

4040 97TH AVE SE.,
MERCER ISLAND, WA 98040

STRUCTURAL CALCULATIONS
FOR
EXISTING RESIDENCE ADDITION



Date Signed: 07-12-2024

2021 International Residential Code
2021 International Building Code

PROJECT NAME

ADDRESS

4040 97TH AVE SE., MERCER ISLAND, WA 98040

PROJECT #

DATE

6/30/2024

BUILDING CODE

2021 International Residential Code

2021 International Building Code

WIND DESIGN

Vult = 110 MPH

Vasd = 85 MPH

Exposure = B

Kzt = 1.30

Importance Factor = 1.0

SEISMIC DESIGN

Ss(g) = 1.405 Sms(g) = 1.687 Sds(g) = 1.124

St(g) = 0.489

Seismic Design Category = D

Site Class = D

Importance Factor = 1.0

DESIGN LOADING

Roof Snow Load = 25 PSF

Floor Live Load = 40 PSF

Bedroom Live Load = 30 PSF

Deck & Balcony Live Load = 60 PSF

Roof Dead Load = 15 PSF

Floor Dead Load = 15 PSF (For framing gravity design)

Exterior Wall Dead Load = 10 PSF

Partition Wall Seismic Weight = 10 PSF

Floor Seismic Weight = 10 PSF

Allowable Soil Pressure = 1500 PSF

Lateral Earth (Restrained) Pressure = 50 PCF

Passive Pressure = 300 PCF

Coefficient of Friction = 0.4

SCOPE OF WORK

Existing residence building addition design

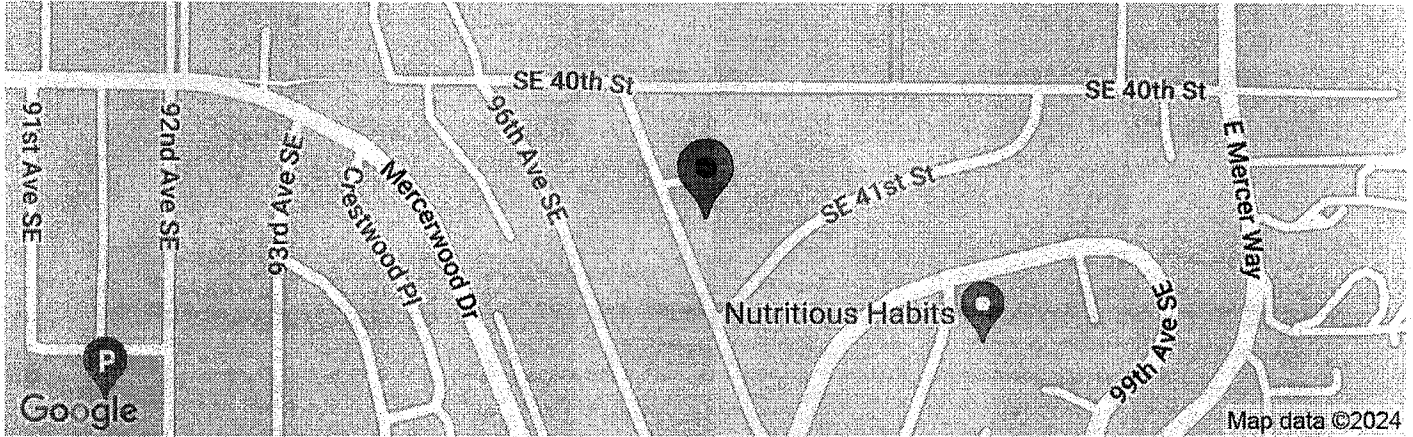
USGS web services were down for some period of time and as a result this tool wasn't operational, resulting in *timeout* error.
 USGS web services are now operational so this tool should work as expected.



OSHPD

4040 97th Ave SE, Mercer Island, WA 98040, USA

Latitude, Longitude: 47.5736359, -122.2109234



Date	7/11/2024, 5:32:43 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S _S	1.405	MCE _R ground motion. (for 0.2 second period)
S ₁	0.489	MCE _R ground motion. (for 1.0s period)
S _{MS}	1.687	Site-modified spectral acceleration value
S _{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S _{DS}	1.124	Numeric seismic design value at 0.2 second SA
S _{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F _a	1.2	Site amplification factor at 0.2 second
F _v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.601	MCE _G peak ground acceleration
F _{PGA}	1.2	Site amplification factor at PGA
PGA _M	0.722	Site modified peak ground acceleration
T _L	6	Long-period transition period in seconds
SsRT	1.405	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.557	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	3.643	Factored deterministic acceleration value. (0.2 second)
S1RT	0.489	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.544	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.454	Factored deterministic acceleration value. (1.0 second)

Type	Value	Description
PGAd	1.24	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA _{UH}	0.601	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C _{RS}	0.903	Mapped value of the risk coefficient at short periods
C _{R1}	0.898	Mapped value of the risk coefficient at a period of 1 s
C _V	1.381	Vertical coefficient

ISLAND/114 LATERAL DESIGN CHECK

$$\text{ROOF WT: } 1970 \text{ kips. } (15 \text{ PSF} + 10 \text{ PSF}/2) = 39.4 \text{ kips}$$

$$\begin{aligned} \text{UPPER LEVEL WT: } & 1591 \text{ kips. } (10 \text{ PSF} + 10 \text{ PSF}) \\ & + 1354 \text{ kips. } (10 \text{ PSF} + 10 \text{ PSF}/2) = 52.1 \text{ kips.} \end{aligned}$$

$$\text{ROOF HT: } 10' \quad (21')$$

$$\text{UPPER LEVEL HT: } 11'$$

ASCE 7-16 Seismic Base Shear

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: Seismic Base Shear Analysis

Specific Description: 4040 RESIDENCE ADDITION

Risk Category

Calculations per ASCE 7-16

Risk Category of Building or Other Structure : "II" : All Buildings and other structures except those listed as Category I, III, and IV *SCE 7-16, Page 4, Table 1.5-1*Seismic Importance Factor = 1 *ASCE 7-16, Page 5, Table 1.5-2***USER DEFINED Ground Motion**

ASCE 7-16 11.4.2

Max. Ground Motions, 5% Damping

$S_S = 1.405 \text{ g, 0.2 sec response}$

$S_1 = 0.4890 \text{ g, 1.0 sec response}$

For the closest datapoint grid location . . .

Latitude = 0.000 deg North

Longitude = 0.000 deg West

Conforms to ASCE 7 Section 12.8.1.3: Regular structure with period of 0.5 s or less, SDS limited to max of 0.7*SDS or 1.0 for calculation

Site Class, Site Coeff. and Design CategoryClassification: "D" : Shear Wave Velocity 600 to 1,200 ft/sec = D (By Default per 11.4.3) *ASCE 7-16 Table 20.3-1*Site Coefficients F_a & F_v $F_a = 1.20$ $F_v = 1.81$ *ASCE 7-16 Table 11.4-1 & 11.4-2*
(using straight-line interpolation from table va)Maximum Considered Earthquake Acceleration $S_{MS} = F_a * S_s = 1.686$ *ASCE 7-16 Eq. 11.4-1*
 $S_{M1} = F_v * S_1 = 0.886$ *ASCE 7-16 Eq. 11.4-2*Design Spectral Acceleration $S_{DS} = S_{MS}^{2/3} = 1.124$ *ASCE 7-16 Eq. 11.4-3*
 $S_{D1} = S_{M1}^{2/3} = 0.590$ *ASCE 7-16 Eq. 11.4-4*Seismic Design Category = D *ASCE 7-16 Table 11.6-1 & -2***Resisting System**

ASCE 7-16 Table 12.2-1

Basic Seismic Force Resisting System . . .

Bearing Wall Systems**15. Light-frame (wood) walls sheathed w/wood structural panels rated for shear resistance.**Response Modification Coefficient "R" = 6.50
System Overstrength Factor "Wo" = 2.50
Deflection Amplification Factor "Cd" = 4.00

Building height Limits :

Category "A & B" Limit: No Limit
Category "C" Limit: No Limit
Category "D" Limit: Limit = 65
Category "E" Limit: Limit = 65
Category "F" Limit: Limit = 65

NOTE! See ASCE 7-16 for all applicable footnc

Lateral Force Procedure

ASCE 7-16 Section 12.8.2

Equivalent Lateral Force Procedure

The "Equivalent Lateral Force Procedure" is being used according to the provisions of ASCE 7-16 12.8

Determine Building Period

Use ASCE 12.8-7

Structure Type for Building Period Calc: All Other Structural Systems

"Ct" value = 0.020 "hn" : Height from base to highest level = 21.0 ft

"x" value = 0.75

"Ta" Approximate fundamental period using Eq. 12.8-7 : $T_a = C_t * (h_n^x) = 0.196 \text{ sec}$

"TL" : Long-period transition period per ASCE 7-16 Maps 22-14 -> 22-17 = 6.000 sec

Building Period "Ta" Calculated from Approximate Method sel = 0.196

ASCE 7-16 Seismic Base Shear

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: Seismic Base Shear Analysis

"Cs" Response Coefficient

ASCE 7-16 Section 12.8.1.1

S_{DS} : Short Period Design Spectral Response	=	1.124	From Eq. 12.8-2, Preliminary C_s	=	0.154
"R" : Response Modification Factor	=	6.50	From Eq. 12.8-3 & 12.8-4, C_s need not exceed	=	0.463
"I" : Seismic Importance Factor	=	1	From Eq. 12.8-5 & 12.8-6, C_s not be less than	=	0.044

User has selected ASCE 12.8.1.3 : Regular structure, **C_s : Seismic Response Coefficient = 0.1538**
 Less than 5 Stories and with $T \leq 0.5$ sec, SO $S_s \leq 1.5$ for C_s calcul

Seismic Base Shear

ASCE 7-16 Section 12.8.1

C_s =	0.1538 from 12.8.1.1	W (see Sum W_i below) =	91.50 k
		Seismic Base Shear $V = C_s * W =$	14.08 k

Vertical Distribution of Seismic Forces

ASCE 7-16 Section 12.8.3

"k" : hx exponent based on $T_a = 1.00$

Table of building Weights by Floor Level...

