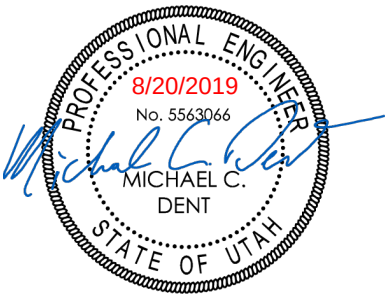
York Engineering

Structural Design
(801) 876-3501



Structural Calculations

R1889
R1889 - 1088 Maple Drive, Huntsville, UT, USA

Prepared For:

HABITATIONS
RESIDENTIAL DESIGN GROUP

Habitations Home Plans
1523 East Skyline Drive, Suite B
Ogden, UT 84405

8/20/2019

8/20/2019

STRUCTURAL CALCULATIONS

For: Habitations Home Plans
Plan #: R1889
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

From: York Engineering Inc.
4883 Old Highway Rd. Suite A
Morgan, Utah 84050
(801) 876-3501

Design Criteria 2018 IRC

Roof Loads:

Roof Snow Load (psf):	55
Roof Dead Load (psf):	15

Floor Loads:

Floor Live Load (psf):	40
Floor Dead Load (psf):	12
Seismic Design Category:	D
Wind Speed:	115 mph for Exposure C

Material Properties:

Concrete (f_c'):	3000 psi (foundation) to 4000 psi (suspended slab)
Concrete Reinforcement:	ASTM A615 Grade 60
Site Conditions:	Dry & stable granular based, 1500 psf bearing capacity, granular based
Backfill:	KH = 35 pcf, slope not to exceed 20%, setback from slopes is min. 25'
Dimensional Lumber:	Doug Fir #2 or better
Posts and Timbers:	Doug Fir #1 or better
Steel:	ASTM Grade 50

Use straps and tie downs, and meet nailing, reinforcement and other structural requirements as noted on the drawing and within the pages of this document. These structural calculations are based on conditions and assumptions listed above. If the conditions listed herein are not met or are different, contractor shall notify York Engineering prior to construction. Prefab trusses to be engineered by the supplier. This engineering assumes that the building site is dry and stable, a high water table or adverse soils such as plastic clays, fills etc. could cause future flooding, settlement, site instability, or other adverse conditions. Verification of and liability for the soil bearing pressure, site stability, and all other site conditions, including site engineering as required, is the responsibility of others. This engineering assumes that the site is stable having no global stability concerns or hazards. If this is not true, contact soils engineer and provide soils/slope stability report to York Engineering for review and further design. These calculations and engineering are for the new building structure only and do not provide any engineering analysis of or liability/warranty for the non-structural portions of the building, or the site itself. York Engineering Inc. does not assume the role of "Registered Design Professional in Responsible Charge" on this project. The purpose of these calculations and engineering is to help reduce structural damage and loss of life due to seismic activity and/or high wind conditions. York Engineering liability is limited to five times the fee collected for services. The contractor(s) must read, understand, and accept all York Engineering documents applicable to this design prior to utilizing the design. By using the design, the owner/contractor accepts the design, assumed loads, and limits on liability stated. If any discrepancies occur between the structural and other project documents, notify York Engineering of the discrepancy prior to construction.

The following general requirements shall be followed during construction:

1. Attach (2) ply headers together with (3) 16d at 12" O.C. [(2) 16d OK for 2x6 headers], use (3) 16d at 12" O.C. each side of (3) ply headers [use (4) 16d when header height is greater than 11"]. Attach (4) ply headers together with (2) 1/2" through bolts at 16" O.C. or (2) SDS 1/4" x 6" screws at 16" O.C. each side of header U.N.O., see plan.
2. Contractor shall assure that all materials are used per manufactures recommendations.
3. Site engineering and liability shall be provided by the owner/builder as required.
4. Contractor shall assure that footings are properly drained, soil is dry, footings rest on undisturbed native soil, building horizontal clearance from footings to adjacent slopes is per IRC Section R403.1.7.2. If setback requirements of R403.1.7.2 cannot be met then contact engineer for further design requirements.
5. The contractor shall conform to all building codes and practices as per the current IRC
6. Provide solid blocking through structure down to footing for all load paths
7. Builder shall follow all recommendations found in all applicable geotechnical reports.
8. Stacking of two sill plates is permitted with 5/8" J-Bolts through both plates. Stacking more than two plates is not permitted without special engineering.
9. All footings, foundations, and interior slabs shall be normal wt. concrete with a compressive strength of 2,500 PSI min. U.N.O. to meet strength requirements (see calcs., no special inspections required U.N.O., see plan) however, per IRC 402.2 use 3000 PSI concrete for durability purposes.

Table of Contents

SNOW CALCULATION:	
Elevation:	5624
Utah Snow Load	Utah Snow Loads
Idaho Snow Load	Idaho Snow Loads
P_g (psf)	78
Ce	1
C_t	1
I	1
C_s	1
P_f (psf)	**55**

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	PASS	PASS	PASS	PASS	PASS
LOCATION	**Back**	**Front**	**Left**	**Right**	**Interior**
	FS: 1.33	FS: 1.37	FS: 1.37	FS: 1.37	FS: 2.75
	DL+0.75LL+0.75S	DL+0.75LL+0.75S	DL+S	DL+S	DL+LL
SOIL SPECS					
Density (pcf)	125	125	125	125	125
Soil Pressure (psf)	1500	1500	1500	1500	1500
Weight (k/lft)	0.04	0.04	0.04	0.04	0.03
BUILDING LOADS					
Roof Span (ft)	32	24	30.5	30.5	0
Floor Span (ft)	20	20	4	4	4
Wall Height (ft)	14	23	23	23	23
Suspended Slab Span (ft)	0	0	0	0	0
Total Load (k/lft)	1.60	1.56	1.55	1.55	0.56
FOOTING SPECS					
Footing Width (in)	20	20	20	20	18
Footing Height (in)	10	10	10	10	10
FOUNDATION					
Height Above Grade (ft)	0.67	0.67	0.67	0.67	0.67
Wall Thickness (ft)	0.67	0.67	0.67	0.67	0.67
Weight (k/lft)	0.07	0.07	0.07	0.07	0.07
CONCRETE SPECS					
Density (pcf)	150	150	150	150	150
Strength (psi)	2500	2500	2500	2500	2500
Clear Cover Thickness (in)	3	3	3	3	3
CALCULATIONS					
Total Weight on Soil (k/lft)	1.88	1.83	1.83	1.83	0.82
Soil Load (ksf)	1.13	1.10	1.10	1.10	0.55
FOOTING SELECTION	**F-20**	**F-20**	**F-20**	**F-20**	**F-18**

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

LOADING SUMMARY	
Roof Live Load (psf):	55
Roof Dead Load (psf):	15
Floor Live Load (psf):	40
Floor Dead Load (psf):	12
Exterior Wall Dead Load (psf):	20
Interior Wall Dead Load (psf):	10
Suspended Slab Dead Load (psf):	75
Suspended Slab Live Load (psf):	60

SNOW LOAD PARAMETERS	
Roof Slope (x/12):	2
Roof Pitch (θ):	9.46
Total Roof Load (psf):	70.00

SEISMIC LOAD PARAMETERS	
Site Class:	D
F_a:	1.19
R:	6.5
S_S:	0.777
S_{MS}:	0.924
S_{DS}:	0.615
C_S:	0.095
Redundancy Factor, ρ :	1.30
ASD Load Combination Factor:	0.70
Factored C_S:	0.086

SHEAR DISTRIBUTION	
Base Shear Force lb:	14,438
Floor 1 Lateral Force lb:	4,478
Floor 2 Lateral Force lb:	0
Roof Lateral Force lb:	9,960
Diaphragm Loading (plf):	88
Diaphragm FS	**2.44**

DIAPHRAGM LOADING

	Avg. Length (ft)	Avg. Width (ft)	Wall Height (ft)	Dead Wgt. (psf)	Snow Wgt. (psf)	Diaphragm Weight (lb)	Wall Weight (lb)	Total Weight (lb)	Shear (lb)
Roof	56.446	60.788	---	15	12	92,156	23,447	115,603	9,960
Floor 2	56.446	61	0	12		0	23,447	0	0
Floor 1	56.446	61	10	12		22,668	29,309	51,977	4,478

SEISMIC FORCE DISTRIBUTION

	H_X (ft)	W_X (kip)	$H_X \times W_X$	% Force	Total Shear (kip)	F_X	V_X
Roof	14.08	115.60	1,628	93%	13.37	13.37	13.37
Floor 2	0.00	0.00	0	0%	13.37	0.00	13.37
Floor 1	2.50	51.98	130	7%	14.44	1.07	14.44
TOTALS	0.01	167.58	1,758	14,438	---	---	14.44

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	Seismic (kips)	Wind (kips)		Shear Wall Allowable Loads (plf)		
	total	left/right	front/back		seismic	wind
2nd Floor	0.0 kips	0.0	0.0	SW-1	350	490
1st Floor	13.4 kips	6.2	6.3	SW-2	450	630
Basement	1.1 kips	7.6	7.7	SW-3	585	819

Location	Master	Boat/RV	Kitchen	Entry	Bath 2	Mstr Bath	Master	Dining/Living	Bed 2	Boat/RV	Garage/Mud	Stairs/Bed
	Front side	Front side	Front side	Front side	Front side	Back side	Back side	Back side	Back side	Back side	Front/Back mi	Left/Right mid
Floor	1	1	1	1	1	1	1	1	1	1	1	1
Lines up w/	none	none	none	none	none	none	none	none	none	none	none	none
Width	**27.5**	**38**	**8**	**17**	**13.5**	**10**	**17.5**	**36**	**14**	**12.5**	**24.5**	**15**
Depth	**19**	**17.5**	**25.5**	**27.5**	**19.5**	**12.5**	**19**	**27.5**	**19.5**	**17.5**	**38.5**	**79.5**
Area (sqft)	318.25	589.75	102	340	141.375	127.5	166.25	775.75	136.5	109.375	672.6925	552
Force (lb)	1240	2298	397	1325	551	497	648	3023	532	426	2621	2151
Adj. Force	1223	2266	392	1307	543	490	639	2981	525	420	2585	2246
% of floor	9%	17%	3%	10%	4%	4%	5%	22%	4%	3%	19%	17%
Flr. Diaphragm	0	0	0	0	0	0	0	0	0	0	0	0
Transferred Sourc	none	none	none	none	none	none	none	none	none	none	none	none
Transfered Forces	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Forces from Upper	0	0	0	0	0	0	0	0	0	0	0	0
Total Seismic	**1223**	**2266**	**392**	**1307**	**543**	**490**	**639**	**2981**	**525**	**420**	**2585**	**2246**
Wind (lb)	582	1079	187	622	259	233	304	1419	250	200	1231	999
Adj. Force	574	1064	184	614	255	230	300	1400	246	197	1214	1044
% of total	9%	17%	3%	10%	4%	4%	5%	22%	4%	3%	19%	17%
Total Wind	**574**	**1064**	**184**	**614**	**255**	**230**	**300**	**1400**	**246**	**197**	**1214**	**1044**
Shear Wall	**21.38**	**38**	**4**	**Portal**	**11.38**	**3.5**	**FTW**	**8**	**FTW**	**9.5**	**18**	**15.5**
Aspect Ratio	1	1	0.94	Frame	1	1	(1)	1	(2)	1	1	1
PSW Adj. C_o	0.99	1	1		0.99	1		1		1	1	1
Seis Load (plf)	57	60	98		48	140		373		44	144	145
Wind Load (plf)	27	28	46		22	66		175		21	67	67
Shear Wall	**SW-1**	**SW-1**	**SW-1**		**SW-1**	**SW-1**	**SW-1**	**SW-2**	**SW-1**	**SW-1**	**SW-1**	**SW-1**
Uplift												
% Force on pier	100%	100%	100%	100%	100%	100%	100%	50%	100%	42%	31%	100%
Wall Length (ft)	25	38	4	Portal	13.5	3.5	FTW	4	FTW	4	5.5	15.5
Wall Height (ft)	9	10	11	11	8.5	10	10.5	13	10	12	9	10
Floor Span (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Roof Span (ft)	16	4	15	11	19	18.5	24	41	22	4	4	4
Wall Load (plf)	180	200	220	220	170	200	210	260	200	240	180	200
Total DL (plf)	180	138	199.5	181.5	187.5	203.25	234	340.5	219	162	126	138
Seis.Uplift (lbs)	**0**	**0**	**679**	-	**0**	**1044**	**534**	**4163**	**0**	**207**	**946**	**380**
Wind Uplift (lbs)	**0**	**0**	**107**	-	**0**	**302**	**64**	**1594**	**0**	**0**	**260**	**0**
			LSTHD8RJ	STHD14RJ		CS16X42"	OK	MST48		N/A	LSTHD8RJ	N/A
						LSTHD8RJ						

Location	Dining	Master	Mstr Bath	Pantry/Mud	Garage	Living	Fire	Bed 2	Bath 2	Pantry/Mud	Garage	Boat/RV
	Left side	Left side	Left side	Left side	Left side	Right side	Right side	Right side	Right side	Right side	Right side	Right side
Floor	1	1	1	1	1	1	1	1	1	1	1	1
Lines up w/	none	none	none	none	none	none	none	none	none	none	none	none
Width	**5**	**6.5**	**12.5**	**18.5**	**38.5**	**5**	**7**	**13**	**6.5**	**17**	**21**	**17.5**
Depth	**36.5**	**54.5**	**66**	**10**	**24.5**	**36.5**	**56**	**16.5**	**14**	**10**	**24.5**	**38**
Area (sqft)	191.25	242.125	412.5	92.5	581	191.25	196	107.25	45.5	85	257.25	332.5
Force (lb)	745	943	1607	360	2264	745	764	418	177	331	1002	1296
Adj. Force	778	985	1678	376	2364	778	797	436	185	346	1047	1353
% of floor	6%	7%	13%	3%	18%	6%	6%	3%	1%	3%	8%	10%
Flr. Diaphragm	0	0	0	0	0	0	0	0	0	0	0	0
Transferred Sourc	none	1-Left-Dining	1-Left-Maste	none	none	none	1-right-Living	none	none	none	none	none
Transfered Forces	**0**	**778**	**1763**	**0**	**0**	**0**	**778**	**0**	**0**	**0**	**0**	**0**
Forces from Upper	0	0	0	0	0	0	0	0	0	0	0	0
Total Seismic	**778**	**1763**	**3442**	**376**	**2364**	**778**	**1576**	**436**	**185**	**346**	**1047**	**1353**
Wind (lb)	346	438	747	167	1052	346	355	194	82	154	466	602
Adj. Force	362	458	780	175	1098	362	371	203	86	161	486	629
% of total	6%	7%	13%	3%	18%	6%	6%	3%	1%	3%	8%	10%
Total Wind	**362**	**819**	**1599**	**175**	**1098**	**362**	**732**	**203**	**86**	**161**	**486**	**629**
Shear Wall	**Transferred**	**Transferred**	**9.7**	**4.67**	**30.34**	**Transferred**	**7**	**7.67**	**FTW**	**5.67**	**5**	**5.34**
Aspect Ratio	Master	Mstr Bath	1	1	1	Fire	1	1	(3)	1	1	1
PSW Adj. C_o			0.99	1	0.99		1	1		1	1	1
Seis Load (plf)			355	81	78		225	57		61	209	253
Wind Load (plf)			165	37	36		105	26		28	97	118
Shear Wall			**SW-2**	**SW-1**	**SW-1**		**SW-1**	**SW-1**	**SW-1**	**SW-1**	**SW-1**	**SW-1**
Uplift												
% Force on pier	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%
Wall Length (ft)	Transferred	Transferred	12.5	4.67	38.5	Transferred	7	7.67	FTW	5.67	2.5	2.67
Wall Height (ft)	13	10	9	8	9	13	10	9	9	8	10.5	13
Floor Span (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Roof Span (ft)	4	4	4.5	14.5	30.5	4	4	4	4	14.5	30.5	43
Wall Load (plf)	260	200	180	160	180	260	200	180	180	160	210	260
Total DL (plf)	174	138	128.25	161.25	245.25	174	138	126	126	161.25	263.25	349.5
Seis.Uplift (lbs)	-	-	**1693**	**268**	**0**	-	**1768**	**29**	**0**	**31**	**1869**	**2827**
Wind Uplift (lbs)	-	-	**353**	**0**	**0**	-	**563**	**0**	**0**	**0**	**692**	**1064**
			CS16X48"	N/A			MST37	N/A		N/A	LSTHD8	LSTHD8

