

Wood Beam

File = \EGRS\SHARES\Homes\NAU\gjc43\DOCUME-1\CENE486\Enercalc\ROOFJO-1.EC6
ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.30

Lic. #: KW-06090388 - Educational Version

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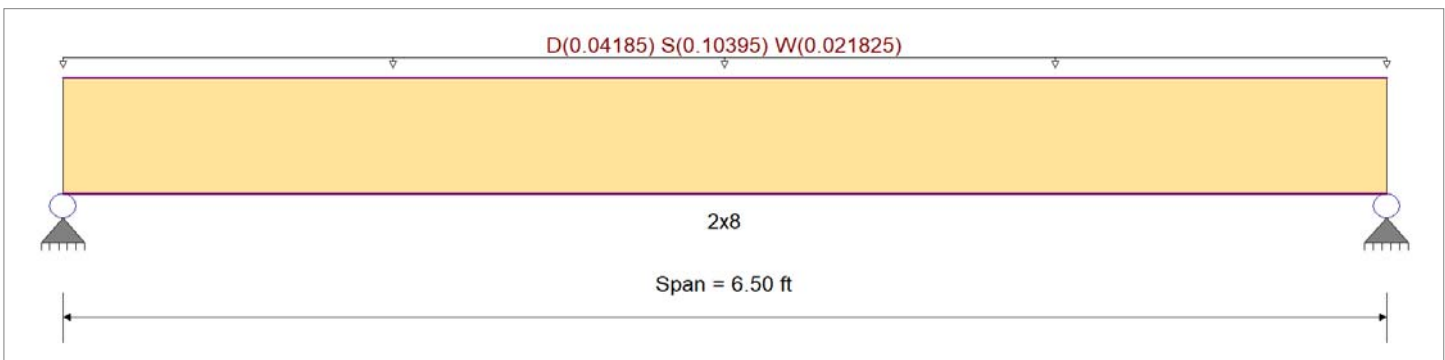
Description : Gable Roof Joist

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Load Resistance Factor D	Fb +	850.0 psi	E : Modulus of Elasticity
Load Combination IBC 2015	Fb -	850.0 psi	Ebend- xx
	Fc - Prll	1,300.0 psi	Eminbend - xx
Wood Species : Hem Fir	Fc - Perp	405.0 psi	
Wood Grade : No.2	Fv	150.0 psi	Density
	Ft	525.0 psi	26.830pcf
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

Uniform Load : D = 0.01860, S = 0.04620, W = 0.00970 ksf, Tributary Width = 2.250 ft, (Roof Snow Load)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.786 : 1	Maximum Shear Stress Ratio =	0.325 : 1
Section used for this span	2x8	Section used for this span	2x8
fb : Actual =	1,108.69 psi	fv : Actual =	84.25 psi
FB : Allowable =	1,410.05 psi	Fv : Allowable =	259.20 psi
Load Combination	+1.20D+1.60S+0.50W+1.60H	Load Combination	+1.20D+1.60S+0.50W+1.60H
Location of maximum on span	= 3.250ft	Location of maximum on span	= 5.907 ft
Span # where maximum occurs	= Span # 1	Span # where maximum occurs	= Span # 1
Maximum Deflection			
Max Downward Transient Deflection	0.068 in	Ratio =	1150 >=240
Max Upward Transient Deflection	-0.014 in	Ratio =	5478 >=240
Max Downward Total Deflection	0.096 in	Ratio =	808 >=180
Max Upward Total Deflection	0.000 in	Ratio =	0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values					
			M	V	λ	C _{FV}	C _i	C _r	C _m	C _t	C _L	Mu	fb	Fb	Vu	fv	Fv		
+1.40D+1.60H	Length = 6.50 ft	1	0.374	0.116	0.60	1.200	1.00	1.00	1.00	1.00	1.00	0.32	296.25	793.15	0.00	0.00	0.00	0.00	194.40
+1.20D+0.50Lr+1.60L+1.60H	Length = 6.50 ft	1	0.180	0.074	0.80	1.200	1.00	1.00	1.00	1.00	1.00	0.28	253.93	1410.05	0.00	0.00	0.00	0.00	259.20
+1.20D+1.60Lr+0.50S+1.60H	Length = 6.50 ft	1	0.358	0.148	0.80	1.200	1.00	1.00	1.00	1.00	1.00	0.55	504.60	1410.05	0.00	0.00	0.00	0.00	259.20
+1.20D+1.60Lr+0.50L+1.60H	Length = 6.50 ft	1	0.180	0.074	0.80	1.200	1.00	1.00	1.00	1.00	1.00	0.28	253.93	1410.05	0.00	0.00	0.00	0.00	259.20
+1.20D+1.60Lr+0.50W+1.60H						1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	0.00	0.00

Commercial Use Not Allowed

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Description: Gable Roof Joist

Load Combination	Segment Length	Span #	Max Stress Ratios							Moment Values				Shear Values		
			M	V	λ	C_{FV}	C_i	C_r	C_m	C_t	C_L	Mu	Fb	Fb	Vu	Vv
Length = 6.50 ft	1	0.217	0.090	0.80	1.200	1.00	1.00	1.00	1.00	1.00	0.34	306.56	1410.05	0.17	23.29	259.20
+1.20D+1.60Lr-0.50W+1.60H	1	0.143	0.059	0.80	1.200	1.00	1.00	1.00	1.00	1.00	0.22	201.30	1410.05	0.00	0.00	0.00
Length = 6.50 ft	1	0.749	0.310	0.80	1.200	1.00	1.00	1.00	1.00	1.00	1.16	1,056.06	1410.05	0.58	80.25	259.20
+1.20D+0.50L+1.60S+1.60H	1	0.786	0.325	0.80	1.200	1.00	1.00	1.00	1.00	1.00	1.21	1,108.69	1410.05	0.61	84.25	259.20
Length = 6.50 ft	1	0.712	0.294	0.80	1.200	1.00	1.00	1.00	1.00	1.00	1.10	1,003.43	1410.05	0.55	76.25	259.20
+1.20D+1.60S-0.50W+1.60H	1	0.163	0.084	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.39	359.19	2203.20	0.20	27.29	324.00
Length = 6.50 ft	1	0.067	0.035	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.16	148.67	2203.20	0.08	11.30	324.00
+1.20D+0.50Lr+0.50L+W+1.60H	1	0.277	0.143	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.67	609.85	2203.20	0.34	46.34	324.00
Length = 6.50 ft	1	0.181	0.094	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.44	399.34	2203.20	0.22	30.34	324.00
+1.20D+0.50L+0.50S-W+1.60H	1	0.275	0.142	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.66	604.86	2203.20	0.33	45.96	324.00
Length = 6.50 ft	1	0.134	0.069	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.32	295.71	2203.20	0.16	22.47	324.00
+0.90D+W+0.90H	1	0.039	0.020	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.09	85.19	2203.20	0.05	6.47	324.00
Length = 6.50 ft	1	0.086	0.045	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.21	190.45	2203.20	0.10	14.47	324.00
+0.90D-E+0.90H	1															

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0964	3.274		0.0000	0.000

Vertical Reactions

Support notation: Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.480	0.480
Overall MINimum	-0.071	-0.071
+D+H	0.143	0.143
+D+L+H	0.143	0.143
+D+Lr+H	0.143	0.143
+D+S+H	0.480	0.480
+D+0.750Lr+0.750L+H	0.143	0.143
+D+0.750L+0.750S+H	0.396	0.396
+D+0.60W+H	0.185	0.185
+D-0.60W+H	0.100	0.100
+D+0.70E+H	0.143	0.143
+D+0.750Lr+0.750L+0.450W+H	0.175	0.175
+D+0.750Lr+0.750L-0.450W+H	0.111	0.111
+D+0.750L+0.750S+0.450W+H	0.428	0.428
+D+0.750L+0.750S-0.450W+H	0.364	0.364
+D+0.750L+0.750S+0.5250E+H	0.396	0.396
+0.60D+0.60W+0.60H	0.128	0.128
+0.60D-0.60W+0.60H	0.043	0.043
+0.60D+0.70E+0.60H	0.086	0.086
D Only	0.143	0.143
Lr Only		
L Only		
S Only	0.338	0.338
W Only	0.071	0.071
-W	-0.071	-0.071
E Only		
H Only		

Wall Footing

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Lic. # : KW-06090388 - Educational Version

Description : Continuous strip foundation

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
 Load Combinations Used : IBC 2015

General Information

Material Properties

f_c : Concrete 28 day strength	=	3.0 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	=	2.0 : 1
Min. Sliding Safety Factor	=	2.0 : 1
AutoCalc Footing Weight as DL	=	Yes

Soil Design Values

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

Increases based on footing Depth

Reference Depth below Surface	=	ft
Allow. Pressure Increase per foot of depth when base footing is below	=	ksf
	=	ft

Increases based on footing Width

Allow. Pressure Increase per foot of width when footing is wider than	=	ksf
	=	ft

