MYERS ENGINEERING

BEAM CALCULATIONS

Digitally signed by Mark Myers, PE
Date: 2022.08.31 14:23:30 -07'00'

MUST BEAR ORIGINAL BLUE INK SIGNATURE OR
DIGITAL PDF SIGNATURE FOR PERMIT SUBMITTAL.

Project: Chase's Corner – Lot 2
Mercer Island, WA

August 30, 2022

2018 INTERNATIONAL BUILDING CODE
100 MPH WIND, EXPOSURE B, K_{zt} = 1.03
RISK CATEGORY II - SOIL SITE CLASS D
SEISMIC DESIGN CATEGORY D (IBC)

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Gig Harbor, WA 98335
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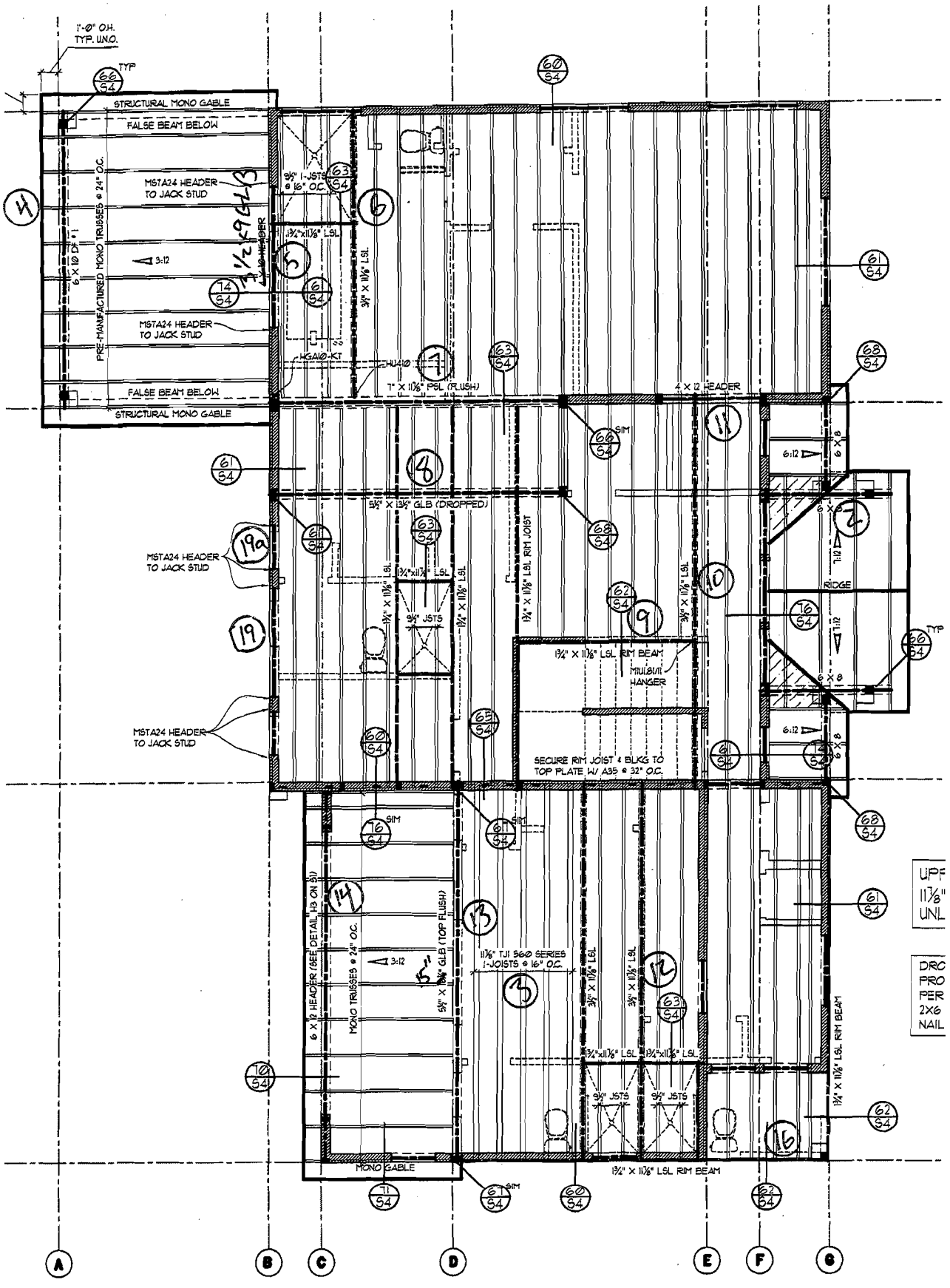
1'-0" O.H. TYP. U.N.O.
TYP
STRUCTURAL MONO GABLE
FALSE BEAM BELOW
MSTA24 HEADER TO JACK STUD
PRE-MANUFACTURED MONO TRUSSES @ 24" O.C.
6 X 10 DF #1
3:12
3½"x9¼" LVL HEADER
MSTA24 HEADER TO JACK STUD
FALSE BEAM BELOW
STRUCTURAL MONO GABLE
9½" I-JSTS @ 16" O.C.
1¾"x11⅞" LSL
3¼" X 11⅞" LSL
HGAI0-KT
HUI410
1" X 11⅞" PSL (FLUSH)
4 X 12 HEADER
SIM
5½" X 13½" GLB (DROPPED)
MSTA24 HEADER TO JACK STUD
1¾" X 11⅞" LSL RIM JOIST
9½" JSTS
1¾" X 11⅞" LSL RIM BEAM
MIULBUIT HANGER
RIDGE
MSTA24 HEADER TO JACK STUD
SECURE RIM JOIST & BLKG TO TOP PLATE W/ A35 @ 32" O.C.
6 X 12 HEADER (SEE DETAIL 1/S3 ON S1)
MONO TRUSSES @ 24" O.C.
3:12
5½" X 16" GLB (TOP FLUSH)
11⅞" TJI 560 SERIES I-JOISTS @ 16" O.C.
MONO GABLE
1¾" X 11⅞" LSL RIM BEAM
A
B
C
D
E
F
G

