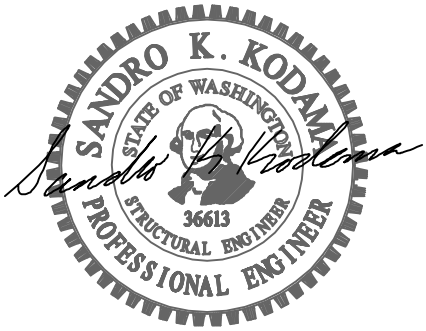
QUANTUM
CONSULTING ENGINEERS

May 1, 2020

STRUCTURAL CALCULATIONS
(Permit Submittal)

DUBEY RES. ELEVATOR & ADDITION
8140 WEST MERCER WAY.
MERCER IS, WA 98040

Quantum Job Number: 20130.01



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Dubey Res. Addition& Elevator
8140 West Mercer Way, Mercer Is, WA

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DUBEY RES. ELEVATOR
8140 WEST MERCER WAY.
MERCER IS., WA 98040

QUANTUM JOB NUMBER: 20130.01

DESIGN CRITERIA
AND
CALCULATIONS

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STRUCTURAL DESIGN CRITERIA

DUBEY RES. ELEVATOR & ADDITION
8140 WEST MERCER WAY
MERCER ISLAND, WA 98040

QUANTUM JOB NUMBER: 20130.01

CODE CRITERIA:
BUILDING CODE ..... 2015 INTERNATIONAL BUILDING CODE
BUILDING DEPARTMENT ..... CITY OF MERCER ISLAND
SNOW LOAD ..... 25 PSF
LIVE LOAD (RESIDENTIAL)..... 40 PSF

SOILS CRITERIA:
ALLOWABLE BEARING PRESSURE ..... 1,500 PSF
MINIMUM FOOTING WIDTH..... ….CONTINUOUS: 18” MIN., ISOLATED: 18” MIN.
FROST DEPTH ..... 18” MIN.
ACTIVE SOIL PRESSURE (UNRESTRAINED)……...35 PCF
SEISMIC SURCHARGE……5H PSF
PASSIVE SOIL PRESSURE ……..300 PCF
COEFFICIENT OF FRICTION ……0.35

MATERIALS CRITERIA:

CONCRETE (28 DAY STRENGTH):
FOUNDATION/S.O.G..... ....F’C=2,500 PSI
BASEMENT WALLS…….F’C=2,500 PSI

REINFORCING STEEL:
GRADE 60 (#5 BAR OR LARGER)..... ..... FY=60,000 PSI
GRADE 40 (#4 BAR)..... ..... FY=40,000 PSI

STRUCTURAL STEEL:
MISCELLANEOUS SECTIONS: A-36 ……..FY=36,000 PSI
WELDING ……FY=70,000 PSI

WOOD FRAMING:
2X, 3X, & 4X FRAMING MBRS ..... HF#2 OR DF#2
6X FRAMING MBRS..... DF#1
LSL MEMBERS – BEAMS & HEADERS ..... 1.55E LSL
WOOD SHTG..... ….APA RATED

STRUCTURAL DESIGN CRITERIA

DUBEY RES. ELEVATOR & ADDITION
8140 WEST MERCER WAY
MERCER ISLAND, WA 98040

QUANTUM JOB NUMBER: 20130.01

ASSEMBLY WEIGHTS

ROOF LOADS			**COMMENTS**
STD. ROOFING W/ ASPHALT SHINGLES	3.0	PSF	
1/2” PLYWOOD SHEATHING	1.8	PSF	
ROOF TRUSSES @ 24” O.C.	4.0	PSF	
R30 BATT INSULATION	2.0	PSF	
LIGHTS, DUCTS	1.0	PSF	
1/2” GWB	2.2	PSF	
MISCELLANEOUS	1.0	PSF	
ROOF DL	15.0	PSF	SL = 25 PSF

FLOOR LOAD			
HARDWOOD FLOORING	4.0	PSF	
3/4" SHEATHING	2.4	PSF	
FLOOR JOISTS @ 16” O.C.	3.0	PSF	
LIGHTS, DUCTS	0.8	PSF	
5/8” GWB	2.8	PSF	
MISCELLANEOUS	1.0	PSF	
FLOOR DL	14.0	PSF	LL = 40 PSF