Adjusted Allowable Bearing Pressure

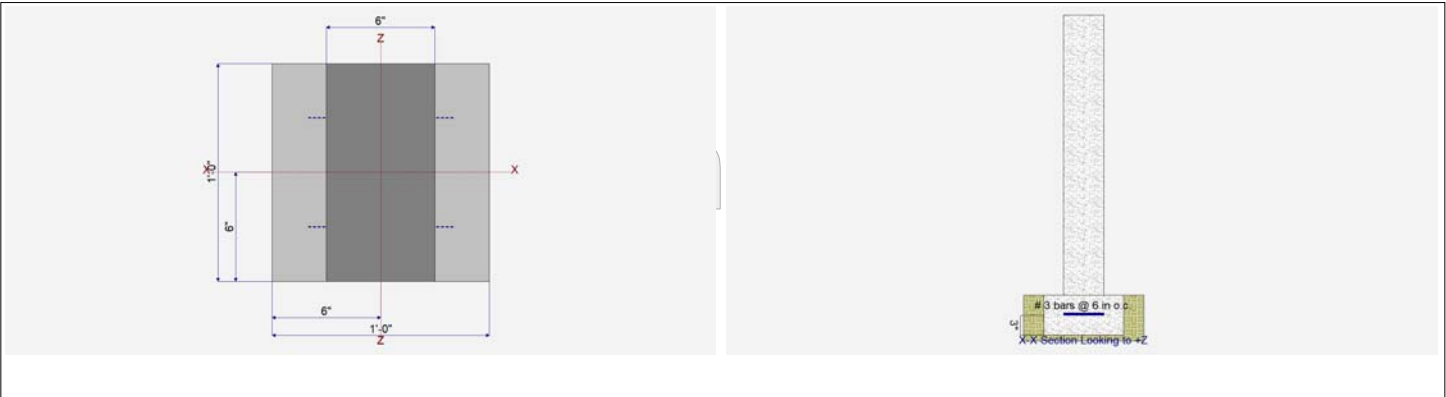
= 1.50 ksf

Dimensions

Footing Width	=	1.0 ft
Wall Thickness	=	6.0 in
Wall center offset from center of footing	=	0 in

Reinforcing

Footing Thickness	=	6.0 in	Bars along X-X Axis	=	
Rebar Centerline to Edge of Concrete... at Bottom of footing	=	3.0 in	Bar spacing	=	6.00
			Reinforcing Bar Size	=	# 3



Applied Loads

	D	Lr	L	S	W	E	H	
P : Column Load	=	0.170		0.3760	0.770			k
OB : Overburden	=							ksf
V-x	=							k
M-zz	=							k-ft
Vx applied	=							in above top of footing

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Wall Footing

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Description : Continuous strip foundation

Design OK

DESIGN SUMMARY

Factor of Safety	Item	Applied	Capacity	Governing Load Combination	
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	Uplift	0.0 k	0.0 k	No Uplift

Utilization Ratio	Item	Applied	Capacity	Governing Load Combination	
PASS	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
PASS	0.0	Z Flexure (+X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	0.0	Z Flexure (-X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	n/a	1-way Shear (+X)	0.0 psi	0.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
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Overturning Stability

Units : k-ft

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

Sliding Stability

Force Application Axis & Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status
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Footing Has NO Sliding

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
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One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
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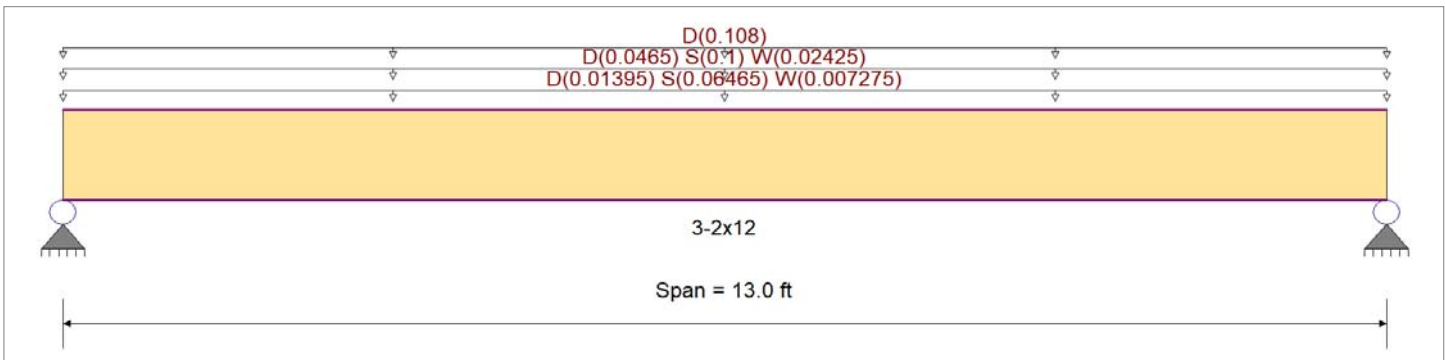
Description : Flat Roof Beam 1

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Stress Design	Fb +	875.0 psi	E : Modulus of Elasticity
Load Combination IBC 2015	Fb -	875.0 psi	Ebend- xx
	Fc - Prll	600.0 psi	Eminbend - xx
Wood Species : Douglas Fir - Larch	Fc - Perp	625.0 psi	
Wood Grade : No.2	Fv	170.0 psi	
	Ft	425.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			31.20 pcf



Applied Loads

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

Beam self weight calculated and added to loads

Uniform Load : D = 0.01860, S = 0.08620, W = 0.00970 ksf, Tributary Width = 0.750 ft, (Lower Roof)

Uniform Load : D = 0.01860, S = 0.040, W = 0.00970 ksf, Tributary Width = 2.50 ft, (Upper Roof)

Uniform Load : D = 0.0120 ksf, Tributary Width = 9.0 ft, (Wall Weight)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.913	1	Maximum Shear Stress Ratio	=	0.292	1
Section used for this span		3-2x12		Section used for this span		3-2x12	
fb : Actual	=	918.88	psi	fv : Actual	=	57.08	psi
FB : Allowable	=	1,006.25	psi	Fv : Allowable	=	195.50	psi
Load Combination		+D+S+H		Load Combination		+D+S+H	
Location of maximum on span	=	6.500	ft	Location of maximum on span	=	12.099	ft
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.153	in	Ratio =		1017	>=240
Max Upward Transient Deflection		0.000	in	Ratio =		0	<240
Max Downward Total Deflection		0.320	in	Ratio =		486	>=180
Max Upward Total Deflection		0.000	in	Ratio =		0	<180

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values					
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v			
+D+H	Length = 13.0 ft	1	0.608	0.195	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.79	479.16	787.50	0.00	0.00	0.00	0.00
+D+L+H	Length = 13.0 ft	1	0.548	0.175	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.79	479.16	875.00	0.00	0.00	0.00	0.00

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Description: Flat Roof Beam 1

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values				
			M	V	C _d	C _{FV}	C _i	C _r	C _m	C _t	C _L	M	F _b	F _b '	V	V	F _v	
+D+Lr+H	Length = 13.0 ft	1	0.438	0.140	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.79	479.16	1093.75	0.00	0.00	0.00	0.00
+D+S+H	Length = 13.0 ft	1	0.913	0.292	1.15	1.000	1.00	1.00	1.00	1.00	7.27	918.88	1006.25	1.93	57.08	195.50	0.00	0.00
+D+0.750Lr+0.750L+H	Length = 13.0 ft	1	0.438	0.140	1.25	1.000	1.00	1.00	1.00	1.00	3.79	479.16	1093.75	1.00	29.76	212.50	0.00	0.00
+D+0.750L+0.750S+H	Length = 13.0 ft	1	0.804	0.257	1.15	1.000	1.00	1.00	1.00	1.00	6.40	808.95	1006.25	1.70	50.25	195.50	0.00	0.00
+D+0.60W+H	Length = 13.0 ft	1	0.378	0.121	1.60	1.000	1.00	1.00	1.00	1.00	4.19	529.67	1400.00	1.11	32.90	272.00	0.00	0.00
+D+0.70E+H	Length = 13.0 ft	1	0.342	0.109	1.60	1.000	1.00	1.00	1.00	1.00	3.79	479.16	1400.00	1.00	29.76	272.00	0.00	0.00
+D+0.750Lr+0.750L+0.450W+H	Length = 13.0 ft	1	0.369	0.118	1.60	1.000	1.00	1.00	1.00	1.00	4.09	517.04	1400.00	1.08	32.12	272.00	0.00	0.00
+D+0.750L+0.750S+0.450W+H	Length = 13.0 ft	1	0.605	0.193	1.60	1.000	1.00	1.00	1.00	1.00	6.70	846.83	1400.00	1.78	52.60	272.00	0.00	0.00
+D+0.750L+0.750S+0.5250E+H	Length = 13.0 ft	1	0.578	0.185	1.60	1.000	1.00	1.00	1.00	1.00	6.40	808.95	1400.00	1.70	50.25	272.00	0.00	0.00
+0.60D+0.60W+0.60H	Length = 13.0 ft	1	0.241	0.077	1.60	1.000	1.00	1.00	1.00	1.00	2.67	338.01	1400.00	0.71	21.00	272.00	0.00	0.00
+0.60D+0.70E+0.60H	Length = 13.0 ft	1	0.205	0.066	1.60	1.000	1.00	1.00	1.00	1.00	2.27	287.50	1400.00	0.60	17.86	272.00	0.00	0.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.3204	6.547		0.0000	0.000

