

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Printed: 13 OCT 2020, 2:46PM

File = C:\Users\JAMESF~1\DOCUME~1\ENERCA~1\Carrino Olive 9-20.ec6
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Wood Beam

DESCRIPTION: 18' opening w/ LVL header, separates entry to dining

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

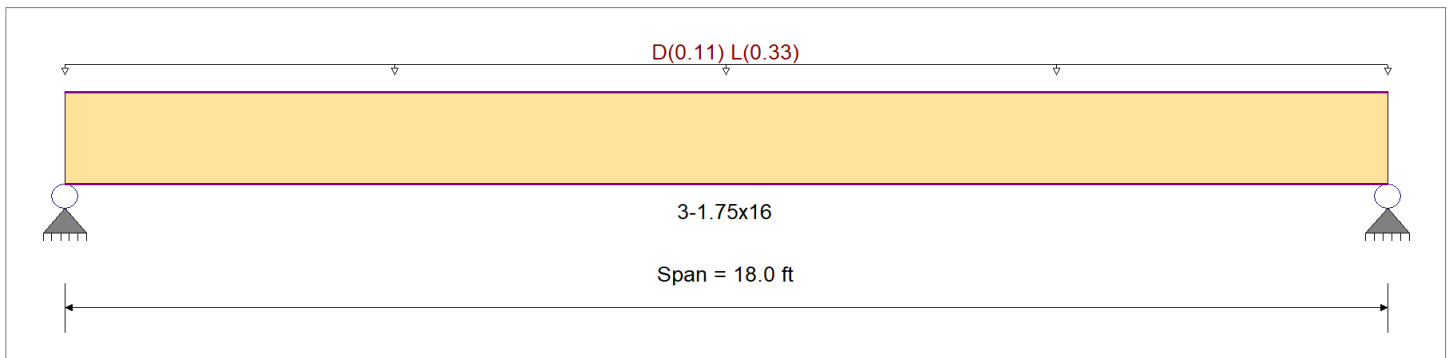
Material Properties

Analysis Method : Allowable Stress Design
 Load Combination ASCE 7-16

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

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

F_b + 2,600.0 psi E : Modulus of Elasticity
 F_b - 2,600.0 psi Ebend- xx 2,000.0 ksi
 F_c - Prll 2,510.0 psi Eminbend - xx 1,016.54 ksi
 F_c - Perp 750.0 psi
 F_v 285.0 psi
 F_t 1,555.0 psi Density 42.010pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations

Uniform Load : D = 0.010, L = 0.030 ksf, Tributary Width = 11.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.382 1	Maximum Shear Stress Ratio	=	0.212 : 1
Section used for this span	=	3-1.75x16	Section used for this span	=	3-1.75x16
	=	954.64 psi		=	60.39 psi
	=	2,500.24 psi		=	285.00 psi
Load Combination	=	+D+L+H	Load Combination	=	+D+L+H
Location of maximum on span	=	9.000ft	Location of maximum on span	=	16.686 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.219 in	Ratio =		987 >=360
Max Upward Transient Deflection		0.000 in	Ratio =		0 <360
Max Downward Total Deflection		0.292 in	Ratio =		740 >=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 _{FV}	C _i	C _r	C _m	C _t	C _L	M	fb	F'b	V	f _v	F _v	
+D+H Length = 18.0 ft	1	0.106	0.059	0.90	0.962	1.00	1.00	1.00	1.00	1.00	4.46	238.66	2250.22	0.00	0.00	0.00	0.00
+D+L+H Length = 18.0 ft	1	0.382	0.212	1.00	0.962	1.00	1.00	1.00	1.00	1.00	17.82	954.64	2500.24	0.00	0.00	0.00	0.00
+D+Lr+H Length = 18.0 ft	1	0.076	0.042	1.25	0.962	1.00	1.00	1.00	1.00	1.00	4.46	238.66	3125.30	0.00	0.00	0.00	0.00
+D+S+H Length = 18.0 ft	1	0.083	0.046	1.15	0.962	1.00	1.00	1.00	1.00	1.00	4.46	238.66	2875.28	0.00	0.00	0.00	0.00
+D+0.750Lr+0.750L+H Length = 18.0 ft	1	0.248	0.138	1.25	0.962	1.00	1.00	1.00	1.00	1.00	14.48	775.65	3125.30	0.00	0.00	0.00	0.00
+D+0.750L+0.750S+H Length = 18.0 ft	1	0.270	0.150	1.15	0.962	1.00	1.00	1.00	1.00	1.00	14.48	775.65	2875.28	0.00	0.00	0.00	0.00
+D+0.60W+H Length = 18.0 ft	1	0.060	0.033	1.60	0.962	1.00	1.00	1.00	1.00	1.00	4.46	238.66	4000.38	0.00	0.00	0.00	0.00

