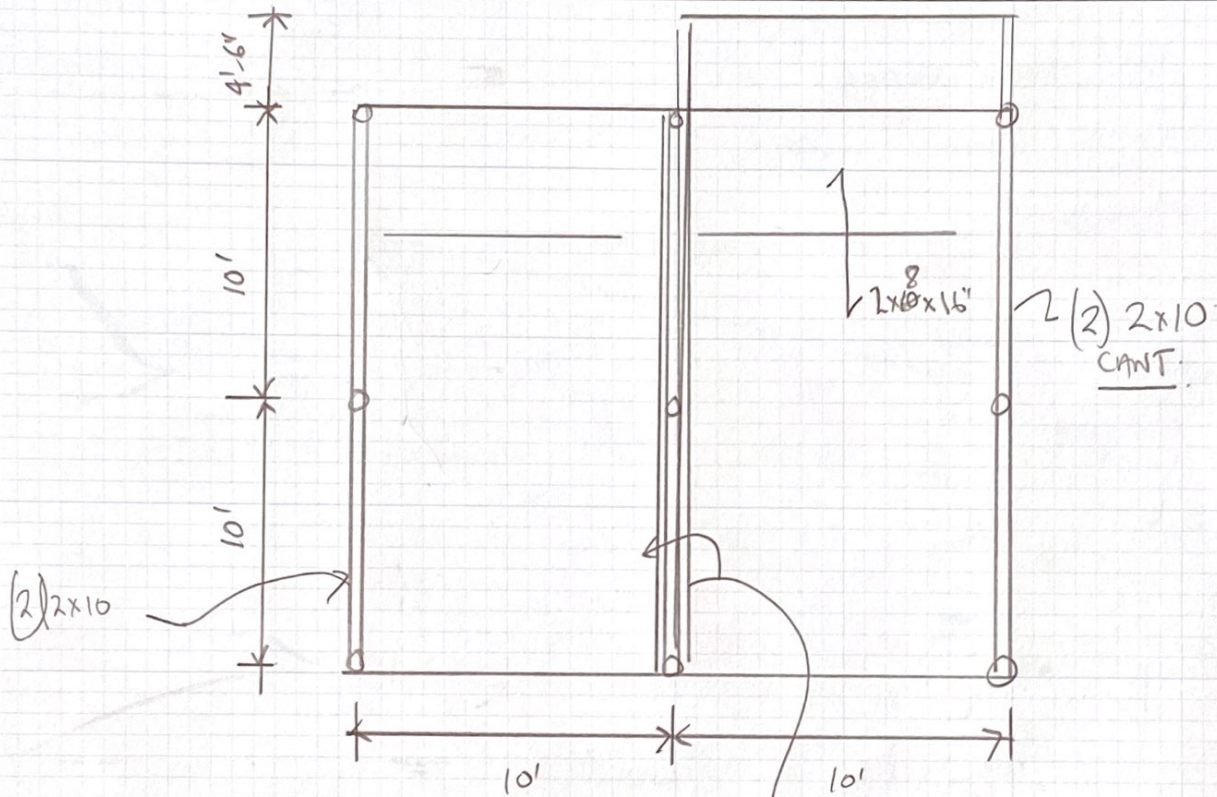


RESURGET ENGINEERING

Project	WALDORF	Project Number
Subject	Temporary classrooms	Sheet Number
Reference		Made By mps.
Date	8/16/20	Checked By

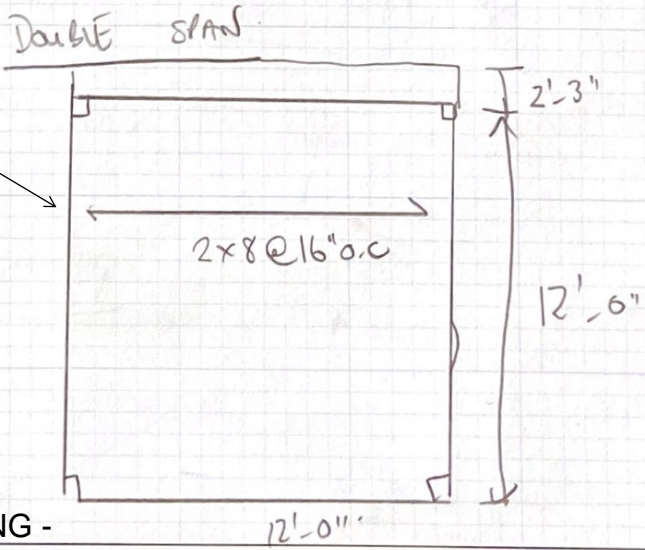


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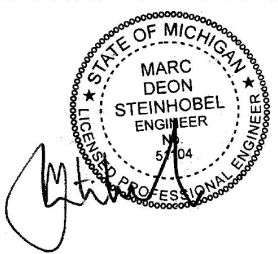
FLOOR FRAMING
 DOUBLE BAY
 ROOM