WALL LOAD		
SIDING	3.0	PSF
1/2" PLYWOOD SHEATHING	1.5	PSF
FRAMING – 2X6 @ 16” O.C.	1.7	PSF
INSULATION	2.0	PSF
5/8” GWB	2.8	PSF
MISCELLANEOUS MECHANICAL/ELEC.	1.0	PSF
WALL DL	12.0	PSF

INTERIOR WALL PARTITIONS	DL	8.0	PSF
EXTERIOR GLAZING	DL	8.0	PSF

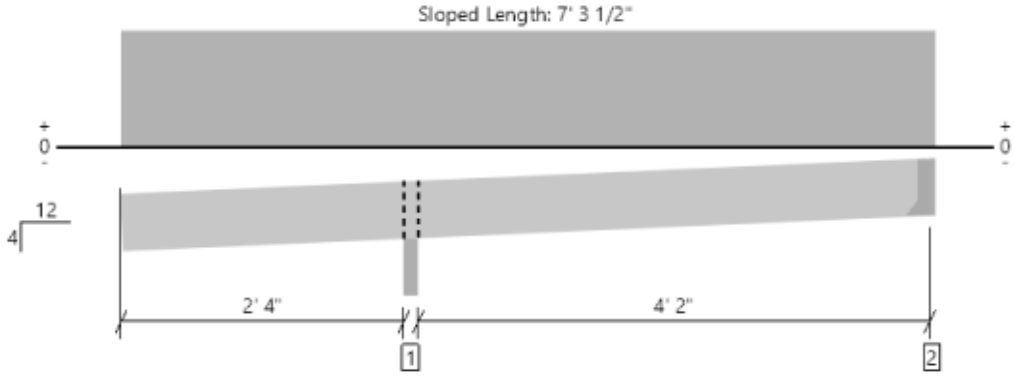
DUBEY RES. ELEVATOR
8140 WEST MERCER WAY.
MERCER IS., WA 98040

QUANTUM JOB NUMBER: 20130.01

GRAVITY DESIGN

Low Roof, Rj-1

1 piece(s) 2 x 8 Hem-Fir No. 2 @ 24" OC



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

Member Length : 7' 4 5/16"

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 4/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	704 @ 2' 5 3/4"	2241 (3.50")	Passed (31%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	283 @ 3' 2 3/8"	1251	Passed (23%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	-404 @ 2' 5 3/4"	1477	Passed (27%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.036 @ 0	0.261	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.043 @ 0	0.348	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Left cantilever length exceeds 1/3 member length or 1/2 back span length. Additional bracing should be considered.
- Top Edge Bracing (Lu): Top compression edge must be braced at 7' 2" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 7' 2" o/c based on loads applied, unless detailed otherwise.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beveled Plate - DF	3.50"	3.50"	1.50"	169	535	704	Blocking
2 - Hanger on 7 1/4" DF beam	1.50"	Hanger[1]	1.50"	49	192	241	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

Vertical Loads	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 6' 11"	24"	15.0	25.0	roof dead and snow load
2 - Uniform (PSF)	0 to 6' 11"	24"	-	25.0	snow drift

Member Notes

low roof joist #1

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.

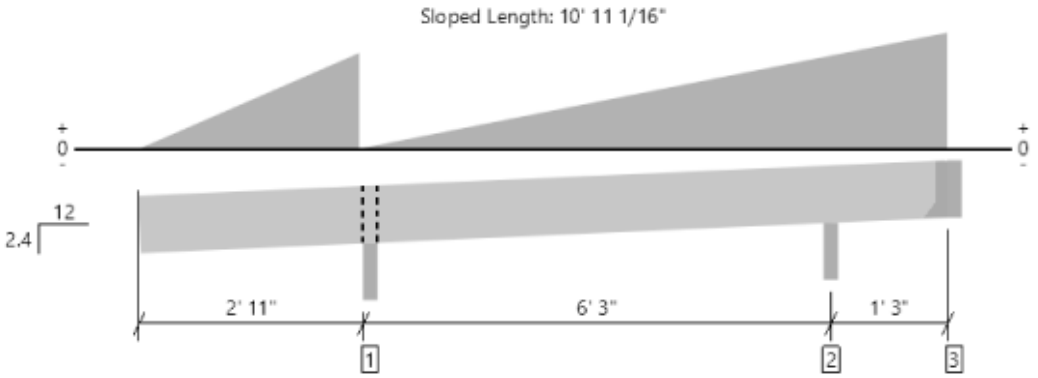
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Mario D. Alvarado Jr. Quantum Consulting Engineers (206) 957-3904 malvarado@quantumce.com	