MYERS ENGINEERING

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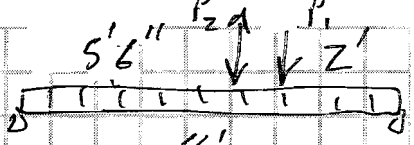
(5) $w_D = 15psf(12'/2 + 2' + 1') + 12psf(9') = 243plf$
$w_L = 40psf(1') = 40plf$
$w_S = 25psf(12'/2 + 2') = 200plf$

$P_1 = 320\# DL + 850\# LL$ from LSL

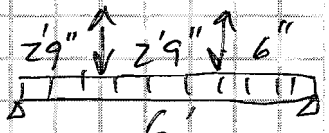
$P_2 = \pm 740\# WL \pm 1565\# EL$ from AA w/ $\Omega = 3.0$



3½ x 9 GLB

(18) $w_{D_1} = 15psf(30'/2 + 1') + 12psf(9') = 348plf$
$w_{L_1} = 40plf$
$w_{S_1} = 25psf(30'/2) = 375plf$

$P = \pm 740\# WL \pm 1565\# EL$ from AA w/ $\Omega = 3.0$



4x10

FOR Chase's Lt 2
JOB

DATE 8-30-22
BY MH

Project Title: Chases Corner - Lot 2
Engineer: Mark Myers, P.E.
Project ID:
Project Descr:

Wood Beam

Project File: Chases Lot 2.ec6

LIC# : KW-06015659, Build:20.22.8.17 MYERS ENGINEERING (c) ENERCALC INC 1983-2022

DESCRIPTION: 5. Header at Great Rm Slider

CODE REFERENCES

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

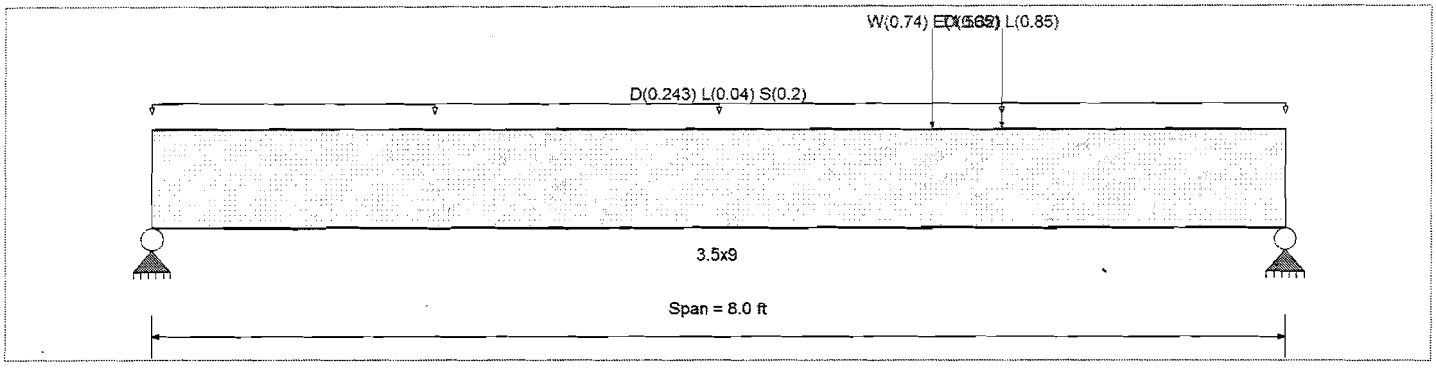
Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2018

Wood Species : DF/DF
Wood Grade : 24F-V4

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

		E : Modulus of Elasticity	
Fb +	2,400.0 psi	Ebend- xx	1,800.0 ksi
Fb -	1,850.0 psi	Eminbend - xx	950.0 ksi
Fc - Prll	1,650.0 psi	Ebend- yy	1,600.0 ksi
Fc - Perp	650.0 psi	Eminbend - yy	850.0 ksi
Fv	265.0 psi	Density	31.210 pcf
Ft	1,100.0 psi		



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.2430, L = 0.040, S = 0.20 , Tributary Width = 1.0 ft
Point Load : D = 0.320, L = 0.850 k @ 6.0 ft
Point Load : W = 0.740, E = 1.565 k @ 5.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.576 : 1	Maximum Shear Stress Ratio	=	0.440 : 1
Section used for this span		**3.5x9**	Section used for this span		**3.5x9**
fb: Actual	=	2,211.12 psi	fv: Actual	=	186.57 psi
Fb: Allowable	=	3,840.00 psi	Fv: Allowable	=	424.00 psi
Load Combination		+1.118D+0.750L+0.750S+1.575E	Load Combination		+1.118D+0.750L+0.750S+1.575E
Location of maximum on span	=	5.489 ft	Location of maximum on span	=	7.270 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.062 in	Ratio =	1536 >=360	Span: 1 : E Only
Max Upward Transient Deflection	-0.062 in	Ratio =	1536 >=360	Span: 1 : E Only * -1.0
Max Downward Total Deflection	0.167 in	Ratio =	574 >=240	Span: 1 : +D+0.750L+0.750S+0.5250E
Max Upward Total Deflection	-0.004 in	Ratio =	25846 >=240	Span: 1 : +0.60D-0.70E

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 = 8.0 ft	1	0.268	0.207	0.90	1.000	1.00	1.00	1.00	1.00	1.00	2.28	578.33	2160.00	1.03	49.27	238.50
+D+L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.379	0.324	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.59	910.51	2400.00	1.80	85.85	265.00
+D+S					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.356	0.264	1.15	1.000	1.00	1.00	1.00	1.00	1.00	3.87	983.17	2760.00	1.69	80.41	304.75
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.275	0.232	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.25	824.49	3000.00	1.61	76.71	331.25
+D+0.750L+0.750S					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.406	0.328	1.15	1.000	1.00	1.00	1.00	1.00	1.00	4.41	1,119.80	2760.00	2.10	100.07	304.75
+D+0.60W					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Project Title: Chases Corner - Lot 2
Engineer: Mark Myers, P.E.
Project ID:
Project Descr:

Wood Beam

Project File: Chases Lot 2.ec6

LIC# : KW-06015659, Build:20.22.8.17 MYERS ENGINEERING (c) ENERCALC INC 1983-2022

DESCRIPTION: 5. Header at Great Rm Slider

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
Length = 8.0 ft	1	0.193	0.150	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.92	740.94	3840.00	1.34	63.80	424.00
+D-0.60W					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.113	0.083	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.72	435.83	3840.00	0.74	35.04	424.00
+1.157D+2.10E					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.535	0.388	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.08	2,052.95	3840.00	3.46	164.61	424.00
+1.157D-2.10E					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.274	0.216	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.19	810.51	2960.00	1.93	91.67	424.00
+D+0.750L+0.450W					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.250	0.207	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.77	958.42	3840.00	1.84	87.61	424.00
+D+0.750L-0.450W					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.182	0.155	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.76	700.64	3840.00	1.38	65.81	424.00
+D+0.750L+0.750S+0.450W					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.324	0.262	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.90	1,243.72	3840.00	2.33	110.97	424.00
+D+0.750L+0.750S-0.450W					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.261	0.210	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.95	1,002.39	3840.00	1.87	89.16	424.00
+1.118D+0.750L+0.750S+1.5					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.576	0.440	1.60	1.000	1.00	1.00	1.00	1.00	1.00	8.71	2,211.12	3840.00	3.92	186.57	424.00
+1.118D+0.750L+0.750S-1.57					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.121	0.141	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.83	464.35	3840.00	1.26	59.89	424.00
+0.60D+0.60W					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.134	0.104	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.03	516.32	3840.00	0.93	44.10	424.00
+0.60D-0.60W					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.055	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	0.83	211.21	3840.00	0.39	18.38	424.00
+0.4428D+2.10E					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.435	0.305	1.60	1.000	1.00	1.00	1.00	1.00	1.00	6.57	1,669.42	3840.00	2.72	129.41	424.00
+0.4428D-2.10E					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.403	0.239	1.60	1.000	1.00	1.00	1.00	1.00	1.00	4.70	1,194.03	2960.00	2.13	101.50	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E	1	0.1671	4.175		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.188	2.975
Overall MINimum	-0.489	-1.076 ←
D Only	1.052	1.212
+D+L	1.425	2.010
+D+S	1.852	2.012
+D+0.750L	1.331	1.810
+D+0.750L+0.750S	1.931	2.410
+D+0.60W	1.191	1.517
+D-0.60W	0.913	0.907
+D+0.70E	1.394	1.965
+D-0.70E	0.710	0.459
+D+0.750L+0.450W	1.435	2.039
+D+0.750L-0.450W	1.227	1.581
+D+0.750L+0.750S+0.450W	2.035	2.639
+D+0.750L+0.750S-0.450W	1.827	2.181
+D+0.750L+0.750S+0.5250E	2.188	2.975
+D+0.750L+0.750S-0.5250E	1.675	1.845
+0.60D+0.60W	0.770	1.032
+0.60D-0.60W	0.492	0.422
+0.60D+0.70E	0.974	1.480
+0.60D-0.70E	0.289	-0.026
L Only	0.373	0.798
S Only	0.800	0.800
W Only	0.231	0.509
-W	-0.231	-0.509

Wood Beam

DESCRIPTION: 5. Header at Great Rm Slider

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
E Only	0.489	1.076
E Only * -1.0	-0.489	-1.076

Project Title: Chases Corner - Lot 2
Engineer: Mark Myers, P.E.
Project ID:
Project Descr:

Wood Beam

Project File: Chases Lot 2.ec6

DESCRIPTION: 19. Header at Dining

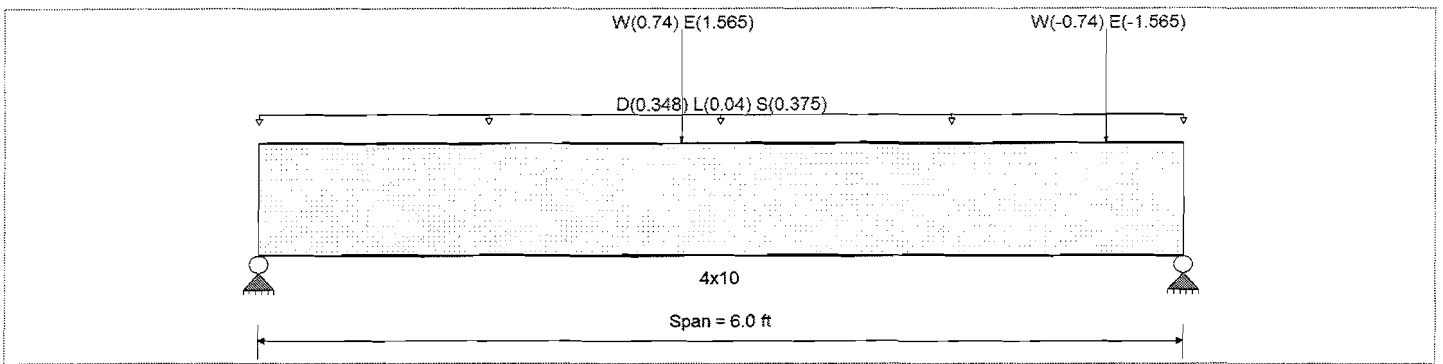
CODE REFERENCES

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

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	900.0 psi	*E : Modulus of Elasticity*	
Load Combination :	IBC 2018	Fb -	900.0 psi	Ebend- xx	1,600.0 ksi
		Fc - Prll	1,350.0 psi	Eminbend - xx	580.0 ksi
Wood Species :	DouglasFir-Larch	Fc - Perp	625.0 psi		
Wood Grade :	No.2	Fv	180.0 psi		
		Ft	575.0 psi	Density	31.210 pcf

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 NOT internally calculated and added
Uniform Load : D = 0.3480, L = 0.040, S = 0.3750 , Tributary Width = 1.0 ft
Point Load : W = 0.740, E = 1.565 k @ 2.750 ft
Point Load : W = -0.740, E = -1.565 k @ 5.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.866 : 1	Maximum Shear Stress Ratio	=	0.464 : 1
Section used for this span		**4x10**	Section used for this span		**4x10**
fb: Actual	=	1,496.78 psi	fv: Actual	=	133.62 psi
Fb: Allowable	=	1,728.00 psi	Fv: Allowable	=	288.00 psi
Load Combination		+1.118D+0.750L+0.750S+1.575E	Load Combination		+1.118D+0.750L+0.750S+1.575E
Location of maximum on span	=	2.759 ft	Location of maximum on span	=	5.212 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.030 in	Ratio =	2417 >=360	Span: 1 : S Only
Max Upward Transient Deflection	-0.025 in	Ratio =	2907 >=360	Span: 1 : E Only * -1.0
Max Downward Total Deflection	0.065 in	Ratio =	1102 >=240	Span: 1 : +D+0.750L+0.750S+0.5250E
Max Upward Total Deflection	-0.001 in	Ratio =	69139 >=240	Span: 1 : +0.60D-0.70E

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 = 6.0 ft	1	0.387	0.222	0.90	1.200	1.00	1.00	1.00	1.00	1.00	1.57	376.51	972.00	0.78	36.01	162.00
+D+L					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.389	0.223	1.00	1.200	1.00	1.00	1.00	1.00	1.00	1.75	419.78	1080.00	0.87	40.15	180.00
+D+S					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.630	0.361	1.15	1.200	1.00	1.00	1.00	1.00	1.00	3.25	782.23	1242.00	1.61	74.82	207.00
+D+0.750L					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.303	0.174	1.25	1.200	1.00	1.00	1.00	1.00	1.00	1.70	408.96	1350.00	0.84	39.12	225.00
+D+0.750L+0.750S					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.574	0.330	1.15	1.200	1.00	1.00	1.00	1.00	1.00	2.97	713.25	1242.00	1.47	68.22	207.00
+D+0.60W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Project Title: Chases Corner - Lot 2
Engineer: Mark Myers, P.E.
Project ID:
Project Descr:

Wood Beam

Project File: Chases Lot 2.ec6

LIC# : KW-06015659, Build:20.22.8.17 MYERS ENGINEERING (c) ENERCALC INC 1983-2022

DESCRIPTION: 19. Header at Dining

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
Length = 6.0 ft	1	0.294	0.163	1.60	1.200	1.00	1.00	1.00	1.00	1.00	2.11	508.10	1728.00	1.01	46.80	288.00
+D-0.60W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.160	0.092	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.15	276.39	1728.00	0.57	26.58	288.00
+1.157D+2.10E					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.825	0.430	1.60	1.200	1.00	1.00	1.00	1.00	1.00	5.93	1,424.92	1728.00	2.67	123.75	288.00
+1.157D-2.10E					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.324	0.302	1.60	1.200	1.00	1.00	1.00	1.00	1.00	2.33	559.13	1728.00	1.88	86.97	288.00
+D+0.750L+0.450W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.293	0.164	1.60	1.200	1.00	1.00	1.00	1.00	1.00	2.11	506.84	1728.00	1.02	47.09	288.00
+D+0.750L-0.450W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.191	0.111	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.37	329.24	1728.00	0.69	32.05	288.00
+D+0.750L+0.750S+0.450W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.468	0.264	1.60	1.200	1.00	1.00	1.00	1.00	1.00	3.37	809.17	1728.00	1.64	75.91	288.00
+D+0.750L+0.750S-0.450W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.364	0.212	1.60	1.200	1.00	1.00	1.00	1.00	1.00	2.62	629.11	1728.00	1.32	61.15	288.00
+1.118D+0.750L+0.750S+1.5					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.866	0.464	1.60	1.200	1.00	1.00	1.00	1.00	1.00	6.23	1,496.78	1728.00	2.88	133.62	288.00
+1.118D+0.750L+0.750S-1.5					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.230	0.242	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.65	396.96	1728.00	1.50	69.68	288.00
+0.60D+0.60W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.207	0.113	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.49	358.47	1728.00	0.70	32.54	288.00
+0.60D-0.60W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.081	0.047	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.58	139.11	1728.00	0.29	13.47	288.00
+0.4428D+2.10E					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.670	0.341	1.60	1.200	1.00	1.00	1.00	1.00	1.00	4.82	1,157.66	1728.00	2.12	98.27	288.00
+0.4428D-2.10E					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 6.0 ft	1	0.478	0.292	1.60	1.200	1.00	1.00	1.00	1.00	1.00	3.44	826.39	1728.00	1.82	84.20	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E	1	0.0653	2.956		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.354	2.354
Overall MINimum	-0.717	0.717
D Only	1.044	1.044
+D+L	1.164	1.164
+D+S	2.169	2.169
+D+0.750L	1.134	1.134
+D+0.750L+0.750S	1.978	1.978
+D+0.60W	1.248	0.841
+D-0.60W	0.841	1.248
+D+0.70E	1.546	0.542
+D-0.70E	0.542	1.546
+D+0.750L+0.450W	1.287	0.981
+D+0.750L-0.450W	0.981	1.287
+D+0.750L+0.750S+0.450W	2.130	1.825
+D+0.750L+0.750S-0.450W	1.825	2.130
+D+0.750L+0.750S+0.5250E	2.354	1.601
+D+0.750L+0.750S-0.5250E	1.601	2.354
+0.60D+0.60W	0.830	0.423
+0.60D-0.60W	0.423	0.830
+0.60D+0.70E	1.129	0.124
+0.60D-0.70E	0.124	1.129
L Only	0.120	0.120
S Only	1.125	1.125
W Only	0.339	-0.339
-W	-0.339	0.339