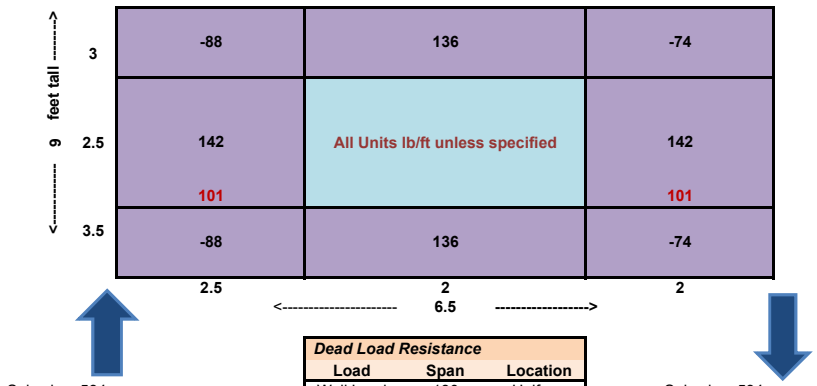
Location	Bath	Steam	Hot Tub	Media/Rec	Bed 3	Media	Hot Tub	Steam	Rec	Bed 3
	Front side	Back side	Back side	Back side	Back side	Left side	Left side	Left side	Right side	Right side
Floor	0	0	0	0	0	0	0	0	0	0
Lines up w/	1-front-Master	1-front-Bath 2	1-back-Master	back-Dining/Li	1-back-Bed 2	1-Left-Dining	1-Left-Master	Left-Mstr Ba	1-right-Living	1-right-Bed 2
Width	**13.67**	**9.33**	**17.5**	**36**	**16**	**5**	**6.5**	**12.67**	**12**	**6**
Depth	**12.67**	**12.67**	**18.33**	**22.5**	**12**	**36**	**55.5**	**79.5**	**45**	**79.5**
Area (sqft)	86.59945	108.10555	160.3875	565	96	90	180.375	552.6325	270	238.5
Force (lb)	27	34	50	176	30	28	56	172	84	74
Adj. Force	27	34	50	176	30	28	56	172	84	74
% of floor	3%	3%	5%	16%	3%	3%	5%	16%	8%	7%
Flr. Diaphragm	4	5	7	24	4	4	8	23	11	10
Adj Flr. Dia.	12	15	23	80	14	10	20	60	29	26
Transferred Sourc	none	none	none	none	none	none	0-Left-Media	1-Left-Hot Tul	none	none
Transfered Forces	**0**	**0**	**0**	**0**	**0**	**0**	**812**	**2644**	**0**	**0**
Forces from Upper	608	543	639	2981	525	778	1763	3442	778	194
Total Seismic	**644**	**588**	**705**	**3213**	**564**	**812**	**2644**	**6294**	**880**	**284**
Wind (lb)	194	243	360	1269	216	200	401	1228	600	530
Adj. Force	194	243	360	1269	216	200	401	1228	600	530
% of total	3%	3%	5%	16%	3%	3%	5%	16%	8%	7%
Total Wind	**480**	**498**	**660**	**2669**	**462**	**562**	**1782**	**4608**	**961**	**620**
Shear Wall	**13.67**	**3.5**	**5.5**	**8**	**FTW**	**Transferred**	**Transferred**	**12.67**	**7**	**Transferred**
Aspect Ratio	1	1	1	1	(4)	Hot Tub	Steam	1	1	Foundation
PSW Adj. C_o	1	1	1	1				1	1	Wall
Seis Load (plf)	47	168	128	402				497	126	
Wind Load (plf)	35	142	120	334				364	137	
Shear Wall	**SW-1**	**SW-1**	**SW-1**	**SW-2**	**SW-1**			**SW-3**	**SW-1**	
Uplift										
% Force on pier	100%	100%	50%	50%	100%	100%	100%	100%	100%	100%
Wall Length (ft)	13.67	3.5	2.75	4	FTW	Transferred	Transferred	12.67	7	Transferred
Wall Height (ft)	8	8	8	8	8	8	8	8	8	8
Floor Span (ft)	11.5	18.5	18	23.5	18	4	4	4	4	4
Roof Span (ft)	0	0	0	0	0	0	0	0	0	0
Wall Load (plf)	160	160	160	160	160	160	160	160	160	160
Total DL (plf)	137.4	162.6	160.8	180.6	160.8	110.4	110.4	110.4	110.4	110.4
Seis.Uplift (lbs)	**0**	**1059**	**804**	**2852**	**0**	-	-	**3275**	**619**	-
Wind Uplift (lbs)	**0**	**853**	**739**	**2307**	**0**	-	-	**2210**	**712**	-
		LSTHD8	LSTHD8	STHD10				STHD14	LSTHD8	

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, US

Master First Floor Back Side

LOAD PARAMETERS	
Seismic Load (lb):	639
Wind Load (lb):	300
SHEAR WALL SELECTION	
Shear Wall Callout:	SW-1
Seismic Strength (lb/ft):	350
Edge Nailing (in o.c.)	4
Field Nailing (in o.c.)	12
Seismic FS	**2.47**
Wind FS	**7.35**
ASPECT RATIO	
Left Aspect Ratio:	100%
Right Aspect Ratio:	100%
CONNECTORS	
Force-Transfer Wall Location:	Interfloor
Tie-Down:	CS16X32
Tie-Down Seismic FS	**1.45**
Tie-Down Wind FS	**12.04**
Window Strap:	CS16
Window Strap Connector:	Nails
Strap FS	**16.95**
Bolt Diameter (in):	1/2
Bolt Spacing (in o.c.):	32
Bolt Capacity (plf):	390
Bolt FS	**3.97**
Stud Size:	2x4
Tension (lb):	619
Stress (psi):	127
F'_T (psi)	920
Stud FS:	**7.24**

FORCE TRANSFER WALL



Dead Load Resistance		
Load	**Span**	**Location**
Wall Load	180	Uniform
Floor	0	Uniform
Roof	0	Uniform
Point Load	0	0

FORCE TRANSFER WALL DESIGN	
Shear Wall:	SW-1 --- 4" Edge Nailing and 12" Field Nailing
Tie-Down:	CS16X32
Straps:	CS16 --- Nails to Connect
Bolts:	1/2" Bolts @ 32" O.C.
Studs:	2x4 Studs

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, US

Bed 2 First Floor Back Side

LOAD PARAMETERS	
Seismic Load (lb):	525
Wind Load (lb):	246
SHEAR WALL SELECTION	
Shear Wall Callout:	SW-1
Seismic Strength (lb/ft):	350
Edge Nailing (in o.c.)	4
Field Nailing (in o.c.)	12
Seismic FS	**2.34**
Wind FS	**6.96**
ASPECT RATIO	
Left Aspect Ratio:	88%
Right Aspect Ratio:	88%
CONNECTORS	
Force-Transfer Wall Location:	Interfloor
Tie-Down:	CS16X32
Tie-Down Seismic FS	**Not Needed**
Tie-Down Wind FS	**Not Needed**
Window Strap:	CS16
Window Strap Connector:	Nails
Strap FS	**1.50**
Bolt Diameter (in):	1/2
Bolt Spacing (in o.c.):	32
Bolt Capacity (plf):	390
Bolt FS	**10.41**
Stud Size:	2x4
Tension (lb):	262
Stress (psi):	54
F'_T (psi)	920
Stud FS:	**17.10**

FORCE TRANSFER WALL

Dead Load Resistance		
Load	**Span**	**Location**
Wall Load	200	Uniform
Floor	0	Uniform
Roof	0	Uniform
Point Load	0	0

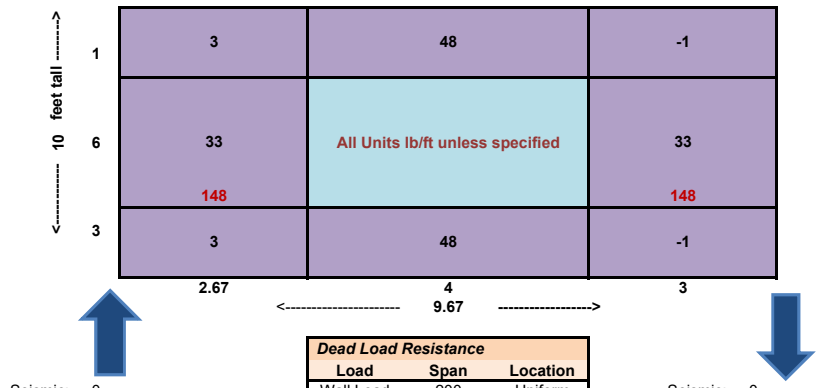
FORCE TRANSFER WALL DESIGN	
Shear Wall:	SW-1 --- 4" Edge Nailing and 12" Field Nailing
Tie-Down:	CS16X32
Straps:	CS16 --- Nails to Connect
Bolts:	1/2" Bolts @ 32" O.C.
Studs:	2x4 Studs

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, US

Bath 2 First Floor Right Side

LOAD PARAMETERS	
Seismic Load (lb):	185
Wind Load (lb):	86
SHEAR WALL SELECTION	
Shear Wall Callout:	SW-1
Seismic Strength (lb/ft):	350
Edge Nailing (in o.c.)	4
Field Nailing (in o.c.)	12
Seismic FS	**4.73**
Wind FS	**14.24**
ASPECT RATIO	
Left Aspect Ratio:	97%
Right Aspect Ratio:	100%
CONNECTORS	
Force-Transfer Wall Location:	Interfloor
Tie-Down:	CS16X32
Tie-Down Seismic FS	**Not Needed**
Tie-Down Wind FS	**Not Needed**
Window Strap:	CS16
Window Strap Connector:	Nails
Strap FS	**11.51**
Bolt Diameter (in):	1/2
Bolt Spacing (in o.c.):	32
Bolt Capacity (plf):	390
Bolt FS	**20.37**
Stud Size:	2x4
Tension (lb):	134
Stress (psi):	27
F'_T (psi)	920
Stud FS:	**33.47**

FORCE TRANSFER WALL



Dead Load Resistance		
Load	**Span**	**Location**
Wall Load	200	Uniform
Floor	0	Uniform
Roof	0	Uniform
Point Load	0	0

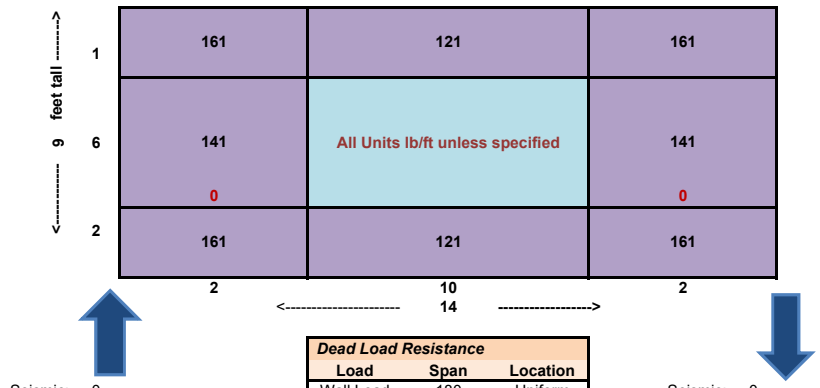
FORCE TRANSFER WALL DESIGN	
Shear Wall:	SW-1 --- 4" Edge Nailing and 12" Field Nailing
Tie-Down:	CS16X32
Straps:	CS16 --- Nails to Connect
Bolts:	1/2" Bolts @ 32" O.C.
Studs:	2x4 Studs

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, US

Bed 3 Basement Floor Back Side

LOAD PARAMETERS	
Seismic Load (lb):	564
Wind Load (lb):	462
SHEAR WALL SELECTION	
Shear Wall Callout:	SW-1
Seismic Strength (lb/ft):	350
Edge Nailing (in o.c.)	4
Field Nailing (in o.c.)	12
Seismic FS	**2.17**
Wind FS	**3.71**
ASPECT RATIO	
Left Aspect Ratio:	88%
Right Aspect Ratio:	88%
CONNECTORS	
Force-Transfer Wall Location:	Interfloor
Tie-Down:	CS16X32
Tie-Down Seismic FS	**Not Needed**
Tie-Down Wind FS	**Not Needed**
Window Strap:	CS16
Window Strap Connector:	Nails
Strap FS	**1.50**
Bolt Diameter (in):	1/2
Bolt Spacing (in o.c.):	32
Bolt Capacity (plf):	390
Bolt FS	**9.68**
Stud Size:	2x4
Tension (lb):	254
Stress (psi):	52
F'_T (psi)	920
Stud FS:	**17.67**

FORCE TRANSFER WALL



Dead Load Resistance		
Load	**Span**	**Location**
Wall Load	180	Uniform
Floor	0	Uniform
Roof	0	Uniform
Point Load	0	0

FORCE TRANSFER WALL DESIGN	
Shear Wall:	SW-1 --- 4" Edge Nailing and 12" Field Nailing
Tie-Down:	CS16X32
Straps:	CS16 --- Nails to Connect
Bolts:	1/2" Bolts @ 32" O.C.
Studs:	2x4 Studs

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, U **LEFT AND RIGHT LOADING**

Wind Loading Calculations using Main Windforce-Resisting System (MWFRS)
Longitudinal Direction
Table 27.5-1 Steps to Determine MWFRS Loads Enclosed Simple Diaphram Buildings

Risk Category	**II**	Table 1.5-1
Wind speed	**115**	Figure 26.5-1 A-B or C
Exposure Category	**C**	Section 26.7
L/B upper floor	1.08	
L/B main floor	1.08	
Roof Height	3.17	
Mean roof Height	14.1	
Truss Span	**38**	
Roof Slope	2 /12	
Roof Angle (deg)	9.46	Sine = 0.1644
Lower Truss Span	**38**	
Lower roof Slope	**2** /12	
Lower roof Angle (deg)	9.46	Sine = 0.1644
Load combination factor	0.6	(ASCE 7-10 2.4.1)
Upper floor, p_h	22.3	Table 27.6-1
Upper floor, p_o	22.3	Table 27.6-1
Main floor, p_h	22.3	
Main floor, p_o	22.3	
Basement floor, p_h	22.3	
Basement floor, p_o	22.3	

Upper Floor (psf)				Relative positioning		
Net Pressure	13.4	Windward	8.4	Left	7.1	
		Leeward	5.0	Right	7.1	
Main Floor (psf)						
Net Pressure	13.4	Windward	8.4	Left	7.1	
		Leeward	5.0	Right	7.1	
Basement Floor (psf)						
Net Pressure	13.4	Windward	8.4	Left	7.1	
		Leeward	5.0	Right	7.1	

Roof (psf)	Zone 1	Zone 2
Load Case 1	0.0	0.0
Load Case 2	0.0	0.0

Exposure Adj. Factor	1.000
Elevation Adj. Factor	0.816

Lower Roof (psf)

Load Case 1	0.0	0.0
Load Case 2	0.0	0.0

Roof Load

Roof Height	Length	Area (ft^2)	Horizontal Force (lbs)
3.17	84.50	267.6	0

Lower Roof Load

Low Roof Height	Upper Length	Lower length	Low Roof Length(ft)	Area (ft^2)	Horizontal Force (lbs)
0.0	85	84.5	0	0.0	0.0

