0	n/a	n/a	n/a	1.662	1.662		0.968
Z-Z, +0.60D+0.70E+H	1.718	0.0	n/a	n/a	n/a	1.389	1.389		0.809

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+1.60H	1.302	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.40D+1.60H	1.302	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.763	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.763	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

Footings 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+1.60L+0.50S+1.60H	2.730	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60L+0.50S+1.60H	2.730	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.229	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	2.229	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.220	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.220	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	2.125	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	2.125	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.116	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.116	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.157	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	2.157	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.125	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	2.125	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	0.8370	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	0.8370	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	5.877	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	5.877	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	4.590	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	4.590	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	1.302	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	1.302	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.763	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.763	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	2.730	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	2.730	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.229	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	2.229	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.220	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.220	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.125	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	2.125	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.116	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.116	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.157	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	2.157	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.125	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	2.125	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	0.8370	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	0.8370	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	5.877	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	5.877	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	4.590	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	4.590	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	2.83 psi	2.83 psi	2.83 psi	2.83 psi	2.83 psi	75.00 psi	0.04	OK
+1.20D+0.50Lr+1.60L+1.60H	6.00 psi	6.00 psi	6.00 psi	6.00 psi	6.00 psi	75.00 psi	0.08	OK
+1.20D+1.60L+0.50S+1.60H	5.93 psi	5.93 psi	5.93 psi	5.93 psi	5.93 psi	75.00 psi	0.08	OK
+1.20D+1.60Lr+L+1.60H	4.84 psi	4.84 psi	4.84 psi	4.84 psi	4.84 psi	75.00 psi	0.06	OK
+1.20D+1.60Lr+0.50W+1.60H	2.65 psi	2.65 psi	2.65 psi	2.65 psi	2.65 psi	75.00 psi	0.04	OK
+1.20D+L+1.60S+1.60H	4.62 psi	4.62 psi	4.62 psi	4.62 psi	4.62 psi	75.00 psi	0.06	OK
+1.20D+1.60S+0.50W+1.60H	2.43 psi	2.43 psi	2.43 psi	2.43 psi	2.43 psi	75.00 psi	0.03	OK
+1.20D+0.50Lr+L+W+1.60H	4.69 psi	4.69 psi	4.69 psi	4.69 psi	4.69 psi	75.00 psi	0.06	OK
+1.20D+L+0.50S+W+1.60H	4.62 psi	4.62 psi	4.62 psi	4.62 psi	4.62 psi	75.00 psi	0.06	OK
+0.90D+W+1.60H	1.82 psi	1.82 psi	1.82 psi	1.82 psi	1.82 psi	75.00 psi	0.02	OK
+1.20D+L+0.20S+E+1.90H	12.77 psi	12.77 psi	12.77 psi	12.77 psi	12.77 psi	75.00 psi	0.17	OK
+0.90D+E+0.90H	9.97 psi	9.97 psi	9.97 psi	9.97 psi	9.97 psi	75.00 psi	0.13	OK

DESCRIPTION: FTG6 (FBM16,FBM26)

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	10.67 psi	150.00psi	0.07111	OK
+1.20D+0.50Lr+1.60L+1.60H	22.63 psi	150.00psi	0.1509	OK
+1.20D+1.60L+0.50S+1.60H	22.36 psi	150.00psi	0.1491	OK
+1.20D+1.60Lr+L+1.60H	18.26 psi	150.00psi	0.1217	OK
+1.20D+1.60Lr+0.50W+1.60H	9.99 psi	150.00psi	0.06663	OK
+1.20D+L+1.60S+1.60H	17.41 psi	150.00psi	0.116	OK
+1.20D+1.60S+0.50W+1.60H	9.14 psi	150.00psi	0.06095	OK
+1.20D+0.50Lr+L+W+1.60H	17.67 psi	150.00psi	0.1178	OK
+1.20D+L+0.50S+W+1.60H	17.41 psi	150.00psi	0.116	OK
+0.90D+W+1.60H	6.86 psi	150.00psi	0.04571	OK
+1.20D+L+0.20S+E+1.90H	48.15 psi	150.00psi	0.321	OK
+0.90D+E+0.90H	37.60 psi	150.00psi	0.2506	OK

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	=	60.0	ksi
Ec : Concrete Elastic Modulus	=	3,122.0	ksi
Concrete Density	=	145.0	pcf
φ Values Flexure	=	0.90	
Shear	=	0.750	

Soil Design Values

Allowable Soil Bearing	=	1.50	ksf
Increase Bearing By Footing Weight	=	Yes	
Soil Passive Resistance (for Sliding)	=	100.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.50 : 1
Min. Sliding Safety Factor	=	1.50 : 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

Increases based on footing Depth

Footing base depth below soil surface	=	1.50	ft
Allow press. increase per foot of depth	=		ksf
when footing base is below	=		ft

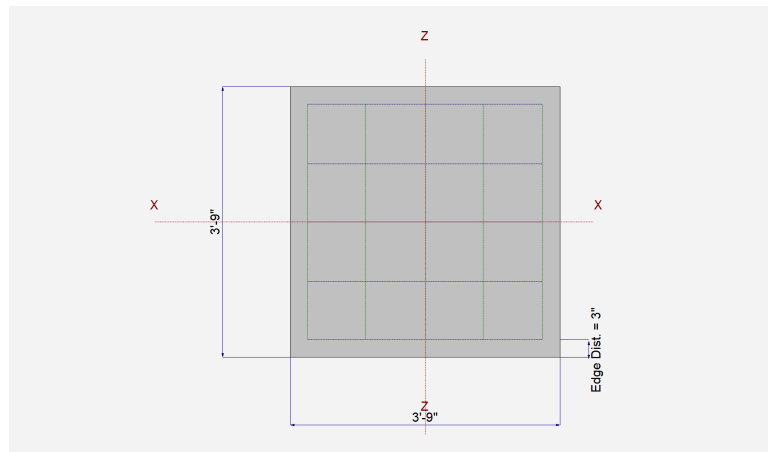
Increases based on footing plan dimension

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

Dimensions

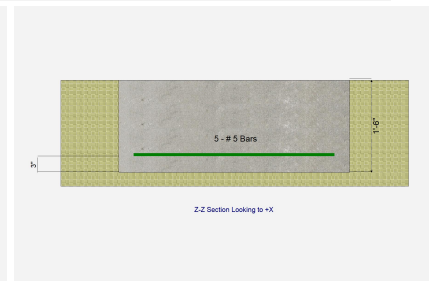
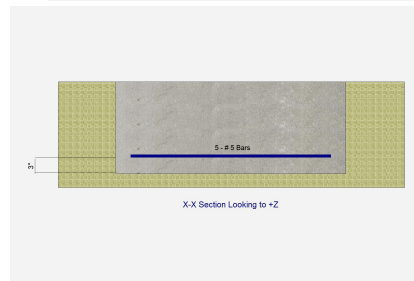
Width parallel to X-X Axis	=	3.750 ft
Length parallel to Z-Z Axis	=	3.750 ft
Footing Thickness	=	18.0 in

Pedestal dimensions...	=	in
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	=		5.0
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis	=		
Number of Bars	=		5.0
Reinforcing Bar Size	=	#	5
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	=	3.920	2.990			23.270	k
OB : Overburden	=						k ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9636	Soil Bearing	1.655 ksf	1.718 ksf	+D+0.70E+0.60H 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	0.1434	Z Flexure (+X)	3.871 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1434	Z Flexure (-X)	3.871 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1434	X Flexure (+Z)	3.871 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1434	X Flexure (-Z)	3.871 k-ft/ft	26.996 k-ft/ft	+1.20D+L+0.20S+E+1.90H
PASS	0.1040	1-way Shear (+X)	7.798 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1040	1-way Shear (-X)	7.798 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1040	1-way Shear (+Z)	7.798 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.1040	1-way Shear (-Z)	7.798 psi	75.0 psi	+1.20D+L+0.20S+E+1.90H
PASS	0.2028	2-way Punching	30.427 psi	150.0 psi	+1.20D+L+0.20S+E+1.90H

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+H	1.718	n/a	0.0	0.4963	0.4963	n/a	n/a	0.289
X-X, +D+L+H	1.718	n/a	0.0	0.7089	0.7089	n/a	n/a	0.413
X-X, +D+Lr+H	1.718	n/a	0.0	0.4963	0.4963	n/a	n/a	0.289
X-X, +D+S+H	1.718	n/a	0.0	0.4963	0.4963	n/a	n/a	0.289
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	0.6557	0.6557	n/a	n/a	0.382
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	0.6557	0.6557	n/a	n/a	0.382
X-X, +D+0.60W+H	1.718	n/a	0.0	0.4963	0.4963	n/a	n/a	0.289
X-X, +D+0.750Lr+0.450W+H	1.718	n/a	0.0	0.4963	0.4963	n/a	n/a	0.289
X-X, +D+0.750S+0.450W+H	1.718	n/a	0.0	0.4963	0.4963	n/a	n/a	0.289
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.2978	0.2978	n/a	n/a	0.173
X-X, +D+0.70E+0.60H	1.718	n/a	0.0	1.655	1.655	n/a	n/a	0.964
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	0.0	1.524	1.524	n/a	n/a	0.887
X-X, +0.60D+0.70E+H	1.718	n/a	0.0	1.456	1.456	n/a	n/a	0.848
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	0.4963	0.4963	0.289
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	0.7089	0.7089	0.413
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	0.4963	0.4963	0.289
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	0.4963	0.4963	0.289
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	0.6557	0.6557	0.382
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	0.6557	0.6557	0.382
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	0.4963	0.4963	0.289
Z-Z, +D+0.750Lr+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.4963	0.4963	0.289
Z-Z, +D+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	0.4963	0.4963	0.289
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.2978	0.2978	0.173
Z-Z, +D+0.70E+0.60H	1.718	0.0	n/a	n/a	n/a	1.655	1.655	0.964
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	0.0	n/a	n/a	n/a	1.524	1.524	0.887
Z-Z, +0.60D+0.70E+H	1.718	0.0	n/a	n/a	n/a	1.456	1.456	0.848

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+1.60H	0.6860	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.40D+1.60H	0.6860	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.186	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	1.186	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

Footings 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+1.60L+0.50S+1.60H	1.186	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60L+0.50S+1.60H	1.186	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.9618	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	0.9618	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.5880	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	0.5880	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	0.9618	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	0.9618	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.5880	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	0.5880	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.9618	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	0.9618	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.9618	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	0.9618	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	0.4410	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	0.4410	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	3.871	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	3.871	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	3.350	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	3.350	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	0.6860	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	0.6860	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.186	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	1.186	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.186	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	1.186	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.9618	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	0.9618	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.5880	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	0.5880	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.9618	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	0.9618	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.5880	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	0.5880	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.9618	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	0.9618	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.9618	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	0.9618	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	0.4410	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	0.4410	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	3.871	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	3.871	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	3.350	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	3.350	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	1.38 psi	1.38 psi	1.38 psi	1.38 psi	1.38 psi	75.00 psi	0.02	OK
+1.20D+0.50Lr+1.60L+1.60H	2.39 psi	2.39 psi	2.39 psi	2.39 psi	2.39 psi	75.00 psi	0.03	OK
+1.20D+1.60L+0.50S+1.60H	2.39 psi	2.39 psi	2.39 psi	2.39 psi	2.39 psi	75.00 psi	0.03	OK
+1.20D+1.60Lr+L+1.60H	1.94 psi	1.94 psi	1.94 psi	1.94 psi	1.94 psi	75.00 psi	0.03	OK
+1.20D+1.60Lr+0.50W+1.60H	1.19 psi	1.19 psi	1.19 psi	1.19 psi	1.19 psi	75.00 psi	0.02	OK
+1.20D+L+1.60S+1.60H	1.94 psi	1.94 psi	1.94 psi	1.94 psi	1.94 psi	75.00 psi	0.03	OK
+1.20D+1.60S+0.50W+1.60H	1.19 psi	1.19 psi	1.19 psi	1.19 psi	1.19 psi	75.00 psi	0.02	OK
+1.20D+0.50Lr+L+W+1.60H	1.94 psi	1.94 psi	1.94 psi	1.94 psi	1.94 psi	75.00 psi	0.03	OK
+1.20D+L+0.50S+W+1.60H	1.94 psi	1.94 psi	1.94 psi	1.94 psi	1.94 psi	75.00 psi	0.03	OK
+0.90D+W+1.60H	0.89 psi	0.89 psi	0.89 psi	0.89 psi	0.89 psi	75.00 psi	0.01	OK
+1.20D+L+0.20S+E+1.90H	7.80 psi	7.80 psi	7.80 psi	7.80 psi	7.80 psi	75.00 psi	0.10	OK
+0.90D+E+0.90H	6.75 psi	6.75 psi	6.75 psi	6.75 psi	6.75 psi	75.00 psi	0.09	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	5.39 psi	150.00psi	0.03595	OK
+1.20D+0.50Lr+1.60L+1.60H	9.32 psi	150.00psi	0.06216	OK
+1.20D+1.60L+0.50S+1.60H	9.32 psi	150.00psi	0.06216	OK
+1.20D+1.60Lr+L+1.60H	7.56 psi	150.00psi	0.0504	OK
+1.20D+1.60Lr+0.50W+1.60H	4.62 psi	150.00psi	0.03082	OK
+1.20D+L+1.60S+1.60H	7.56 psi	150.00psi	0.0504	OK
+1.20D+1.60S+0.50W+1.60H	4.62 psi	150.00psi	0.03082	OK
+1.20D+0.50Lr+L+W+1.60H	7.56 psi	150.00psi	0.0504	OK
+1.20D+L+0.50S+W+1.60H	7.56 psi	150.00psi	0.0504	OK
+0.90D+W+1.60H	3.47 psi	150.00psi	0.02311	OK
+1.20D+L+0.20S+E+1.90H	30.43 psi	150.00psi	0.2028	OK
+0.90D+E+0.90H	26.33 psi	150.00psi	0.1756	OK

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
f _y : Rebar Yield	=	60.0	ksi
E _c : 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	=	1.50	: 1
Min. Sliding Safety Factor	=	1.50	: 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
Increase Bearing By Footing Weight	=	Yes	
Soil Passive Resistance (for Sliding)	=	100.0	pcf
Soil/Concrete Friction Coeff.	=	0.30	

Increases based on footing Depth

Footing base depth below soil surface	=	1.50	ft
Allow press. increase per foot of depth when footing base is below	=		ksf

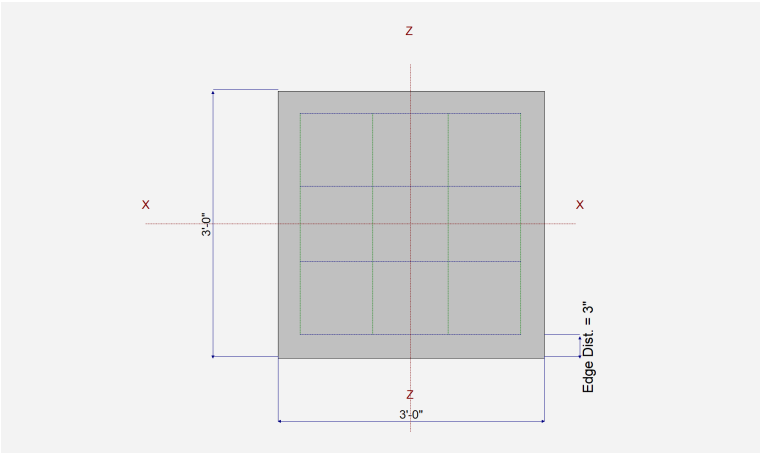
Increases based on footing plan dimension

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

Dimensions

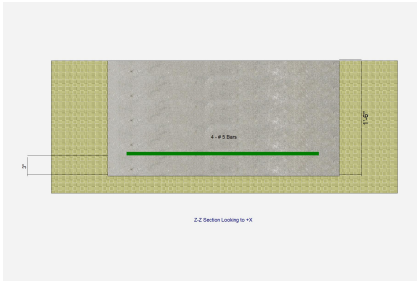
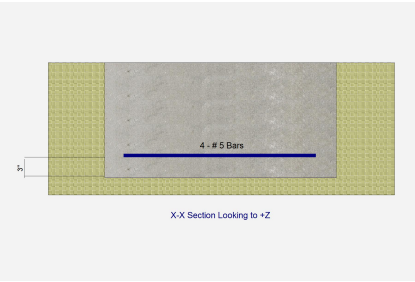
Width parallel to X-X Axis	=	3.0	ft
Length parallel to Z-Z Axis	=	3.0	ft
Footing Thickness	=	18.0	in

Pedestal dimensions...	=		in
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	=	4.0	
Number of Bars	=	#	5
Reinforcing Bar Size	=		
Bars parallel to Z-Z Axis	=	4.0	
Number of Bars	=	#	5
Reinforcing Bar Size	=		
Bandwidth Distribution Check (ACI 15.4.4.2)			
Direction Requiring Closer Separation			
# Bars required within zone		n/a	
# Bars required on each side of zone		n/a	



Applied Loads

	D	L _r	L	S	W	E	H
P : Column Load	=	7.98	0.250	4.040		0.690	k
OB : Overburden	=						ksf
M-xx	=						k-ft
M-zz	=						k-ft
V-x	=						k
V-z	=						k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9042	Soil Bearing	1.553 ksf	1.718 ksf	+D+L+H 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	0.07485	Z Flexure (+X)	2.021 k-ft/ft	26.996 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.07485	Z Flexure (-X)	2.021 k-ft/ft	26.996 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.07485	X Flexure (+Z)	2.021 k-ft/ft	26.996 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.07485	X Flexure (-Z)	2.021 k-ft/ft	26.996 k-ft/ft	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.03193	1-way Shear (+X)	2.395 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.03193	1-way Shear (-X)	2.395 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.03193	1-way Shear (+Z)	2.395 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.03193	1-way Shear (-Z)	2.395 psi	75.0 psi	+1.20D+0.50Lr+1.60L+1.60H
PASS	0.09862	2-way Punching	14.793 psi	150.0 psi	+1.20D+0.50Lr+1.60L+1.60H

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location		Left, -X		Actual / Allow Ratio
				Bottom, -Z	Top, +Z		Right, +X	
X-X, +D+H	1.718	n/a	0.0	1.104	1.104	n/a	n/a	0.643
X-X, +D+L+H	1.718	n/a	0.0	1.553	1.553	n/a	n/a	0.904
X-X, +D+Lr+H	1.718	n/a	0.0	1.132	1.132	n/a	n/a	0.659
X-X, +D+S+H	1.718	n/a	0.0	1.104	1.104	n/a	n/a	0.643
X-X, +D+0.750Lr+0.750L+H	1.718	n/a	0.0	1.462	1.462	n/a	n/a	0.851
X-X, +D+0.750L+0.750S+H	1.718	n/a	0.0	1.441	1.441	n/a	n/a	0.839
X-X, +D+0.60W+H	1.718	n/a	0.0	1.104	1.104	n/a	n/a	0.643
X-X, +D+0.750Lr+0.450W+H	1.718	n/a	0.0	1.125	1.125	n/a	n/a	0.655
X-X, +D+0.750S+0.450W+H	1.718	n/a	0.0	1.104	1.104	n/a	n/a	0.643
X-X, +0.60D+0.60W+0.60H	1.718	n/a	0.0	0.6625	0.6625	n/a	n/a	0.386
X-X, +D+0.70E+0.60H	1.718	n/a	0.0	1.158	1.158	n/a	n/a	0.674
X-X, +D+0.750L+0.750S+0.5250E+H	1.718	n/a	0.0	1.481	1.481	n/a	n/a	0.862
X-X, +0.60D+0.70E+H	1.718	n/a	0.0	0.7162	0.7162	n/a	n/a	0.417
Z-Z, +D+H	1.718	0.0	n/a	n/a	n/a	1.104	1.104	0.643
Z-Z, +D+L+H	1.718	0.0	n/a	n/a	n/a	1.553	1.553	0.904
Z-Z, +D+Lr+H	1.718	0.0	n/a	n/a	n/a	1.132	1.132	0.659
Z-Z, +D+S+H	1.718	0.0	n/a	n/a	n/a	1.104	1.104	0.643
Z-Z, +D+0.750Lr+0.750L+H	1.718	0.0	n/a	n/a	n/a	1.462	1.462	0.851
Z-Z, +D+0.750L+0.750S+H	1.718	0.0	n/a	n/a	n/a	1.441	1.441	0.839
Z-Z, +D+0.60W+H	1.718	0.0	n/a	n/a	n/a	1.104	1.104	0.643
Z-Z, +D+0.750Lr+0.450W+H	1.718	0.0	n/a	n/a	n/a	1.125	1.125	0.655
Z-Z, +D+0.750S+0.450W+H	1.718	0.0	n/a	n/a	n/a	1.104	1.104	0.643
Z-Z, +0.60D+0.60W+0.60H	1.718	0.0	n/a	n/a	n/a	0.6625	0.6625	0.386
Z-Z, +D+0.70E+0.60H	1.718	0.0	n/a	n/a	n/a	1.158	1.158	0.674
Z-Z, +D+0.750L+0.750S+0.5250E+H	1.718	0.0	n/a	n/a	n/a	1.481	1.481	0.862
Z-Z, +0.60D+0.70E+H	1.718	0.0	n/a	n/a	n/a	0.7162	0.7162	0.417

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+1.60H	1.397	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.40D+1.60H	1.397	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.021	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+1.60L+1.60H	2.021	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

Footings 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+1.60L+0.50S+1.60H	2.005	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60L+0.50S+1.60H	2.005	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.752	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+L+1.60H	1.752	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.247	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60Lr+0.50W+1.60H	1.247	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	1.702	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+1.60S+1.60H	1.702	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.197	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+1.60S+0.50W+1.60H	1.197	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	1.718	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+0.50Lr+L+W+1.60H	1.718	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.702	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.50S+W+1.60H	1.702	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	0.8978	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+W+1.60H	0.8978	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	1.788	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +1.20D+L+0.20S+E+1.90H	1.788	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	0.9840	+Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
X-X, +0.90D+E+0.90H	0.9840	-Z	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	1.397	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.40D+1.60H	1.397	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.021	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+1.60L+1.60H	2.021	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	2.005	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60L+0.50S+1.60H	2.005	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.752	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+L+1.60H	1.752	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.247	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60Lr+0.50W+1.60H	1.247	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	1.702	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+1.60S+1.60H	1.702	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.197	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+1.60S+0.50W+1.60H	1.197	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	1.718	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+0.50Lr+L+W+1.60H	1.718	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.702	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.50S+W+1.60H	1.702	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	0.8978	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+W+1.60H	0.8978	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	1.788	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +1.20D+L+0.20S+E+1.90H	1.788	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	0.9840	-X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK
Z-Z, +0.90D+E+0.90H	0.9840	+X	Bottom	0.3888	Min Temp %	0.4133	26.996	OK

One Way Shear

Load Combination...	Vu @ -X	Vu @ +X	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	1.66 psi	1.66 psi	1.66 psi	1.66 psi	1.66 psi	75.00 psi	0.02	OK
+1.20D+0.50Lr+1.60L+1.60H	2.40 psi	2.40 psi	2.40 psi	2.40 psi	2.40 psi	75.00 psi	0.03	OK
+1.20D+1.60L+0.50S+1.60H	2.38 psi	2.38 psi	2.38 psi	2.38 psi	2.38 psi	75.00 psi	0.03	OK
+1.20D+1.60Lr+L+1.60H	2.08 psi	2.08 psi	2.08 psi	2.08 psi	2.08 psi	75.00 psi	0.03	OK
+1.20D+1.60Lr+0.50W+1.60H	1.48 psi	1.48 psi	1.48 psi	1.48 psi	1.48 psi	75.00 psi	0.02	OK
+1.20D+L+1.60S+1.60H	2.02 psi	2.02 psi	2.02 psi	2.02 psi	2.02 psi	75.00 psi	0.03	OK
+1.20D+1.60S+0.50W+1.60H	1.42 psi	1.42 psi	1.42 psi	1.42 psi	1.42 psi	75.00 psi	0.02	OK
+1.20D+0.50Lr+L+W+1.60H	2.04 psi	2.04 psi	2.04 psi	2.04 psi	2.04 psi	75.00 psi	0.03	OK
+1.20D+L+0.50S+W+1.60H	2.02 psi	2.02 psi	2.02 psi	2.02 psi	2.02 psi	75.00 psi	0.03	OK
+0.90D+W+1.60H	1.06 psi	1.06 psi	1.06 psi	1.06 psi	1.06 psi	75.00 psi	0.01	OK
+1.20D+L+0.20S+E+1.90H	2.12 psi	2.12 psi	2.12 psi	2.12 psi	2.12 psi	75.00 psi	0.03	OK
+0.90D+E+0.90H	1.17 psi	1.17 psi	1.17 psi	1.17 psi	1.17 psi	75.00 psi	0.02	OK

