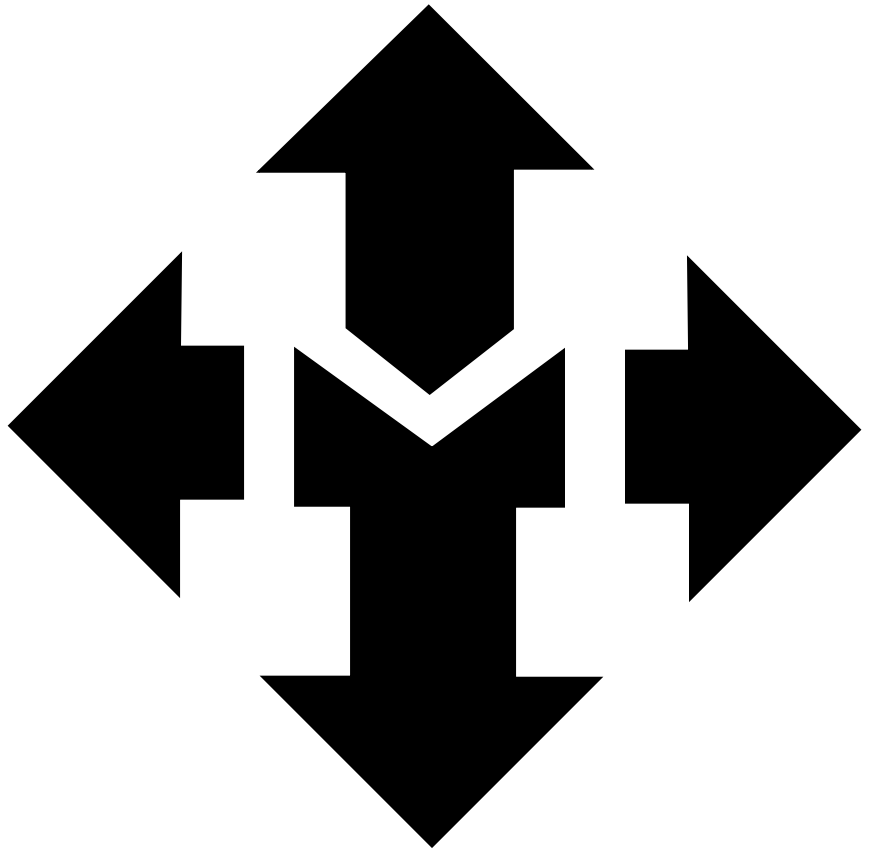




McNeil Engineering, Structural, L.C.

A Part of the McNeil Group
321 North Mall Drive, Suite J-101
St. George, UT 84790
Ph: 435-632-7660 fax: 801-255-8071

Structural Calculations

For:

KEB Homes, Inc.

Attn: Kam Valgardson

Jones Sledhaus

28935 Yellow Jacket Dr., Oak Creek, Colorado

Prepared By Anthony Beau Schmid
Supervised by Brian Warner P.E.



IMPORTANT

If the seal is not in red or green ink and the signature is not in red or blue ink, then this is an unauthorized copy and is to be rejected as unsanctioned and unusable.

June 27, 2022

Revised January 31, 2023

McNeil Engineering assumes responsibility only for the items addressed herein and does not assume responsibility for the remainder of the structure. No site observations are scheduled to verify the understanding of the contractor or the proper installation of the items addressed.



ENGINEERING STRUCTURAL, L.C.
THE MCNEIL GROUP
1100 WEST DRIVE SUITE J 101
SALT LAKE CITY, UTAH 84119
(435) 632-7660 FAX: (801) 255-8071

PROJECT INFORMATION:

Project Name: KEB Homes, Inc. , Jones Sledhaus
Project Location: 28935 Yellow Jacket Dr., Oak Creek, Colorado

DESIGN CRITERIA:

Governing Building Code: IBC 2018/ IRC 2018
Type of Construction: Wood Framed Shear Wall
Roof Snow Load: 101 psf (120 psf Ground)
Roof Live Load: 20 psf
Roof Dead Load: 15 psf
Floor Dead Load: 15 psf
Floor Live Load: 40 psf
Wind (3 Second Gust): 115 MPH (Ultimate Wind Speed), exp C
Risk Category: II
Seismic Design Category: D
Site Class: C
S_{DS}: 0.527
S_{D1}: 0.164
R: 6.5

CONSTRUCTION MATERIALS:

Concrete 28 day Strength

Footings: 3000 psi (2500 psi used in design)
Walls: 3000 psi (2500 psi used in design)
Slab on Grade: 3000 psi (2500 psi used in design)

Reinforcing Grade: ASTM A615 Grade 60

Timber

Sawn Lumber: Hem Fir no. 2 – Fb = 850 psi, Fv = 150 psi, E = 1300 ksi
LVL : I-Level or equivalent – Fb = 2600 psi, Fv = 285 psi, E = 1900 ksi
Glu-Laminated: 24F-V4 DF/DF - Fb = 2400 psi, Fv = 165 psi, E = 1800 ksi

SOILS CRITERIA:

Bearing Pressures 3,500 psf and a min. Dead Load of 700 psf per Geotechnical report by
Bear Valley Design, Ltd. Engineers-Consultants Dated November 7, 2020

22411
ABS



ENGINEERING STRUCTURAL, L.C.
THE MCNEIL GROUP
ALL DRIVE SUITE J 101
UTAH 84790
(435) 632-7660 FAX: (801) 255-8071

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(435) 632-7660 • FAX (801) 255-8071

CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.

Jones Sledhaus

28935 Yellow Jacket Dr., Oak Creek, Colorado

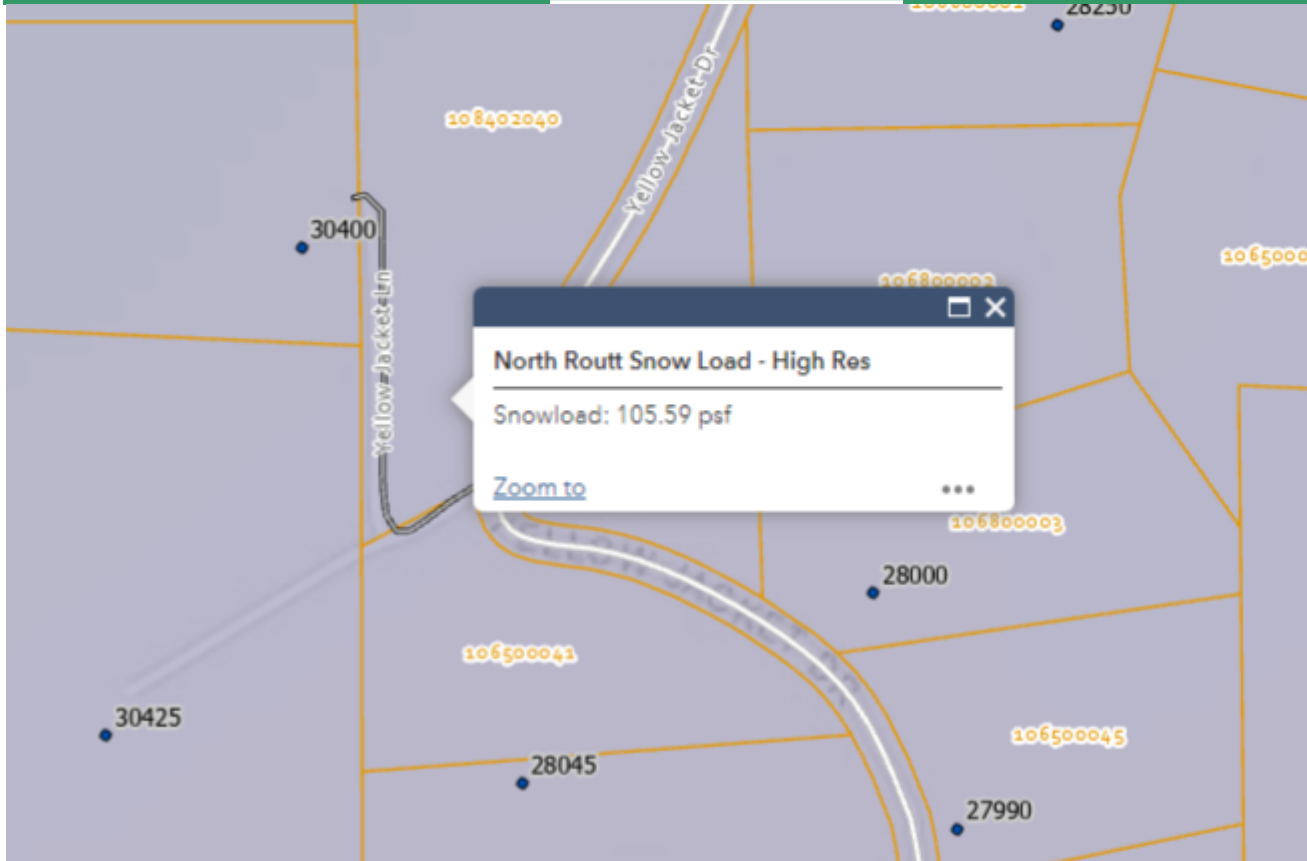
DATE

January, 23

SHEET

7DESIGNED BY **2 2 4 1 1****A B S**

PROJECT NO.

22411**VERTICAL LOADING**

Snow Load:

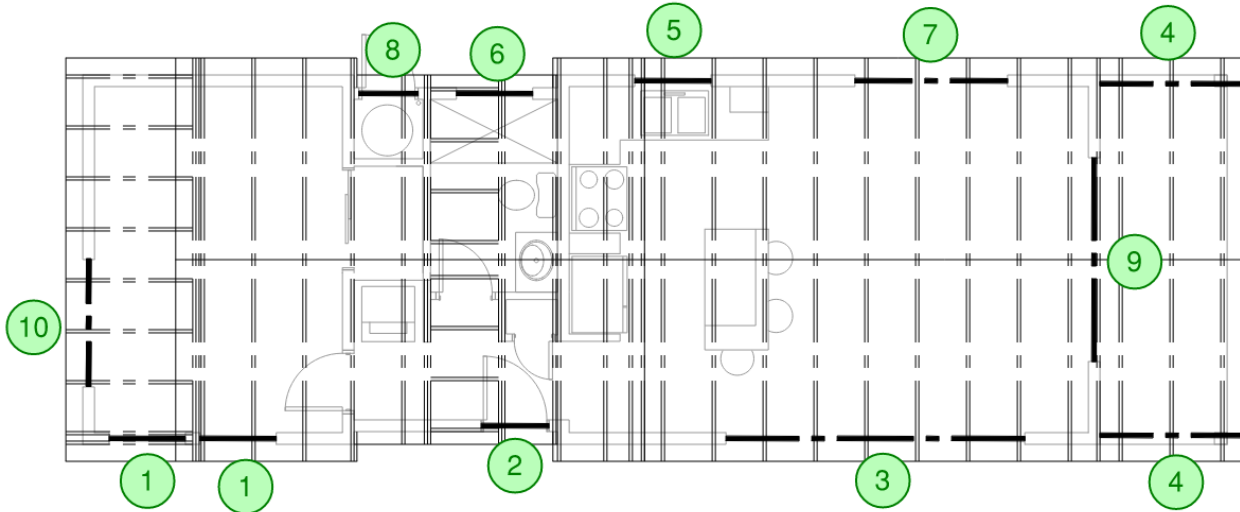
Ground Snow Load=120 psf (per local jurisdiction)

 $P_f = 0.7 \cdot C_e \cdot C_t \cdot I_s \cdot p_g$ $C_e = 1.0, C_t = 1.2, I_s = 1.0$ $P_f = 0.7 \cdot 1.0 \cdot 1.2 \cdot 1.0 \cdot 120 \text{ psf} = 100.8 \text{ use } 101 \text{ psf}$

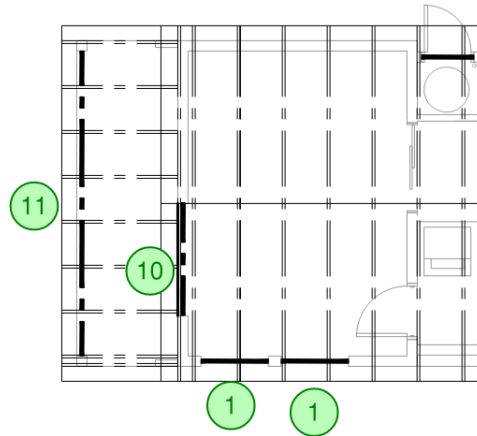
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SHEET 8	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado	
PROJECT NO. 22411	DESIGNED BY A B S		

Framing Calculations

Roof Framing Key with Beam Designations



Beam 11 is for the optional back patio.





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CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

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PROJECT NO.
22411

Roof Beam Calculations

Wood Beam (ASD) (version 139) — Generic Beam

Created with ClearCalcs.com

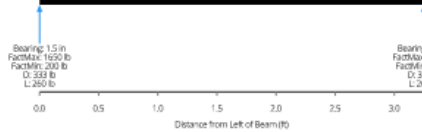


Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	jones sledhaus	Subject:	RB1 PASS
References:	NDS 2018 (ASD)		

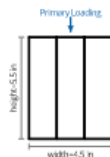
Summary

79%	Allowable Bending Moment	$M' = 1680 \text{ lb} \cdot \text{ft}$
58%	Allowable Shear	$V' = 2850 \text{ lb}$
60%	Allowable Bearing Load	$R' = 2730 \text{ lb}$
25%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.0271 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 1440$
5%	Governing Long-Term Deflection	$\delta_{LT} = -0.0088 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 4430$
6%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.0122 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 3190$

Reactions:

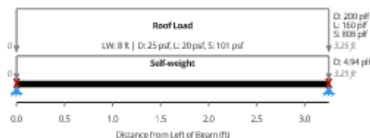


Key Properties



Member	3 plies - 2x6 H-F Stud
Beam Plan Length	$L_X = 3.25 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 24.7 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 62.4 \text{ in}^4$
Section Modulus	$S = 22.7 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 675 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,200\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,200\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,200\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,200\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,B} = 1$
Incising Factor	$C_{i,B} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,B}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.998$
Adjusted Bending Strength - Positive Bending	$F_b^{+} = 891 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,B}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.998$
Adjusted Bending Strength - Negative Bending	$F_b^{-} = 698 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 173 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}' / C_b = 405 \text{ psi}$
-----------------------	---------------------------------------

Comments

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SHEET 10	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Wood Beam (ASD) (version 139) — Generic Beam

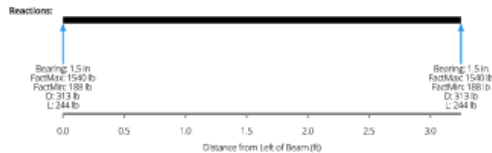
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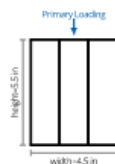
Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB2 PASS
References:	NDS 2018 (ASD)		

