



11656 W. 75th Street
Shawnee, KS 66214

HD Engineering & Design, Inc.

Solutions for all your engineering and design needs

May 16, 2017
P: (913) 831-2222
D: (800) 780-8608

McGraw Homes Inc
902 SW Willow Pl
Blue Springs, MO 64014

Re: 1340 NE Brandywine Rd

Our firm has been asked to make structural recommendations for the house being built at the address above under permit number PRRES201663237. The city has questioned several items during the rough-in inspection. Below is a list of our recommendations along with the corresponding city item.

Item 4: The Foyer wall is not designated as a load bearing wall. **Our firm has recommended to relocate the side to side ridge strut from this wall and relocate valley struts to load bearing walls. The wall should only be carrying the front to back ridge strut for the ridge located just left of the entry. After removing the loading as described above our firm recommends approval of the double #2 2x10 for carrying the loads as imposed.**

Item 5: The plan shows steel columns at the right of the stairs transferring the steel beam load to the pier pad in the basement. **The builder has installed a (5) 2X4 stud column, after performing calculations (attached) we recommend approval of this item as framed.**

Item 7: Overnotched LVL and Double ceiling joist at I beam bearing. No more than 1/4 depth. **After performing calculations (attached) we recommend approval of the LVL and 2x12 beam end support as framed.**

Item 9: Over notched valley rafter near sliding door. The valley has been framed onto an upset (2) 2x10 at the left of the Family Room. **After performing calculations on the double 2x10 we recommend supporting the valley on the upset 2x10. The end of the valley should be fastened to the upset beam with a Simpson ML26Z framing angle.**

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted engineering practices. No warranties, either express or implied, are intended or made.

We appreciate the opportunity to be of service to you on this project. If you have any questions regarding this report, please contact us.

Very truly yours,
HD ENGINEERING & DESIGN, INC.

Chris Saathoff, P.E., LEED-AP





HD Engineering & Design, Inc.

HD ENGINEERING Project Title: Lot 11 Monticello/ 1340 NE Brandywine
11656 W. 75TH ST Engineer:
SHAWNEE, KS Project Descr:
913-631-2222
WWW.HDENGINEERS.COM

Project ID:



Wood Beam

Lic. #: KW-06001844

Description: LVL BEAM AT FAMILY ROOM

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set: IBC 2012

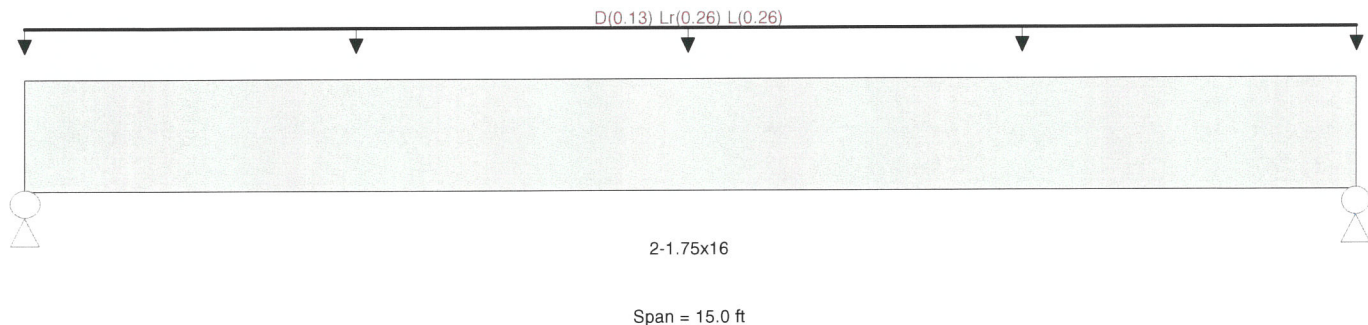
Material Properties

Analysis Method: Allowable Stress Design
Load Combination IBC 2012

Wood Species: iLevel Truss Joist
Wood Grade: MicroLam LVL 1.9 E

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

Fb - Tension 2,600.0 psi
Fb - Compr 2,600.0 psi
Fc - Prll 2,510.0 psi
Fc - Perp 750.0 psi
Fv 285.0 psi
Ft 1,555.0 psi
E: Modulus of Elasticity
Ebend- xx 1,900.0 ksi
Eminbend- xx 965.71 ksi
Density 32.210 pcf