(2) 2x10 EACH
 SIDE

(1) 1 3/4"x14"
 Treated PSL beam



FLOOR FRAMING -
 SINGLE BAY ROOM

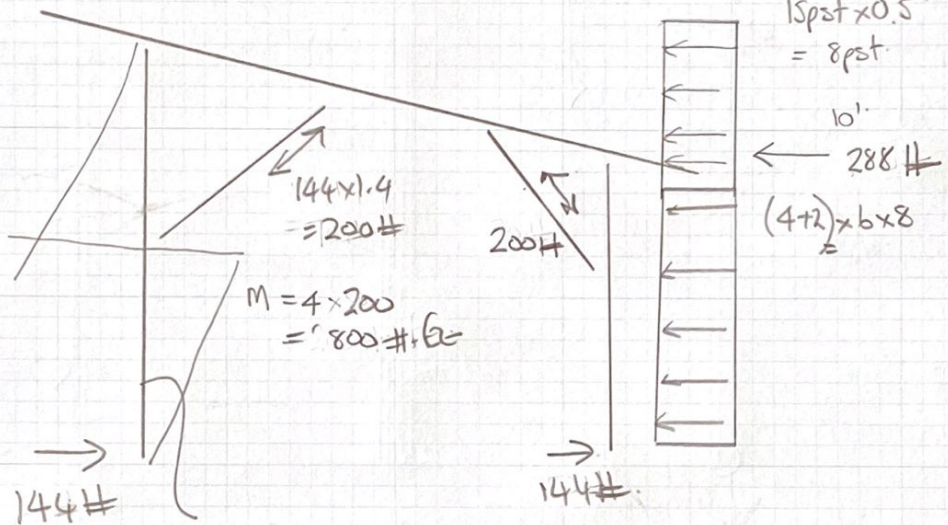


RESURGET ENGINEERING

Project	Project Number
Subject	Sheet Number
Reference	Made By
Date	Checked By

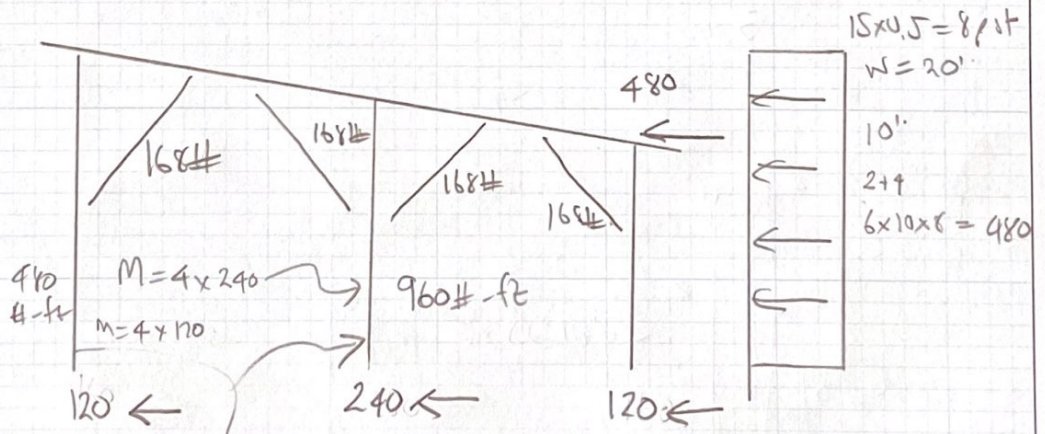
SINGLE BAY

CATERAL WIND LOAD



POST DESIGN

DOUBLE BAY



POST DESIGN



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Aug. 16, 2020 12:36

Floor Joists.wwb

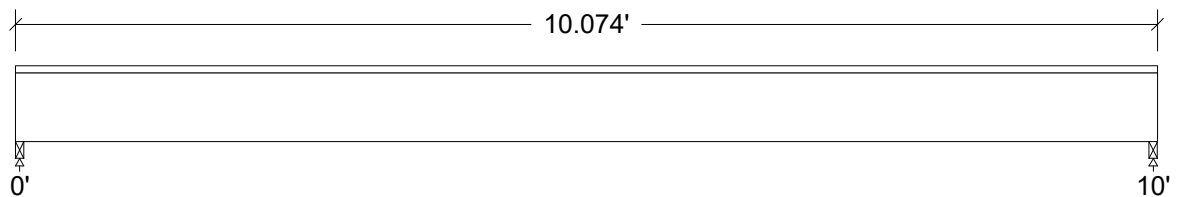
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area				15.00 (16.0")		psf
Live	Live	Full Area				40.00 (16.0")		psf
Self-weight	Dead	Full UDL				2.2		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	112		112
Live	269		269
Factored:			
Total	380		380
Bearing:			
Capacity			
Joist	380		380
Support	699		699
Des ratio			
Joist	1.00		1.00
Support	0.54		0.54
Load comb	#2		#2
Length	0.89		0.89
Min req'd	0.89		0.89
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.25		1.25
Fcp sup	625		625

floor joists

Lumber-soft, S-P-F, No.1/No.2, 2x8 (1-1/2"x7-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Floor joist spaced at 16.0" c/c; Total length: 10.07'; Clear span: 9.926'; Volume = 0.8 cu.ft.

Wet service; Lateral support: top = continuous, bottom = at supports; Repetitive factor: applied where permitted (refer to online help);

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 45$	$F_v' = 131$	psi	$f_v/F_v' = 0.35$
Bending (+)	$f_b = 862$	$F_b' = 1207$	psi	$f_b/F_b' = 0.71$
Live Defl'n	$0.20 = L/600$	$0.33 = L/360$	in	0.60
Total Defl'n	$0.37 = L/327$	$0.50 = L/240$	in	0.73

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	135	1.00	0.97	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	875	1.00	1.00	1.00	1.000	1.200	-	1.15	1.00	1.00	-	2
Fcp'	425	-	0.67	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.4 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2
Emin'	0.51 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L

Bending (+): LC #2 = D+L

Deflection: LC #2 = D+L (live)

LC #2 = D+L (total)

Bearing : Support 1 - LC #2 = D+L

Support 2 - LC #2 = D+L

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 378, V design = 329 lbs; M(+) = 944 lbs-ft

EI = 66.69e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.



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floor beam edge.wwb

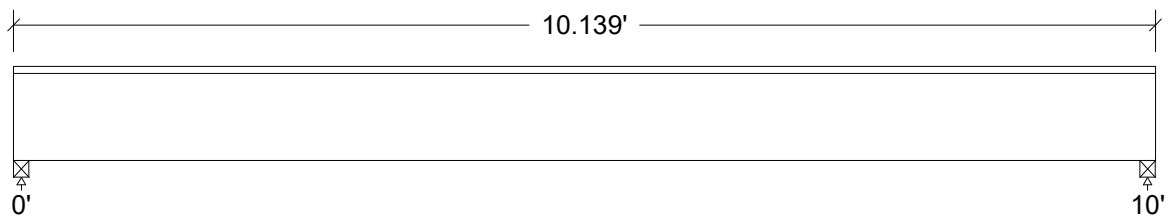
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area				15.00	(5.00')	psf
Live	Live	Full Area				40.00	(5.00')	psf
Self-weight	Dead	Full UDL				5.6		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	408		408
Live	1014		1014
Factored:			
Total	1422		1422
Bearing:			
Capacity			
Beam	1422		1422
Support	2353		2353
Des ratio			
Beam	1.00		1.00
Support	0.60		0.60
Load comb	#2		#2
Length	1.66		1.66
Min req'd	1.66		1.66
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.13		1.13
Fcp sup	625		625

1.02 CLOSE TO 1.0
OK

floor beam - edge

Lumber n-ply, S-P-F, No.1/No.2, 2x10, 2-ply (3"x9-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 10.14'; Clear span: 9.861'; Volume = 2.0 cu.ft.