Summary

74%	Allowable Bending Moment	$M' = 1680 \text{ lb} \cdot \text{ft}$
54%	Allowable Shear	$V' = 2850 \text{ lb}$
56%	Allowable Bearing Load	$R' = 2730 \text{ lb}$
23%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.0254 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 1540$
5%	Governing Long-Term Deflection	$\delta_{LT} = -0.00825 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 4720$
5%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.0115 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 3400$



Key Properties



Member	3 plies - 2x6 H-F Stud
Beam Plan Length	$L_X = 3.25 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
-----------------------------------	--

Member Properties

Cross-Sectional Area	$A = 24.7 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 62.4 \text{ in}^4$
Section Modulus	$S = 22.7 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 675 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c \perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,200\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,200\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,200\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,200\,000 \text{ psi}$
--------------------------------	--------------------------------

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} = 1$
Incising Factor	$C_{i,b} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.998$
Adjusted Bending Strength - Positive Bending	$F_b^+ = 891 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.998$
Adjusted Bending Strength - Negative Bending	$F_b^- = 698 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 173 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c \perp}' / C_b = 405 \text{ psi}$
-----------------------	--

Comments



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CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

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PROJECT NO.
22411

Wood Beam (ASD) (version 139) — Generic Beam

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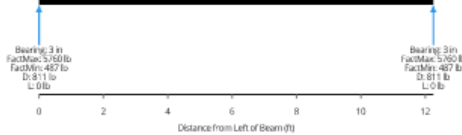


Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB3 PASS
References:	NDS 2018 (ASD)		

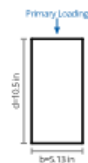
Summary

83%	Allowable Bending Moment	$M' = 21\,300 \text{ lb} \cdot \text{ft}$
53%	Allowable Shear	$V' = 10\,900 \text{ lb}$
58%	Allowable Bearing Load	$R' = 9990 \text{ lb}$
75%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.46 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 320$
5%	Governing Long-Term Deflection	$\delta_{LT} = -0.0377 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 3900$
9%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.0754 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 1950$

Reactions

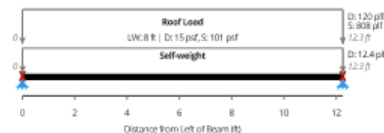


Key Properties



Member	5-1/8x10-1/2 24F-V4 DF
Beam Plan Length	$L_X = 12.3 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 53.8 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 494 \text{ in}^4$
Section Modulus	$S = 94.2 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 2400 \text{ psi}$
Base Allowable Shear Stress	$F_v = 265 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 650 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,900\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,800\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,800\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,800\,000 \text{ psi}$
--------------------------------	--------------------------------

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V = 1$
---------------	-----------

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.982$
Adjusted Bending Strength - Positive Bending	$F_b^{t+} = 2710 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.99$
Adjusted Bending Strength - Negative Bending	$F_b^{t-} = 1650 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 305 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b = 650 \text{ psi}$
-----------------------	-------------------------------------

Comments

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SHEET 12	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Wood Beam (ASD) (version 139) — Generic Beam

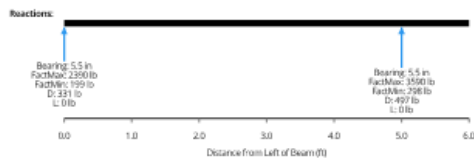
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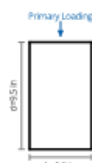
Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB4 PASS
References:	NDS 2018 (ASD)		

Summary

54%	Allowable Bending Moment	$M' = 5330 \text{ lb} \cdot \text{ft}$
46%	Allowable Shear	$V' = 5610 \text{ lb}$
41%	Allowable Bearing Load	$R' = 8770 \text{ lb}$
15%	Governing Live / Short-Term Deflection	$\delta_{ST} = 0.0146 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 823$
2%	Governing Long-Term Deflection	$\delta_{LT} = 0.00234 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 5120$
2%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = 0.00234 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 5120$

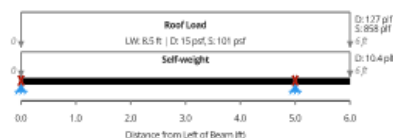


Key Properties



Member	6x10 H-F No. 2
Beam Plan Length	$L_X = 6 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 52.2 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 393 \text{ in}^4$
Section Modulus	$S = 82.7 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 675 \text{ psi}$
Base Allowable Shear Stress	$F_v = 140 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,100\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,100\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,100\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,100\,000 \text{ psi}$
--------------------------------	--------------------------------

Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} = 1$
Incising Factor	$C_{i,b} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b} = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L = 0.996$
Adjusted Bending Strength - Positive Bending	$F_b' = 773 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b} = 1.15$
Governing Beam Stability Factor - Negative Bending	$C_L = 0.996$
Adjusted Bending Strength - Negative Bending	$F_b' = 773 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 161 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b = 271 \text{ psi}$
-----------------------	-------------------------------------

Comments



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CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
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PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

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13

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PROJECT NO.
22411

Wood Beam (ASD) (version 139) — Generic Beam

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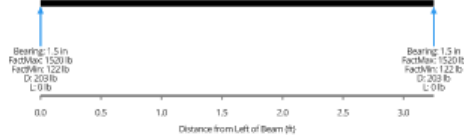


Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB5 PASS
References:	NDS 2018 (ASD)		

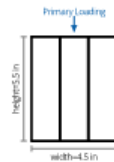
Summary

73%	Allowable Bending Moment	$M' = 1680 \text{ lb} \cdot \text{ft}$
53%	Allowable Shear	$V' = 2850 \text{ lb}$
55%	Allowable Bearing Load	$R' = 2730 \text{ lb}$
17%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.0271 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/f)_{ST} = 1440$
1%	Governing Long-Term Deflection	$\delta_{LT} = -0.00209 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/f)_{LT} = 18600$
2%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.00419 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/f)_{DL+LL} = 9310$

Reactions:

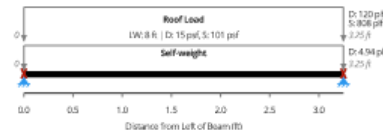


Key Properties



Member	3 plies - 2x6 H-F Stud
Beam Plan Length	$L_X = 3.25 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 24.7 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 62.4 \text{ in}^4$
Section Modulus	$S = 22.7 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 675 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1200000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1200000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1200000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1200000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} = 1$
Incising Factor	$C_{i,b} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.998$
Adjusted Bending Strength - Positive Bending	$F_b^+ = 891 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.998$
Adjusted Bending Strength - Negative Bending	$F_b^- = 698 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 173 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}' / C_b = 405 \text{ psi}$
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Comments

CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING PAVEMENT & ROOF CONSULTING		McNEIL ENGINEERING STRUCTURAL, L.C. A PART OF MCNEIL GROUP 321 North Mall Drive, Suite J-101 • ST. GEORGE, UTAH 84790 (435) 632-7660 • FAX (801) 255-8071		
SHEET 14	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Wood Beam (ASD) [version 1.39] — Generic Beam

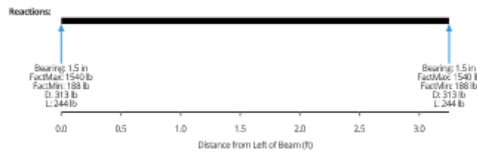
Created with ClearCalcs.com



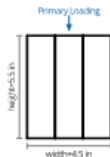
Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB6 PASS
References:	NDS 2018 (ASD)		

Summary

74%	Allowable Bending Moment	$M' = 1680 \text{ lb} \cdot \text{ft}$
54%	Allowable Shear	$V' = 2850 \text{ lb}$
56%	Allowable Bearing Load	$R' = 2730 \text{ lb}$
16%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.0254 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 1540$
4%	Governing Long-Term Deflection	$\delta_{LT} = -0.00825 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 4720$
5%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.0115 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 3400$



Key Properties



Member	3 plies - 2x6 H-F Stud
Beam Plan Length	$L_X = 3.25 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 24.7 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 62.4 \text{ in}^4$
Section Modulus	$S = 22.7 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 675 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1200000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1200000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1200000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1200000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} = 1$
Incising Factor	$C_{i,b} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.998$
Adjusted Bending Strength - Positive Bending	$F_b^{st+} = 891 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.998$
Adjusted Bending Strength - Negative Bending	$F_b^{st-} = 698 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 173 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b = 405 \text{ psi}$
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Comments



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CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

15

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PROJECT NO.
22411

Wood Beam (ASD) (version 139) — Generic Beam

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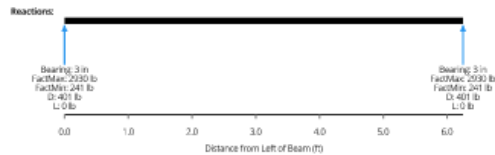


Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB7
References:	NDS 2018 (ASD)		

PASS

Summary

70%	Allowable Bending Moment	$M' = 6550 \text{ lb} \cdot \text{ft}$
61%	Allowable Shear	$V' = 4790 \text{ lb}$
54%	Allowable Bearing Load	$R' = 5470 \text{ lb}$
23%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.0719 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 1040$
1%	Governing Long-Term Deflection	$\delta_{LT} = -0.00571 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 13100$
3%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.0114 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 6570$

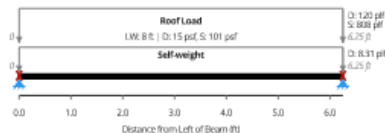


Key Properties



Member	3 plies - 2x10 H-F No. 2
Beam Plan Length	$L_x = 6.25 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 41.6 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 297 \text{ in}^4$
Section Modulus	$S = 64.2 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 850 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1300000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1300000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1300000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1300000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Size Factor	$C_{Fb} = 1.1$
Incising Factor	$C_{ib} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D+} = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_{L+} = 0.991$
Adjusted Bending Strength - Positive Bending	$F_b^+ = 1220 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D-} = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_{L-} = 0.993$
Adjusted Bending Strength - Negative Bending	$F_b^- = 961 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 173 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b = 405 \text{ psi}$
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Comments

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SHEET 16	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Wood Beam (ASD) [version 139] — Generic Beam

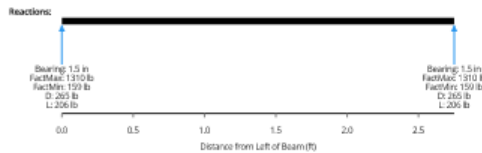
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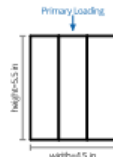
Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB8 PASS
References:	NDS 2018 (ASD)		

Summary

53%	Allowable Bending Moment	$M' = 1680 \text{ lb} \cdot \text{ft}$
46%	Allowable Shear	$V' = 2850 \text{ lb}$
48%	Allowable Bearing Load	$R' = 2730 \text{ lb}$
9%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.013 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 2530$
2%	Governing Long-Term Deflection	$\delta_{LT} = -0.00423 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 7800$
3%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.00589 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 5610$

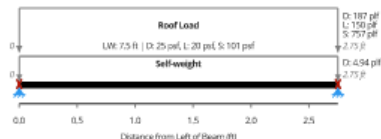


Key Properties



Member	3 plies - 2x6 H-F Stud
Beam Plan Length	$L_X = 2.75 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 24.7 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 62.4 \text{ in}^4$
Section Modulus	$S = 22.7 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 675 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,200\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,200\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,200\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,200\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Size Factor	$C_{Fb} = 1$
Incising Factor	$C_{ib} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.998$
Adjusted Bending Strength - Positive Bending	$F_b^{*+} = 891 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.999$
Adjusted Bending Strength - Negative Bending	$F_b^{*-} = 698 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 173 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b = 405 \text{ psi}$
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Comments



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CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

17

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A B S

PROJECT NO.
22411

Wood Beam (ASD) (version 139) — Generic Beam

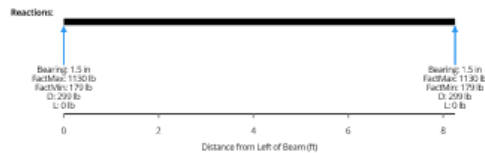
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Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB9 PASS
References:	NDS 2018 (ASD)		

Summary

53%	Allowable Bending Moment	$M' = 4390 \text{ lb} \cdot \text{ft}$
30%	Allowable Shear	$V' = 3750 \text{ lb}$
41%	Allowable Bearing Load	$R' = 2730 \text{ lb}$
27%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.113 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 874$
4%	Governing Long-Term Deflection	$\delta_{LT} = -0.0203 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 4870$
7%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.0407 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 2430$

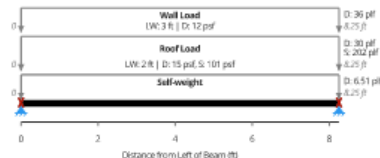


Key Properties



Member	3 plies - 2x8 H-F No. 2
Beam Plan Length	$L_X = 8.25 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 32.6 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 143 \text{ in}^4$
Section Modulus	$S = 39.4 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 850 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,300\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,300\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,300\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,300\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Size Factor	$C_{Fb} = 1.2$
Incising Factor	$C_{ib} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_D^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.991$
Adjusted Bending Strength - Positive Bending	$F_b^{'+} = 1340 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_D^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.993$
Adjusted Bending Strength - Negative Bending	$F_b^{'-} = 1050 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 173 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{e\perp}' / C_b = 405 \text{ psi}$
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Comments

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SHEET 18	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Wood Beam (ASD) (version 139) — Generic Beam

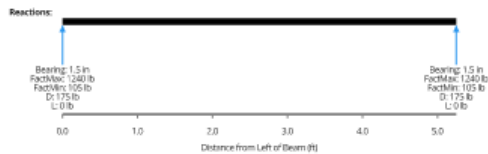
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Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB10 PASS
References:	NDS 2018 (ASD)		

Summary

37%	Allowable Bending Moment	$M' = 4400 \text{ lb} \cdot \text{ft}$
33%	Allowable Shear	$V' = 3750 \text{ lb}$
45%	Allowable Bearing Load	$R' = 2730 \text{ lb}$
14%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.0372 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 1690$
1%	Governing Long-Term Deflection	$\delta_{LT} = -0.00306 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 20\,600$
2%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.00612 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 10\,300$

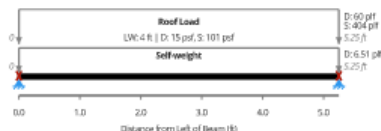


Key Properties



Member	3 plies - 2x8 H-F No. 2
Beam Plan Length	$L_X = 5.25 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 32.6 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 143 \text{ in}^4$
Section Modulus	$S = 39.4 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 850 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,300\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,300\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,300\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,300\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Size Factor	$C_{Fb} = 1.2$
Incising Factor	$C_{ib} = 1$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{Dh}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.994$
Adjusted Bending Strength - Positive Bending	$F_b^{t+} = 1340 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{Dh}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.995$
Adjusted Bending Strength - Negative Bending	$F_b^{t-} = 1050 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 173 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}' / C_h = 405 \text{ psi}$
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Comments



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PROJECT

KEB Homes, Inc.
Jones Sledhaus
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DATE