Level #	W_i : Weight	H_i : Height	$(W_i * H_i^k)$	C_{vx}	$F_x = C_{vx} * V$	Sum Story Shear	Sum Story Moment
2	39.40	21.00	827.40	0.5908	8.32	8.32	0.00
1	52.10	11.00	573.10	0.4092	5.76	14.08	83.16
Sum $W_i =$		91.50 k	Sum $W_i * H_i =$	1,400.50 k-ft	Total Base Shear =	14.08 k	Base Moment = 238.0 k-ft

Diaphragm Forces : Seismic Design Category "B" to "F"

ASCE 7-16 12.10.1.1

Level #	W_i	F_i	Sum F_i	Sum W_i	F_{px} : Calcd	F_{px} : Min	F_{px} : Max	F_{px}	Dsgn. Force
2	39.40	8.32	8.32	39.40	8.32	8.86	17.71	8.86	8.86
1	52.10	5.76	14.08	91.50	8.02	11.71	23.42	11.71	11.71

- W_{px} Weight at level of diaphragm and other structure elements attached to it.
- F_i Design Lateral Force applied at the level.
- Sum F_i Sum of "Lat. Force" of current level plus all levels above
- MIN Req'd Force @ Level ... $0.20 * S_{DS} * I * W_{px}$
- MAX Req'd Force @ Level .. $0.40 * S_{DS} * I * W_{px}$
- F_{px} : Design Force @ Level . $W_{px} * \text{SUM}(x \rightarrow n) F_i / \text{SUM}(x \rightarrow n) w_i$, $x =$ Current level, $n =$ Top Level

ASCE 7

Wind Loads per ASCE 7 Chapter 28 MWFRS (Envelope Procedure)- Low-Rise Buildings

Input Cells = _____
 Project Number: _____
 Project Name: **4040 RESIDENCE ADDITION**
 Location: _____
 Design By: _____
 Program Limitations: 1. Mean roof height h less than or equal to 60 ft.
 2. Mean roof height h does not exceed least horizontal dimension.

BUILDING AND SITE INFORMATION

INPUT

Building width, B =	46	ft (perpendicular to ridge)
Building length, L =	80	ft (parallel to ridge)
Building eave height, h_e =	21	ft
Building ridge height, h_r =	25	ft
Height of parapet, h_p =	21	ft
Roof slope, s =	4.00 in./ft.	= 18.43 degrees
Is roof a gable or hip =	Hip	
Risk Category =	II	
Wind velocity, V =	110	mi/hr = 85 mi/hr (ASD)
Exposure =	B	
Topographic factor, K_{zt} =	1.3	
Wind directionality factor, K_d =	0.85	
Bldg internal pressure condition =	Enclosed	

Design Wind Pressure (LRFD)				
22.6 PSF				
Bldg. Info.	Height(ft)	Roof	First	
		10	11	
E-W Width	46	ft		
N-S Width	80	ft		
E-W Vw (kip)	Roof	5.2	Sum	5.2
	First	11	(kip)	16.2
N-S Vw (kip)	Roof	9.1	Sum	9.1
	First	19	(kip)	28.1

OUTPUT

Mean roof height, h =	23	ft
$2a$ =	9.2	ft
h/L =	0.29	
h/B =	0.5	
Internal Pressure Coeff's, GC_{pi} =	0.18	
	-0.18	
Pressure exposure coeff, K_h =	0.7	
Velocity pressure, q_h =	23.96	psf

MAIN WIND-FORCE RESISTING SYSTEM (MWFRS)

Wind Pressures for Low-Rise Buildings

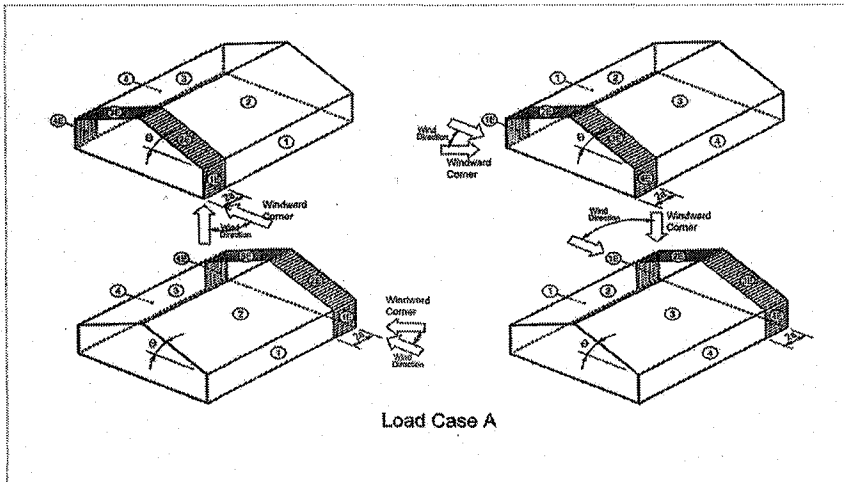
$$p = q_h[(GC_{pi}) - (GC_{pe})] \text{ (lb/ft}^2\text{)}$$

Load Case A: Winds Perpendicular to Ridge

Internal pressure = +/- 4.3 psf (LRFD)
 +/- 2.6 psf (ASD)

Bldg Surface	GC_{pi}	Wind Pressure (lb/ft ²)	
		LRFD	ASD
1	0.52	12.5	7.5
2	-0.69	-16.6	-10
3	-0.47	-11.3	-6.8
4	-0.42	-10.1	-6.1
1E	0.78	18.7	11.2
2E	-1.07	-25.7	-15.4
3E	-0.67	-16.1	-9.7
4E	-0.62	-14.9	-8.9

- Note: 1. Sign Convention
 positive numbers denote forces toward the surface
 negative numbers denote forces away from the surface
2. Minimum wind design loads shall not be less than 16 psf (LRFD) multiplied by wall area of building and 8 psf (LRFD) multiplied by the roof area of the building projected onto a vertical plane normal to the assumed wind direction (see Sect. C27.4.7 & Figure C27.4-1)
3. Internal pressure cancels when Zones 1 & 4 and 1E & 4E are combined, but adds or subtracts at Zones 2 & 3 and 2E & 3E that do not have directly opposing loads.



Load Case B: Winds Parallel to Ridge

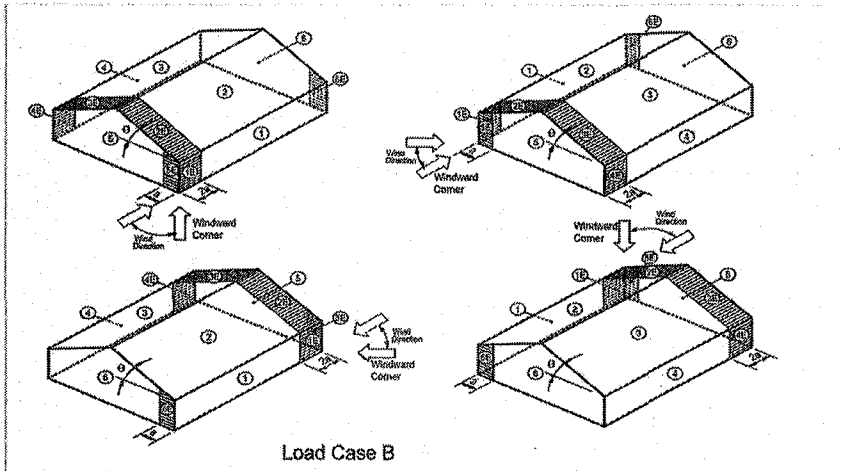
Bldg Surface	GC _{pf}	Wind Pressure (lb/ft ²)	
		LRFD	ASD
1	-0.45	-10.8	-6.5
2	-0.69	-16.6	-10
3	-0.37	-8.9	-5.3
4	-0.45	-10.8	-6.5
5	0.4	9.6	5.8
6	-0.29	-7	-4.2
1E	-0.48	-11.6	-7
2E	-1.07	-25.7	-15.4
3E	-0.53	-12.7	-7.6
4E	-0.48	-11.6	-7
5E	0.61	14.7	8.8
6E	-0.43	-10.4	-6.2

Internal pressure = +/- 4.3 psf (LRFD)
 +/- 2.6 psf (ASD)

Note: 1. Sign Convention

*positive numbers denote forces toward the surface
 negative numbers denote forces away from the surface*

2. Minimum wind design loads shall not be less than 16 psf (LRFD) multiplied by wall area of building (see Sect. C27.4.7 & Figure C27.4-1).
3. Internal pressure cancels when Zones 1 & 4 and 1E & 4E are combined, but adds or subtracts at Zones 2 & 3 and 2E & 3E that do not have directly opposing loads.



MAIN WIND-FORCE RESISTING SYSTEM (MWFRS)
Wind Pressures for Parapets

Pressure exposure coeff, $K_z = 0.7$
 Velocity pressure, $q_p = 23.96$ psf (LRFD)

$$p_p = q_p(GC_{pn}) \text{ (lb/ft}^2\text{)}$$

Windward parapets, $p_{p_wind} = 35.9$ psf (LRFD)

Leeward parapets, $p_{p_lee} = -24$ psf (LRFD)

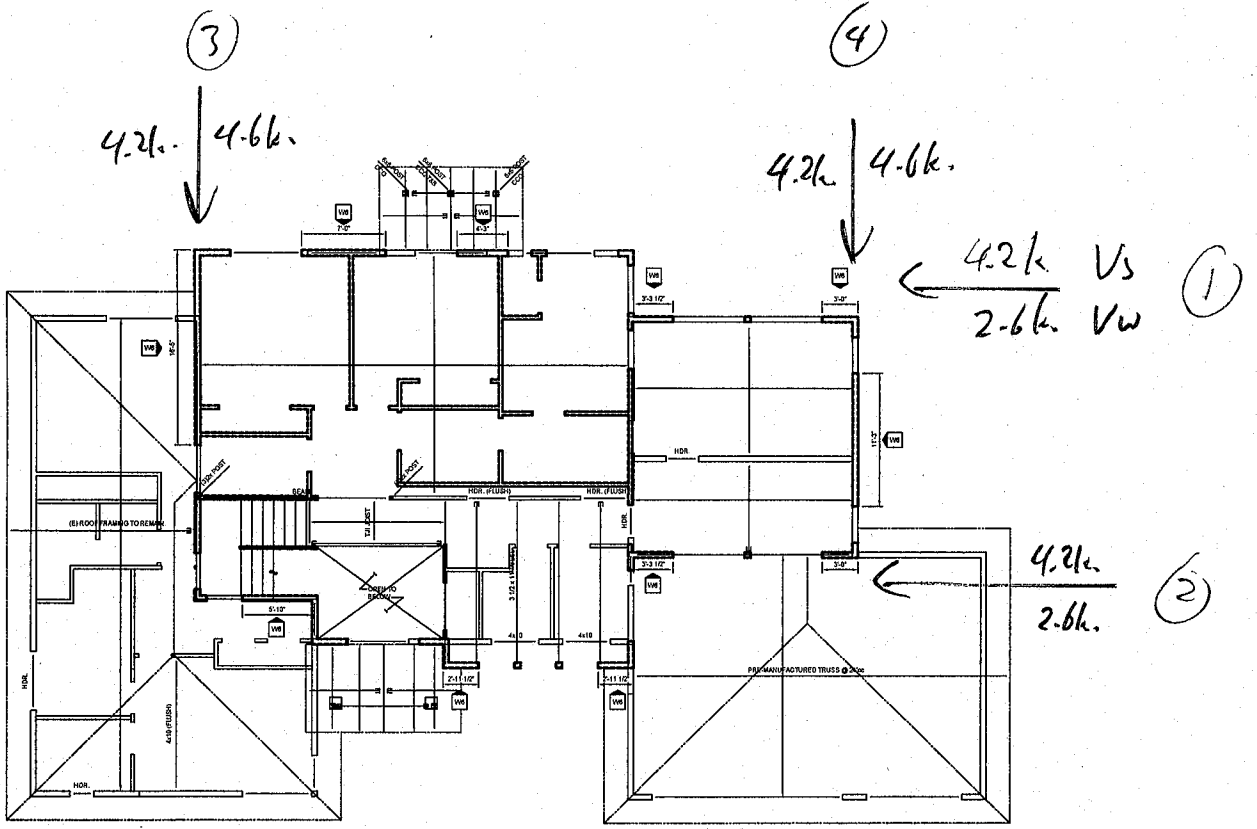
*positive numbers signify net pressure acting toward the exterior side of the parapet
 negative numbers signify net pressure acting away from the exterior side of the parapet*