Wet service; Lateral support: top = continuous, bottom = at supports;

This section FAILS the design check

WARNING: This section violates the following design criteria: Bending

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 63$	$F_v' = 131$	psi	$f_v/F_v' = 0.48$
Bending (+)	$f_b = 984$	$F_b' = 962$	psi	$f_b/F_b' = 1.02$
Live Defl'n	$0.18 = L/664$	$0.33 = L/360$	in	0.54
Total Defl'n	$0.33 = L/368$	$0.50 = L/240$	in	0.65

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	135	1.00	0.97	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	875	1.00	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	-	2
Fcp'	425	-	0.67	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.4 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2
Emin'	0.51 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L

Bending (+): LC #2 = D+L

Deflection: LC #2 = D+L (live)

LC #2 = D+L (total)

Bearing : Support 1 - LC #2 = D+L

Support 2 - LC #2 = D+L

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 1403, V design = 1167 lbs; M(+) = 3508 lbs-ft

EI = 138.50e06 lb-in²/ply

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
4. BUILT-UP BEAMS: it is assumed that each ply is a single continuous member (that is, no butt joints are present) and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.
5. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.



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floor beam cantilevered.wwb

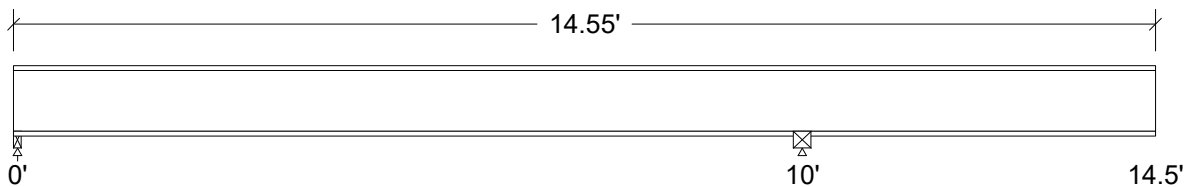
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area	No			10.00	(5.00')	psf
Live	Live	Full Area	No			40.00	(5.00')	psf
Self-weight	Dead	Full UDL	No			5.6		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:					
Dead	224		585		
Live	808		2103		
Factored:					
Total	1032		2687		
Bearing:					
Capacity					
Beam	1032		2687		
Support	1707		3916		
Des ratio					
Beam	1.00		1.00		
Support	0.60		0.69		
Load comb	#2		#2		
Length	1.21		2.77		
Min req'd	1.21		2.77		
Cb	1.00		1.14		
Cb min	1.00		1.14		
Cb support	1.13		1.13		
Fcp sup	625		625		

floor beam - cantilevered

Lumber n-ply, S-P-F, No.1/No.2, 2x10, 2-ply (3"x9-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 14.55'; Clear span: 9.834', 4.385'; Volume = 2.8 cu.ft.

Wet service; Lateral support: top = continuous, bottom = continuous

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 71$	$F_v' = 131$	psi	$f_v/F_v' = 0.54$
Bending (+)	$f_b = 570$	$F_b' = 962$	psi	$f_b/F_b' = 0.59$
Bending (-)	$f_b = 726$	$F_b' = 962$	psi	$f_b/F_b' = 0.75$
Deflection:				
Interior Live	$0.09 = < L/999$	$0.33 = L/360$	in	0.28
Total	$0.15 = L/818$	$0.50 = L/240$	in	0.29
Cantil. Live	$0.02 = < L/999$	$0.30 = L/180$	in	0.07
Total	$0.03 = < L/999$	$0.45 = L/120$	in	0.07

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	135	1.00	0.97	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	875	1.00	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	-	2
Fb'-	875	1.00	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	-	2
Fcp'	425	-	0.67	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.4 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2
Emin'	0.51 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L

Bending (+): LC #2 = D+L

Bending (-): LC #2 = D+L

Deflection: LC #2 = D+L (live)

LC #2 = D+L (total)

Bearing : Support 1 - LC #2 = D+L

Support 2 - LC #2 = D+L

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 1537, V design = 1312 lbs; M(+) = 2032 lbs-ft; M(-) = 2588 lbs-ft

EI = 138.50e06 lb-in²/ply

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Continuous or Cantilevered Beams: NDS Clause 4.2.5.5 requires that normal grading provisions be extended to the middle 2/3 of 2 span beams and to the full length of cantilevers and other spans.
4. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
5. BUILT-UP BEAMS: it is assumed that each ply is a single continuous member (that is, no butt joints are present) and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.
6. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.



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Aug. 16, 2020 12:55

Roof beam edge.wwb

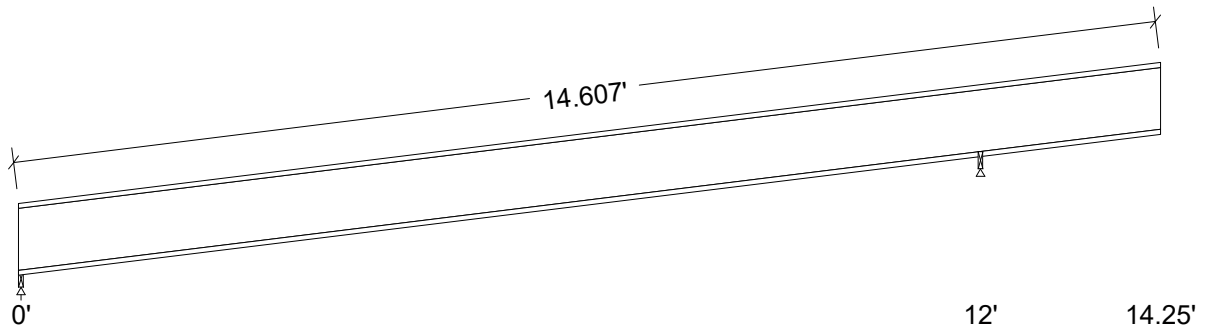
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area	No			10.00	(5.00')	psf
Snow	Snow	Full Area	Yes			22.00	(5.00')	psf
Self-weight	Dead	Full UDL	No			5.6		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:				
Dead	328		477	
Snow	652		930	
Factored:				
Total	980		1407	
Bearing:				
F' _{theta}	433		433	
Capacity				
Beam	980		1407	
Support	1592		1494	
Des ratio				
Beam	1.00		1.00	
Support	0.62		0.94	
Load comb	#3		#2	
Length	0.75		0.71	
Min req'd	0.75		0.71	
Cb	1.00		1.53	
Cb min	1.00		1.53	
Cb support	1.13		1.13	
F _{cp sup}	625		625	