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DESCRIPTION: 18' opening w/ LVL header, separates entry to dining

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	Fv			
+D+0.750Lr+0.750L+0.450W+H Length = 18.0 ft	1	0.194	0.108	1.60	0.962	1.00	1.00	1.00	1.00	1.00	14.48	775.65	4000.38	0.00	0.00	0.00	2.75	49.07	456.00
+D+0.750L+0.750S+0.450W+H Length = 18.0 ft	1	0.194	0.108	1.60	0.962	1.00	1.00	1.00	1.00	1.00	14.48	775.65	4000.38	0.00	0.00	0.00	0.00	0.00	0.00
+0.60D+0.60W+0.60H Length = 18.0 ft	1	0.036	0.020	1.60	0.962	1.00	1.00	1.00	1.00	1.00	2.67	143.20	4000.38	0.00	0.00	0.00	0.51	9.06	456.00
+D+0.70E+0.60H Length = 18.0 ft	1	0.060	0.033	1.60	0.962	1.00	1.00	1.00	1.00	1.00	4.46	238.66	4000.38	0.00	0.00	0.00	0.85	15.10	456.00
+D+0.750L+0.750S+0.5250E+H Length = 18.0 ft	1	0.194	0.108	1.60	0.962	1.00	1.00	1.00	1.00	1.00	14.48	775.65	4000.38	0.00	0.00	0.00	0.00	0.00	0.00
+0.60D+0.70E+H Length = 18.0 ft	1	0.036	0.020	1.60	0.962	1.00	1.00	1.00	1.00	1.00	2.67	143.20	4000.38	0.00	0.00	0.00	0.51	9.06	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.2917	9.066		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	3.960	3.960
Overall MINimum	2.970	2.970
+D+H	0.990	0.990
+D+L+H	3.960	3.960
+D+Lr+H	0.990	0.990
+D+S+H	0.990	0.990
+D+0.750Lr+0.750L+H	3.218	3.218
+D+0.750L+0.750S+H	3.218	3.218
+D+0.60W+H	0.990	0.990
+D+0.750Lr+0.750L+0.450W+H	3.218	3.218
+D+0.750L+0.750S+0.450W+H	3.218	3.218
+0.60D+0.60W+0.60H	0.594	0.594
+D+0.70E+0.60H	0.990	0.990
+D+0.750L+0.750S+0.5250E+H	3.218	3.218
+0.60D+0.70E+H	0.594	0.594
D Only	0.990	0.990
Lr Only		
L Only	2.970	2.970
S Only		
W Only		
E Only		
H Only		

