HD ENGINEERING & DESIGN, INC

11656 W. 75TH STREET
SHAWNEE, KS 66214

WWW.HDENGINEERS.COM

913.631.2222

SERVICE@HDENGINEERS.COM

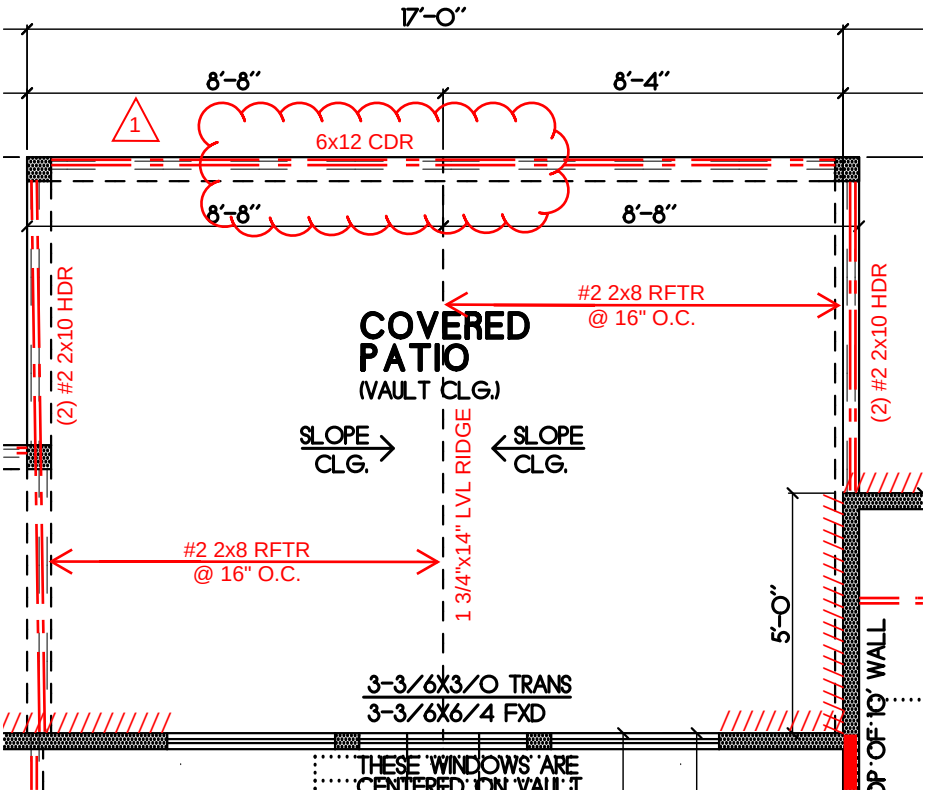
SAB HOMES
4801 NE Freehold Ct.
Lee's Summit, MO 64064

Digitally signed by Kim Brennan
Reason: Release for Construction
Date: 2021.08.18 07:59:14-05'00'
Kim Brennan

RELEASE FOR CONSTRUCTION
AS NOTED ON PLANS REVIEW
Development Services
LEE'S SUMMIT, MISSOURI

Our firm has been asked to make alternate structural recommendations for the house being built at the address listed above. The builder has informed us that the covered deck has been built with 6X12 cedar header instead of the planned glulam header.

After reviewing the approved plans and completing the attached calculations our firm recommends approval of the 6X12 cedar beam as an alternative as shown below.



STATE OF MISSOURI
CHRIS SAATHOFF
NUMBER 2008001865
8/13/2021
REGISTERED PROFESSIONAL ENGINEER

STRUCTURAL REVIEW
HD ENGINEERING & DESIGN
HD: 41485 DATE: 8/13/2021

Title Block Line 1
You can change this area
using the "Settings" menu item
and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr: HDE STAND

STATE OF MISSOURI
CHRIS SAATHOFF
NUMBER 2008001865
08/13/2021
REGISTERED PROFESSIONAL ENGINEER

Wood Beam

Lic. # : KW-06001844

DESCRIPTION: CEDAR BEAM AT DECK

CODE REFERENCES

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

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2018

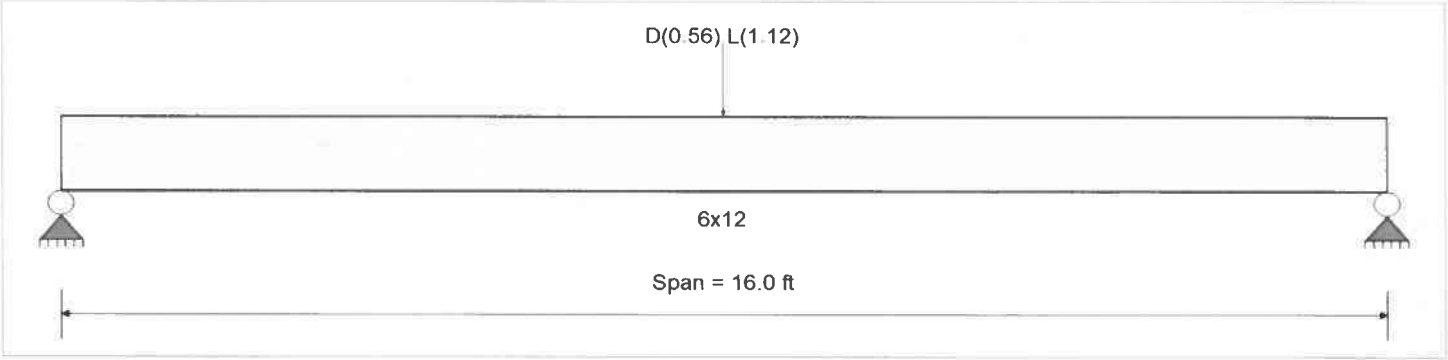
Wood Species : Western Cedars
Wood Grade : No.1

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

Fb +	725.0 psi
Fb -	725.0 psi
Fc - Prll	825.0 psi
Fc - Perp	425.0 psi
Fv	155.0 psi
Ft	425.0 psi

E : Modulus of Elasticity

Ebend- xx	1,000.0 ksi
Eminbend - xx	370.0 ksi
Density	22.470 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Point Load : D = 0.560, L = 1.120 k @ 8.0 ft, (RIDGE END REACTION)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	**0.961**: 1	Maximum Shear Stress Ratio	=	**0.139** : 1
Section used for this span		**6x12**	Section used for this span		**6x12**
fb: Actual	=	696.45 psi	fv: Actual	=	21.57 psi
Fb: Allowable	=	725.00 psi	Fv: Allowable	=	155.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	15.066 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.238 in	Ratio =	805 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.378 in	Ratio =	507 >=180
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	fb	F'b	V	fv	F'v
D Only													0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.388	0.059	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.56	252.99	652.50	0.35	8.29	139.50
+D+L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.961	0.139	1.00	1.000	1.00	1.00	1.00	1.00	1.00	7.04	696.45	725.00	0.91	21.57	155.00
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.646	0.094	1.25	1.000	1.00	1.00	1.00	1.00	1.00	5.92	585.58	906.25	0.77	18.25	193.75
+0.60D					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 16.0 ft	1	0.131	0.020	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.53	151.79	1160.00	0.21	4.98	248.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.3783	8.058		0.0000	0.000

Wood Beam

DESCRIPTION: CEDAR BEAM AT DECK

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.919	0.919
Overall MINimum	0.560	0.560
D Only	0.359	0.359
+D+L	0.919	0.919
+D+0.750L	0.779	0.779
+0.60D	0.215	0.215
L Only	0.560	0.560