January, 23

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PROJECT NO.
22411

Wood Beam (ASD) (version 139) — Generic Beam

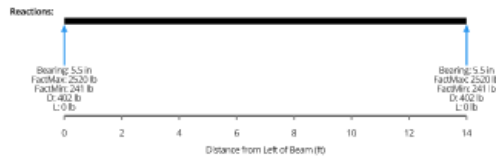
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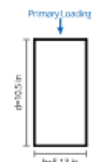
Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	RB11 PASS
References:	NDS 2018 (ASD)		

Summary

52%	Allowable Bending Moment	$M' = 17\,000 \text{ lb} \cdot \text{ft}$
26%	Allowable Shear	$V' = 9570 \text{ lb}$
26%	Allowable Bearing Load	$R' = 9710 \text{ lb}$
50%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.353 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 476$
7%	Governing Long-Term Deflection	$\delta_{LT} = -0.0669 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 2510$
7%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.0669 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 2510$

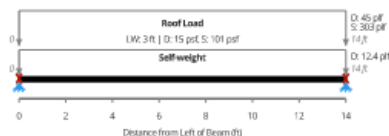


Key Properties



Member	5-1/8x10-1/2 24F-V4 DF
Beam Plan Length	$L_X = 14 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	No Continuous Bracing

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 53.8 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 494 \text{ in}^4$
Section Modulus	$S = 94.2 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 2400 \text{ psi}$
Base Allowable Shear Stress	$F_v = 265 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 650 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,900\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,800\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,800\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,500\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Volume Factor	$C_V = 1$
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Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 0.98$
Adjusted Bending Strength - Positive Bending	$F_b^{'+} = 2160 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.99$
Adjusted Bending Strength - Negative Bending	$F_b^{'-} = 1320 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1.15$
Adjusted Shear Strength	$F_v' = 267 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b = 345 \text{ psi}$
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Comments

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SHEET 20	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Framing Calculations

Wood Column (ASD) (version 109) — Exterior Stud Wall

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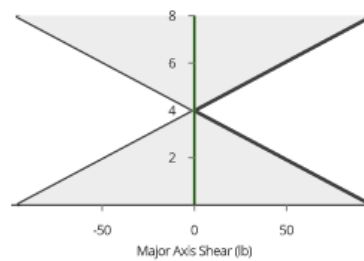


Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	Exterior wall Framing PASS
References:	NDS 2018 (ASD)		

Summary

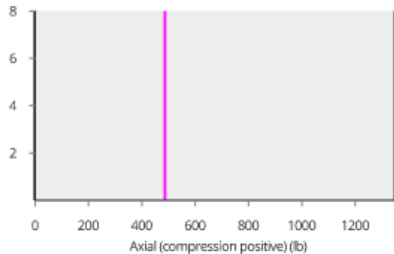
23%	Allowable Compressive Load (X-Axis Buckling)	$P'_x = 5850 \text{ lb}$
18%	Allowable Compressive Load (Y-Axis Buckling)	$P'_y = 7590 \text{ lb}$
25%	Allowable X-Axis Moment	$M'_x = 783 \text{ lb} \cdot \text{ft}$
25%	Combined Compression / Bending	$\text{Int.} = 0.254$
16%	Governing Live / Short-Term X-Axis Deflection	$\delta_{x,ST} = 0.062 \text{ in}$
	Critical Live / Short-Term X-Axis Deflection Ratio	$(L/r)_{x,ST} = 1550$
0%	Governing Long-Term X-Axis Deflection	$\delta_{x,LT} = 0 \text{ in}$
	Critical Long-Term X-Axis Deflection Ratio	$(L/r)_{x,LT} = 0$
	Critical Simplified DL+LL X-Axis Deflection Ratio	$(L/r)_{x,DL+LL} = 0$

● Load Case: D+H+F + L
● Envelope

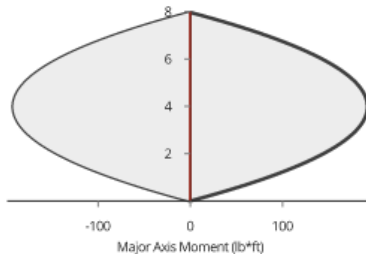


Key Properties

● Load Case: D+H+F + L
● Envelope



● Load Case: D+H+F + L
● Envelope



Member	2x6 H-F Stud
Column Height	$L = 8 \text{ ft}$
Continuous Bracing for Strong Axis Buckling	No
Continuous Bracing for Weak Axis Buckling	Yes
Continuous Bracing for Lateral Torsional Buckling	Yes

Loads



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KEB Homes, Inc.
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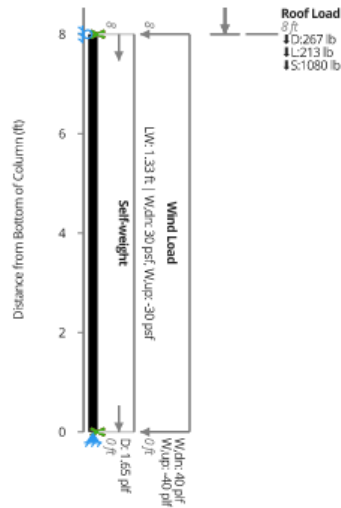
January, 23

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Apparent Modulus of Elasticity (Y-Axis) $E_{y,app} = 1\,200\,000\text{ psi}$

Modulus of Elasticity for Deflections (Y-Axis) $E_y = 1\,200\,000\text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Minimum Elastic Modulus (X-axis) $E'_{min,x} = 440\,000\text{ psi}$

Adjusted Minimum Elastic Modulus (Y-axis) $E'_{min,y} = 440\,000\text{ psi}$

Adjusted Modulus of Elasticity (X-axis) $E'_x = 1\,200\,000\text{ psi}$

Adjusted Modulus of Elasticity (Y-axis) $E'_y = 1\,200\,000\text{ psi}$

Capacity in Pure Axial Loading (NDS 2018 Section 3.7)

Size Factor $C_{F,C} = 1$

Fully Braced Compression Strength - Pure Axial Loading $F'_c = 920\text{ psi}$

Governing Slenderness - X-axis $(l_e/d) = 17.5$

Governing Slenderness - Y-axis $(l_e/b) = 0$

Adjusted Compression Strength (X-axis) $F'_{c,x} = 709\text{ psi}$

Adjusted Compression Strength (Y-axis) $F'_{c,y} = 920\text{ psi}$

Capacity in Pure Bending (NDS 2018 Section 3.3)

Governing Duration Factor - Pure X-Axis Bending $C_{D,x} = 1.6$

Governing Duration Factor - Pure Y-Axis Bending $C_{D,y} = 0.9$

Size Factor $C_{F,b} = 1$

Governing Beam Stability Factor - Pure Bending $C_L = 1$

Allowable Bending Stress (X-axis) $F'_{bx} = 1240\text{ psi}$

Allowable Bending Stress (Y-Axis) $F'_{by} = 803\text{ psi}$

Combined Bending and Compression (NDS 2018 Section 3.9)

Fully Braced Compression Strength $F'_{c,int} = 1280\text{ psi}$

Adjusted Compression Strength (X-axis) $F'_{cx,int} = 850\text{ psi}$

Adjusted Compression Strength (Y-axis) $F'_{cy,int} = 1280\text{ psi}$

Adjusted Compression Strength - Interaction $F'_{c,int} = 850\text{ psi}$

Governing Beam Stability Factor - Interaction $C_{L,int} = 1$

Allowable Bending Stress (X-axis) $F'_{bx,int} = 1240\text{ psi}$

Allowable Bending Stress (Y-axis) $F'_{by,int} = 1430\text{ psi}$

Shear Design (NDS 2018 3.4)

7% Shear Capacity (X-axis) $V'_{rx} = 1320\text{ lb}$

Comments

Design Conditions

Design Code for Load Combinations International Building Code (IBC) 2018

Member Properties

Cross-Sectional Area	$A = 8.25\text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 20.8\text{ in}^4$
Weak Axis Moment of Inertia	$I_{yy} = 1.55\text{ in}^4$
Base Allowable Compression Stress	$F_c = 800\text{ psi}$
Base Allowable Bending Stress (X-axis)	$F_{bx} = 675\text{ psi}$
Base Allowable Bending Stress (Y-axis)	$F_{by} = 675\text{ psi}$
Base Minimum Elastic Modulus (X-axis)	$E'_{min,x} = 440\,000\text{ psi}$
Base Minimum Elastic Modulus (Y-axis)	$E'_{min,y} = 440\,000\text{ psi}$
True Modulus of Elasticity (X-Axis)	$E_{x,true} = 1\,200\,000\text{ psi}$
Apparent Modulus of Elasticity (X-Axis)	$E_{x,app} = 1\,200\,000\text{ psi}$
Modulus of Elasticity for Deflections (X-Axis)	$E_x = 1\,200\,000\text{ psi}$
True Modulus of Elasticity (Y-Axis)	$E_{y,true} = 1\,200\,000\text{ psi}$

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SHEET 22	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Column Calculations

Wood Column (ASD) (version 109) — Generic Concentrically-Loaded Column

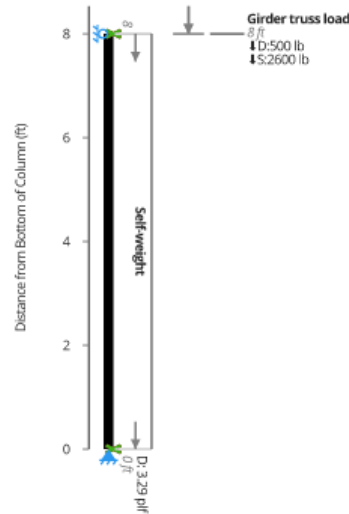
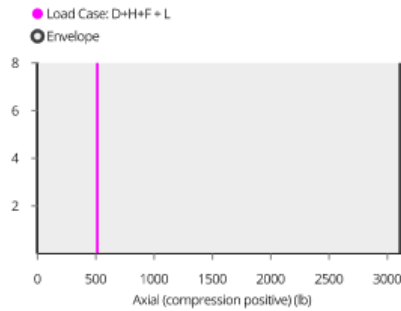
Created with ClearCalcs.com



Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	C1 Below Girder Truss PASS
References:	NDS 2018 (ASD)		

Summary

27%	Allowable Compressive Load (X-Axis Buckling)	$P'_x = 11\,700\text{ lb}$
34%	Allowable Compressive Load (Y-Axis Buckling)	$P'_y = 9110\text{ lb}$



Key Properties



Member	2 plies - 2x6 H-F Stud
Connection Between Plies	Nailed
Column Height	$L = 8\text{ ft}$
Continuous Bracing for Strong Axis Buckling	No
Continuous Bracing for Weak Axis Buckling	Yes
Continuous Bracing for Lateral Torsional Buckling	Yes

Weak Axis Loads

Loads



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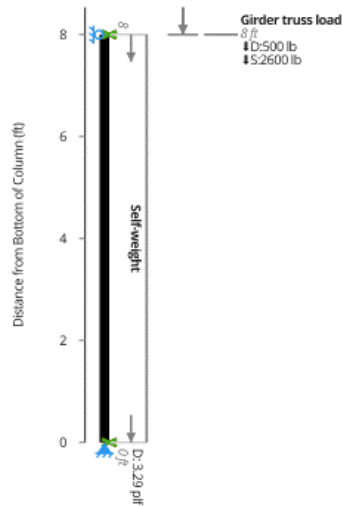
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Design Conditions

Design Code for Load Combinations International Building Code (IBC) 2018

Member Properties

Cross-Sectional Area $A = 16.5 \text{ in}^2$
Strong Axis Moment of Inertia $I_{xx} = 41.6 \text{ in}^4$
Weak Axis Moment of Inertia $I_{yy} = 12.4 \text{ in}^4$

Base Allowable Compression Stress

$$F_c = 800 \text{ psi}$$

Base Allowable Bending Stress (X-axis)

$$F_{bx} = 675 \text{ psi}$$

Base Allowable Bending Stress (Y-axis)

$$F_{by} = 675 \text{ psi}$$

Base Minimum Elastic Modulus (X-axis)

$$E_{min,x} = 440\,000 \text{ psi}$$

Base Minimum Elastic Modulus (Y-axis)

$$E_{min,y} = 440\,000 \text{ psi}$$

True Modulus of Elasticity (X-Axis)

$$E_{x,true} = 1\,200\,000 \text{ psi}$$

Apparent Modulus of Elasticity (X-Axis)

$$E_{x,app} = 1\,200\,000 \text{ psi}$$

Modulus of Elasticity for Deflections (X-Axis)

$$E_x = 1\,200\,000 \text{ psi}$$

True Modulus of Elasticity (Y-Axis)

$$E_{y,true} = 1\,200\,000 \text{ psi}$$

Apparent Modulus of Elasticity (Y-Axis)

$$E_{y,app} = 1\,200\,000 \text{ psi}$$

Modulus of Elasticity for Deflections (Y-Axis)

$$E_y = 1\,200\,000 \text{ psi}$$

Elastic Modulus (NDS 2018 2.3)

Adjusted Minimum Elastic Modulus (X-axis)

$$E'_{min,x} = 440\,000 \text{ psi}$$

Adjusted Minimum Elastic Modulus (Y-axis)

$$E'_{min,y} = 440\,000 \text{ psi}$$

Adjusted Modulus of Elasticity (X-axis)

$$E'_x = 1\,200\,000 \text{ psi}$$

Adjusted Modulus of Elasticity (Y-axis)

$$E'_y = 1\,200\,000 \text{ psi}$$

Capacity in Pure Axial Loading (NDS 2018 Section 3.7)

Size Factor

$$C_{F,c} = 1$$

Fully Braced Compression Strength - Pure Axial Loading

$$F_c^* = 920 \text{ psi}$$

Governing Slenderness - X-axis

$$(l_e/d) = 17.5$$

Governing Slenderness - Y-axis

$$(l_e/b) = 0$$

Adjusted Compression Strength (X-axis)

$$F'_{c,x} = 709 \text{ psi}$$

Adjusted Compression Strength (Y-axis)

$$F'_{c,y} = 552 \text{ psi}$$

Comments

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SHEET 24	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

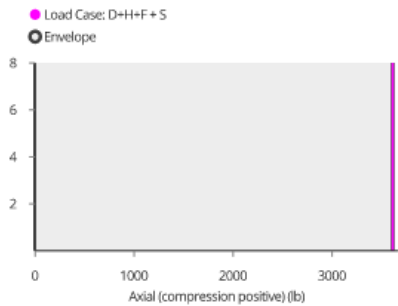
Wood Column (ASD) (version 109) — Generic Concentrically-Loaded Column

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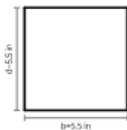
	Client:	Irontown Homes	Date:	Jun 15, 2022
	Author:	Anthony Schmid	Job #:	22411
	Project:	Jones Sledhaus	Subject:	C2 Below Deck Columns PASS
	References:	NDS 2018 (ASD)		

Summary

- 24% Allowable Compressive Load (X-Axis Buckling) $P'_x = 15\,400\text{ lb}$
- 20% Allowable Compressive Load (Y-Axis Buckling) $P'_y = 18\,200\text{ lb}$