Wind Pressures for Roof Uplift

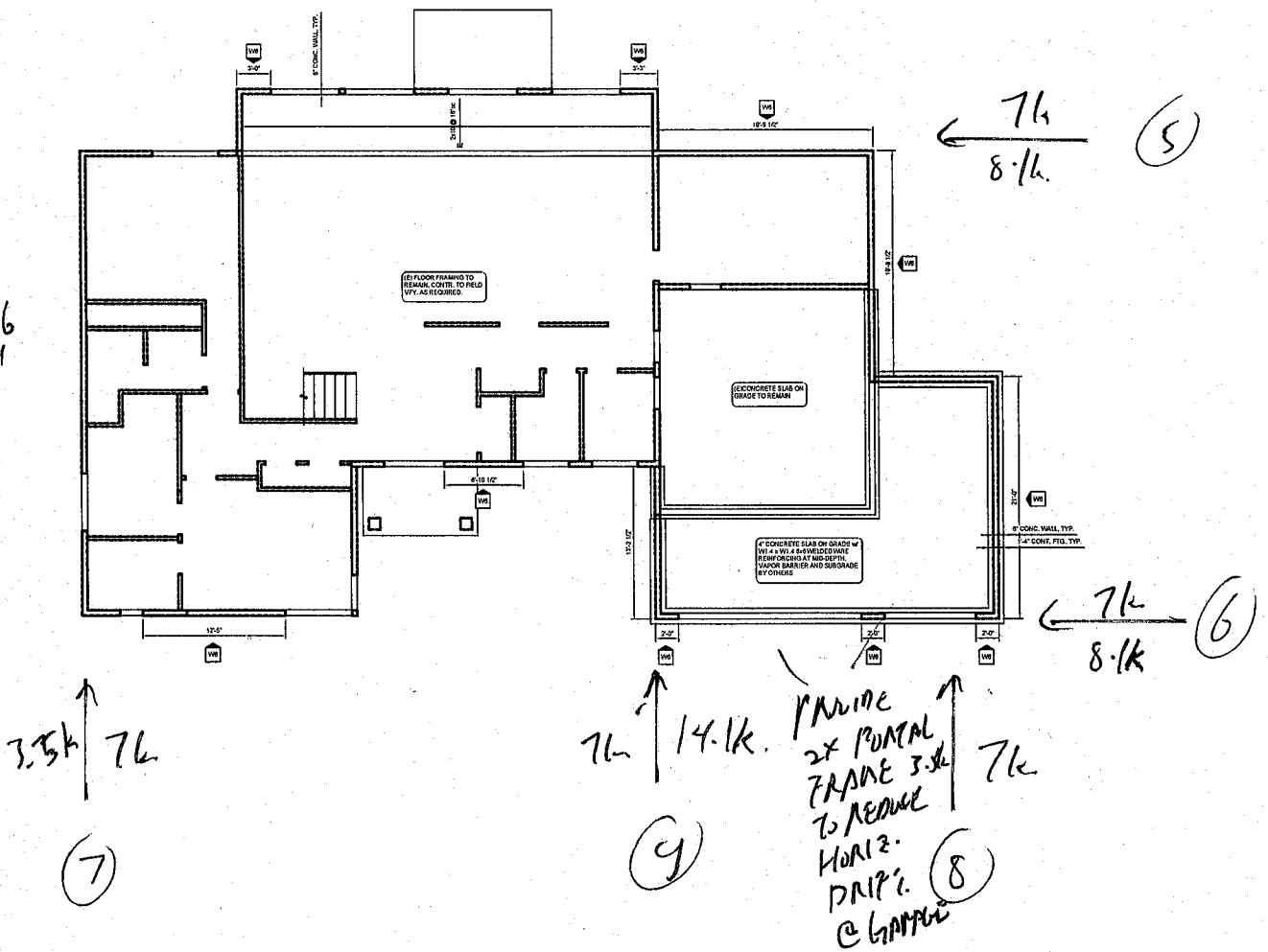
Roof uplift load up to 9.2 feet
 from exterior walls, $p = -24.6$ psf (LRFD)

Roof uplift load more than 9.2 feet
 from exterior walls, $p = -15.9$ psf (LRFD)

SHEAR WALL DESIGN PLAN.



(E) W6
L=35'

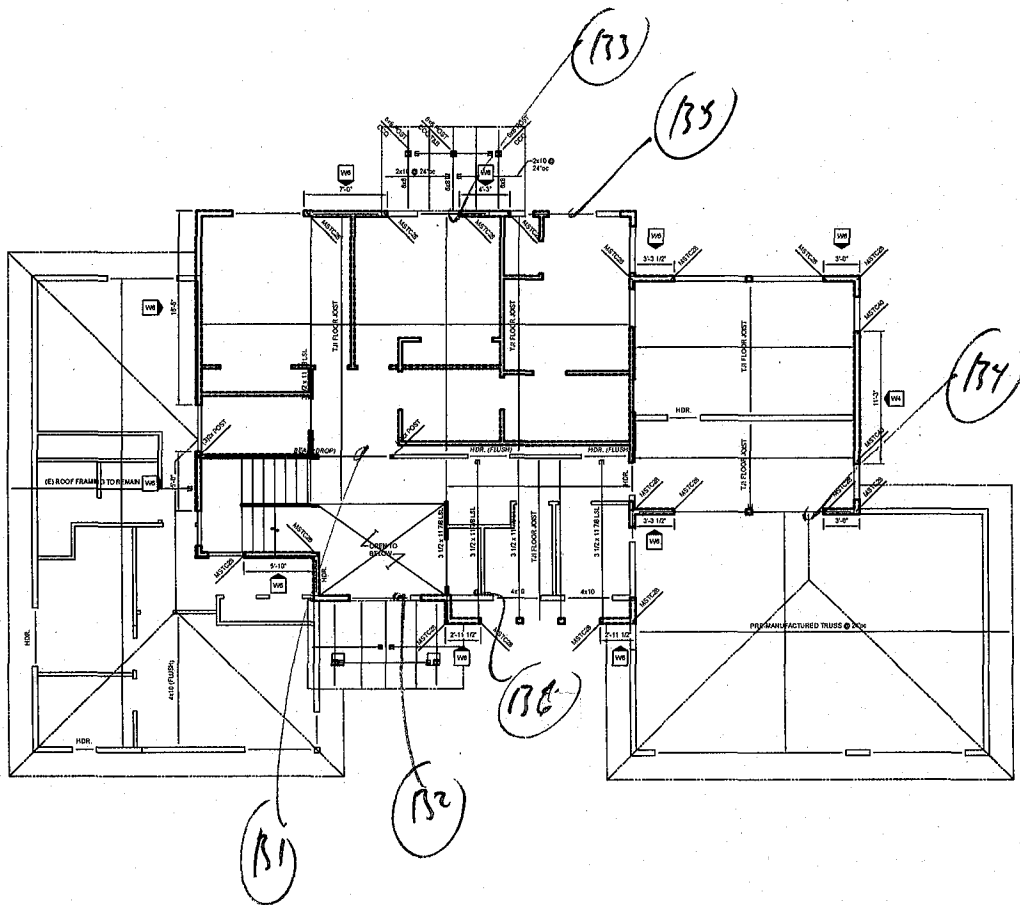


Wood Shear Wall Design

	SW#	Length b(ft)	Height h(ft)	Vseismic (LRFD)(kips)	Vwind (LRFD)(kips)	Aspect Ratio		Total Design V (ASD)		SW Design	SW Uplift (ASD)	Wall Holdown	Foundation Holddown
						h/b	h/b>2?						
Seisc.	SW1	17.50'	10.0'	4.20 k	2.60 k	0.57	N	2.94 k	0.17 klf	W6	1.16 k	MSTC28	
		WALL											
Seisc.	SW2	16.18'	10.0'	4.20 k	2.60 k	0.62	N	2.94 k	0.18 klf	W6	1.33 k	MSTC28	
		BEAM											
		1.46k. 2.5 = 3.65k.											
Seisc.	SW3	21.42'	10.0'	4.20 k	4.60 k	0.47	N	2.94 k	0.14 klf	W6	.73 k	Not Reqd'	
		WALL											
Seisc.	SW4	11.25'	10.0'	4.20 k	4.60 k	0.89	N	2.94 k	0.26 klf	W4	2.28 k	MSTC40	
		WALL											
Seisc.	SW5	22.0'	11.0'	7.0 k	8.10 k	0.50	N	4.90 k	0.22 klf	W6	1.72 k		HDU4(9")
Seisc.	SW6	19.17'	11.0'	7.0 k	8.10 k	0.57	N	4.90 k	0.26 klf	W6	2.18 k		HDU4(9")
Wind	SW7	35.0'	10.0'	3.50 k	7.0 k	0.29	N	4.20 k	0.12 klf	W6	.15 k		Not Reqd'
Wind	SW8	40.75'	10.0'	3.50 k	7.0 k	0.25	N	4.20 k	0.10 klf	W6	-.19 k		
Wind	SW9	13.17'	11.0'	7.0 k	14.10 k	0.84	N	8.46 k	0.64 klf	W3	6.63 k		HDU8(12")
	SW10												
	SW11												
	SW12												

SW #	Vs,all (ASD) (kip/ft)	Vw,all (ASD) (kip/ft)	Wall HD	Tall (ASD)(kips)	FTG HD	Tall (ASD) (kips)
W6	0.26	0.37	MSTC28	1.54	STHD10	3.40
W4	0.38	0.53	MSTC40	3.08	STHD14	3.82
W3	0.49	0.69	MSTC52	4.62	HDU4	4.57
2W6	0.52	0.73	MSTC66	5.86	HDU5	5.65
2W4	0.76	1.07	MST72	6.73	HDU8	6.97
2W3	0.98	1.37	CMST12x84"	9.215	HDU11	9.34
2W2	1.28	1.79	2xMSTC66	11.72	HDU14	10.77
			2xMST72	13.46	HD12	12.67
			2xCMST12x84"	18.43	HDU14(SPC.)	14.44
			HD19(SPC.)	19.07	HD12(SPC.)	15.51
					HD19	16.77
					HD19(SPC.)	19.07

*Holdown not required for uplift less than 1 Kips(ASD)



B1, L = 15'10", T.C. = 14', 6 3/4 x 12 G.C.L.