Vertical Reactions

Support notation: Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.236	2.236
Overall MINimum	0.205	0.205
+D+H	1.166	1.166
+D+L+H	1.166	1.166
+D+Lr+H	1.166	1.166
+D+S+H	2.236	2.236
+D+0.750Lr+0.750L+H	1.166	1.166
+D+0.750L+0.750S+H	1.969	1.969
+D+0.60W+H	1.289	1.289
+D+0.70E+H	1.166	1.166
+D+0.750Lr+0.750L+0.450W+H	1.258	1.258
+D+0.750L+0.750S+0.450W+H	2.061	2.061
+D+0.750L+0.750S+0.5250E+H	1.969	1.969
+0.60D+0.60W+0.60H	0.823	0.823
+0.60D+0.70E+0.60H	0.700	0.700
D Only	1.166	1.166
Lr Only		
L Only		
S Only	1.070	1.070
W Only	0.205	0.205
E Only		
H Only		

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Description: Flat roof Joist

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set: IBC 2015

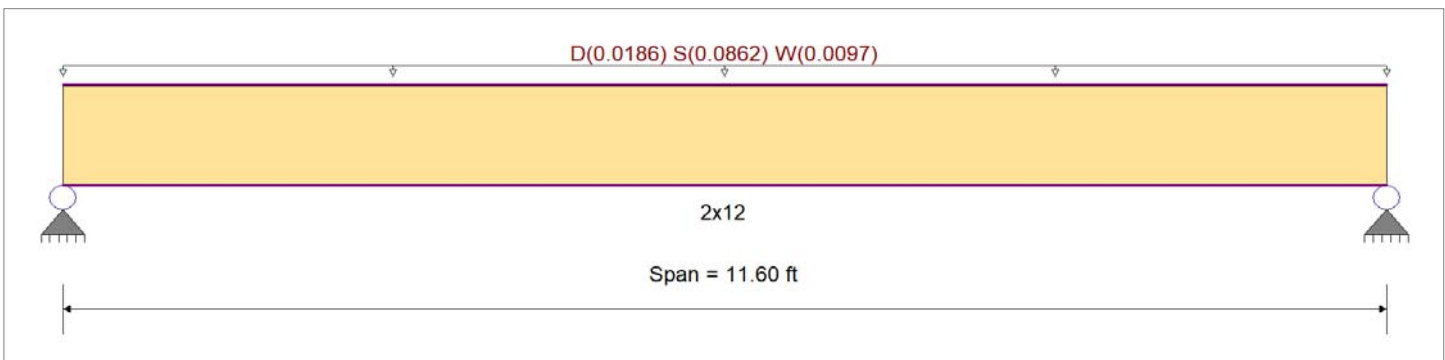
Material Properties

Analysis Method: Allowable Stress Design
Load Combination: IBC 2015

Wood Species: Hem Fir
Wood Grade: No.2

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

Fb +	675.0 psi	E: Modulus of Elasticity	
Fb -	675.0 psi	Ebend- xx	1,100.0 ksi
Fc - Prll	500.0 psi	Eminbend - xx	400.0 ksi
Fc - Perp	405.0 psi		
Fv	140.0 psi		
Ft	350.0 psi	Density	26.830 pcf



Applied Loads

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

Uniform Load: D = 0.01860, S = 0.08620, W = 0.00970, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.861 : 1	Maximum Shear Stress Ratio	=	0.282 : 1
Section used for this span		2x12	Section used for this span		2x12
fb: Actual	=	668.53 psi	fv: Actual	=	45.35 psi
FB: Allowable	=	776.25 psi	Fv: Allowable	=	161.00 psi
Load Combination	=	+D+S+H	Load Combination	=	+D+S+H
Location of maximum on span	=	5.800ft	Location of maximum on span	=	0.000ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.180 in	Ratio =		771 >=240
Max Upward Transient Deflection		-0.020 in	Ratio =		6856 >=240
Max Downward Total Deflection		0.219 in	Ratio =		634 >=180
Max Upward Total Deflection		0.000 in	Ratio =		0 <180

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values			
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
+D+H	Length = 11.60 ft	1	0.195	0.064	0.90	1.000	1.00	1.00	1.00	1.00	1.00	0.31	118.65	607.50	0.09	8.05	126.00
+D+L+H	Length = 11.60 ft	1	0.176	0.057	1.00	1.000	1.00	1.00	1.00	1.00	1.00	0.31	118.65	675.00	0.09	8.05	140.00
+D+Lr+H	Length = 11.60 ft	1	0.141	0.046	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.31	118.65	843.75	0.09	8.05	175.00
+D+S+H	Length = 11.60 ft	1	0.861	0.282	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.76	668.53	776.25	0.51	45.35	161.00
+D+0.750Lr+0.750L+H	Length = 11.60 ft	1	0.141	0.046	1.25	1.000	1.00	1.00	1.00	1.00	1.00	0.31	118.65	843.75	0.09	8.05	175.00

Commercial Use Not Allowed

Wood Beam

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Description: Flat roof Joist

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	F _b	F _b '	V	V _v	F _v	
+D+0.750L+0.750S+H	Length = 11.60 ft	1	0.684	0.224	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.40	531.06	776.25	0.00	0.00	0.00	161.00
+D+0.60W+H	Length = 11.60 ft	1	0.144	0.047	1.60	1.000	1.00	1.00	1.00	1.00	0.41	155.78	1080.00	0.00	0.00	0.00	0.00	224.00
+D-0.60W+H	Length = 11.60 ft	1	0.075	0.025	1.60	1.000	1.00	1.00	1.00	1.00	0.21	81.53	1080.00	0.00	0.00	0.00	0.00	224.00
+D+0.70E+H	Length = 11.60 ft	1	0.110	0.036	1.60	1.000	1.00	1.00	1.00	1.00	0.31	118.65	1080.00	0.00	0.00	0.00	0.00	224.00
+D+0.750Lr+0.750L+0.450W+H	Length = 11.60 ft	1	0.136	0.044	1.60	1.000	1.00	1.00	1.00	1.00	0.39	146.50	1080.00	0.00	0.00	0.00	0.00	224.00
+D+0.750Lr+0.750L-0.450W+H	Length = 11.60 ft	1	0.084	0.028	1.60	1.000	1.00	1.00	1.00	1.00	0.24	90.81	1080.00	0.00	0.00	0.00	0.00	224.00
+D+0.750L+0.750S+0.450W+H	Length = 11.60 ft	1	0.518	0.169	1.60	1.000	1.00	1.00	1.00	1.00	1.47	558.91	1080.00	0.00	0.00	0.00	0.00	224.00
+D+0.750L+0.750S-0.450W+H	Length = 11.60 ft	1	0.466	0.152	1.60	1.000	1.00	1.00	1.00	1.00	1.33	503.22	1080.00	0.00	0.00	0.00	0.00	224.00
+D+0.750L+0.750S+0.5250E+H	Length = 11.60 ft	1	0.492	0.161	1.60	1.000	1.00	1.00	1.00	1.00	1.40	531.06	1080.00	0.00	0.00	0.00	0.00	224.00
+0.60D+0.60W+0.60H	Length = 11.60 ft	1	0.100	0.033	1.60	1.000	1.00	1.00	1.00	1.00	0.29	108.32	1080.00	0.00	0.00	0.00	0.00	224.00
+0.60D-0.60W+0.60H	Length = 11.60 ft	1	0.032	0.010	1.60	1.000	1.00	1.00	1.00	1.00	0.09	34.06	1080.00	0.00	0.00	0.00	0.00	224.00
+0.60D+0.70E+0.60H	Length = 11.60 ft	1	0.066	0.022	1.60	1.000	1.00	1.00	1.00	1.00	0.19	71.19	1080.00	0.00	0.00	0.00	0.00	224.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.2194	5.842		0.0000	0.000

Vertical Reactions

Support notation: Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.608	0.608
Overall MINimum	-0.056	-0.056
+D+H	0.108	0.108
+D+L+H	0.108	0.108
+D+Lr+H	0.108	0.108
+D+S+H	0.608	0.608
+D+0.750Lr+0.750L+H	0.108	0.108
+D+0.750L+0.750S+H	0.483	0.483
+D+0.60W+H	0.142	0.142
+D-0.60W+H	0.074	0.074
+D+0.70E+H	0.108	0.108
+D+0.750Lr+0.750L+0.450W+H	0.133	0.133
+D+0.750Lr+0.750L-0.450W+H	0.083	0.083
+D+0.750L+0.750S+0.450W+H	0.508	0.508
+D+0.750L+0.750S-0.450W+H	0.458	0.458
+D+0.750L+0.750S+0.5250E+H	0.483	0.483
+0.60D+0.60W+0.60H	0.098	0.098
+0.60D-0.60W+0.60H	0.031	0.031
+0.60D+0.70E+0.60H	0.065	0.065
D Only	0.108	0.108
Lr Only		
L Only		
S Only	0.500	0.500
W Only	0.056	0.056
-W	-0.056	-0.056
E Only		
H Only		