Two-Way "Punching" Shear

All units k

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D+1.60H	10.22 psi	150.00psi	0.06816	OK
+1.20D+0.50Lr+1.60L+1.60H	14.79 psi	150.00psi	0.09862	OK
+1.20D+1.60L+0.50S+1.60H	14.68 psi	150.00psi	0.09786	OK
+1.20D+1.60Lr+L+1.60H	12.83 psi	150.00psi	0.08551	OK
+1.20D+1.60Lr+0.50W+1.60H	9.13 psi	150.00psi	0.06086	OK
+1.20D+L+1.60S+1.60H	12.46 psi	150.00psi	0.08307	OK
+1.20D+1.60S+0.50W+1.60H	8.76 psi	150.00psi	0.05842	OK
+1.20D+0.50Lr+L+W+1.60H	12.58 psi	150.00psi	0.08383	OK
+1.20D+L+0.50S+W+1.60H	12.46 psi	150.00psi	0.08307	OK
+0.90D+W+1.60H	6.57 psi	150.00psi	0.04382	OK
+1.20D+L+0.20S+E+1.90H	13.09 psi	150.00psi	0.08728	OK
+0.90D+E+0.90H	7.20 psi	150.00psi	0.04803	OK

S-2.2

DESCRIPTION: FBM7

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor D

Load Combination :ASCE 7-16

Wood Species : iLevel Truss Joist

Wood Grade : Parallam PSL 2.2E

Beam Bracing : Beam bracing is defined as a set spacing over all spans

Fb + 2,900.0 psi

Fb - 2,900.0 psi

Fc - Prll 2,900.0 psi

Fc - Perp 750.0 psi

Fv 290.0 psi

Ft 2,025.0 psi

E : Modulus of Elasticity

Ebend- xx 2,200.0ksi

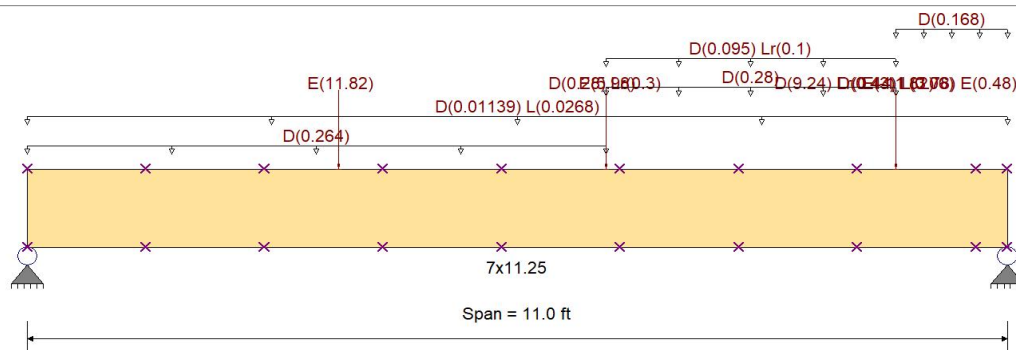
Eminbend - xx 1,118.19ksi

Density 45.070pcf

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support

Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.0160 ksf, Extent = 0.0 --> 6.50 ft, Tributary Width = 16.50 ft, (From wall above)

Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 0.670 ft, (From Floor)

Uniform Load : D = 0.0160 ksf, Extent = 6.50 --> 9.750 ft, Tributary Width = 17.50 ft, (From wall above)

Point Load : D = 0.280, Lr = 0.30 k @ 6.50 ft, (From HDR-2)

Point Load : E = 5.980 k @ 6.50 ft, (From roof level shear wall above H-2x2.5)

Uniform Load : D = 0.0190, Lr = 0.020 ksf, Extent = 6.50 --> 9.750 ft, Tributary Width = 5.0 ft, (roof)

Point Load : E = -11.820 k @ 9.750 ft, (From roof level shear wall above H-2x2.5)

Uniform Load : D = 0.0160 ksf, Extent = 9.750 --> 11.0 ft, Tributary Width = 10.50 ft, (From wall above)

Point Load : D = 0.430, L = 0.060 k @ 9.750 ft, (FROM FBM29)

Point Load : D = 9.240, Lr = 0.440, L = 3.780, E = 0.480 k @ 9.750 ft, (From wFBM3)

Point Load : E = 11.820 k @ 3.50 ft, (From Roof deck level shear wall above H-2x2.5)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.576	1	Maximum Shear Stress Ratio	=	0.734	: 1
Section used for this span		7x11.25		Section used for this span		7x11.25	
fb: Actual	=	3,605.42	psi	fv: Actual	=	276.04	psi
Fb: Allowable	=	6,256.51	psi	Fv: Allowable	=	375.84	psi
Load Combination	+1.20D+L+0.20S+E+1.90H			Load Combination	+1.40D+1.60H		
Location of maximum on span	=	3.934	ft	Location of maximum on span	=	10.077	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.311	in	Ratio = 424	>=360			
Max Upward Transient Deflection	0.000	in	Ratio = 0	<360			
Max Downward Total Deflection	0.368	in	Ratio = 358	>=240			
Max Upward Total Deflection	0.000	in	Ratio = 0	<240			

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	9.403	14.091
Overall MINimum	9.217	-2.757
+D+H	2.951	10.540
+D+L+H	3.535	14.091
+D+Lr+H	3.209	11.347
+D+S+H	2.951	10.540
+D+0.750Lr+0.750L+H	3.582	13.809
+D+0.750L+0.750S+H	3.389	13.203
+D+0.60W+H	2.951	10.540
+D+0.750Lr+0.450W+H	3.144	11.146
+D+0.750S+0.450W+H	2.951	10.540
+0.60D+0.60W+0.60H	1.771	6.324
+D+0.70E+0.60H	9.403	8.610
+D+0.750L+0.750S+0.5250E+H	8.228	11.756
+0.60D+0.70E+H	8.222	4.394
D Only	2.951	10.540
Lr Only	0.258	0.807
L Only	0.584	3.551
E Only	9.217	-2.757
H Only		

DESCRIPTION: FBM8

CODE REFERENCES

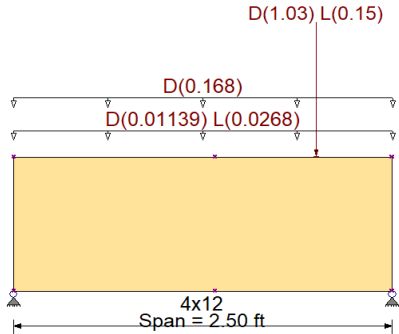
Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	1,000.0 psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	Fb -	1,000.0 psi	Ebend- xx	1,700.0ksi
		Fc - Prll	1,500.0 psi	Eminbend - xx	620.0ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625.0 psi		
Wood Grade :	No.1	Fv	180.0 psi		
		Ft	675.0 psi		
Beam Bracing :	Beam bracing is defined as a set spacing over all spans			Density	31.210pcf

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 0.670 ft, (From Floor)
Uniform Load : D = 0.0160 ksf, Tributary Width = 10.50 ft, (From wall above)
Point Load : D = 1.030, L = 0.150 k @ 2.0 ft, (From DBM2)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.081	1	Maximum Shear Stress Ratio	=	0.061	1
Section used for this span		4x12		Section used for this span		4x12	
fb: Actual	=	115.11	psi	fv: Actual	=	14.19	psi
Fb: Allowable	=	1,423.09	psi	Fv: Allowable	=	233.28	psi
Load Combination		+1.40D+1.60H		Load Combination		+1.40D+1.60H	
Location of maximum on span	=	1.998	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		0.000	in	Ratio =		0	<360
Max Upward Transient Deflection		0.000	in	Ratio =		0	<360
Max Downward Total Deflection		0.001	in	Ratio =		36924	>=240
Max Upward Total Deflection		0.000	in	Ratio =		0	<240

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.504	1.212
Overall MINimum	0.064	0.154
+D+H	0.441	1.059
+D+L+H	0.504	1.212
+D+Lr+H	0.441	1.059
+D+S+H	0.441	1.059
+D+0.750Lr+0.750L+H	0.489	1.174
+D+0.750L+0.750S+H	0.489	1.174
+D+0.60W+H	0.441	1.059

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750Lr+0.450W+H	0.441	1.059
+D+0.750S+0.450W+H	0.441	1.059
+0.60D+0.60W+0.60H	0.265	0.635
+D+0.70E+0.60H	0.441	1.059
+D+0.750L+0.750S+0.5250E+H	0.489	1.174
+0.60D+0.70E+H	0.265	0.635
D Only	0.441	1.059
L Only	0.064	0.154
H Only		

DESCRIPTION: FBM9

CODE REFERENCES

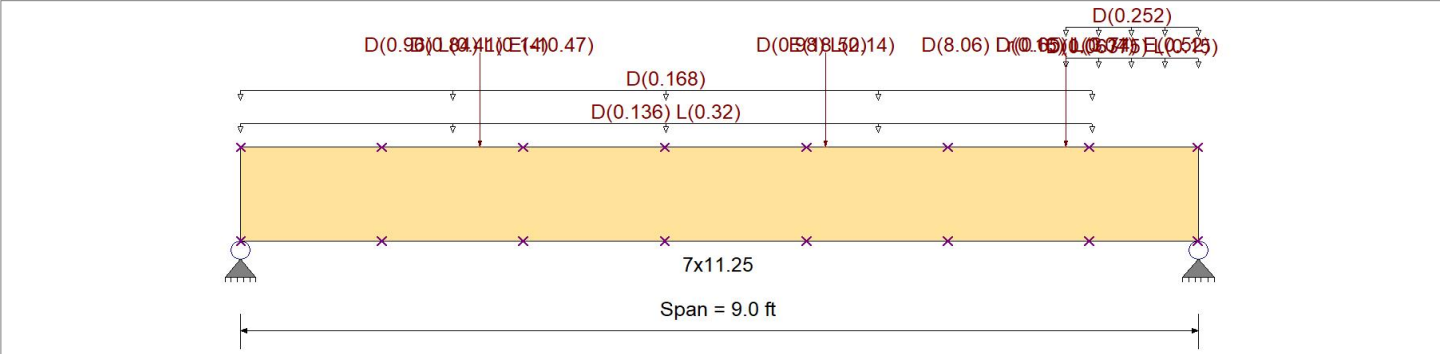
Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	2,900.0	psi	E : Modulus of Elasticity	
Load Combination	ASCE 7-16	Fb -	2,900.0	psi	Ebend- xx	2,200.0ksi
		Fc - Prll	2,900.0	psi	Eminbend - xx	1,118.19ksi
Wood Species	iLevel Truss Joist	Fc - Perp	750.0	psi		
Wood Grade	Parallam PSL 2.2E	Fv	290.0	psi		
		Ft	2,025.0	psi	Density	45.070pcf
Beam Bracing	Beam bracing is defined as a set spacing over all spans					

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1

- Uniform Load : D = 0.0170, L = 0.040 ksf, Extent = 0.0 --> 8.0 ft, Tributary Width = 8.0 ft, (From Floor)
- Uniform Load : D = 0.0160 ksf, Extent = 0.0 --> 8.0 ft, Tributary Width = 10.50 ft, (From wall above)
- Point Load : D = 0.840, L = 0.140 k @ 2.250 ft, (From FBM29)
- Uniform Load : D = 0.0170, L = 0.040 ksf, Extent = 7.750 --> 9.0 ft, Tributary Width = 3.750 ft, (From floor)
- Uniform Load : D = 0.0160 ksf, Extent = 7.750 --> 9.0 ft, Tributary Width = 15.750 ft, (From wall above)
- Point Load : D = 0.980, L = 0.140 k @ 5.50 ft, (From FBM29)
- Point Load : D = 0.160, L = 0.040 k @ 7.750 ft, (From FBM29)
- Point Load : D = 8.060, Lr = 0.650, L = 3.740, E = 0.520 k @ 7.750 ft, (From WFBM4)
- Point Load : E = 18.520 k @ 5.50 ft, (From roof deck shear wall aboveH-1x2.5)
- Point Load : D = 0.960, L = 0.410, E = -10.470 k @ 2.250 ft, (FromFBM27)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.691 : 1	Maximum Shear Stress Ratio	=	0.762 : 1
Section used for this span		7x11.25	Section used for this span		7x11.25
fb: Actual	=	4,324.89psi	fv: Actual	=	477.11 psi
Fb: Allowable	=	6,256.39psi	Fv: Allowable	=	626.40 psi
Load Combination	+1.20D+L+0.20S+E+1.90H		Load Combination	+1.20D+L+0.20S+E+1.90H	
Location of maximum on span	=	5.485ft	Location of maximum on span	=	8.080 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.153 in	Ratio = 703 >=360			
Max Upward Transient Deflection	0.000 in	Ratio = 0 <360			
Max Downward Total Deflection	0.228 in	Ratio = 473 >=240			
Max Upward Total Deflection	0.000 in	Ratio = 0 <240			

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	6.789	18.082
Overall MINimum	-0.578	9.148
+D+H	4.362	9.686
+D+L+H	6.789	14.477
+D+Lr+H	4.452	10.246
+D+S+H	4.362	9.686
+D+0.750Lr+0.750L+H	6.250	13.699
+D+0.750L+0.750S+H	6.183	13.279
+D+0.60W+H	4.362	9.686
+D+0.750Lr+0.450W+H	4.430	10.106
+D+0.750S+0.450W+H	4.362	9.686
+0.60D+0.60W+0.60H	2.617	5.812
+D+0.70E+0.60H	3.958	16.090
+D+0.750L+0.750S+0.5250E+H	5.879	18.082
+0.60D+0.70E+H	2.213	12.215
D Only	4.362	9.686
Lr Only	0.090	0.560
L Only	2.427	4.790
E Only	-0.578	9.148
H Only		

DESCRIPTION: FBM16

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor D

Load Combination : ASCE 7-16

Wood Species : iLevel Truss Joist

Wood Grade : Parallam PSL 2.2E

Beam Bracing : Beam bracing is defined as a set spacing over all spans

Fb + 2,900.0 psi

Fb - 2,900.0 psi

Fc - Prll 2,900.0 psi

Fc - Perp 750.0 psi

Fv 290.0 psi

Ft 2,025.0 psi

E : Modulus of Elasticity

Ebend- xx 2,200.0 ksi

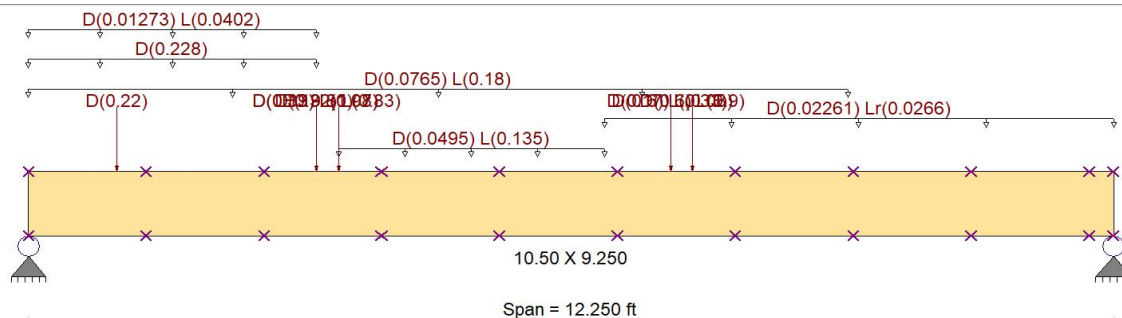
Eminbend - xx 1,118.19 ksi

Density 45.070 pcf

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support

Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.0220, L = 0.060 ksf, Extent = 3.50 --> 6.50 ft, Tributary Width = 2.250 ft, (From Floor deck)

Uniform Load : D = 0.0170, Lr = 0.020 ksf, Extent = 6.50 --> 12.250 ft, Tributary Width = 1.330 ft, (From ROOF DECK)

Uniform Load : D = 0.0170, L = 0.040 ksf, Extent = 0.0 --> 9.250 ft, Tributary Width = 4.50 ft, (From Floor)

Uniform Load : D = 0.0160 ksf, Extent = 0.0 --> 3.250 ft, Tributary Width = 14.250 ft, (From wall above)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 0.0 --> 3.250 ft, Tributary Width = 0.670 ft, (From roof deck)

Point Load : D = 0.190, L = 0.070 k @ 3.250 ft, (From HDR4)

Point Load : E = 19.810 k @ 3.250 ft, (shear wall from above)

Point Load : D = 0.330, L = 0.980 k @ 3.250 ft, (From FBM6)

Point Load : D = 0.320, L = 0.830 k @ 3.50 ft, (From FBM25)

Point Load : D = 0.170, L = 0.080 k @ 7.250 ft, (From HDR4)

Point Load : D = 0.60, L = 0.330 k @ 7.250 ft, (From fbm15)

Point Load : D = 0.60, L = 0.90 k @ 7.50 ft, (FROM DBL and HDR-4A)

Point Load : D = 0.220 k @ 1.0 ft, (From FBM33)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.829	1	Maximum Shear Stress Ratio	=	0.510	: 1
Section used for this span		10.50 X 9.250		Section used for this span		10.50 X 9.250	
fb: Actual	=	5,192.17 psi		fv: Actual	=	319.38 psi	
Fb: Allowable	=	6,264.00 psi		Fv: Allowable	=	626.40 psi	
Load Combination		+1.20D+L+0.20S+E+1.90H		Load Combination		+1.20D+L+0.20S+E+1.90H	
Location of maximum on span	=	3.264 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		0.634 in	Ratio =	231	>=	231	
Max Upward Transient Deflection		-0.634 in	Ratio =	231	>=	231	
Max Downward Total Deflection		0.611 in	Ratio =	240	>=	240	
Max Upward Total Deflection		-0.361 in	Ratio =	407	>=	240	

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	-14.554	6.137
Overall MINimum	-14.554	-5.256
+D+H	2.783	1.788
+D+L+H	6.053	3.908
+D+Lr+H	2.819	1.905
+D+S+H	2.783	1.788
+D+0.750Lr+0.750L+H	5.263	3.466
+D+0.750L+0.750S+H	5.236	3.378
+D+0.60W+H	2.783	1.788
+D+0.750Lr+0.450W+H	2.810	1.875
+D+0.750S+0.450W+H	2.783	1.788
+0.60D+0.60W+0.60H	1.670	1.073
+D+0.70E+0.60H	12.971	5.467
+D-0.70E+0.60H	-7.405	-1.891
+D+0.750L+0.750S+0.5250E+H	12.877	6.137
+D+0.750L+0.750S-0.5250E+H	-2.405	0.619
+0.60D+0.70E+H	11.858	4.752
+0.60D-0.70E+H	-8.518	-2.606
D Only	2.783	1.788
Lr Only	0.036	0.117
L Only	3.270	2.121
E Only	14.554	5.256
E Only * -1.0	-14.554	-5.256
H Only		

DESCRIPTION: FBM19

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor D

Load Combination :ASCE 7-16

Wood Species : iLevel Truss Joist

Wood Grade : Parallam PSL 2.2E

Beam Bracing : Beam bracing is defined as a set spacing over all spans

Fb + 2,900.0 psi

Fb - 2,900.0 psi

Fc - Prll 2,900.0 psi

Fc - Perp 750.0 psi

Fv 290.0 psi

Ft 2,025.0 psi

E : Modulus of Elasticity

Ebend- xx 2,200.0ksi

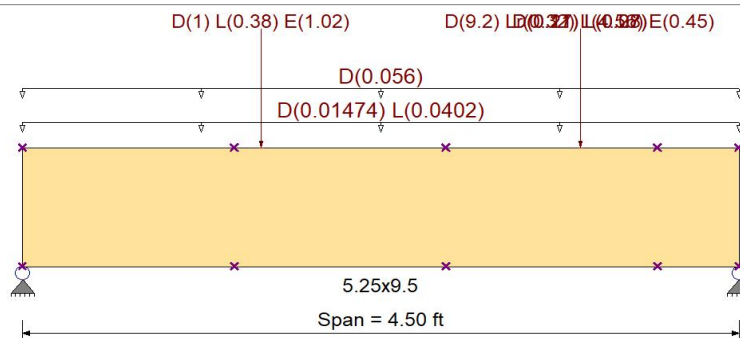
Eminbend - xx 1,118.19ksi

Density 45.070pcf

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support

Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads

Uniform Load : D = 0.0220, L = 0.060 ksf, Tributary Width = 0.670 ft, (From floor deck)

Uniform Load : D = 0.0160 ksf, Tributary Width = 3.50 ft, (Wall above)

Point Load : D = 0.170, L = 0.080 k @ 3.50 ft, (From HDR4)

Point Load : D = 1.0, L = 0.380, E = 1.020 k @ 1.50 ft, (From FBM18)

Point Load : D = 9.20, Lr = 0.320, L = 4.560, E = 0.450 k @ 3.50 ft, (From WFBM3)

Point Load : D = 0.210, L = 0.270 k @ 3.50 ft, (From FBM24)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.488	1	Maximum Shear Stress Ratio	=	0.962	: 1
Section used for this span		5.25x9.5		Section used for this span		5.25x9.5	
fb: Actual	=	2,441.39psi		fv: Actual	=	481.93 psi	
Fb: Allowable	=	5,003.95psi		Fv: Allowable	=	501.12 psi	
Load Combination	+1.20D+0.50Lr+1.60L+1.60H			Load Combination	+1.20D+0.50Lr+1.60L+1.60H		
Location of maximum on span	=	3.498ft		Location of maximum on span	=	3.712 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.014 in	Ratio = 3822 >=360				
Max Upward Transient Deflection		0.000 in	Ratio = 0 <360				
Max Downward Total Deflection		0.043 in	Ratio = 1266 >=240				
Max Upward Total Deflection		0.000 in	Ratio = 0 <240				

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.476	12.015
Overall MINimum	0.780	0.690
+D+H	2.990	7.979
+D+L+H	4.425	12.015
+D+Lr+H	3.061	8.228
+D+S+H	2.990	7.979

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750Lr+0.750L+H	4.119	11.192
+D+0.750L+0.750S+H	4.066	11.006
+D+0.60W+H	2.990	7.979
+D+0.750Lr+0.450W+H	3.043	8.165
+D+0.750S+0.450W+H	2.990	7.979
+0.60D+0.60W+0.60H	1.794	4.787
+D+0.70E+0.60H	3.536	8.462
+D+0.750L+0.750S+0.5250E+H	4.476	11.368
+0.60D+0.70E+H	2.340	5.270
D Only	2.990	7.979
Lr Only	0.071	0.249
L Only	1.435	4.036
E Only	0.780	0.690
H Only		

DESCRIPTION: FBM20A

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor D

Load Combination :ASCE 7-16

Wood Species : iLevel Truss Joist

Wood Grade : Parallam PSL 2.2E

Beam Bracing : Beam bracing is defined as a set spacing over all spans

Fb + 2,900.0 psi

Fb - 2,900.0 psi

Fc - Prll 2,900.0 psi

Fc - Perp 750.0 psi

Fv 290.0 psi

Ft 2,025.0 psi

E : Modulus of Elasticity

Ebend- xx 2,200.0 ksi

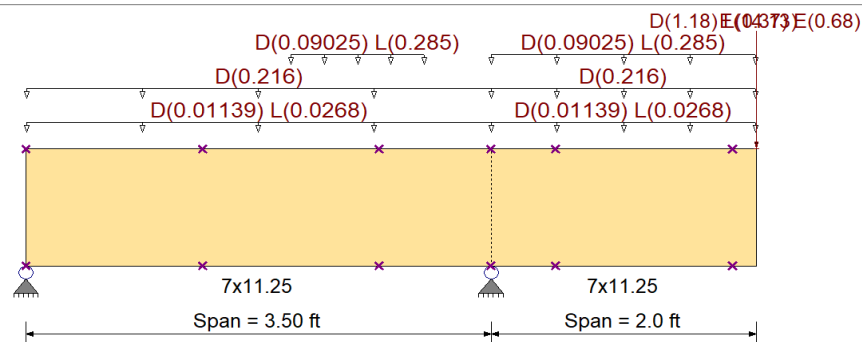
Eminbend - xx 1,118.19 ksi

Density 45.070 pcf

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support

Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 0.670 ft, (From floor)

Uniform Load : D = 0.0160 ksf, Tributary Width = 13.50 ft, (FROM WALL ABOVE)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 2.0 --> 3.0 ft, Tributary Width = 4.750 ft, (From Roof deck)

Load for Span Number 2

Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 0.670 ft, (From floor)

Uniform Load : D = 0.0160 ksf, Tributary Width = 13.50 ft, (FROM WALL ABOVE)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 0.0 --> 2.0 ft, Tributary Width = 4.750 ft, (From Roof deck)