Roof Beam - edge of double bay

Lumber n-ply, S-P-F, No.1/No.2, 2x10, 2-ply (3"x9-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 14.61'; Clear span: 12.104', 2.251'; Volume = 2.8 cu.ft.; Pitch: 2/12

Lateral support: top = continuous, bottom = continuous

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 48$	$F_v' = 155$	psi	$f_v/F_v' = 0.31$
Bending(+)	$f_b = 801$	$F_b' = 1107$	psi	$f_b/F_b' = 0.72$
Bending(-)	$f_b = 118$	$F_b' = 1107$	psi	$f_b/F_b' = 0.11$
Deflection:				
Interior Live	$0.18 = L/800$	$0.41 = L/360$	in	0.45
Total	$0.36 = L/404$	$0.73 = L/200$	in	0.49
Cantil. Live	$-0.11 = L/260$	$0.15 = L/180$	in	0.69
Total	$-0.20 = L/134$	$0.27 = L/100$	in	0.74

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	135	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	875	1.15	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	-	3
Fb'-	875	1.15	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	-	2
Fcp'	425	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.4 million	1.00	1.00	1.00	-	-	-	-	1.00	1.00	-	3
Emin'	0.51 million	1.00	1.00	1.00	-	-	-	-	1.00	1.00	-	3

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S

Bending(+): LC #3 = D+S (pattern: Ss)

Bending(-): LC #2 = D+S

Deflection: LC #3 = (live)

LC #3 = (total)

Bearing : Support 1 - LC #3 = D+S (pattern: Ss)

Support 2 - LC #2 = D+S

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load Patterns: s=S/2, X=L+S or L+Lr, _=no pattern load in this span

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 1019, V design = 890 lbs; M(+) = 2855 lbs-ft; M(-) = 421 lbs-ft

EI = 138.50e06 lb-in²/ply

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Bearing: Allowable bearing at an angle F'_{theta} calculated for each support as per NDS 3.10.3

Design Notes:

- WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
- Please verify that the default deflection limits are appropriate for your application.
- Continuous or Cantilevered Beams: NDS Clause 4.2.5.5 requires that normal grading provisions be extended to the middle 2/3 of 2 span beams and to the full length of cantilevers and other spans.
- Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
- BUILT-UP BEAMS: it is assumed that each ply is a single continuous member (that is, no butt joints are present) and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.
- SLOPED BEAMS: level bearing is required for all sloped beams.
- FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.



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Roof beam edge - center.wwb

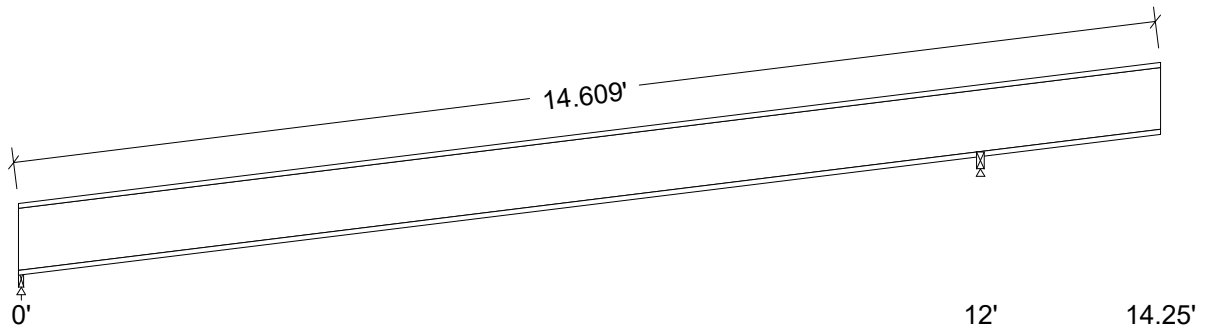
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area	No			10.00	(10.00')	psf
Snow	Snow	Full Area	Yes			22.00	(10.00')	psf
Self-weight	Dead	Full UDL	No			9.3		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:				
Dead	646		937	
Snow	1305		1860	
Factored:				
Total	1950		2797	
Bearing:				
F'theta	766		766	
Capacity				
Beam	2158		4100	
Support	1950		2797	
Des ratio				
Beam	0.90		0.68	
Support	1.00		1.00	
Load comb	#3		#2	
Length	0.81		1.16	
Min req'd	0.81**		1.16**	
Cb	1.00		1.32	
Cb min	1.00		1.32	
Cb support	1.11		1.11	
Fcp sup	625		625	

**Minimum bearing length governed by the required width of the supporting member.

Roof Beam - Center of double bay

LVL n-ply, 2.0E, 2500Fb, 1-3/4"x9-1/4", 2-ply (3-1/2"x9-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 14.61'; Clear span: 12.083', 2.232'; Volume = 3.3 cu.ft.; Pitch: 2/12

Lateral support: top = continuous, bottom = continuous

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 82$	$F_v' = 328$	psi	$f_v/F_v' = 0.25$
Bending(+)	$f_b = 1365$	$F_b' = 2978$	psi	$f_b/F_b' = 0.46$
Bending(-)	$f_b = 201$	$F_b' = 2978$	psi	$f_b/F_b' = 0.07$
Deflection:				
Interior Live	$0.22 = L/667$	$0.41 = L/360$	in	0.54
Total	$0.43 = L/339$	$0.73 = L/200$	in	0.59
Cantil. Live	$-0.13 = L/217$	$0.15 = L/180$	in	0.83
Total	$-0.24 = L/113$	$0.27 = L/100$	in	0.88