Wood Beam

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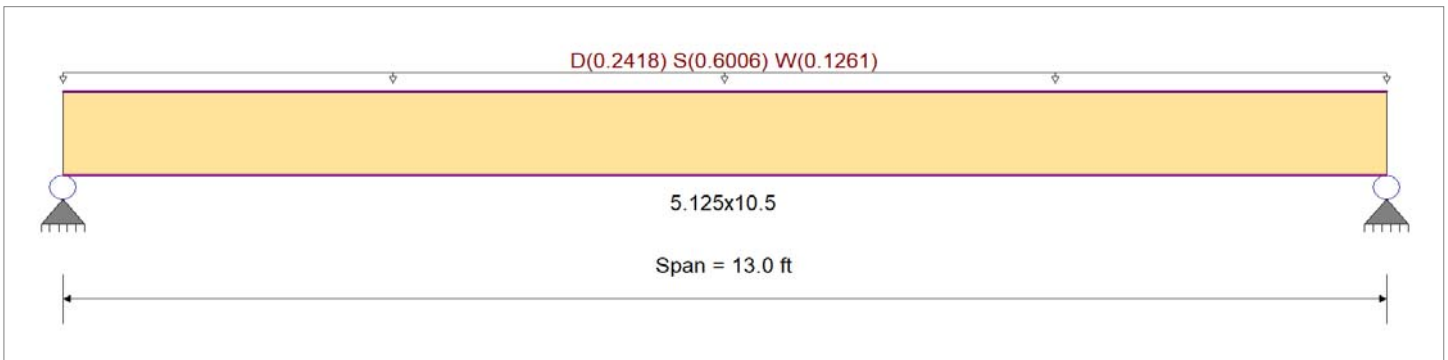
Description: Ridge Beam

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set: IBC 2015

Material Properties

Analysis Method: Load Resistance Factor D	Fb +	2400 psi	E: Modulus of Elasticity	
Load Combination IBC 2015	Fb -	1850 psi	Ebend- xx	1800 ksi
	Fc - Prll	1650 psi	Eminbend - xx	950 ksi
Wood Species: DF/DF	Fc - Perp	650 psi	Ebend- yy	1600 ksi
Wood Grade: 24F - V4	Fv	265 psi	Eminbend - yy	850 ksi
	Ft	1100 psi	Density	31.2pcf
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

Uniform Load: D = 0.01860, S = 0.04620, W = 0.00970 ksf, Tributary Width = 13.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = 0.862 < 1	Maximum Shear Stress Ratio = 0.456 < 1
Section used for this span: 5.125x10.5	Section used for this span: 5.125x10.5
fb: Actual = 3,575.26 psi	fv: Actual = 209.03 psi
FB: Allowable = 4,147.20 psi	Fv: Allowable = 457.92 psi
Load Combination: +1.20D+1.60S+0.50W+1.60H	Load Combination: +1.20D+1.60S+0.50W+1.60H
Location of maximum on span = 6.500ft	Location of maximum on span = 12.146 ft
Span # where maximum occurs = Span # 1	Span # where maximum occurs = Span # 1
Maximum Deflection	
Max Downward Transient Deflection: 0.436 in	Ratio = 357 >= 240
Max Upward Transient Deflection: -0.092 in	Ratio = 1703 >= 240
Max Downward Total Deflection: 0.620 in	Ratio = 251 >= 180
Max Upward Total Deflection: 0.000 in	Ratio = 0 < 180

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values				
			M	V	λ	C _{FV}	C _i	C _r	C _m	C _t	C _L	Mu	fb	Fb	Vu	fv	Fv	
+1.40D+1.60H	Length = 13.0 ft	1	0.307	0.163	0.60	1.000	1.00	1.00	1.00	1.00	1.00	7.50	955.20	3110.40	0.00	0.00	0.00	0.00
+1.20D+0.50Lr+1.60L+1.60H	Length = 13.0 ft	1	0.197	0.105	0.80	1.000	1.00	1.00	1.00	1.00	1.00	6.43	818.74	4147.20	0.00	0.00	0.00	0.00
+1.20D+1.60Lr+0.50S+1.60H	Length = 13.0 ft	1	0.392	0.208	0.80	1.000	1.00	1.00	1.00	1.00	1.00	12.77	1,627.11	4147.20	0.00	0.00	0.00	0.00
+1.20D+1.60Lr+0.50L+1.60H	Length = 13.0 ft	1	0.197	0.105	0.80	1.000	1.00	1.00	1.00	1.00	1.00	6.43	818.74	4147.20	0.00	0.00	0.00	0.00
+1.20D+1.60Lr+0.50W+1.60H			1.000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	0.00

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Wood Beam

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Description: Ridge Beam

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values			
			M	V	λ	C _{FV}	C _i	C _r	C _m	C _t	C _L	Mu	Fb	Fb	Vu	Vv	Fv
Length = 13.0 ft	1	0.238	0.126	0.80	1.000	1.00	1.00	1.00	1.00	1.00	1.00	7.76	988.46	4147.20	2.07	57.79	457.92
+1.20D+1.60Lr-0.50W+1.60H	1	0.156	0.083	0.80	1.000	1.00	1.00	1.00	1.00	1.00	1.00	5.09	649.02	4147.20	1.36	37.94	457.92
Length = 13.0 ft	1	0.821	0.435	0.80	1.000	1.00	1.00	1.00	1.00	1.00	1.00	26.73	3,405.54	4147.20	7.14	199.10	457.92
+1.20D+0.50L+1.60S+1.60H	1	0.862	0.456	0.80	1.000	1.00	1.00	1.00	1.00	1.00	1.00	28.06	3,575.26	4147.20	7.50	209.03	457.92
Length = 13.0 ft	1	0.780	0.413	0.80	1.000	1.00	1.00	1.00	1.00	1.00	1.00	25.39	3,235.81	4147.20	6.79	189.18	457.92
+1.20D+1.60S-0.50W+1.60H	1	0.223	0.118	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	9.09	1,158.19	5184.00	2.43	67.71	572.40
Length = 13.0 ft	1	0.092	0.049	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	3.76	479.29	5184.00	1.01	28.02	572.40
+1.20D+0.50Lr+0.50L+W+1.60H	1	0.379	0.201	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	15.43	1,966.56	5184.00	4.12	114.97	572.40
Length = 13.0 ft	1	0.248	0.132	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	10.11	1,287.67	5184.00	2.70	75.28	572.40
+1.20D+0.50L+0.50S-W+1.60H	1	0.376	0.199	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	15.31	1,950.46	5184.00	4.09	114.03	572.40
Length = 13.0 ft	1	0.184	0.097	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	7.48	953.50	5184.00	2.00	55.75	572.40
+1.20D+0.50L+0.70S+E+1.60H	1	0.053	0.028	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	2.16	274.61	5184.00	0.58	16.05	572.40
+0.90D+W+0.90H	1	0.118	0.063	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	4.82	614.06	5184.00	1.29	35.90	572.40
Length = 13.0 ft	1				1.000	1.00	1.00	1.00	1.00	1.00	1.00						
+0.90D-W+0.90H	1				1.000	1.00	1.00	1.00	1.00	1.00	1.00						
Length = 13.0 ft	1				1.000	1.00	1.00	1.00	1.00	1.00	1.00						
+0.90D+E+0.90H	1				1.000	1.00	1.00	1.00	1.00	1.00	1.00						
Length = 13.0 ft	1				1.000	1.00	1.00	1.00	1.00	1.00	1.00						

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.6203	6.547		0.0000	0.000

Vertical Reactions

Support notation: Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.551	5.551
Overall MINimum	-0.820	-0.820
+D+H	1.647	1.647
+D+L+H	1.647	1.647
+D+Lr+H	1.647	1.647
+D+S+H	5.551	5.551
+D+0.750Lr+0.750L+H	1.647	1.647
+D+0.750L+0.750S+H	4.575	4.575
+D+0.60W+H	2.139	2.139
+D-0.60W+H	1.156	1.156
+D+0.70E+H	1.647	1.647
+D+0.750Lr+0.750L+0.450W+H	2.016	2.016
+D+0.750Lr+0.750L-0.450W+H	1.279	1.279
+D+0.750L+0.750S+0.450W+H	4.944	4.944
+D+0.750L+0.750S-0.450W+H	4.207	4.207
+D+0.750L+0.750S+0.5250E+H	4.575	4.575
+0.60D+0.60W+0.60H	1.480	1.480
+0.60D-0.60W+0.60H	0.497	0.497
+0.60D+0.70E+0.60H	0.988	0.988
D Only	1.647	1.647
Lr Only		
L Only		
S Only	3.904	3.904
W Only	0.820	0.820
-W	-0.820	-0.820
E Only		
H Only		