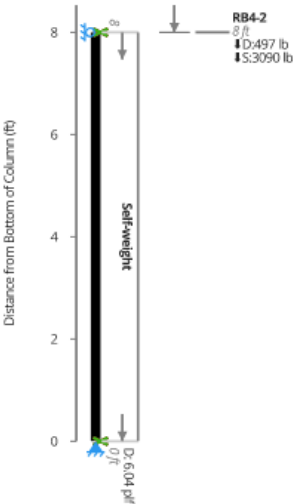


Key Properties



Member	6x6 H-F No. 2
Column Height	$L = 8\text{ ft}$
Continuous Bracing for Strong Axis Buckling	No
Continuous Bracing for Weak Axis Buckling	Yes
Continuous Bracing for Lateral Torsional Buckling	Yes

Loads



Weak Axis Loads



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PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

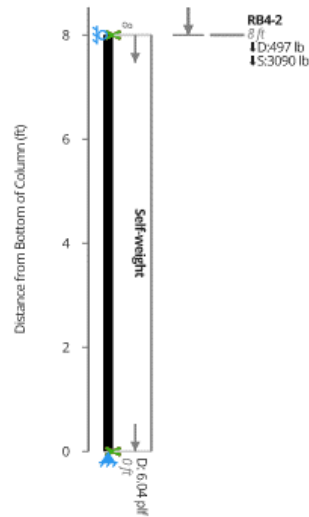
January, 23

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Design Conditions

Design Code for Load Combinations International Building Code (IBC) 2018

Member Properties

Cross-Sectional Area $A = 30.2 \text{ in}^2$
Strong Axis Moment of Inertia $I_{xx} = 76.3 \text{ in}^4$
Weak Axis Moment of Inertia $I_{yy} = 76.3 \text{ in}^4$

Base Allowable Compression Stress

$$F_c = 575 \text{ psi}$$

Base Allowable Bending Stress (X-axis)

$$F_{bx} = 575 \text{ psi}$$

Base Allowable Bending Stress (Y-axis)

$$F_{by} = 575 \text{ psi}$$

Base Minimum Elastic Modulus (X-axis)

$$E_{minx} = 400\,000 \text{ psi}$$

Base Minimum Elastic Modulus (Y-axis)

$$E_{miny} = 400\,000 \text{ psi}$$

True Modulus of Elasticity (X-Axis)

$$E_{x,true} = 1\,100\,000 \text{ psi}$$

Apparent Modulus of Elasticity (X-Axis)

$$E_{x,app} = 1\,100\,000 \text{ psi}$$

Modulus of Elasticity for Deflections (X-Axis)

$$E_x = 1\,100\,000 \text{ psi}$$

True Modulus of Elasticity (Y-Axis)

$$E_{y,true} = 1\,100\,000 \text{ psi}$$

Apparent Modulus of Elasticity (Y-Axis)

$$E_{y,app} = 1\,100\,000 \text{ psi}$$

Modulus of Elasticity for Deflections (Y-Axis)

$$E_y = 1\,100\,000 \text{ psi}$$

Elastic Modulus (NDS 2018 2.3)

Adjusted Minimum Elastic Modulus (X-axis)

$$E'_{min,x} = 400\,000 \text{ psi}$$

Adjusted Minimum Elastic Modulus (Y-axis)

$$E'_{min,y} = 400\,000 \text{ psi}$$

Adjusted Modulus of Elasticity (X-axis)

$$E'_x = 1\,100\,000 \text{ psi}$$

Adjusted Modulus of Elasticity (Y-axis)

$$E'_y = 1\,100\,000 \text{ psi}$$

Capacity in Pure Axial Loading (NDS 2018 Section 3.7)

Size Factor

$$C_{F,c} = 1$$

Fully Braced Compression Strength - Pure Axial Loading

$$F_c^* = 602 \text{ psi}$$

Governing Slenderness - X-axis

$$(\ell_e/d) = 17.5$$

Governing Slenderness - Y-axis

$$(\ell_e/b) = 0$$

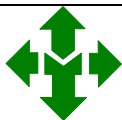
Adjusted Compression Strength (X-axis)

$$F'_{c,x} = 510 \text{ psi}$$

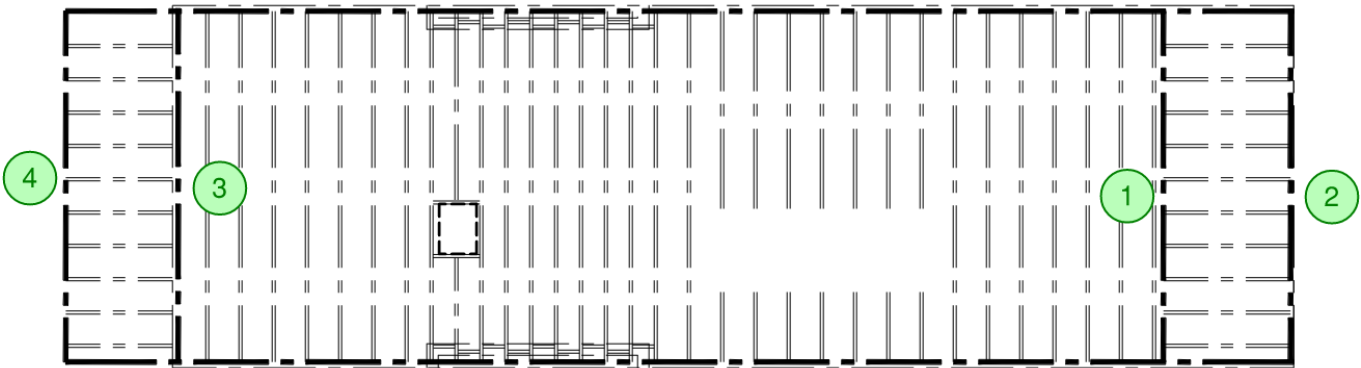
Adjusted Compression Strength (Y-axis)

$$F'_{c,y} = 602 \text{ psi}$$

Comments

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SHEET 26	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Main Floor Beam Key Plan



FB-4 beam for optional back deck.



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Main Floor Beam Calculations

Wood Beam (ASD) (version 139) — Generic Beam

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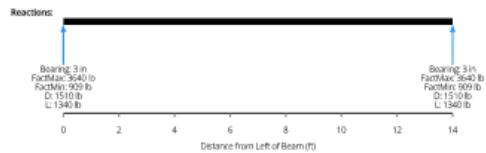


Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	FB1
References:	NDS 2018 (ASD)		

PASS

Summary

50%	Allowable Bending Moment	$M' = 22\,600 \text{ lb} \cdot \text{ft}$
33%	Allowable Shear	$V' = 10\,900 \text{ lb}$
69%	Allowable Bearing Load	$R' = 5300 \text{ lb}$
43%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.15 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 1120$
67%	Governing Long-Term Deflection	$\delta_{LT} = -0.315 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 533$
34%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.315 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 533$

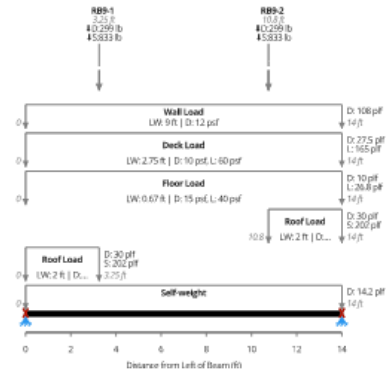


Key Properties



Member	5-1/8x12 24F-V4 DF
Beam Plan Length	$L_X = 14 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	Top Braced

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 61.5 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 738 \text{ in}^4$
Section Modulus	$S = 123 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 2400 \text{ psi}$
Base Allowable Shear Stress	$F_v = 265 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c \perp} = 650 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,900\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,800\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,800\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,500\,000 \text{ psi}$
--------------------------------	--------------------------------

Section Bending (NDS 2018 2.3)

Volume Factor	$C_V = 1$
---------------	-----------

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 1$
Adjusted Bending Strength - Positive Bending	$F_b^{'+} = 2210 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.987$

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SHEET 28	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Wood Beam (ASD) (version 1309) — Generic Beam

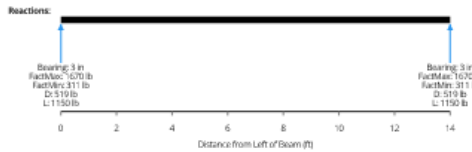
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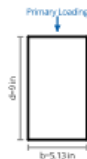
Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	FB2 PASS
References:	NDS 2018 (ASD)		

Summary

53%	Allowable Bending Moment	$M' = 11\,100 \text{ lb} \cdot \text{ft}$
23%	Allowable Shear	$V' = 7130 \text{ lb}$
32%	Allowable Bearing Load	$R' = 5300 \text{ lb}$
87%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.305 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 550$
95%	Governing Long-Term Deflection	$\delta_{LT} = -0.443 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 379$
47%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.443 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 379$

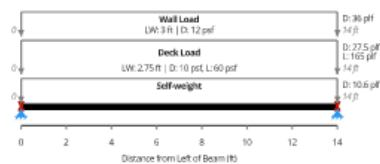


Key Properties



Member	5-1/8x9 24F-V4 DF
Beam Plan Length	$L_X = 14 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	Top Braced

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 46.1 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 311 \text{ in}^4$
Section Modulus	$S = 69.2 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 2400 \text{ psi}$
Base Allowable Shear Stress	$F_v = 265 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 650 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,900\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,800\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,800\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,500\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Volume Factor	$C_V = 1$
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Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_D^+ = 1$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 1$
Adjusted Bending Strength - Positive Bending	$F_b^+ = 1920 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_D^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.991$
Adjusted Bending Strength - Negative Bending	$F_b^- = 1320 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1$
Adjusted Shear Strength	$F_v' = 232 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}' / C_b = 345 \text{ psi}$
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Comments



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CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

29

DESIGNED BY 2 2 4 1 1
A B S

PROJECT NO.
22411

Wood Beam (ASD) (version 139) — Generic Beam

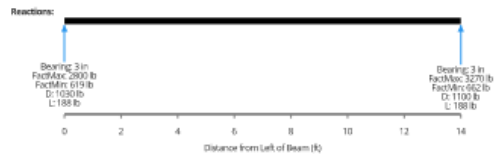
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Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	FB3 PASS
References:	NDS 2018 (ASD)		

Summary

50%	Allowable Bending Moment	$M' = 22\,600 \text{ lb} \cdot \text{ft}$
30%	Allowable Shear	$V' = 10\,900 \text{ lb}$
62%	Allowable Bearing Load	$R' = 5300 \text{ lb}$
63%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.221 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 761$
30%	Governing Long-Term Deflection	$\delta_{LT} = -0.14 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 1200$
15%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.14 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 1200$

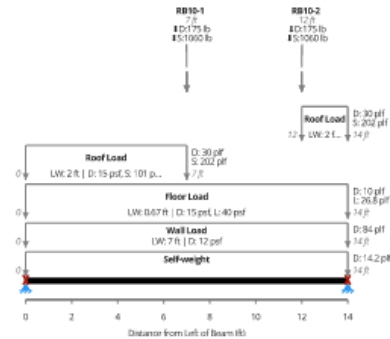


Key Properties



Member	5-1/8x12 24F-V4 DF
Beam Plan Length	$L_X = 14 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	Top Braced

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 61.5 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 738 \text{ in}^4$
Section Modulus	$S = 123 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 2400 \text{ psi}$
Base Allowable Shear Stress	$F_v = 265 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c \perp} = 650 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,900\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,800\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,800\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,500\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Volume Factor	$C_V = 1$
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Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 1$
Adjusted Bending Strength - Positive Bending	$F_b^{+} = 2210 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.988$
Adjusted Bending Strength - Negative Bending	$F_b^{-} = 1320 \text{ psi}$

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SHEET 30	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Wood Beam (ASD) (version 139) — Generic Beam

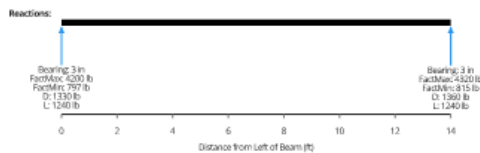
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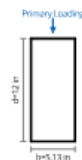
Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	FB3 Deck Option PASS
References:	NDS 2018 (ASD)		

Summary

67%	Allowable Bending Moment	$M' = 22\,600\text{ lb} \cdot \text{ft}$
40%	Allowable Shear	$V' = 10\,900\text{ lb}$
82%	Allowable Bearing Load	$R' = 5300\text{ lb}$
82%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.286\text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/f)_{ST} = 588$
61%	Governing Long-Term Deflection	$\delta_{LT} = -0.287\text{ in}$
	Governing Long-Term Deflection Ratio	$(L/f)_{LT} = 586$
31%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.287\text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/f)_{DL+LL} = 586$

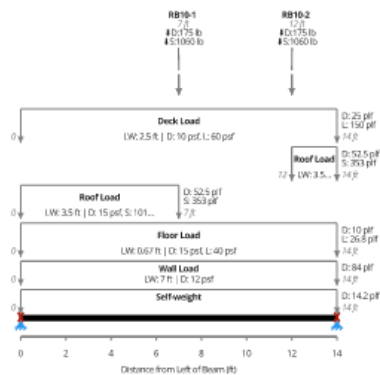


Key Properties



Member	5-1/8x12 24F-V4 DF
Beam Plan Length	$L_X = 14\text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	Top Braced

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 61.5\text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 738\text{ in}^4$
Section Modulus	$S = 123\text{ in}^3$
Base Allowable Bending Stress	$F_b = 2400\text{ psi}$
Base Allowable Shear Stress	$F_v = 265\text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 650\text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,900\,000\text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,800\,000\text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,800\,000\text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,500\,000\text{ psi}$
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Section Bending (NDS 2018 2.3)

Volume Factor	$C_V = 1$
---------------	-----------

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1.15$
Governing Beam Stability Factor - Positive Bending	$C_b^+ = 1$
Adjusted Bending Strength - Positive Bending	$F_b^{\sigma+} = 2210\text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_b^- = 0.988$

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	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado	DATE January, 23 DESIGNED BY 2 2 4 1 1 A B S

Wood Beam (ASD) (version 139) — Generic Beam

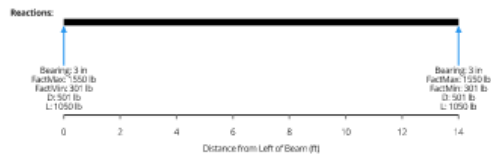
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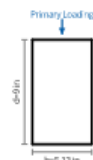
Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	FB4 PASS
References:	NDS 2018 (ASD)		

Summary

49%	Allowable Bending Moment	$M' = 11\,100 \text{ lb} \cdot \text{ft}$
22%	Allowable Shear	$V' = 7130 \text{ lb}$
29%	Allowable Bearing Load	$R' = 5300 \text{ lb}$
79%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.278 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L'/\delta)_{ST} = 605$
88%	Governing Long-Term Deflection	$\delta_{LT} = -0.41 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L'/\delta)_{LT} = 409$
44%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.41 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L'/\delta)_{DL+LL} = 409$

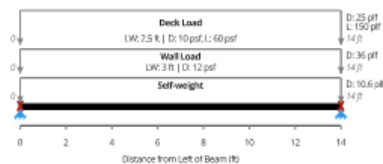


Key Properties



Member	5-1/8x9 24F-V4 DF
Beam Plan Length	$L_X = 14 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	Top Braced