Point Load : D = 1.180, L = 0.370, E = 0.680 k @ 2.0 ft, (From FBM18)

Point Load : E = 14.130 k @ 2.0 ft, (From shear wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.450	1	Maximum Shear Stress Ratio	=	0.528	1
Section used for this span		7x11.25		Section used for this span		7x11.25	
fb: Actual	=	2,814.95 psi		fv: Actual	=	330.88 psi	
Fb: Allowable	=	6,259.29 psi		Fv: Allowable	=	626.40 psi	
Load Combination		+1.20D+L+0.20S+E+1.90H, LL Comb Ru		Load Combination		+1.20D+L+0.20S+E+1.90H, LL Comb Ru	
Location of maximum on span	=	3.500 ft		Location of maximum on span	=	3.500 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.103 in	Ratio = 468 >= 360				
Max Upward Transient Deflection		-0.022 in	Ratio = 1894 >= 360				
Max Downward Total Deflection		0.081 in	Ratio = 590 >= 240				
Max Upward Total Deflection		-0.017 in	Ratio = 2429 >= 240				

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXIMUM	-8.463	23.273	

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MINimum	-0.403	23.273	
+D+H	-0.403	3.240	
+D+L+H, LL Comb Run (*L)	-0.793	4.623	
+D+L+H, LL Comb Run (L*)	-0.275	3.490	
+D+L+H, LL Comb Run (LL)	-0.664	4.874	
+D+Lr+H, LL Comb Run (*L)	-0.403	3.240	
+D+Lr+H, LL Comb Run (L*)	-0.403	3.240	
+D+Lr+H, LL Comb Run (LL)	-0.403	3.240	
+D+S+H	-0.403	3.240	
+D+0.750Lr+0.750L+H, LL Comb Run (*)	-0.695	4.277	
+D+0.750Lr+0.750L+H, LL Comb Run (L	-0.307	3.428	
+D+0.750Lr+0.750L+H, LL Comb Run (L	-0.599	4.465	
+D+0.750L+0.750S+H, LL Comb Run (*L	-0.695	4.277	
+D+0.750L+0.750S+H, LL Comb Run (L*	-0.307	3.428	
+D+0.750L+0.750S+H, LL Comb Run (LL	-0.599	4.465	
+D+0.60W+H	-0.403	3.240	
+D+0.750Lr+0.450W+H, LL Comb Run (*)	-0.403	3.240	
+D+0.750Lr+0.450W+H, LL Comb Run (L	-0.403	3.240	
+D+0.750Lr+0.450W+H, LL Comb Run (L	-0.403	3.240	
+D+0.750S+0.450W+H	-0.403	3.240	
+0.60D+0.60W+0.60H	-0.242	1.944	
+D+0.70E+0.60H	-6.327	19.531	
+D+0.750L+0.750S+0.5250E+H, LL Comb	-5.138	16.496	
+D+0.750L+0.750S+0.5250E+H, LL Comb	-4.750	15.646	
+D+0.750L+0.750S+0.5250E+H, LL Comb	-5.042	16.683	
+0.60D+0.70E+H	-6.166	18.235	
D Only	-0.403	3.240	
L Only, LL Comb Run (*L)	-0.390	1.383	
L Only, LL Comb Run (L*)	0.128	0.250	
L Only, LL Comb Run (LL)	-0.261	1.634	
E Only	-8.463	23.273	
H Only			

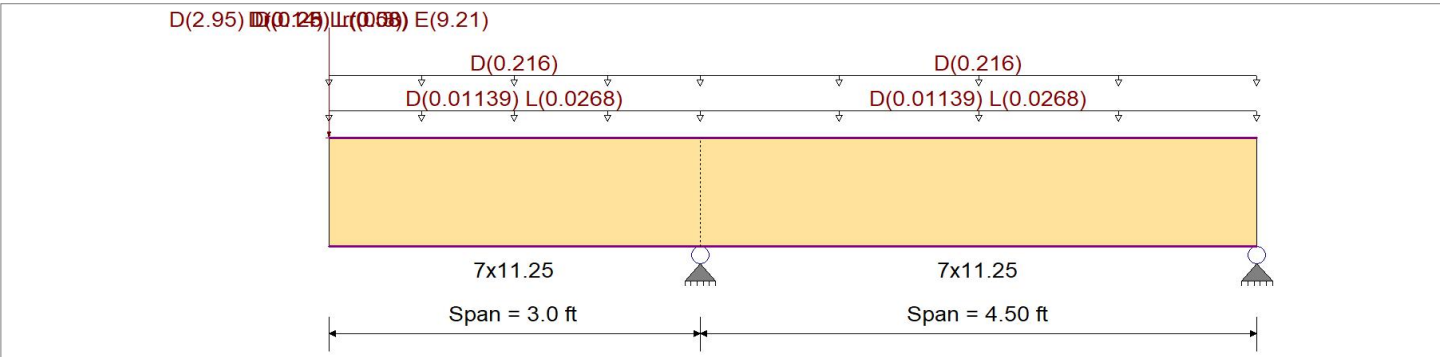
DESCRIPTION: FBM20

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	2,900.0	psi	E : Modulus of Elasticity	
Load Combination	ASCE 7-16	Fb -	2,900.0	psi	Ebend- xx	2,200.0ksi
		Fc - Prll	2,900.0	psi	Eminbend - xx	1,118.19ksi
Wood Species	iLevel Truss Joist	Fc - Perp	750.0	psi		
Wood Grade	Parallam PSL 2.2E	Fv	290.0	psi		
		Ft	2,025.0	psi	Density	45.070pcf
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 loads

Load for Span Number 1

- Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 0.670 ft, (From floor)
- Point Load : D = 0.280, Lr = 0.30 k @ 0.0 ft, (From HDR2)
- Point Load : D = 0.140, Lr = 0.080 k @ 0.0 ft, (From HDR3)
- Uniform Load : D = 0.0160 ksf, Tributary Width = 13.50 ft, (From wall)
- Point Load : D = 2.950, Lr = 0.250, L = 0.580, E = 9.210 k @ 0.0 ft, (From FBM7)

Load for Span Number 2

- Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 0.670 ft, (From floor)
- Uniform Load : D = 0.0160 ksf, Tributary Width = 13.50 ft, (FROM WALL ABOVE)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.558	1	Maximum Shear Stress Ratio	=	0.441	: 1
Section used for this span		7x11.25		Section used for this span		7x11.25	
fb: Actual	=	3,493.27 psi		fv: Actual	=	276.54 psi	
Fb: Allowable	=	6,264.00psi		Fv: Allowable	=	626.40 psi	
Load Combination		+1.20D+L+0.20S+E+1.90H, LL Comb Ru		Load Combination		+1.20D+L+0.20S+E+1.90H, LL Comb Ru	
Location of maximum on span	=	3.000ft		Location of maximum on span	=	2.078 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.196 in	Ratio = 366	>=360			
Max Upward Transient Deflection		-0.034 in	Ratio = 1568	>=360			
Max Downward Total Deflection		0.214 in	Ratio = 336	>=240			
Max Upward Total Deflection		-0.037 in	Ratio = 1464	>=240			

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		17.937	-6.230
Overall MINimum		15.350	-1.932
+D+H		7.192	-1.932
+D+L+H, LL Comb Run (*L)		7.252	-1.871
+D+L+H, LL Comb Run (L*)		8.266	-2.345
+D+L+H, LL Comb Run (LL)		8.326	-2.285

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
+D+Lr+H, LL Comb Run (*L)		7.192	-1.932
+D+Lr+H, LL Comb Run (L*)		8.242	-2.352
+D+Lr+H, LL Comb Run (LL)		8.242	-2.352
+D+S+H		7.192	-1.932
+D+0.750Lr+0.750L+H, LL Comb Run (*)		7.237	-1.886
+D+0.750Lr+0.750L+H, LL Comb Run (L		8.785	-2.557
+D+0.750Lr+0.750L+H, LL Comb Run (L		8.830	-2.511
+D+0.750L+0.750S+H, LL Comb Run (*L		7.237	-1.886
+D+0.750L+0.750S+H, LL Comb Run (L*		7.997	-2.242
+D+0.750L+0.750S+H, LL Comb Run (LL		8.043	-2.196
+D+0.60W+H		7.192	-1.932
+D+0.750Lr+0.450W+H, LL Comb Run (*)		7.192	-1.932
+D+0.750Lr+0.450W+H, LL Comb Run (L		7.979	-2.247
+D+0.750Lr+0.450W+H, LL Comb Run (L		7.979	-2.247
+D+0.750S+0.450W+H		7.192	-1.932
+0.60D+0.60W+0.60H		4.315	-1.159
+D+0.70E+0.60H		17.937	-6.230
+D+0.750L+0.750S+0.5250E+H, LL Comb		15.296	-5.110
+D+0.750L+0.750S+0.5250E+H, LL Comb		16.056	-5.465
+D+0.750L+0.750S+0.5250E+H, LL Comb		16.101	-5.420
+0.60D+0.70E+H		15.060	-5.457
D Only		7.192	-1.932
Lr Only, LL Comb Run (L*)		1.050	-0.420
Lr Only, LL Comb Run (LL)		1.050	-0.420
L Only, LL Comb Run (*L)		0.060	0.060
L Only, LL Comb Run (L*)		1.074	-0.413
L Only, LL Comb Run (LL)		1.134	-0.353
E Only		15.350	-6.140
H Only			

DESCRIPTION: WFBM21

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor Design

Beam Bracing : Beam bracing is defined as a set spacing over all spans

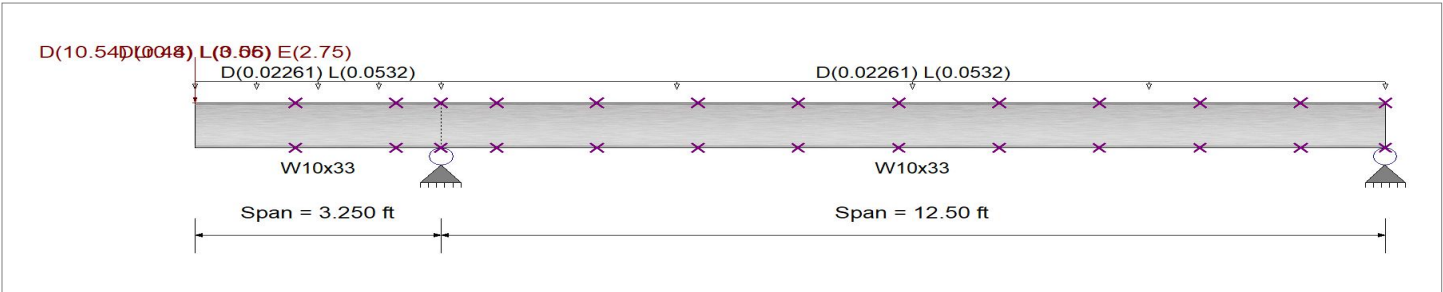
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi

E: Modulus : 29,000.0 ksi

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 1.330 ft, (From floor)

Point Load : D = 10.540, Lr = 0.80, L = 3.550, E = 2.750 k @ 0.0 ft, (From FBM-7)

Point Load : D = 0.440, L = 0.060 k @ 0.0 ft, (From FBM-8)

Load for Span Number 2
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 1.330 ft, (From floor)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.441 : 1	Maximum Shear Stress Ratio =	0.235 : 1
Section used for this span	W10x33	Section used for this span	W10x33
Mu : Applied	64.125 k-ft	Vu : Applied	19.926 k
Mn * Phi : Allowable	145.500 k-ft	Vn * Phi : Allowable	84.651 k
Load Combination+1.20D+L+0.20S+E+1.90H, LL Comb Run (L*)		Load Combination+1.20D+L+0.20S+E+1.90H, LL Comb Run (LL)	
Location of maximum on span	3.250 ft	Location of maximum on span	3.250 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.071 in	Ratio =	1,092 >=360
Max Upward Transient Deflection	-0.042 in	Ratio =	3,537 >=360
Max Downward Total Deflection	0.290 in	Ratio =	269 >=240
Max Upward Total Deflection	-0.169 in	Ratio =	886 >=240

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.2903	0.000	+D+0.750L+0.750S+0.5250E+H	0.0000	0.000
	2	0.0000	0.000		-0.1693	5.250

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		20.013	-3.627
Overall MINimum		0.333	-0.208
+D+H		14.387	-2.531
+D+L+H, LL Comb Run (*L)		14.719	-2.198
+D+L+H, LL Comb Run (L*)		19.131	-3.492

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
+D+L+H, LL Comb Run (LL)		19.463	-3.159
+D+Lr+H, LL Comb Run (*L)		14.387	-2.531
+D+Lr+H, LL Comb Run (L*)		15.395	-2.739
+D+Lr+H, LL Comb Run (LL)		15.395	-2.739
+D+S+H		14.387	-2.531
+D+0.750Lr+0.750L+H, LL Comb Run (*)		14.636	-2.281
+D+0.750Lr+0.750L+H, LL Comb Run (L		18.701	-3.408
+D+0.750Lr+0.750L+H, LL Comb Run (L		18.950	-3.158
+D+0.750L+0.750S+H, LL Comb Run (*L		14.636	-2.281
+D+0.750L+0.750S+H, LL Comb Run (L'		17.945	-3.252
+D+0.750L+0.750S+H, LL Comb Run (LI		18.194	-3.002
+D+0.60W+H		14.387	-2.531
+D+0.750Lr+0.450W+H, LL Comb Run ('		14.387	-2.531
+D+0.750Lr+0.450W+H, LL Comb Run (I		15.143	-2.687
+D+0.750Lr+0.450W+H, LL Comb Run (I		15.143	-2.687
+D+0.750S+0.450W+H		14.387	-2.531
+0.60D+0.60W+0.60H		8.632	-1.518
+D+0.70E+0.60H		16.812	-3.031
+D+0.750L+0.750S+0.5250E+H, LL Corr		16.455	-2.657
+D+0.750L+0.750S+0.5250E+H, LL Corr		19.764	-3.627
+D+0.750L+0.750S+0.5250E+H, LL Corr		20.013	-3.378
+0.60D+0.70E+H		11.057	-2.019
D Only		14.387	-2.531
Lr Only, LL Comb Run (L*)		1.008	-0.208
Lr Only, LL Comb Run (LL)		1.008	-0.208
L Only, LL Comb Run (*L)		0.333	0.333
L Only, LL Comb Run (L*)		4.744	-0.961
L Only, LL Comb Run (LL)		5.076	-0.629
E Only		3.465	-0.715
H Only			

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor Design

Beam Bracing : Beam bracing is defined as a set spacing over all spans

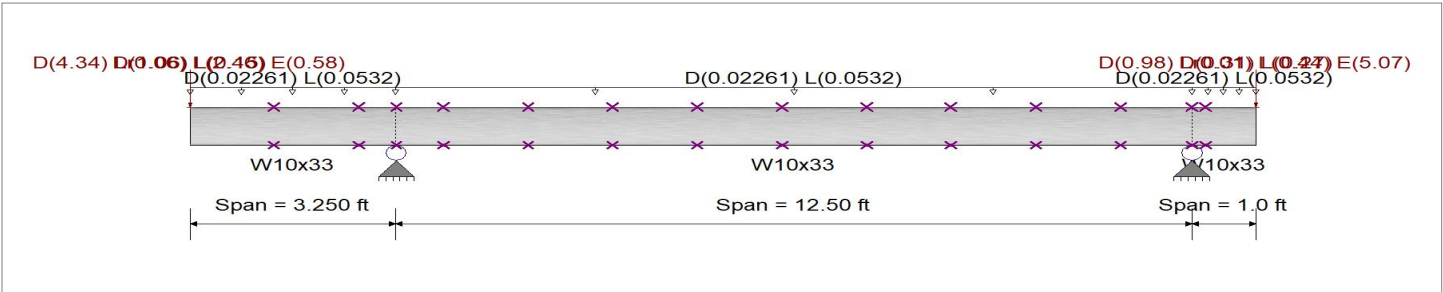
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi

E: Modulus : 29,000.0 ksi

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 1.330 ft, (From floor)

Point Load : D = 4.340, Lr = 0.060, L = 2.460, E = 0.580 k @ 0.0 ft, (From FBM-9)

Point Load : D = 1.060, L = 0.150 k @ 0.0 ft, (From FBM-8)

Load for Span Number 2
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 1.330 ft, (From floor)

Load for Span Number 3
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 1.330 ft, (From floor)

Point Load : D = 0.310, L = 0.270 k @ 1.0 ft, (FROM FBM24)

Point Load : D = 0.980, Lr = 0.010, L = 0.440, E = 5.070 k @ 1.0 ft, (FROM FBM26)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.244 : 1	Maximum Shear Stress Ratio =	0.132 : 1
Section used for this span	W10x33	Section used for this span	W10x33
Mu : Applied	35.531 k-ft	Vu : Applied	11.180 k
Mn * Phi : Allowable	145.500 k-ft	Vn * Phi : Allowable	84.651 k
Load Combination	1.2D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL)	Load Combination	1.2D+0.50Lr+1.60L+1.60H, LL Comb Run (LLL)
Location of maximum on span	3.250 ft	Location of maximum on span	3.250 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.054 in	Ratio =	1,449 >=360
Max Upward Transient Deflection	-0.033 in	Ratio =	4,477 >=360
Max Downward Total Deflection	0.158 in	Ratio =	494 >=240
Max Upward Total Deflection	-0.099 in	Ratio =	1519 >=240

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.1579	0.000		0.0000	0.000

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	2	0.0000	0.000	+D+0.750L+0.750S+0.5250E+H	-0.0988	5.583
+D+0.750L+0.750S+0.5250E+H	3	0.0240	1.000		0.0000	5.583

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum		11.067	5.325	
Overall MINimum		-0.001	0.003	
+D+H		7.250	0.371	
+D+L+H, LL Comb Run (**L)		7.191	1.193	
+D+L+H, LL Comb Run (*L*)		7.583	0.704	
+D+L+H, LL Comb Run (*LL)		7.524	1.526	
+D+L+H, LL Comb Run (L**)		10.734	-0.330	
+D+L+H, LL Comb Run (L*L)		10.675	0.492	
+D+L+H, LL Comb Run (LL*)		11.067	0.003	
+D+L+H, LL Comb Run (LLL)		11.008	0.825	
+D+Lr+H, LL Comb Run (**L)		7.250	0.382	
+D+Lr+H, LL Comb Run (*L*)		7.250	0.371	
+D+Lr+H, LL Comb Run (*LL)		7.250	0.382	
+D+Lr+H, LL Comb Run (L**)		7.326	0.356	
+D+Lr+H, LL Comb Run (L*L)		7.325	0.366	
+D+Lr+H, LL Comb Run (LL*)		7.326	0.356	
+D+Lr+H, LL Comb Run (LLL)		7.325	0.366	
+D+S+H		7.250	0.371	
+D+0.750Lr+0.750L+H, LL Comb Run (*)		7.206	0.996	
+D+0.750Lr+0.750L+H, LL Comb Run (*)		7.500	0.620	
+D+0.750Lr+0.750L+H, LL Comb Run (*)		7.455	1.245	
+D+0.750Lr+0.750L+H, LL Comb Run (L		9.920	-0.166	
+D+0.750Lr+0.750L+H, LL Comb Run (L		9.875	0.458	
+D+0.750Lr+0.750L+H, LL Comb Run (L		10.169	0.083	
+D+0.750Lr+0.750L+H, LL Comb Run (L		10.125	0.708	
+D+0.750L+0.750S+H, LL Comb Run (**		7.206	0.988	
+D+0.750L+0.750S+H, LL Comb Run (*L		7.500	0.620	
+D+0.750L+0.750S+H, LL Comb Run (*L		7.456	1.237	
+D+0.750L+0.750S+H, LL Comb Run (L ⁺		9.863	-0.155	
+D+0.750L+0.750S+H, LL Comb Run (L ⁺		9.819	0.462	
+D+0.750L+0.750S+H, LL Comb Run (LI		10.113	0.095	
+D+0.750L+0.750S+H, LL Comb Run (LI		10.069	0.711	
+D+0.60W+H		7.250	0.371	
+D+0.750Lr+0.450W+H, LL Comb Run (†		7.250	0.379	
+D+0.750Lr+0.450W+H, LL Comb Run (†		7.250	0.371	
+D+0.750Lr+0.450W+H, LL Comb Run (†		7.250	0.379	
+D+0.750Lr+0.450W+H, LL Comb Run (I		7.307	0.359	
+D+0.750Lr+0.450W+H, LL Comb Run (I		7.306	0.368	
+D+0.750Lr+0.450W+H, LL Comb Run (I		7.307	0.359	
+D+0.750Lr+0.450W+H, LL Comb Run (I		7.306	0.368	
+D+0.750S+0.450W+H		7.250	0.371	
+0.60D+0.60W+0.60H		4.350	0.223	
+D+0.70E+0.60H		7.478	4.098	
+D+0.750L+0.750S+0.5250E+H, LL Corr		7.377	3.783	
+D+0.750L+0.750S+0.5250E+H, LL Corr		7.670	3.416	
+D+0.750L+0.750S+0.5250E+H, LL Corr		7.626	4.033	
+D+0.750L+0.750S+0.5250E+H, LL Corr		10.034	2.641	
+D+0.750L+0.750S+0.5250E+H, LL Corr		9.990	3.257	
+D+0.750L+0.750S+0.5250E+H, LL Corr		10.283	2.890	
+D+0.750L+0.750S+0.5250E+H, LL Corr		10.239	3.507	
+0.60D+0.70E+H		4.578	3.950	
D Only		7.250	0.371	
Lr Only, LL Comb Run (**L)		-0.001	0.011	
Lr Only, LL Comb Run (*LL)		-0.001	0.011	
Lr Only, LL Comb Run (L**)		0.076	-0.016	
Lr Only, LL Comb Run (L*L)		0.075	-0.005	
Lr Only, LL Comb Run (LL*)		0.076	-0.016	
Lr Only, LL Comb Run (LLL)		0.075	-0.005	
L Only, LL Comb Run (**L)		-0.059	0.822	

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
L Only, LL Comb Run (*L*)		0.333	0.333	
L Only, LL Comb Run (*LL)		0.274	1.155	
L Only, LL Comb Run (L**)		3.484	-0.701	
L Only, LL Comb Run (L*L)		3.425	0.121	
L Only, LL Comb Run (LL*)		3.816	-0.369	
L Only, LL Comb Run (LLL)		3.758	0.454	
E Only		0.325	5.325	
H Only				

DESCRIPTION: FBM24

CODE REFERENCES

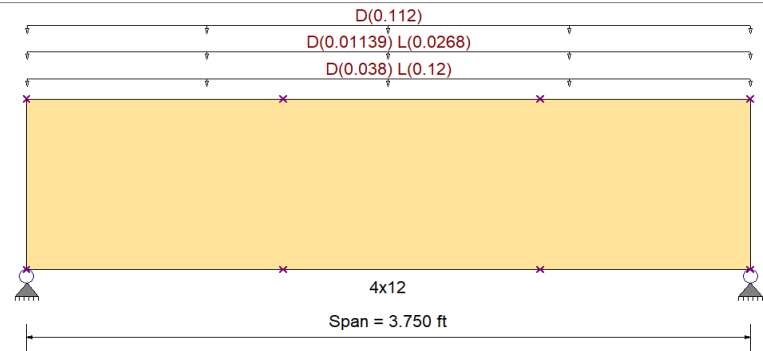
Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor D	Fb +	1000 psi	E : Modulus of Elasticity	
Load Combination :ASCE 7-16	Fb -	1000 psi	Ebend- xx	1700 ksi
	Fc - Prll	1500 psi	Eminbend - xx	620 ksi
Wood Species : Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade : No.1	Fv	180 psi		
	Ft	675 psi		
Beam Bracing : Beam bracing is defined as a set spacing over all spans			Density	31.21 pcf

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0190, L = 0.060 ksf, Tributary Width = 2.0 ft, (From Roof deck)
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 0.670 ft, (From Floor)
Uniform Load : D = 0.0160 ksf, Extent = 0.0 -->> 3.750 ft, Tributary Width = 7.0 ft, (Wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.066	1	Maximum Shear Stress Ratio	=	0.051	: 1
Section used for this span		4x12		Section used for this span		4x12	
fb: Actual	=	125.37	psi	fv: Actual	=	15.79	psi
Fb: Allowable	=	1,895.69	psi	Fv: Allowable	=	311.04	psi
Load Combination		+1.20D+0.50Lr+1.60L+1.60H		Load Combination		+1.20D+0.50Lr+1.60L+1.60H	
Location of maximum on span	=	1.875	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		0.000	in	Ratio =		0	<360
Max Upward Transient Deflection		0.000	in	Ratio =		0	<360
Max Downward Total Deflection		0.002	in	Ratio =		22412	>=240
Max Upward Total Deflection		0.000	in	Ratio =		0	<240