Weyerhaeuser

Low Roof, HP-1

1 piece(s) 2 x 8 Hem-Fir No. 2



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

Member Length : 10' 8 15/16"

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 2.4/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	491 @ 9' 2"	2168 (3.50")	Passed (23%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	172 @ 8' 5 1/8"	1251	Passed (14%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	-199 @ 3' 3/4"	1284	Passed (15%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.015 @ 0	0.312	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.022 @ 0	0.416	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)

- 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 10' 7" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 10' 7" o/c based on loads applied, unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beveled Plate - SPF	3.50"	3.50"	1.50"	127	182	309	Blocking
2 - Beveled Plate - SPF	3.50"	3.50"	1.50"	164	327	491	None
3 - Hanger on 7 1/4" SPF beam	3.50"	Hanger[1]	1.50"	-19	26/-82	26/-101	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
3 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 10' 5"	N/A	2.8	--	
1 - Tapered (PLF)	0 to 2' 11"	N/A	0.0 to 42.9	0.0 to 70.0	Generated from Roof Geometry
2 - Tapered (PLF)	2' 11" to 10' 5"	N/A	0.0 to 46.9	0.0 to 90.0	Generated from Roof Geometry

Member Notes

hip beam at low roof

Weyerhaeuser Notes

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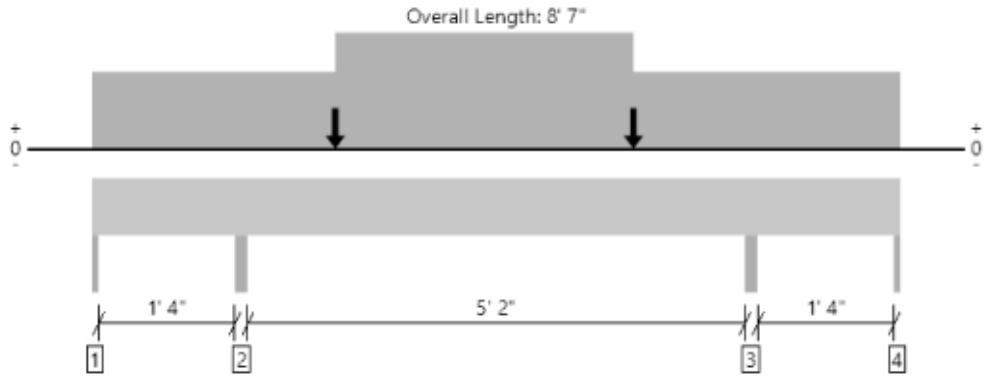
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Mario D. Alvarado Jr. Quantum Consulting Engineers (206) 957-3904 malvarado@quantumce.com	

Weyerhaeuser

Low Roof, H-1

1 piece(s) 6 x 8 Douglas Fir-Larch No. 1



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1290 @ 1' 7"	10313 (3.00")	Passed (13%)	--	1.0 D + 1.0 S (Adj Spans)
Shear (lbs)	759 @ 2' 4"	5376	Passed (14%)	1.15	1.0 D + 1.0 S (Adj Spans)
Moment (Ft-lbs)	-621 @ 1' 7"	5930	Passed (10%)	1.15	1.0 D + 1.0 S (Adj Spans)
Live Load Defl. (in)	0.004 @ 4' 3 11/16"	0.181	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.006 @ 4' 3 3/4"	0.271	Passed (L/999+)	--	1.0 D + 1.0 S (Alt Spans)