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 46.1 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 311 \text{ in}^4$
Section Modulus	$S = 69.2 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 2400 \text{ psi}$
Base Allowable Shear Stress	$F_v = 265 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 650 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,900\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,800\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,800\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,500\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Volume Factor	$C_V = 1$
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Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D\delta}^+ = 1$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 1$
Adjusted Bending Strength - Positive Bending	$F_b^{e+} = 1920 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D\delta}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.991$
Adjusted Bending Strength - Negative Bending	$F_b^{e-} = 1320 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1$
Adjusted Shear Strength	$F_v' = 232 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b = 345 \text{ psi}$
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Comments

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SHEET 32	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Framing Calculations

Wood Beam (ASD) (version 139) — Floor Joist

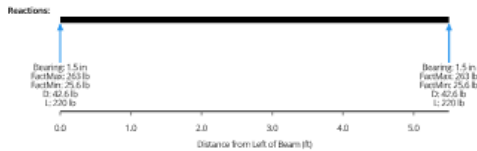
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Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	Deck Joist PASS
References:	NDS 2018 (ASD)		

Summary

35%	Allowable Bending Moment	$M' = 1030 \text{ lb} \cdot \text{ft}$
31%	Allowable Shear	$V' = 844 \text{ lb}$
43%	Allowable Bearing Load	$R' = 611 \text{ lb}$
17%	Governing Live / Short-Term Deflection	$\delta_{ST} = -0.0311 \text{ in}$
	Governing Live / Short-Term Deflection Ratio	$(L/\delta)_{ST} = 2120$
14%	Governing Long-Term Deflection	$\delta_{LT} = -0.0371 \text{ in}$
	Governing Long-Term Deflection Ratio	$(L/\delta)_{LT} = 1780$
10%	Governing Simplified DL+LL Deflection	$\delta_{DL+LL} = -0.0371 \text{ in}$
	Governing Simplified DL+LL Deflection Ratio	$(L/\delta)_{DL+LL} = 1780$

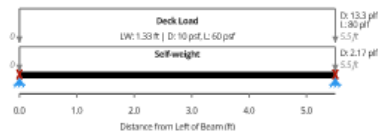


Key Properties



Member	2x8 H-F No. 2
Beam Plan Length	$L_X = 5.5 \text{ ft}$
Continuous Bracing for Lateral Torsional Buckling	Top Braced

Loads



Design Conditions

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Cross-Sectional Area	$A = 10.9 \text{ in}^2$
Strong Axis Moment of Inertia	$I_{xx} = 47.6 \text{ in}^4$
Section Modulus	$S = 13.1 \text{ in}^3$
Base Allowable Bending Stress	$F_b = 850 \text{ psi}$
Base Allowable Shear Stress	$F_v = 150 \text{ psi}$
Base Perpendicular Compression Allowable Stress	$F_{c\perp} = 405 \text{ psi}$
True Modulus of Elasticity	$E_{true} = 1\,300\,000 \text{ psi}$
Apparent Modulus of Elasticity	$E_{app} = 1\,300\,000 \text{ psi}$
Modulus of Elasticity for Deflections	$E = 1\,300\,000 \text{ psi}$

Elastic Modulus (NDS 2018 2.3)

Adjusted Modulus of Elasticity	$E' = 1\,110\,000 \text{ psi}$
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Section Bending (NDS 2018 2.3)

Size Factor	$C_{F,b} = 1.2$
Incising Factor	$C_{i,b} = 0.8$

Positive Bending (NDS 2018 2.3)

Governing Duration Factor - Positive Bending	$C_{D,b}^+ = 1$
Governing Beam Stability Factor - Positive Bending	$C_L^+ = 1$
Adjusted Bending Strength - Positive Bending	$F_b^+ = 938 \text{ psi}$

Negative Bending (NDS 2018 2.3)

Governing Duration Factor - Negative Bending	$C_{D,b}^- = 0.9$
Governing Beam Stability Factor - Negative Bending	$C_L^- = 0.898$
Adjusted Bending Strength - Negative Bending	$F_b^- = 759 \text{ psi}$

Shear Design (NDS 2018 3.4)

Governing Duration Factor	$C_D = 1$
Adjusted Shear Strength	$F_v' = 116 \text{ psi}$

Bearing (NDS 2018 3.10)

Base Bearing Strength	$F_{c\perp}'/C_b = 271 \text{ psi}$
-----------------------	-------------------------------------

Comments



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PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

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DESIGNED BY 2 2 4 1 1
A B S

PROJECT NO.
22411



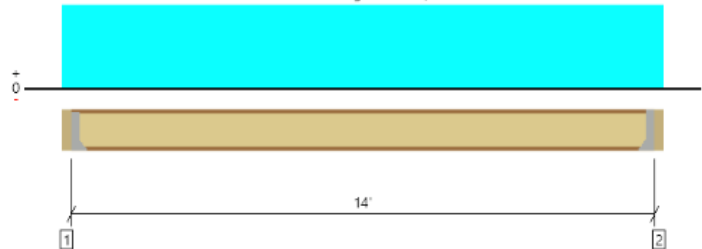
MEMBER REPORT

PASSED

Level, Typical Floor Joist

1 piece(s) 11 7/8" TJI@ 110 @ 16" OC

Overall Length: 14' 6 1/4"



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	513 @ 3 1/8"	910 (1.75")	Passed (56%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	513 @ 3 1/8"	1560	Passed (33%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1797 @ 7' 3 1/8"	3160	Passed (57%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.161 @ 7' 3 1/8"	0.350	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.221 @ 7' 3 1/8"	0.700	Passed (L/760)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	46	45	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Hanger on 11 7/8" GLB beam	3.13"	Hanger ¹	1.75" / - 2	145	387	532	See note ¹
2 - Hanger on 11 7/8" GLB beam	3.13"	Hanger ¹	1.75" / - 2	145	387	532	See note ¹

¹ At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

² See Connector grid below for additional information and/or requirements.

³ Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 3" o/c	
Bottom Edge (Lu)	14' o/c	

• TJI joists are only analyzed using Maximum Allowable bracing solutions.

• Maximum allowable bracing intervals based on applied load.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	IUS1.81/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	
2 - Face Mount Hanger	IUS1.81/11.88	2.00"	N/A	10-10dx1.5	2-Strong-Grip	

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Load	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PSF)	0 to 14' 6 1/4"	16"	15.0	40.0	Default Load

Weyerhaeuser Notes

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

ForteWEB Software Operator	Job Notes
Anthony Schmid McNeil Engineering (435) 632-7660 anthony@mcneileng.com	



6/27/2022 7:25:09 PM UTC
ForteWEB v3.2, Engine: V8.2.0.17, Data: V8.1.0.16
File Name: 22411-Jones Sledhaus
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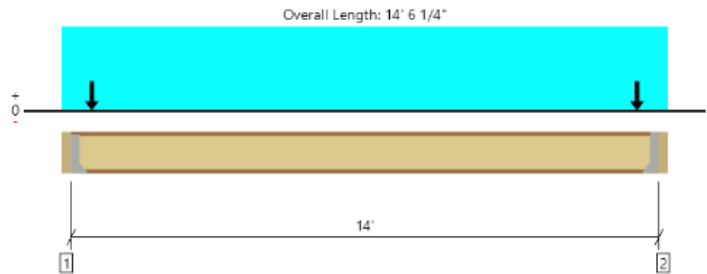
CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING PAVEMENT & ROOF CONSULTING		McNEIL ENGINEERING STRUCTURAL, L.C. A PART OF MCNEIL GROUP 321 North Mall Drive, Suite J-101 • ST. GEORGE, UTAH 84790 (435) 632-7660 • FAX (801) 255-8071		
SHEET 34	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			



MEMBER REPORT

PASSED

Level, Floor Joist Below Wall
1 piece(s) 11 7/8" TJI® 110 @ 12" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1239 @ 3 1/8"	1239 (2.39")	Passed (100%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1239 @ 3 1/8"	1794	Passed (69%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	1553 @ 7' 3 1/4"	3160	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.143 @ 7' 3 3/16"	0.350	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.209 @ 7' 3 3/16"	0.700	Passed (L/806)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
TJ-Pro™ Rating	52	40	Passed	--	--

System : Floor
 Member Type : Joist
 Building Use : Residential
 Building Code : IBC 2018
 Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Hanger on 11 7/8" GLB beam	3.13"	Hanger ¹	2.39" / - ²	369	441	735	1545	See note ¹
2 - Hanger on 11 7/8" GLB beam	3.13"	Hanger ¹	2.38" / - ²	369	440	733	1542	See note ¹

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- ¹ See Connector grid below for additional information and/or requirements.
- ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 7" o/c	
Bottom Edge (Lu)	14' o/c	

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

Connector: Simpson Strong-Tie							
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories	
1 - Face Mount Hanger	MIU1.81/11	2.50"	N/A	20-10dx1.5	2-10dx1.5		
2 - Face Mount Hanger	MIU1.81/11	2.50"	N/A	20-10dx1.5	2-10dx1.5		

- Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 14' 6 1/4"	12"	15.0	40.0	-	Default Load
2 - Point (PLF)	9"	12"	260.0	150.0	734.0	
3 - Point (PLF)	13' 9"	12"	260.0	150.0	734.0	

ForteWEB Software Operator	Job Notes
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 File Name: 22411-Jones Sledhaus
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CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

35

DESIGNED BY 2 2 4 1 1
A B S

PROJECT NO.
22411

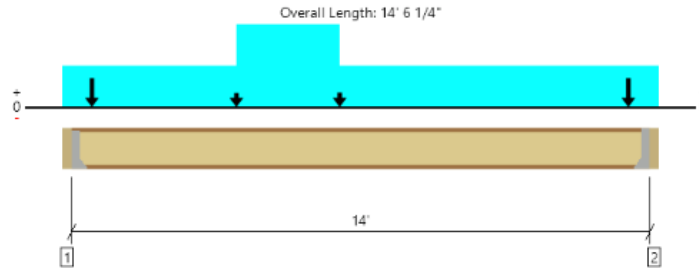


MEMBER REPORT

PASSED

Level, Floor joist at crawl space

2 piece(s) 11 7/8" TJI® 110 @ 12" OC



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1451 @ 3 1/8"	2093 (1.75")	Passed (69%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Shear (lbs)	1451 @ 3 1/8"	3588	Passed (40%)	1.15	1.0 D + 0.75 L + 0.75 S (All Spans)
Moment (Ft-lbs)	2554 @ 6' 9"	6320	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.116 @ 7' 1 9/16"	0.350	Passed (L/999+)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
Total Load Defl. (in)	0.169 @ 7' 1 9/16"	0.700	Passed (L/991)	--	1.0 D + 0.75 L + 0.75 S (All Spans)
TJ-Pro™ Rating	61	40	Passed	--	--

- Deflection criteria: LL (L/480) and TL (L/240).
- 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.

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Hanger on 11 7/8" GLB beam	3.13"	Hanger ¹	1.75" / - ²	437	589	779	1805	See note ¹
2 - Hanger on 11 7/8" GLB beam	3.13"	Hanger ¹	1.75" / - ²	410	533	756	1699	See note ¹

• At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger

- ¹ See Connector grid below for additional information and/or requirements.
- ² Required Bearing Length / Required Bearing Length with Web Stiffeners

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 1" o/c	
Bottom Edge (Lu)	14' o/c	

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

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	IUS3.56/11.88	2.00"	N/A	12-10d	2-Strong-Grip	
2 - Face Mount Hanger	IUS3.56/11.88	2.00"	N/A	12-10d	2-Strong-Grip	

• Refer to manufacturer notes and instructions for proper installation and use of all connectors.

Vertical Loads	Location	Spacing	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 14' 6 1/4"	12"	15.0	40.0	-	Default Load
2 - Point (PLF)	9'	12"	260.0	150.0	734.0	
3 - Point (PLF)	13' 9"	12"	260.0	150.0	734.0	
4 - Point (lb)	4' 3"	N/A	33	56	43	
5 - Point (lb)	6' 9"	N/A	39	85	24	
6 - Uniform (PLF)	4' 3" to 6' 9"	N/A	15.0	40.0	-	

FortewEB Software Operator	Job Notes
Anthony Schmid McNeil Engineering (435) 632-7660 anthony@mcneileng.com	



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File Name: 22411-Jones Sledhaus

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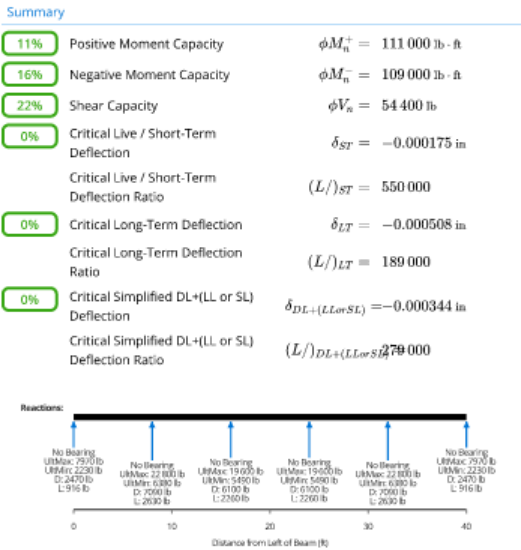
CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING PAVEMENT & ROOF CONSULTING		McNEIL ENGINEERING STRUCTURAL, L.C. A PART OF MCNEIL GROUP 321 North Mall Drive, Suite J-101 • ST. GEORGE, UTAH 84790 (435) 632-7660 • FAX (801) 255-8071		
SHEET 36	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Footing and Foundation Calculations Grade Beam Calculations

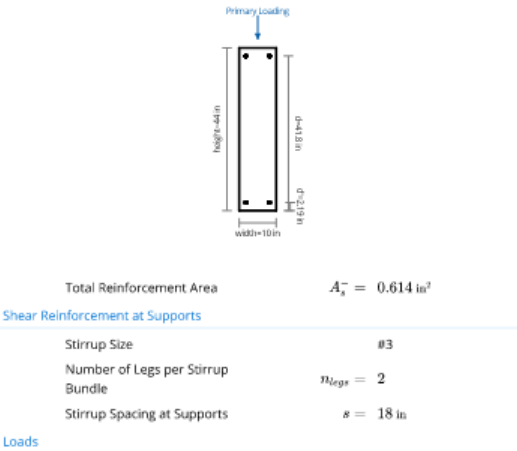
Concrete Beam (ACI 318-14) (version 94)
 Created with ClearCalcs.com

	Client:	Irontown Homes	Date:	Jun 15, 2022
	Author:	Anthony Schmid	Job #:	22411
	Project:	Jones Sledhaus	Subject:	Grade Beam Calculations length of module
	References:	ACI 318-14		