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.594	0.594
Overall MINimum	0.275	0.275
+D+H	0.319	0.319
+D+L+H	0.594	0.594
+D+Lr+H	0.319	0.319
+D+S+H	0.319	0.319
+D+0.750Lr+0.750L+H	0.525	0.525
+D+0.750L+0.750S+H	0.525	0.525
+D+0.60W+H	0.319	0.319

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750Lr+0.450W+H	0.319	0.319
+D+0.750S+0.450W+H	0.319	0.319
+0.60D+0.60W+0.60H	0.191	0.191
+D+0.70E+0.60H	0.319	0.319
+D+0.750L+0.750S+0.5250E+H	0.525	0.525
+0.60D+0.70E+H	0.191	0.191
D Only	0.319	0.319
L Only	0.275	0.275
H Only		

DESCRIPTION: FBM26

CODE REFERENCES

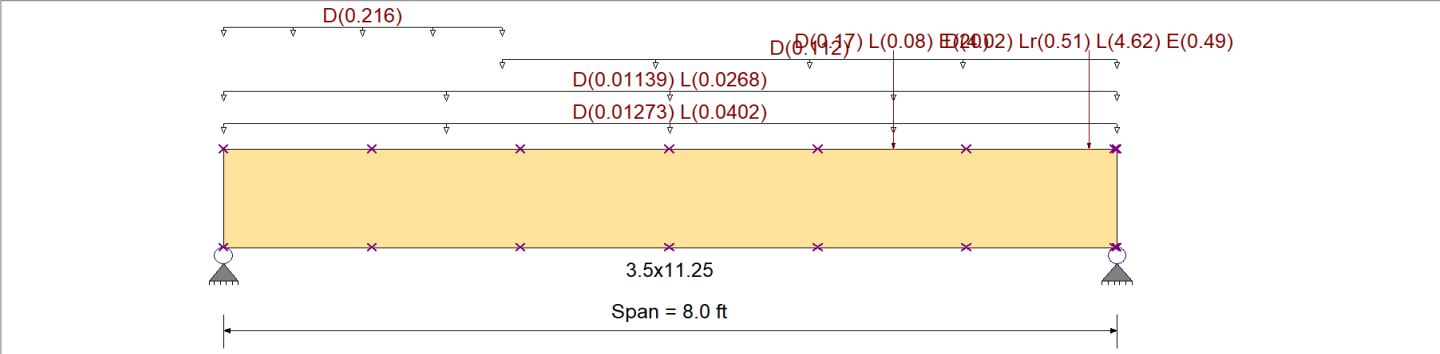
Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	2,900.0	psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	Fb -	2,900.0	psi	Ebend- xx	2,200.0ksi
		Fc - Prll	2,900.0	psi	Eminbend - xx	1,118.19ksi
Wood Species :	iLevel Truss Joist	Fc - Perp	750.0	psi		
Wood Grade :	Parallam PSL 2.2E	Fv	290.0	psi		
		Ft	2,025.0	psi	Density	45.070pcf
Beam Bracing :	Beam bracing is defined as a set spacing over all spans					

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads

- Uniform Load : D = 0.0190, L = 0.060 ksf, Tributary Width = 0.670 ft, (From Roof deck)
- Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 0.670 ft, (From Floor)
- Uniform Load : D = 0.0160 ksf, Extent = 2.50 --> 8.0 ft, Tributary Width = 7.0 ft, (Wall above)
- Uniform Load : D = 0.0160 ksf, Extent = 0.0 --> 2.50 ft, Tributary Width = 13.50 ft, (Wall above)
- Point Load : D = 0.170, L = 0.080, E = 20.0 k @ 6.0 ft, (From HDR4)
- Point Load : D = 4.020, Lr = 0.510, L = 4.620, E = 0.490 k @ 7.75 ft, (From FBM4)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.881	1	Maximum Shear Stress Ratio	=	0.955	1
Section used for this span		3.5x11.25		Section used for this span		3.5x11.25	
fb: Actual	=	5,491.60 psi		fv: Actual	=	598.20 psi	
Fb: Allowable	=	6,232.29 psi		Fv: Allowable	=	626.40 psi	
Load Combination	+1.20D+L+0.20S+E+1.90H			Load Combination	+1.20D+L+0.20S+E+1.90H		
Location of maximum on span	=	5.985 ft		Location of maximum on span	=	7.066 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.284 in	Ratio = 337 >= 337				
Max Upward Transient Deflection		-0.284 in	Ratio = 337 >= 337				
Max Downward Total Deflection		0.226 in	Ratio = 424 >= 240				
Max Upward Total Deflection		-0.183 in	Ratio = 525 >= 240				

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	-5.015	16.383
Overall MINimum	-5.015	-15.475
+D+H	0.981	4.656
+D+L+H	1.414	9.460
+D+Lr+H	0.997	5.150
+D+S+H	0.981	4.656

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750Lr+0.750L+H	1.318	8.630
+D+0.750L+0.750S+H	1.306	8.259
+D+0.60W+H	0.981	4.656
+D+0.750Lr+0.450W+H	0.993	5.027
+D+0.750S+0.450W+H	0.981	4.656
+0.60D+0.60W+0.60H	0.589	2.794
+D+0.70E+0.60H	4.492	15.489
+D-0.70E+0.60H	-2.529	-6.176
+D+0.750L+0.750S+0.5250E+H	3.939	16.383
+D+0.750L+0.750S-0.5250E+H	-1.327	0.135
+0.60D+0.70E+H	4.099	13.626
+0.60D-0.70E+H	-2.922	-8.039
D Only	0.981	4.656
Lr Only	0.016	0.494
L Only	0.432	4.804
E Only	5.015	15.475
E Only * -1.0	-5.015	-15.475
H Only		

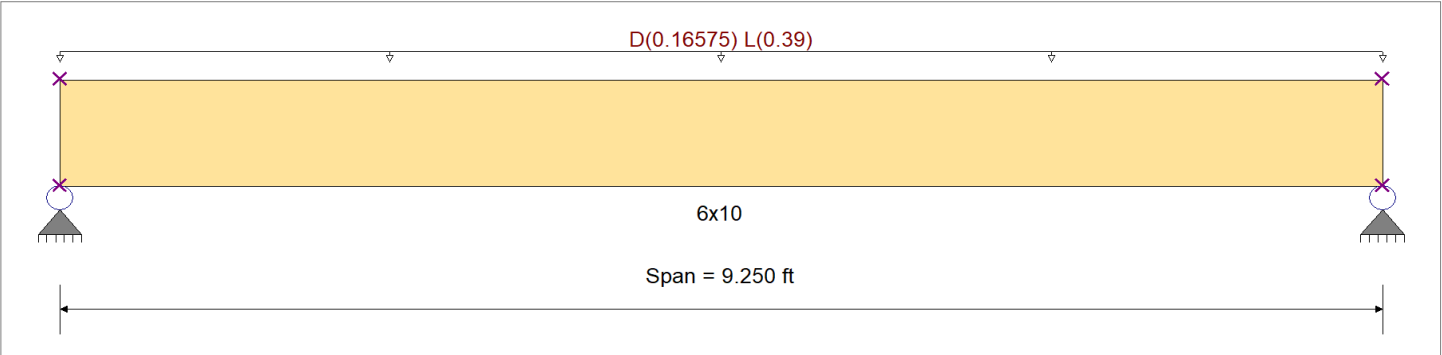
DESCRIPTION: HDR-6

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	1,000.0	psi	E : Modulus of Elasticity	
Load Combination	ASCE 7-16	Fb -	1,000.0	psi	Ebend- xx	1,700.0
		Fc - Prll	1,500.0	psi	Eminbend - xx	620.0
Wood Species :	Douglas Fir-Larch	Fc - Perp	625.0	psi		
Wood Grade :	No.1	Fv	180.0	psi		
		Ft	675.0	psi	Density	31.210
Beam Bracing :	Completely Unbraced					pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 9.750 ft, (From Floor)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.755	1	Maximum Shear Stress Ratio	=	0.297	1
Section used for this span		6x10		Section used for this span		6x10	
fb: Actual	=	1,297.71 psi		fv: Actual	=	92.42 psi	
Fb: Allowable	=	1,718.32 psi		Fv: Allowable	=	311.04 psi	
Load Combination		+1.20D+0.50Lr+1.60L+1.60H		Load Combination		+1.20D+0.50Lr+1.60L+1.60H	
Location of maximum on span	=	4.625 ft		Location of maximum on span	=	8.474 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.097 in	Ratio = 1147			>=360	
Max Upward Transient Deflection		0.000 in	Ratio = 0			<360	
Max Downward Total Deflection		0.141 in	Ratio = 789			>=240	
Max Upward Total Deflection		0.000 in	Ratio = 0			<240	

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.623	2.623
Overall MINimum	1.804	1.804
+D+H	0.819	0.819
+D+L+H	2.623	2.623
+D+Lr+H	0.819	0.819
+D+S+H	0.819	0.819
+D+0.750Lr+0.750L+H	2.172	2.172
+D+0.750L+0.750S+H	2.172	2.172
+D+0.60W+H	0.819	0.819
+D+0.750Lr+0.450W+H	0.819	0.819
+D+0.750S+0.450W+H	0.819	0.819
+0.60D+0.60W+0.60H	0.491	0.491
+D+0.70E+0.60H	0.819	0.819
+D+0.750L+0.750S+0.5250E+H	2.172	2.172

DESCRIPTION: HDR-6

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+0.60D+0.70E+H	0.491	0.491
D Only	0.819	0.819
L Only	1.804	1.804
H Only		

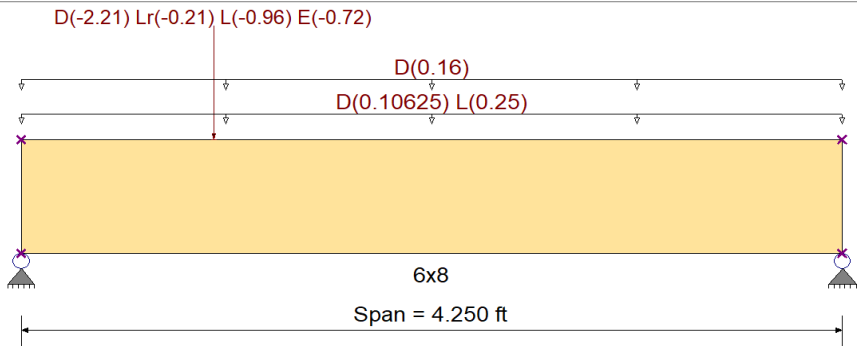
DESCRIPTION: HDR-7

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	1,000.0	psi	E : Modulus of Elasticity	
Load Combination	ASCE 7-16	Fb -	1,000.0	psi	Ebend- xx	1,700.0ksi
		Fc - Prll	1,500.0	psi	Eminbend - xx	620.0ksi
Wood Species	: Douglas Fir-Larch	Fc - Perp	625.0	psi		
Wood Grade	: No.1	Fv	180.0	psi		
		Ft	675.0	psi	Density	31.210pcf
Beam Bracing	: Completely Unbraced					



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 6.250 ft, (From Floor)
Point Load : D = -2.210, Lr = -0.210, L = -0.960, E = -0.720 k @ 1.0 ft, (From FBM21)
Uniform Load : D = 0.0160 ksf, Tributary Width = 10.0 ft, (From wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.311	1	Maximum Shear Stress Ratio	=	0.301	1
Section used for this span		6x8		Section used for this span		6x8	
fb: Actual	=	402.72	psi	fv: Actual	=	70.17	psi
Fb: Allowable	=	1,293.99	psi	Fv: Allowable	=	233.28	psi
Load Combination		+1.40D+1.60H		Load Combination		+1.40D+1.60H	
Location of maximum on span	=	1.008	ft	Location of maximum on span	=	0.993	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.000	in	Ratio =		0	<360
Max Upward Transient Deflection		-0.004	in	Ratio =		12577	>=360
Max Downward Total Deflection		0.000	in	Ratio =		0	<240
Max Upward Total Deflection		-0.009	in	Ratio =		5493	>=240

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	-1.546	0.370
Overall MINimum	-1.105	-0.169
+D+H	-1.105	0.065
+D+L+H	-1.308	0.370
+D+Lr+H	-1.266	0.015
+D+S+H	-1.105	0.065
+D+0.750Lr+0.750L+H	-1.378	0.257
+D+0.750L+0.750S+H	-1.257	0.294
+D+0.60W+H	-1.105	0.065
+D+0.750Lr+0.450W+H	-1.226	0.028
+D+0.750S+0.450W+H	-1.105	0.065
+0.60D+0.60W+0.60H	-0.663	0.039

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.70E+0.60H	-1.491	-0.054
+D+0.750L+0.750S+0.5250E+H	-1.546	0.205
+0.60D+0.70E+H	-1.049	-0.080
D Only	-1.105	0.065
Lr Only	-0.161	-0.049
L Only	-0.203	0.305
E Only	-0.551	-0.169
H Only		

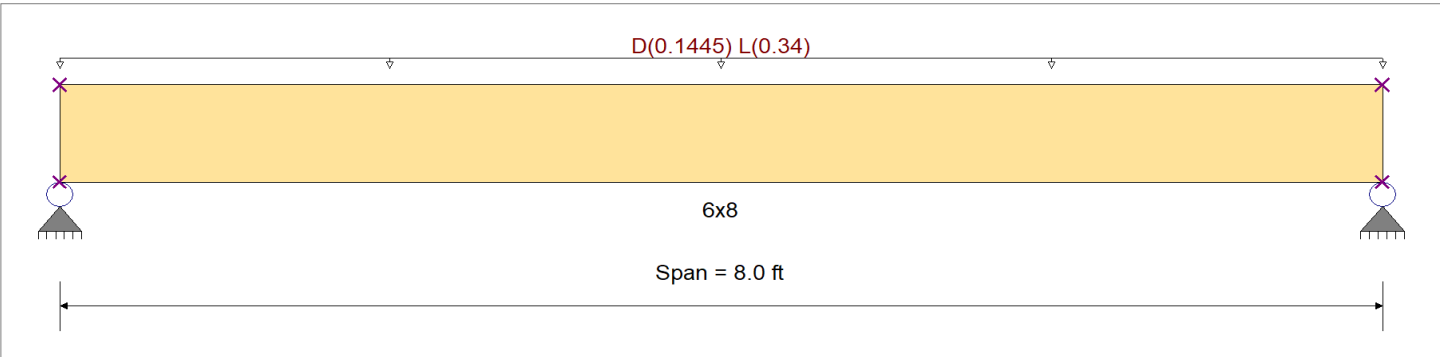
DESCRIPTION: HDR-8

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	1,000.0	psi	E : Modulus of Elasticity	
Load Combination	ASCE 7-16	Fb -	1,000.0	psi	Ebend- xx	1,700.0ksi
		Fc - Prll	1,500.0	psi	Eminbend - xx	620.0ksi
Wood Species	: Douglas Fir-Larch	Fc - Perp	625.0	psi		
Wood Grade	: No.1	Fv	180.0	psi		
		Ft	675.0	psi	Density	31.210pcf
Beam Bracing	: Completely Unbraced					



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 8.50 ft, (From Floor)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.787	1	Maximum Shear Stress Ratio	=	0.288	1
Section used for this span		6x8		Section used for this span		6x8	
fb: Actual	=	1,355.64 psi		fv: Actual	=	89.68 psi	
Fb: Allowable	=	1,721.67 psi		Fv: Allowable	=	311.04 psi	
Load Combination		+1.20D+0.50Lr+1.60L+1.60H		Load Combination		+1.20D+0.50Lr+1.60L+1.60H	
Location of maximum on span	=	4.000 ft		Location of maximum on span	=	7.387 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.096 in	Ratio = 1001	>=360			
Max Upward Transient Deflection		0.000 in	Ratio = 0	<360			
Max Downward Total Deflection		0.139 in	Ratio = 689	>=240			
Max Upward Total Deflection		0.000 in	Ratio = 0	<240			

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.974	1.974
Overall MINimum	1.360	1.360
+D+H	0.614	0.614
+D+L+H	1.974	1.974
+D+Lr+H	0.614	0.614
+D+S+H	0.614	0.614
+D+0.750Lr+0.750L+H	1.634	1.634
+D+0.750L+0.750S+H	1.634	1.634
+D+0.60W+H	0.614	0.614
+D+0.750Lr+0.450W+H	0.614	0.614
+D+0.750S+0.450W+H	0.614	0.614
+0.60D+0.60W+0.60H	0.368	0.368
+D+0.70E+0.60H	0.614	0.614
+D+0.750L+0.750S+0.5250E+H	1.634	1.634

DESCRIPTION: HDR-8

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+0.60D+0.70E+H	0.368	0.368
D Only	0.614	0.614
L Only	1.360	1.360
H Only		

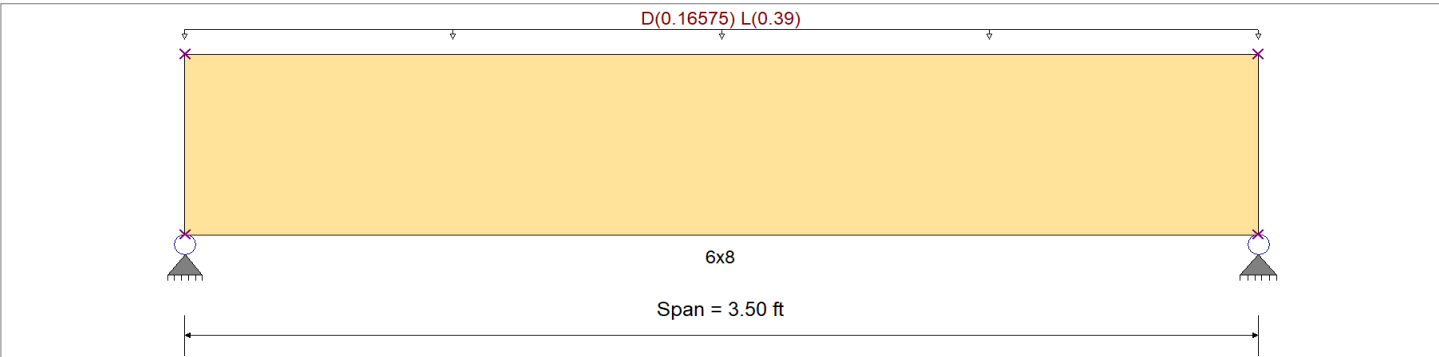
DESCRIPTION: HDR-10

CODE REFERENCES

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

Material Properties

Analysis Method : Load Resistance Factor D	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	Fc - Perp	625 psi		
Wood Grade : No.2	Fv	170 psi		
	Ft	425 psi	Density	31.21 pcf
Beam Bracing : Completely Unbraced				



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 9.750 ft, (From Floor)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.197	1	Maximum Shear Stress Ratio	=	0.117	1
Section used for this span		6x8		Section used for this span		6x8	
fb: Actual	=	297.07 psi		fv: Actual	=	34.46 psi	
Fb: Allowable	=	1,509.00 psi		Fv: Allowable	=	293.76 psi	
Load Combination		+1.20D+0.50Lr+1.60L+1.60H		Load Combination		+1.20D+0.50Lr+1.60L+1.60H	
Location of maximum on span	=	1.750 ft		Location of maximum on span	=	2.887 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.005 in	Ratio = 7970 >= 360				
Max Upward Transient Deflection		0.000 in	Ratio = 0 < 360				
Max Downward Total Deflection		0.008 in	Ratio = 5505 >= 240				
Max Upward Total Deflection		0.000 in	Ratio = 0 < 240				

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.988	0.988
Overall MINimum	0.683	0.683
+D+H	0.306	0.306
+D+L+H	0.988	0.988
+D+Lr+H	0.306	0.306
+D+S+H	0.306	0.306
+D+0.750Lr+0.750L+H	0.818	0.818
+D+0.750L+0.750S+H	0.818	0.818
+D+0.60W+H	0.306	0.306
+D+0.750Lr+0.450W+H	0.306	0.306
+D+0.750S+0.450W+H	0.306	0.306
+0.60D+0.60W+0.60H	0.183	0.183
+D+0.70E+0.60H	0.306	0.306
+D+0.750L+0.750S+0.5250E+H	0.818	0.818

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

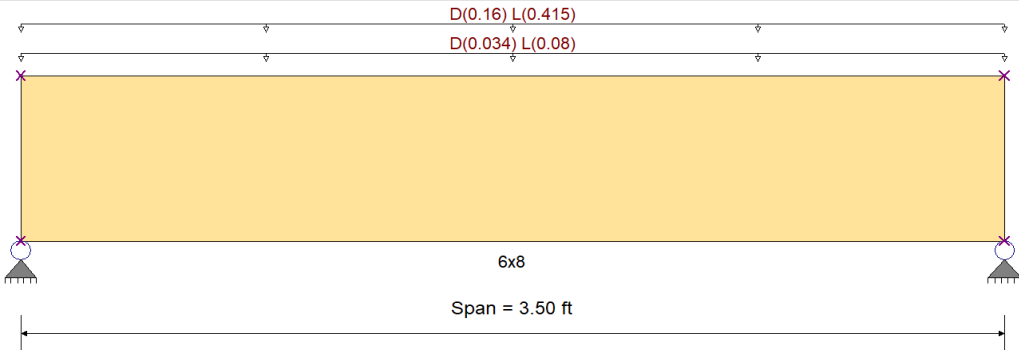
Load Combination	Support 1	Support 2
+0.60D+0.70E+H	0.183	0.183
D Only	0.306	0.306
L Only	0.683	0.683
H Only		

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	875.0	psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	Fb -	875.0	psi	Ebend- xx	1,300.0
		Fc - Prll	600.0	psi	Eminbend - xx	470.0
Wood Species :	Douglas Fir-Larch	Fc - Perp	625.0	psi		
Wood Grade :	No.2	Fv	170.0	psi		
		Ft	425.0	psi	Density	31.210
Beam Bracing :	Completely Unbraced					pcf



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0170, L = 0.040 ksf, Tributary Width = 2.0 ft, (From Floor)
Uniform Load : D = 0.320, L = 0.830 ksf, Tributary Width = 0.50 ft, (From FBM25)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.245	1	Maximum Shear Stress Ratio	=	0.146	: 1
Section used for this span		6x8		Section used for this span		6x8	
fb: Actual	=	369.02	psi	fv: Actual	=	42.81	psi
Fb: Allowable	=	1,509.00	psi	Fv: Allowable	=	293.76	psi
Load Combination	+1.20D+0.50Lr+1.60L+1.60H			Load Combination	+1.20D+0.50Lr+1.60L+1.60H		
Location of maximum on span	=	1.750	ft	Location of maximum on span	=	2.887	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.007	in	Ratio =	6280	>=360	
Max Upward Transient Deflection		0.000	in	Ratio =	0	<360	
Max Downward Total Deflection		0.009	in	Ratio =	4454	>=240	
Max Upward Total Deflection		0.000	in	Ratio =	0	<240	

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.221	1.221
Overall MINimum	0.866	0.866
+D+H	0.355	0.355
+D+L+H	1.221	1.221
+D+Lr+H	0.355	0.355
+D+S+H	0.355	0.355
+D+0.750Lr+0.750L+H	1.005	1.005
+D+0.750L+0.750S+H	1.005	1.005
+D+0.60W+H	0.355	0.355
+D+0.750Lr+0.450W+H	0.355	0.355
+D+0.750S+0.450W+H	0.355	0.355
+0.60D+0.60W+0.60H	0.213	0.213
+D+0.70E+0.60H	0.355	0.355

DESCRIPTION: HDR-11

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L+0.750S+0.5250E+H	1.005	1.005
+0.60D+0.70E+H	0.213	0.213
D Only	0.355	0.355
L Only	0.866	0.866
H Only		

DESCRIPTION: P-1 (FBM20,HDR6)6x8 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		Wood Section Name		6x8	
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		5.50 in	
Wood Grade		No.1		Exact Depth		7.50 in	
Fb +		1,200.0 psi	Fv	170.0 psi	Area		41.250 in^2
Fb -		1,200.0 psi	Ft	825.0 psi	Ix		193.359 in^4
Fc - Prll		1,000.0 psi	Density	31.210 pcf	Iy		103.984 in^4
Fc - Perp		625.0 psi					
E : Modulus of Elasticity . . .		x-x Bending	y-y Bending	Axial			
Basic		1,600.0	1,600.0	1,600.0 ksi			
Minimum		580.0	580.0				
Allow Stress Modification Factors							
Cf or Cv for Bending 1.0							
Cf or Cv for Compression 1.0							
Cf or Cv for Tension 1.0							
Cm : Wet Use Factor 1.0							
Ct : Temperature Factor 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 : Lu for buckling ABOUT Y-Y Axis : 9.5 ft, K = 1.0							
Y-Y (depth) axis : Lu for buckling ABOUT X-X Axis: 9.5 ft, K = 1.0							

Applied Loads

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

Column self weight included : 84.933 lbs * Dead Load Factor

AXIAL LOADS . . .