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	285	1.15	-	1.00	-	-	-	-	1.00	-	1.00	2
Fb'+	2500	1.15	-	1.00	1.000	1.036	-	1.00	1.00	-	-	3
Fb'-	2500	1.15	-	1.00	1.000	1.036	-	1.00	1.00	-	-	2
Fcp'	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	2.0 million	-	-	1.00	-	-	-	-	1.00	-	-	3
E _{miny} '	1.04 million	-	-	1.00	-	-	-	-	1.00	-	-	3

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S

Bending(+): LC #3 = D+S (pattern: Ss)

Bending(-): LC #2 = D+S

Deflection: LC #3 = (live)

LC #3 = (total)

Bearing : Support 1 - LC #3 = D+S (pattern: Ss)

Support 2 - LC #2 = D+S

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load Patterns: s=S/2, X=L+S or L+Lr, _=no pattern load in this span

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 2027, V design = 1763 lbs; M(+) = 5679 lbs-ft; M(-) = 837 lbs-ft

EI = 230.84e06 lb-in²/ply

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Bearing: Allowable bearing at an angle F'_{theta} calculated for each support as per NDS 3.10.3

Design Notes:

- WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
- Please verify that the default deflection limits are appropriate for your application.
- BUILT-UP BEAMS: it is assumed that each ply is a single continuous member (that is, no butt joints are present) and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.
- SLOPED BEAMS: level bearing is required for all sloped beams.
- FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.
- SCL: Structural composite lumber design has assumed: - dry service conditions - no preservative or fire-retardant treatment - no notches
- BUILT-UP SCL: Contact manufacturer for connection details when side-loaded or when loads are not applied equally to all plies.
- SCL deflection is based on apparent modulus of elasticity (MoE) that incorporates the effect of shear deflection. Sizer does not currently calculate shear deflection separately using true MoE.



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Floor Joists SINGLE SPAN
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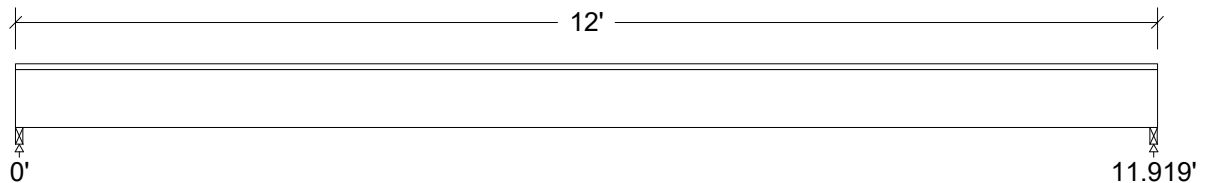
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area				10.00	(16.0")	psf
Live	Live	Full Area				40.00	(16.0")	psf
Self-weight	Dead	Full UDL				2.2		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	93		93
Live	320		320
Factored:			
Total	413		413
Bearing:			
Capacity			
Joist	413		413
Support	759		759
Des ratio			
Joist	1.00		1.00
Support	0.54		0.54
Load comb	#2		#2
Length	0.97		0.97
Min req'd	0.97		0.97
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.25		1.25
Fcp sup	625		625

floor joist single bay room

Lumber-soft, S-P-F, No.1/No.2, 2x8 (1-1/2"x7-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Floor joist spaced at 16.0" c/c; Total length: 12.0'; Clear span: 11.839'; Volume = 0.9 cu.ft.

Wet service; Lateral support: top = continuous, bottom = at supports; Repetitive factor: applied where permitted (refer to online help);

This section FAILS the design check

WARNING: This section violates the following design criteria: Deflection

1.02 ok

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 50$	$F_v' = 131$	psi	$f_v/F_v' = 0.39$
Bending (+)	$f_b = 1117$	$F_b' = 1207$	psi	$f_b/F_b' = 0.92$
Live Defl'n	$0.40 = L/354$	$0.40 = L/360$	in	1.02
Total Defl'n	$0.64 = L/223$	$0.72 = L/200$	in	0.89

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	135	1.00	0.97	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	875	1.00	1.00	1.00	1.000	1.200	-	1.15	1.00	1.00	-	2
Fcp'	425	-	0.67	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.4 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2
Emin'	0.51 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L

Bending (+): LC #2 = D+L

Deflection: LC #2 = D+L (live)

LC #2 = D+L (total)

Bearing : Support 1 - LC #2 = D+L

Support 2 - LC #2 = D+L

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 410, V design = 366 lbs; M(+) = 1223 lbs-ft

EI = 66.69e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.



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floor beam edge SINGLE SPAN
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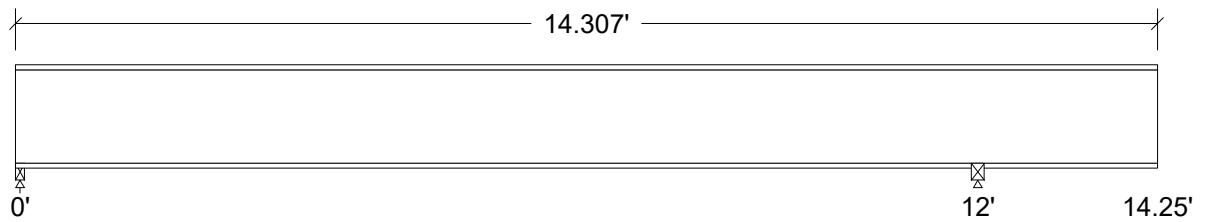
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area	No			10.00	(6.00')	psf
Live	Live	Full Area	No			40.00	(6.00')	psf
Self-weight	Dead	Full UDL	No			7.1		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:					
Dead	392		567		
Live	1403		2031		
Factored:					
Total	1795		2598		
Bearing:					
Capacity					
Beam	1795		3060		
Support	1816		2598		
Des ratio					
Beam	1.00		0.85		
Support	0.99		1.00		
Load comb	#2		#2		
Length	1.37		1.96		
Min req'd	1.37		1.96**		
Cb	1.00		1.19		
Cb min	1.00		1.19		
Cb support	1.21		1.21		
Fcp sup	625		625		

**Minimum bearing length governed by the required width of the supporting member.

floor beam - edge single bay room

LVL n-ply, 1.8E, 2200Fb, 1-3/4"x14", 1-ply

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 14.31'; Clear span: 11.862', 2.168'; Volume = 2.4 cu.ft.