Applied Loads

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

Uniform Load: D = 0.010, Lr = 0.020, L = 0.020 ksf, Tributary Width = 13.0 ft, (ROOF CEILING)

DESIGN SUMMARY

				Design OK			
Maximum Bending Stress Ratio	=	0.452	1	Maximum Shear Stress Ratio	=	0.302	1
Section used for this span	=	2-1.75x16		Section used for this span	=	2-1.75x16	
fb: Actual	=	1,175.22	psi	fv: Actual	=	86.16	psi
FB: Allowable	=	2,600.00	psi	Fv: Allowable	=	285.00	psi
Load Combination	=	+D+0.750Lr+0.750L+H		Load Combination	=	+D+0.750Lr+0.750L+H	
Location of maximum on span	=	7.500 ft		Location of maximum on span	=	13.686 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward L+Lr+S Deflection		0.262	in	Ratio =		685	
Max Upward L+Lr+S Deflection		0.000	in	Ratio =		0 < 360	
Max Downward Total Deflection		0.328	in	Ratio =		548	
Max Upward Total Deflection		0.000	in	Ratio =		0 < 180	

max shear: 4.875 k
 $F_v = 285 \text{ psi} \times 2 \times 1.75 \times 13'' = 12.9 \text{ k capacity}$

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Max Stress Ratios										Moment Values			Shear Values		
		Span #	M	V	C _d	C _{FV}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	fv	F'v
+D+H														0.00			
Length = 15.0 ft	1	0.113	0.076	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.66	293.81	2600.00	0.80	21.54	285.00
+D+L+H														0.00			
Length = 15.0 ft	1	0.339	0.227	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.97	881.42	2600.00	2.41	64.62	285.00
+D+Lr+H														0.00			
Length = 15.0 ft	1	0.339	0.227	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.97	881.42	2600.00	2.41	64.62	285.00
+D+S+H														0.00			
Length = 15.0 ft	1	0.113	0.076	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.66	293.81	2600.00	0.80	21.54	285.00
+D+0.750Lr+0.750L+H														0.00			
Length = 15.0 ft	1	0.452	0.302	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	14.63	1,175.22	2600.00	3.22	86.16	285.00
+D+0.750L+0.750S+H														0.00			
Length = 15.0 ft	1	0.283	0.189	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	9.14	734.51	2600.00	2.01	53.85	285.00



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11656 W. 75TH ST Engineer:
SHAWNEE, KS Project Desc:
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ENERCALO, INC 1983-2014, Build:6.14.1.23, Ver:6.17.4.30

Licensee: HD ENGINEERING & DESIGN INC

Wood Beam

Lic. #: KW-06001844

Description: LVL BEAM AT FAMILY ROOM

Load Combination Segment Length	Span #	Max Stress Ratios		C _d	C _{F/N}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values		
		M	V								M	f _b	F' _b	V	f _v	F' _v
+D+0.60W+H Length = 15.0 ft	1	0.113	0.076	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.66	293.81	2600.00	0.00	0.00	285.00
+D+0.70E+H Length = 15.0 ft	1	0.113	0.076	1.00	1.00	1.00	1.00	1.00	1.00	1.00	3.66	293.81	2600.00	0.00	0.00	285.00
+D+0.750Lr+0.750L+0.450W+H Length = 15.0 ft	1	0.452	0.302	1.00	1.00	1.00	1.00	1.00	1.00	1.00	14.63	1,175.22	2600.00	3.22	86.16	285.00
+D+0.750L+0.750S+0.450W+H Length = 15.0 ft	1	0.283	0.189	1.00	1.00	1.00	1.00	1.00	1.00	1.00	9.14	734.51	2600.00	2.01	53.85	285.00
+D+0.750L+0.750S+0.5250E+H Length = 15.0 ft	1	0.283	0.189	1.00	1.00	1.00	1.00	1.00	1.00	1.00	9.14	734.51	2600.00	2.01	53.85	285.00
+0.60D+0.60W+0.60H Length = 15.0 ft	1	0.068	0.045	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.19	176.28	2600.00	0.48	12.92	285.00
+0.60D+0.70E+0.60H Length = 15.0 ft	1	0.068	0.045	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.19	176.28	2600.00	0.48	12.92	285.00