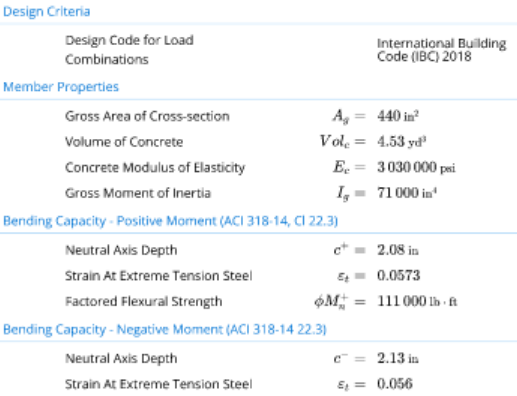
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Reactions:



Longitudinal Reinforcement at Midspan (Positive Moment Regions)



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PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE**January, 23****SHEET****37**

DESIGNED BY **2 2 4 1 1**
A B S

PROJECT NO.
22411

Shear Strength at Supports (ACI 318-14, CI 22.5)

Concrete Shear Strength $V_c = 41\,800\text{ lb}$
Reinforcement Shear Strength $V_s = 30\,700\text{ lb}$

Serviceability Requirements (ACI 318-14, CI 24)

Cracking Moment $M_{cr} = 101\,000\text{ lb}\cdot\text{ft}$
 $I_{cr}^+ = 8300\text{ in}^4$

Cracked Moment of Inertia -
Positive Bending

Cracked Moment of Inertia -
Negative Bending

$$I_{cr}^- = 8320\text{ in}^4$$

Effective Service Moment of
Inertia

$$I_e = 71\,000\text{ in}^4$$

[Comments](#)

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SHEET 38	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Concrete Beam (ACI 318-14) (version 94)

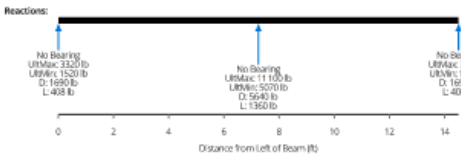
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Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	Grade Beam Calculations width PASS
References:	ACI 318-14		

Summary

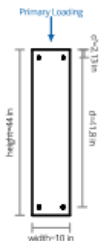
4%	Positive Moment Capacity	$\phi M_n^+ = 111\,000\text{ lb}\cdot\text{ft}$
7%	Negative Moment Capacity	$\phi M_n^- = 109\,000\text{ lb}\cdot\text{ft}$
10%	Shear Capacity	$\phi V_n = 54\,400\text{ lb}$
0%	Critical Live / Short-Term Deflection	$\delta_{ST} = -0.0000243\text{ in}$
	Critical Live / Short-Term Deflection Ratio	$(L/f)_{ST} = 3\,580\,000$
0%	Critical Long-Term Deflection	$\delta_{LT} = -0.000177\text{ in}$
	Critical Long-Term Deflection Ratio	$(L/f)_{LT} = 492\,000$
0%	Critical Simplified DL+(LL or SL) Deflection	$\delta_{DL+(LL\text{ or }SL)} = -0.000099\text{ in}$
	Critical Simplified DL+(LL or SL) Deflection Ratio	$(L/f)_{DL+(LL\text{ or }SL)} = 799\,000$



Key Properties

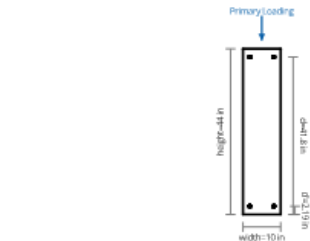
Cross-Section Height	$h = 44\text{ in}$
Cross-Section Width	$b = 10\text{ in}$
Total Length	$L = 14.5\text{ ft}$
Concrete Strength	$f'_c = 2500\text{ psi}$
Concrete Weight Classification	Normalweight
Reinforcement Strength	$f_y = 60\,000\text{ psi}$
Concrete Cover	cover = 1.5 in

Longitudinal Reinforcement at Midspan (Positive Moment Regions)



Total Reinforcement Area $A_s^+ = 0.614\text{ in}^2$

Longitudinal Reinforcement at Supports (Negative Moment Regions)

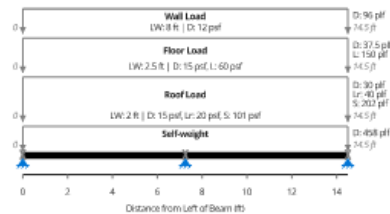


Total Reinforcement Area $A_s^- = 0.614\text{ in}^2$

Shear Reinforcement at Supports

Stirrups Size	#3
Number of Legs per Stirrup Bundle	$n_{legs} = 2$
Stirrups Spacing at Supports	$s = 18\text{ in}$

Loads



Design Criteria

Design Code for Load Combinations	International Building Code (IBC) 2018
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Member Properties

Gross Area of Cross-section	$A_g = 440\text{ in}^2$
Volume of Concrete	$Vol_c = 1.64\text{ yd}^3$
Concrete Modulus of Elasticity	$E_c = 3\,030\,000\text{ psi}$
Gross Moment of Inertia	$I_g = 71\,000\text{ in}^4$

Bending Capacity - Positive Moment (ACI 318-14, CI 22.3)

Neutral Axis Depth	$c^+ = 2.08\text{ in}$
Strain At Extreme Tension Steel	$\epsilon_t = 0.0573$
Factored Flexural Strength	$\phi M_n^+ = 111\,000\text{ lb}\cdot\text{ft}$

Bending Capacity - Negative Moment (ACI 318-14 22.3)

Neutral Axis Depth	$c^- = 2.13\text{ in}$
Strain At Extreme Tension Steel	$\epsilon_t = 0.056$



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PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

39

DESIGNED BY **2 2 4 1 1**
A B S

PROJECT NO.
22411

Shear Strength at Supports (ACI 318-14, CI 22.5)

Concrete Shear Strength $V_c = 41\,800$ lb
Reinforcement Shear Strength $V_s = 30\,700$ lb

Serviceability Requirements (ACI 318-14, CI 24)

Cracking Moment $M_{cr} = 101\,000$ lb · ft
 $I_{cr} = 8300$ in⁴

Cracked Moment of Inertia -
Positive Bending

Cracked Moment of Inertia -
Negative Bending

$$I_{cr} = 8320 \text{ in}^4$$

Effective Service Moment of
Inertia

$$I_e = 71\,000 \text{ in}^4$$

[Comments](#)

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SHEET 40	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

Spot Footing Calculations

Pier Footing (version 26)

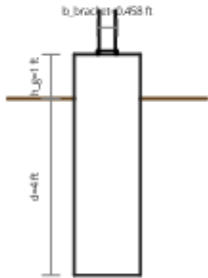
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Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	Pier Footing option deck PASS
References:	IBC 2018		

Summary

0%	Allowable Lateral Soil Stress	$S_a = 133 \text{ psf}$
90%	Allowable Vertical Bearing Pressure	$q_a = 3500 \text{ psf}$
3%	Pier Compression and Bending Capacity	$I_{nt} = 0.0322$
0%	Pier Shear Strength	$\phi V_n = 11\,500 \text{ lb}$
10%	Pier Bearing Capacity	$\phi B_n = 77\,100 \text{ lb}$



Pier Properties

Pier Diameter	$b = 18 \text{ in}$
Embedment Depth	$d = 4 \text{ ft}$
Height of Pier Above Ground	$h_g = 1 \text{ ft}$
Lateral Constraint at Ground Surface	Nonconstrained

Concrete Properties

Concrete Strength	$f'_c = 2500 \text{ psi}$
Volume of Concrete	$V_c = 0.327 \text{ yd}^3$

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_a = 3500 \text{ psf}$
Allowable Lateral Pressure per Unit Depth	$S = 100 \text{ psf/ft}$

Design Criteria

Design Code for Load Combinations	International Building Code (IBC) 2018
-----------------------------------	--

Comments



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PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

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PROJECT NO.
22411

Pier Footing (version 26)

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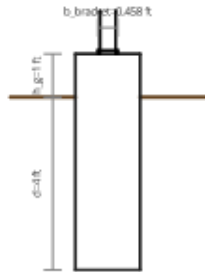


Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	Pier Footing option Dead Load Only PASS
References:	IBC 2018		

Summary

0%	Allowable Lateral Soil Stress	$S_a = 133 \text{ psf}$
36%	Allowable Vertical Bearing Pressure	$q_a = 3500 \text{ psf}$
1%	Pier Compression and Bending Capacity	$\text{Int} = 0.00553$
0%	Pier Shear Strength	$\phi V_n = 11\,500 \text{ lb}$
2%	Pier Bearing Capacity	$\phi B_n = 77\,100 \text{ lb}$

Dead Load Only
qs=1260 psf >700 psf OK



Pier Properties

Pier Diameter	$b = 18 \text{ in}$
Embedment Depth	$d = 4 \text{ ft}$
Height of Pier Above Ground	$h_g = 1 \text{ ft}$
Lateral Constraint at Ground Surface	Nonconstrained

Concrete Properties

Concrete Strength	$f'_c = 2500 \text{ psi}$
Volume of Concrete	$V_c = 0.327 \text{ yd}^3$

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_a = 3500 \text{ psf}$
Allowable Lateral Pressure per Unit Depth	$S = 100 \text{ psf/ft}$

Design Criteria

Design Code for Load Combinations	International Building Code (IBC) 2018
-----------------------------------	--

Comments

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DATE

January, 23

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

PROJECT NO.

22411

DESIGNED BY

A B S

Spread Footing (ACI 318-14) (version 68)

Created with ClearCalcs.com

Client: Irontown Homes

Date: Jun 15, 2022

Author: Anthony Schmid

Job #: 22411

Project: Jones Sledhaus

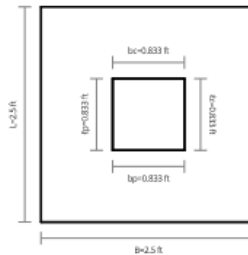
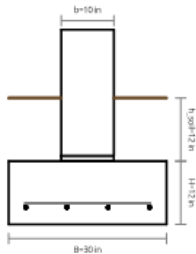
Subject: F5-2.5 Footing PASS

References: ACI 318-14

Summary

74%	Allowable Gross Soil Bearing Stress	$q_a = 3500 \text{ psf}$
51%	Factored Moment Capacity about X-Axis	$\phi M_{nx} = 6250 \text{ lb} \cdot \text{ft}$
51%	Factored Moment Capacity about Y-Axis	$\phi M_{ny} = 6250 \text{ lb} \cdot \text{ft}$
11%	Factored One-Way Shear Strength	$\phi V_n = 12000 \text{ lb}$
20%	Two-Way Shear Capacity	$\phi v_n = 80 \text{ psi}$
9%	Concrete Bearing Capacity	$\phi S_n = 255000 \text{ lb}$
	Development Length for X-Axis Reinforcement	$\ell_{dx} = 12 \text{ in}$
	Design Passes as Plain Concrete (X-Axis)?	$PC_x =$ Insufficient development length but passes as plain concrete
	Development Length for Y-Axis Reinforcement	$\ell_{dy} = 12 \text{ in}$
	Design Passes as Plain Concrete (Y-Axis)?	$PC_y =$ Insufficient development length but passes as plain concrete
	Stability	Status = Footing in Total Compression

⚙️ (8) - #4 X Bars
(4) - #4 Y Bars



Concrete Strength	$f'_c = 2500 \text{ psi}$
Volume of Concrete	$V_c = 0.231 \text{ yd}^3$

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_a = 3500 \text{ psf}$
Lateral Sliding Coefficient of Friction	$\mu = 0.3$

Bottom Reinforcement

Concrete Cover	cover = 3 in
Reinforcement Yield Strength	$f_y = 60000 \text{ psi}$
Ends of Reinforcement - X-Axis	Straight
Ends of Reinforcement - Y-Axis	Straight

Bottom Reinforcement Depth & Spacing

Steel Area - X-Axis Bending	$A_{sx} = 0.8 \text{ in}^2$
Steel Area - Y-Axis Bending	$A_{sy} = 0.8 \text{ in}^2$

Applied Loads

Biaxial Moments Applied	Separately
-------------------------	------------

Design Criteria

Design Code for Load Combinations	International Building Code (IBC) 2018
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Negative Bending Flexural Capacity - X-Axis (ACI 318-14, CI 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{nx}^- = 6250 \text{ lb} \cdot \text{ft}$
----	-----------------------------------	---

Negative Bending Flexural Capacity - Y-Axis (ACI 318-14, CI 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{ny}^- = 6250 \text{ lb} \cdot \text{ft}$
----	-----------------------------------	---

Comments



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PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

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Spread Footing (ACI 318-14) (version 68)

Created with ClearCalcs.com

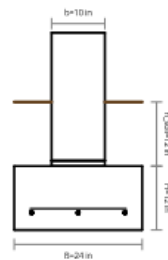


Client:	Irontown Homes	Date:	Jun 15, 2022
Author:	Anthony Schmid	Job #:	22411
Project:	Jones Sledhaus	Subject:	FS-2 Spot Footing PASS
References:	ACI 318-14		

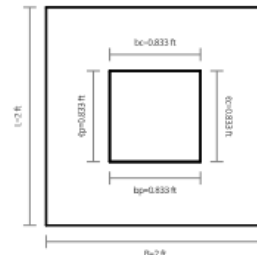
Summary

64%	Allowable Gross Soil Bearing Stress	$q_u = 3500 \text{ psf}$
19%	Factored Moment Capacity about X-Axis	$\phi M_{nx} = 5000 \text{ lb} \cdot \text{ft}$
19%	Factored Moment Capacity about Y-Axis	$\phi M_{ny} = 5000 \text{ lb} \cdot \text{ft}$
0%	Factored One-Way Shear Strength	$\phi V_n = 9600 \text{ lb}$
5%	Two-Way Shear Capacity	$\phi v_n = 80 \text{ psi}$
4%	Concrete Bearing Capacity	$\phi S_n = 255\,000 \text{ lb}$
	Development Length for X-Axis Reinforcement	$\ell_{dx} = 12 \text{ in}$
	Design Passes as Plain Concrete (X-Axis)?	$PC_x =$ Insufficient development length but passes as plain concrete
	Development Length for Y-Axis Reinforcement	$\ell_{dy} = 12 \text{ in}$
	Design Passes as Plain Concrete (Y-Axis)?	$PC_y =$ Insufficient development length but passes as plain concrete
	Stability	Status = Footing in Total Compression

13 - #4 X-Bars
13 - #4 Y-Bars



Footing Properties



Concrete Strength	$f'_c = 2500 \text{ psi}$
Volume of Concrete	$V_c = 0.148 \text{ yd}^3$

Soil Properties

Allowable Soil Gross Bearing Capacity	$q_u = 3500 \text{ psf}$
Lateral Sliding Coefficient of Friction	$\mu = 0.3$

Bottom Reinforcement

Concrete Cover	cover = 3 in
Reinforcement Yield Strength	$f_y = 60\,000 \text{ psi}$
Ends of Reinforcement - X-Axis	Straight
Ends of Reinforcement - Y-Axis	Straight

Bottom Reinforcement Depth & Spacing

Steel Area - X-Axis Bending	$A_{sx} = 0.6 \text{ in}^2$
Steel Area - Y-Axis Bending	$A_{sy} = 0.6 \text{ in}^2$

Applied Loads

Biaxial Moments Applied	Separately
-------------------------	------------

Design Criteria

Design Code for Load Combinations	International Building Code (IBC) 2018
-----------------------------------	--