Lateral support: top = continuous, bottom = continuous

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 93$	$F_v' = 285$	psi	$f_v/F_v' = 0.33$
Bending (+)	$f_b = 1080$	$F_b' = 2154$	psi	$f_b/F_b' = 0.50$
Bending (-)	$f_b = 163$	$F_b' = 2154$	psi	$f_b/F_b' = 0.08$
Deflection:				
Interior Live	$0.14 = < L/999$	$0.40 = L/360$	in	0.36
Total	$0.22 = L/648$	$0.72 = L/200$	in	0.31
Cantil. Live	$-0.08 = L/344$	$0.15 = L/180$	in	0.52
Total	$-0.12 = L/221$	$0.27 = L/100$	in	0.45

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cf _{rt}	Ci	Cn	LC#
F _v '	285	1.00	-	1.00	-	-	-	-	1.00	-	1.00	2
F _b ' ⁺	2200	1.00	-	1.00	1.000	0.979	-	1.00	1.00	-	-	2
F _b ' ⁻	2200	1.00	-	1.00	1.000	0.979	-	1.00	1.00	-	-	2
F _{cp} '	750	-	-	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	-	-	1.00	-	-	-	-	1.00	-	-	2
E _{miny} '	0.93 million	-	-	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+L
 Bending (+): LC #2 = D+L
 Bending (-): LC #2 = D+L
 Deflection: LC #2 = D+L (live)
 LC #2 = D+L (total)
 Bearing : Support 1 - LC #2 = D+L
 Support 2 - LC #2 = D+L
 D=dead L=live S=snow W=wind I=impact L_r=roof live L_c=concentrated E=earthquake
 All LC's are listed in the Analysis output
 Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 1907, V design = 1525 lbs; M(+) = 5145 lbs-ft; M(-) = 777 lbs-ft
 EI = 720.29e06 lb-in²
 "Live" deflection is due to all non-dead loads (live, wind, snow...)
 Total deflection = 2.0 dead + "live"

Design Notes:

- WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
- Please verify that the default deflection limits are appropriate for your application.
- FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.
- SCL: Structural composite lumber design has assumed: - dry service conditions - no preservative or fire-retardant treatment - no notches
- BUILT-UP SCL: Contact manufacturer for connection details when side-loaded or when loads are not applied equally to all plies.
- SCL deflection is based on apparent modulus of elasticity (MoE) that incorporates the effect of shear deflection. Sizer does not currently calculate shear deflection separately using true MoE.



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Aug. 16, 2020 12:47

Roof Joists SINGLE SPAN
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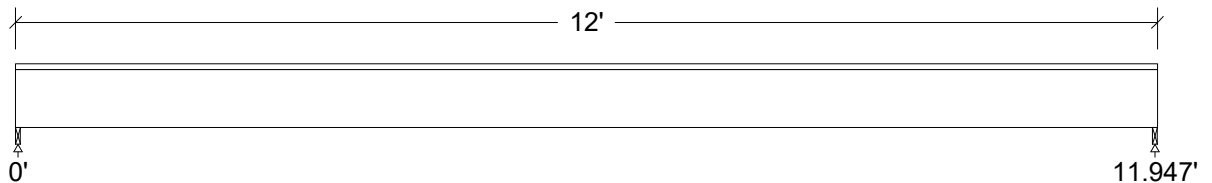
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area				10.00	(16.0")	psf
Snow	Snow	Full Area				22.00	(16.0")	psf
Self-weight	Dead	Full UDL				2.2		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:			
Dead	93		93
Snow	176		176
Factored:			
Total	269		269
Bearing:			
Capacity			
Joist	269		269
Support	495		495
Des ratio			
Joist	1.00		1.00
Support	0.54		0.54
Load comb	#2		#2
Length	0.63		0.63
Min req'd	0.63		0.63
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.25		1.25
Fcp sup	625		625

Roof Joist Single bay room

Lumber-soft, S-P-F, No.1/No.2, 2x8 (1-1/2"x7-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Floor joist spaced at 16.0" c/c; Total length: 12.0'; Clear span: 11.895'; Volume = 0.9 cu.ft.

Wet service; Lateral support: top = continuous, bottom = at supports; Repetitive factor: applied where permitted (refer to online help);

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 33$	$F_v' = 151$	psi	$f_v/F_v' = 0.22$
Bending (+)	$f_b = 731$	$F_b' = 1389$	psi	$f_b/F_b' = 0.53$
Live Defl'n	$0.22 = L/639$	$0.40 = L/360$	in	0.56
Total Defl'n	$0.46 = L/310$	$0.72 = L/200$	in	0.64

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	135	1.15	0.97	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	875	1.15	1.00	1.00	1.000	1.200	-	1.15	1.00	1.00	-	2
Fcp'	425	-	0.67	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.4 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2
Emin'	0.51 million	0.90	1.00	-	-	-	-	-	1.00	1.00	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S

Bending (+): LC #2 = D+S

Deflection: LC #2 = D+S (live)

LC #2 = D+S (total)

Bearing : Support 1 - LC #2 = D+S

Support 2 - LC #2 = D+S

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 268, V design = 240 lbs; M(+) = 801 lbs-ft

EI = 66.69e06 lb-in²

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.



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PROJECT

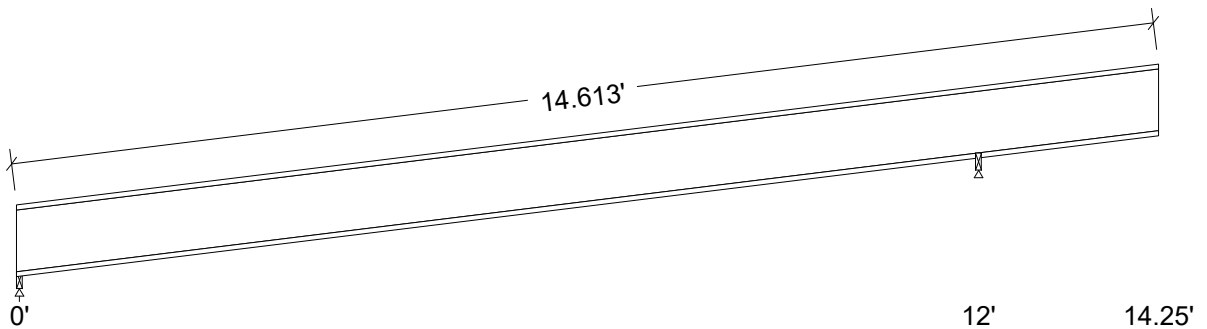
Roof beam edge SINGLE SPAN
ROOM.wwb

Design Check Calculation Sheet
WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
dead	Dead	Full Area	No			10.00 (6.00')		psf
Snow	Snow	Full Area	Yes			22.00 (6.00')		psf
Self-weight	Dead	Full UDL	No			5.6		plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :



Unfactored:				
Dead	388		562	
Snow	783		1116	
Factored:				
Total	1171		1678	
Bearing:				
F'theta	433		433	
Capacity				
Beam	1171		1678	
Support	1902		1935	
Des ratio				
Beam	1.00		1.00	
Support	0.62		0.87	
Load comb	#3		#2	
Length	0.90		0.92	
Min req'd	0.90		0.92	
Cb	1.00		1.41	
Cb min	1.00		1.41	
Cb support	1.13		1.13	
Fcp sup	625		625	

Roof Beam - single room
Lumber n-ply, S-P-F, No.1/No.2, 2x10, 2-ply (3"x9-1/4")
 Supports: All - Timber-soft Beam, D.Fir-L No.2
 Total length: 14.61'; Clear span: 12.089', 2.242'; Volume = 2.8 cu.ft.; Pitch: 2/12
 Lateral support: top = continuous, bottom = continuous
This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 57$	$F_v' = 155$	psi	$f_v/F_v' = 0.37$
Bending(+)	$f_b = 956$	$F_b' = 1107$	psi	$f_b/F_b' = 0.86$
Bending(-)	$f_b = 141$	$F_b' = 1107$	psi	$f_b/F_b' = 0.13$
Deflection:				
Interior Live	$0.22 = L/667$	$0.41 = L/360$	in	0.54
Total	$0.43 = L/339$	$0.73 = L/200$	in	0.59
Cantil. Live	$-0.13 = L/217$	$0.15 = L/180$	in	0.83
Total	$-0.24 = L/113$	$0.27 = L/100$	in	0.88

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	Cn	LC#
Fv'	135	1.15	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	875	1.15	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	-	3
Fb'-	875	1.15	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	-	2
Fcp'	425	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.4 million	1.00	1.00	1.00	-	-	-	-	1.00	1.00	-	3
Emin'	0.51 million	1.00	1.00	1.00	-	-	-	-	1.00	1.00	-	3

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D+S

Bending(+): LC #3 = D+S (pattern: Ss)

Bending(-): LC #2 = D+S

Deflection: LC #3 = (live)

LC #3 = (total)

Bearing : Support 1 - LC #3 = D+S (pattern: Ss)

Support 2 - LC #2 = D+S

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load Patterns: s=S/2, X=L+S or L+Lr, _=no pattern load in this span

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V max = 1216, V design = 1060 lbs; M(+) = 3407 lbs-ft; M(-) = 502 lbs-ft

EI = 138.50e06 lb-in²/ply

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Bearing: Allowable bearing at an angle F'_{theta} calculated for each support as per NDS 3.10.3

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Continuous or Cantilevered Beams: NDS Clause 4.2.5.5 requires that normal grading provisions be extended to the middle 2/3 of 2 span beams and to the full length of cantilevers and other spans.
4. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
5. BUILT-UP BEAMS: it is assumed that each ply is a single continuous member (that is, no butt joints are present) and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.
6. SLOPED BEAMS: level bearing is required for all sloped beams.
7. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.



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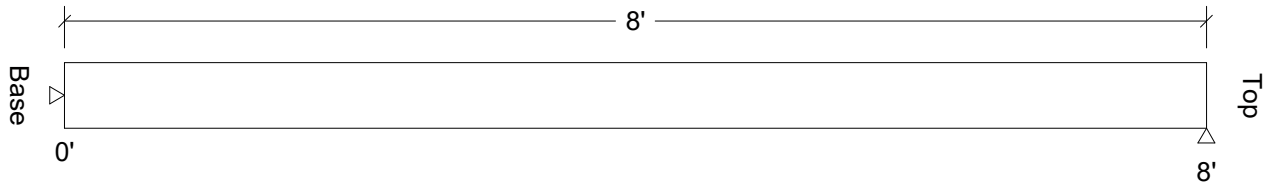
TYPICAL POST.wwc

Design Check Calculation Sheet
WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Location [ft]		Magnitude		Unit
			Start	End	Start	End	
DEAD	Dead	Axial	(Ecc. = 0.92")		500		lbs
SNOW	Snow	Axial	(Ecc. = 0.92")		1000		lbs
Load3	Wind	Point	4.00		144		lbs
Self-weight	Dead	Axial			27		lbs

Reactions (lbs):



Unfactored:			
Lateral:			
Dead	5		-5
Snow	10		-10
Wind	72		72
Axial:			
Dead	527		527
Snow	1000		1000
Factored:			
R->L			-14
Load comb			#2
L->R	48		40
Load comb	#5		#4

SUPPORT POSTS

Lumber n-ply, S-P-F, Stud, 2x6, 2-ply (3"x5-1/2")

Support: Non-wood

Total length: 8.0'; Volume = 0.9 cu.ft.

Pinned base; Load face = width(b); Built-up fastener: bolts; Wet service; $K_e \times L_b: 1.0 \times 8.0 = 8.0$ ft; $K_e \times L_d: 1.0 \times 8.0 = 8.0$ ft; Repetitive factor: applied where permitted (refer to online help);

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 4$	$F_v' = 210$	psi	$f_v/F_v' = 0.02$
Bending (+)	$f_b = 152$	$F_b' = 891$	psi	$f_b/F_b' = 0.17$
Axial	$f_c = 93$	$F_c' = 216$	psi	$f_c/F_c' = 0.43$
Combined	(axial + eccentric + side load bending)			Eq. 15.4-1 = 0.34
Axial Bearing	$f_c = 93$	$F_c^* = 834$	psi	$f_c/F_c^* = 0.11$
Live Defl'n	$0.04 = < L/999$	$0.80 = L/120$	in	0.04
Total Defl'n	$0.05 = < L/999$	$0.80 = L/120$	in	0.06