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D+L+Lr	1	0.3281	7.555		0.0000	0.000

Vertical Reactions - Unfactored

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.875	4.875
D Only	0.975	0.975
L Only	1.950	1.950
Lr Only	1.950	1.950
L+Lr	3.900	3.900
D+Lr	2.925	2.925
D+L	2.925	2.925
D+L+Lr	4.875	4.875



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ENERCALC, INC. 1983-2014, Build: 6.14.1.23, Ver: 6.17.4.30

Licensee: HD ENGINEERING & DESIGN INC

Wood Beam

Lic. #: KW-06001844

Description: 2X12 BEAM AT STAIRS

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set: IBC 2012

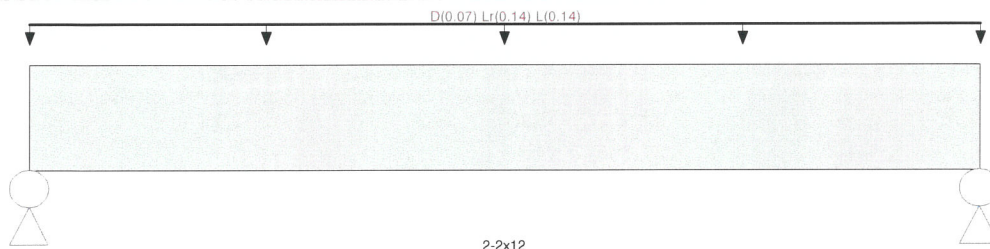
Material Properties

Analysis Method: Allowable Stress Design
Load Combination IBC 2012

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

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

Fb - Tension 900 psi E: Modulus of Elasticity
Fb - Compr 900 psi Ebend-xx 1600 ksi
Fc - Prll 1350 psi Eminbend-xx 580 ksi
Fc - Perp 625 psi
Fv 180 psi
Ft 575 psi Density 32.21 pcf



Span = 8.0 ft

Applied Loads

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

Uniform Load: D = 0.010, Lr = 0.020, L = 0.020 ksf, Tributary Width = 7.0 ft, (ROOF CEILING)

DESIGN SUMMARY

				Design OK			
Maximum Bending Stress Ratio	=	0.472	1	Maximum Shear Stress Ratio	=	0.212	1
Section used for this span		2-2x12		Section used for this span		2-2x12	
fb: Actual	=	424.77	psi	f _v : Actual	=	38.15	psi
FB: Allowable	=	900.00	psi	F _v : Allowable	=	180.00	psi
Load Combination	=	+D+0.750Lr+0.750L+H		Load Combination	=	+D+0.750Lr+0.750L+H	
Location of maximum on span	=	4.000		Location of maximum on span	=	7.066	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	

Maximum Deflection

Max Downward L+Lr+S Deflection	0.046	in	Ratio =	2106
Max Upward L+Lr+S Deflection	0.000	in	Ratio =	0 < 360
Max Downward Total Deflection	0.057	in	Ratio =	1685
Max Upward Total Deflection	0.000	in	Ratio =	0 < 180