Wood Shear Wall

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Description : --None--

Shear Panel Summary

Panel ID	Level #	Max Shear (kips)	Load Comb	# Sides		Shear Summary & Attachment		
				Used	Actual (plf)	Allow	Status	Attachment
					Height/Width Ratio			
					Actual	Allow	Notes	

Chord Summary

Chord ID	Level #	Dist from Left (ft)	Force (kips)	Load Comb	CHORD DESIGN SUMMARY				
					# Req'd @ Location	Member Size	Stress Ratio	Governs	Status
Chord Naming Information : C : Item is a Chord L : Followed by level number # : Followed by chord number from left to right WL : Indicates Chord is on left edge of wall WR : Indicates Chord is on right edge of wall									

Commercial Use Not Allowed

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Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.30

Lic. #: KW-06090388 - Educational Version

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Description: Ridge Beam Support Column

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used: IBC 2015

General Information

Analysis Method: **Load Resistance Factor Design**
End Fixities: **Top & Bottom Pinned**
Overall Column Height: **10.6 ft**
(Used for non-slender calculations)

Wood Section Name: **3-2x6**
Wood Grading/Manuf.: **Graded Lumber**
Wood Member Type: **Sawn**

Wood Species: **Hem Fir**
Wood Grade: **No.2**
Fb +: **850 psi** Fv: **150 psi**
Fb -: **850 psi** Ft: **525 psi**
Fc - Prll: **1300 psi** Density: **26.83 pcf**
Fc - Perp: **405 psi**
E: Modulus of Elasticity...
Basic: **1300** x-x Bending: **1300** y-y Bending: **1300**
Minimum: **470** Axial: **1300 ksi**

Exact Width: **4.50 in** Allow Stress Modification Factors
Exact Depth: **5.50 in** Cf or Cv for Bending: **1.30**
Area: **24.750 in^2** Cf or Cv for Compression: **1.10**
Ix: **62.391 in^4** Cf or Cv for Tension: **1.30**
Iy: **41.766 in^4** Cm: Wet Use Factor: **1.0**
Ct: Temperature Factor: **1.0**
Cfu: Flat Use Factor: **1.0**
Kf: Built-up columns: **1.0**
Use Cr: Repetitive?: **No** NDS 15.3.2

Brace condition for deflection (buckling) along columns:

X-X (width) axis: Lu for X-X Axis buckling: K = 1.0

Y-Y (depth) axis: Lu for Y-Y Axis buckling: K = 1.0

Applied Loads

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

Column self weight included: 48.881 lbs * Dead Load Factor

AXIAL LOADS...

Axial Load at 10.60 ft, D = 5.60 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.4657 : 1**
Load Combination: **+1.40D+1.60H**
Governing NDS Formula: **Comp Only, fc/Fc'**
Location of max. above base: **0.0 ft**
At maximum location values are...
Applied Axial: **7.908 k**
Applied Mx: **0.0 k-ft**
Applied My: **0.0 k-ft**
Fc: Allowable: **686.11 psi**

Maximum SERVICE Lateral Load Reactions...
Top along Y-Y: **0.0 k** Bottom along Y-Y: **0.0 k**
Top along X-X: **0.0 k** Bottom along X-X: **0.0 k**

Maximum SERVICE Load Lateral Deflections...
Along Y-Y: **0.0 in** at **0.0 ft** above base
for load combination: **n/a**
Along X-X: **0.0 in** at **0.0 ft** above base
for load combination: **n/a**

Other Factors used to calculate allowable stresses...

PASS Maximum Shear Stress Ratio = **0.0 : 1**
Load Combination: **+0.90D+E+0.90H**
Location of max. above base: **0.0 ft**
Applied Design Shear: **0.0 psi**
Allowable Shear: **0.0 psi**

	Bending	Compression	Tension
LRFD - Format Conversion factor	2.541	2.400	2.700
LRFD - Resistance factor	0.850	0.900	0.800

Load Combination Results

Load Combination	Lambda	Cp	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+1.40D+1.60H	0.000	0.222	0.4657	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+0.50Lr+1.60L+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60L+0.50S+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60Lr+0.50L+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60Lr+0.50W+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+0.50L+1.60S+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60S+0.50W+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+0.50Lr+0.50L+W+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+0.50L+0.50S+W+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+0.50L+0.70S+E+1.60H	0.000	0.222	0.3992	PASS	0.0 ft	0.0	PASS	0.0 ft
+0.90D+W+0.90H	0.000	0.222	0.2994	PASS	0.0 ft	0.0	PASS	0.0 ft
+0.90D+E+0.90H	0.000	0.222	0.2994	PASS	0.0 ft	0.0	PASS	0.0 ft

Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.3f

Lic. #: KW-06090388 - Educational Version

Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : Ridge Beam Support Column

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		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
+D+H						5.649				
+D+L+H						5.649				
+D+Lr+H						5.649				
+D+S+H						5.649				
+D+0.750Lr+0.750L+H						5.649				
+D+0.750L+0.750S+H						5.649				
+D+0.60W+H						5.649				
+D+0.70E+H						5.649				
+D+0.750Lr+0.750L+0.450W+H						5.649				
+D+0.750L+0.750S+0.450W+H						5.649				
+D+0.750L+0.750S+0.5250E+H						5.649				
+0.60D+0.60W+0.60H						3.389				
+0.60D+0.70E+0.60H						3.389				
D Only						5.649				
Lr Only										
L Only										
S Only										
W Only										
E Only										
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	0.000 in	0.000 ft
+D+L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.70E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.60W+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.70E+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Commercial Use Not Allowed

Educational Version

Wood Column

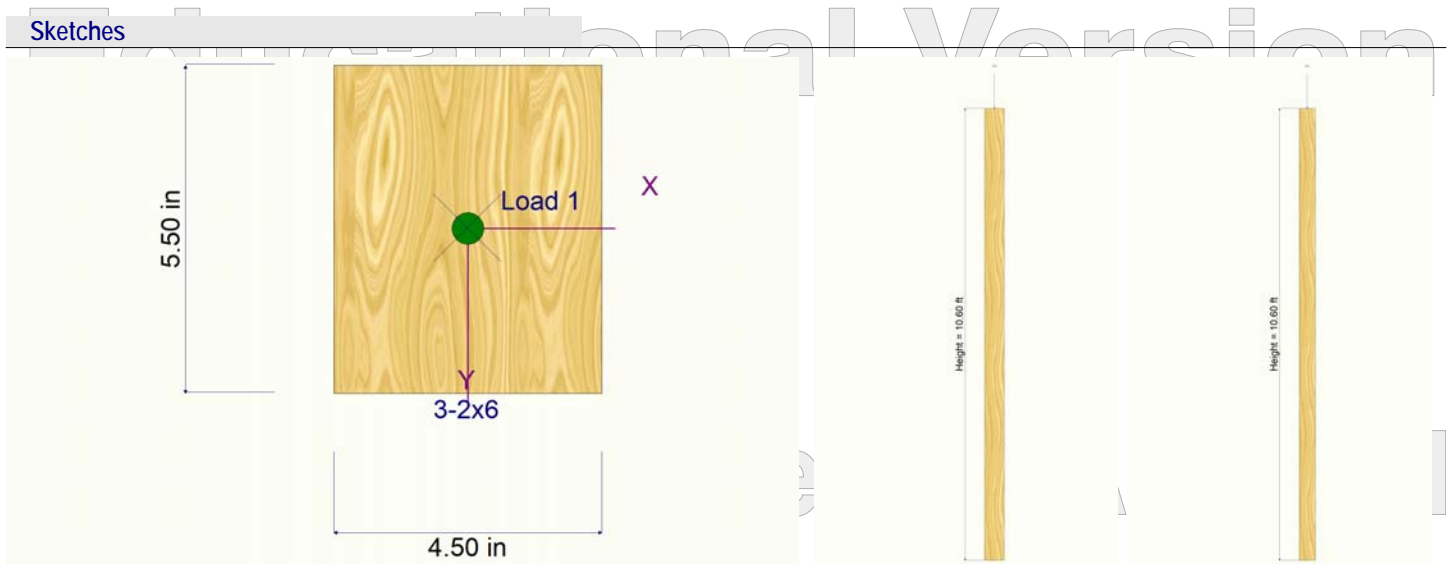
File = \EGRSHARES\Homes\NAU\gjc43\DOCUME - 1\CENE486\Enercalc\ROOFJO-1.EC6
ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.30

Lic. # : KW-06090388 - Educational Version

Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : Ridge Beam Support Column

Sketches



Educational Version

Commercial Use Not Allowed

Educational Version

Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.30

Lic. #: KW-06090388 - Educational Version

Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : 2nd story wall stud

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Analysis Method : **Load Resistance Factor Design**
End Fixities : **Top & Bottom Pinned**
Overall Column Height : **9.0 ft**
(Used for non-slender calculations)

Wood Section Name : **2x6**
Wood Grading/Manuf. : **Graded Lumber**
Wood Member Type : **Sawn**

Wood Species : **Hem Fir**
Wood Grade : **No.2**
Fb + : **675.0 psi** Fv : **140.0 psi**
Fb - : **675.0 psi** Ft : **350.0 psi**
Fc - Prll : **500.0 psi** Density : **26.830 pcf**
Fc - Perp : **405.0 psi**
E : Modulus of Elasticity . . . x-x Bending y-y Bending Axial
Basic : **1,100.0** **1,100.0** **1,100.0 ksi**
Minimum : **400.0** **400.0**

Exact Width : **1.50 in** Allow Stress Modification Factors
Exact Depth : **5.50 in** Cf or Cv for Bending : **1.30**
Area : **8.250 in^2** Cf or Cv for Compression : **1.10**
Ix : **20.797 in^4** Cf or Cv for Tension : **1.30**
Iy : **1.547 in^4** 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 : **Fully braced against buckling along X-X Axis**
Y-Y (depth) axis : **Unbraced Length for X-X Axis buckling = 9.0 ft, K = 1.0**

Applied Loads

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

Column self weight included : 13.834 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 9.0 ft, D = 0.170, S = 0.430, W = 0.090 k

BENDING LOADS . . .