Wall Load	**Basement** (height) 2.5		**1st floor** (height) 11		**2nd floor** (height) 0	
	ft^2	force (lbs)	ft^2	force (lbs)	ft^2	force (lbs)
Windward	211	1774.6	929.5	7808.1	0	0.0
Leeward	211	1049.1	929.5	4616.1	0	0.0

2nd Floor Diaphragm Shear
Total Shear (lbs) 0

1st Floor Diaphragm Shear
Total Shear (lbs) 6212

Basement Diaphragm Shear
Total Shear (lbs) 13836

Base Wind Shear 15248

Hurricane Ties

		Factors of Safety	
Uplift	(lbs)	H1	H2.5
Roof (per truss)	-342.0	**-1.71**	**-1.75**
Low roof (per truss)	-	-	-
Lateral	(lbs)	H1	H2.5
Roof (per truss)	0.0	**#DIV/0!**	**#DIV/0!**
Low roof (per truss)	0.0	-	-

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, U **FRONT AND BACK LOADING**

Wind Loading Calculations using Main Windforce-Resisting System (MWFRS)
Longitudinal Direction
Table 27.5-1 Steps to Determine MWFRS Loads Enclosed Simple Diaphram Buildings

Risk Category	**II**	Table 1.5-1
Wind speed	**115**	Figure 26.5-1 A-B or C
Exposure Category	**C**	Section 26.7
L/B upper floor	0.93	
L/B main floor	0.93	
Roof Height	3.17	
Mean roof Height	14.1	
Truss Span	**38**	
Roof Slope	2 /12	
Roof Angle (deg)	9.46	Sine = 0.1644
Lower Truss Span	**38**	
Lower roof Slope	**2** /12	
Lower roof Angle (deg)	9.46	Sine = 0.1644
Load combination factor	0.6	(ASCE 7-10 2.4.1)
Upper floor, p_h	22.5	Table 27.6-1
Upper floor, p_o	22.5	Table 27.6-1
Main floor, p_h	22.5	
Main floor, p_o	22.5	
Basement floor, p_h	22.5	
Basement floor, p_o	22.5	

Upper Floor (psf)				Relative positioning		
Net Pressure	13.5	Windward	8.4	Left	7.3	
		Leeward	5.1	Right	7.3	
Main Floor (psf)						
Net Pressure	13.5	Windward	8.4	Left	7.3	
		Leeward	5.1	Right	7.3	
Basement Floor (psf)						
Net Pressure	13.5	Windward	8.4	Left	7.3	
		Leeward	5.1	Right	7.3	

Roof (psf)	Zone 1	Zone 2
Load Case 1	0.0	0.0
Load Case 2	0.0	0.0

Exposure Adj. Factor	1.000
Elevation Adj. Factor	0.816

Lower Roof (psf)

Load Case 1	0.0	0.0
Load Case 2	0.0	0.0

Roof Load

Roof Height	Length	Area (ft^2)	Horizontal Force (lbs)
3.17	91.00	288.2	0

Lower Roof Load

Low Roof Height	Upper Length	Lower length	Low Roof Length(ft)	Area (ft^2)	Horizontal Force (lbs)
0.0	91	91	0	0.0	0.0

Wall Load	**Basement** (height)	2.5	**1st floor** (height)	11	**2nd floor** (height)	0
	ft^2	force (lbs)	ft^2	force (lbs)	ft^2	force (lbs)
Windward	211	1769.4	929.5	7785.5	0	0.0
Leeward	211	1084.5	929.5	4771.7	0	0.0

2nd Floor Diaphragm Shear
Total Shear (lbs) 0

1st Floor Diaphragm Shear
Total Shear (lbs) 6279

Basement Diaphragm Shear
Total Shear (lbs) 13984

Base Wind Shear 15411

Hurricane Ties

		Factors of Safety	
Uplift	(lbs)	H1	H2.5
Roof (per truss)	-342.0	**-1.71**	**-1.75**
Low roof (per truss)	-	-	-
Lateral	(lbs)	H1	H2.5
Roof (per truss)	0.0	**#DIV/0!**	**#DIV/0!**
Low roof (per truss)	0.0	-	-

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	PASS	PASS	PASS		
	Moment: 3.43	Moment: 1.3	LL Deflection: 1.83		
			Roof		
JOIST SPECIFICATION		Truss Joists	Truss Joists	Truss Joists	Truss Joists
Joist Type:	SAWN	TJI	TJI	TJI	TJI
Joist Series:	DF #2	210	360	210	210
Joist Depth (ft):	11.25	11.88	14	11.88	11.88
Joist Span (ft):	8	18	18	2	2
Joist Spacing (in):	16	16	16	16	16
LOAD PARAMETERS					
Floor Dead Load	12	12	12	12	12
Floor Live Load	60	40	55	40	40
Total Floor Load	72	52	67	52	52
Pressure Treated (Sawn Only)	No	No	No	No	No
SIMPLE SPAN JOIST					
Duration Increase	1	1	1	1	1
Joist Weight (plf)	3.375	2.8	3.3	2.8	2.8
Joist Loading (plf)	99	72	93	72	72
Max Reaction (lb)	398	649	834	72	72
Max Moment (ft-lb)	795	2921	3752	36	36
JOIST DETERMINATION					
F'b (psi)	1035	3795	7335	3795	3795
Max Bending Stress (Sawn Only) (psi)	301.5	993.6	918.8	12.3	12.3
Moment FS	**3.43**	**1.30**	**1.96**	**105.22**	**105.22**
Max Shear Capacity (lb)	2025	1655	1955	1655	1655
Shear FS	**5.09**	**2.55**	**2.34**	**22.94**	**22.94**
Bearing Required (in)	2.00	2.00	2.00	2.00	2.00
Live Load Deflection Limit	360	360	360	360	360
Live Load Deflection (in)	0.03	0.44	0.33	0.00	0.00
Allowable Live Load Deflection (in)	0.27	0.60	0.60	0.07	0.07
LL Deflection FS	**10.30**	**1.37**	**1.83**	**123.36**	**123.36**
Total Load Deflection Limit	240	240	240	240	240
Total Load Deflection (in)	0.03	0.59	0.41	0.00	0.00
Allowable Total Load Deflection (in)	0.40	0.90	0.90	0.10	0.10
TL Deflection FS	**12.44**	**1.52**	**2.17**	**136.82**	**136.82**
SELECTION	**2x12 DF #2 @ 16" O.C.**	**11 7/8" TJI 210 @ 16" O.C.**	**14" TJI 360 @ 16" O.C.**	**11 7/8" TJI 210 @ 16" O.C.**	**11 7/8" TJI 210 @ 16" O.C.**

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

Beam Page 1

RB-1	(2) 11 7/8" LVL	2.0E 2600 Fb
RB-2	(3) 18" LVL	2.0E 2600 Fb
RB-3	(2) 2X6's DF #2	
RB-4	(3) 16" LVL	2.0E 2600 Fb
RB-5	(2) 2X6's DF #2	
RB-6	(2) 2X8's DF #2	
RB-7	(2) 11 7/8" LVL	2.0E 2600 Fb
RB-8	(2) 2X10's DF #2	
RB-9	(2) 9 1/2" LVL	2.0E 2600 Fb
RB-10	(2) 2X8's DF #2	

Beam Page 2

RB-11	(2) 2X10's DF #2	
RB-12	(2) 11 7/8" LVL	2.0E 2600 Fb
RB-13	(2) 11 7/8" LVL	2.0E 2600 Fb
RB-14	5 1/8" x 27" GLB	24F-V4
RB-14 (OPT)	W10x88 Steel	Gr 50
RB-14 (OPT)	W14x53 Steel	Gr 50
RB-15	5 1/8" x 24" GLB	24F-V4
RB-16	(3) 14" LVL	2.0E 2600 Fb
RB-17	(2) 11 7/8" LVL	2.0E 2600 Fb
RB-18	(2) 2X10's DF #2	

Beam Page 3

RB-19	(2) 11 7/8" LVL	2.0E 2600 Fb
MFB-1	(2) 11 7/8" LVL	2.0E 2600 Fb
MFB-2	(2) 2X12's DF #2	
MFB-3	(2) 2X6's DF #2	
MFB-4	(2) 9 1/2" LVL	2.0E 2600 Fb
MFB-5	(2) 2X8's DF #2	

Beam Page 4

MFB-6	W12x19 Steel	Gr 50
MFB-7	(2) 9 1/2" LVL	2.0E 2600 Fb
MFB-8	(2) 11 7/8" LVL	2.0E 2600 Fb
MFB-9	W10x30 Steel	Gr 50
MFB-10	W10x30 Steel	Gr 50
MFB-11	W10x30 Steel	Gr 50
MFB-12	10 3/4" x 12" GLB	24F-V4
MFB-13	(2) 9 1/2" LVL	2.0E 2600 Fb

Plan: R1889
Date: 07/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
	(2) 11 7/8" LVL Moment: 1.42	(3) 18" LVL Moment: 1.25	(2) 2X6's DF #2 Moment: 4.02	(3) 16" LVL Moment: 1.27	(2) 2X6's DF #2 Moment: 1.18	(2) 2X8's DF #2 Moment: 1.37	(2) 11 7/8" LVL Moment: 1.07	(2) 2X10's DF #2 Moment: 1.63	(2) 9 1/2" LVL Moment: 2.09	(2) 2X8's DF #2 Moment: 1.1
Controlling Load Case	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S
Name	**RB-1**	**RB-2**	**RB-3**	**RB-4**	**RB-5**	**RB-6**	**RB-7**	**RB-8**	**RB-9**	**RB-10**
Grade	**LVL**	**LVL**	**DF #2**	**LVL**	**DF #2**	**DF #2**	**LVL**	**DF #2**	**LVL**	**DF #2**
LOADING PARAMETERS										
Floor Live Load (psf)	40	40	40	40	40	40	40	40	40	40
Floor Total Load (psf)	52	52	52	52	52	52	52	52	52	52
Roof Live Load (psf)	55	55	55	55	55	55	55	55	55	55
Roof Total Load (psf)	70	70	70	70	70	70	70	70	70	70
Wall Load (psf)	20	20	20	20	20	20	20	20	20	20
BEAM SPECIFICATIONS										
Beam Span (ft)	**12**	**16.67**	**4**	**16**	**4**	**4**	**12**	**5**	**9.67**	**4**
Beam Weight (plf)	12.06	27.41	3.30	24.36	3.30	4.35	12.06	5.55	9.64	4.35
BEAM SIZING										
Beam Depth (in)	**11.88**	**18**	**5.5**	**16**	**5.5**	**7.25**	**11.88**	**9.25**	**9.5**	**7.25**
Beam Width/Weight	**3.5**	**5.25**	**3**	**5.25**	**3**	**3**	**3.5**	**3**	**3.5**	**3**
UNIFORM LOADING										
Floor Span (ft)	0	0	0	0	0	0	0	0	0	0
Roof Span (ft)	18.5	37.5	4	31	16	24	25	18.5	13.5	29
Wall Height (ft)	2	0	2	2	3	1	2	2	0	3
Total Uniform Floor Load (plf)	0	0	0	0	0	0	0	0	0	0
Total Live Floor Load (plf)	0	0	0	0	0	0	0	0	0	0
Total Uniform Roof Load (plf)	647.5	1312.5	140	1085	560	840	875	647.5	472.5	1015
Total Live Roof Load (plf)	508.75	1031.25	110	852.5	440	660	687.5	508.75	371.25	797.5
Total Uniform Wall Load (plf)	40	0	40	40	60	20	40	40	0	60
PARTIALLY UNIFORM LOADING										
Partially Uniform Load 1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
1 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
1 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
1 End Point (ft)	0	0	0	0	0	0	0	0	0	0
1 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
Partially Uniform Load 2	----	----	----	----	----	----	----	----	----	----
2 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
2 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
POINT LOADS										
Point Load 1	---	---	---	---	---	---	---	---	---	---
1 Location (ft)	0	0	0	0	0	0	0	0	0	0
1 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
Point Load 2	---	---	---	---	---	---	---	---	---	---
2 Location (ft)	0	0	0	0	0	0	0	0	0	0
2 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
Point Load 3	---	---	---	---	---	---	---	---	---	---
3 Location (ft)	0	0	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
TAPERED LOADS										
Tapered Load Starting Point (ft)	0	0	0	0	0	0	0	0	0	0
Tapered Load Ending Point (ft)	0	0	0	0	0	0	0	0	0	0
Tapered Load at Start (plf)	0	0	0	0	0	0	0	0	0	0
Tapered Load at End (plf)	0	0	0	0	0	0	0	0	0	0
REACTIONS & MOMENT										
Duration Increase	1	1	1	1	1	1	1	1	1	1
Left Reaction (lb)	4197	11168	367	9195	1247	1729	5562	1733	2331	2159
Right Reaction (lb)	4197	11168	367	9195	1247	1729	5562	1733	2331	2159
Max Moment (lb-ft)	12592	46542	367	36780	1247	1729	16687	2166	5635	2159
Max Shear (lb)	4197	11168	367	9195	1247	1729	5562	1733	2331	2159
C_v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C_r	1.00	1.00	1.30	1.00	1.30	1.20	1.00	1.10	1.00	1.20
Area (in^2)	41.58	94.50	16.50	84.00	16.50	21.75	41.58	27.75	33.25	21.75
Moment of Inertia I (in^4)	489	2552	42	1792	42	95	489	198	250	95
Maximum Bending Stress (psi)	1835	1970	291	1970	989	789	2432	607	1284	986
Allowable Bending Stress (psi)	2604	2461	1170	2500	1170	1080	2604	990	2684	1080
Allowable Moment (lb-ft)	17862	58130	1475	46671	1475	2365	17862	3529	11775	2365
MOMENT FS	**1.42**	**1.25**	**4.02**	**1.27**	**1.18**	**1.37**	**1.07**	**1.63**	**2.09**	**1.10**
Allowable Shear Stress (psi)	285	285	180	285	180	180	285	180	285	180
Maximum Shear Capacity (lb)	7900	17955	1980	15960	1980	2610	7900	3330	6318	2610
SHEAR FS	**1.88**	**1.61**	**5.40**	**1.74**	**1.59**	**1.51**	**1.42**	**1.92**	**2.71**	**1.21**
Bearing Required	1.60	2.84	0.20	2.34	0.66	0.92	2.12	0.92	0.89	1.15
Elastic Modulus (psi)	2,000,000	2,000,000	1,600,000	2,000,000	1,600,000	1,600,000	2,000,000	1,600,000	2,000,000	1,600,000
Live Load Deflection (in)	0.25	0.35	0.01	0.35	0.04	0.03	0.33	0.02	0.15	0.03
Live Load Deflection Limit	360	360	360	360	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.40	0.56	0.13	0.53	0.13	0.13	0.40	0.17	0.32	0.13
LIVE LOAD DEFLECTION FS	**1.63**	**1.57**	**13.87**	**1.51**	**3.47**	**5.29**	**1.21**	**7.30**	**2.19**	**4.38**
Total Load Deflection (in)	0.34	0.46	0.02	0.48	0.05	0.03	0.45	0.03	0.19	0.04
Total Load Deflection Limit	240	240	240	240	240	240	240	240	240	240
Allowable Total Load Deflection (in)	0.60	0.83	0.20	0.80	0.20	0.20	0.60	0.25	0.48	0.20
TOTAL LOAD DEFLECTION FS	**1.78**	**1.81**	**12.48**	**1.68**	**3.67**	**6.06**	**1.34**	**8.04**	**2.52**	**4.86**
SELECTION	LVL (2) 11 7/8"	LVL (3) 18"	DF #2 (2) 2X6's	LVL (3) 16"	DF #2 (2) 2X6's	DF #2 (2) 2X8's	LVL (2) 11 7/8"	DF #2 (2) 2X10's	LVL (2) 9 1/2"	DF #2 (2) 2X8's