1.4 k actual
F_v: 180 psi 2x 1.5"x8" = 4.3 k Capacity

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	f _v	F'v
+D+H Length = 8.0 ft	1	0.118	0.053	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.56	106.19	900.00	0.21	9.54	180.00
+D+L+H Length = 8.0 ft	1	0.354	0.159	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.68	318.58	900.00	0.64	28.61	180.00
+D+Lr+H Length = 8.0 ft	1	0.354	0.159	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.68	318.58	900.00	0.64	28.61	180.00
+D+S+H Length = 8.0 ft	1	0.118	0.053	1.00	1.00	1.00	1.00	1.00	1.00	1.00		0.56	106.19	900.00	0.21	9.54	180.00
+D+0.750Lr+0.750L+H Length = 8.0 ft	1	0.472	0.212	1.00	1.00	1.00	1.00	1.00	1.00	1.00		2.24	424.77	900.00	0.86	38.15	180.00
+D+0.750L+0.750S+H Length = 8.0 ft	1	0.295	0.132	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.40	265.48	900.00	0.54	23.84	180.00



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Engineer:
Project Descr:

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Wood Beam

Lic. # : KW-06001844

Description : 2X12 BEAM AT STAIRS

Load Combination Segment Length	Span #	Max Stress Ratios		C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	fv	F'v
+D+0.60W+H Length = 8.0 ft	1	0.118	0.053	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.56	106.19	900.00	0.21	9.54	180.00
+D+0.70E+H Length = 8.0 ft	1	0.118	0.053	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.56	106.19	900.00	0.21	9.54	180.00
+D+0.750Lr+0.750L+0.450W+H Length = 8.0 ft	1	0.472	0.212	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.24	424.77	900.00	0.86	38.15	180.00
+D+0.750L+0.750S+0.450W+H Length = 8.0 ft	1	0.295	0.132	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.40	265.48	900.00	0.54	23.84	180.00
+D+0.750L+0.750S+0.5250E+H Length = 8.0 ft	1	0.295	0.132	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.40	265.48	900.00	0.54	23.84	180.00
+0.60D+0.60W+0.60H Length = 8.0 ft	1	0.071	0.032	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.34	63.72	900.00	0.13	5.72	180.00
+0.60D+0.70E+0.60H Length = 8.0 ft	1	0.071	0.032	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.34	63.72	900.00	0.13	5.72	180.00

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D+L+Lr	1	0.0570	4.029		0.0000	0.000

Vertical Reactions - Unfactored

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.400	1.400
D Only	0.280	0.280
L Only	0.560	0.560
Lr Only	0.560	0.560
L+Lr	1.120	1.120
D+Lr	0.840	0.840
D+L	0.840	0.840
D+L+Lr	1.400	1.400