FROM FBM20: Axial Load at 9.50 ft, D = 7.740, Lr = 1.070, L = 2.90, E = 15.370 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	0.5073 : 1	Maximum SERVICE Lateral Load Reactions . .			
	Load Combination	+D+0.70E+0.60H	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
	Governing NDS Formula	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom along X-X	0.0 k
	Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections . .			
	At maximum location values are . .		Along Y-Y	0.0 in	at	0.0 ft above base
	Applied Axial	18.584 k	for load combination : n/a			
	Applied Mx	0.0 k-ft	Along X-X	0.0 in	at	0.0 ft above base
	Applied My	0.0 k-ft	for load combination : n/a			
	Fc : Allowable	888.12 psi	Other Factors used to calculate allowable stresses . .			
PASS	Maximum Shear Stress Ratio =	0.0 : 1	<u>Bending</u> <u>Compression</u> <u>Tension</u>			
	Load Combination	+0.60D+0.70E+H				
	Location of max.above base	9.50 ft				
	Applied Design Shear	0.0 psi				
	Allowable Shear	272.0 psi				

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+H	0.900	0.758	0.2780	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+L+H	1.000	0.726	0.3583	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+Lr+H	1.250	0.648	0.2660	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+S+H	1.150	0.679	0.2431	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+H	1.250	0.648	0.3231	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+H	1.150	0.679	0.3107	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.60W+H	1.600	0.555	0.2136	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.555	0.2949	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.555	0.2730	PASS	0.0 ft	0.0	PASS	9.50 ft
+0.60D+0.60W+0.60H	1.600	0.555	0.1282	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.70E+0.60H	1.600	0.555	0.5073	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.555	0.4932	PASS	0.0 ft	0.0	PASS	9.50 ft

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
+0.60D+0.70E+H	1.600	0.555	0.4218	PASS	0.0 ft	0.0	PASS	9.50 ft

Maximum Reactions

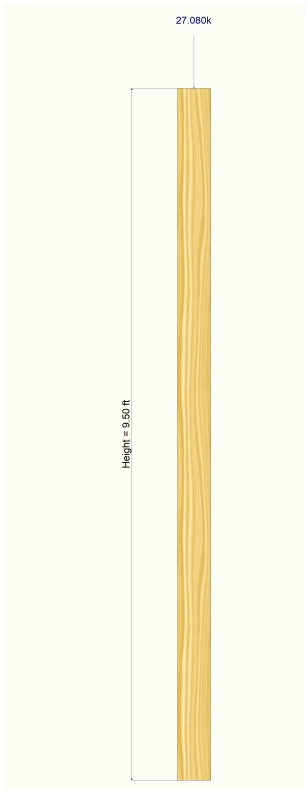
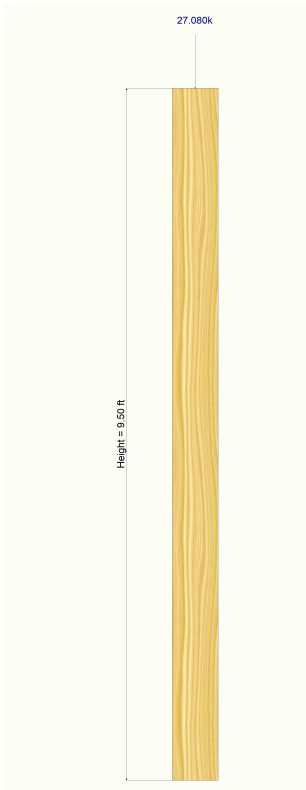
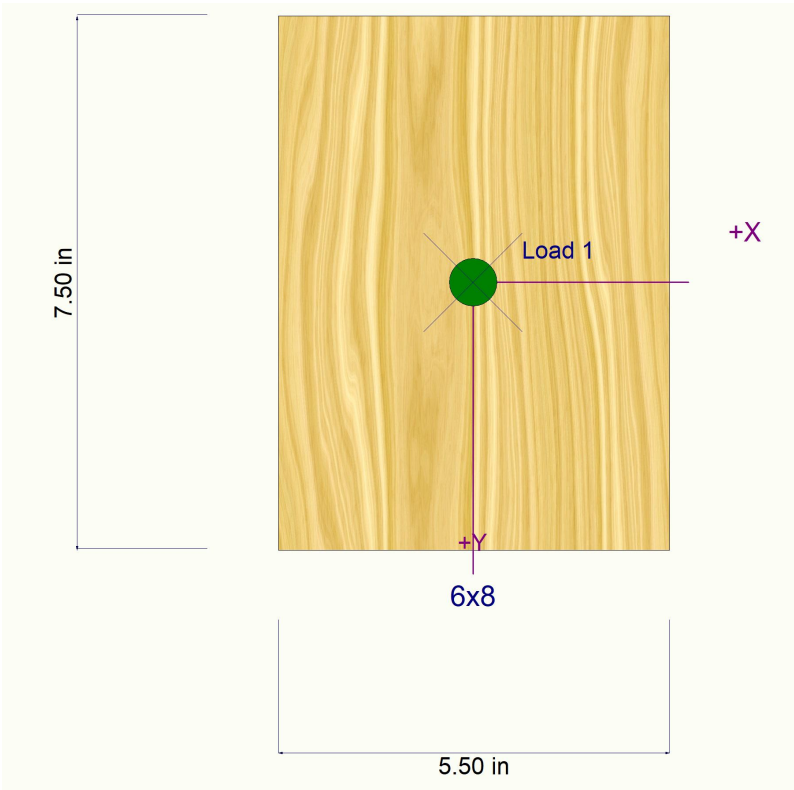
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
+D+H						7.825					
+D+L+H						10.725					
+D+Lr+H						8.895					
+D+S+H						7.825					
+D+0.750Lr+0.750L+H						10.802					
+D+0.750L+0.750S+H						10.000					
+D+0.60W+H						7.825					
+D+0.750Lr+0.750L+0.450W+H						10.802					
+D+0.750L+0.750S+0.450W+H						10.000					
+0.60D+0.60W+0.60H						4.695					
+D+0.70E+0.60H						18.584					
+D+0.750L+0.750S+0.5250E+H						18.069					
+0.60D+0.70E+H						15.454					
D Only						7.825					
Lr Only						1.070					
L Only						2.900					
S Only											
W Only											
E Only						15.370					
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
+D+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+L+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+Lr+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+S+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.60W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+0.60D+0.60W+0.60H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.70E+0.60H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+0.60D+0.70E+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
D Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
Lr Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
S Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
W Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
E Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
H Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft

Sketches



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		Wood Section Name	6x6		
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	5.50 in	Allow Stress Modification Factors	
Wood Grade	No.1			Exact Depth	5.50 in		
Fb +	1200 psi	Fv	170 psi	Area	30.250 in^2	Cf or Cv for Bending	1.0
Fb -	1200 psi	Ft	825 psi	Ix	76.255 in^4	Cf or Cv for Compression	1.0
Fc - Prll	1000 psi	Density	31.21 pcf	Iy	76.255 in^4	Cf or Cv for Tension	1.0
Fc - Perp	625 psi					Cm : Wet Use Factor	1.0
						Ct : Temperature Factor	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 NDS 15.3.2
	Minimum	580	580			Use Cr : Repetitive ?	No
Brace condition for deflection (buckling) along columns :							
				X-X (width) axis :	Lu for buckling ABOUT Y-Y Axis : 9.5 ft, K = 1.0		
				Y-Y (depth) axis :	Lu for buckling ABOUT X-X Axis: 9.5 ft, K = 1.0		

Applied Loads

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

Column self weight included : 62.285 lbs * Dead Load Factor

AXIAL LOADS . . .

FROM WFBM21: Axial Load at 9.50 ft, D = 12.810, Lr = 1.040, L = 5.090, E = 3.480 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	0.8182 : 1	Maximum SERVICE Lateral Load Reactions . .				
	Load Combination	+D+L+H	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k	
	Governing NDS Formula	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom along X-X	0.0 k	
	Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections . . .				
	At maximum location values are . . .		Along Y-Y	0.0 in	at	0.0 ft	above base
	Applied Axial	17.962 k	for load combination :	n/a			
	Applied Mx	0.0 k-ft	Along X-X	0.0 in	at	0.0 ft	above base
	Applied My	0.0 k-ft	for load combination :	n/a			
	Fc : Allowable	725.71 psi	Other Factors used to calculate allowable stresses . . .				
PASS	Maximum Shear Stress Ratio =	0.0 : 1			Bending	Compression	Tension
	Load Combination	+0.60D+0.70E+H					
	Location of max.above base	9.50 ft					
	Applied Design Shear	0.0 psi					
	Allowable Shear	272.0 psi					

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+H	0.900	0.758	0.6237	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+L+H	1.000	0.726	0.8182	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+Lr+H	1.250	0.648	0.5674	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+S+H	1.150	0.679	0.5453	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+H	1.250	0.648	0.7124	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+H	1.150	0.679	0.7071	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.60W+H	1.600	0.555	0.4791	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.555	0.6503	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.555	0.6212	PASS	0.0 ft	0.0	PASS	9.50 ft
+0.60D+0.60W+0.60H	1.600	0.555	0.2875	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.70E+0.60H	1.600	0.555	0.5698	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.555	0.6892	PASS	0.0 ft	0.0	PASS	9.50 ft

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
+0.60D+0.70E+H	1.600	0.555	0.3782	PASS	0.0 ft	0.0	PASS	9.50 ft

Maximum Reactions

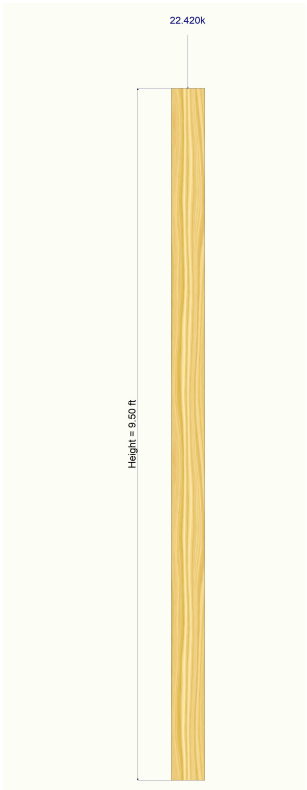
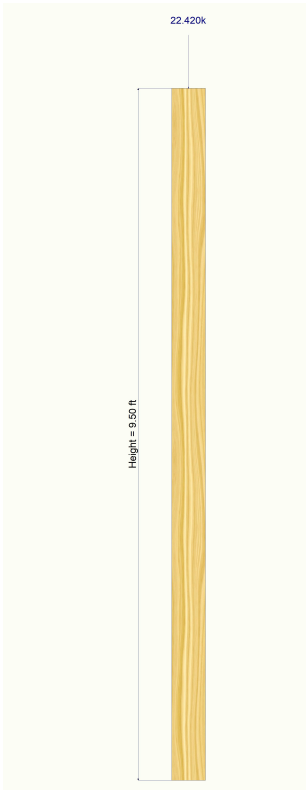
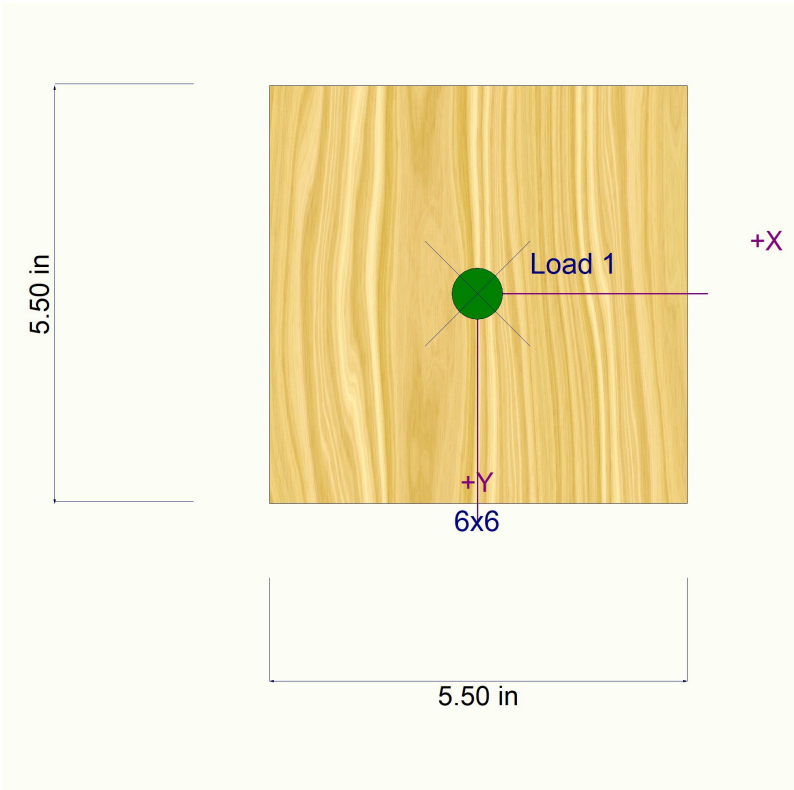
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
+D+H						12.872					
+D+L+H						17.962					
+D+Lr+H						13.912					
+D+S+H						12.872					
+D+0.750Lr+0.750L+H						17.470					
+D+0.750L+0.750S+H						16.690					
+D+0.60W+H						12.872					
+D+0.750Lr+0.750L+0.450W+H						17.470					
+D+0.750L+0.750S+0.450W+H						16.690					
+0.60D+0.60W+0.60H						7.723					
+D+0.70E+0.60H						15.308					
+D+0.750L+0.750S+0.5250E+H						18.517					
+0.60D+0.70E+H						10.159					
D Only						12.872					
Lr Only						1.040					
L Only						5.090					
S Only											
W Only											
E Only						3.480					
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.60W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750Lr+0.750L+0.450W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+0.60D+0.60W+0.60H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.70E+0.60H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+0.60D+0.70E+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
D Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
E Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft

Sketches



DESCRIPTION: P-3 (WFBM22) 6x6POST

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		Wood Section Name	6x6		
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	5.50 in	Allow Stress Modification Factors	
Wood Grade	No.1			Exact Depth	5.50 in		
Fb +	1200 psi	Fv	170 psi	Area	30.250 in^2	Cf or Cv for Bending	1.0
Fb -	1200 psi	Ft	825 psi	Ix	76.255 in^4	Cf or Cv for Compression	1.0
Fc - Prll	1000 psi	Density	31.21 pcf	Iy	76.255 in^4	Cf or Cv for Tension	1.0
Fc - Perp	625 psi					Cm : Wet Use Factor	1.0
						Ct : Temperature Factor	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 NDS 15.3.2
	Minimum	580	580			Use Cr : Repetitive ?	No
Brace condition for deflection (buckling) along columns :							
				X-X (width) axis :	Lu for buckling ABOUT Y-Y Axis : 9.5 ft, K = 1.0		
				Y-Y (depth) axis :	Lu for buckling ABOUT X-X Axis: 9.5 ft, K = 1.0		

Applied Loads

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

Column self weight included : 62.285 lbs * Dead Load Factor

AXIAL LOADS . . .

FROM WFB22: Axial Load at 9.50 ft, D = 7.250, Lr = 0.0740, L = 3.820, E = 0.330 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	0.5071 : 1	Maximum SERVICE Lateral Load Reactions . .				
	Load Combination	+D+L+H	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k	
	Governing NDS Formula	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom along X-X	0.0 k	
	Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections . . .				
	At maximum location values are . . .		Along Y-Y	0.0 in	at	0.0 ft	above base
	Applied Axial	11.132 k	for load combination :	n/a			
	Applied Mx	0.0 k-ft	Along X-X	0.0 in	at	0.0 ft	above base
	Applied My	0.0 k-ft	for load combination :	n/a			
	Fc : Allowable	725.71 psi	Other Factors used to calculate allowable stresses . . .				
PASS	Maximum Shear Stress Ratio =	0.0 : 1			Bending	Compression	Tension
	Load Combination	+0.60D+0.70E+H					
	Location of max.above base	9.50 ft					
	Applied Design Shear	0.0 psi					
	Allowable Shear	272.0 psi					

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+H	0.900	0.758	0.3543	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+L+H	1.000	0.726	0.5071	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+Lr+H	1.250	0.648	0.3012	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+S+H	1.150	0.679	0.3098	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+H	1.250	0.648	0.4173	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+H	1.150	0.679	0.4312	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.60W+H	1.600	0.555	0.2722	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.555	0.3809	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.555	0.3788	PASS	0.0 ft	0.0	PASS	9.50 ft
+0.60D+0.60W+0.60H	1.600	0.555	0.1633	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.70E+0.60H	1.600	0.555	0.2808	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.555	0.3853	PASS	0.0 ft	0.0	PASS	9.50 ft

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
+0.60D+0.70E+H	1.600	0.555	0.1719	PASS	0.0 ft	0.0	PASS	9.50 ft

Maximum Reactions

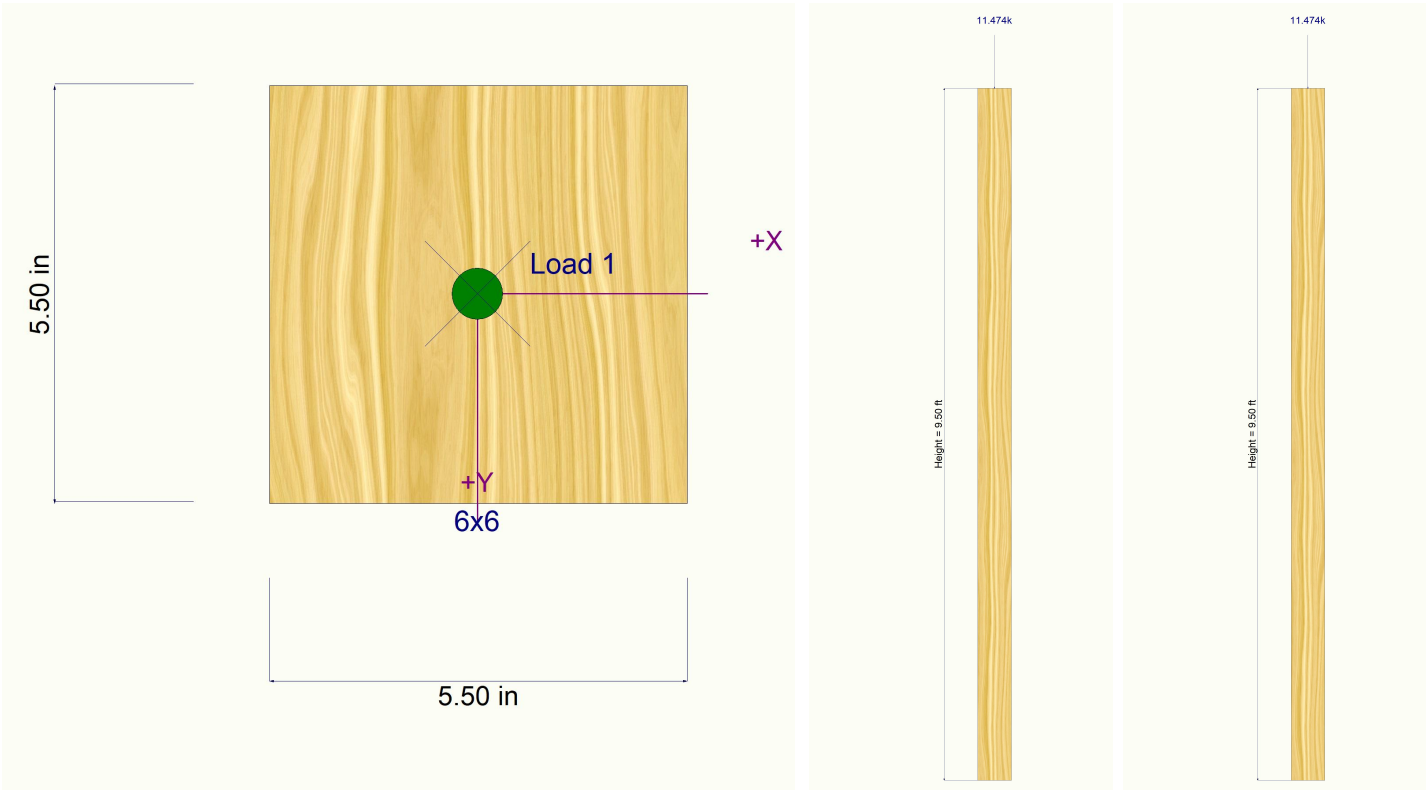
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
+D+H						7.312					
+D+L+H						11.132					
+D+Lr+H						7.386					
+D+S+H						7.312					
+D+0.750Lr+0.750L+H						10.233					
+D+0.750L+0.750S+H						10.177					
+D+0.60W+H						7.312					
+D+0.750Lr+0.750L+0.450W+H						10.233					
+D+0.750L+0.750S+0.450W+H						10.177					
+0.60D+0.60W+0.60H						4.387					
+D+0.70E+0.60H						7.543					
+D+0.750L+0.750S+0.5250E+H						10.351					
+0.60D+0.70E+H						4.618					
D Only						7.312					
Lr Only						0.074					
L Only						3.820					
S Only											
W Only											
E Only						0.330					
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
+D+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+L+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+Lr+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+S+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.60W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+0.60D+0.60W+0.60H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.70E+0.60H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+0.60D+0.70E+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
D Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
Lr Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
S Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
W Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
E Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
H Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft

Sketches



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		Wood Section Name	6x6		
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	5.50 in	Allow Stress Modification Factors	
Wood Grade	No.1			Exact Depth	5.50 in		
Fb +	1200 psi	Fv	170 psi	Area	30.250 in^2	Cf or Cv for Bending	1.0
Fb -	1200 psi	Ft	825 psi	Ix	76.255 in^4	Cf or Cv for Compression	1.0
Fc - Prll	1000 psi	Density	31.21 pcf	Iy	76.255 in^4	Cf or Cv for Tension	1.0
Fc - Perp	625 psi					Cm : Wet Use Factor	1.0
						Ct : Temperature Factor	1.0
						Cfu : Flat Use Factor	1.0
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial			Kf : Built-up columns	1.0 NDS 15.3.2
Basic	1600	1600	1600 ksi			Use Cr : Repetitive ?	No
Minimum	580	580					
Brace condition for deflection (buckling) along columns :							
X-X (width) axis :				Lu for buckling ABOUT Y-Y Axis : 9.5 ft, K = 1.0			
Y-Y (depth) axis :				Lu for buckling ABOUT X-X Axis: 9.5 ft, K = 1.0			

Applied Loads

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

Column self weight included : 62.285 lbs * Dead Load Factor

AXIAL LOADS . . .