Plan: R1889
Date: 07/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
	(2) 2X10's DF #2	(2) 11 7/8" LVL	(2) 11 7/8" LVL	5 1/8" x 27" GLB	W10x88 Steel	W14x53 Steel	5 1/8" x 24" GLB	(3) 14" LVL	(2) 11 7/8" LVL	(2) 2X10's DF #2
	Moment: 1.23	Moment: 1.41	Shear: 2.06	Moment: 1.6	LL Deflection: L/665	LL Deflection: L/673	Moment: 1.81	Shear: 1.16	Moment: 1.23	Shear: 1.32
Controlling Load Case	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S	DL+S
Name	**RB-11**	**RB-12**	**RB-13**	**RB-14**	**RB-14 (OPT)**	**RB-14 (OPT)**	**RB-15**	**RB-16**	**RB-17**	**RB-18**
Grade	**DF #2**	**LVL**	**LVL**	**GLB**	**Steel**	**Steel**	**GLB**	**LVL**	**LVL**	**DF #2**
LOADING PARAMETERS										
Floor Live Load (psf)	40	40	40	40	40	40	40	40	40	40
Floor Total Load (psf)	52	52	52	52	52	52	52	52	52	52
Roof Live Load (psf)	55	55	55	55	55	55	55	55	55	55
Roof Total Load (psf)	70	70	70	70	70	70	70	70	70	70
Wall Load (psf)	20	20	20	20	20	20	20	20	20	20
BEAM SPECIFICATIONS					9'3" max unbraced	6'9" max unbraced				
Beam Span (ft)	**5.5**	**12.5**	**8**	**26**	**26**	**26**	**18.5**	**4**	**11**	**4**
Beam Weight (plf)	5.55	12.06	12.06	33.60	88.00	53.00	29.86	21.32	12.06	5.55
BEAM SIZING										
Beam Depth (in)	**9.25**	**11.88**	**11.88**	**27**	**10**	**14**	**24**	**14**	**11.88**	**9.25**
Beam Width/Weight	**3**	**3.5**	**3.5**	**5.125**	**88**	**53**	**5.125**	**5.25**	**3.5**	**3**
UNIFORM LOADING										
Floor Span (ft)	0	0	0	0	0	0	0	0	0	0
Roof Span (ft)	21.5	13.33	27	25	25	25	32	32	18.5	16
Wall Height (ft)	0	2	0	0	0	0	6	6	3	3
Total Uniform Floor Load (plf)	0	0	0	0	0	0	0	0	0	0
Total Live Floor Load (plf)	0	0	0	0	0	0	0	0	0	0
Total Uniform Roof Load (plf)	752.5	466.55	945	875	875	875	1120	1120	647.5	560
Total Live Roof Load (plf)	591.25	366.575	742.5	687.5	687.5	687.5	880	880	508.75	440
Total Uniform Wall Load (plf)	0	40	0	0	0	0	120	120	60	60
PARTIALLY UNIFORM LOADING										
Partially Uniform Load 1	-----	-----	-----	Roof	Roof	Roof	-----	-----	Roof	-----
1 Span/Height (ft)	0	0	0	2	2	2	0	0	7	0
1 Start Point (ft)	0	0	0	17.67	17.67	17.67	0	0	0	0
1 End Point (ft)	0	0	0	26	26	26	0	0	9.67	0
1 Total Partially Uniform Load (plf)	0	0	0	70	70	70	0	0	245	0
Partially Uniform Load 2	----	----	----	----	----	----	----	----	----	----
2 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
2 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0	0	0
POINT LOADS										
Point Load 1	---	RB-21 #1	RB-21 #2	RB-21 #2	RB-21 #2	RB-21 #2	---	RB-19/RB-22/RB-23	---	RB-21 #1
1 Location (ft)	0	9.67	3	4.33	4.33	4.33	0	1	0	3
1 Total Load (lb)	0	1702	0	0	0	0	0	12731	0	1702
Point Load 2	---	---	---	---	---	---	---	---	---	---
2 Location (ft)	0	0	0	0	0	0	0	0	0	0
2 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
Point Load 3	---	---	---	---	---	---	---	---	---	---
3 Location (ft)	0	0	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0	0	0
TAPERED LOADS										
Tapered Load Starting Point (ft)	0	0	0	0	0	0	0	0	0	0
Tapered Load Ending Point (ft)	0	0	0	0	0	0	0	0	0	0
Tapered Load at Start (plf)	0	0	0	0	0	0	0	0	0	0
Tapered Load at End (plf)	0	0	0	0	0	0	0	0	0	0
REACTIONS & MOMENT										
Duration Increase	1	1	1	1	1	1	1	1	1	1
Left Reaction (lb)	2085	3627	3828	11905	12612	12157	11746	12071	5285	1677
Right Reaction (lb)	2085	4558	3828	12301	13009	12554	11746	5705	4999	2528
Max Moment (lb-ft)	2865	12681	7656	77996	82592	79635	54325	10804	14481	2247
Max Shear (lb)	2085	4558	3828	12301	13009	12554	11746	12071	5285	2528
C_v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C_r	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10
Area (in^2)	27.75	41.58	41.58	138.38	---	---	123.00	73.50	41.58	27.75
Moment of Inertia I (in^4)	198	489	489	8406	534	541	5904	1201	489	198
Maximum Bending Stress (psi)	804	1848	1116	1503	9280	12365	1325	756	2111	630
Allowable Bending Stress (psi)	990	2604	2604	2400	470833	362917	2400	2546	2604	990
Allowable Moment (lb-ft)	3529	17862	17862	124538	281936	217315	98400	36387	17862	3529
MOMENT FS	**1.23**	**1.41**	**2.33**	**1.60**	**3.41**	**2.73**	**1.81**	**3.37**	**1.23**	**1.57**
Allowable Shear Stress (psi)	180	285	285	265	---	---	265	285	285	180
Maximum Shear Capacity (lb)	3330	7900	7900	24446	93750	157500	21730	13965	7900	3330
SHEAR FS	**1.60**	**1.73**	**2.06**	**1.99**	**7.21**	**12.55**	**1.85**	**1.16**	**1.49**	**1.32**
Bearing Required	1.11	1.74	1.46	3.69	---	---	3.53	3.07	2.01	1.35
Elastic Modulus (psi)	1,600,000	2,000,000	2,000,000	1,800,000	29,000,000	29,000,000	1,800,000	2,000,000	2,000,000	1,600,000
Live Load Deflection (in)	0.04	0.27	0.07	0.48	0.47	0.46	0.22	0.01	0.24	0.01
Live Load Deflection Limit	360	360	360	360	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.18	0.42	0.27	0.87	0.87	0.87	0.62	0.13	0.37	0.13
LIVE LOAD DEFLECTION FS	**4.72**	**1.55**	**3.77**	**1.80**	**1.85**	**1.87**	**2.80**	**15.02**	**1.55**	**8.95**
Total Load Deflection (in)	0.05	0.37	0.09	0.63	0.66	0.62	0.32	0.01	0.33	0.02
Total Load Deflection Limit	240	240	240	240	240	240	240	240	240	240
Allowable Total Load Deflection (in)	0.28	0.63	0.40	1.30	1.30	1.30	0.93	0.20	0.55	0.20
TOTAL LOAD DEFLECTION FS	**5.53**	**1.68**	**4.39**	**2.05**	**1.98**	**2.08**	**2.91**	**17.18**	**1.69**	**9.92**
SELECTION	DF #2 (2) 2X10's	LVL (2) 11 7/8"	LVL (2) 11 7/8"	GLB 5 1/8" x 27"	Steel W10x88	Steel W14x53	GLB 5 1/8" x 24"	LVL (3) 14"	LVL (2) 11 7/8"	DF #2 (2) 2X10's

Plan: R1889
Date: 07/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	PASS	PASS	PASS	PASS	PASS	PASS
	(2) 11 7/8" LVL	(2) 11 7/8" LVL	(2) 2X12's DF #2	(2) 2X6's DF #2	(2) 9 1/2" LVL	(2) 2X8's DF #2
	Moment: 1.97	Moment: 1.28	Moment: 2.01	Moment: 3.22	TL Deflection: L/273	Moment: 1.54
Controlling Load Case	DL+0.75LL+0.75S	DL+0.75LL+0.75S	DL+LL	DL+LL	DL+LL	DL+LL
Name	**RB-19**	**MFB-1**	**MFB-2**	**MFB-3**	**MFB-4**	**MFB-5**
Grade	**LVL**	**LVL**	**DF #2**	**DF #2**	**LVL**	**DF #2**
LOADING PARAMETERS						
Floor Live Load (psf)	40	40	40	40	40	40
Floor Total Load (psf)	52	52	52	52	52	52
Roof Live Load (psf)	55	55	55	55	55	55
Roof Total Load (psf)	70	70	70	70	70	70
Wall Load (psf)	20	20	20	20	20	20
BEAM SPECIFICATIONS						
Beam Span (ft)	**11.5**	**9**	**10**	**4**	**12**	**5**
Beam Weight (plf)	12.06	12.06	6.75	3.30	9.64	4.35
BEAM SIZING						
Beam Depth (in)	**11.88**	**11.88**	**11.25**	**5.5**	**9.5**	**7.25**
Beam Width/Weight	**3.5**	**3.5**	**3**	**3**	**3.5**	**3**
UNIFORM LOADING						
Floor Span (ft)	0	26	7	6	18.5	16
Roof Span (ft)	0	13	0	0	0	0
Wall Height (ft)	0	0	0	3.5	3.5	3.5
Total Uniform Floor Load (plf)	0	546	182	156	481	416
Total Live Floor Load (plf)	0	390	140	120	370	320
Total Uniform Roof Load (plf)	0	365.625	0	0	0	0
Total Live Roof Load (plf)	0	268.125	0	0	0	0
Total Uniform Wall Load (plf)	0	0	0	70	70	70
PARTIALLY UNIFORM LOADING						
Partially Uniform Load 1	-----	Roof	-----	-----	-----	-----
1 Span/Height (ft)	0	-13	0	0	0	0
1 Start Point (ft)	0	2.67	0	0	0	0
1 End Point (ft)	0	5.67	0	0	0	0
1 Total Partially Uniform Load (plf)	0	-365.625	0	0	0	0
Partially Uniform Load 2	----	----	----	----	----	----
2 Span/Height (ft)	0	0	0	0	0	0
2 Start Point (ft)	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0
POINT LOADS						
Point Load 1	---	RB-18 Left	---	---	---	---
1 Location (ft)	0	2.67	0	0	0	0
1 Total Load (lb)	0	1677	0	0	0	0
Point Load 2	---	RB-18 Right	---	---	---	---
2 Location (ft)	0	5.67	0	0	0	0
2 Total Load (lb)	0	2528	0	0	0	0
Point Load 3	---	---	---	---	---	---
3 Location (ft)	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0
TAPERED LOADS						
Tapered Load Starting Point (ft)	0	0	0	0	0	0
Tapered Load Ending Point (ft)	11.5	0	0	0	0	0
Tapered Load at Start (plf)	0	0	0	0	0	0
Tapered Load at End (plf)	560	0	0	0	0	0
REACTIONS & MOMENT						
Duration Increase	1	1	1	1	1	1
Left Reaction (lb)	1143	5682	944	459	3364	1226
Right Reaction (lb)	2216	5738	944	459	3364	1226
Max Moment (lb-ft)	9079	13970	2359	459	10092	1532
Max Shear (lb)	2216	5738	944	459	3364	1226
C_v	1.00	1.00	1.00	1.00	1.00	1.00
C_f	1.00	1.00	1.00	1.30	1.00	1.20
Area (in^2)	41.58	41.58	33.75	16.50	33.25	21.75
Moment of Inertia I (in^4)	489	489	356	42	250	95
Maximum Bending Stress (psi)	1323	2036	447	364	2300	700
Allowable Bending Stress (psi)	2604	2604	900	1170	2684	1080
Allowable Moment (lb-ft)	17862	17862	4746	1475	11775	2365
MOMENT FS	**1.97**	**1.28**	**2.01**	**3.22**	**1.17**	**1.54**
Allowable Shear Stress (psi)	285	285	180	180	285	180
Maximum Shear Capacity (lb)	7900	7900	4050	1980	6318	2610
SHEAR FS	**3.57**	**1.38**	**4.29**	**4.32**	**1.88**	**2.13**
Bearing Required	0.84	2.19	0.50	0.24	1.28	0.65
Elastic Modulus (psi)	2,000,000	2,000,000	1,600,000	1,600,000	2,000,000	1,600,000
Live Load Deflection (in)	0.18	0.15	0.06	0.01	0.35	0.03
Live Load Deflection Limit	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.38	0.30	0.33	0.13	0.40	0.17
LIVE LOAD DEFLECTION FS	**2.14**	**2.01**	**5.97**	**12.71**	**1.15**	**5.59**
Total Load Deflection (in)	0.23	0.20	0.08	0.02	0.53	0.05
Total Load Deflection Limit	240	240	240	240	240	240
Allowable Total Load Deflection (in)	0.58	0.45	0.50	0.20	0.60	0.25
TOTAL LOAD DEFLECTION FS	**2.47**	**2.24**	**6.64**	**9.98**	**1.14**	**5.47**
SELECTION	LVL	LVL	DF #2	DF #2	LVL	DF #2
	(2) 11 7/8"	(2) 11 7/8"	(2) 2X12's	(2) 2X6's	(2) 9 1/2"	(2) 2X8's