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Wood Beam

Lic. #: KW-06001844

Description: DOUBLE 2X10 AT LEFT OF FAMILY ROOM

CODE REFERENCES

Calculations per NDS 2012, IBC 2012, CBC 2013, ASCE 7-10

Load Combination Set: IBC 2012

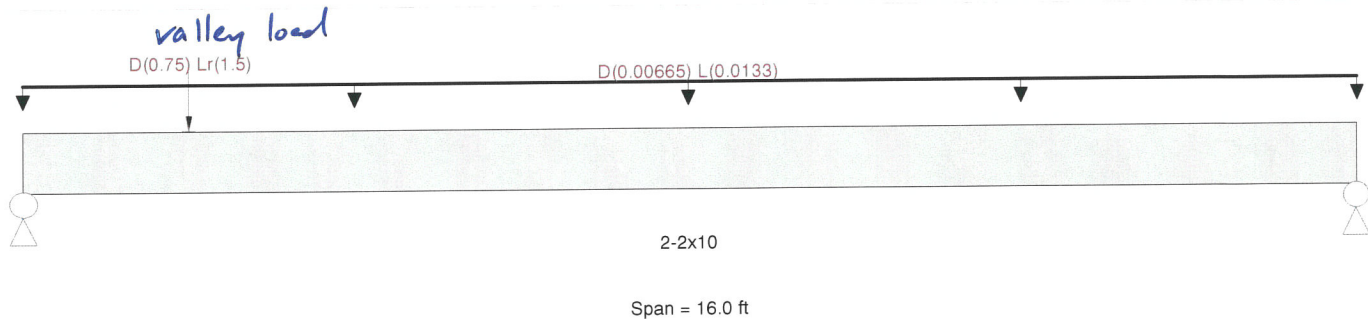
Material Properties

Analysis Method: Allowable Stress Design
Load Combination IBC 2012

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

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

Fb - Tension 900 psi
Fb - Compr 900 psi
Fc - Prll 1350 psi
Fc - Perp 625 psi
Fv 180 psi
Ft 575 psi
E: Modulus of Elasticity
Ebend-xx 1600 ksi
Eminbend-xx 580 ksi
Density 32.21 pcf
Repetitive Member Stress Increase



Applied Loads

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

Uniform Load: D = 0.0050, L = 0.010 ksf, Tributary Width = 1.330 ft, (CEILING)
Point Load: D = 0.750, Lr = 1.50 k @ 2.0 ft, (VALLEY POINT LOAD)

DESIGN SUMMARY

				Design OK			
Maximum Bending Stress Ratio	=	0.990	1	Maximum Shear Stress Ratio	=	0.606	1
Section used for this span		2-2x10		Section used for this span		2-2x10	
fb : Actual	=	1,127.60 psi		fv : Actual	=	109.02 psi	
FB : Allowable	=	1,138.50 psi		Fv : Allowable	=	180.00 psi	
Load Combination		+D+Lr+H		Load Combination		+D+Lr+H	
Location of maximum on span	=	2.044 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 L+Lr+S Deflection		0.326 in	Ratio = 589				
Max Upward L+Lr+S Deflection		0.000 in	Ratio = 0 < 240				
Max Downward Total Deflection		0.489 in	Ratio = 392				
Max Upward Total Deflection		0.000 in	Ratio = 0 < 180				

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios											Moment Values			Shear Values		
Segment Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	f _b	F'b	V	f _v	F'v		
+D+H													0.00	0.00	0.00	0.00		
Length = 16.0 ft	1	0.346	0.212	1.00	1.10	1.00	1.15	1.00	1.00	1.00	1.40	393.60	1138.50	0.70	38.08	180.00		
+D+L+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00		
Length = 16.0 ft	1	0.396	0.240	1.00	1.10	1.00	1.15	1.00	1.00	1.00	1.61	451.23	1138.50	0.80	43.28	180.00		
+D+Lr+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00		
Length = 16.0 ft	1	0.990	0.606	1.00	1.10	1.00	1.15	1.00	1.00	1.00	4.02	1,127.60	1138.50	2.02	109.02	180.00		
+D+S+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00		
Length = 16.0 ft	1	0.346	0.212	1.00	1.10	1.00	1.15	1.00	1.00	1.00	1.40	393.60	1138.50	0.70	38.08	180.00		
+D+0.750Lr+0.750L+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00		
Length = 16.0 ft	1	0.864	0.529	1.00	1.10	1.00	1.15	1.00	1.00	1.00	3.51	984.01	1138.50	1.76	95.19	180.00		
+D+0.750L+0.750S+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00		



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Description: DOUBLE 2X10 AT LEFT OF FAMILY ROOM