System : Wall
Member Type : Header
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/360) and TL (L/240).
- Top Edge Bracing (Lu): Top compression edge must be braced at 8' 7" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 8' 7" o/c based on loads applied, unless detailed otherwise.
- -339 lbs uplift at support located at 0". Strapping or other restraint may be required.
- -338 lbs uplift at support located at 8' 7". Strapping or other restraint may be required.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Trimmer - HF	1.50"	1.50"	1.50"	-93	-246	-339	None
2 - Trimmer - HF	3.00"	3.00"	1.50"	429	862	1291	None
3 - Trimmer - HF	3.00"	3.00"	1.50"	415	822	1237	None
4 - Trimmer - HF	1.50"	1.50"	1.50"	-93	-244	-337	None

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 8' 7"	N/A	10.4	--	
1 - Point (lb)	2' 7"	N/A	164	327	Linked from: HP-1, Support 2
2 - Point (lb)	5' 9"	N/A	164	327	Linked from: HP-1, Support 2
3 - Uniform (PSF)	0 to 2' 7"	2'	15.0	25.0	roof dead and snow load
4 - Uniform (PSF)	5' 9" to 8' 7"	2'	15.0	25.0	roof dead and snow load
5 - Uniform (PLF)	2' 7" to 5' 9"	N/A	24.5	96.0	Linked from: Rj-1, Support 2

Member Notes

Header #1 at main entry door

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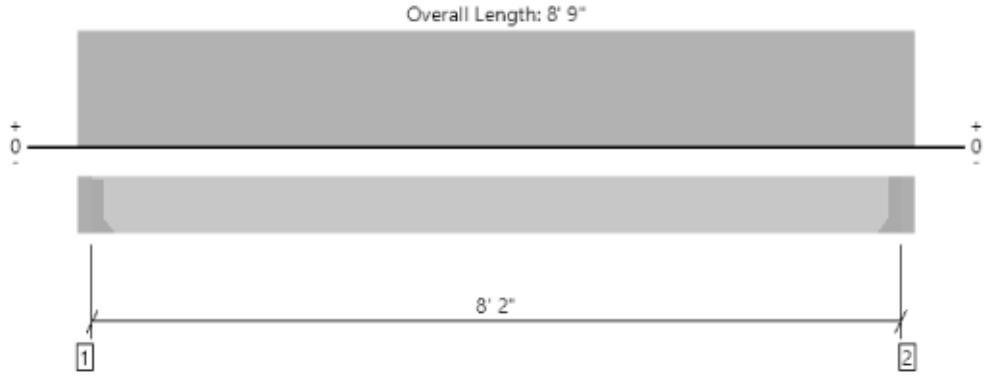
Mario D. Alvarado Jr. Quantum Consulting Engineers (206) 957-3904 malvarado@quantumce.com	

Weyerhaeuser

Low Roof, B-1

1 piece(s) 3 1/2" x 7 1/2" 24F-V4 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1500 @ 3 1/2"	3413 (1.50")	Passed (44%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	1271 @ 11"	5333	Passed (24%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	3063 @ 4' 4 1/2"	7547	Passed (41%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.121 @ 4' 4 1/2"	0.408	Passed (L/811)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.166 @ 4' 4 1/2"	0.544	Passed (L/590)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Top Edge Bracing (Lu): Top compression edge must be braced at 8' 2" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 8' 2" o/c based on loads applied, unless detailed otherwise.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 8' 2".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- The specified glulam is assumed to have its strong laminations at the bottom of the beam. Install with proper side up as indicated by the manufacturer.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Hanger on 7 1/2" GLB beam	3.50"	Hanger[1]	1.50"	435	1170	1605	See note [1]
2 - Hanger on 7 1/2" GLB beam	3.50"	Hanger[1]	1.50"	435	1170	1605	See note [1]

- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
1 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	
2 - Face Mount Hanger	Connector not found	N/A	N/A	N/A	N/A	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	3 1/2" to 8' 5 1/2"	N/A	6.4	--	
1 - Uniform (PSF)	0 to 8' 9" (Front)	1' 6"	6.0	-	ceiling load
2 - Uniform (PLF)	0 to 8' 9" (Top)	N/A	84.5	267.5	Linked from: Rj-1, Support 1