Negative Bending Flexural Capacity - X-Axis (ACI 318-14, CI 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{nx}^- = 5000 \text{ lb} \cdot \text{ft}$
----	-----------------------------------	---

Negative Bending Flexural Capacity - Y-Axis (ACI 318-14, CI 22.2)

0%	Factored Negative Moment Capacity	$\phi M_{ny}^- = 5000 \text{ lb} \cdot \text{ft}$
----	-----------------------------------	---

Comments

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Dead Load Check on Spot Footings

	DL	FTG Size	q	
Long Side intermediate Footing	6100	2.5	976	>700 psf OK
Short Side Intermediate Footing	5640	2	1410	>700 psf OK
Corner Footing	4160	2	1040	>700 psf OK



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LATERAL LOADING

Seismic Loading

5/16/22, 4:10 PM

ATC Hazards by Location



Hazards by Location

Search Information

Address: Yellow Jacket Ln, Colorado 80467, USA

Coordinates: 40.3271836, -106.8578466

Elevation: 7239 ft

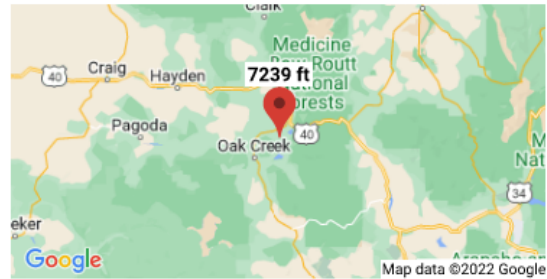
Timestamp: 2022-05-16T22:10:37.821Z

Hazard Type: Seismic

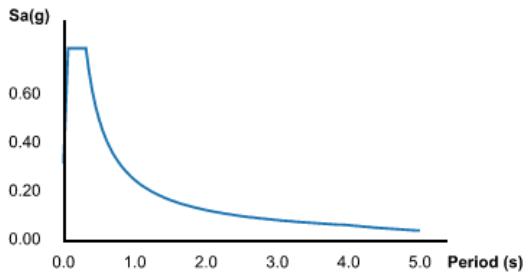
Reference Document: ASCE7-16

Risk Category: II

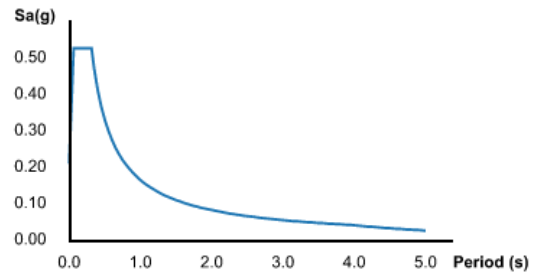
Site Class: D-default



MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.598	MCE _R ground motion (period=0.2s)
S_1	0.104	MCE _R ground motion (period=1.0s)
S_{MS}	0.791	Site-modified spectral acceleration value
S_{M1}	0.248	Site-modified spectral acceleration value
S_{DS}	0.527	Numeric seismic design value at 0.2s SA
S_{D1}	0.165	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1.321	Site amplification factor at 0.2s
F_v	2.393	Site amplification factor at 1.0s

<https://hazards.atcouncil.org/#/seismic?lat=40.3271836&lng=-106.8578466&address=Yellow Jacket Ln%2C Colorado 80467%2C USA>

1/2

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5/16/22, 4:10 PM

ATC Hazards by Location

CR _S	0.906	Coefficient of risk (0.2s)
CR ₁	0.945	Coefficient of risk (1.0s)
PGA	0.42	MCE _G peak ground acceleration
F _{PGA}	1.2	Site amplification factor at PGA
PGA _M	0.504	Site modified peak ground acceleration
T _L	4	Long-period transition period (s)
SsRT	0.598	Probabilistic risk-targeted ground motion (0.2s)
SsUH	0.66	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.104	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.11	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.6	Factored deterministic acceleration value (1.0s)
PGA _d	0.5	Factored deterministic acceleration value (PGA)

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey [Seismic Design Web Services](https://seismic.hazards.atcouncil.org/).

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Lateral Analysis - Seismic

S_s	59.8	Mapped spectral acceleration for short periods, %, per Fig. 1613.3.1(1) or from NSHMP Program
S_1	10.4	Mapped spectral acceleration for 1-second periods, %, per Fig. 1613.3.1(2) or from NSHMP Program
SC	D	Site Class as defined per ASCE 7-16 Tbl. 20.3-1
F_a	1.321	Site coeff as a function of Site Class and S_s per IBC 2018 Tbl. 1613.2.3(1)
F_v	2.393	Site coeff as a function of Site Class and S_1 per IBC 2018 Tbl. 1613.2.3(2)
R	6.5	Response modification factor per ASCE 7-16 Tbl. 12.2-1
I_E	1	Occupancy importance factor per ASCE 7-16 Table 1.5-2
S_{MS}	0.790	IBC 2018 Eq. 16-36
S_{M1}	0.249	IBC 2018 Eq. 16-37
S_{DS}	0.527	IBC 2018 Eq. 16-38
S_{D1}	0.166	IBC 2018 Eq. 16-39
C_T	0.02	Building period coeff per ASCE 7-16 Table 12.8-2
h_n	10	Height of building above base level to highest level of structure, ft., per ASCE 7-16 12.8.2.1
$x=$	0.75	ASCE 7-16 Table 12.8-2
T_a	0.112	Approximate Fundamental period of the building, sec. per ASCE 7-16 12.8.2.1
f	8.891	Frequency of the building, Hz
T_0	0.063	Period corresponding to change in design response spectrum
T_s	0.315	Short period ASCE 7-16 11.3
T_L	4.000	Long-period transition period shown in ASCE 7-16 Fig. 22-14
S_a	0.527	ASCE 7-16 Eq. 11.4-6 For $T_L > T > T_s$
RC	II	Risk Category Per IBC 2018 1604.5, Table 1604.5
SDC	D	Seismic Design Category per IBC 2018 Table 1613.2.5(1) & 1613.2.5(2)
C_s	0.0810	ASCE 7-16 Eq. 12.8-2
C_s	0.2270	ASCE 7-16 Eq. 12.8-3
C_s	0.0232	ASCE 7-16 Eq. 12.8-5
Base Shear Coefficient used in calculations		
C_s	0.081 *W	(Ultimate)
C_s	0.058 *W	(Service) = (Ultimate)/1.4 IBC 2018 Sec. 1605.3.2
k=	1	

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Lateral Analysis - Seismic									
Elevation=				ft					
Pf=				psf					
Seismic Snow=		20		psf					
Dead Loading					Diaphragm				
Roof	Diaphragm		17	PSF	<---Depth = Y <----- Length = X ----->				
	Walls		48	PLF					
	Deck/Other			PSF					
Main Floor	Diaphragm		15	PSF					
	Walls		48	PLF					
	Deck/Other			PSF					
	Diaphragm			PSF					
	Walls			PLF					
	Deck/Other			PSF					
	Diaphragm			PSF					
	Walls			PLF					
	Deck/Other			PSF					
	Diaphragm			PSF					
	Walls			PLF					
	Deck/Other			PSF					
	Diaphragm			PSF					
	Walls			PLF					
	Deck/Other			PSF					
Level	LENGTH	DEPTH	AREA_{ROOF}	AREA_{FLOOR}	AREA_{DECK}	WALL	SNOW	Story Weight (w_x)	
Roof	51 FT	16 FT	816 sq ft			150 FT	20 psf	37.4 k	
Main Floor	51 FT	14 FT		714 sq ft		150 FT	20 psf	17.9 k	
						Total Building Weight=	55 k		
						Base Shear V (Ultimate)=	4.48 k		
						Base Shear V (Service)=	3.20 k		
Base Shear=	Service								
Vertical Distribution of Seismic Forces						Diaphragm Forces			
Level	h_x	w_x*h_x^k	C_{vx}	F_x	V_x	ASCE 7-16 12.10.1.1 F_{px}	ASCE 7-16 12.14-5 E		
Roof	10.0 ft	373.92	0.954	3.05 k	3.05 k	3.94 k	5.12 k		
Main Floor	1.0 ft	17.91	0.046	0.15 k	3.20 k	1.89 k	2.45 k		
		391.83	1.000	3.20 k	<=checks okay				
h _x = the height from the base to level x C _{vx} = vertical distribution factor F _x = lateral seismic force									

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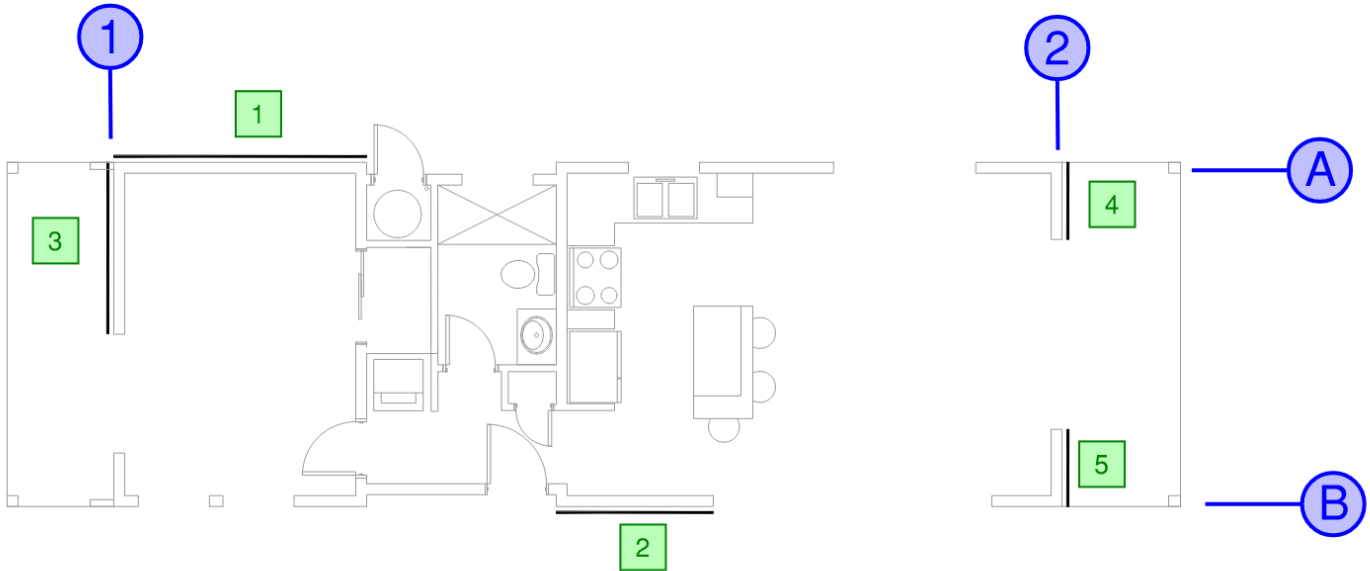
22411**Wind Loading**

Lateral Analysis - Wind					
Method 2 - Simplified Procedure (ASCE 7, 28.6)					
Ht <= 60ft	Okay	Roof Slope < 45deg?	Okay		
Regular Shape?	Okay	See 26.2			
Non-Flexible?	Okay	f = 8.9 Hz > 1 Hz			
V _{wind} =	115 mph	h _{roof} =	10 ft	Mean roof height, if slope is <= 1.2/12, use eave height	
P _{min} (A & C) =	16 psf	λ _{roof} =	1.21		
P _{min} (B & D) =	8 psf	l _{min} =	14 ft	Least Horizontal Dimension	
Exposure	C	a =	3.0 ft		
Slope (x/12)	3	K _{zt} =	1.0		
Lateral Wind Analysis designed in accordance with IBC 2018 1609 & ASCE 7-16 Chapter 28, Loads reduced by 0.6 per Eq. 16-15					
ASCE 7 Figure 28.6-1 Values		Design Values per ASCE 7 Eq. 28.6-1			
A:	26.3 psf	A:	31.8 psf		
B:	-8.7 psf	B:	0.0 psf		
C:	17.5 psf	C:	21.2 psf		
D:	-5.0 psf	D:	0.0 psf		
Notice: Front to Back (F-B) is Y direction and Right to Left (R-L) is X direction.					
Wind Loading - X Direction					
1. Force acting R - L		Roof		2. Force acting R - L	
Tributary Area (ft²)		Loading		Main Floor	
Tributary Area (ft²)		Loading		Tributary Area (ft²)	
Area A=	43	P=	1.4 kip	Area A=	43
Area B=	0	P=	0.0 kip	Area B=	
Area C=	61	P=	1.3 kip	Area C=	61
Area D=	0	P=	0.0 kip	Area D=	
Area Total=	104	P (total)=	2.7 kip	Area Total=	104
P =	2.7 kip	<= Governs		P =	2.7 kip
P _{min} =	1.7 kip			P _{min} =	1.7 kip
P _{design} (0.6W) =	1.6 kip	(Eq. 16-15)		P _{gov} =	2.7 kip
				P _{design} (0.6W) =	3.2 kip
				(Eq. 16-15)	
Wind Loading - Y Direction					
1. Force acting F-B		Roof		2. Force acting F - B	
Tributary Area (ft²)		Loading		Main Floor	
Tributary Area (ft²)		Loading		Tributary Area (ft²)	
Area A=	24	P=	0.8 kip	Area A=	24
Area B=	21	P=	0.0 kip	Area B=	
Area C=	136	P=	2.9 kip	Area C=	136
Area D=	120	P=	0.0 kip	Area D=	
Area Total=	301	P (total)=	3.6 kip	Area Total=	160
P =	3.6 kip			P =	3.6 kip
P _{min} =	3.7 kip	<= Governs		P _{min} =	2.6 kip
P _{design} (0.6W) =	2.2 kip	(Eq. 16-15)		P _{gov} =	3.6 kip
				P _{design} (0.6W) =	4.4 kip
				(Eq. 16-15)	

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Shearwall Key Plans

Roof Diaphragm (Main Floor Walls)¹



¹ Key plans provided are intended to show location and orientation of shearwalls used in the analysis but do not show exact locations of holdowns. Holdowns are located at the ends of each wall and are shown on the foundation plan in the contract documents. Uplift values and holdown designations are provided in the lateral calculations on sheet 24.