Load Combination Segment Length	Span #	Max Stress Ratios		C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	Moment Values			Shear Values		
		M	V								M	fb	F'b	V	Fv	F'v
Length = 16.0 ft	1	0.381	0.233	1.00	1.10	1.00	1.15	1.00	1.00	1.00	1.55	433.74	1138.50	0.78	41.98	180.00
+D+0.60W+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.346	0.212	1.00	1.10	1.00	1.15	1.00	1.00	1.00	1.40	393.60	1138.50	0.70	38.08	180.00
+D+0.70E+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.346	0.212	1.00	1.10	1.00	1.15	1.00	1.00	1.00	1.40	393.60	1138.50	0.70	38.08	180.00
+D+0.750Lr+0.750L+0.450W+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.864	0.529	1.00	1.10	1.00	1.15	1.00	1.00	1.00	3.51	984.01	1138.50	1.76	95.19	180.00
+D+0.750L+0.750S+0.450W+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.381	0.233	1.00	1.10	1.00	1.15	1.00	1.00	1.00	1.55	433.74	1138.50	0.78	41.98	180.00
+D+0.750L+0.750S+0.5250E+H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.381	0.233	1.00	1.10	1.00	1.15	1.00	1.00	1.00	1.55	433.74	1138.50	0.78	41.98	180.00
+0.60D+0.60W+0.60H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.207	0.127	1.00	1.10	1.00	1.15	1.00	1.00	1.00	0.84	236.16	1138.50	0.42	22.85	180.00
+0.60D+0.70E+0.60H					1.10	1.00	1.15	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.207	0.127	1.00	1.10	1.00	1.15	1.00	1.00	1.00	0.84	236.16	1138.50	0.42	22.85	180.00

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D+L+Lr	1	0.4887	7.124		0.0000	0.000

Vertical Reactions - Unfactored

Support notation : Far left is #1

Values in KIPS

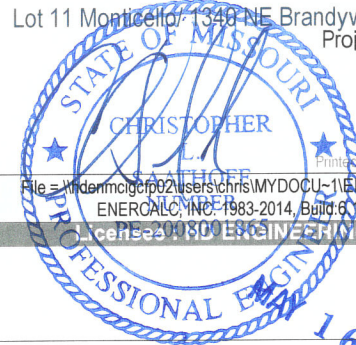
Load Combination	Support 1	Support 2
Overall MAXimum	2.128	0.441
D Only	0.709	0.147
L Only	0.106	0.106
Lr Only	1.313	0.188
L+Lr	1.419	0.294
D+Lr	2.022	0.334
D+L	0.816	0.253
D+L+Lr	2.128	0.441



HD Engineering & Design, Inc.

HD ENGINEERING Project Title: Lot 11 Monticello 1340 NE Brandywine
11656 W. 75TH ST Engineer:
SHAWNEE, KS Project Descr:
913-631-2222
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Project ID:



Printed: 16 MAY 2017, 10:09AM

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ENERCALC, INC. 1983-2014, Build: 6.14.1.23, Ver: 6.17.4.30

Wood Column

Lic. #: KW-06001844

Description: 5 stud column at bottom of stairs

Code References

Calculations per 2012 NDS, IBC 2012, CBC 2013, ASCE 7-10

Load Combinations Used: IBC 2012

General Information

Analysis Method :		Allowable Stress Design		Wood Section Name		5-2x4		
End Fixities		Top & Bottom Pinned		Wood Grading/Manuf.		Graded Lumber		
Overall Column Height		10.0 ft		Wood Member Type		Sawn		
(Used for non-slender calculations)								
Wood Species		Douglas Fir - Larch		Exact Width		7.50 in		
Wood Grade		No.2		Exact Depth		3.50 in		
Fb - Tension		900 psi	Fv	180 psi	Area		26.250 in^2	
Fb - Compr		900 psi	Ft	575 psi	Ix		26.797 in^4	
Fc - Prll		1350 psi	Density	32.21 pcf	Iy		123.047 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 along X-X Axis		
				Y-Y (depth) axis :		Fully braced against buckling along Y-Y Axis		
						Allow Stress Modification Factors		
						Cf or Cv for Bending		1.50
						Cf or Cv for Compression		1.150
						Cf or Cv for Tension		1.50
						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
						(non-glb only)		

Applied Loads

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

Column self weight included : 58.716 lbs * Dead Load Factor

AXIAL LOADS :