FROM FBM9: Axial Load at 9.50 ft, D = 12.120, Lr = 0.890, L = 5.990, E = 15.290 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	0.9195 : 1	Maximum SERVICE Lateral Load Reactions . .				
	Load Combination	+D+0.750L+0.750S+0.5250E+H	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k	
	Governing NDS Formula	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom along X-X	0.0 k	
	Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections . . .				
	At maximum location values are . . .		Along Y-Y	0.0 in at	0.0 ft	above base	
	Applied Axial	24.702 k	for load combination :	n/a			
	Applied Mx	0.0 k-ft	Along X-X	0.0 in at	0.0 ft	above base	
	Applied My	0.0 k-ft	for load combination :	n/a			
	Fc : Allowable	888.12 psi	Other Factors used to calculate allowable stresses . . .				
PASS	Maximum Shear Stress Ratio =	0.0 : 1			Bending	Compression	Tension
	Load Combination	+0.60D+0.70E+H					
	Location of max.above base	9.50 ft					
	Applied Design Shear	0.0 psi					
	Allowable Shear	272.0 psi					

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+H	0.900	0.758	0.5903	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+L+H	1.000	0.726	0.8278	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+Lr+H	1.250	0.648	0.5331	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+S+H	1.150	0.679	0.5161	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+H	1.250	0.648	0.7072	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+H	1.150	0.679	0.7064	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.60W+H	1.600	0.555	0.4535	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.555	0.6455	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.555	0.6207	PASS	0.0 ft	0.0	PASS	9.50 ft
+0.60D+0.60W+0.60H	1.600	0.555	0.2721	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.70E+0.60H	1.600	0.555	0.8518	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.555	0.9195	PASS	0.0 ft	0.0	PASS	9.50 ft

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
+0.60D+0.70E+H	1.600	0.555	0.6705	PASS	0.0 ft	0.0	PASS	9.50 ft

Maximum Reactions

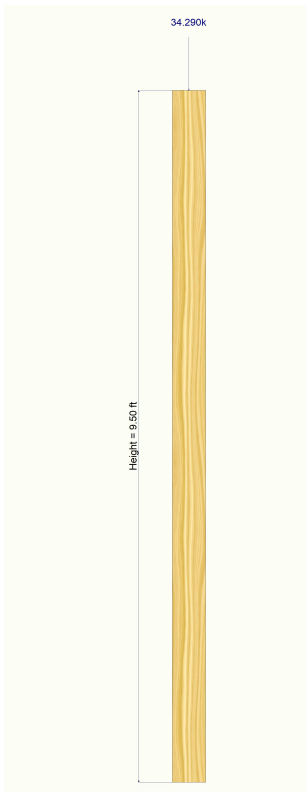
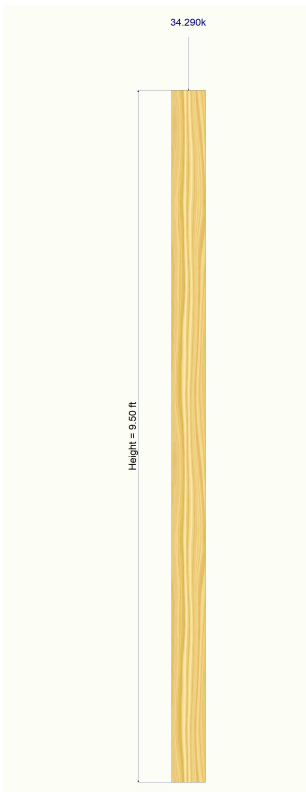
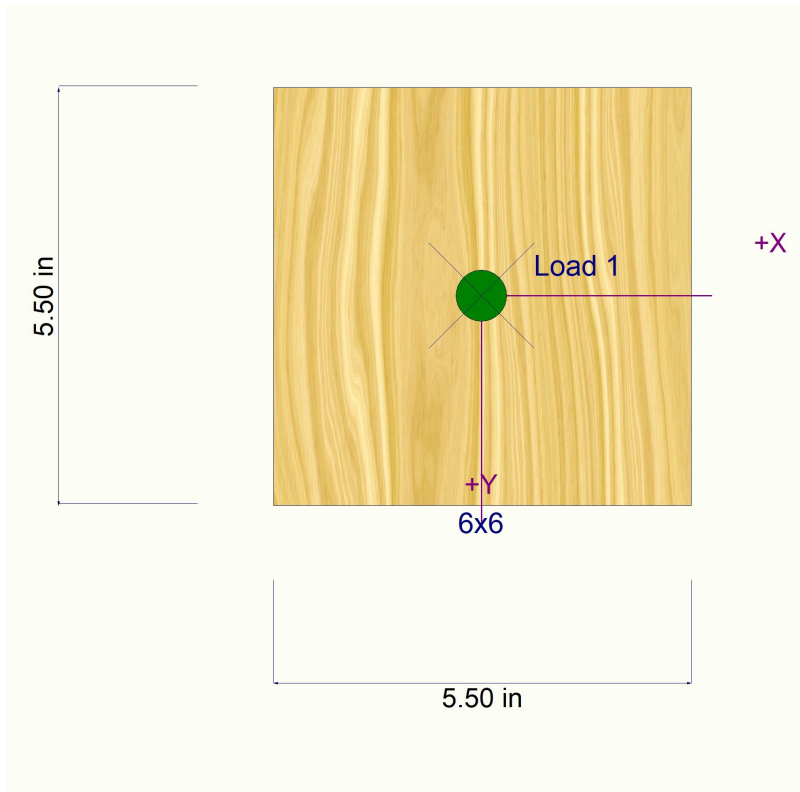
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
+D+H						12.182					
+D+L+H						18.172					
+D+Lr+H						13.072					
+D+S+H						12.182					
+D+0.750Lr+0.750L+H						17.342					
+D+0.750L+0.750S+H						16.675					
+D+0.60W+H						12.182					
+D+0.750Lr+0.750L+0.450W+H						17.342					
+D+0.750L+0.750S+0.450W+H						16.675					
+0.60D+0.60W+0.60H						7.309					
+D+0.70E+0.60H						22.885					
+D+0.750L+0.750S+0.5250E+H						24.702					
+0.60D+0.70E+H						18.012					
D Only						12.182					
Lr Only						0.890					
L Only						5.990					
S Only											
W Only											
E Only						15.290					
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.60W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750Lr+0.750L+0.450W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+0.60D+0.60W+0.60H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.70E+0.60H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+0.60D+0.70E+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
D Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
E Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft

Sketches



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				Wood Section Name 6x6	
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 5.50 in	
Wood Grade No.1				Exact Depth 5.50 in	
Fb + 1,200.0 psi		Fv 170.0 psi	Allow Stress Modification Factors		
Fb - 1,200.0 psi		Ft 825.0 psi	Cf or Cv for Bending 1.0		
Fc - Prll 1,000.0 psi		Density 31.210 pcf	Cf or Cv for Compression 1.0		
Fc - Perp 625.0 psi			Cf or Cv for Tension 1.0		
			Cm : Wet Use Factor 1.0		
			Ct : Temperature Factor 1.0		
			Cfu : Flat Use Factor 1.0		
E : Modulus of Elasticity . . .		x-x Bending	y-y Bending	Axial	Kf : Built-up columns 1.0
Basic 1,600.0		1,600.0	1,600.0	1,600.0 ksi	Use Cr : Repetitive ? No
Minimum 580.0		580.0	580.0		
Brace condition for deflection (buckling) along columns :					
				X-X (width) axis : Lu for buckling ABOUT Y-Y Axis : 9.5 ft, K = 1.0	
				Y-Y (depth) axis : Lu for buckling ABOUT X-X Axis: 9.5 ft, K = 1.0	

Applied Loads

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

Column self weight included : 62.285 lbs * Dead Load Factor

AXIAL LOADS . . .

FROM HDR7,FBM19: Axial Load at 9.50 ft, D = 7.980, Lr = 0.250, L = 4.040, E = 0.690 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	0.5504 : 1	Maximum SERVICE Lateral Load Reactions . .			
	Load Combination	+D+L+H	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
	Governing NDS Formula	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom along X-X	0.0 k
	Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections . . .			
	At maximum location values are . . .		Along Y-Y	0.0 in	at	0.0 ft above base
	Applied Axial	12.082 k	for load combination : n/a			
	Applied Mx	0.0 k-ft	Along X-X	0.0 in	at	0.0 ft above base
	Applied My	0.0 k-ft	for load combination : n/a			
	Fc : Allowable	725.71 psi	Other Factors used to calculate allowable stresses . . .			
				<u>Bending</u>	<u>Compression</u>	<u>Tension</u>
PASS	Maximum Shear Stress Ratio =	0.0 : 1				
	Load Combination	+0.60D+0.70E+H				
	Location of max.above base	9.50 ft				
	Applied Design Shear	0.0 psi				
	Allowable Shear	272.0 psi				

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+H	0.900	0.758	0.3897	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+L+H	1.000	0.726	0.5504	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+Lr+H	1.250	0.648	0.3382	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+S+H	1.150	0.679	0.3407	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+H	1.250	0.648	0.4592	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+H	1.150	0.679	0.4691	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.60W+H	1.600	0.555	0.2994	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.555	0.4191	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.555	0.4121	PASS	0.0 ft	0.0	PASS	9.50 ft
+0.60D+0.60W+0.60H	1.600	0.555	0.1796	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.70E+0.60H	1.600	0.555	0.3173	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.555	0.4256	PASS	0.0 ft	0.0	PASS	9.50 ft

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
+0.60D+0.70E+H	1.600	0.555	0.1976	PASS	0.0 ft	0.0	PASS	9.50 ft

Maximum Reactions

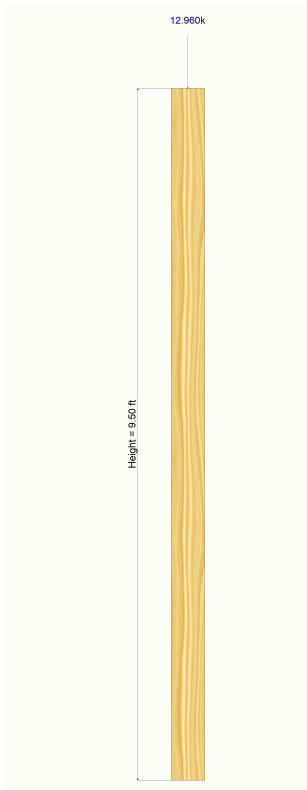
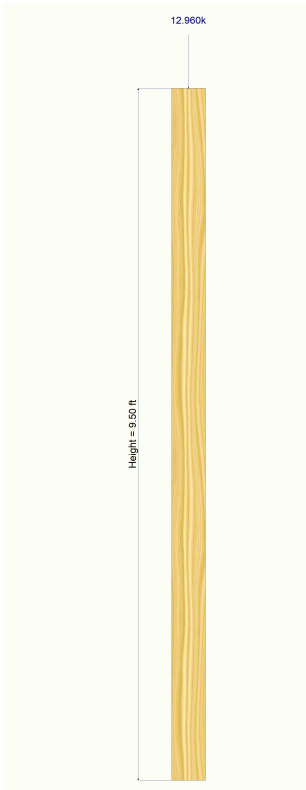
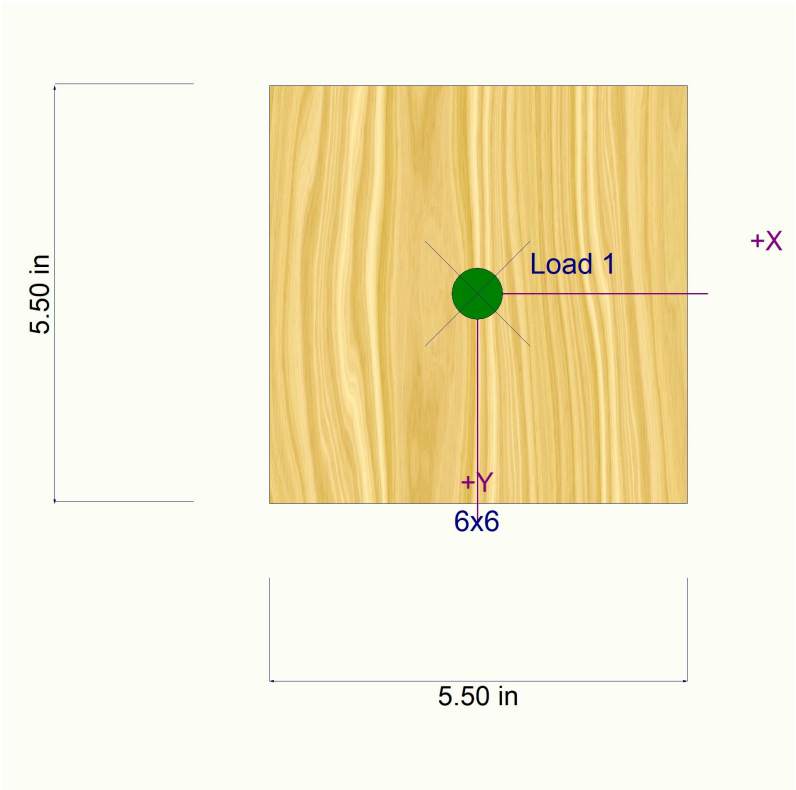
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
+D+H						8.042					
+D+L+H						12.082					
+D+Lr+H						8.292					
+D+S+H						8.042					
+D+0.750Lr+0.750L+H						11.260					
+D+0.750L+0.750S+H						11.072					
+D+0.60W+H						8.042					
+D+0.750Lr+0.750L+0.450W+H						11.260					
+D+0.750L+0.750S+0.450W+H						11.072					
+0.60D+0.60W+0.60H						4.825					
+D+0.70E+0.60H						8.525					
+D+0.750L+0.750S+0.5250E+H						11.435					
+0.60D+0.70E+H						5.308					
D Only						8.042					
Lr Only						0.250					
L Only						4.040					
S Only											
W Only											
E Only						0.690					
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
+D+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+L+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+Lr+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+S+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.60W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+0.60D+0.60W+0.60H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.70E+0.60H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+0.60D+0.70E+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
D Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
Lr Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
S Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
W Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
E Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
H Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft

Sketches



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		Wood Section Name	6x6		
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	5.50 in	Allow Stress Modification Factors	
Wood Grade	No.1			Exact Depth	5.50 in		
Fb +	1200 psi	Fv	170 psi	Area	30.250 in^2	Cf or Cv for Bending	1.0
Fb -	1200 psi	Ft	825 psi	Ix	76.255 in^4	Cf or Cv for Compression	1.0
Fc - Prll	1000 psi	Density	31.21 pcf	Iy	76.255 in^4	Cf or Cv for Tension	1.0
Fc - Perp	625 psi					Cm : Wet Use Factor	1.0
						Ct : Temperature Factor	1.0
						Cfu : Flat Use Factor	1.0
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial			Kf : Built-up columns	1.0 NDS 15.3.2
Basic	1600	1600	1600 ksi			Use Cr : Repetitive ?	No
Minimum	580	580					
Brace condition for deflection (buckling) along columns :							
X-X (width) axis :				Lu for buckling ABOUT Y-Y Axis : 9.5 ft, K = 1.0			
Y-Y (depth) axis :				Lu for buckling ABOUT X-X Axis: 9.5 ft, K = 1.0			

Applied Loads

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

Column self weight included : 62.285 lbs * Dead Load Factor

AXIAL LOADS . . .

FROM HDR8,FBM20A: Axial Load at 9.50 ft, D = 3.920, L = 2.990, E = 23.270 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	0.7545 : 1	Maximum SERVICE Lateral Load Reactions . .				
	Load Combination	+D+0.70E+0.60H	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k	
	Governing NDS Formula	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom along X-X	0.0 k	
	Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections . . .				
	At maximum location values are . . .		Along Y-Y	0.0 in at	0.0 ft	above base	
	Applied Axial	20.271 k	for load combination :	n/a			
	Applied Mx	0.0 k-ft	Along X-X	0.0 in at	0.0 ft	above base	
	Applied My	0.0 k-ft	for load combination :	n/a			
	Fc : Allowable	888.12 psi	Other Factors used to calculate allowable stresses . . .				
PASS	Maximum Shear Stress Ratio =	0.0 : 1	Bending	Compression	Tension		
	Load Combination	+0.60D+0.70E+H					
	Location of max.above base	9.50 ft					
	Applied Design Shear	0.0 psi					
	Allowable Shear	272.0 psi					

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+H	0.900	0.758	0.1930	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+L+H	1.000	0.726	0.3176	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+Lr+H	1.250	0.648	0.1624	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+S+H	1.150	0.679	0.1687	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+H	1.250	0.648	0.2539	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+H	1.150	0.679	0.2637	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.60W+H	1.600	0.555	0.1482	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	0.555	0.2317	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.450W+H	1.600	0.555	0.2317	PASS	0.0 ft	0.0	PASS	9.50 ft
+0.60D+0.60W+0.60H	1.600	0.555	0.08894	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.70E+0.60H	1.600	0.555	0.7545	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.555	0.6864	PASS	0.0 ft	0.0	PASS	9.50 ft

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
+0.60D+0.70E+H	1.600	0.555	0.6952	PASS	0.0 ft	0.0	PASS	9.50 ft

Maximum Reactions

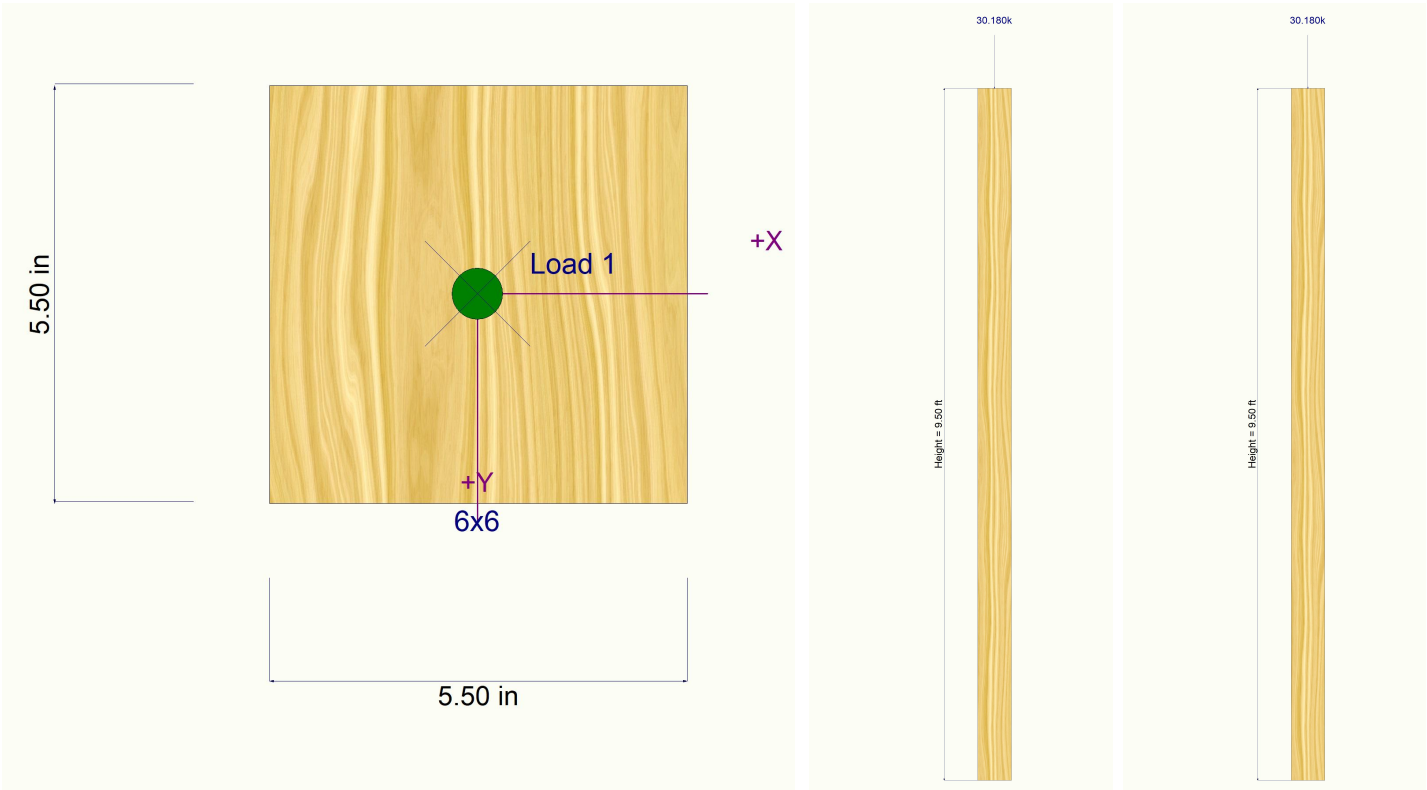
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
+D+H						3.982					
+D+L+H						6.972					
+D+Lr+H						3.982					
+D+S+H						3.982					
+D+0.750Lr+0.750L+H						6.225					
+D+0.750L+0.750S+H						6.225					
+D+0.60W+H						3.982					
+D+0.750Lr+0.750L+0.450W+H						6.225					
+D+0.750L+0.750S+0.450W+H						6.225					
+0.60D+0.60W+0.60H						2.389					
+D+0.70E+0.60H						20.271					
+D+0.750L+0.750S+0.5250E+H						18.442					
+0.60D+0.70E+H						18.678					
D Only						3.982					
Lr Only											
L Only						2.990					
S Only											
W Only											
E Only						23.270					
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+L+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+Lr+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+S+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.60W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750Lr+0.750L+0.450W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+0.450W+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+0.60D+0.60W+0.60H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.70E+0.60H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
+0.60D+0.70E+H	0.0000	in	0.000	ft	0.0000	in	0.000	ft
D Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
E Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.0000	in	0.000	ft

Sketches



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		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	
Wood Grade		No.1		Exact Depth		5.50 in	
Fb +		1200 psi	Fv	170 psi	Area		19.250 in^2
Fb -		1200 psi	Ft	825 psi	Ix		48.526 in^4
Fc - Prll		1000 psi	Density	31.21 pcf	Iy		19.651 in^4
Fc - Perp		625 psi					
E : Modulus of Elasticity . . .		x-x Bending	y-y Bending	Axial			
Basic		1600	1600	1600 ksi			
Minimum		580	580				
Brace condition for deflection (buckling) along columns :							
				X-X (width) axis :		Fully braced against buckling ABOUT Y-Y Axis	
				Y-Y (depth) axis :		Lu for buckling ABOUT X-X Axis: K = 1.0	
Allow Stress Modification Factors							
Cf or Cv for Bending 1.30							
Cf or Cv for Compression 1.10							
Cf or Cv for Tension 1.30							
Cm : Wet Use Factor 1.0							
Ct : Temperature Factor 1.0							
Cfu : Flat Use Factor 1.0							
Kf : Built-up columns 1.0 NDS 15.3.2							
Use Cr : Repetitive ? No							

Applied Loads

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

Column self weight included : 39.636 lbs * Dead Load Factor

AXIAL LOADS . . .