B2, L = 5'3", T.C. = 18' ROOF. PL @ MIN. PL = 2x12 4x12
S.L. = 4x12

B3, L = 6', T.C. = 18' ROOF, 10' PLANK. PL @ MIN. PL = 2x12 4x12.
S.L. = 4x12

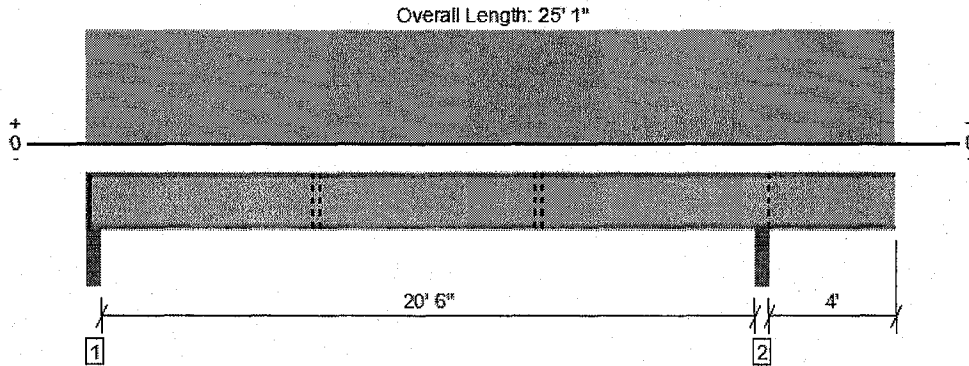
B4, L = 18'7", T.C. = 10' ROOF, 4' PLANK, 2' ROOF. 5 1/2 x 11 7/8 G.C.L.

B5, L = 6', T.C. = 18' ROOF, 10' PLANK 4x12.

B6, L = 11'10", 2'6" CANT., 2' PLANK. PL @ CANT. PL = 1x2x6. S.L. = 3x6x6.
S.L. = 1.7x6. 3 1/2 x 11 7/8 G.C.L.

Level, Floor: Joist

1 piece(s) 11 7/8" TJI@ 360 @ 12" OC



Drawing is Conceptual. All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal (typ.).

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	519 @ 2 1/2"	1202 (2.25")	Passed (43%)	1.00	1.0 D + 1.0 L (Alt Spans)
Shear (lbs)	510 @ 3 1/2"	1705	Passed (30%)	1.00	1.0 D + 1.0 L (Alt Spans)
Moment (Ft-lbs)	2643 @ 10' 5 7/8"	6180	Passed (43%)	1.00	1.0 D + 1.0 L (Alt Spans)
Live Load Defl. (in)	0.384 @ 10' 6 7/8"	0.518	Passed (L/648)	--	1.0 D + 1.0 L (Alt Spans)
Total Load Defl. (in)	0.471 @ 10' 6 9/16"	1.036	Passed (L/528)	--	1.0 D + 1.0 L (Alt Spans)
TJ-Pro™ Rating	40	40	Passed	--	--

Member Length : 24' 11 3/4"
 System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2021
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240).
- Upward deflection on right cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.
- Permanent bracing at third points in the back span or a direct applied ceiling over the entire back span length is required at the right span of the member. See literature detail (PB1) For clarification.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Factored	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	102	423/-12	525	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	3.50"	3.50"	149	597	746	Blocking

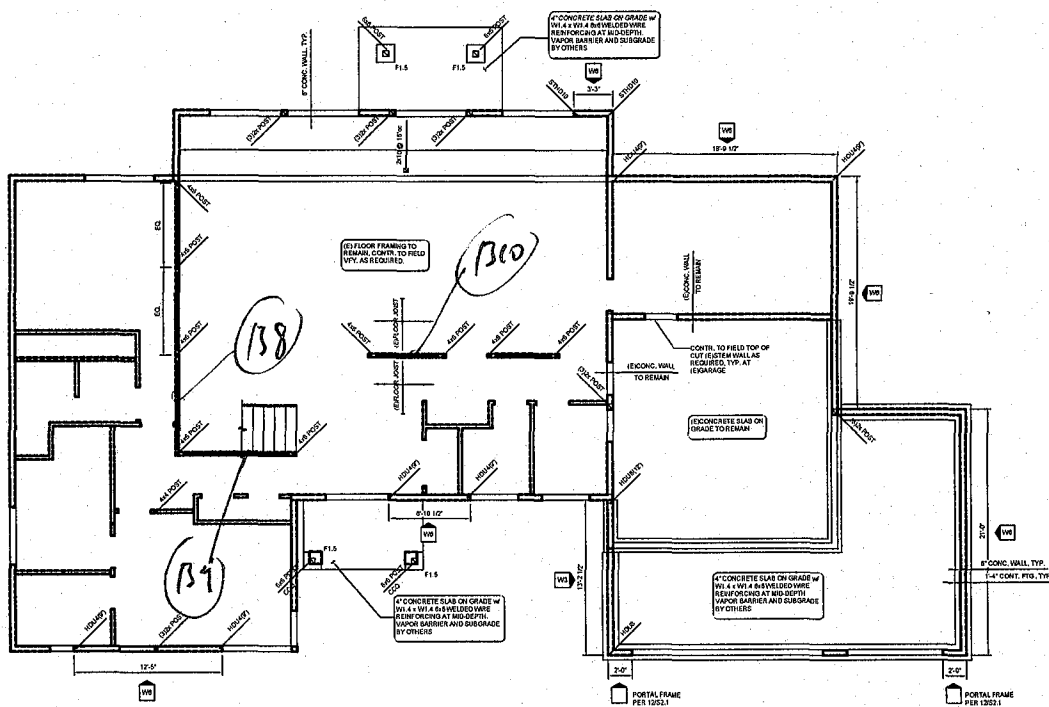
- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 10" o/c	
Bottom Edge (Lu)	9' 7" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 25' 1"	12"	10.0	40.0	Default Load

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 The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator



138, L= 8', ZL= 4' Floor, 7' Roof, 4' Roof. 6x10.

139, L= 9'6", ZL= 12' Floor, 4' Floor, 14' Roof. 6x12.

130, L= 6', ZL= 12' Floor, 11' Floor. 6x12.

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

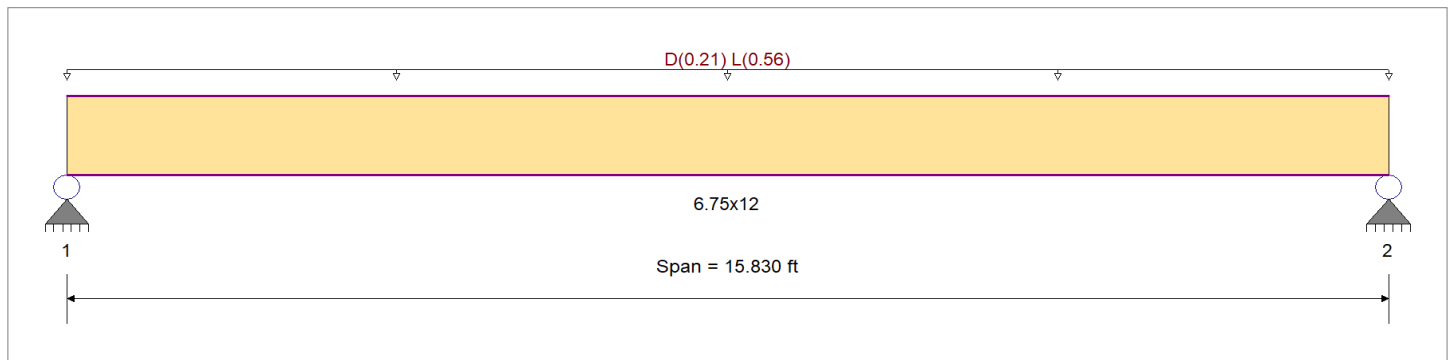
DESCRIPTION: B1

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2400 psi	<i>E : Modulus of Elasticity</i>	
Load Combination IBC 2021	Fb -	1850 psi	Ebend- xx	1800ksi
	Fc - Prll	1650 psi	Eminbend - xx	950ksi
Wood Species : DF/DF	Fc - Perp	650 psi	Ebend- yy	1600ksi
Wood Grade : 24F-V4	Fv	265 psi	Eminbend - yy	850ksi
	Ft	1100 psi	Density	31.21pcf
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 loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 14.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.761 : 1	Maximum Shear Stress Ratio	=	0.382 : 1
Section used for this span		6.75x12	Section used for this span		6.75x12
fb: Actual	=	1,827.34psi	fv: Actual	=	101.11 psi
F'b	=	2,400.00psi	F'v	=	265.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	7.915ft	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	0.455 in	Ratio =	0 >=360	Span: 1 : L Only	
Max Upward Transient Deflection	0 in	Ratio =	417 <360	n/a	
Max Downward Total Deflection	0.640 in	Ratio =	296 >=180	Span: 1 : +D+L	
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _v	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v		
D Only																				
Length = 15.830 ft	1		0.244	0.122	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.13	528.0	2,160.0	0.0	0.00	0.0	0.0	238.5
+D+L																				
Length = 15.830 ft	1		0.761	0.382	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	24.67	1,827.3	2,400.0	0.0	0.00	0.0	0.0	265.0
+D+0.750L																				
Length = 15.830 ft	1		0.501	0.251	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	20.28	1,502.5	3,000.0	0.0	0.00	0.0	0.0	331.3
+0.60D																				
Length = 15.830 ft	1		0.082	0.041	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.28	316.8	3,840.0	0.0	0.00	0.0	0.0	424.0

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B1**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.6397	7.973		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	6.234	6.234
Max Upward from Load Combinations	6.234	6.234
Max Upward from Load Cases	4.432	4.432
D Only	1.801	1.801
+D+L	6.234	6.234
+D+0.750L	5.125	5.125
+0.60D	1.081	1.081
L Only	4.432	4.432