Member Notes

End Beam #1 at main entry cantilever

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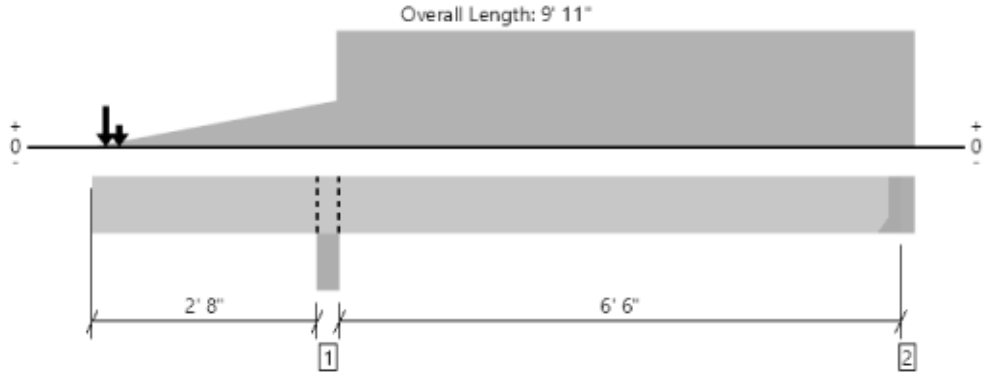
Mario D. Alvarado Jr. Quantum Consulting Engineers (206) 957-3904 malvarado@quantumce.com	

Weyerhaeuser

Low Roof, B-2

1 piece(s) 5 1/8" x 7 1/2" 24F-V8 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	4133 @ 2' 10 3/4"	18322 (5.50")	Passed (23%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	2030 @ 2' 1/2"	7809	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	666 @ 7' 8 7/16"	11051	Passed (6%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-5400 @ 2' 10 3/4"	11051	Passed (49%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.158 @ 0	0.290	Passed (2L/440)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.219 @ 0	0.386	Passed (2L/318)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- 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' 8" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 9' 8" o/c based on loads applied, unless detailed otherwise.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 3' 10 1/16".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 7' 4 1/16".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Column - HF	5.50"	5.50"	1.50"	1216	2917	4133	Blocking
2 - Hanger on 7 1/2" GLB beam	3.50"	Hanger[1]	1.50"	99	697/-33	796/-33	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	HU36-2	2.50"	N/A	8-10d	4-10d	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 7 1/2"	N/A	9.3	--	
1 - Point (lb)	4" (Top)	N/A	127	182	Linked from: HP-1, Support 1
2 - Tapered (PSF)	0 to 3' (Back)	0 to 3' 6"	15.0	25.0	overhang dead and snow load
3 - Uniform (PLF)	3' to 9' 11" (Top)	N/A	84.5	267.5	Linked from: Rj-1, Support 1
4 - Point (lb)	2" (Front)	N/A	435	1170	Linked from: B-1, Support 2

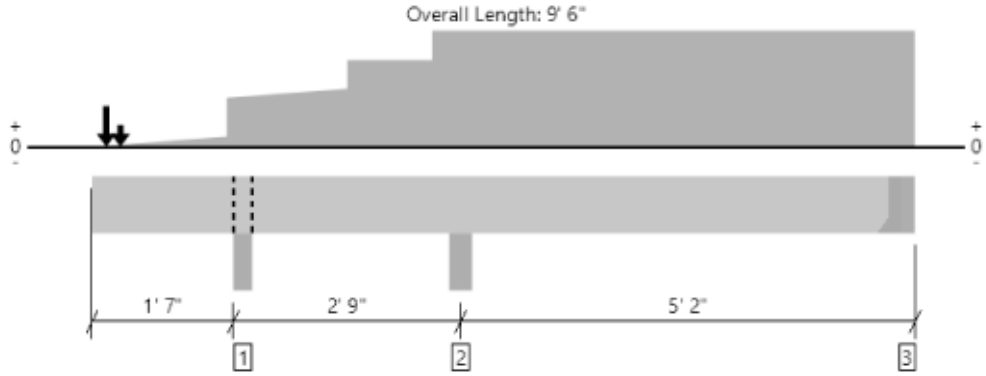
Member Notes
cant. Beam#2, supporting B-1