From FBM14: Axial Load at 9.50 ft, D = 3.430, Lr = 0.40, L = 3.080, E = 18.220 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS	Max. Axial+Bending Stress Ratio =	0.9232 : 1	Maximum SERVICE Lateral Load Reactions . .				
	Load Combination	+D+0.70E+0.60H	Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k	
	Governing NDS Formula	Comp Only, fc/Fc'	Top along X-X	0.0 k	Bottom along X-X	0.0 k	
	Location of max.above base	0.0 ft	Maximum SERVICE Load Lateral Deflections . . .				
	At maximum location values are . . .		Along Y-Y	0.0 in at 0.0 ft above base			
	Applied Axial	16.224 k	for load combination :	n/a			
	Applied Mx	0.0 k-ft	Along X-X	0.0 in at 0.0 ft above base			
	Applied My	0.0 k-ft	for load combination :	n/a			
	Fc : Allowable	912.94 psi	Other Factors used to calculate allowable stresses . . .				
PASS	Maximum Shear Stress Ratio =	0.0 : 1			Bending	Compression	Tension
	Load Combination	+0.60D+0.70E+H					
	Location of max.above base	9.50 ft					
	Applied Design Shear	0.0 psi					
	Allowable Shear	272.0 psi					

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+H	0.900	0.729	0.2498	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+L+H	1.000	0.694	0.4457	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+Lr+H	1.250	0.613	0.2385	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+S+H	1.150	0.644	0.2212	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.750L+H	1.250	0.613	0.3747	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+H	1.150	0.644	0.3685	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.60W+H	1.600	0.519	0.1974	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750Lr+0.450W+H	1.600	0.519	0.2145	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750S+0.450W+H	1.600	0.519	0.1974	PASS	0.0 ft	0.0	PASS	9.50 ft
+0.60D+0.60W+0.60H	1.600	0.519	0.1185	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.70E+0.60H	1.600	0.519	0.9232	PASS	0.0 ft	0.0	PASS	9.50 ft
+D+0.750L+0.750S+0.5250E+H	1.600	0.519	0.8732	PASS	0.0 ft	0.0	PASS	9.50 ft

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
+0.60D+0.70E+H	1.600	0.519	0.8442	PASS	0.0 ft	0.0	PASS	9.50 ft

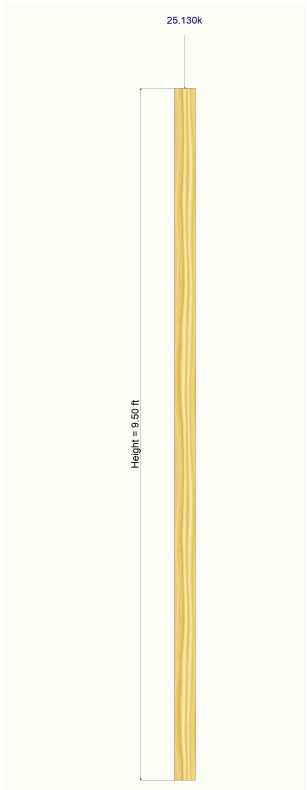
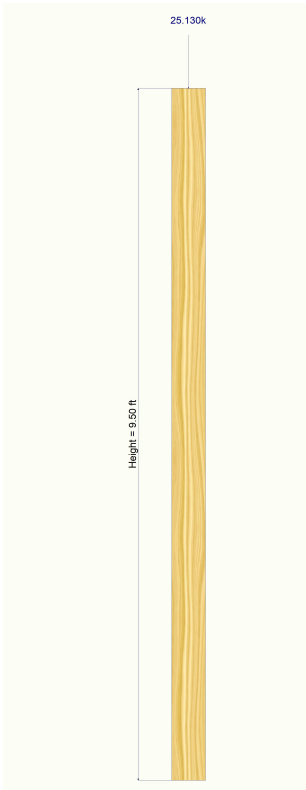
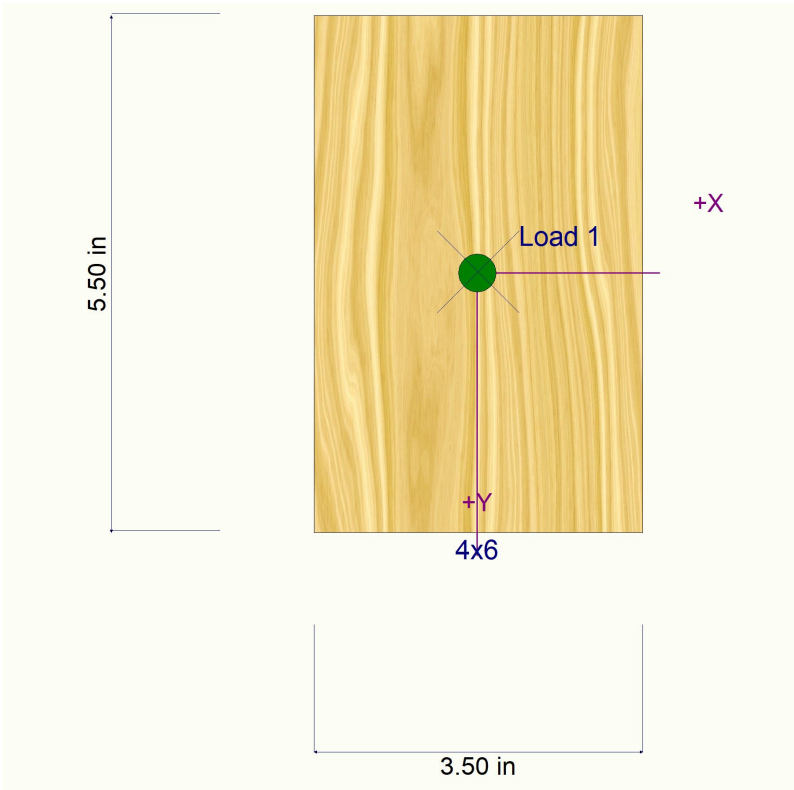
Maximum Reactions Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
+D+H						3.470					
+D+L+H						6.550					
+D+Lr+H						3.870					
+D+S+H						3.470					
+D+0.750Lr+0.750L+H						6.080					
+D+0.750L+0.750S+H						5.780					
+D+0.60W+H						3.470					
+D+0.750Lr+0.450W+H						3.770					
+D+0.750S+0.450W+H						3.470					
+0.60D+0.60W+0.60H						2.082					
+D+0.70E+0.60H						16.224					
+D+0.750L+0.750S+0.5250E+H						15.345					
+0.60D+0.70E+H						14.836					
D Only						3.470					
Lr Only						0.400					
L Only						3.080					
S Only											
W Only											
E Only						18.220					
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
+D+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+L+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+Lr+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+S+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.60W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750Lr+0.450W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750S+0.450W+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+0.60D+0.60W+0.60H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.70E+0.60H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
+0.60D+0.70E+H	0.0000	in	0.000 ft	0.0000	in	0.000 ft
D Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
Lr Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
S Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
W Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
E Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft
H Only	0.0000	in	0.000 ft	0.0000	in	0.000 ft

Sketches



S-2.3

DESCRIPTION: FBM1

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor D

Load Combination :ASCE 7-16

Wood Species : iLevel Truss Joist

Wood Grade : Parallam PSL 2.2E

Beam Bracing : Beam bracing is defined as a set spacing over all spans

Fb + 2,900.0 psi

Fb - 2,900.0 psi

Fc - Prll 2,900.0 psi

Fc - Perp 750.0 psi

Fv 290.0 psi

Ft 2,025.0 psi

E : Modulus of Elasticity

Ebend- xx 2,200.0 ksi

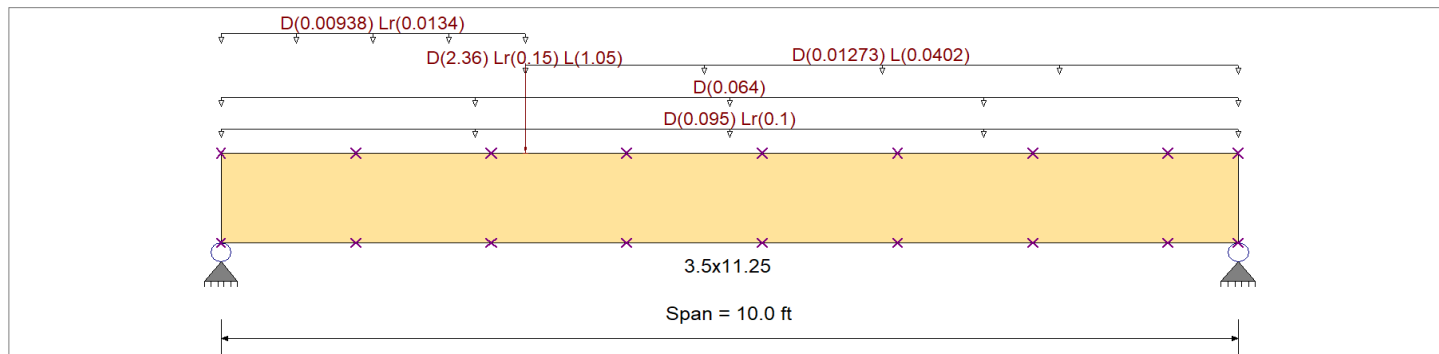
Eminbend - xx 1,118.19 ksi

Density 45.070 pcf

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support

Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads

Uniform Load : D = 0.0190, Lr = 0.020 ksf, Tributary Width = 5.0 ft, (ROOF with solar panel)

Uniform Load : D = 0.0160 ksf, Tributary Width = 4.0 ft, (From wall above)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 3.0 --> 10.0 ft, Tributary Width = 0.670 ft, (From Roof deck)

Point Load : D = 2.360, Lr = 0.150, L = 1.050 k @ 3.0 ft, (FROM FBM1A)

Uniform Load : D = 0.0140, Lr = 0.020 ksf, Extent = 0.0 --> 3.0 ft, Tributary Width = 0.670 ft, (From Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.423	1	Maximum Shear Stress Ratio	=	0.347	: 1
Section used for this span		3.5x11.25		Section used for this span		3.5x11.25	
fb: Actual	=	2,112.08 psi		fv: Actual	=	174.07 psi	
Fb: Allowable	=	4,990.67 psi		Fv: Allowable	=	501.12 psi	
Load Combination		+1.20D+1.60Lr+L+1.60H		Load Combination		+1.20D+1.60Lr+L+1.60H	
Location of maximum on span	=	3.029 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		0.041 in	Ratio = 2912 >= 360				
Max Upward Transient Deflection		0.000 in	Ratio = 0 < 360				
Max Downward Total Deflection		0.174 in	Ratio = 691 >= 240				
Max Upward Total Deflection		0.000 in	Ratio = 0 < 240				

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.668	2.413
Overall MINimum	0.833	0.498
+D+H	2.564	1.627
+D+L+H	3.397	2.125
+D+Lr+H	3.203	2.178
+D+S+H	2.564	1.627
+D+0.750Lr+0.750L+H	3.668	2.413

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L+0.750S+H	3.189	2.000
+D+0.60W+H	2.564	1.627
+D+0.750Lr+0.450W+H	3.043	2.040
+D+0.750S+0.450W+H	2.564	1.627
+0.60D+0.60W+0.60H	1.538	0.976
+D+0.70E+0.60H	2.564	1.627
+D+0.750L+0.750S+0.5250E+H	3.189	2.000
+0.60D+0.70E+H	1.538	0.976
D Only	2.564	1.627
Lr Only	0.639	0.551
L Only	0.833	0.498
H Only		

DESCRIPTION: FBM1A

CODE REFERENCES

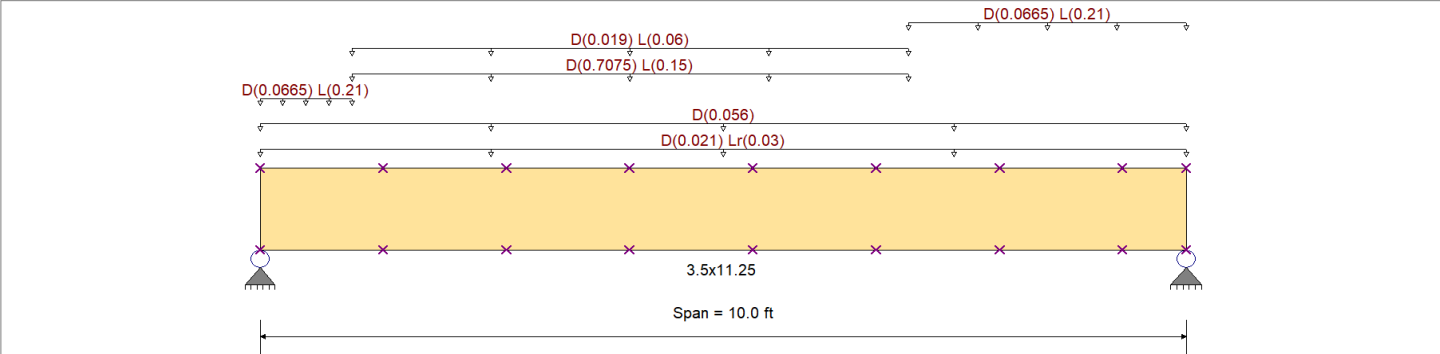
Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	2,900.0	psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	Fb -	2,900.0	psi	Ebend- xx	2,200.0ksi
		Fc - Prll	2,900.0	psi	Eminbend - xx	1,118.19ksi
Wood Species :	iLevel Truss Joist	Fc - Perp	750.0	psi		
Wood Grade :	Parallam PSL 2.2E	Fv	290.0	psi		
		Ft	2,025.0	psi	Density	45.070pcf
Beam Bracing :	Beam bracing is defined as a set spacing over all spans					

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads

- Uniform Load : D = 0.0140, Lr = 0.020 ksf, Tributary Width = 1.50 ft, (ROOF)
- Uniform Load : D = 0.0160 ksf, Tributary Width = 3.50 ft, (From wall above)
- Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 0.0 --> 1.0 ft, Tributary Width = 3.50 ft, (From Roof deck)
- Uniform Load : D = 0.2830, L = 0.060 ksf, Extent = 1.0 --> 7.0 ft, Tributary Width = 2.50 ft, (From Roof deck jacuzzi)
- Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 1.0 --> 7.0 ft, Tributary Width = 1.0 ft, (From Roof deck)
- Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 7.0 --> 10.0 ft, Tributary Width = 3.50 ft, (From Roof deck)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.522	1	Maximum Shear Stress Ratio	=	0.428	: 1
Section used for this span		3.5x11.25		Section used for this span		3.5x11.25	
fb: Actual	=	1,954.82	psi	fv: Actual	=	160.69	psi
Fb: Allowable	=	3,747.38	psi	Fv: Allowable	=	375.84	psi
Load Combination		+1.40D+1.60H		Load Combination		+1.40D+1.60H	
Location of maximum on span	=	4.672	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		0.052	in	Ratio =		2306	>=360
Max Upward Transient Deflection		0.000	in	Ratio =		0	<360
Max Downward Total Deflection		0.217	in	Ratio =		552	>=240
Max Upward Total Deflection		0.000	in	Ratio =		0	<240

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.205	3.413
Overall MINimum	1.050	1.050
+D+H	3.155	2.363
+D+L+H	4.205	3.413
+D+Lr+H	3.305	2.513
+D+S+H	3.155	2.363

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750Lr+0.750L+H	4.055	3.263
+D+0.750L+0.750S+H	3.943	3.151
+D+0.60W+H	3.155	2.363
+D+0.750Lr+0.450W+H	3.268	2.476
+D+0.750S+0.450W+H	3.155	2.363
+0.60D+0.60W+0.60H	1.893	1.418
+D+0.70E+0.60H	3.155	2.363
+D+0.750L+0.750S+0.5250E+H	3.943	3.151
+0.60D+0.70E+H	1.893	1.418
D Only	3.155	2.363
Lr Only	0.150	0.150
L Only	1.050	1.050
H Only		

DESCRIPTION: FBM2

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor D

Load Combination :ASCE 7-16

Wood Species : Douglas Fir-Larch

Wood Grade : No.1

Beam Bracing : Beam bracing is defined as a set spacing over all spans

Fb + 1,000.0 psi

Fb - 1,000.0 psi

Fc - Prll 1,500.0 psi

Fc - Perp 625.0 psi

Fv 180.0 psi

Ft 675.0 psi

E : Modulus of Elasticity

Ebend- xx 1,700.0 ksi

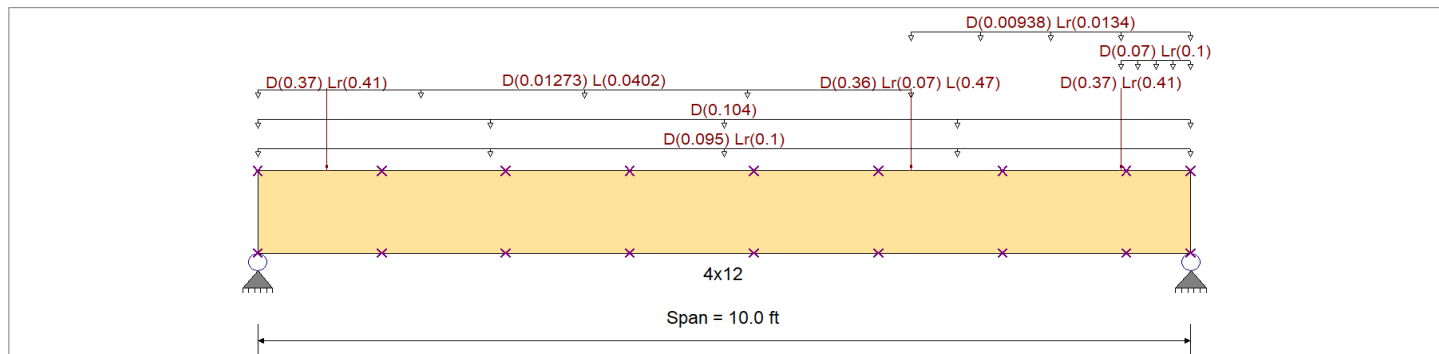
Eminbend - xx 620.0 ksi

Density 31.210 pcf

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support

Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.0190, Lr = 0.020 ksf, Extent = 0.0 --> 10.0 ft, Tributary Width = 5.0 ft, (ROOF)

Uniform Load : D = 0.0160 ksf, Tributary Width = 6.50 ft, (From wall above)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 0.0 --> 7.0 ft, Tributary Width = 0.670 ft, (From Roof deck)

Point Load : D = 0.370, Lr = 0.410 k @ 0.750 ft, (From HDR-1)

Point Load : D = 0.370, Lr = 0.410 k @ 9.250 ft, (From HDR-1)

Uniform Load : D = 0.0140, Lr = 0.020 ksf, Extent = 9.250 --> 10.0 ft, Tributary Width = 5.0 ft, (ROOF)

Uniform Load : D = 0.0140, Lr = 0.020 ksf, Extent = 7.0 --> 10.0 ft, Tributary Width = 0.670 ft, (From Roof)

Point Load : D = 0.360, Lr = 0.070, L = 0.470 k @ 7.0 ft, (From FBM2A)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.706	1	Maximum Shear Stress Ratio	=	0.314	: 1
Section used for this span		4x12		Section used for this span		4x12	
fb: Actual	=	1,338.17	psi	fv: Actual	=	97.69	psi
Fb: Allowable	=	1,895.59	psi	Fv: Allowable	=	311.04	psi
Load Combination		+1.20D+1.60Lr+L+1.60H		Load Combination		+1.20D+1.60Lr+L+1.60H	
Location of maximum on span	=	5.657	ft	Location of maximum on span	=	9.088	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.046	in	Ratio =		2631	>=360
Max Upward Transient Deflection		0.000	in	Ratio =		0	<360
Max Downward Total Deflection		0.150	in	Ratio =		799	>=240
Max Upward Total Deflection		0.000	in	Ratio =		0	<240

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.528	2.885
Overall MINimum	0.324	0.427

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+H	1.580	1.765
+D+L+H	1.904	2.193
+D+Lr+H	2.520	2.831
+D+S+H	1.580	1.765
+D+0.750Lr+0.750L+H	2.528	2.885
+D+0.750L+0.750S+H	1.823	2.086
+D+0.60W+H	1.580	1.765
+D+0.750Lr+0.450W+H	2.285	2.564
+D+0.750S+0.450W+H	1.580	1.765
+0.60D+0.60W+0.60H	0.948	1.059
+D+0.70E+0.60H	1.580	1.765
+D+0.750L+0.750S+0.5250E+H	1.823	2.086
+0.60D+0.70E+H	0.948	1.059
D Only	1.580	1.765
Lr Only	0.940	1.065
L Only	0.324	0.427
H Only		

DESCRIPTION: FBM2A

CODE REFERENCES

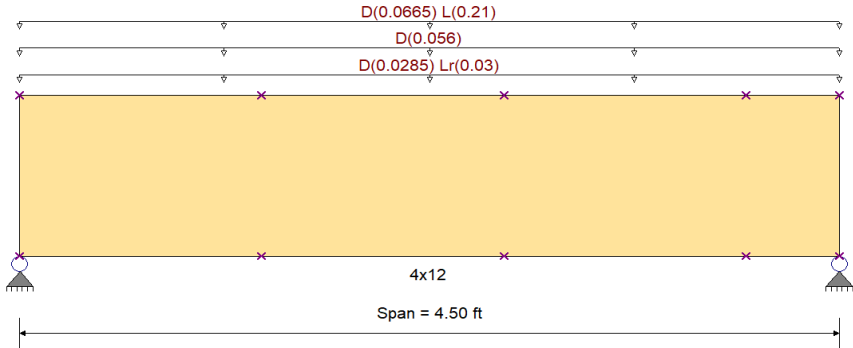
Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	1,000.0	psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	Fb -	1,000.0	psi	Ebend- xx	1,700.0ksi
		Fc - Prll	1,500.0	psi	Eminbend - xx	620.0ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625.0	psi		
Wood Grade :	No.1	Fv	180.0	psi		
		Ft	675.0	psi	Density	31.210pcf
Beam Bracing :	Beam bracing is defined as a set spacing over all spans					

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1

- Uniform Load : D = 0.0190, Lr = 0.020 ksf, Extent = 0.0 --> 4.50 ft, Tributary Width = 1.50 ft, (ROOF)
- Uniform Load : D = 0.0160 ksf, Tributary Width = 3.50 ft, (From wall above)
- Uniform Load : D = 0.0190, L = 0.060 ksf, Tributary Width = 3.50 ft, (From Roof deck)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.118	1	Maximum Shear Stress Ratio	=	0.087	: 1
Section used for this span		4x12		Section used for this span		4x12	
fb: Actual	=	223.18	psi	fv: Actual	=	27.15	psi
Fb: Allowable	=	1,895.67	psi	Fv: Allowable	=	311.04	psi
Load Combination	+1.20D+0.50Lr+1.60L+1.60H			Load Combination	+1.20D+0.50Lr+1.60L+1.60H		
Location of maximum on span	=	2.250	ft	Location of maximum on span	=	3.564	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.003	in	Ratio =	19561	>=360	
Max Upward Transient Deflection		0.000	in	Ratio =	0	<360	
Max Downward Total Deflection		0.005	in	Ratio =	11116	>=240	
Max Upward Total Deflection		0.000	in	Ratio =	0	<240	

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.831	0.831
Overall MINimum	0.473	0.473
+D+H	0.359	0.359
+D+L+H	0.831	0.831
+D+Lr+H	0.426	0.426
+D+S+H	0.359	0.359
+D+0.750Lr+0.750L+H	0.764	0.764
+D+0.750L+0.750S+H	0.713	0.713

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.60W+H	0.359	0.359
+D+0.750Lr+0.450W+H	0.410	0.410
+D+0.750S+0.450W+H	0.359	0.359
+0.60D+0.60W+0.60H	0.215	0.215
+D+0.70E+0.60H	0.359	0.359
+D+0.750L+0.750S+0.5250E+H	0.713	0.713
+0.60D+0.70E+H	0.215	0.215
D Only	0.359	0.359
Lr Only	0.068	0.068
L Only	0.473	0.473
H Only		

CODE REFERENCES

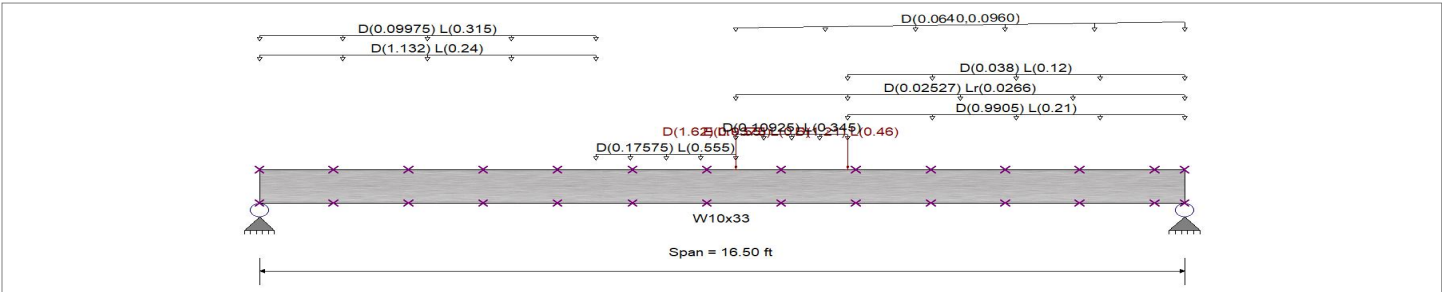
Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Load Resistance Factor Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam bracing is defined as a set spacing over all spans	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loading
Loads on all spans...
Varying Uniform Load : D= 0.0640->0.0960 k/ft, Extent = 8.50 -->> 16.50 ft

Load for Span Number 1
Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 6.0 -->> 8.50 ft, Tributary Width = 9.250 ft, (From Roof deck)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 8.50 -->> 10.50 ft, Tributary Width = 5.750 ft, (From roof deck)

Uniform Load : D = 0.2830, L = 0.060 ksf, Extent = 10.50 -->> 16.50 ft, Tributary Width = 3.50 ft, (From jacuzzi)

Uniform Load : D = 0.0190, Lr = 0.020 ksf, Extent = 8.50 -->> 16.50 ft, Tributary Width = 1.330 ft, (From roof)

Point Load : D = 1.620, Lr = 0.550, L = 0.50 k @ 8.50 ft, (From FBM1)

Point Load : E = 0.9375 k @ 8.50 ft, (From shear wall 7-1x2.5)

Point Load : D = 1.210, L = 0.460 k @ 10.50 ft, (From DBM1)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 10.50 -->> 16.50 ft, Tributary Width = 2.0 ft, (From deck)

Uniform Load : D = 0.2830, L = 0.060 ksf, Extent = 0.0 -->> 6.0 ft, Tributary Width = 4.0 ft, (From Roof deckjacuzzi)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 0.0 -->> 6.0 ft, Tributary Width = 5.250 ft, (From Roof deck)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.524 : 1	Maximum Shear Stress Ratio =	0.222 : 1
Section used for this span	W10x33	Section used for this span	W10x33
Mu : Applied	76.295 k-ft	Vu : Applied	18.818 k
Mn * Phi : Allowable	145.500 k-ft	Vn * Phi : Allowable	84.651 k
Load Combination	+1.50D+L+0.20S+E+1.90H	Load Combination	+1.50D+L+0.20S+E+1.90H
Location of maximum on span	8.486 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	0.182 in	Ratio =	1,086 >=360
Max Upward Transient Deflection	-0.031 in	Ratio =	6,456 >=360
Max Downward Total Deflection	0.540 in	Ratio =	367 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.5399	8.297		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	13.764	13.019
Overall MINimum	0.318	0.445
+D+H	9.199	9.237
+D+L+H	13.764	13.019
+D+Lr+H	9.518	9.681
+D+S+H	9.199	9.237
+D+0.750Lr+0.750L+H	12.862	12.407
+D+0.750L+0.750S+H	12.623	12.074
+D+0.60W+H	9.199	9.237
+D-0.60W+H	9.199	9.237
+D+0.750Lr+0.450W+H	9.438	9.570
+D+0.750Lr-0.450W+H	9.438	9.570
+D+0.750S+0.450W+H	9.199	9.237
+D+0.750S-0.450W+H	9.199	9.237
+0.60D+0.60W+0.60H	5.520	5.542
+0.60D-0.60W+0.60H	5.520	5.542
+D+0.70E+0.60H	9.517	9.575
+D-0.70E+0.60H	8.881	8.899
+D+0.750L+0.750S+0.5250E+H	12.862	12.327
+D+0.750L+0.750S-0.5250E+H	12.384	11.820
+0.60D+0.70E+H	5.838	5.880
+0.60D-0.70E+H	5.201	5.204
D Only	9.199	9.237
Lr Only	0.318	0.445
L Only	4.565	3.783
E Only	0.455	0.483
E Only * -1.0	-0.455	-0.483
H Only		

DESCRIPTION: WFBM4

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16

Load Combination Set : ASCE 7-16

Material Properties

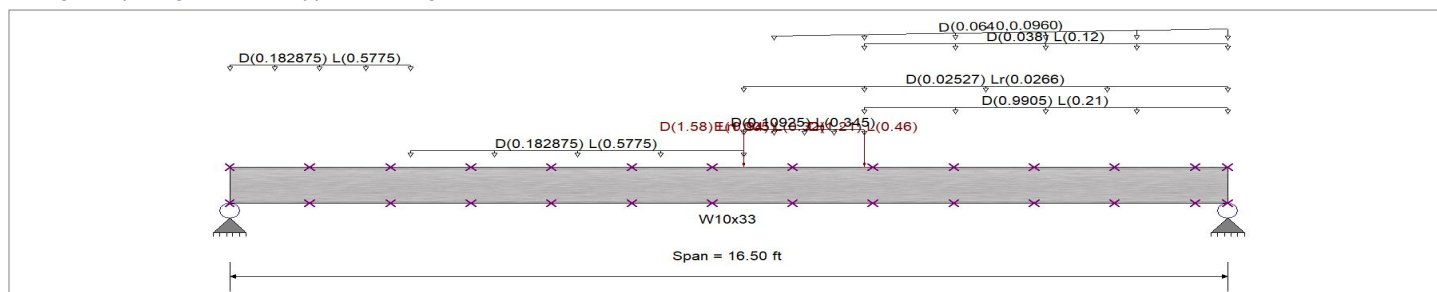
Analysis Method : Load Resistance Factor Design
Beam Bracing : Beam bracing is defined as a set spacing over all spans
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi

Unbraced Lengths

First Brace starts at 1.330 ft from Left-Most support

Regular spacing of lateral supports on length of beam = 1.330 ft



Applied Loads

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

Beam self weight calculated and added to loading

Loads on all spans...