Wood Beam

DESCRIPTION: 19. Header at Dining

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
E Only	0.717	-0.717
E Only * -1.0	-0.717	0.717

Project Title: Chases Corner - Lot 2
Engineer: Mark Myers, P.E.
Project ID:
Project Descr:

Wood Beam

Project File: Chases Lot 2.ec6

LIC# : KW-06015659, Build:20.22.8.17 MYERS ENGINEERING (c) ENERCALC INC 1983-2022

DESCRIPTION: 19a. Header at Dining

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

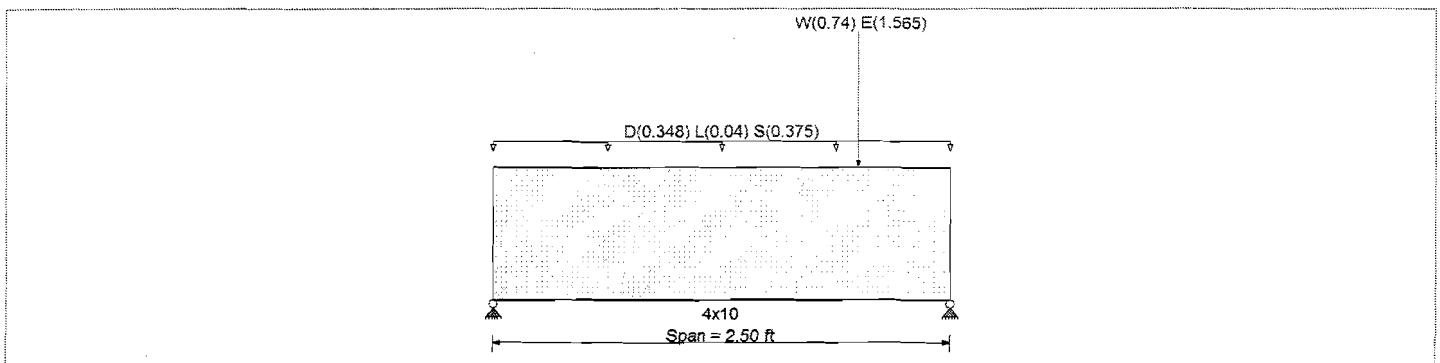
Wood Species : DouglasFir-Larch
Wood Grade : No.2

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

Fb +	900.0 psi
Fb -	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	625.0 psi
Fv	180.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,600.0 ksi
Eminbend - xx	580.0 ksi
Density	31.210 pcf



Applied Loads

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

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.3480, L = 0.040, S = 0.3750 , Tributary Width = 1.0 ft
Point Load : W = 0.740, E = 1.565 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.211 : 1	Maximum Shear Stress Ratio	=	0.137 : 1
Section used for this span		4x10	Section used for this span		4x10
fb: Actual	=	364.32 psi	fv: Actual	=	39.48 psi
Fb: Allowable	=	1,728.00 psi	Fv: Allowable	=	288.00 psi
Load Combination		+1.157D+2.10E	Load Combination		+1.157D+2.10E
Location of maximum on span	=	1.998 ft	Location of maximum on span	=	0.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.001 in	Ratio =	21624 >=360	Span: 1 : E Only
Max Upward Transient Deflection	-0.001 in	Ratio =	21624 >=360	Span: 1 : E Only * -1.0
Max Downward Total Deflection	0.002 in	Ratio =	13063 >=240	Span: 1 : +D+0.750L+0.750S+0.5250E
Max Upward Total Deflection	-0.000 in	Ratio =	61005 >=240	Span: 1 : +0.60D-0.70E