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

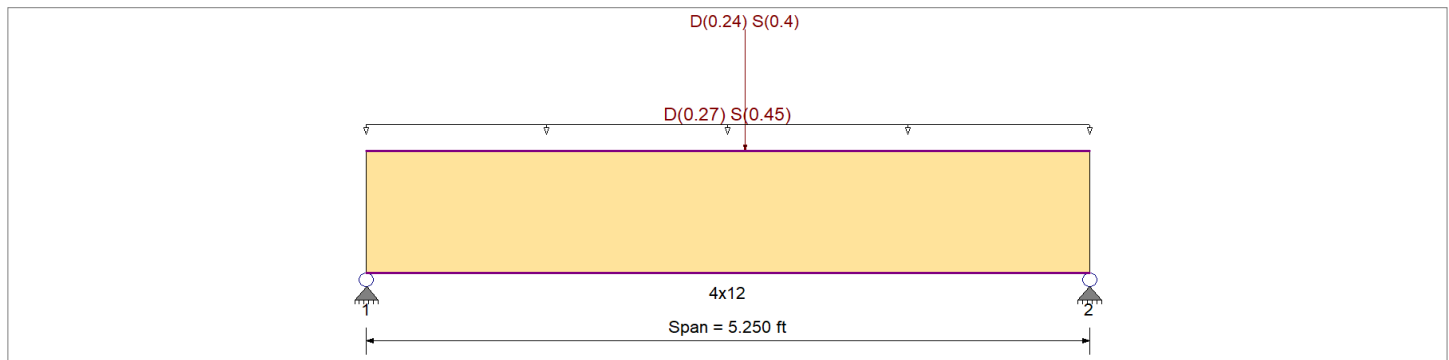
DESCRIPTION: B2

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	850.0 psi	E : Modulus of Elasticity	
Load Combination IBC 2021	Fb -	850.0 psi	Ebend- xx	1,600.0ksi
	Fc - Prll	1,400.0 psi	Eminbend - xx	580.0ksi
Wood Species : Douglas Fir-Larch (North)	Fc - Perp	625.0 psi		
Wood Grade : No. 1/No. 2	Fv	180.0 psi		
	Ft	500.0 psi	Density	30.590pcf
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 loading
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 18.0 ft
Point Load : D = 0.240, S = 0.40 k @ 2.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.505 : 1	Maximum Shear Stress Ratio	=	0.290 : 1
Section used for this span		4x12	Section used for this span		4x12
fb: Actual	=	542.83psi	fv: Actual	=	60.09 psi
F'b	=	1,075.25psi	F'v	=	207.00 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	2.740ft	Location of maximum on span	=	4.330 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.015 in Ratio =	0 >=360	Span: 1 : S Only	
Max Upward Transient Deflection		0 in Ratio =	4260 <360	n/a	
Max Downward Total Deflection		0.024 in Ratio =	2638 >=180	Span: 1 : +D+S	
Max Upward Total Deflection		0 in Ratio =	0 <180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only																			
	Length = 5.250 ft	1	0.245	0.141	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.27	206.5	841.5	0.0	0.00	0.0	162.0
+D+S																			
	Length = 5.250 ft	1	0.505	0.290	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.34	542.8	1,075.3	0.0	0.00	0.0	0.0
+D+0.750S																			
	Length = 5.250 ft	1	0.427	0.245	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.82	458.7	1,075.3	0.0	0.00	0.0	0.0
+0.60D																			
	Length = 5.250 ft	1	0.083	0.048	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	0.76	123.9	1,496.0	0.36	13.7	288.0	

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B2**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0239	2.644		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.217	2.247
Max Upward from Load Combinations	2.217	2.247
Max Upward from Load Cases	1.372	1.391
D Only	0.845	0.856
+D+S	2.217	2.247
+D+0.750S	1.874	1.900
+0.60D	0.507	0.514
S Only	1.372	1.391

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

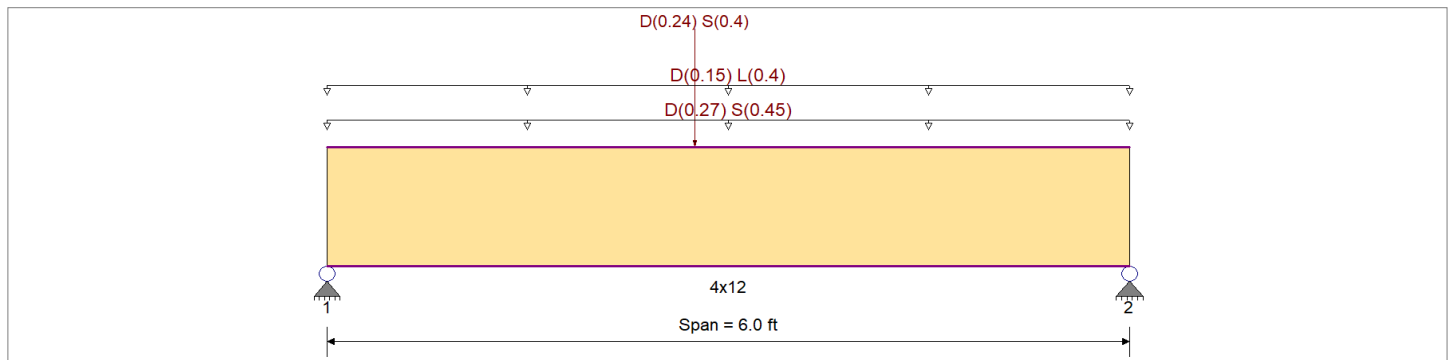
DESCRIPTION: B3

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	850.0 psi	E : Modulus of Elasticity
Load Combination IBC 2021	Fb -	850.0 psi	Ebend- xx
	Fc - Prll	1,400.0 psi	Eminbend - xx
Wood Species : Douglas Fir-Larch (North)	Fc - Perp	625.0 psi	
Wood Grade : No. 1/No. 2	Fv	180.0 psi	
	Ft	500.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			30.590pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 18.0 ft
Point Load : D = 0.240, S = 0.40 k @ 2.750 ft
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 10.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.842 1	Maximum Shear Stress Ratio	=	0.462 : 1
Section used for this span		4x12	Section used for this span		4x12
fb: Actual	=	904.95 psi	fv: Actual	=	95.61 psi
F'b	=	1,075.25 psi	F'v	=	207.00 psi
Load Combination	=	+D+0.750L+0.750S	Load Combination	=	+D+0.750L+0.750S
Location of maximum on span	=	2.759ft	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		0.025 in	Ratio =	0 >=360	Span: 1 : S Only
Max Upward Transient Deflection		0 in	Ratio =	2935 <360	n/a
Max Downward Total Deflection		0.053 in	Ratio =	1349 >=180	Span: 1 : +D+0.750L+0.750S
Max Upward Total Deflection		0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 6.0 ft	1	0.439	0.240	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	2.27	369.2	841.5	0.0	0.00	0.0	0.0
+D+L	Length = 6.0 ft	1	0.707	0.392	1.00	1.00	1.00	1.00	1.100	1.00	1.00	1.00	4.06	660.7	935.0	1.85	38.9	162.0	0.0
+D+S	Length = 6.0 ft	1	0.737	0.400	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	4.88	792.8	1,075.3	2.17	70.6	180.0	0.0
+D+0.750L	Length = 6.0 ft	1	0.503	0.279	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.62	587.7	1,168.8	1.65	82.8	207.0	0.0

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B3**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S						1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	1		0.842	0.462	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	5.57	905.0	1,075.3	2.51	95.6	207.0
+0.60D						1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 6.0 ft	1		0.148	0.081	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.36	221.5	1,496.0	0.61	23.3	288.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0533	3.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	3.490	3.445
Max Upward from Load Combinations	3.490	3.445
Max Upward from Load Cases	1.567	1.533
D Only	1.415	1.395
+D+L	2.615	2.595
+D+S	2.982	2.928
+D+0.750L	2.315	2.295
+D+0.750L+0.750S	3.490	3.445
+0.60D	0.849	0.837
L Only	1.200	1.200
S Only	1.567	1.533

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

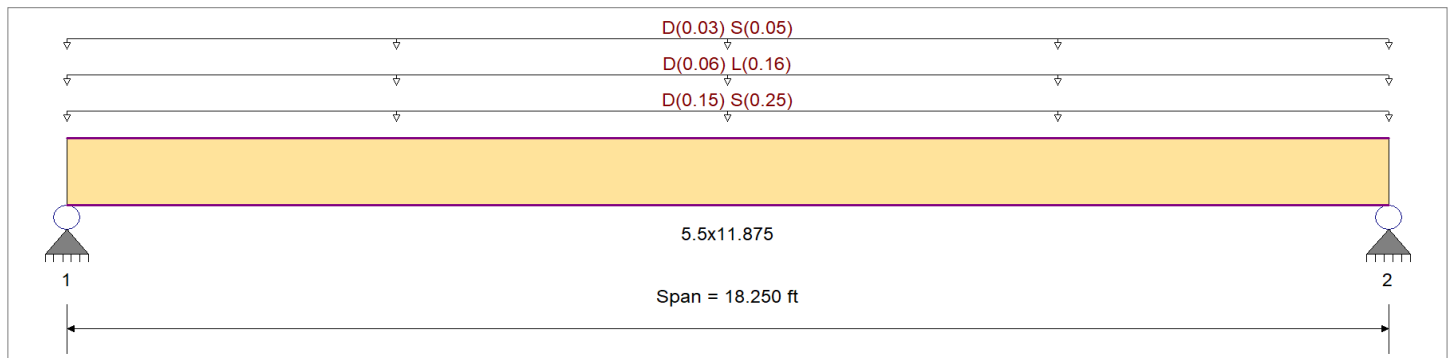
DESCRIPTION: B4

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2400 psi	<i>E : Modulus of Elasticity</i>	
Load Combination IBC 2021	Fb -	1850 psi	Ebend- xx	1800ksi
	Fc - Prll	1650 psi	Eminbend - xx	950ksi
Wood Species : DF/DF	Fc - Perp	650 psi	Ebend- yy	1600ksi
Wood Grade : 24F-V4	Fv	265 psi	Eminbend - yy	850ksi
	Ft	1100 psi	Density	31.21pcf
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 loading
 Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 10.0 ft
 Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 4.0 ft
 Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.839	1	Maximum Shear Stress Ratio	=	0.370	: 1
Section used for this span		5.5x11.875		Section used for this span		5.5x11.875	
fb: Actual	=	2,315.68psi		fv: Actual	=	112.73 psi	
F'b	=	2,760.00psi		F'v	=	304.75 psi	
Load Combination	=	+D+0.750L+0.750S		Load Combination	=	+D+0.750L+0.750S	
Location of maximum on span	=	9.125ft		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		0.545 in	Ratio =	0	>=360	Span: 1 : S Only	
Max Upward Transient Deflection		0 in	Ratio =	401	<360	n/a	
Max Downward Total Deflection		1.089 in	Ratio =	201	>=180	Span: 1 : +D+0.750L+0.750S	
Max Upward Total Deflection		0 in	Ratio =	0	<180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _v	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 18.250 ft	1	0.455	0.201	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.58	982.3	2,160.0	0.0	0.00	0.0	0.0
+D+L	Length = 18.250 ft	1	0.667	0.294	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	17.24	1,600.7	2,400.0	0.0	0.00	0.0	0.0
+D+S	Length = 18.250 ft	1	0.776	0.342	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	23.07	2,141.8	2,760.0	0.0	0.00	0.0	0.0
+D+0.750L	Length = 18.250 ft	1	0.482	0.213	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	15.58	1,446.1	3,000.0	0.0	0.00	0.0	0.0

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B4**Maximum Forces & Stresses for Load Combinations**

Load Combination	Max Stress Ratios											Moment Values			Shear Values			
	Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _v	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.839	0.370	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	24.94	2,315.7	2,760.0	4.91	112.7	304.8	
+0.60D						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.153	0.068	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.35	589.4	3,840.0	1.25	28.7	424.0	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	1.0888	9.192		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.467	5.467
Max Upward from Load Combinations	5.467	5.467
Max Upward from Load Cases	2.738	2.738
D Only	2.319	2.319
+D+L	3.779	3.779
+D+S	5.057	5.057
+D+0.750L	3.414	3.414
+D+0.750L+0.750S	5.467	5.467
+0.60D	1.392	1.392
L Only	1.460	1.460
S Only	2.738	2.738