Plan: R1889
Date: 07/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
	W12x19 Steel	(2) 9 1/2" LVL	(2) 11 7/8" LVL	W10x30 Steel	W10x30 Steel	W10x30 Steel	10 3/4" x 12" GLB	(2) 9 1/2" LVL
	LL Deflection: L/588	Moment: 1.35	Moment: 11.54	Moment: 5.43	Moment: 17.23	LL Deflection: L/397	LL Deflection: L/472	Moment: 1.51
Controlling Load Case	DL+LL	DL+LL	DL+LL	DL+LL	DL+LL	DL+LL	DL+LL	DL+LL
Name	**MFB-6**	**MFB-7**	**MFB-8**	**MFB-9**	**MFB-10**	**MFB-11**	**MFB-12**	**MFB-13**
Grade	**Steel**	**LVL**	**LVL**	**Steel**	**Steel**	**Steel**	**GLB**	**LVL**
LOADING PARAMETERS								
Floor Live Load (psf)	40	40	40	40	40	40	60	40
Floor Total Load (psf)	52	52	52	52	52	52	72	52
Roof Live Load (psf)	55	55	55	55	55	55	55	55
Roof Total Load (psf)	70	70	70	70	70	70	70	70
Wall Load (psf)	20	20	20	20	20	20	20	20
BEAM SPECIFICATIONS	2'10" max unbraced			4'10" max unbraced	4'10" max unbraced	4'10" max unbraced		
Beam Span (ft)	**18**	**11.33**	**10.33**	**11.33**	**8**	**15.5**	**19.5**	**10**
Beam Weight (plf)	19.00	9.64	12.06	30.00	30.00	30.00	31.32	9.64
BEAM SIZING								
Beam Depth (in)	**12**	**9.5**	**11.88**	**10**	**10**	**10**	**12**	**9.5**
Beam Width/Weight	**19**	**3.5**	**3.5**	**30**	**30**	**30**	**10.75**	**3.5**
UNIFORM LOADING								
Floor Span (ft)	16	18.33	4	24.33	24.33	16	14	19
Roof Span (ft)	0	0	0	0	0	0	0	0
Wall Height (ft)	3.5	3.5	0	0	0	0	0	6
Total Uniform Floor Load (plf)	416	476.58	104	632.58	632.58	416	504	494
Total Live Floor Load (plf)	320	366.6	80	486.6	486.6	320	420	380
Total Uniform Roof Load (plf)	0	0	0	0	0	0	0	0
Total Live Roof Load (plf)	0	0	0	0	0	0	0	0
Total Uniform Wall Load (plf)	70	70	0	0	0	0	0	120
PARTIALLY UNIFORM LOADING								
Partially Uniform Load 1	Floor	Floor	-----	-----	-----	Floor	-----	-----
1 Span/Height (ft)	13.005	-5.5	0	0	0	10.33	0	0
1 Start Point (ft)	0	9	0	0	0	0	0	0
1 End Point (ft)	18	11.33	0	0	0	7	0	0
1 Total Partially Uniform Load (plf)	338.13	-143	0	0	0	268.58	0	0
Partially Uniform Load 2	----	----	----	----	----	----	----	----
2 Span/Height (ft)	0	0	0	0	0	0	0	0
2 Start Point (ft)	0	0	0	0	0	0	0	0
2 End Point (ft)	0	0	0	0	0	0	0	0
2 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0
Partially Uniform Load 3	----	----	----	----	----	----	----	----
3 Span/Height (ft)	0	0	0	0	0	0	0	0
3 Start Point (ft)	0	0	0	0	0	0	0	0
3 End Point (ft)	0	0	0	0	0	0	0	0
3 Total Partially Uniform Load (plf)	0	0	0	0	0	0	0	0
POINT LOADS								
Point Load 1	---	---	---	RB-14 Left	---	MFB-8 Right	---	---
1 Location (ft)	0	0	0	1	0	7.5	0	0
1 Total Load (lb)	0	0	0	11905	0	599	0	0
Point Load 2	---	---	---	---	---	RB-13/RB-14	---	---
2 Location (ft)	0	0	0	0	0	7.5	0	0
2 Total Load (lb)	0	0	0	0	0	16130	0	0
Point Load 3	---	---	---	---	---	---	---	---
3 Location (ft)	0	0	0	0	0	0	0	0
3 Total Load (lb)	0	0	0	0	0	0	0	0
TAPERED LOADS								
Tapered Load Starting Point (ft)	0	0	0	0	0	0	0	0
Tapered Load Ending Point (ft)	0	0	0	0	0	0	0	0
Tapered Load at Start (plf)	0	0	0	0	0	0	0	0
Tapered Load at End (plf)	0	0	0	0	0	0	0	0
REACTIONS & MOMENT								
Duration Increase	1	1	1	1	1	1	1	1
Left Reaction (lb)	7588	3117	599	14608	2650	13546	5219	3118
Right Reaction (lb)	7588	2852	599	4804	2650	11976	5219	3118
Max Moment (lb-ft)	34147	8732	1548	16822	5301	81534	25444	7796
Max Shear (lb)	7588	3117	599	14608	2650	13546	5219	3118
C_v	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C_f	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Area (in^2)	---	33.25	41.58	---	---	---	129.00	33.25
Moment of Inertia I (in^4)	130	250	489	170	170	170	1548	250
Maximum Bending Stress (psi)	18912	1990	226	5937	1871	28777	1183	1777
Allowable Bending Stress (psi)	102917	2684	2604	152500	152500	152500	2400	2684
Allowable Moment (lb-ft)	61627	11775	17862	91317	91317	91317	51600	11775
MOMENT FS	**1.80**	**1.35**	**11.54**	**5.43**	**17.23**	**1.12**	**2.03**	**1.51**
Allowable Shear Stress (psi)	---	285	285	---	---	---	265	285
Maximum Shear Capacity (lb)	90000	6318	7900	93750	93750	93750	22790	6318
SHEAR FS	**11.86**	**2.03**	**13.18**	**6.42**	**35.37**	**6.92**	**4.37**	**2.03**
Bearing Required	---	1.19	0.23	---	---	---	0.75	1.19
Elastic Modulus (psi)	29,000,000	2,000,000	2,000,000	29,000,000	29,000,000	29,000,000	1,800,000	2,000,000
Live Load Deflection (in)	0.37	0.27	0.02	0.06	0.01	0.47	0.50	0.17
Live Load Deflection Limit	360	360	360	360	360	360	360	360
Allowable Live Load Deflection (in)	0.60	0.38	0.34	0.38	0.27	0.52	0.65	0.33
LIVE LOAD DEFLECTION FS	**1.63**	**1.42**	**16.27**	**5.95**	**29.03**	**1.10**	**1.31**	**1.93**
Total Load Deflection (in)	0.53	0.41	0.03	0.08	0.01	0.61	0.63	0.28
Total Load Deflection Limit	240	240	240	240	240	240	240	240
Allowable Total Load Deflection (in)	0.90	0.57	0.52	0.57	0.40	0.78	0.98	0.50
TOTAL LOAD DEFLECTION FS	**1.69**	**1.40**	**16.82**	**6.74**	**31.97**	**1.28**	**1.54**	**1.76**
SELECTION	Steel W12x19	LVL (2) 9 1/2"	LVL (2) 11 7/8"	Steel W10x30	Steel W10x30	Steel W10x30	GLB 10 3/4" x 12"	LVL (2) 9 1/2"

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	PASS	PASS	PASS	PASS	PASS
	8x8 POST	**4x6 POST**	**3 1/2" x 5 1/4" Parallam**	**8x8 POST**	**8x8 POST**
Controlling Factor	FS:2.2 Axial Compression	FS:1.3 Axial Compression	FS:1.6 Axial Compression	FS:4.8 Axial Compression	FS:2.2 Axial Compression
Location:	**RB-13/RB-14**	**RB-14**	**MFB-9**	**MFB-9/MFB-10**	**MFB-10/MFB-11**
	---	Left	Left	---	---
COLUMN DIMENSIONS:					
Total Column Length (ft):	10	10	10	10	10
X-Unbraced Length (ft):	10	10	10	10	10
Y-Unbraced Length (ft):	0	0	0	0	0
MATERIAL SPECS:					
Material:	Doug Fir #2	Doug Fir #2	Parallam	Doug Fir #2	Doug Fir #2
Depth-x (in):	7.5	5.5	5.25	7.5	7.5
Width-y (in):	7.5	3.5	3.5	7.5	7.5
# Members	1	1	1	1	1
Choose Post or Stud spacing	Post	Post	Post	Post	Post
Post, Axial Load (lbs)	16130	11905	14608	7455	16197
Post, Lateral Loading (plf)	0	0	0	0	0
Loading for Stud Design					
Lateral Loading (psf)	0	0	0	0	0
Roof Span (ft)	0	0	0	0	0
Floor Span (ft)	0	0	0	0	0
Additional Wall Height (ft)	0	0	0	0	0
Allowable Bending Stress (psi)	1,728	2,153	4,416	1,728	1,728
F_{bE}	423,000	155,018	256,166	423,000	423,000
Moment of Inertia (in^4)	264	49	42	264	264
D+ (0.6W)					
Bending Stress (f_b)	0	0	0	0	0
f_c (psi)	287	618	795	133	288
Bending and Axial (3.9-3)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
D + 0.75L + 0.75S + 0.75(0.6W)					
Bending Stress (f_b)	0	0	0	0	0
f_c (psi)	287	618	795	133	288
Bending and Axial (3.9-3)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
MATERIAL PROPERTIES:					
Area (in^2)	56.25	19.25	18.38	56.25	56.25
F_c	700	1,350	2,500	700	700
E	1,300,000	1,600,000	1,800,000	1,300,000	1,300,000
E_{min}	470,000	580,000	914,880	470,000	470,000
Lex/dx	16.00	21.82	22.86	16.00	16.00
Ley/dy	0.00	0.00	0.00	0.00	0.00
FACTORS:					
C_d (axial loads)	1	1	1	1	1
C_d (lateral loads)	1.6	1.6	1.6	1.6	1.6
C_L	1.000	0.999	0.999	1.000	1.000
Cf (compression)	1.05	1.1	1	1.05	1.05
Cf (bending)	1.2	1.3	1	1.2	1.2
Cr (bending only)	1	1.15	1.15	1	1
Ke	1	1	1	1	1
Fc*	735	1,485	2,500	735	735
Fce	1,509	1,002	1,439	1,509	1,509
Cp	0.87	0.54	0.52	0.87	0.87
F'c	641	808	1,299	641	641
Allowable Load (lbs)	**36,030**	**15,561**	**23,868**	**36,030**	**36,030**
Wind Deflection (in)	0.00	0.00	0.00	0.00	0.00
Wind Load Deflection Limit	120	120	120	120	120
Allowable Deflection (in)	1.0	1.0	1.0	1.0	1.0

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

	PASS	PASS	PASS	PASS	PASS
	(4) 2x6	(2) 2x6	4x6 POST	(2) 2x4	4x4 POST
Controlling Factor	FS:1.4 Axial Compression	FS:1.5 Axial Compression	FS:1.1 Axial Compression	FS:1.9 Axial Compression	FS:2.5 Axial Compression
Location:	**MFB-6/RB-15**	**MFB-4/RB-7**	**MFB-12**	**RB-11**	**MFB-2**
	---	---	---	---	---
COLUMN DIMENSIONS:					
Total Column Length (ft):	10	10	10	10	10
X-Unbraced Length (ft):	10	10	10	10	10
Y-Unbraced Length (ft):	0	0	0	0	0
MATERIAL SPECS:					
Material:	Doug Fir #2	Doug Fir #2	Doug Fir #2	Doug Fir #2	Doug Fir #2
Depth-x (in):	5.5	5.5	5.5	3.5	3.5
Width-y (in):	1.5	1.5	3.5	1.5	3.5
# Members	4	2	1	2	1
Choose Post or Stud spacing	Post	Post	Post	Post	Post
Post, Axial Load (lbs)	19334	8926	13546	2085	1888
Post, Lateral Loading (plf)	0	0	0	0	0
Loading for Stud Design					
Lateral Loading (psf)	0	0	0	0	0
Roof Span (ft)	0	0	0	0	0
Floor Span (ft)	0	0	0	0	0
Additional Wall Height (ft)	0	0	0	0	0
Allowable Bending Stress (psi)	2,153	2,153	2,153	2,484	2,484
F_{bE}	455,564	113,891	155,018	178,971	243,600
Moment of Inertia (in^4)	83	42	49	11	13
D+ (0.6W)					
Bending Stress (f_b)	0	0	0	0	0
f_c (psi)	586	541	704	199	154
Bending and Axial (3.9-3)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
D + 0.75L + 0.75S + 0.75(0.6W)					
Bending Stress (f_b)	0	0	0	0	0
f_c (psi)	586	541	704	199	154
Bending and Axial (3.9-3)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
MATERIAL PROPERTIES:					
Area (in^2)	33.00	16.50	19.25	10.50	12.25
F_c	1,350	1,350	1,350	1,350	1,350
E	1,600,000	1,600,000	1,600,000	1,600,000	1,600,000
E_{min}	580,000	580,000	580,000	580,000	580,000
Lex/dx	21.82	21.82	21.82	34.29	34.29
Ley/dy	0.00	0.00	0.00	0.00	0.00
FACTORS:					
C_d (axial loads)	1	1	1	1	1
C_d (lateral loads)	1.6	1.6	1.6	1.6	1.6
C_L	1.000	0.999	0.999	0.999	0.999
Cf (compression)	1.1	1.1	1.1	1.15	1.15
Cf (bending)	1.3	1.3	1.3	1.5	1.5
Cr (bending only)	1.15	1.15	1.15	1.15	1.15
Ke	1	1	1	1	1
Fc*	1,485	1,485	1,485	1,553	1,553
Fce	1,002	1,002	1,002	406	406
Cp	0.54	0.54	0.54	0.25	0.25
F'c	808	808	808	381	381
Allowable Load (lbs)	**26,676**	**13,338**	**15,561**	**3,999**	**4,665**
Wind Deflection (in)	0.00	0.00	0.00	0.00	0.00
Wind Load Deflection Limit	120	120	120	120	120
Allowable Deflection (in)	1.0	1.0	1.0	1.0	1.0

Plan: R1889
Date: 7/15/2019
Location: R1889 - 1088 Maple Drive, Huntsville, UT, USA

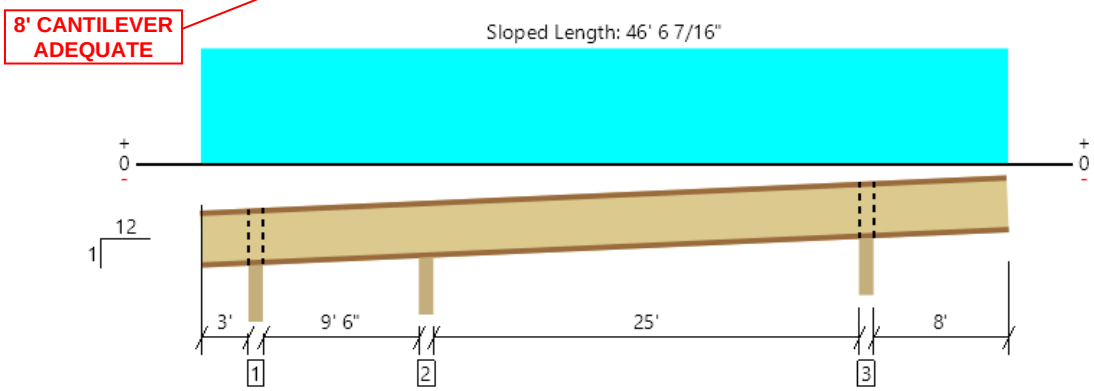
	PASS FS: 1.26	PASS FS: 1.13	PASS FS: 1.24	PASS FS: 1.36	PASS FS: 2.46
INPUT					
Location:	MFB-9	MFB-10/MFB-11	MFB-6/RB-15	MFB-12	MFB-9/MFB-10
Callout	S-42	S-42	S-48	S-42	S-42
Column Width (in)	3.5	3.5	3.5	3.5	3.5
Load (lb)	14,608	16,197	19,334	13,546	7,455
SPECS					
Soil Bearing Pressure (psf)	1500	1500	1500	1500	1500
Footing Width/Diameter (in)	42	42	48	42	42
Footing Length/Diameter (in)	42	42	48	42	42
Footing Depth (in)	10	10	12	10	10
CALCULATIONS					
Area Required (ft^2)	9.74	10.80	12.89	9.03	4.97
Area Provided (ft^2)	12.25	12.25	16.00	12.25	12.25
FLEXURE					
M_u (lb-ft/ft)	2323.43	2576.13	3145.48	2154.59	1185.67
ΦMn (lb-ft/ft)	6396.31	6396.31	8950.37	6396.31	6396.31
ONE WAY SHEAR					
V_u (kip)	1.96	2.17	2.13	1.81	1.00
ΦV_c (kip)	6.16	6.16	8.13	6.16	6.16
PUNCHING SHEAR					
V_u (kip)	20.9	23.2	27.5	19.4	10.7
ΦV_c (kip)	40.1	40.1	63.7	40.1	40.1
SELECTION	**S-42 42" Square by 10" Deep Concrete Footing with (5) #4 Bars Each Way**	**S-42 42" Square by 10" Deep Concrete Footing with (5) #4 Bars Each Way**	**S-48 48" Square by 12" Deep Concrete Footing with (6) #4 Bars Each Way**	**S-42 42" Square by 10" Deep Concrete Footing with (5) #4 Bars Each Way**	**S-42 42" Square by 10" Deep Concrete Footing with (5) #4 Bars Each Way**

	PASS FS: 1.53	PASS FS: 4.97			
INPUT					
Location:	MFB-11	MFB-2	---	---	---
Callout	S-42	S-30	S-24	S-24	S-24
Column Width (in)	3.5	3.5	3.5	3.5	3.5
Load (lb)	11,976	1,888	10	10	10
SPECS					
Soil Bearing Pressure (psf)	1500	1500	1500	1500	1500
Footing Width/Diameter (in)	42	30	24	24	24
Footing Length/Diameter (in)	42	30	24	24	24
Footing Depth (in)	10	10	10	10	10
CALCULATIONS					
Area Required (ft^2)	7.98	1.26	0.01	0.01	0.01
Area Provided (ft^2)	12.25	6.25	4.00	4.00	4.00
FLEXURE					
M_u (lb-ft/ft)	1904.78	278.78	1.38	1.38	1.38
ΦMn (lb-ft/ft)	6396.31	5413.24	6700.37	6700.37	6700.37
ONE WAY SHEAR					
V_u (kip)	1.60	0.27	0.00	0.00	0.00
ΦV_c (kip)	6.16	6.16	6.16	6.16	6.16
PUNCHING SHEAR					
V_u (kip)	17.2	2.6	0.0	0.0	0.0
ΦV_c (kip)	40.1	40.1	40.1	40.1	40.1
SELECTION	**S-42 42" Square by 10" Deep Concrete Footing with (5) #4 Bars Each Way**	**S-30 30" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**	**S-24 24" Square by 10" Deep Concrete Footing with (3) #4 Bars Each Way**

Level, Cantilevered Roof

1 piece(s) 14" TJI® 560 @ 16" OC

Right overhang exceeds the maximum length of 7' for this product.