Lat. Uniform Load creating Mx-x, W = 0.0420 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.3803 : 1**
Load Combination : **+1.20D+0.50L+0.50S+W+1.60H**
Governing NDS Formula : **Comp + Mxx, NDS Eq. 3.9-3**
Location of max. above base : **4.470 ft**
At maximum location values are . . .
Applied Axial : **0.5256 k**
Applied Mx : **0.4252 k-ft**
Applied My : **0.0 k-ft**
Fc : Allowable : **850.48 psi**

Maximum SERVICE Lateral Load Reactions . . .
Top along Y-Y : **0.0 k** Bottom along Y-Y : **0.0 k**
Top along X-X : **0.0 k** Bottom along X-X : **0.0 k**

Maximum SERVICE Load Lateral Deflections . . .
Along Y-Y : **0.0 in** at **4.530 ft** above base
for load combination : **W Only**
Along X-X : **0.0 in** at **0.0 ft** above base
for load combination : **n/a**

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension
LRFD - Format Conversion factor	2.541	2.400	2.700
LRFD - Resistance factor	0.850	0.900	0.800

PASS Maximum Shear Stress Ratio = **0.07576 : 1**
Load Combination : **+0.90D+W+0.90H**
Location of max. above base : **0.0 ft**
Applied Design Shear : **34.364 psi**
Allowable Shear : **302.40 psi**

Load Combination Results

Load Combination	Lambda	Cp	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+1.40D+1.60H	0.000	0.716	0.03668	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+0.50Lr+1.60L+1.60H	0.000	0.716	0.03144	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60L+0.50S+1.60H	0.000	0.716	0.06208	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60Lr+0.50L+1.60H	0.000	0.716	0.03144	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60Lr+0.50W+1.60H	0.000	0.716	0.1840	PASS	4.470 ft	0.03788	PASS	0.0 ft
+1.20D+0.50L+1.60S+1.60H	0.000	0.716	0.1295	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60S+0.50W+1.60H	0.000	0.716	0.2142	PASS	4.470 ft	0.03788	PASS	0.0 ft
+1.20D+0.50Lr+0.50L+W+1.60H	0.000	0.716	0.3687	PASS	4.470 ft	0.07576	PASS	0.0 ft
+1.20D+0.50L+0.50S+W+1.60H	0.000	0.716	0.3803	PASS	4.470 ft	0.07576	PASS	0.0 ft

Commercial Use Not Allowed

Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.30

Lic. #: KW-06090388 - Educational Version

Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : 2nd story wall stud

Load Combination Results

Load Combination	Lambda	C _p	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+1.20D+0.50L+0.70S+E+1.60H	0.000	0.716	0.07434	PASS	0.0 ft	0.0	PASS	0.0 ft
+0.90D+W+0.90H	0.000	0.716	0.3661	PASS	4.470 ft	0.07576	PASS	0.0 ft
+0.90D+E+0.90H	0.000	0.716	0.02358	PASS	0.0 ft	0.0	PASS	0.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction @ Base	My - End Moments		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
+D+H						0.184				
+D+L+H						0.184				
+D+Lr+H						0.184				
+D+S+H						0.614				
+D+0.750Lr+0.750L+H						0.184				
+D+0.750L+0.750S+H						0.506				
+D+0.60W+H				0.113	0.113	0.238				
+D+0.70E+H						0.184				
+D+0.750Lr+0.750L+0.450W+H				0.085	0.085	0.224				
+D+0.750L+0.750S+0.450W+H				0.085	0.085	0.547				
+D+0.750L+0.750S+0.5250E+H						0.506				
+0.60D+0.60W+0.60H				0.113	0.113	0.164				
+0.60D+0.70E+0.60H						0.110				
D Only						0.184				
Lr Only										
L Only										
S Only										
W Only				0.189	0.189	0.090				
E Only										
H Only										

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
	in	ft		in	ft	
+D+H	0.0000	0.000	0.000	0.000	0.000	0.000
+D+L+H	0.0000	0.000	0.000	0.000	0.000	0.000
+D+Lr+H	0.0000	0.000	0.000	0.000	0.000	0.000
+D+S+H	0.0000	0.000	0.000	0.000	0.000	0.000
+D+0.750Lr+0.750L+H	0.0000	0.000	0.000	0.000	0.000	0.000
+D+0.750L+0.750S+H	0.0000	0.000	0.000	0.000	0.000	0.000
+D+0.60W+H	0.0000	0.000	0.000	0.164	4.530	4.530
+D+0.70E+H	0.0000	0.000	0.000	0.000	0.000	0.000
+D+0.750Lr+0.750L+0.450W+H	0.0000	0.000	0.000	0.123	4.530	4.530
+D+0.750L+0.750S+0.450W+H	0.0000	0.000	0.000	0.123	4.530	4.530
+D+0.750L+0.750S+0.5250E+H	0.0000	0.000	0.000	0.000	0.000	0.000
+0.60D+0.60W+0.60H	0.0000	0.000	0.000	0.164	4.530	4.530
+0.60D+0.70E+0.60H	0.0000	0.000	0.000	0.000	0.000	0.000
D Only	0.0000	0.000	0.000	0.000	0.000	0.000
Lr Only	0.0000	0.000	0.000	0.000	0.000	0.000
L Only	0.0000	0.000	0.000	0.000	0.000	0.000
S Only	0.0000	0.000	0.000	0.000	0.000	0.000
W Only	0.0000	0.000	0.000	0.274	4.530	4.530
E Only	0.0000	0.000	0.000	0.000	0.000	0.000
H Only	0.0000	0.000	0.000	0.000	0.000	0.000

Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.30

Lic. # : KW-06090388 - Educational Version

Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : 2nd story wall stud

Sketches



Educational Version

Commercial Use Not Allowed

Educational Version

Wood Column

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Lic. # : KW-06090388 - Educational Version

Description : Big column

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Analysis Method :	Allowable Stress Design			Wood Section Name	3x6
End Fixities	Top & Bottom Pinned			Wood Grading/Manuf.	Graded Lumber
Overall Column Height	9.0 ft			Wood Member Type	Sawn
<i>(Used for non-slender calculations)</i>					
Wood Species				Exact Width	2.50 in
Wood Grade				Exact Depth	5.50 in
Fb +	1,500.0 psi	Fv	150.0 psi	Area	13.750 in ²
Fb -	1,500.0 psi	Ft	1,000.0 psi	Ix	34.661 in ⁴
Fc - Prll	1,000.0 psi	Density	33.0 pcf	Iy	7.161 in ⁴
Fc - Perp	1,000.0 psi			Allow Stress Modification Factors	
E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial	Cf or Cv for Bending	
Basic	1,400.0	1,400.0	1,400.0 ksi	Cf or Cv for Compression	1.0
Minimum	1,400.0	1,400.0		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 <small>NDS 15.3.2</small>
				Use Cr : Repetitive ?	No
Brace condition for deflection (buckling) along columns :					
X-X (width) axis : Fully braced against buckling along X-X Axis					
Y-Y (depth) axis : Fully braced against buckling along Y-Y Axis					

Applied Loads

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

Column self weight included : 28.359 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 9.0 ft, D = 2.50, S = 0.430, W = 0.090 k

BENDING LOADS . . .