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

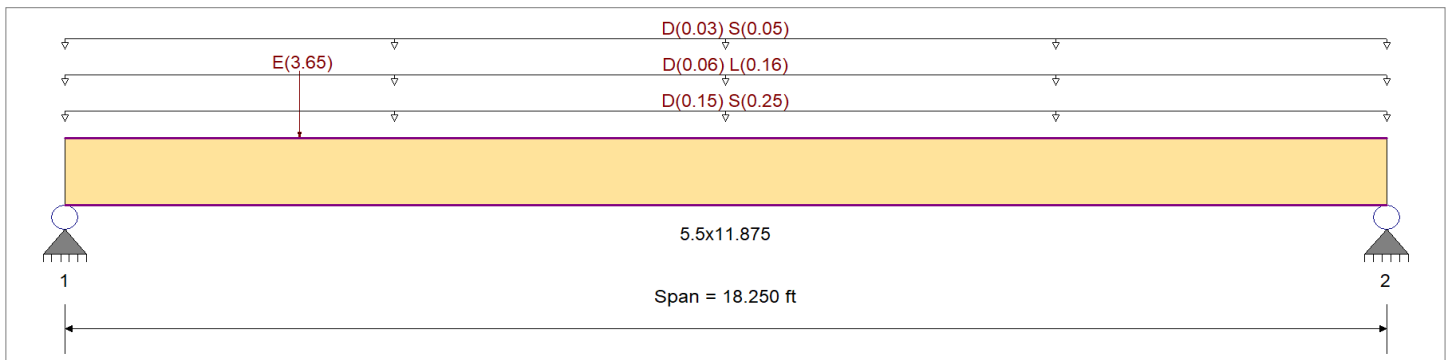
DESCRIPTION: B4 WITH Vs OMEGA

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2,400.0 psi	E : Modulus of Elasticity	
Load Combination IBC 2021	Fb -	1,850.0 psi	Ebend- xx	1,800.0ksi
	Fc - Prll	1,650.0 psi	Eminbend - xx	950.0ksi
Wood Species : DF/DF	Fc - Perp	650.0 psi	Ebend- yy	1,600.0ksi
Wood Grade : 24F-V4	Fv	265.0 psi	Eminbend - yy	850.0ksi
	Ft	1,100.0 psi	Density	31.210pcf
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 loading
 Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 10.0 ft
 Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 4.0 ft
 Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 2.0 ft
 Point Load : E = 3.650 k @ 3.250 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.839 : 1	Maximum Shear Stress Ratio	=	0.370 : 1
Section used for this span		5.5x11.875	Section used for this span		5.5x11.875
fb: Actual	=	2,315.68psi	fv: Actual	=	112.73 psi
F'b	=	2,760.00psi	F'v	=	304.75 psi
Load Combination	=	+D+0.750L+0.750S	Load Combination	=	+D+0.750L+0.750S
Location of maximum on span	=	9.125ft	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		0.545 in Ratio =	0 >=160	Span: 1 : S Only	
Max Upward Transient Deflection		0 in Ratio =	401 <160	n/a	
Max Downward Total Deflection		1.246 in Ratio =	175 >=160	Span: 1 : +D+0.750L+0.750S+0.5250E	
Max Upward Total Deflection		0 in Ratio =	0 <160	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CL _x	C _v	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
D Only															0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.455	0.201	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.58	982.3	2,160.0	2.08	47.8	238.5	
+D+L															0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.667	0.294	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	17.24	1,600.7	2,400.0	3.39	77.9	265.0	
+D+S															0.0	0.00	0.0	0.0
Length = 18.250 ft	1	0.776	0.342	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	23.07	2,141.8	2,760.0	4.54	104.3	304.8	
+D+0.750L															0.0	0.00	0.0	0.0

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B4 WITH Vs OMEGA

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _v	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 18.250 ft	1	0.482	0.213	1.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	15.58	1,446.1	3,000.0	3.07	70.4	331.3
+D+0.750L+0.750S					1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.250 ft	1	0.839	0.370	1.15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	24.94	2,315.7	2,760.0	4.91	112.7	304.8	
+D+0.70E					1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.250 ft	1	0.366	0.227	1.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	15.14	1,405.5	3,840.0	4.18	96.0	424.0	
+D+0.750L+0.750S+0.5250E					1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.250 ft	1	0.681	0.351	1.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	28.16	2,613.7	3,840.0	6.48	148.9	424.0	
+0.60D					1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.250 ft	1	0.153	0.068	1.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.35	589.4	3,840.0	1.25	28.7	424.0	
+0.60D+0.70E					1.00	1.00	1.00	1.00	1.00	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 18.250 ft	1	0.270	0.181	1.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	11.18	1,037.8	3,840.0	3.35	76.9	424.0	

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	1.2457	8.992		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	7.042	5.809
Max Upward from Load Combinations	7.042	5.809
Max Upward from Load Cases	3.000	2.738
D Only	2.319	2.319
+D+L	3.779	3.779
+D+S	5.057	5.057
+D+0.750L	3.414	3.414
+D+0.750L+0.750S	5.467	5.467
+D+0.70E	4.419	2.774
+D+0.750L+0.750S+0.5250E	7.042	5.809
+0.60D	1.392	1.392
+0.60D+0.70E	3.492	1.847
L Only	1.460	1.460
S Only	2.738	2.738
E Only	3.000	0.650

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

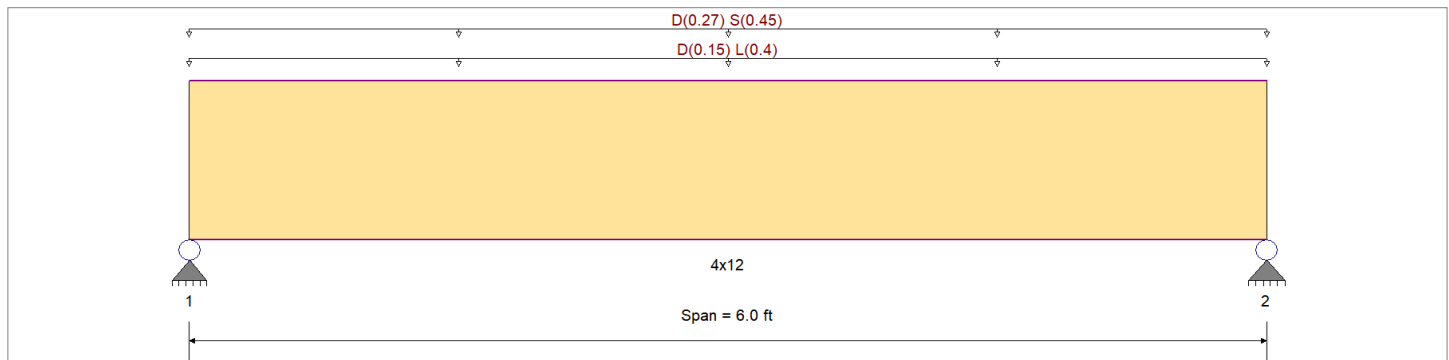
DESCRIPTION: B5

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	850.0 psi	<i>E : Modulus of Elasticity</i>	
Load Combination IBC 2021	Fb -	850.0 psi	Ebend- xx	1,600.0ksi
	Fc - Prll	1,400.0 psi	Eminbend - xx	580.0ksi
Wood Species : Douglas Fir-Larch (North)	Fc - Perp	625.0 psi		
Wood Grade : No. 1/No. 2	Fv	180.0 psi		
	Ft	500.0 psi	Density	30.590pcf
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 loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 10.0 ft
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 18.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.725	1	Maximum Shear Stress Ratio	=	0.408	1
Section used for this span		4x12		Section used for this span		4x12	
fb: Actual	=	779.60psi		fv: Actual	=	84.47 psi	
F'b	=	1,075.25psi		F'v	=	207.00 psi	
Load Combination	=	+D+0.750L+0.750S		Load Combination	=	+D+0.750L+0.750S	
Location of maximum on span	=	3.000ft		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		0.020 in	Ratio =	0	>=360	Span: 1 : S Only	
Max Upward Transient Deflection		0 in	Ratio =	3624	<360	n/a	
Max Downward Total Deflection		0.047 in	Ratio =	1530	>=180	Span: 1 : +D+0.750L+0.750S	
Max Upward Total Deflection		0 in	Ratio =	0	<180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 6.0 ft	1	0.372	0.210	0.90	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.93	313.3	841.5	0.0	0.00	0.0	162.0
+D+L	Length = 6.0 ft	1	0.648	0.365	1.00	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.73	605.9	935.0	0.0	0.00	0.0	0.0
+D+S	Length = 6.0 ft	1	0.597	0.336	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.95	642.5	1,075.3	1.83	69.6	207.0	0.0
+D+0.750L	Length = 6.0 ft	1	0.456	0.257	1.25	1.00	1.00	1.00	1.100	1.00	1.00	1.00	3.28	532.7	1,168.8	1.52	57.7	225.0	0.0
+D+0.750L+0.750S	Length = 6.0 ft	1				1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0	0.0

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B5**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 6.0 ft	1	0.725	0.408	1.15	1.00	1.00	1.00	1.100	1.00	1.00	1.00	4.80	779.6	1,075.3	2.22	84.5	207.0	
+0.60D					1.00	1.00	1.00	1.100	1.00	1.00	1.00			0.0	0.00	0.0	0.0	
Length = 6.0 ft	1	0.126	0.071	1.60	1.00	1.00	1.00	1.100	1.00	1.00	1.00	1.16	188.0	1,496.0	0.53	20.4	288.0	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0470	3.022		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	3.198	3.198
Max Upward from Load Combinations	3.198	3.198
Max Upward from Load Cases	1.350	1.350
D Only	1.285	1.285
+D+L	2.485	2.485
+D+S	2.635	2.635
+D+0.750L	2.185	2.185
+D+0.750L+0.750S	3.198	3.198
+0.60D	0.771	0.771
L Only	1.200	1.200
S Only	1.350	1.350