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

Member Length : 46' 7 5/8"

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2090 @ 12' 11 1/4"	3462 (3.50")	Passed (60%)	1.15	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	1152 @ 13' 1"	2749	Passed (42%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	-4655 @ 12' 11 1/4"	12966	Passed (36%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.431 @ 26' 4 7/8"	1.269	Passed (L/706)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.497 @ 26' 4 1/4"	1.692	Passed (L/613)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 1/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Top Edge Bracing (Lu): Top compression edge must be braced at 9' 11" o/c unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 9' 1" o/c unless detailed otherwise.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beveled Plate - DF	3.50"	3.50"	3.50"	48	481	529	Blocking
2 - Beveled Plate - DF	3.50"	3.50"	3.50"	302	1788	2090	None
3 - Beveled Plate - DF	3.50"	3.50"	3.50"	270	1486	1756	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 46' 4 1/2"	16"	10.0	55.0	Default Load

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

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

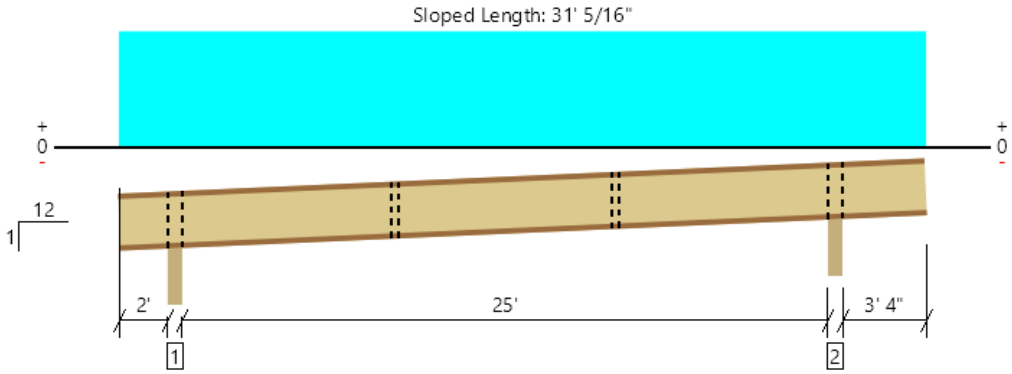
Weyerhaeuser

SUSTAINABLE FORESTRY INITIATIVE

ForteWEB Software Operator	Job Notes
Jacob York Engineering (801) 876-3501 jacobw@yorkengr.com	

Level, Garage Roof

Current Solution: 1 piece(s) 14" TJI® 360 @ 16" OC



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

Member Length : 31' 1 7/16"

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 1/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1523 @ 27' 5 1/4"	2839 (3.50")	Passed (54%)	1.15	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	1120 @ 27' 3 1/2"	2248	Passed (50%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	7232 @ 14' 8 7/16"	8435	Passed (86%)	1.15	1.0 D + 1.0 S (Alt Spans)
Live Load Defl. (in)	1.165 @ 14' 9 3/16"	1.269	Passed (L/261)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	1.475 @ 14' 9 1/8"	1.692	Passed (L/207)	--	1.0 D + 1.0 S (Alt Spans)

All Product Solutions				
Depth	Series	Plies	Spacing	Wood Volume
14"	TJI® 360	1	16"	1.05

The purpose of this report is for product comparison only. Load and support information necessary for professional design review is not displayed here. Please print an individual Member Report for submittal purposes.

ForteWEB Software Operator	Job Notes
Jacob York Engineering (801) 876-3501 jacobw@yorkengr.com	

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: 15 AUG 2019, 7:31AM

Wood Beam

File = \\MORGAN-SHARE\AAwork\DESIGN~1\HABITA~1\Rambler\2019\R1889-~1\Beams.ec6 .

Lic. # : KW-06012024 — York Engineering

DESCRIPTION: RB-20

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

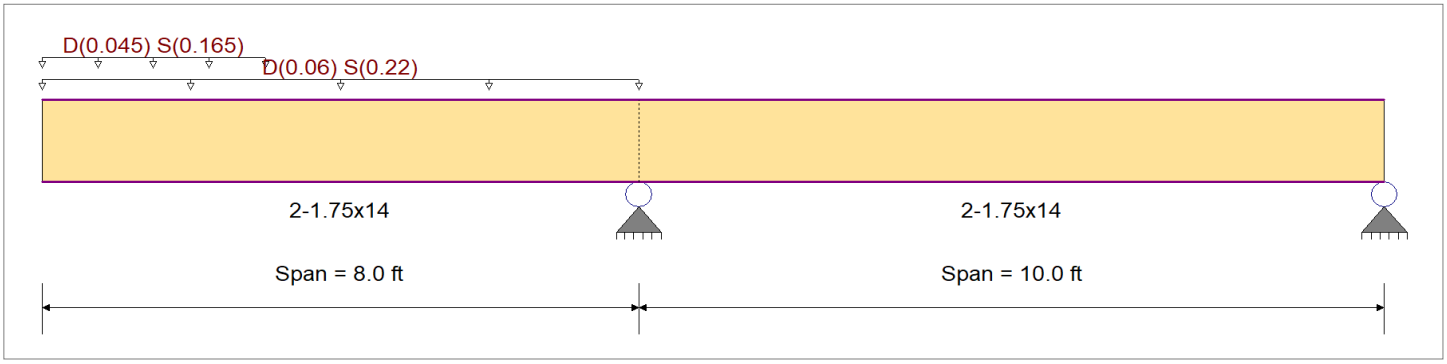
Wood Species : Trus Joist
Wood Grade : MicroLam LVL 1.9 E

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

Fb +	2,600.0 psi
Fb -	2,600.0 psi
Fc - Prll	2,510.0 psi
Fc - Perp	750.0 psi
Fv	285.0 psi
Ft	1,555.0 psi

E : Modulus of Elasticity

Ebend- xx	1,900.0 ksi
Eminbend - xx	965.71 ksi
Density	42.010 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, S = 0.0550 ksf, Tributary Width = 4.0 ft
Uniform Load : D = 0.0150, S = 0.0550 ksf, Extent = 0.0 -->> 3.0 ft, Tributary Width = 3.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.474 : 1	Maximum Shear Stress Ratio	=	0.247 : 1
Section used for this span		2-1.75x14	Section used for this span		2-1.75x14
fb : Actual	=	1,418.22 psi	fv : Actual	=	80.89 psi
FB : Allowable	=	2,990.00 psi	Fv : Allowable	=	327.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	6.838 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.509 in	Ratio =	376 >=360
Max Upward Transient Deflection	-0.076 in	Ratio =	1581 >=360
Max Downward Total Deflection	0.665 in	Ratio =	288 >=180
Max Upward Total Deflection	-0.098 in	Ratio =	1226 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H													0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.146	0.077	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	2340.00	0.64	19.68	256.50
Length = 10.0 ft	2	0.146	0.077	0.90	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	2340.00	0.38	19.68	256.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.131	0.069	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	2600.00	0.64	19.68	285.00
Length = 10.0 ft	2	0.131	0.069	1.00	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	2600.00	0.38	19.68	285.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.105	0.055	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	3250.00	0.64	19.68	356.25

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: 15 AUG 2019, 7:31AM

Wood Beam

File = \\MORGAN-SHARE\AAwork\DESIGN~1\HABITA~1\Rambler\2019\R1889-~1\Beams.ec6 .

Lic. # : KW-06012024 — York Engineering

DESCRIPTION: RB-20

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 10.0 ft	2	0.105	0.055	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	3250.00	0.38	19.68	356.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.474	0.247	1.15	1.000	1.00	1.00	1.00	1.00	1.00	13.51	1,418.22	2990.00	2.64	80.89	327.75
Length = 10.0 ft	2	0.474	0.247	1.15	1.000	1.00	1.00	1.00	1.00	1.00	13.51	1,418.22	2990.00	1.41	80.89	327.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.105	0.055	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	3250.00	0.64	19.68	356.25
Length = 10.0 ft	2	0.105	0.055	1.25	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	3250.00	0.38	19.68	356.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.384	0.200	1.15	1.000	1.00	1.00	1.00	1.00	1.00	10.95	1,149.07	2990.00	2.14	65.59	327.75
Length = 10.0 ft	2	0.384	0.200	1.15	1.000	1.00	1.00	1.00	1.00	1.00	10.95	1,149.07	2990.00	1.15	65.59	327.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.082	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	4160.00	0.64	19.68	456.00
Length = 10.0 ft	2	0.082	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	4160.00	0.38	19.68	456.00
+D+0.750Lr+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.082	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	4160.00	0.64	19.68	456.00
Length = 10.0 ft	2	0.082	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	4160.00	0.38	19.68	456.00
+D+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.276	0.144	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.95	1,149.07	4160.00	2.14	65.59	456.00
Length = 10.0 ft	2	0.276	0.144	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.95	1,149.07	4160.00	1.15	65.59	456.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.049	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.95	204.98	4160.00	0.39	11.81	456.00
Length = 10.0 ft	2	0.049	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.95	204.98	4160.00	0.23	11.81	456.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.082	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	4160.00	0.64	19.68	456.00
Length = 10.0 ft	2	0.082	0.043	1.60	1.000	1.00	1.00	1.00	1.00	1.00	3.25	341.63	4160.00	0.38	19.68	456.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.276	0.144	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.95	1,149.07	4160.00	2.14	65.59	456.00
Length = 10.0 ft	2	0.276	0.144	1.60	1.000	1.00	1.00	1.00	1.00	1.00	10.95	1,149.07	4160.00	1.15	65.59	456.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 8.0 ft	1	0.049	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.95	204.98	4160.00	0.39	11.81	456.00
Length = 10.0 ft	2	0.049	0.026	1.60	1.000	1.00	1.00	1.00	1.00	1.00	1.95	204.98	4160.00	0.23	11.81	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.6649	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S+H	-0.0979	4.246

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		4.407	-1.280
Overall MINimum		3.281	-0.254
+D+H		1.126	-0.254
+D+L+H		1.126	-0.254
+D+Lr+H		1.126	-0.254
+D+S+H		4.407	-1.280
+D+0.750Lr+0.750L+H		1.126	-0.254
+D+0.750L+0.750S+H		3.587	-1.023
+D+0.60W+H		1.126	-0.254
+D+0.750Lr+0.450W+H		1.126	-0.254
+D+0.750S+0.450W+H		3.587	-1.023
+0.60D+0.60W+0.60H		0.676	-0.152
+D+0.70E+0.60H		1.126	-0.254
+D+0.750L+0.750S+0.5250E+H		3.587	-1.023
+0.60D+0.70E+H		0.676	-0.152
D Only		1.126	-0.254
Lr Only			
L Only			
S Only		3.281	-1.026
W Only			
E Only			

Wood Beam

DESCRIPTION: RB-20

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
H Only			

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: 15 AUG 2019, 8:26AM

Wood Beam

File = \\MORGAN-SHARE\AAwork\DESIGN~1\HABITA~1\Rambler\2019\R1889-~1\Beams.ec6 .

Lic. # : KW-06012024 — York Engineering

DESCRIPTION: RB-21

CODE REFERENCES

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

Material Properties

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

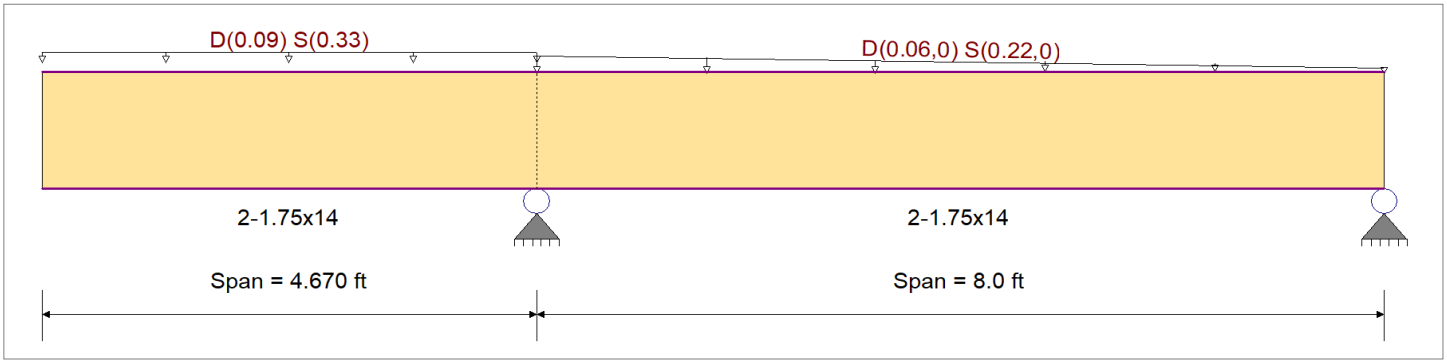
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 1.9 E

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

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 psi

E : Modulus of Elasticity

Ebend- xx	1900 ksi
Eminbend - xx	965.71 ksi
Density	42.01 pcf



Applied Loads

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

Load for Span Number 1
Uniform Load : D = 0.0150, S = 0.0550 ksf, Tributary Width = 6.0 ft, (Roof)
Load for Span Number 2
Varying Uniform Load : D= 0.0150->0.0150, S= 0.0550->0.0550 ksf, Extent = 0.0 -->> 8.0 ft, Trib Width = 4.0->0.0 ft, (Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.164 : 1	Maximum Shear Stress Ratio	=	0.138 : 1
Section used for this span		2-1.75x14	Section used for this span		2-1.75x14
fb : Actual	=	480.69 psi	fv : Actual	=	45.28 psi
FB : Allowable	=	2,927.97 psi	Fv : Allowable	=	327.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	4.670 ft	Location of maximum on span	=	3.522 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.060 in	Ratio =	1866	>=360
Max Upward Transient Deflection	-0.010 in	Ratio =	9159	>=360
Max Downward Total Deflection	0.076 in	Ratio =	1466	>=180
Max Upward Total Deflection	-0.013 in	Ratio =	7196	>=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+H													0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.045	0.038	0.90	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	2291.45	0.32	9.70	256.50
Length = 8.0 ft	2	0.045	0.038	0.90	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	2291.45	0.22	9.70	256.50
+D+L+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.040	0.034	1.00	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	2546.06	0.32	9.70	285.00
Length = 8.0 ft	2	0.040	0.034	1.00	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	2546.06	0.22	9.70	285.00
+D+Lr+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