ForteWEB Software Operator	Job Notes
Mario D. Alvarado Jr. Quantum Consulting Engineers (206) 957-3904 malvarado@quantumce.com	

Weyerhaeuser

Low Roof, B-2B

1 piece(s) 5 1/8" x 7 1/2" 24F-V8 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1539 @ 9' 2 1/2"	4997 (1.50")	Passed (31%)	--	1.0 D + 0.75 L + 0.75 S (Alt Spans)
Shear (lbs)	1944 @ 11 1/2"	7809	Passed (25%)	1.15	1.0 D + 1.0 S (All Spans)
Pos Moment (Ft-lbs)	1646 @ 7' 9/16"	11051	Passed (15%)	1.15	1.0 D + 1.0 S (Alt Spans)
Neg Moment (Ft-lbs)	-3082 @ 1' 9 1/4"	11051	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.030 @ 0	0.200	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)
Total Load Defl. (in)	0.042 @ 0	0.236	Passed (2L/999+)	--	1.0 D + 1.0 S (Alt Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/0.2") and TL (2L/180).
- Top Edge Bracing (Lu): Top compression edge must be braced at 9' 3" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 9' 3" o/c based on loads applied, unless detailed otherwise.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 4' 3 7/8".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 4' 11".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Column - HF	4.50"	4.50"	1.50"	1064	2/-122	2570	3636/-122	Blocking
2 - Column - HF	5.50"	5.50"	1.50"	925	627	1503	3055	None
3 - Hanger on 7 1/2" GLB beam	3.50"	Hanger[1]	1.50"	687	373	1039	2099	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Connector: Simpson Strong-Tie						
Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
3 - Face Mount Hanger	HU36-2	2.50"	N/A	12-10d	6-10d	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 9' 2 1/2"	N/A	9.3	--	--	
1 - Tapered (PSF)	0 to 3' (Back)	0 to 3' 6"	15.0	-	25.0	overhang dead and snow load
2 - Uniform (PSF)	4' to 9' 6" (Front)	4'	14.0	40.0	-	floor dead and live load
3 - Uniform (PSF)	1' 7" to 9' 6" (Top)	4'	12.0	-	-	ext wall dead load
4 - Uniform (PSF)	1' 7" to 9' 6" (Front)	6'	15.0	-	25.0	main roof dead and snow load
5 - Point (lb)	4" (Top)	N/A	127	-	182	Linked from: HP-1, Support 1
6 - Uniform (PLF)	3' to 9' 6" (Top)	N/A	84.5	-	267.5	Linked from: Rj-1, Support 1
7 - Point (lb)	2" (Front)	N/A	435	-	1170	Linked from: B-1, Support 2

Member Notes

cant. Beam#2, supporting B-1

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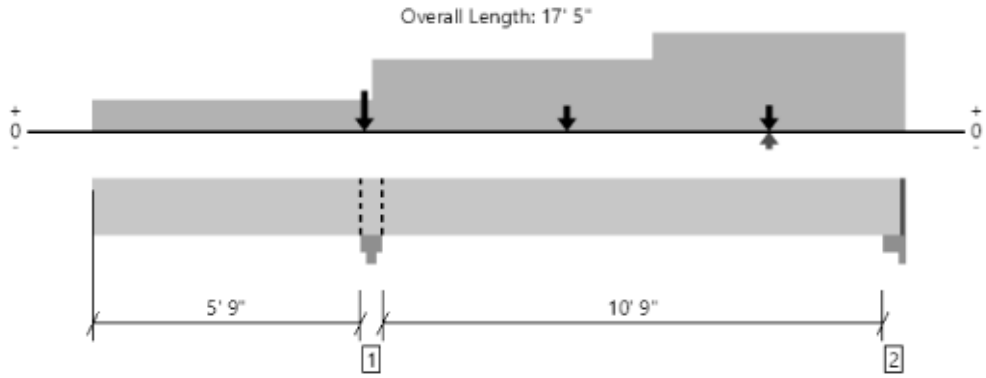
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Low Roof, EB-1