ROOF CEILING POINT LOAD: Axial Load at 10.0 ft, D = 4.330, Lr = 8.660 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio =	0.3202 : 1	Maximum SERVICE Lateral Load Reactions . .	
Load Combination	+D+Lr+H	Top along Y-Y	0.0 k
Governing NDS Formula	Comp Only, f_c/F_c'	Bottom along Y-Y	0.0 k
Location of max. above base	0.0 ft	Top along X-X	0.0 k
Bottom along X-X	0.0 k		
At maximum location values are . . .		Maximum SERVICE Load Lateral Deflections . . .	
Applied Axial	13.049 k	Along Y-Y	0.0 in at 0.0 ft above base
Applied Mx	0.0 k-ft	for load combination : n/a	
Applied My	0.0 k-ft	Along X-X	0.0 in at 0.0 ft above base
Fc : Allowable	1,552.50 psi	for load combination : n/a	
PASS Maximum Shear Stress Ratio =	0.0 : 1	Other Factors used to calculate allowable stresses . . .	
Load Combination	+0.60D+0.70E+0.60H		
Location of max. above base	10.0 ft	Bending	1.500
Applied Design Shear	0.0 psi	Cf or Cv : Size based factors	1.150
Allowable Shear	180.0 psi	Compression	1.150
		Tension	

Load Combination Results

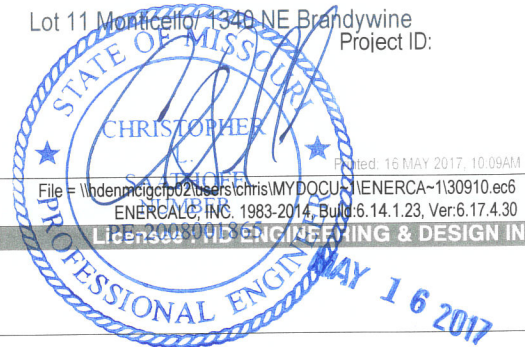
Load Combination	C D	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
		Stress Ratio	Status	Location	Stress Ratio	Status	Location
+D+H	1.000	0.1077	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+L+H	1.000	0.1077	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+Lr+H	1.000	0.3202	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+S+H	1.000	0.1077	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+H	1.000	0.2671	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+H	1.000	0.1077	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.60W+H	1.000	0.1077	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.70E+H	1.000	0.1077	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750Lr+0.750L+0.450W+H	1.000	0.2671	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.450W+H	1.000	0.1077	PASS	0.0 ft	0.0	PASS	10.0 ft
+D+0.750L+0.750S+0.5250E+H	1.000	0.1077	PASS	0.0 ft	0.0	PASS	10.0 ft
+0.60D+0.60W+0.60H	1.000	0.06461	PASS	0.0 ft	0.0	PASS	10.0 ft



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Project ID:



Wood Column

Lic. # : KW-06001844

Description : 5 stud column at bottom of stairs

Load Combination Results

Load Combination	C _D	Maximum Axial + Bending Stress Ratios			Maximum Shear Ratios		
		Stress Ratio	Status	Location	Stress Ratio	Status	Location
+0.60D+0.70E+0.60H	1.000	0.06461	PASS	0.0 ft	0.0	PASS	10.0 ft

Maximum Reactions - Unfactored

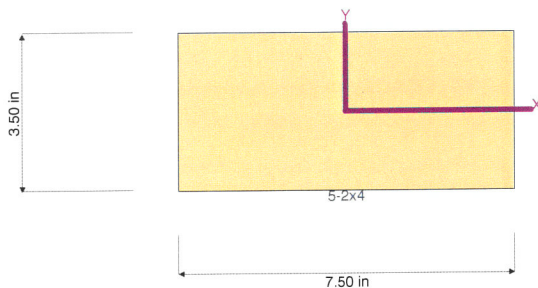
Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		Y-Y Axis Reaction		Axial Reaction
	@ Base	@ Top	@ Base	@ Top	@ Base
D Only		k		k	4.389 k
Lr Only		k		k	8.660 k
D+Lr		k		k	13.049 k

Maximum Deflections for Load Combinations - Unfactored Loads

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
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
D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft

Sketches



Loads are total entered value. Arrows do not reflect absolute direction.