DESCRIPTION: RB-21

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
Length = 4.670 ft	1	0.032	0.027	1.25	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	3182.57	0.32	9.70	356.25
Length = 8.0 ft	2	0.032	0.027	1.25	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	3182.57	0.22	9.70	356.25
+D+S+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.164	0.138	1.15	0.979	1.00	1.00	1.00	1.00	1.00	4.58	480.69	2927.97	1.48	45.28	327.75
Length = 8.0 ft	2	0.164	0.138	1.15	0.979	1.00	1.00	1.00	1.00	1.00	4.58	480.69	2927.97	1.02	45.28	327.75
+D+0.750Lr+0.750L+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.032	0.027	1.25	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	3182.57	0.32	9.70	356.25
Length = 8.0 ft	2	0.032	0.027	1.25	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	3182.57	0.22	9.70	356.25
+D+0.750L+0.750S+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.132	0.111	1.15	0.979	1.00	1.00	1.00	1.00	1.00	3.68	386.27	2927.97	1.19	36.39	327.75
Length = 8.0 ft	2	0.132	0.111	1.15	0.979	1.00	1.00	1.00	1.00	1.00	3.68	386.27	2927.97	0.82	36.39	327.75
+D+0.60W+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.025	0.021	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	4073.70	0.32	9.70	456.00
Length = 8.0 ft	2	0.025	0.021	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	4073.70	0.22	9.70	456.00
+D+0.750Lr+0.450W+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.025	0.021	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	4073.70	0.32	9.70	456.00
Length = 8.0 ft	2	0.025	0.021	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	4073.70	0.22	9.70	456.00
+D+0.750S+0.450W+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.095	0.080	1.60	0.979	1.00	1.00	1.00	1.00	1.00	3.68	386.27	4073.70	1.19	36.39	456.00
Length = 8.0 ft	2	0.095	0.080	1.60	0.979	1.00	1.00	1.00	1.00	1.00	3.68	386.27	4073.70	0.82	36.39	456.00
+0.60D+0.60W+0.60H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.015	0.013	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.59	61.80	4073.70	0.19	5.82	456.00
Length = 8.0 ft	2	0.015	0.013	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.59	61.80	4073.70	0.13	5.82	456.00
+D+0.70E+0.60H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.025	0.021	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	4073.70	0.32	9.70	456.00
Length = 8.0 ft	2	0.025	0.021	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.98	103.00	4073.70	0.22	9.70	456.00
+D+0.750L+0.750S+0.5250E+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.095	0.080	1.60	0.979	1.00	1.00	1.00	1.00	1.00	3.68	386.27	4073.70	1.19	36.39	456.00
Length = 8.0 ft	2	0.095	0.080	1.60	0.979	1.00	1.00	1.00	1.00	1.00	3.68	386.27	4073.70	0.82	36.39	456.00
+0.60D+0.70E+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 4.670 ft	1	0.015	0.013	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.59	61.80	4073.70	0.19	5.82	456.00
Length = 8.0 ft	2	0.015	0.013	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.59	61.80	4073.70	0.13	5.82	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0764	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S+H	-0.0133	3.084

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		3.281	-0.199
Overall MINimum		2.578	-0.043
+D+H		0.703	-0.043
+D+L+H		0.703	-0.043
+D+Lr+H		0.703	-0.043
+D+S+H		3.281	-0.199
+D+0.750Lr+0.750L+H		0.703	-0.043
+D+0.750L+0.750S+H		2.636	-0.160
+D+0.60W+H		0.703	-0.043
+D+0.750Lr+0.450W+H		0.703	-0.043
+D+0.750S+0.450W+H		2.636	-0.160
+0.60D+0.60W+0.60H		0.422	-0.026
+D+0.70E+0.60H		0.703	-0.043
+D+0.750L+0.750S+0.5250E+H		2.636	-0.160
+0.60D+0.70E+H		0.422	-0.026
D Only		0.703	-0.043
Lr Only			
L Only			
S Only		2.578	-0.156
W Only			

Wood Beam

DESCRIPTION: RB-21

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
E Only			
H Only			

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: 15 AUG 2019, 8:27AM

Wood Beam

File = \\MORGAN-SHARE\AAwork\DESIGN~1\HABITA~1\Rambler\2019\R1889-~1\Beams.ec6 .

Lic. # : KW-06012024 — York Engineering

DESCRIPTION: RB-22

CODE REFERENCES

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

Material Properties

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

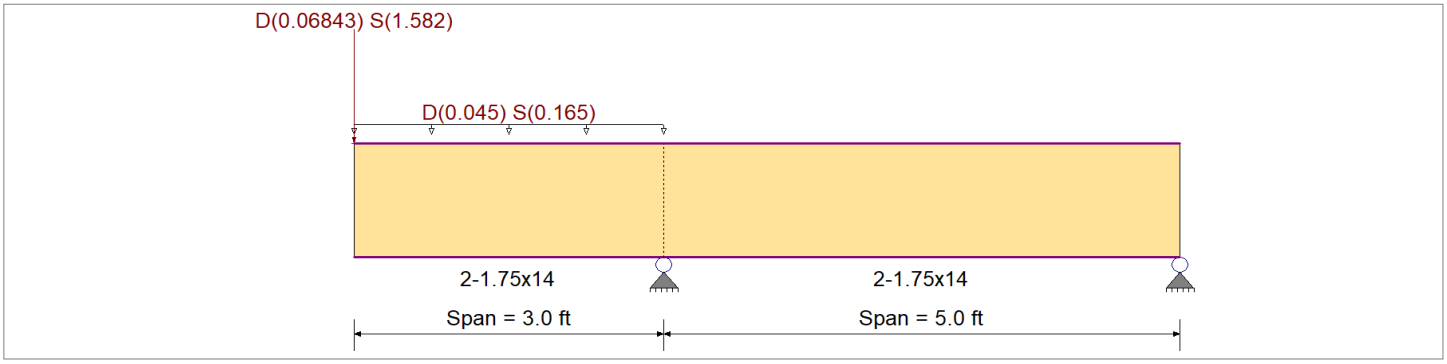
Wood Species : iLevel Truss Joist
Wood Grade : MicroLam LVL 1.9 E

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

Fb +	2600 psi
Fb -	2600 psi
Fc - Prll	2510 psi
Fc - Perp	750 psi
Fv	285 psi
Ft	1555 psi

E : Modulus of Elasticity

Ebend- xx	1900 ksi
Eminbend - xx	965.71 ksi
Density	42.01 pcf



Applied Loads

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

Load for Span Number 1
Uniform Load : D = 0.0150, S = 0.0550 ksf, Tributary Width = 3.0 ft, (Roof)
Point Load : D = 0.06843, S = 1.582 k @ 0.0 ft, (RB-21)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.211 : 1	Maximum Shear Stress Ratio	=	0.190 : 1
Section used for this span		2-1.75x14	Section used for this span		2-1.75x14
fb : Actual	=	618.85 psi	fv : Actual	=	62.37 psi
FB : Allowable	=	2,927.97 psi	Fv : Allowable	=	327.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	3.000 ft	Location of maximum on span	=	1.844 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.049 in	Ratio =	1458	>=360
Max Upward Transient Deflection	-0.010 in	Ratio =	5912	>=360
Max Downward Total Deflection	0.053 in	Ratio =	1360	>=180
Max Upward Total Deflection	-0.011 in	Ratio =	5503	>=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H													0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.019	0.018	0.90	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	2291.45	0.15	4.63	256.50
Length = 5.0 ft	2	0.019	0.018	0.90	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	2291.45	0.08	4.63	256.50
+D+L+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.017	0.016	1.00	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	2546.06	0.15	4.63	285.00
Length = 5.0 ft	2	0.017	0.016	1.00	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	2546.06	0.08	4.63	285.00
+D+Lr+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.013	0.013	1.25	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	3182.57	0.15	4.63	356.25
Length = 5.0 ft	2	0.013	0.013	1.25	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	3182.57	0.08	4.63	356.25

Wood Beam

DESCRIPTION: RB-22

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
+D+S+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.211	0.190	1.15	0.979	1.00	1.00	1.00	1.00	1.00	5.90	618.85	2927.97	2.04	62.37	327.75
Length = 5.0 ft	2	0.211	0.190	1.15	0.979	1.00	1.00	1.00	1.00	1.00	5.90	618.85	2927.97	1.18	62.37	327.75
+D+0.750Lr+0.750L+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.013	0.013	1.25	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	3182.57	0.15	4.63	356.25
Length = 5.0 ft	2	0.013	0.013	1.25	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	3182.57	0.08	4.63	356.25
+D+0.750L+0.750S+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.162	0.146	1.15	0.979	1.00	1.00	1.00	1.00	1.00	4.52	474.84	2927.97	1.57	47.94	327.75
Length = 5.0 ft	2	0.162	0.146	1.15	0.979	1.00	1.00	1.00	1.00	1.00	4.52	474.84	2927.97	0.90	47.94	327.75
+D+0.60W+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.010	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	4073.70	0.15	4.63	456.00
Length = 5.0 ft	2	0.011	0.010	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	4073.70	0.08	4.63	456.00
+D+0.750Lr+0.450W+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.010	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	4073.70	0.15	4.63	456.00
Length = 5.0 ft	2	0.011	0.010	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	4073.70	0.08	4.63	456.00
+D+0.750S+0.450W+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.117	0.105	1.60	0.979	1.00	1.00	1.00	1.00	1.00	4.52	474.84	4073.70	1.57	47.94	456.00
Length = 5.0 ft	2	0.117	0.105	1.60	0.979	1.00	1.00	1.00	1.00	1.00	4.52	474.84	4073.70	0.90	47.94	456.00
+0.60D+0.60W+0.60H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.006	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.24	25.68	4073.70	0.09	2.78	456.00
Length = 5.0 ft	2	0.006	0.006	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.24	25.68	4073.70	0.05	2.78	456.00
+D+0.70E+0.60H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.011	0.010	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	4073.70	0.15	4.63	456.00
Length = 5.0 ft	2	0.011	0.010	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.41	42.80	4073.70	0.08	4.63	456.00
+D+0.750L+0.750S+0.5250E+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.117	0.105	1.60	0.979	1.00	1.00	1.00	1.00	1.00	4.52	474.84	4073.70	1.57	47.94	456.00
Length = 5.0 ft	2	0.117	0.105	1.60	0.979	1.00	1.00	1.00	1.00	1.00	4.52	474.84	4073.70	0.90	47.94	456.00
+0.60D+0.70E+H					0.979	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 3.0 ft	1	0.006	0.006	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.24	25.68	4073.70	0.09	2.78	456.00
Length = 5.0 ft	2	0.006	0.006	1.60	0.979	1.00	1.00	1.00	1.00	1.00	0.24	25.68	4073.70	0.05	2.78	456.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0529	0.000		0.0000	0.000
	2	0.0000	0.000	+D+S+H	-0.0109	2.123

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum		3.460	-1.179
Overall MINimum		3.175	-0.082
+D+H		0.285	-0.082
+D+L+H		0.285	-0.082
+D+Lr+H		0.285	-0.082
+D+S+H		3.460	-1.179
+D+0.750Lr+0.750L+H		0.285	-0.082
+D+0.750L+0.750S+H		2.666	-0.905
+D+0.60W+H		0.285	-0.082
+D+0.750Lr+0.450W+H		0.285	-0.082
+D+0.750S+0.450W+H		2.666	-0.905
+0.60D+0.60W+0.60H		0.171	-0.049
+D+0.70E+0.60H		0.285	-0.082
+D+0.750L+0.750S+0.5250E+H		2.666	-0.905
+0.60D+0.70E+H		0.171	-0.049
D Only		0.285	-0.082
Lr Only			
L Only			
S Only		3.175	-1.098
W Only			
E Only			
H Only			

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: 15 AUG 2019, 7:42AM

Wood Beam

File = \\MORGAN-SHARE\AAwork\DESIGN~1\HABITA~1\Rambler\2019\R1889-~1\Beams.ec6 .

Lic. # : KW-06012024 — York Engineering

DESCRIPTION: RB-23

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

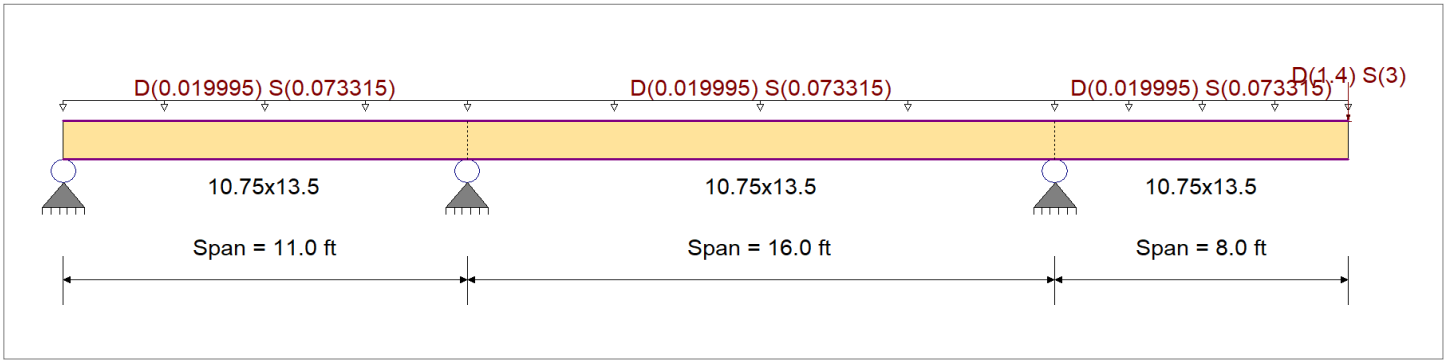
Wood Species : DF/DF
Wood Grade : 24F-V8

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

Fb +	2,400.0 psi
Fb -	2,400.0 psi
Fc - Prll	1,650.0 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	1,600.0 ksi
Eminbend - yy	850.0 ksi
Density	31.210 pcf



Applied Loads

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

Load for Span Number 1
Uniform Load : D = 0.0150, S = 0.0550 ksf, Tributary Width = 1.333 ft, (Roof)
Load for Span Number 2
Uniform Load : D = 0.0150, S = 0.0550 ksf, Tributary Width = 1.333 ft, (Roof)
Load for Span Number 3
Uniform Load : D = 0.0150, S = 0.0550 ksf, Tributary Width = 1.333 ft, (Roof)
Point Load : D = 1.40, S = 3.0 k @ 8.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.539 : 1	Maximum Shear Stress Ratio	=	0.171 : 1
Section used for this span		10.75x13.5	Section used for this span		10.75x13.5
fb : Actual	=	1,403.33 psi	fv : Actual	=	52.16 psi
FB : Allowable	=	2,602.75 psi	Fv : Allowable	=	304.75 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	16.000 ft	Location of maximum on span	=	16.000 ft
Span # where maximum occurs	=	Span # 2	Span # where maximum occurs	=	Span # 2

Maximum Deflection

Max Downward Transient Deflection	0.628 in	Ratio =	304 >=300
Max Upward Transient Deflection	-0.126 in	Ratio =	1519 >=300
Max Downward Total Deflection	0.916 in	Ratio =	208 >=180
Max Upward Total Deflection	-0.186 in	Ratio =	1034 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H													0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.052	0.033	0.90	0.979	1.00	1.00	1.00	1.00	1.00	3.01	110.46	2114.70	0.77	7.94	238.50
Length = 16.0 ft	2	0.214	0.067	0.90	0.943	1.00	1.00	1.00	1.00	1.00	11.84	435.11	2036.93	1.54	15.90	238.50
Length = 8.0 ft	3	0.201	0.067	0.90	1.000	1.00	1.00	1.00	1.00	1.00	11.84	435.11	2160.00	1.54	15.90	238.50
+D+L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00