Varying Uniform Load : D= 0.0640->0.0960 k/ft, Extent = 9.0 -->> 16.50 ft

Load for Span Number 1

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 3.0 -->> 8.50 ft, Tributary Width = 9.625 ft, (From Roof deck)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 8.50 -->> 10.50 ft, Tributary Width = 5.750 ft, (From roof deck)

Uniform Load : D = 0.2830, L = 0.060 ksf, Extent = 10.50 -->> 16.50 ft, Tributary Width = 3.50 ft, (From jacuzzi)

Uniform Load : D = 0.0190, Lr = 0.020 ksf, Extent = 8.50 -->> 16.50 ft, Tributary Width = 1.330 ft, (From roof)

Point Load : D = 1.580, Lr = 0.940, L = 0.320 k @ 8.50 ft, (From FBM2)

Point Load : E = 1.005 k @ 8.50 ft, (From shear wall)

Point Load : D = 1.210, L = 0.460 k @ 10.50 ft, (From DBM1)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 0.0 -->> 3.0 ft, Tributary Width = 9.625 ft, (From Roof deck)

Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 10.50 -->> 16.50 ft, Tributary Width = 2.0 ft, (From Deck)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.435 : 1	Maximum Shear Stress Ratio =	0.189 : 1
Section used for this span	W10x33	Section used for this span	W10x33
Mu : Applied	63.267 k-ft	Vu : Applied	15.974 k
Mn * Phi : Allowable	145.500 k-ft	Vn * Phi : Allowable	84.651 k
Load Combination	+1.20D+0.50Lr+1.60L+1.60H	Load Combination	+1.20D+0.50Lr+1.60L+1.60H
Location of maximum on span	8.533ft	Location of maximum on span	16.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.180 in	Ratio =	1,098 >=360
Max Upward Transient Deflection	-0.033 in	Ratio =	6,023 >=360
Max Downward Total Deflection	0.434 in	Ratio =	456 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.4338	8.486		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	8.643	11.796
Overall MINimum	-0.487	-0.518
+D+H	4.023	8.057
+D+L+H	8.643	11.796
+D+Lr+H	4.531	8.703
+D+S+H	4.023	8.057
+D+0.750Lr+0.750L+H	7.868	11.346
+D+0.750L+0.750S+H	7.488	10.862
+D+0.60W+H	4.023	8.057
+D-0.60W+H	4.023	8.057
+D+0.750Lr+0.450W+H	4.404	8.541
+D+0.750Lr-0.450W+H	4.404	8.541
+D+0.750S+0.450W+H	4.023	8.057
+D+0.750S-0.450W+H	4.023	8.057
+0.60D+0.60W+0.60H	2.414	4.834
+0.60D-0.60W+0.60H	2.414	4.834
+D+0.70E+0.60H	4.364	8.420
+D-0.70E+0.60H	3.682	7.695
+D+0.750L+0.750S+0.5250E+H	7.744	11.133
+D+0.750L+0.750S-0.5250E+H	7.232	10.590
+0.60D+0.70E+H	2.755	5.197
+0.60D-0.70E+H	2.073	4.472
D Only	4.023	8.057
Lr Only	0.507	0.645
L Only	4.620	3.739
E Only	0.487	0.518
E Only * -1.0	-0.487	-0.518
H Only		

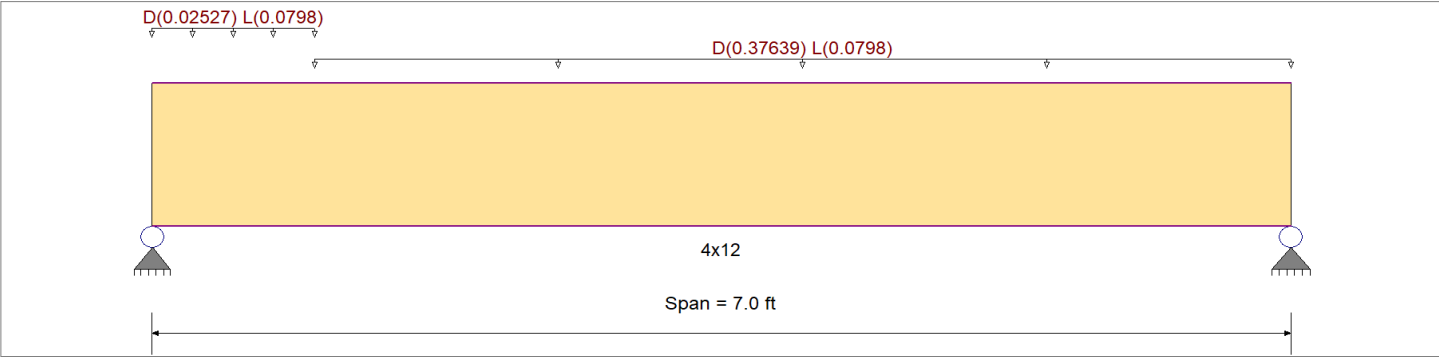
DESCRIPTION: TYP. ROOF DECK JOIST(D.J-2) below jacuzzi New Location

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	1,000.0	psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	Fb -	1,000.0	psi	Ebend- xx	1,700.0ksi
		Fc - Prll	1,500.0	psi	Eminbend - xx	620.0ksi
Wood Species :	Douglas Fir-Larch	Fc - Perp	625.0	psi		
Wood Grade :	No.1	Fv	180.0	psi		
		Ft	675.0	psi	Density	31.210pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				Repetitive Member Stress Increase	



Applied Loads

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

Load for Span Number 1
Uniform Load : D = 0.2830, L = 0.060 ksf, Extent = 1.0 --> 7.0 ft, Tributary Width = 1.330 ft, (Roof Deck)
Uniform Load : D = 0.0190, L = 0.060 ksf, Extent = 0.0 --> 1.0 ft, Tributary Width = 1.330 ft, (Roof Deck)

DESIGN SUMMARY

Maximum Bending Stress Ratio	=	0.308	1	Maximum Shear Stress Ratio	=	0.221	: 1
Section used for this span		4x12		Section used for this span		4x12	
fb: Actual	=	504.82	psi	fv: Actual	=	51.63	psi
Fb: Allowable	=	1,639.44	psi	Fv: Allowable	=	233.28	psi
Load Combination		+1.40D+1.60H		Load Combination		+1.40D+1.60H	
Location of maximum on span	=	3.577	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		0.006	in	Ratio =	13676	>=360	
Max Upward Transient Deflection		0.000	in	Ratio =	0	<360	
Max Downward Total Deflection		0.034	in	Ratio =	2484	>=240	
Max Upward Total Deflection		0.000	in	Ratio =	0	<240	

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.271	1.572
Overall MINimum	0.279	0.279
+D+H	0.991	1.292
+D+L+H	1.271	1.572
+D+Lr+H	0.991	1.292
+D+S+H	0.991	1.292
+D+0.750Lr+0.750L+H	1.201	1.502
+D+0.750L+0.750S+H	1.201	1.502
+D+0.60W+H	0.991	1.292
+D+0.750Lr+0.450W+H	0.991	1.292
+D+0.750S+0.450W+H	0.991	1.292
+0.60D+0.60W+0.60H	0.595	0.775
+D+0.70E+0.60H	0.991	1.292

DESCRIPTION: TYP. ROOF DECK JOIST(D.J-2) below jacuzzi New Location

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L+0.750S+0.5250E+H	1.201	1.502
+0.60D+0.70E+H	0.595	0.775
D Only	0.991	1.292
L Only	0.279	0.279
H Only		

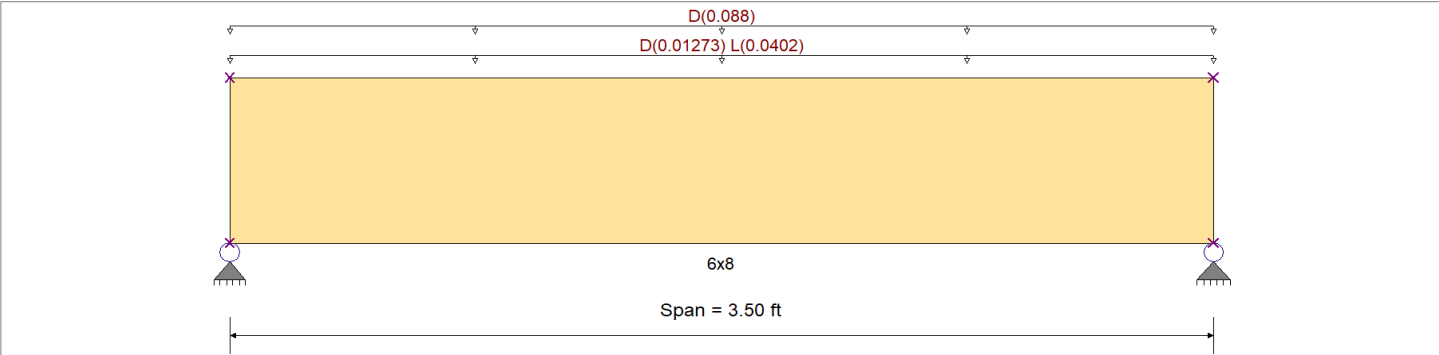
DESCRIPTION: HDR-4

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	900.0	psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	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 :	Completely Unbraced					



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0190, L = 0.060 ksf, Tributary Width = 0.670 ft, (Roof deck)
Uniform Load : D = 0.0160 ksf, Tributary Width = 5.50 ft, (From wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.047	1	Maximum Shear Stress Ratio	=	0.027	1
Section used for this span		6x8		Section used for this span		6x8	
fb: Actual	=	54.72	psi	fv: Actual	=	6.35	psi
Fb: Allowable	=	1,164.97	psi	Fv: Allowable	=	233.28	psi
Load Combination		+1.40D+1.60H		Load Combination		+1.40D+1.60H	
Location of maximum on span	=	1.750	ft	Location of maximum on span	=	2.887	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.000	in	Ratio =		0	<360
Max Upward Transient Deflection		0.000	in	Ratio =		0	<360
Max Downward Total Deflection		0.002	in	Ratio =		25529	>=240
Max Upward Total Deflection		0.000	in	Ratio =		0	<240

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.262	0.262
Overall MINimum	0.070	0.070
+D+H	0.192	0.192
+D+L+H	0.262	0.262
+D+Lr+H	0.192	0.192
+D+S+H	0.192	0.192
+D+0.750Lr+0.750L+H	0.245	0.245
+D+0.750L+0.750S+H	0.245	0.245
+D+0.60W+H	0.192	0.192
+D+0.750Lr+0.450W+H	0.192	0.192
+D+0.750S+0.450W+H	0.192	0.192
+0.60D+0.60W+0.60H	0.115	0.115
+D+0.70E+0.60H	0.192	0.192

DESCRIPTION: HDR-4

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L+0.750S+0.5250E+H	0.245	0.245
+0.60D+0.70E+H	0.115	0.115
D Only	0.192	0.192
L Only	0.070	0.070
H Only		

DESCRIPTION: HDR-4A

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Load Resistance Factor D

Load Combination :ASCE 7-16

Wood Species : Douglas Fir-Larch

Wood Grade : No.2

Beam Bracing : Completely Unbraced

Fb + 900.0 psi

Fb - 900.0 psi

Fc - Prll 1,350.0 psi

Fc - Perp 625.0 psi

Fv 180.0 psi

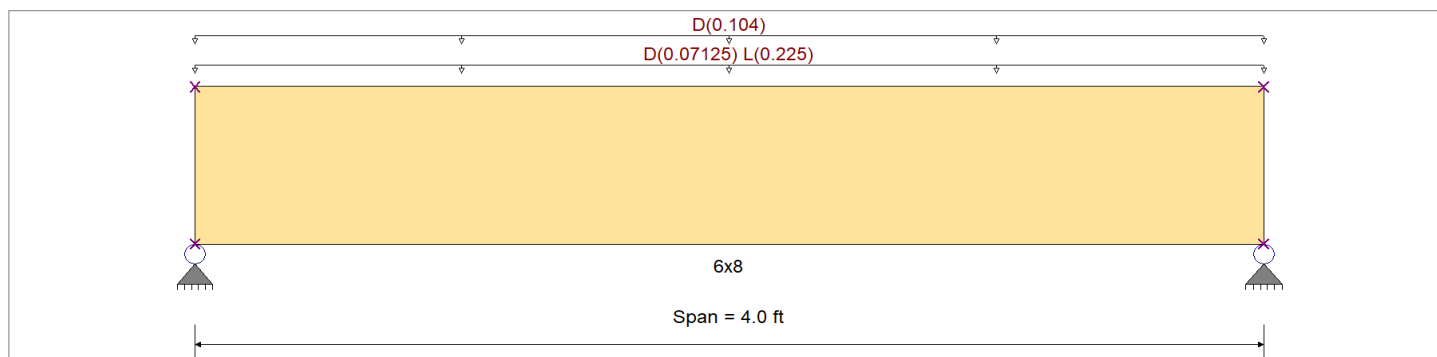
Ft 575.0 psi

E : Modulus of Elasticity

Ebend- xx 1,600.0 ksi

Eminbend - xx 580.0 ksi

Density 31.210 pcf



Applied Loads

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

Beam self weight calculated and added to loads

Uniform Load : D = 0.0190, L = 0.060 ksf, Tributary Width = 3.750 ft, (Roof deck)

Uniform Load : D = 0.0160 ksf, Tributary Width = 6.50 ft, (From wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.174	1	Maximum Shear Stress Ratio	=	0.094	: 1
Section used for this span		6x8		Section used for this span		6x8	
fb: Actual	=	270.44	psi	fv: Actual	=	29.30	psi
Fb: Allowable	=	1,552.26	psi	Fv: Allowable	=	311.04	psi
Load Combination		+1.20D+0.50Lr+1.60L+1.60H		Load Combination		+1.20D+0.50Lr+1.60L+1.60H	
Location of maximum on span	=	2.000	ft	Location of maximum on span	=	3.387	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.004	in	Ratio =	11391	>=360	
Max Upward Transient Deflection		0.000	in	Ratio =	0	<360	
Max Downward Total Deflection		0.008	in	Ratio =	6263	>=240	
Max Upward Total Deflection		0.000	in	Ratio =	0	<240	

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.818	0.818
Overall MINimum	0.450	0.450
+D+H	0.368	0.368
+D+L+H	0.818	0.818
+D+Lr+H	0.368	0.368
+D+S+H	0.368	0.368
+D+0.750Lr+0.750L+H	0.706	0.706
+D+0.750L+0.750S+H	0.706	0.706
+D+0.60W+H	0.368	0.368
+D+0.750Lr+0.450W+H	0.368	0.368
+D+0.750S+0.450W+H	0.368	0.368
+0.60D+0.60W+0.60H	0.221	0.221
+D+0.70E+0.60H	0.368	0.368

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L+0.750S+0.5250E+H	0.706	0.706
+0.60D+0.70E+H	0.221	0.221
D Only	0.368	0.368
L Only	0.450	0.450
H Only		

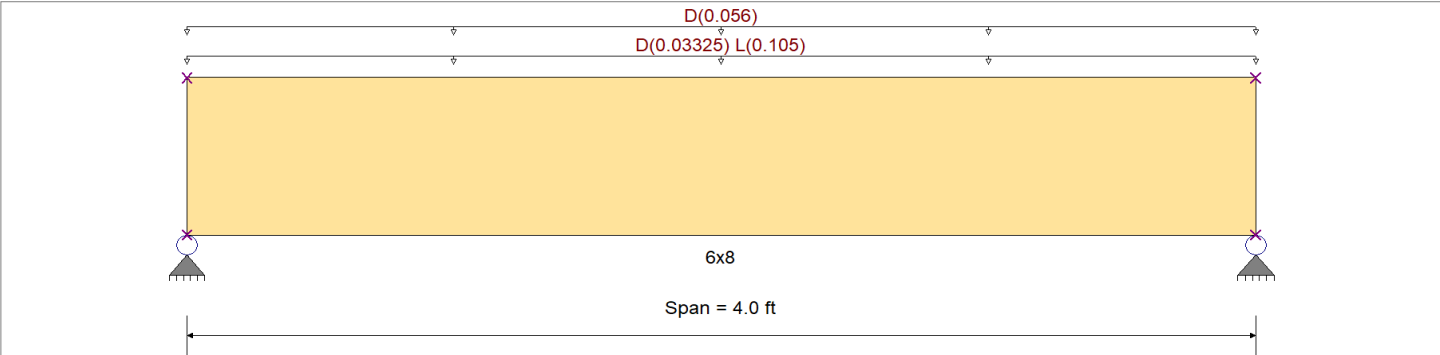
DESCRIPTION: HDR-6A

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	900.0	psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	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 :	Completely Unbraced					



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0190, L = 0.060 ksf, Tributary Width = 1.750 ft, (Roof deck)
Uniform Load : D = 0.0160 ksf, Tributary Width = 3.50 ft, (From wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.086	1	Maximum Shear Stress Ratio	=	0.046	: 1
Section used for this span		6x8		Section used for this span		6x8	
fb: Actual	=	133.04	psi	fv: Actual	=	14.41	psi
Fb: Allowable	=	1,552.26	psi	Fv: Allowable	=	311.04	psi
Load Combination		+1.20D+0.50Lr+1.60L+1.60H		Load Combination		+1.20D+0.50Lr+1.60L+1.60H	
Location of maximum on span	=	2.000	ft	Location of maximum on span	=	3.387	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.002	in	Ratio =		24410	>=360
Max Upward Transient Deflection		0.000	in	Ratio =		0	<360
Max Downward Total Deflection		0.004	in	Ratio =		12614	>=240
Max Upward Total Deflection		0.000	in	Ratio =		0	<240

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.406	0.406
Overall MINimum	0.210	0.210
+D+H	0.196	0.196
+D+L+H	0.406	0.406
+D+Lr+H	0.196	0.196
+D+S+H	0.196	0.196
+D+0.750Lr+0.750L+H	0.354	0.354
+D+0.750L+0.750S+H	0.354	0.354
+D+0.60W+H	0.196	0.196
+D+0.750Lr+0.450W+H	0.196	0.196
+D+0.750S+0.450W+H	0.196	0.196
+0.60D+0.60W+0.60H	0.118	0.118
+D+0.70E+0.60H	0.196	0.196

DESCRIPTION: HDR-6A

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L+0.750S+0.5250E+H	0.354	0.354
+0.60D+0.70E+H	0.118	0.118
D Only	0.196	0.196
L Only	0.210	0.210
H Only		

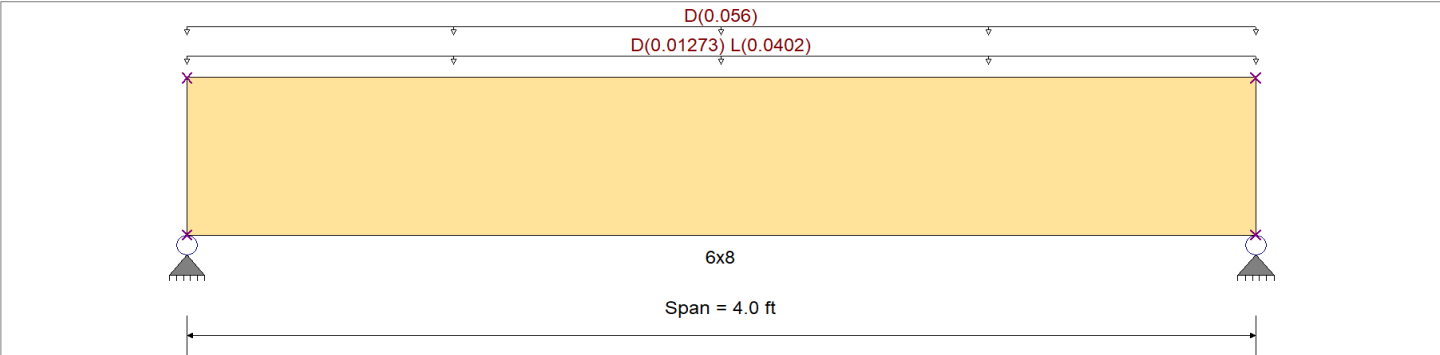
DESCRIPTION: HDR-7A

CODE REFERENCES

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

Material Properties

Analysis Method :	Load Resistance Factor D	Fb +	900.0	psi	E : Modulus of Elasticity	
Load Combination :	ASCE 7-16	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 :	Completely Unbraced					



Applied Loads

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

Beam self weight calculated and added to loads
Uniform Load : D = 0.0190, L = 0.060 ksf, Tributary Width = 0.670 ft, (Roof deck)
Uniform Load : D = 0.0160 ksf, Tributary Width = 3.50 ft, (From wall above)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.047	1	Maximum Shear Stress Ratio	=	0.026	1
Section used for this span		6x8		Section used for this span		6x8	
fb: Actual	=	73.32	psi	fv: Actual	=	7.94	psi
Fb: Allowable	=	1,552.26	psi	Fv: Allowable	=	311.04	psi
Load Combination		+1.20D+0.50Lr+1.60L+1.60H		Load Combination		+1.20D+0.50Lr+1.60L+1.60H	
Location of maximum on span	=	2.000	ft	Location of maximum on span	=	3.387	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.000	in	Ratio =		0	<360
Max Upward Transient Deflection		0.000	in	Ratio =		0	<360
Max Downward Total Deflection		0.002	in	Ratio =		21745	>=240
Max Upward Total Deflection		0.000	in	Ratio =		0	<240

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.236	0.236
Overall MINimum	0.080	0.080
+D+H	0.155	0.155
+D+L+H	0.236	0.236
+D+Lr+H	0.155	0.155
+D+S+H	0.155	0.155
+D+0.750Lr+0.750L+H	0.216	0.216
+D+0.750L+0.750S+H	0.216	0.216
+D+0.60W+H	0.155	0.155
+D+0.750Lr+0.450W+H	0.155	0.155
+D+0.750S+0.450W+H	0.155	0.155
+0.60D+0.60W+0.60H	0.093	0.093
+D+0.70E+0.60H	0.155	0.155

DESCRIPTION: HDR-7A

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L+0.750S+0.5250E+H	0.216	0.216
+0.60D+0.70E+H	0.093	0.093
D Only	0.155	0.155
L Only	0.080	0.080
H Only		