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22411**Shearwall Design**

Story and Line Loading

Lateral Analysis - Line Distribution

Line Identification			Wind			Seismic			
Floor Level	Dir.	Line #	V _{TOTAL} (kips)	% _{TRIBUTARY} Projected Area	V _{LINE} (kips)	R	V _{TOTAL} (kips)	% _{TRIBUTARY} Area	V _{LINE} (kips)
Roof	X	A	1.60	50.00	0.80	6.5	3.05	50.00	1.53
Roof	X	B	1.60	50.00	0.80	6.5	3.05	50.00	1.53
Roof	Y	1	2.21	50.00	1.11	6.5	3.05	50.00	1.53
Roof	Y	2	2.21	50.00	1.11	6.5	3.05	50.00	1.53

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Wall Shear Requirements

$p_{max} = 1.3$				Floor Depth Under 14"? Yes									
	Wall	L _{wall}	H _{wall}	Wind Load _D	Seismic Load _D								
Line Identification	#	(ft)	(ft)	(plf)	(plf)	Holdown _{type}	Location	Wall # _{above}	Wood Used	Nail Used	SW Thick.	Shearwall Design	Holdown Required
Roof - X Dir. - Line A	1	10.50 ft	8.00	150.00	150	Floor-to-Floor			HF	8d	7/16in	SW1	Use CS16x28 plus fir depth w/30-8d
Roof - X Dir. - Line B	2	6.50 ft	8.00	150.00	150	Floor-to-Floor			HF	8d	7/16in	SW2	Use CS16x28 plus fir depth w/30-8d
Roof - Y Dir. - Line 1	3	7.00 ft	8.00	130.00	130	Floor-to-Floor			HF	8d	7/16in	SW2	Use CS16x28 plus fir depth w/30-8d
Roof - Y Dir. - Line 2	4	3.25 ft	8.50	75.00	75	Floor-to-Floor			HF	8d	7/16in	SW3	Use MST37 w/20-16d
Roof - Y Dir. - Line 2	5	3.25 ft	8.50	75.00	75	Floor-to-Floor			HF	8d	7/16in	SW3	Use MST37 w/20-16d

		Unit Shear (plf)				7/16in Framing at 16in o.c. or Framing at 24in o.c. (Sheathing long axis horizontal)				Holdown Force				Redundancy	
		Unmodified		Modified seismic shear for Height:Width Per IBC		Use to Compare with Shearwall Table		Shearwall		Tension forces are not modified for height:width		Holddown Required		Wall Shear Load	
#	L _{wall} (ft)	V _{wind} plf	V _{seis} plf	H:W	factor	V _{wind} (V _{wind} / 1.4)	V _{seis} (V _{seis} ρ H:w)	Type		Tension _{max} (lbs)				Wall Shear Load	% Story Shear
										Wind	Seismic				ρ
1	10.50	76	145	NO	1.00	54	189	SW1		136	514	Use CS16x28 plus flr depth w/30-8d		1.53 kip	50
2	6.50	123	235	NO	1.00	88	305	SW2		690	1477	Use CS16x28 plus flr depth w/30-8d		1.53 kip	50
3	7.00	158	218	NO	1.00	113	284	SW2		991	1370	Use CS16x28 plus flr depth w/30-8d		1.53 kip	50
4	3.25	170	235	YES	1.31	122	399	SW3		1374	1896	Use MST37 w/20-16d		0.76 kip	25
5	3.25	170	235	YES	1.31	122	399	SW3		1374	1896	Use MST37 w/20-16d		0.76 kip	25

Multiple CS14 Straps used to attach to Beam

- (1) CS14 1300 LBS
- (2) CS14 2600 LBS
- (3) CS14 3900 LBS



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Seismic Check on Beams

Beam check for Seismic and Wind Loads at Hold Down Straps

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

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 27 JUN 2022, 1:33PM

Wood Beam

Lic. #: KW-06016079

File: Jones Sledhaus.ecb
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MCNEIL GROUP INC.

DESCRIPTION: FB1 Shear wall check

CODE REFERENCES

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

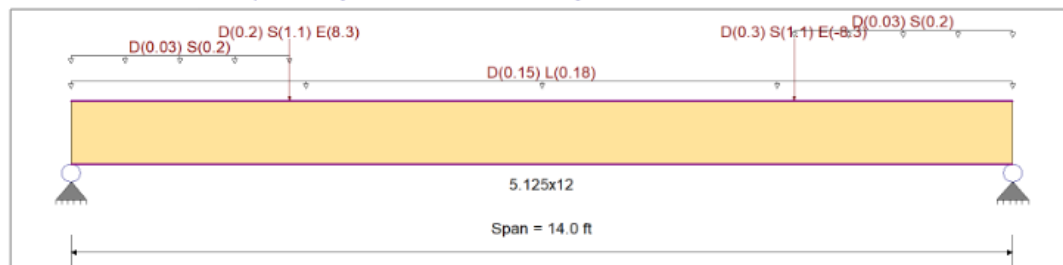
Material Properties

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

Wood Species : DF/DF
Wood Grade : 24F-E4

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

Fb +	2,400.0 psi	E : Modulus of Elasticity	
Fb -	1,450.0 psi	Ebend-xx	1,800.0 ksi
Fc - Prll	1,700.0 psi	Eminbend-xx	950.0 ksi
Fc - Perp	650.0 psi	Ebend-yy	1,700.0 ksi
Fv	265.0 psi	Eminbend-yy	900.0 ksi
Ft	1,100.0 psi	Density	31.210 pcf



Applied Loads

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

Uniform Load : D = 0.150, L = 0.180, Tributary Width = 1.0 ft
Uniform Load : D = 0.030, S = 0.20 k/ft, Extent = 0.0 --> 3.250 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.030, S = 0.20 k/ft, Extent = 10.750 --> 14.0 ft, Tributary Width = 1.0 ft
Point Load : D = 0.20, S = 1.10, E = 8.30 k @ 3.250 ft
Point Load : D = 0.30, S = 1.10, E = -8.30 k @ 10.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.429	1	Maximum Shear Stress Ratio	=	0.317	1
Section used for this span	=	5.125x12		Section used for this span	=	5.125x12	
fb: Actual	=	1,649.16 psi		fv: Actual	=	134.42 psi	
Fb: Allowable	=	3,840.00 psi		Fv: Allowable	=	424.00 psi	
Load Combination	=	+D+0.750L+0.750S+0.5250E		Load Combination	=	+D+0.750L+0.750S+0.5250E	
Location of maximum on span	=	3.270 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		0.139 in	Ratio = 1208 >= 360				
Max Upward Transient Deflection		-0.076 in	Ratio = 2218 >= 360				
Max Downward Total Deflection		0.329 in	Ratio = 510 >= 180				
Max Upward Total Deflection		-0.007 in	Ratio = 24772 >= 180				

Maximum Forces & Stresses for Load Combinations

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	Fb	V	fv	Fv
D Only	Length = 14.0 ft	1	0.210	0.128	0.90	1.000	1.00	1.00	1.00	1.00	1.00	4.65	453.44	2160.00	0.00	0.00	0.00
+D+L	Length = 14.0 ft	1	0.368	0.215	1.00	1.000	1.00	1.00	1.00	1.00	1.00	9.06	883.58	2400.00	2.33	56.95	265.00
+D+S	Length = 14.0 ft	1	0.328	0.225	1.15	1.000	1.00	1.00	1.00	1.00	1.00	9.28	905.27	2760.00	2.81	68.42	304.75
+D+0.750L	Length = 14.0 ft	1	0.259	0.152	1.25	1.000	1.00	1.00	1.00	1.00	1.00	7.95	776.03	3000.00	2.06	50.33	331.25
+D+0.750L+0.750S	Length = 14.0 ft	1	0.404	0.259	1.15	1.000	1.00	1.00	1.00	1.00	1.00	11.43	1,114.90	2760.00	3.23	78.79	304.75

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SHEET 54	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

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Project Title:
 Engineer:
 Project ID:
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Wood Beam

Lic. #: KW-06016079

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 MCNEIL GROUP INC.

DESCRIPTION: FB1 Shear wall check

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	f _b	F _b	V	f _v	F _v
+0.60D						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1		0.071	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.79	272.06	3840.00	0.75	18.29	424.00
+D+0.70E						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1		0.345	0.248	1.60	1.000	1.00	1.00	1.00	1.00	1.00	13.58	1,324.62	3840.00	4.31	105.08	424.00
+D+0.750L+0.750S+0.5250E						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1		0.429	0.317	1.60	1.000	1.00	1.00	1.00	1.00	1.00	16.90	1,649.16	3840.00	5.51	134.42	424.00
+0.60D+0.70E						1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1		0.309	0.220	1.60	1.000	1.00	1.00	1.00	1.00	1.00	12.17	1,187.42	3840.00	3.83	93.42	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	0.3292	5.978		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	5.963	-4.446
Overall MINimum	4.446	1.750
D Only	1.371	1.424
+D+L	2.631	2.684
+D+S	3.121	3.174
+D+0.750L	2.316	2.369
+D+0.750L+0.750S	3.628	3.682
+0.60D	0.822	0.855
+D+0.70E	4.483	-1.688
+D+0.750L+0.750S+0.5250E	5.963	1.347
+0.60D+0.70E	3.935	-2.258
L Only	1.260	1.260
S Only	1.750	1.750
E Only	4.446	-4.446



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CIVIL, STRUCTURAL ENGINEERING & LAND SURVEYING
PAVEMENT & ROOF CONSULTING

PROJECT

KEB Homes, Inc.
Jones Sledhaus
28935 Yellow Jacket Dr., Oak Creek, Colorado

DATE

January, 23

SHEET

55

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PROJECT NO.

22411

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MCNEIL GROUP INC.

Wood Beam

Lic. #: KW-06016079

DESCRIPTION: FB 3 Seismic Check

CODE REFERENCES

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

Material Properties

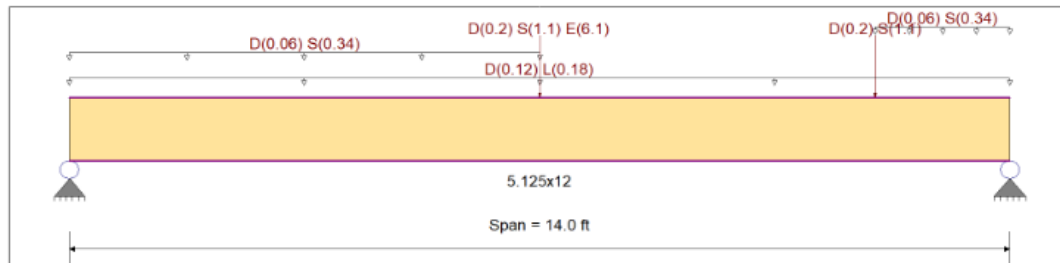
Analysis Method : Allowable Stress Design
Load Combination ASCE 7-16

Fb + 2,400.0 psi
Fb - 1,450.0 psi
Fc - Prll 1,700.0 psi
Fc - Perp 650.0 psi
Fv 265.0 psi
Ft 1,100.0 psi

E : Modulus of Elasticity

Ebend-xx 1,800.0 ksi
Eminbend-xx 950.0 ksi
Ebend-yy 1,700.0 ksi
Eminbend-yy 900.0 ksi
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.

Uniform Load : D = 0.120, L = 0.180, Tributary Width = 1.0 ft
Uniform Load : D = 0.060, S = 0.340 k/ft, Extent = 0.0 --> 7.0 ft, Tributary Width = 1.0 ft
Uniform Load : D = 0.060, S = 0.340 k/ft, Extent = 12.0 --> 14.0 ft, Tributary Width = 1.0 ft
Point Load : D = 0.20, S = 1.10, E = 6.10 k @ 7.0 ft
Point Load : D = 0.20, S = 1.10 k @ 12.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.667 : 1	Maximum Shear Stress Ratio	=	0.308 : 1
Section used for this span	=	5.125x12	Section used for this span	=	5.125x12
fb: Actual	=	2,560.24 psi	fv: Actual	=	130.74 psi
Fb: Allowable	=	3,840.00 psi	Fv: Allowable	=	424.00 psi
Load Combination	=	+D+0.750L+0.750S+0.5250E	Load Combination	=	+D+0.750L+0.750S+0.5250E
Location of maximum on span	=	7.000 ft	Location of maximum on span	=	13.029 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection		0.456 in	Ratio =		368 >= 360
Max Upward Transient Deflection		0.000 in	Ratio =		0 < 360
Max Downward Total Deflection		0.628 in	Ratio =		267 >= 180
Max Upward Total Deflection		0.000 in	Ratio =		0 < 180

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment	Length	Span #	M	V	C _d	C _{F/V}	C _i	C _r	C _m	C _t	C _L	M	f _b	F _b	V	f _v	F _v
D Only														0.00		0.00	0.00
Length = 14.0 ft	1	0.209	0.118	0.90	1.000	1.00	1.00	1.00	1.00	1.00	1.00	4.64	452.20	2160.00	1.15	28.12	238.50
+D+L					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.368	0.206	1.00	1.000	1.00	1.00	1.00	1.00	1.00	1.00	9.04	882.44	2400.00	2.24	54.59	265.00
+D+S					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.498	0.284	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	14.09	1,374.63	2760.00	3.54	86.40	304.75
+D+0.750L					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.258	0.145	1.25	1.000	1.00	1.00	1.00	1.00	1.00	1.00	7.94	774.88	3000.00	1.97	47.98	331.25
+D+0.750L+0.750S					1.000	1.00	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 14.0 ft	1	0.531	0.301	1.15	1.000	1.00	1.00	1.00	1.00	1.00	1.00	15.03	1,466.71	2760.00	3.76	91.68	304.75

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SHEET 56	DATE January, 23	PROJECT KEB Homes, Inc. Jones Sledhaus 28935 Yellow Jacket Dr., Oak Creek, Colorado		
PROJECT NO. 22411	DESIGNED BY A B S			

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 Title Block Line 6

Project Title:
 Engineer:
 Project ID:
 Project Descr:

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Wood Beam	File: Jones Sledhaus.ec6
Lic. #: KW-06016079	Software copyright ENERCALC, INC. 1983-2020; Build:12.20.8.24
MCNEIL GROUP INC.	

DESCRIPTION: **FB 3 Seismic Check**

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	f _b	F _b	V	f _v	F _v
+0.60D Length = 14.0 ft	1	0.071	0.040	1.60	1.000	1.00	1.00	1.00	1.00	1.00	2.78	271.32	3840.00	0.69	16.87	424.00
+D+0.70E Length = 14.0 ft	1	0.497	0.189	1.60	1.000	1.00	1.00	1.00	1.00	1.00	19.58	1,910.24	3840.00	3.29	80.20	424.00
+D+0.750L+0.750S+0.5250E Length = 14.0 ft	1	0.667	0.308	1.60	1.000	1.00	1.00	1.00	1.00	1.00	26.24	2,560.24	3840.00	5.36	130.74	424.00
+0.60D+0.70E Length = 14.0 ft	1	0.450	0.163	1.60	1.000	1.00	1.00	1.00	1.00	1.00	17.73	1,729.37	3840.00	2.83	68.95	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "Δ" Defl	Location in Span	Load Combination	Max. "Δ" Defl	Location in Span
+D+0.750L+0.750S+0.5250E	1	0.6280	7.000		0.0000	0.000

Vertical Reactions

Load Combination	Support 1	Support 2
Overall MAXimum	5.744	5.914
Overall MINimum	3.050	3.050
D Only	1.292	1.328
+D+L	2.552	2.588
+D+S	3.833	4.047
+D+0.750L	2.237	2.273
+D+0.750L+0.750S	4.143	4.312
+0.60D	0.775	0.797
+D+0.70E	3.427	3.463
+D+0.750L+0.750S+0.5250E	5.744	5.914
+0.60D+0.70E	2.910	2.932
L Only	1.260	1.260
S Only	2.541	2.719
E Only	3.050	3.050