Wood Beam

DESCRIPTION: RB-23

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	fb	F'b	Shear Values V	fv	F'v
Length = 11.0 ft	1	0.047	0.030	1.00	0.979	1.00	1.00	1.00	1.00	1.00	3.01	110.46	2349.67	0.77	7.94	265.00
Length = 16.0 ft	2	0.192	0.060	1.00	0.943	1.00	1.00	1.00	1.00	1.00	11.84	435.11	2263.26	1.54	15.90	265.00
Length = 8.0 ft	3	0.181	0.060	1.00	1.000	1.00	1.00	1.00	1.00	1.00	11.84	435.11	2400.00	1.54	15.90	265.00
+D+Lr+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.038	0.024	1.25	0.979	1.00	1.00	1.00	1.00	1.00	3.01	110.46	2937.09	0.77	7.94	331.25
Length = 16.0 ft	2	0.154	0.048	1.25	0.943	1.00	1.00	1.00	1.00	1.00	11.84	435.11	2829.08	1.54	15.90	331.25
Length = 8.0 ft	3	0.145	0.048	1.25	1.000	1.00	1.00	1.00	1.00	1.00	11.84	435.11	3000.00	1.54	15.90	331.25
+D+S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.122	0.075	1.15	0.979	1.00	1.00	1.00	1.00	1.00	8.97	329.64	2702.12	2.20	22.75	304.75
Length = 16.0 ft	2	0.539	0.171	1.15	0.943	1.00	1.00	1.00	1.00	1.00	38.19	1,403.33	2602.75	5.05	52.16	304.75
Length = 8.0 ft	3	0.508	0.171	1.15	1.000	1.00	1.00	1.00	1.00	1.00	38.19	1,403.33	2760.00	5.05	52.16	304.75
+D+0.750Lr+0.750L+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.038	0.024	1.25	0.979	1.00	1.00	1.00	1.00	1.00	3.01	110.46	2937.09	0.77	7.94	331.25
Length = 16.0 ft	2	0.154	0.048	1.25	0.943	1.00	1.00	1.00	1.00	1.00	11.84	435.11	2829.08	1.54	15.90	331.25
Length = 8.0 ft	3	0.145	0.048	1.25	1.000	1.00	1.00	1.00	1.00	1.00	11.84	435.11	3000.00	1.54	15.90	331.25
+D+0.750L+0.750S+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.102	0.062	1.15	0.979	1.00	1.00	1.00	1.00	1.00	7.48	274.85	2702.12	1.84	19.04	304.75
Length = 16.0 ft	2	0.446	0.141	1.15	0.943	1.00	1.00	1.00	1.00	1.00	31.60	1,161.28	2602.75	4.17	43.09	304.75
Length = 8.0 ft	3	0.421	0.141	1.15	1.000	1.00	1.00	1.00	1.00	1.00	31.60	1,161.28	2760.00	4.17	43.09	304.75
+D+0.60W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.029	0.019	1.60	0.979	1.00	1.00	1.00	1.00	1.00	3.01	110.46	3759.47	0.77	7.94	424.00
Length = 16.0 ft	2	0.120	0.038	1.60	0.943	1.00	1.00	1.00	1.00	1.00	11.84	435.11	3621.22	1.54	15.90	424.00
Length = 8.0 ft	3	0.113	0.038	1.60	1.000	1.00	1.00	1.00	1.00	1.00	11.84	435.11	3840.00	1.54	15.90	424.00
+D+0.750Lr+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.029	0.019	1.60	0.979	1.00	1.00	1.00	1.00	1.00	3.01	110.46	3759.47	0.77	7.94	424.00
Length = 16.0 ft	2	0.120	0.038	1.60	0.943	1.00	1.00	1.00	1.00	1.00	11.84	435.11	3621.22	1.54	15.90	424.00
Length = 8.0 ft	3	0.113	0.038	1.60	1.000	1.00	1.00	1.00	1.00	1.00	11.84	435.11	3840.00	1.54	15.90	424.00
+D+0.750S+0.450W+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.073	0.045	1.60	0.979	1.00	1.00	1.00	1.00	1.00	7.48	274.85	3759.47	1.84	19.04	424.00
Length = 16.0 ft	2	0.321	0.102	1.60	0.943	1.00	1.00	1.00	1.00	1.00	31.60	1,161.28	3621.22	4.17	43.09	424.00
Length = 8.0 ft	3	0.302	0.102	1.60	1.000	1.00	1.00	1.00	1.00	1.00	31.60	1,161.28	3840.00	4.17	43.09	424.00
+0.60D+0.60W+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.018	0.011	1.60	0.979	1.00	1.00	1.00	1.00	1.00	1.80	66.28	3759.47	0.46	4.76	424.00
Length = 16.0 ft	2	0.072	0.023	1.60	0.943	1.00	1.00	1.00	1.00	1.00	7.10	261.07	3621.22	0.92	9.54	424.00
Length = 8.0 ft	3	0.068	0.023	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.10	261.07	3840.00	0.92	9.54	424.00
+D+0.70E+0.60H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.029	0.019	1.60	0.979	1.00	1.00	1.00	1.00	1.00	3.01	110.46	3759.47	0.77	7.94	424.00
Length = 16.0 ft	2	0.120	0.038	1.60	0.943	1.00	1.00	1.00	1.00	1.00	11.84	435.11	3621.22	1.54	15.90	424.00
Length = 8.0 ft	3	0.113	0.038	1.60	1.000	1.00	1.00	1.00	1.00	1.00	11.84	435.11	3840.00	1.54	15.90	424.00
+D+0.750L+0.750S+0.5250E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.073	0.045	1.60	0.979	1.00	1.00	1.00	1.00	1.00	7.48	274.85	3759.47	1.84	19.04	424.00
Length = 16.0 ft	2	0.321	0.102	1.60	0.943	1.00	1.00	1.00	1.00	1.00	31.60	1,161.28	3621.22	4.17	43.09	424.00
Length = 8.0 ft	3	0.302	0.102	1.60	1.000	1.00	1.00	1.00	1.00	1.00	31.60	1,161.28	3840.00	4.17	43.09	424.00
+0.60D+0.70E+H					1.000	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 11.0 ft	1	0.018	0.011	1.60	0.979	1.00	1.00	1.00	1.00	1.00	1.80	66.28	3759.47	0.46	4.76	424.00
Length = 16.0 ft	2	0.072	0.023	1.60	0.943	1.00	1.00	1.00	1.00	1.00	7.10	261.07	3621.22	0.92	9.54	424.00
Length = 8.0 ft	3	0.068	0.023	1.60	1.000	1.00	1.00	1.00	1.00	1.00	7.10	261.07	3840.00	0.92	9.54	424.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.0383	6.193		0.0000	0.000
	2	0.0000	6.193	+D+S+H	-0.1856	10.218
+D+S+H	3	0.9165	8.000		0.0000	10.218

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
Overall MAXimum	1.329	-2.503	8.840	
Overall MINimum	0.945	-0.931	6.192	
+D+H	0.383	-0.931	2.648	
+D+L+H	0.383	-0.931	2.648	

Wood Beam

DESCRIPTION: RB-23

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4
+D+Lr+H	0.383	-0.931	2.648	
+D+S+H	1.329	-2.503	8.840	
+D+0.750Lr+0.750L+H	0.383	-0.931	2.648	
+D+0.750L+0.750S+H	1.092	-2.110	7.292	
+D+0.60W+H	0.383	-0.931	2.648	
+D+0.750Lr+0.450W+H	0.383	-0.931	2.648	
+D+0.750S+0.450W+H	1.092	-2.110	7.292	
+0.60D+0.60W+0.60H	0.230	-0.559	1.589	
+D+0.70E+0.60H	0.383	-0.931	2.648	
+D+0.750L+0.750S+0.5250E+H	1.092	-2.110	7.292	
+0.60D+0.70E+H	0.230	-0.559	1.589	
D Only	0.383	-0.931	2.648	
Lr Only				
L Only				
S Only	0.945	-1.572	6.192	
W Only				
E Only				
H Only				

Wood Beam

DESCRIPTION: RB-24

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

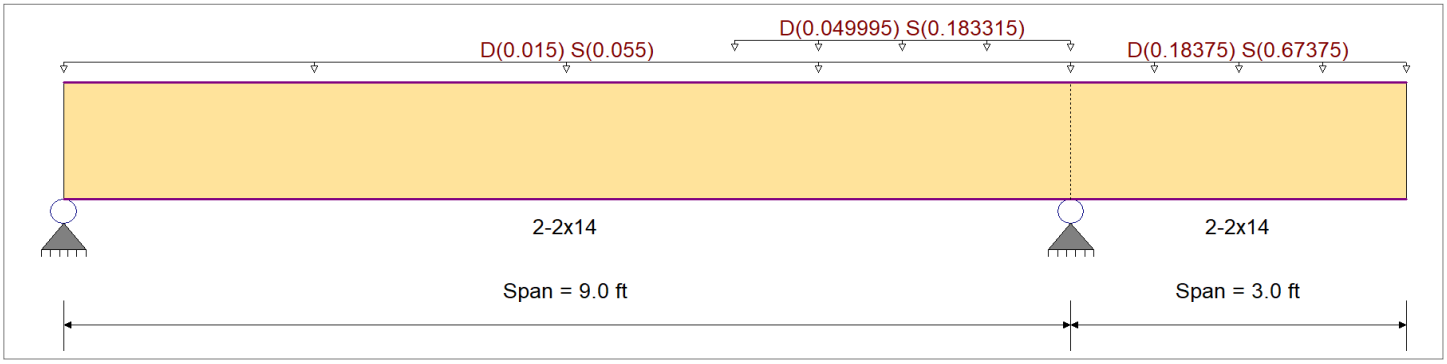
Wood Species : Douglas Fir - Larch
Wood Grade : No.2

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

Fb +	900 psi
Fb -	900 psi
Fc - Prll	1350 psi
Fc - Perp	625 psi
Fv	180 psi
Ft	575 psi

E : Modulus of Elasticity

Ebend- xx	1600 ksi
Eminbend - xx	580 ksi
Density	31.21 pcf



Applied Loads

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

Beam self weight calculated and added to loads
Load for Span Number 1
Uniform Load : D = 0.0150, S = 0.0550 ksf, Tributary Width = 1.0 ft, (Roof)
Uniform Load : D = 0.0150, S = 0.0550 ksf, Extent = 6.0 -->> 9.0 ft, Tributary Width = 3.333 ft, (Roof)
Load for Span Number 2
Uniform Load : D = 0.0150, S = 0.0550 ksf, Tributary Width = 12.250 ft, (Roof)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.572 : 1	Maximum Shear Stress Ratio	=	0.302 : 1
Section used for this span		2-2x14	Section used for this span		2-2x14
fb : Actual	=	532.80 psi	fv : Actual	=	62.45 psi
FB : Allowable	=	931.50 psi	Fv : Allowable	=	207.00 psi
Load Combination		+D+S+H	Load Combination		+D+S+H
Location of maximum on span	=	9.000 ft	Location of maximum on span	=	9.000 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.044 in	Ratio =	1620 >=360
Max Upward Transient Deflection	-0.014 in	Ratio =	7822 >=360
Max Downward Total Deflection	0.056 in	Ratio =	1288 >=180
Max Upward Total Deflection	-0.017 in	Ratio =	6468 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+H													0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.162	0.086	0.90	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	729.00	0.37	13.87	162.00
Length = 3.0 ft	2	0.162	0.086	0.90	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	729.00	0.37	13.87	162.00
+D+L+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.146	0.077	1.00	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	810.00	0.37	13.87	180.00
Length = 3.0 ft	2	0.146	0.077	1.00	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	810.00	0.37	13.87	180.00

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: 20 JUL 2019, 3:12PM

Wood Beam

File = \\MORGAN-SHARE\AAwork\DESIGN~1\HABITA~1\Rambler\2019\R1889-~1\Beams.ec6 .

Lic. # : KW-06012024 — York Engineering

DESCRIPTION: RB-24

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	C_d	$C_{F/V}$	C_i	C_r	C_m	C_t	C_L	Moment Values M	Moment Values fb	Moment Values F'b	Shear Values V	Shear Values fv	Shear Values F'v
+D+Lr+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.117	0.062	1.25	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1012.50	0.37	13.87	225.00
Length = 3.0 ft	2	0.117	0.062	1.25	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1012.50	0.37	13.87	225.00
+D+S+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.572	0.302	1.15	0.900	1.00	1.00	1.00	1.00	1.00	3.90	532.80	931.50	1.65	62.45	207.00
Length = 3.0 ft	2	0.572	0.302	1.15	0.900	1.00	1.00	1.00	1.00	1.00	3.90	532.80	931.50	1.65	62.45	207.00
+D+0.750Lr+0.750L+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.117	0.062	1.25	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1012.50	0.37	13.87	225.00
Length = 3.0 ft	2	0.117	0.062	1.25	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1012.50	0.37	13.87	225.00
+D+0.750L+0.750S+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.461	0.243	1.15	0.900	1.00	1.00	1.00	1.00	1.00	3.14	429.19	931.50	1.33	50.30	207.00
Length = 3.0 ft	2	0.461	0.243	1.15	0.900	1.00	1.00	1.00	1.00	1.00	3.14	429.19	931.50	1.33	50.30	207.00
+D+0.60W+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.091	0.048	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1296.00	0.37	13.87	288.00
Length = 3.0 ft	2	0.091	0.048	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1296.00	0.37	13.87	288.00
+D+0.750Lr+0.450W+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.091	0.048	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1296.00	0.37	13.87	288.00
Length = 3.0 ft	2	0.091	0.048	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1296.00	0.37	13.87	288.00
+D+0.750S+0.450W+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.331	0.175	1.60	0.900	1.00	1.00	1.00	1.00	1.00	3.14	429.19	1296.00	1.33	50.30	288.00
Length = 3.0 ft	2	0.331	0.175	1.60	0.900	1.00	1.00	1.00	1.00	1.00	3.14	429.19	1296.00	1.33	50.30	288.00
+0.60D+0.60W+0.60H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.055	0.029	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.52	71.00	1296.00	0.22	8.32	288.00
Length = 3.0 ft	2	0.055	0.029	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.52	71.00	1296.00	0.22	8.32	288.00
+D+0.70E+0.60H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.091	0.048	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1296.00	0.37	13.87	288.00
Length = 3.0 ft	2	0.091	0.048	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.87	118.34	1296.00	0.37	13.87	288.00
+D+0.750L+0.750S+0.5250E+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.331	0.175	1.60	0.900	1.00	1.00	1.00	1.00	1.00	3.14	429.19	1296.00	1.33	50.30	288.00
Length = 3.0 ft	2	0.331	0.175	1.60	0.900	1.00	1.00	1.00	1.00	1.00	3.14	429.19	1296.00	1.33	50.30	288.00
+0.60D+0.70E+H					0.900	1.00	1.00	1.00	1.00	1.00			0.00	0.00	0.00	0.00
Length = 9.0 ft	1	0.055	0.029	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.52	71.00	1296.00	0.22	8.32	288.00
Length = 3.0 ft	2	0.055	0.029	1.60	0.900	1.00	1.00	1.00	1.00	1.00	0.52	71.00	1296.00	0.22	8.32	288.00

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+S+H	-0.0167	5.883
+D+S+H	2	0.0559	3.000		0.0000	5.883

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	0.037	3.968	
Overall MINimum	0.002	3.064	
+D+H	0.035	0.905	
+D+L+H	0.035	0.905	
+D+Lr+H	0.035	0.905	
+D+S+H	0.037	3.968	
+D+0.750Lr+0.750L+H	0.035	0.905	
+D+0.750L+0.750S+H	0.037	3.202	
+D+0.60W+H	0.035	0.905	
+D+0.750Lr+0.450W+H	0.035	0.905	
+D+0.750S+0.450W+H	0.037	3.202	
+0.60D+0.60W+0.60H	0.021	0.543	
+D+0.70E+0.60H	0.035	0.905	
+D+0.750L+0.750S+0.5250E+H	0.037	3.202	
+0.60D+0.70E+H	0.021	0.543	
D Only	0.035	0.905	
Lr Only			
L Only			
S Only	0.002	3.064	

Wood Beam

DESCRIPTION: RB-24

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
W Only			
E Only			
H Only			