Lat. Uniform Load creating Mx-x, W = 0.270 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.6644 : 1	Maximum SERVICE Lateral Load Reactions . . .	
Load Combination	+D+0.60W+H	Top along Y-Y	0.0 k
Governing NDS Formula	Comp + Mxx, NDS Eq. 3.9-3	Bottom along Y-Y	0.0 k
Location of max. above base	4.470 ft	Top along X-X	0.0 k
At maximum location values are . . .		Bottom along X-X	0.0 k
Applied Axial	2.582 k	Maximum SERVICE Load Lateral Deflections . . .	
Applied Mx	1.640 k-ft	Along Y-Y	0.0 in at 4.530 ft above base
Applied My	0.0 k-ft	for load combination : W Only	
Fc : Allowable	1,600.0 psi	Along X-X	0.0 in at 0.0 ft above base
		for load combination : n/a	
PASS Maximum Shear Stress Ratio =	0.3314 : 1	Other Factors used to calculate allowable stresses . . .	
Load Combination	+D+0.60W+H	Bending	Compression
Location of max. above base	9.0 ft	Tension	
Applied Design Shear	79.527 psi		
Allowable Shear	240.0 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	1.000	0.2043	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+L+H	1.000	1.000	0.1839	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+Lr+H	1.250	1.000	0.1471	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+S+H	1.150	1.000	0.1871	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750Lr+0.750L+H	1.250	1.000	0.1471	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750L+0.750S+H	1.150	1.000	0.1803	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.60W+H	1.600	1.000	0.6644	PASS	4.470 ft	0.3314	PASS	9.0 ft
+D+0.70E+H	1.600	1.000	0.1149	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.600	1.000	0.5016	PASS	4.470 ft	0.2485	PASS	9.0 ft

Commercial Use Not Allowed

Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.3f

Lic. #: KW-06090388 - Educational Version

Licensed User: NORTHERN ARIZONA UNIVERSITY

Description: Big column

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+0.750L+0.750S+0.450W+H	1.600	1.000	0.5053	PASS	4.470 ft	0.2485	PASS	9.0 ft
+D+0.750L+0.750S+0.5250E+H	1.600	1.000	0.1296	PASS	0.0 ft	0.0	PASS	9.0 ft
+0.60D+0.60W+0.60H	1.600	1.000	0.6557	PASS	4.470 ft	0.3314	PASS	9.0 ft
+0.60D+0.70E+0.60H	1.600	1.000	0.06896	PASS	0.0 ft	0.0	PASS	9.0 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	@ Top		@ Base	@ Top
+D+H						2.528					
+D+L+H						2.528					
+D+Lr+H						2.528					
+D+S+H						2.958					
+D+0.750Lr+0.750L+H						2.528					
+D+0.750L+0.750S+H						2.851					
+D+0.60W+H				0.729	0.729	2.582					
+D+0.70E+H						2.528					
+D+0.750Lr+0.750L+0.450W+H				0.547	0.547	2.569					
+D+0.750L+0.750S+0.450W+H				0.547	0.547	2.891					
+D+0.750L+0.750S+0.5250E+H						2.851					
+0.60D+0.60W+0.60H				0.729	0.729	1.571					
+0.60D+0.70E+0.60H						1.517					
D Only						2.528					
Lr Only											
L Only											
S Only						0.430					
W Only				1.215	1.215	0.090					
E Only											
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Max. Y-Y Deflection	
	Distance	Distance	Distance	Distance
+D+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W+H	0.0000 in	0.000 ft	0.498 in	4.530 ft
+D+0.70E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+0.450W+H	0.0000 in	0.000 ft	0.374 in	4.530 ft
+D+0.750L+0.750S+0.450W+H	0.0000 in	0.000 ft	0.374 in	4.530 ft
+D+0.750L+0.750S+0.5250E+H	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.60W+0.60H	0.0000 in	0.000 ft	0.498 in	4.530 ft
+0.60D+0.70E+0.60H	0.0000 in	0.000 ft	0.000 in	0.000 ft
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.830 in	4.530 ft
E Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
H Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Commercial Use Not Allowed

Wood Column

Lic. # : KW-06090388 - Educational Version

Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : Big column

Sketches



Educational Version

Commercial Use Not Allowed

Educational Version

Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.30

Lic. #: KW-06090388 - Educational Version

Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : 1st story stud design

Code References

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

Analysis Method : **Load Resistance Factor Design**
End Fixities : **Top & Bottom Pinned**
Overall Column Height : **9.0 ft**
(Used for non-slender calculations)

Wood Section Name : **2x6**
Wood Grading/Manuf. : **Graded Lumber**
Wood Member Type : **Sawn**

Wood Species : **Hem Fir**
Wood Grade : **No.2**
Fb + : **675.0 psi** Fv : **140.0 psi**
Fb - : **675.0 psi** Ft : **350.0 psi**
Fc - Prll : **500.0 psi** Density : **26.830 pcf**
Fc - Perp : **405.0 psi**
E : Modulus of Elasticity . . . x-x Bending y-y Bending Axial
Basic : **1,100.0** **1,100.0** **1,100.0 ksi**
Minimum : **400.0** **400.0**

Exact Width : **1.50 in** Allow Stress Modification Factors
Exact Depth : **5.50 in** Cf or Cv for Bending : **1.30**
Area : **8.250 in^2** Cf or Cv for Compression : **1.10**
Ix : **20.797 in^4** Cf or Cv for Tension : **1.30**
Iy : **1.547 in^4** 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 : **Fully braced against buckling along X-X Axis**
Y-Y (depth) axis : **Unbraced Length for X-X Axis buckling = 9.0 ft, K = 1.0**

Applied Loads

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

Column self weight included : 13.834 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 9.0 ft, D = 0.040, S = 0.04260, W = 0.00970 k

Axial Load at 9.0 ft, D = 0.170, L = 0.3760, S = 0.770 k

BENDING LOADS . . .

Lat. Uniform Load creating Mx-x, W = 0.0420 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.4035 : 1**
Load Combination : **+1.20D+0.50L+0.50S+W+1.60H**
Governing NDS Formula : **Comp + Mxx, NDS Eq. 3.9-3**
Location of max. above base : **4.470 ft**
At maximum location values are . . .
Applied Axial : **0.8726 k**
Applied Mx : **0.4252 k-ft**
Applied My : **0.0 k-ft**
Fc : Allowable : **850.48 psi**

Maximum SERVICE Lateral Load Reactions . . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y	0.0 in	at	4.530 ft	above base
for load combination : W Only				
Along X-X	0.0 in	at	0.0 ft	above base
for load combination : n/a				

Other Factors used to calculate allowable stresses . . .

	<u>Bending</u>	<u>Compression</u>	<u>Tension</u>
LRFD - Format Conversion factor	2.541	2.400	2.700
LRFD - Resistance factor	0.850	0.900	0.800

PASS Maximum Shear Stress Ratio = **0.07576 : 1**
Load Combination : **+0.90D+W+0.90H**
Location of max. above base : **0.0 ft**
Applied Design Shear : **34.364 psi**
Allowable Shear : **302.40 psi**

Load Combination Results

Load Combination	Lambda	Cp	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+1.40D+1.60H	0.000	0.716	0.04466	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+0.50Lr+1.60L+1.60H	0.000	0.716	0.1240	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60L+0.50S+1.60H	0.000	0.716	0.1819	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60Lr+0.50L+1.60H	0.000	0.716	0.06508	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60Lr+0.50W+1.60H	0.000	0.716	0.1843	PASS	4.470 ft	0.03788	PASS	0.0 ft
+1.20D+0.50L+1.60S+1.60H	0.000	0.716	0.2504	PASS	0.0 ft	0.0	PASS	0.0 ft
+1.20D+1.60S+0.50W+1.60H	0.000	0.716	0.2595	PASS	4.470 ft	0.03788	PASS	0.0 ft
+1.20D+0.50Lr+0.50L+W+1.60H	0.000	0.716	0.3769	PASS	4.470 ft	0.07576	PASS	0.0 ft

Commercial Use Not Allowed

Wood Column

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ENERCALC, INC. 1983-2017, Build:10.17.9.30, Ver:10.17.9.3f

Lic. #: KW-06090388 - Educational Version

Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : 1st story stud design

Load Combination Results

Load Combination	Lambda	C _p	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
			Stress Ratio	Status	Location	Stress Ratio	Status	Location
+1.20D+0.50L+0.50S+W+1.60H	0.000	0.716	0.4035	PASS	4.470 ft	0.07576	PASS	0.0 ft
+1.20D+0.50L+0.70S+E+1.60H	0.000	0.716	0.1461	PASS	0.0 ft	0.0	PASS	0.0 ft
+0.90D+W+0.90H	0.000	0.716	0.3642	PASS	4.470 ft	0.07576	PASS	0.0 ft
+0.90D+E+0.90H	0.000	0.716	0.02871	PASS	0.0 ft	0.0	PASS	0.0 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
+D+H						0.224					
+D+L+H						0.600					
+D+Lr+H						0.224					
+D+S+H						1.036					
+D+0.750Lr+0.750L+H						0.506					
+D+0.750L+0.750S+H						1.115					
+D+0.60W+H				0.113	0.113	0.230					
+D+0.70E+H						0.224					
+D+0.750Lr+0.750L+0.450W+H				0.085	0.085	0.510					
+D+0.750L+0.750S+0.450W+H				0.085	0.085	1.120					
+D+0.750L+0.750S+0.5250E+H						1.115					
+0.60D+0.60W+0.60H				0.113	0.113	0.140					
+0.60D+0.70E+0.60H						0.134					
D Only						0.224					
Lr Only											
L Only						0.376					
S Only						0.813					
W Only				0.189	0.189	0.010					
E Only											
H Only											