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Wood Beam

DESCRIPTION: LVL ridge beam in vaulted living room ceiling

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	Fv
+D+0.750Lr+0.750L+0.450W+H Length = 17.0 ft	1	0.159	0.093	1.60	0.962	1.00	1.00	1.00	1.00	1.00	11.90	637.43	4000.38	0.00	0.00	0.00
+D+0.750L+0.750S+0.450W+H Length = 17.0 ft	1	0.356	0.208	1.60	0.962	1.00	1.00	1.00	1.00	1.00	26.60	1,424.84	4000.38	0.00	0.00	0.00
+0.60D+0.60W+0.60H Length = 17.0 ft	1	0.045	0.026	1.60	0.962	1.00	1.00	1.00	1.00	1.00	3.36	179.98	4000.38	0.00	0.00	0.00
+D+0.70E+0.60H Length = 17.0 ft	1	0.075	0.044	1.60	0.962	1.00	1.00	1.00	1.00	1.00	5.60	299.97	4000.38	0.00	0.00	0.00
+D+0.750L+0.750S+0.5250E+H Length = 17.0 ft	1	0.356	0.208	1.60	0.962	1.00	1.00	1.00	1.00	1.00	26.60	1,424.84	4000.38	0.00	0.00	0.00
+0.60D+0.70E+H Length = 17.0 ft	1	0.045	0.026	1.60	0.962	1.00	1.00	1.00	1.00	1.00	3.36	179.98	4000.38	0.00	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	0.4905	8.562		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	7.905	7.905
Overall MINimum	6.588	6.588
+D+H	1.318	1.318
+D+L+H	1.318	1.318
+D+Lr+H	3.294	3.294
+D+S+H	7.905	7.905
+D+0.750Lr+0.750L+H	2.800	2.800
+D+0.750L+0.750S+H	6.258	6.258
+D+0.60W+H	1.318	1.318
+D+0.750Lr+0.750L+0.450W+H	2.800	2.800
+D+0.750L+0.750S+0.450W+H	6.258	6.258
+0.60D+0.60W+0.60H	0.791	0.791
+D+0.70E+0.60H	1.318	1.318
+D+0.750L+0.750S+0.5250E+H	6.258	6.258
+0.60D+0.70E+H	0.791	0.791
D Only	1.318	1.318
Lr Only	1.976	1.976
L Only		
S Only	6.588	6.588
W Only		
E Only		
H Only		

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Wood Beam

DESCRIPTION: LVL ridge beam in Den

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	Fv			
+D+0.750Lr+0.750L+0.450W+H Length = 19.0 ft	1	0.139	0.080	1.60	0.946	1.00	1.00	1.00	1.00	1.00	12.95	547.95	3936.81	0.00	0.00	0.00	2.31	36.63	456.00
+D+0.750L+0.750S+0.450W+H Length = 19.0 ft	1	0.311	0.180	1.60	0.946	1.00	1.00	1.00	1.00	1.00	28.94	1,224.82	3936.81	0.00	0.00	0.00	5.16	81.87	456.00
+0.60D+0.60W+0.60H Length = 19.0 ft	1	0.039	0.023	1.60	0.946	1.00	1.00	1.00	1.00	1.00	3.66	154.71	3936.81	0.00	0.00	0.00	0.65	10.34	456.00
+D+0.70E+0.60H Length = 19.0 ft	1	0.065	0.038	1.60	0.946	1.00	1.00	1.00	1.00	1.00	6.09	257.86	3936.81	0.00	0.00	0.00	1.09	17.24	456.00
+D+0.750L+0.750S+0.5250E+H Length = 19.0 ft	1	0.311	0.180	1.60	0.946	1.00	1.00	1.00	1.00	1.00	28.94	1,224.82	3936.81	0.00	0.00	0.00	5.16	81.87	456.00
+0.60D+0.70E+H Length = 19.0 ft	1	0.039	0.023	1.60	0.946	1.00	1.00	1.00	1.00	1.00	3.66	154.71	3936.81	0.00	0.00	0.00	0.65	10.34	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4682	9.569		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	7.695	7.695
Overall MINimum	6.413	6.413
+D+H	1.283	1.283
+D+L+H	1.283	1.283
+D+Lr+H	3.206	3.206
+D+S+H	7.695	7.695
+D+0.750Lr+0.750L+H	2.725	2.725
+D+0.750L+0.750S+H	6.092	6.092
+D+0.60W+H	1.283	1.283
+D+0.750Lr+0.750L+0.450W+H	2.725	2.725
+D+0.750L+0.750S+0.450W+H	6.092	6.092
+0.60D+0.60W+0.60H	0.770	0.770
+D+0.70E+0.60H	1.283	1.283
+D+0.750L+0.750S+0.5250E+H	6.092	6.092
+0.60D+0.70E+H	0.770	0.770
D Only	1.283	1.283
Lr Only	1.924	1.924
L Only		
S Only	6.413	6.413
W Only		
E Only		
H Only		