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 = 2.50 ft	1	0.067	0.048	0.90	1.200	1.00	1.00	1.00	1.00	1.00	0.27	65.37	972.00	0.17	7.80	162.00
+D+L					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.067	0.048	1.00	1.200	1.00	1.00	1.00	1.00	1.00	0.30	72.88	1080.00	0.19	8.69	180.00
+D+S					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.109	0.078	1.15	1.200	1.00	1.00	1.00	1.00	1.00	0.56	135.80	1242.00	0.35	16.20	207.00
+D+0.750L					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.053	0.038	1.25	1.200	1.00	1.00	1.00	1.00	1.00	0.30	71.00	1350.00	0.18	8.47	225.00
+D+0.750L+0.750S					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.100	0.071	1.15	1.200	1.00	1.00	1.00	1.00	1.00	0.52	123.83	1242.00	0.32	14.77	207.00
+D+0.60W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.055	0.041	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.39	94.78	1728.00	0.26	11.91	288.00

Project Title: Chases Corner - Lot 2
Engineer: Mark Myers, P.E.
Project ID:
Project Descr:

Wood Beam

Project File: Chases Lot 2.ec6

LIC# : KW-06015659, Build:20.22.8.17 MYERS ENGINEERING (c) ENERCALC INC 1983-2022

DESCRIPTION: 19a. Header at Dining

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-0.60W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.024	0.041	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.17	41.40	1728.00	0.25	11.76	288.00
+1.157D+2.10E					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.211	0.137	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.52	364.32	1728.00	0.85	39.48	288.00
+1.157D-2.10E					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.155	0.137	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.11	267.23	1728.00	0.85	39.48	288.00
+D+0.750L+0.450W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.053	0.040	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.38	92.43	1728.00	0.25	11.55	288.00
+D+0.750L-0.450W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.030	0.040	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.22	52.40	1728.00	0.25	11.40	288.00
+D+0.750L+0.750S+0.450W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.084	0.062	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.60	144.65	1728.00	0.39	17.86	288.00
+D+0.750L+0.750S-0.450W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.061	0.061	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.44	104.62	1728.00	0.38	17.58	288.00
+1.118D+0.750L+0.750S+1.5					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.186	0.134	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.34	321.41	1728.00	0.83	38.53	288.00
+1.118D+0.750L+0.750S-1.5					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.088	0.134	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.63	152.42	1728.00	0.83	38.53	288.00
+0.60D+0.60W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.041	0.031	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.29	70.45	1728.00	0.19	8.79	288.00
+0.60D-0.60W					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.010	0.030	1.60	1.200	1.00	1.00	1.00	1.00	1.00	0.07	17.49	1728.00	0.19	8.70	288.00
+0.4428D+2.10E					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.193	0.118	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.39	334.35	1728.00	0.73	33.91	288.00
+0.4428D-2.10E					1.200	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 2.50 ft	1	0.172	0.118	1.60	1.200	1.00	1.00	1.00	1.00	1.00	1.24	297.20	1728.00	0.73	33.91	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E	1	0.0023	1.305		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.988	1.481
Overall MINimum	-0.313	-1.252 ←
D Only	0.435	0.435
+D+L	0.485	0.485
+D+S	0.904	0.904
+D+0.750L	0.473	0.473
+D+0.750L+0.750S	0.824	0.824
+D+0.60W	0.524	0.790
+D-0.60W	0.346	0.080
+D+0.70E	0.654	1.311
+D-0.70E	0.216	-0.441
+D+0.750L+0.450W	0.539	0.739
+D+0.750L-0.450W	0.406	0.206
+D+0.750L+0.750S+0.450W	0.891	1.090
+D+0.750L+0.750S-0.450W	0.757	0.558
+D+0.750L+0.750S+0.5250E	0.988	1.481
+D+0.750L+0.750S-0.5250E	0.660	0.167
+0.60D+0.60W	0.350	0.616
+0.60D-0.60W	0.172	-0.094
+0.60D+0.70E	0.480	1.137
+0.60D-0.70E	0.042	-0.615
L Only	0.050	0.050
S Only	0.469	0.469
W Only	0.148	0.592
-W	-0.148	-0.592
E Only	0.313	1.252

Wood Beam

DESCRIPTION: 19a. Header at Dining

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
E Only * -1.0	-0.313	-1.252