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL/CP	CF	Cfu	Cr	Cfrt	Ci	LC#
Fv'	135	1.60	0.97	1.00	-	-	-	-	1.00	1.00	5
Fb'+	675	1.60	1.00	1.00	0.825	1.000	-	1.00	1.00	1.00	5
Fc'	725	1.15	1.00	1.00	0.259	1.000	-	-	1.00	1.00	2
Fc'comb	725	1.60	-	-	0.192	-	-	-	-	-	3
E'	1.2 million	0.90	1.00	-	-	-	-	-	1.00	1.00	3
Emin'	0.44 million	0.90	1.00	-	-	-	-	-	1.00	1.00	3
Fc*	725	1.15	1.00	1.00	-	1.000	-	-	1.00	1.00	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #5 = D+.6W

Bending(+): LC #5 = D+.6W

Deflection: LC #4 = .6D+.6W (live)
 LC #3 = D+.75(S+.6W) (total)

Axial : LC #2 = D+S

Combined : LC #3 = D+.75(S+.6W) fb= 103 Fb'= 891
 FcE= 1068 Pxe/S=fc(6xe/d)= 76

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V = 48 lbs; M(+) = 192 lbs-ft; P = 1527 lbs, Kf = 0.75

EI = 24.96e06 lb-in²/ply

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Lateral stability: Lu = 8.00' Le = 14.75' RB = 20.8; b = single ply width

Design Notes:

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2018), the National Design Specification (NDS 2018), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. BUILT-UP COLUMNS: nailed or bolted built-up columns shall conform to the provisions of NDS Clause 15.3.
4. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.
5. Axial load eccentricity applied in direction of load face only. It is the designers responsibility to check for effect of eccentricity in the other direction.



WoodWorks[®]
SOFTWARE FOR WOOD DESIGN

COMPANY

Aug. 16, 2020 13:23

PROJECT

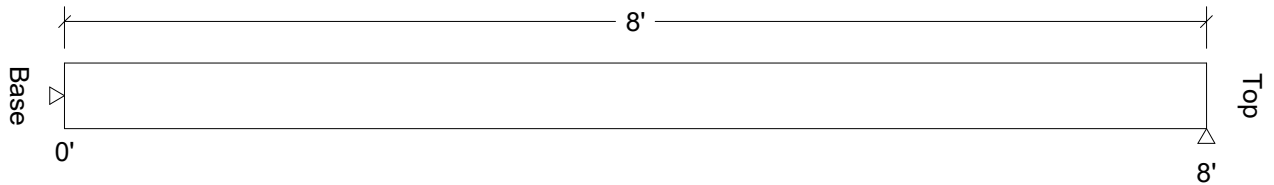
TYPICAL POST - DOUBLE BAY
WITH WIND.wvc

Design Check Calculation Sheet
WoodWorks Sizer 2019 (Update 1)

Loads:

Load	Type	Distribution	Location [ft]		Magnitude		Unit
			Start	End	Start	End	
DEAD	Dead	Axial	(Ecc. = 0.92")		600		lbs
SNOW	Snow	Axial	(Ecc. = 0.92")		1100		lbs
Load3	Wind	Point	4.00		240		lbs
Self-weight	Dead	Axial			27		lbs

Reactions (lbs):



Unfactored:			
Lateral:			
Dead	6		-6
Snow	11		-11
Wind	120		120
Axial:			
Dead	627		627
Snow	1100		1100
Factored:			
R->L			-16
Load comb			#2
L->R	78		69
Load comb	#5		#4

SUPPORT POSTS

Lumber n-ply, S-P-F, Stud, 2x6, 2-ply (3"x5-1/2")

Support: Non-wood

Total length: 8.0'; Volume = 0.9 cu.ft.

Pinned base; Load face = width(b); Built-up fastener: bolts; Wet service; $K_e \times L_b = 1.0 \times 8.0 = 8.0$ ft; $K_e \times L_d = 1.0 \times 8.0 = 8.0$ ft; Repetitive factor: applied where permitted (refer to online help);

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 7$	$F_v' = 210$	psi	$f_v/F_v' = 0.03$
Bending(+)	$f_b = 247$	$F_b' = 891$	psi	$f_b/F_b' = 0.28$
Axial	$f_c = 105$	$F_c' = 216$	psi	$f_c/F_c' = 0.49$
Combined	(axial + eccentric + side load bending)			Eq. 15.4-1 = 0.47
Axial Bearing	$f_c = 105$	$F_c^* = 834$	psi	$f_c/F_c^* = 0.13$
Live Defl'n	$0.06 = < L/999$	$0.80 = L/120$	in	0.07
Total Defl'n	$0.07 = < L/999$	$0.80 = L/120$	in	0.09

Additional Data:

FACTORS:	F/E (psi)	CD	CM	Ct	CL/CP	CF	Cfu	Cr	Cfrt	Ci	LC#
Fv'	135	1.60	0.97	1.00	-	-	-	-	1.00	1.00	4
Fb'+	675	1.60	1.00	1.00	0.825	1.000	-	1.00	1.00	1.00	5
Fc'	725	1.15	1.00	1.00	0.259	1.000	-	-	1.00	1.00	2
Fc'comb	725	1.60	-	-	0.192	-	-	-	-	-	3
E'	1.2 million	0.90	1.00	-	-	-	-	-	1.00	1.00	5
Emin'	0.44 million	0.90	1.00	-	-	-	-	-	1.00	1.00	5
Fc*	725	1.15	1.00	1.00	-	1.000	-	-	1.00	1.00	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #4 = .6D+.6W

Bending(+): LC #5 = D+.6W

Deflection: LC #4 = .6D+.6W (live)

LC #5 = D+.6W (total)

Axial : LC #2 = D+S

Combined : LC #3 = D+.75(S+.6W) fb= 171 Fb'= 891

FcE= 1068 Pxe/S=fc(6xe/d)= 87

D=dead L=live S=snow W=wind I=impact Lr=roof live Lc=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.2

CALCULATIONS:

V = 75 lbs; M(+) = 311 lbs-ft; P = 1727 lbs, Kf = 0.75

EI = 24.96e06 lb-in²/ply

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 2.0 dead + "live"

Lateral stability: Lu = 8.00' Le = 14.75' RB = 20.8; b = single ply width

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