Steel Beam

DESCRIPTION: Lintel for stone

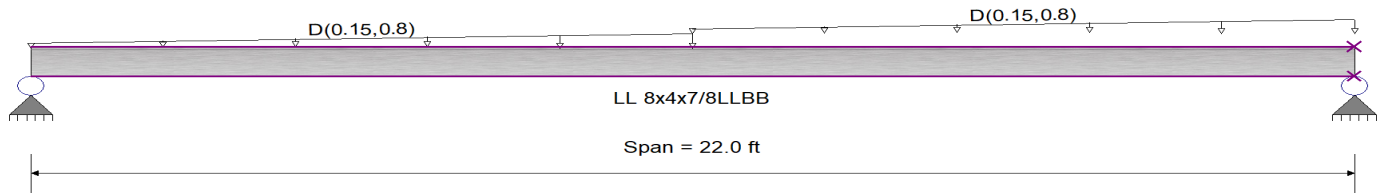
CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, CBC 2013, ASCE 7-10
 Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Strength Design
 Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
 Bending Axis : Major Axis Bending
 Fy : Steel Yield : 50.0 ksi
 E: Modulus : 29,000.0 ksi

Vertical Leg Up



Applied Loads

Service loads entered. Load Factors will be applied for calculations

Beam self weight NOT internally calculated and added
 Load for Span Number 1

Varying Uniform Load : D = 0.150->0.80 k/ft, Extent = 0.0 -->> 11.0 ft, Trib Width = 1.0 ft

Varying Uniform Load : D = 0.150->0.80 k/ft, Extent = 11.0 -->> 22.0 ft, Trib Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.310 : 1	Maximum Shear Stress Ratio =	0.023 : 1
Section used for this span	LL 8x4x7/8LLBB	Section used for this span	LL 8x4x7/8LLBB
Ma : Applied	28.964 k-ft	Va : Applied	5.821 k
Mn / Omega : Allowable	93.563 k-ft	Vn/Omega : Allowable	251.497 k
Load Combination	+D+H	Load Combination	+D+H
Location of maximum on span	10.246 ft	Location of maximum on span	22.000 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	0.694 in	Ratio =	381 >= 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		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+L+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+Lr+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+S+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+0.750Lr+0.750L+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+0.750L+0.750S+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+0.60W+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+0.750Lr+0.750L+0.450W+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+0.750L+0.750S+0.450W+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+0.60D+0.60W+0.60H	Dsgn. L = 22.00 ft	1	0.186	0.014	17.38		17.38	156.25	93.56	1.00	1.00	3.49	420.00	251.50

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DESCRIPTION: Lintel for stone

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+0.70E+0.60H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+D+0.750L+0.750S+0.5250E+H	Dsgn. L = 22.00 ft	1	0.310	0.023	28.96		28.96	156.25	93.56	1.00	1.00	5.82	420.00	251.50
+0.60D+0.70E+H	Dsgn. L = 22.00 ft	1	0.186	0.014	17.38		17.38	156.25	93.56	1.00	1.00	3.49	420.00	251.50

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.6938	11.000		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	4.629	5.821
Overall MINimum	2.778	3.493
+D+H	4.629	5.821
+D+L+H	4.629	5.821
+D+Lr+H	4.629	5.821
+D+S+H	4.629	5.821
+D+0.750Lr+0.750L+H	4.629	5.821
+D+0.750L+0.750S+H	4.629	5.821
+D+0.60W+H	4.629	5.821
+D+0.750Lr+0.750L+0.450W+H	4.629	5.821
+D+0.750L+0.750S+0.450W+H	4.629	5.821
+0.60D+0.60W+0.60H	2.778	3.493
+D+0.70E+0.60H	4.629	5.821
+D+0.750L+0.750S+0.5250E+H	4.629	5.821
+0.60D+0.70E+H	2.778	3.493
D Only	4.629	5.821
Lr Only		
L Only		
S Only		
W Only		
E Only		
H Only		

Support notation : Far left is #1

Values in KIPS