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Max. Y-Y Deflection	Distance	
	in	ft		in	ft
+D+H	0.0000	0.000	0.000	0.000	0.000
+D+L+H	0.0000	0.000	0.000	0.000	0.000
+D+Lr+H	0.0000	0.000	0.000	0.000	0.000
+D+S+H	0.0000	0.000	0.000	0.000	0.000
+D+0.750Lr+0.750L+H	0.0000	0.000	0.000	0.000	0.000
+D+0.750L+0.750S+H	0.0000	0.000	0.000	0.000	0.000
+D+0.60W+H	0.0000	0.000	0.164	4.530	0.000
+D+0.70E+H	0.0000	0.000	0.000	0.000	0.000
+D+0.750Lr+0.750L+0.450W+H	0.0000	0.000	0.123	4.530	0.000
+D+0.750L+0.750S+0.450W+H	0.0000	0.000	0.123	4.530	0.000
+D+0.750L+0.750S+0.5250E+H	0.0000	0.000	0.000	0.000	0.000
+0.60D+0.60W+0.60H	0.0000	0.000	0.164	4.530	0.000
+0.60D+0.70E+0.60H	0.0000	0.000	0.000	0.000	0.000
D Only	0.0000	0.000	0.000	0.000	0.000
Lr Only	0.0000	0.000	0.000	0.000	0.000
L Only	0.0000	0.000	0.000	0.000	0.000
S Only	0.0000	0.000	0.000	0.000	0.000
W Only	0.0000	0.000	0.274	4.530	0.000
E Only	0.0000	0.000	0.000	0.000	0.000
H Only	0.0000	0.000	0.000	0.000	0.000

Commercial Use Not Allowed

Wood Column

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Licensed User : NORTHERN ARIZONA UNIVERSITY

Description : 1st story stud design

Sketches



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Wood Beam

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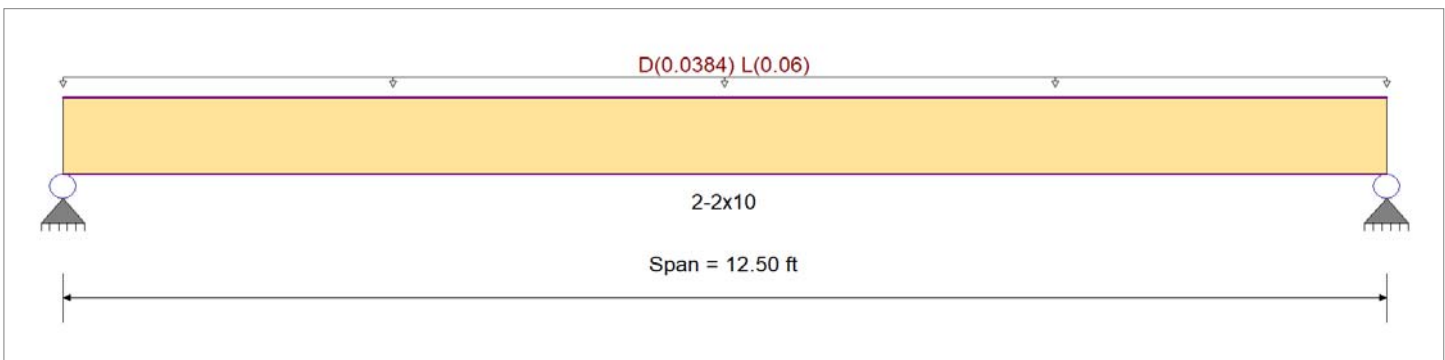
Description : 2nd Floor Interior Beam

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
 Load Combination Set : IBC 2015

Material Properties

Analysis Method : Load Resistance Factor D	Fb +	675.0 psi	E : Modulus of Elasticity
Load Combination IBC 2015	Fb -	675.0 psi	Ebend- xx
	Fc - Prll	500.0 psi	Eminbend - xx
Wood Species : Hem Fir	Fc - Perp	405.0 psi	
Wood Grade : No.2	Fv	140.0 psi	Density
	Ft	350.0 psi	26.830pcf
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

Uniform Load : D = 0.02560, L = 0.040 ksf, Tributary Width = 1.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = 0.791 : 1	Maximum Shear Stress Ratio = 0.183 : 1
Section used for this span 2-2x10	Section used for this span 2-2x10
fb : Actual = 812.37 psi	fv : Actual = 44.25 psi
FB : Allowable = 1,026.43 psi	Fv : Allowable = 241.92 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 = 6.250ft	Location of maximum on span = 11.770 ft
Span # where maximum occurs = Span # 1	Span # where maximum occurs = Span # 1
Maximum Deflection	
Max Downward Transient Deflection 0.152 in Ratio = 984 >=360	
Max Upward Transient Deflection 0.000 in Ratio = 0 <360	
Max Downward Total Deflection 0.263 in Ratio = 570 >=180	
Max Upward Total Deflection 0.000 in Ratio = 0 <180	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values					
			M	V	λ	C _{FV}	C _i	C _r	C _m	C _t	C _L	Mu	fb	Fb	Vu	fv	Fv		
+1.40D+1.60H	Length = 12.50 ft	1	0.579	0.100	0.60	1.100	1.00	1.00	1.00	1.00	1.00	1.19	334.18	577.37	0.00	0.00	0.00	0.00	181.44
+1.20D+0.50Lr+1.60L+1.60H	Length = 12.50 ft	1	0.791	0.183	0.80	1.100	1.00	1.00	1.00	1.00	1.00	2.90	812.37	1026.43	0.00	0.00	0.00	0.00	241.92
+1.20D+1.60L+0.50S+1.60H	Length = 12.50 ft	1	0.791	0.183	0.80	1.100	1.00	1.00	1.00	1.00	1.00	2.90	812.37	1026.43	0.00	0.00	0.00	0.00	241.92
+1.20D+1.60Lr+0.50L+1.60H	Length = 12.50 ft	1	0.439	0.101	0.80	1.100	1.00	1.00	1.00	1.00	1.00	1.61	450.79	1026.43	0.00	0.00	0.00	0.00	241.92
+1.20D+1.60Lr+0.50W+1.60H						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00	0.00	0.00

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Wood Beam

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Description : 2nd Floor Interior Beam

Load Combination	Segment Length	Span #	Max Stress Ratios								Moment Values			Shear Values			
			M	V	λ	C _{FV}	C _i	C _r	C _m	C _t	C _L	Mu	f _b	F _b	V _u	f _v	F _v
Length = 12.50 ft	1		0.279	0.064	0.80	1.100	1.00	1.00	1.00	1.00	1.00	1.02	286.44	1026.43	0.29	15.60	241.92
+1.20D+0.50L+1.60S+1.60H						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1		0.439	0.101	0.80	1.100	1.00	1.00	1.00	1.00	1.00	1.61	450.79	1026.43	0.45	24.55	241.92
+1.20D+1.60S+0.50W+1.60H						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1		0.279	0.064	0.80	1.100	1.00	1.00	1.00	1.00	1.00	1.02	286.44	1026.43	0.29	15.60	241.92
+1.20D+0.50Lr+0.50L+W+1.60H						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1		0.281	0.081	1.00	1.100	1.00	1.00	1.00	1.00	1.00	1.61	450.79	1603.80	0.45	24.55	302.40
+1.20D+0.50L+0.50S+W+1.60H						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1		0.281	0.081	1.00	1.100	1.00	1.00	1.00	1.00	1.00	1.61	450.79	1603.80	0.45	24.55	302.40
+1.20D+0.50L+0.70S+E+1.60H						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1		0.281	0.081	1.00	1.100	1.00	1.00	1.00	1.00	1.00	1.61	450.79	1603.80	0.45	24.55	302.40
+0.90D+W+0.90H						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1		0.134	0.039	1.00	1.100	1.00	1.00	1.00	1.00	1.00	0.77	214.83	1603.80	0.22	11.70	302.40
+0.90D+E+0.90H						1.100	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 12.50 ft	1		0.134	0.039	1.00	1.100	1.00	1.00	1.00	1.00	1.00	0.77	214.83	1603.80	0.22	11.70	302.40

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.2629	6.296		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.647	0.647
Overall MINimum	0.375	0.375
+D+H	0.272	0.272
+D+L+H	0.647	0.647
+D+Lr+H	0.272	0.272
+D+S+H	0.272	0.272
+D+0.750Lr+0.750L+H	0.554	0.554
+D+0.750L+0.750S+H	0.554	0.554
+D+0.60W+H	0.272	0.272
+D+0.70E+H	0.272	0.272
+D+0.750Lr+0.750L+0.450W+H	0.554	0.554
+D+0.750L+0.750S+0.450W+H	0.554	0.554
+D+0.750L+0.750S+0.5250E+H	0.554	0.554
+0.60D+0.60W+0.60H	0.163	0.163
+0.60D+0.70E+0.60H	0.163	0.163
D Only	0.272	0.272
Lr Only		
L Only	0.375	0.375
S Only		
W Only		
E Only		
H Only		

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