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

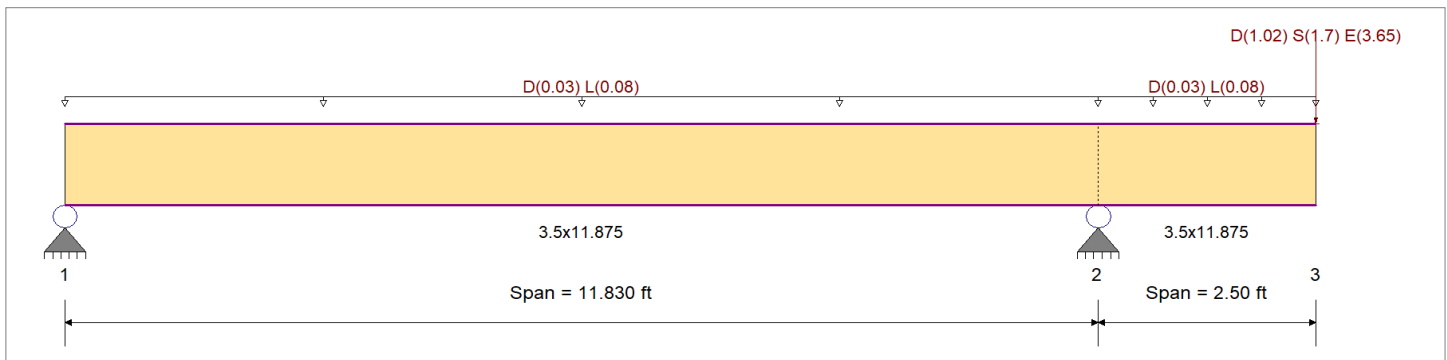
DESCRIPTION: B6

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	2325 psi	E : Modulus of Elasticity
Load Combination IBC 2021	Fb -	2325 psi	Ebend- xx 1550 ksi
	Fc - Prll	2050 psi	Eminbend - xx 787.815 ksi
Wood Species : iLevel Truss Joist	Fc - Perp	800 psi	
Wood Grade : TimberStrand LSL 1.55E	Fv	310 psi	
	Ft	1070 psi	Density 45.01 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 calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 2.0 ft
Load for Span Number 2
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 2.0 ft
Point Load : D = 1.020, S = 1.70, E = 3.650 k @ 2.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.425 : 1	Maximum Shear Stress Ratio	=	0.318 : 1
Section used for this span		3.5x11.875	Section used for this span		3.5x11.875
fb: Actual	=	1,582.80psi	fv: Actual	=	157.64 psi
F'b	=	3,723.59psi	F'v	=	496.00 psi
Load Combination	+D+0.750L+0.750S+0.5250E		Load Combination	+D+0.750L+0.750S+0.5250E	
Location of maximum on span	=	11.830ft	Location of maximum on span	=	11.830 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.249 in	Ratio =	753	>=240	Span: 2 : E Only
Max Upward Transient Deflection	-0.188 in	Ratio =	240	>=240	Span: 1 : E Only
Max Downward Total Deflection	0.255 in	Ratio =	234	>=180	Span: 2 : +D+0.750L+0.750S+0.5250E
Max Upward Total Deflection	-0.166 in	Ratio =	855	>=180	Span: 1 : +D+0.750L+0.750S+0.5250E

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v		
D Only																				
	Length = 11.830 ft	1	0.187	0.140	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.68	391.6	2,094.5	0.0	0.00	0.0	0.0	279.0
	Length = 2.50 ft	2	0.187	0.140	0.90	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.68	391.6	2,094.5	1.09	39.2	279.0		
+D+L																				
	Length = 11.830 ft	1	0.184	0.141	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.93	428.1	2,327.2	0.0	0.00	0.0	0.0	310.0
	Length = 2.50 ft	2	0.184	0.141	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.93	428.1	2,327.2	1.21	43.6	310.0		

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B6

Maximum Forces & Stresses for Load Combinations

Load Combination	Max Stress Ratios											Moment Values			Shear Values			
	Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+S						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.830 ft	1	0.378	0.282	1.15	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	6.93	1,011.6	2,676.3	2.79	100.5	356.5
Length = 2.50 ft	2	0.378	0.282	1.15	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	6.93	1,011.6	2,676.3	2.79	100.5	356.5
+D+0.750L						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.830 ft	1	0.144	0.110	1.25	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.87	418.9	2,909.1	1.18	42.5	387.5
Length = 2.50 ft	2	0.144	0.110	1.25	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	2.87	418.9	2,909.1	1.18	42.5	387.5
+D+0.750L+0.750S						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.830 ft	1	0.330	0.248	1.15	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	6.06	883.9	2,676.3	2.45	88.5	356.5
Length = 2.50 ft	2	0.330	0.248	1.15	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	6.06	883.9	2,676.3	2.45	88.5	356.5
+D+0.70E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.830 ft	1	0.355	0.265	1.60	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	9.07	1,323.4	3,723.6	3.64	131.4	496.0
Length = 2.50 ft	2	0.355	0.265	1.60	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	9.07	1,323.4	3,723.6	3.64	131.4	496.0
+D+0.750L+0.750S+0.5250E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.830 ft	1	0.425	0.318	1.60	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	10.85	1,582.8	3,723.6	4.37	157.6	496.0
Length = 2.50 ft	2	0.425	0.318	1.60	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	10.85	1,582.8	3,723.6	4.37	157.6	496.0
+0.60D						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.830 ft	1	0.063	0.047	1.60	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.61	235.0	3,723.6	0.65	23.5	496.0
Length = 2.50 ft	2	0.063	0.047	1.60	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	1.61	235.0	3,723.6	0.65	23.5	496.0
+0.60D+0.70E						1.00	1.00	1.00	1.001	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 11.830 ft	1	0.313	0.233	1.60	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	8.00	1,166.8	3,723.6	3.21	115.7	496.0
Length = 2.50 ft	2	0.313	0.233	1.60	1.00	1.00	1.00	1.00	1.001	1.00	1.00	1.00	8.00	1,166.8	3,723.6	3.21	115.7	496.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	E Only	-0.1884	6.873
+D+0.750L+0.750S+0.5250E	2	0.2546	2.500		0.0000	6.873

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	0.479	5.995	
Max Upward from Load Combinations	0.479	5.995	
Max Upward from Load Cases	0.452	4.421	
Max Downward from all Load Conditions	-0.771		
Max Downward from Load Combinations	-0.524		
Max Downward from Load Cases (Resis)	-0.771		
D Only	0.027	1.609	
+D+L	0.479	2.303	
+D+S	-0.332	3.668	
+D+0.750L	0.366	2.129	
+D+0.750L+0.750S	0.097	3.674	
+D+0.70E	-0.513	4.704	
+D+0.750L+0.750S+0.5250E	-0.308	5.995	
+0.60D	0.016	0.965	
+0.60D+0.70E	-0.524	4.060	
L Only	0.452	0.694	
S Only	-0.359	2.059	
E Only	-0.771	4.421	

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

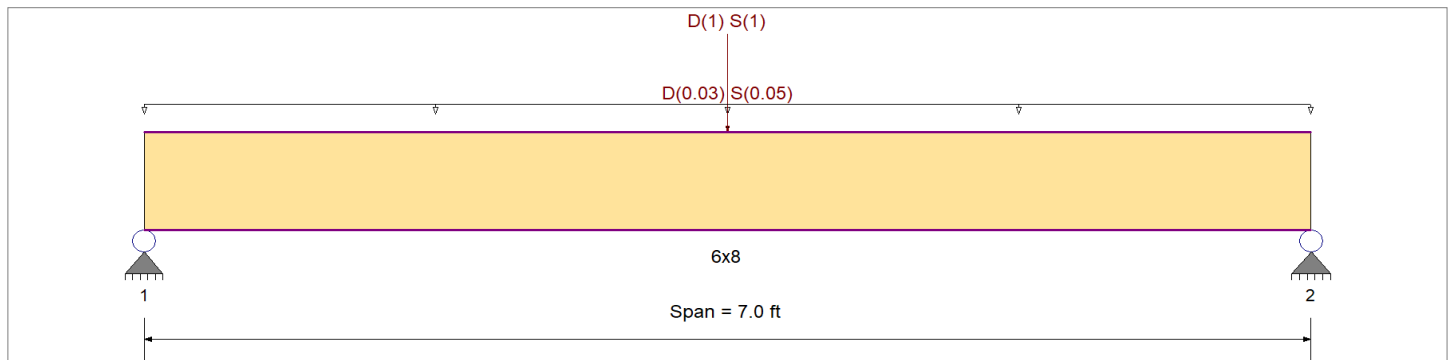
DESCRIPTION: EXTERIOR CANOPY COVER BEAM

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	850.0 psi	E : Modulus of Elasticity
Load Combination IBC 2021	Fb -	850.0 psi	Ebend- xx
	Fc - Prll	1,400.0 psi	Eminbend - xx
Wood Species : Douglas Fir-Larch (North)	Fc - Perp	625.0 psi	
Wood Grade : No. 1/No. 2	Fv	180.0 psi	
	Ft	500.0 psi	Density
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling			30.590pcf



Applied Loads

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

Beam self weight calculated and added to loading
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 2.0 ft
Point Load : D = 1.0, S = 1.0 k @ 3.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.963 : 1	Maximum Shear Stress Ratio	=	0.221 : 1
Section used for this span		6x8	Section used for this span		6x8
fb: Actual	=	941.07 psi	fv: Actual	=	45.68 psi
F'b	=	977.50 psi	F'v	=	207.00 psi
Load Combination		+D+S	Load Combination		+D+S
Location of maximum on span	=	3.500ft	Location of maximum on span	=	6.387 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.049 in	Ratio =	0 >=360	Span: 1 : S Only	
Max Upward Transient Deflection	0 in	Ratio =	1717 <360	n/a	
Max Downward Total Deflection	0.096 in	Ratio =	876 >=180	Span: 1 : +D+S	
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 7.0 ft	1	0.605	0.137	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.99	462.5	765.0	0.0	0.00	0.0	0.0
+D+S	Length = 7.0 ft	1	0.963	0.221	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.04	941.1	977.5	1.26	45.7	207.0	0.0
+D+0.750S	Length = 7.0 ft	1	0.840	0.192	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.53	821.4	977.5	1.10	39.8	207.0	0.0
+0.60D	Length = 7.0 ft	1	0.204	0.046	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.19	277.5	1,360.0	0.37	13.4	288.0	0.0

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: EXTERIOR CANOPY COVER BEAM**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S	1	0.0959	3.526		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	1.311	1.311
Max Upward from Load Combinations	1.311	1.311
Max Upward from Load Cases	0.675	0.675
D Only	0.636	0.636
+D+S	1.311	1.311
+D+0.750S	1.142	1.142
+0.60D	0.381	0.381
S Only	0.675	0.675

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

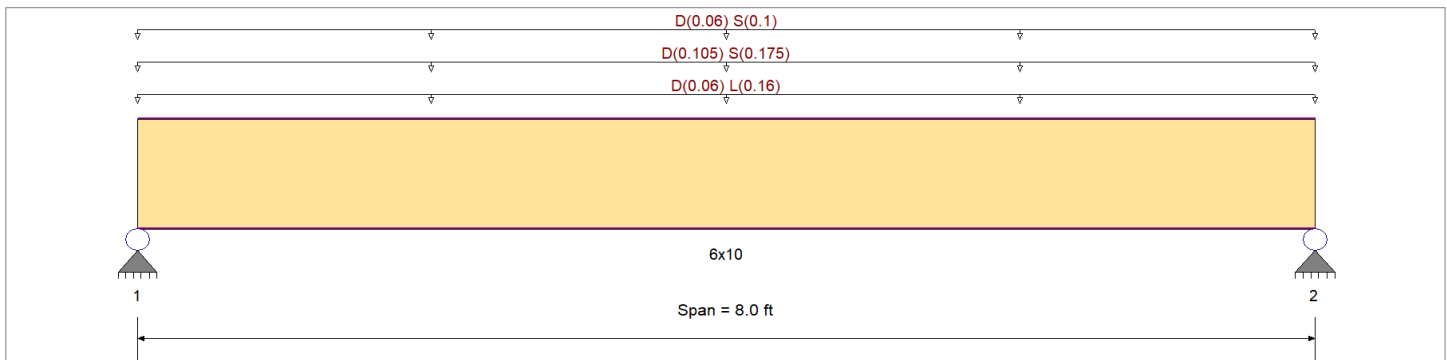
DESCRIPTION: B8

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	1350 psi	E : Modulus of Elasticity	
Load Combination IBC 2021	Fb -	1350 psi	Ebend- xx	1600ksi
	Fc - Prll	925 psi	Eminbend - xx	580ksi
Wood Species : Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade : No.1	Fv	170 psi		
	Ft	675 psi	Density	31.21pcf
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 loading

- Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 4.0 ft
- Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 7.0 ft
- Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 4.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.420	1	Maximum Shear Stress Ratio	=	0.265	: 1
Section used for this span		6x10		Section used for this span		6x10	
fb: Actual	=	652.82psi		fv: Actual	=	51.87 psi	
F'b	=	1,552.50psi		F'v	=	195.50 psi	
Load Combination	=	+D+0.750L+0.750S		Load Combination	=	+D+0.750L+0.750S	
Location of maximum on span	=	4.000ft		Location of maximum on span	=	7.212 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.041 in	Ratio =	0	>=360	Span: 1 : S Only	
Max Upward Transient Deflection		0 in	Ratio =	2367	<360	n/a	
Max Downward Total Deflection		0.083 in	Ratio =	1157	>=180	Span: 1 : +D+0.750L+0.750S	
Max Upward Total Deflection		0 in	Ratio =	0	<180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 8.0 ft	1	0.226	0.142	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.89	274.2	1,215.0	0.0	0.00	0.0	0.0
+D+L	Length = 8.0 ft	1	0.341	0.215	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.17	459.9	1,350.0	0.0	0.00	0.0	0.0
+D+S	Length = 8.0 ft	1	0.382	0.241	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.09	593.3	1,552.5	0.0	0.00	0.0	0.0
+D+0.750L	Length = 8.0 ft	1	0.245	0.155	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.85	413.5	1,687.5	0.0	0.00	0.0	0.0

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B8**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values			
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+0.750L+0.750S						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.0 ft	1		0.420	0.265	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.50	652.8	1,552.5	1.81	51.9	195.5
+0.60D						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 8.0 ft	1		0.076	0.048	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.13	164.5	2,160.0	0.46	13.1	272.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.0829	4.029		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	2.250	2.250
Max Upward from Load Combinations	2.250	2.250
Max Upward from Load Cases	1.100	1.100
D Only	0.945	0.945
+D+L	1.585	1.585
+D+S	2.045	2.045
+D+0.750L	1.425	1.425
+D+0.750L+0.750S	2.250	2.250
+0.60D	0.567	0.567
L Only	0.640	0.640
S Only	1.100	1.100

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

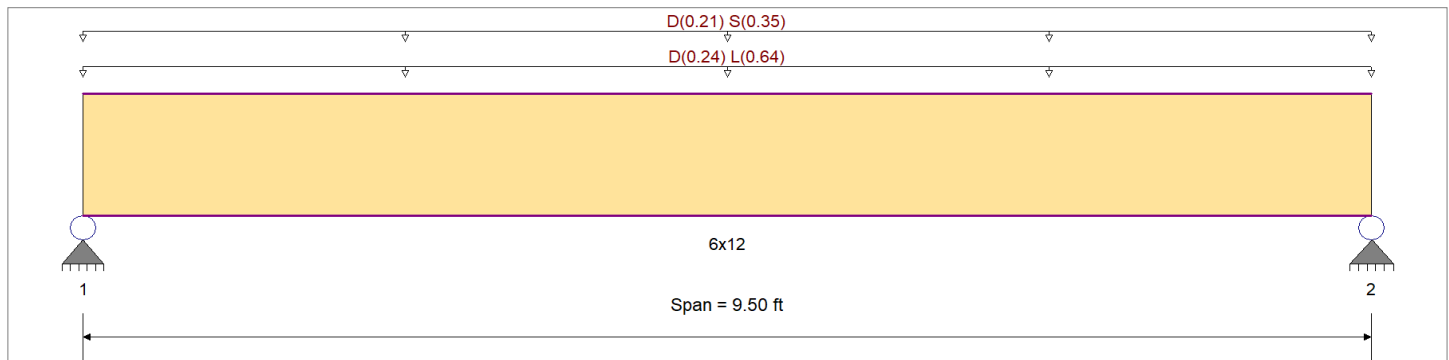
DESCRIPTION: B9

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	1350 psi	<i>E : Modulus of Elasticity</i>	
Load Combination IBC 2021	Fb -	1350 psi	Ebend- xx	1600ksi
	Fc - Prll	925 psi	Eminbend - xx	580ksi
Wood Species : Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade : No.1	Fv	170 psi		
	Ft	675 psi	Density	31.21pcf
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 loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 16.0 ft
Uniform Load : D = 0.0150, S = 0.0250 ksf, Tributary Width = 14.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.913 < 1	Maximum Shear Stress Ratio	=	0.587 < 1
Section used for this span		6x12	Section used for this span		6x12
fb: Actual	=	1,232.50psi	fv: Actual	=	99.83 psi
F'b	=	1,350.00psi	F'v	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	4.750ft	Location of maximum on span	=	8.564 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.106 in Ratio =	0 >= 360	Span: 1 : L Only	
Max Upward Transient Deflection		0 in Ratio =	1077 < 360	n/a	
Max Downward Total Deflection		0.199 in Ratio =	571 >= 180	Span: 1 : +D+0.750L+0.750S	
Max Upward Total Deflection		0 in Ratio =	0 < 180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios									Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v	
D Only	Length = 9.50 ft	1	0.426	0.274	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.23	517.8	1,215.0	0.0	0.00	0.0	153.0
+D+L	Length = 9.50 ft	1	0.913	0.587	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	12.45	1,232.5	1,350.0	0.0	0.00	0.0	0.0
+D+S	Length = 9.50 ft	1	0.585	0.376	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	9.18	908.7	1,552.5	0.0	0.00	0.0	0.0
+D+0.750L	Length = 9.50 ft	1	0.624	0.402	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.65	1,053.8	1,687.5	0.0	0.00	0.0	0.0
+D+0.750L+0.750S	Length = 9.50 ft	1	0.624	0.402	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	10.65	1,053.8	1,687.5	0.0	0.00	0.0	0.0

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B9**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values		
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
Length = 9.50 ft	1		0.868	0.558	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	13.61	1,347.0	1,552.5	4.60	109.1	195.5
+0.60D						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 9.50 ft	1		0.144	0.093	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.14	310.7	2,160.0	1.06	25.2	272.0

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S	1	0.1994	4.785		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.729	5.729
Max Upward from Load Combinations	5.729	5.729
Max Upward from Load Cases	3.040	3.040
D Only	2.203	2.203
+D+L	5.243	5.243
+D+S	3.865	3.865
+D+0.750L	4.483	4.483
+D+0.750L+0.750S	5.729	5.729
+0.60D	1.322	1.322
L Only	3.040	3.040
S Only	1.663	1.663

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

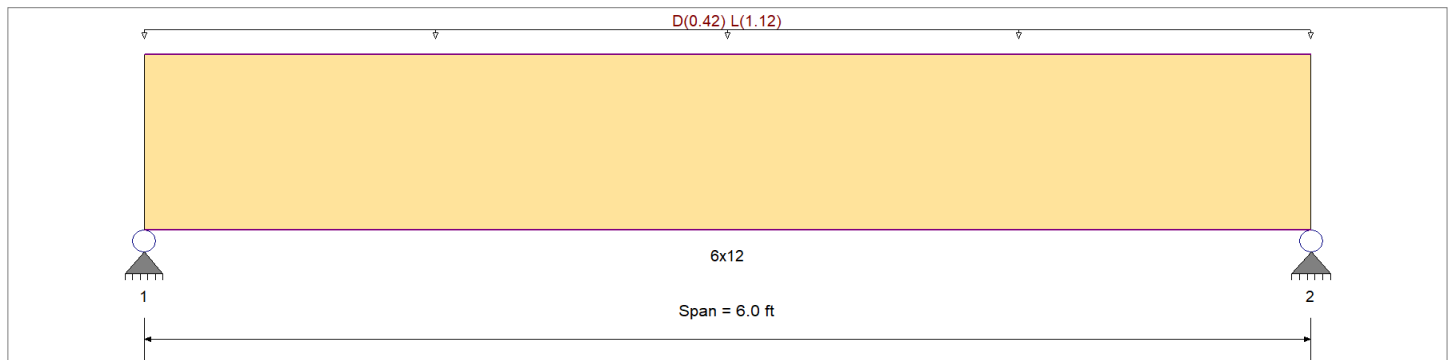
DESCRIPTION: B10

CODE REFERENCES

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design	Fb +	1350 psi	<i>E : Modulus of Elasticity</i>	
Load Combination IBC 2021	Fb -	1350 psi	Ebend- xx	1600ksi
	Fc - Prll	925 psi	Eminbend - xx	580ksi
Wood Species : Douglas Fir-Larch	Fc - Perp	625 psi		
Wood Grade : No.1	Fv	170 psi		
	Ft	675 psi	Density	31.21pcf
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 loading
Uniform Load : D = 0.0150, L = 0.040 ksf, Tributary Width = 28.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.513 < 1	Maximum Shear Stress Ratio	=	0.446 < 1
Section used for this span		6x12	Section used for this span		6x12
fb: Actual	=	692.08psi	fv: Actual	=	75.85 psi
F'b	=	1,350.00psi	F'v	=	170.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	3.000ft	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	0.029 in	Ratio = 0	>=360	Span: 1 : L Only	
Max Upward Transient Deflection	0 in	Ratio = 2444	<360	n/a	
Max Downward Total Deflection	0.041 in	Ratio = 1762	>=180	Span: 1 : +D+L	
Max Upward Total Deflection	0 in	Ratio = 0	<180	n/a	

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Max Stress Ratios										Moment Values			Shear Values				
			M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v		
D Only																				
Length = 6.0 ft	1	0.159	0.138	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.95	193.2	1,215.0	0.00	0.00	0.00	0.00	0.00	153.0
+D+L																				
Length = 6.0 ft	1	0.513	0.446	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.99	692.1	1,350.0	3.20	75.8	170.0	0.00	0.00	0.00
+D+0.750L																				
Length = 6.0 ft	1	0.336	0.293	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.73	567.4	1,687.5	2.62	62.2	212.5	0.00	0.00	0.00
+0.60D																				
Length = 6.0 ft	1	0.054	0.047	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.17	115.9	2,160.0	0.54	12.7	272.0	0.00	0.00	0.00

Wood Beam

Project File: 4040 RESIDENCE ADDITION.ec6

DESCRIPTION: B10**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0409	3.022		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	4.661	4.661
Max Upward from Load Combinations	4.661	4.661
Max Upward from Load Cases	3.360	3.360
D Only	1.301	1.301
+D+L	4.661	4.661
+D+0.750L	3.821	3.821
+0.60D	0.781	0.781
L Only	3.360	3.360