1 piece(s) 5 1/8" x 9" 24F-V8 DF Glulam



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern) [Group]
Member Reaction (lbs)	6012 @ 5' 11 3/4"	18322 (5.50")	Passed (33%)	--	1.0 D + 0.75 L + 0.75 S (All Spans) [1]
Shear (lbs)	3016 @ 16' 2 1/2"	9371	Passed (32%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Pos Moment (Ft-lbs)	9158 @ 11' 8 1/2"	15913	Passed (58%)	1.15	1.0 D + 1.0 S (All Spans) [1]
Neg Moment (Ft-lbs)	-3668 @ 5' 11 3/4"	13838	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans) [1]
Live Load Defl. (in)	0.206 @ 11' 6 13/16"	0.278	Passed (L/646)	--	1.0 D + 1.0 S (All Spans) [1]
Total Load Defl. (in)	0.360 @ 11' 7 5/8"	0.555	Passed (L/370)	--	1.0 D + 1.0 S (All Spans) [1]

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/240).
- Overhang deflection criteria: LL (2L/480) and TL (2L/240). Upward deflection on left cantilever exceeds overhang deflection criteria.
- Top Edge Bracing (Lu): Top compression edge must be braced at 17' 4" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 17' 4" o/c based on loads applied, unless detailed otherwise.
- Critical positive moment adjusted by a volume factor of 1.00 that was calculated using length L = 10' 7 5/8".
- Critical negative moment adjusted by a volume factor of 1.00 that was calculated using length L = 7' 11 3/4".
- Upward deflection on left cantilever exceeds 0.4".
- The effects of positive or negative camber have not been accounted for when calculating deflection.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Floor Live	Snow	Total	
1 - Column Cap - steel	5.50"	5.50"	1.80"	2954	1423	2654	7031	Blocking
2 - Column Cap - steel	5.50"	4.25"	1.50"	1695	510/-181	1919	4124/-181	1 1/4" Rim Board

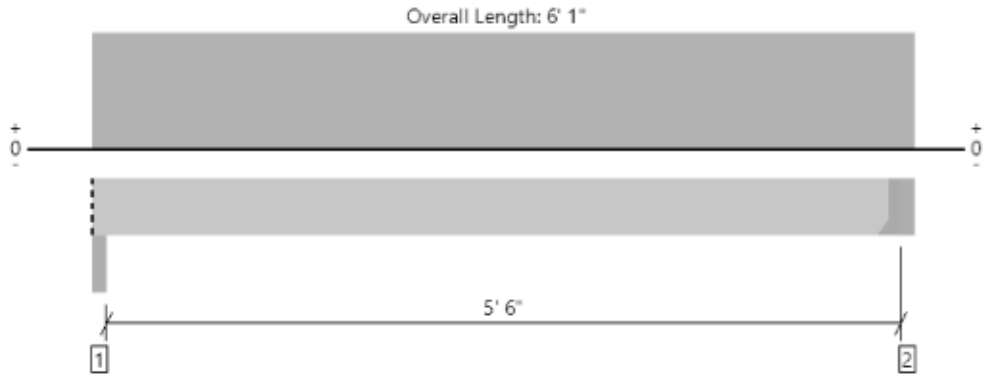
- Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.
- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 17' 3 3/4"	N/A	11.2	--	--	
1 - Uniform (PSF)	6' to 17' 5" (Top)	7'	19.0	-	25.0	roof dead and snow load
2 - Uniform (PSF)	6' to 17' 5" (Top)	8'	12.0	-	-	ext wall dead load
3 - Uniform (PSF)	0 to 6' (Front)	3'	14.0	40.0	-	floor dead and live load
4 - Uniform (PSF)	12' to 17' 5" (Front)	3'	14.0	40.0	-	floor dead and live load
5 - Uniform (PSF)	0 to 6' (Top)	4'	8.0	-	-	midheight partition wall
6 - Uniform (PSF)	6' to 17' 5" (Back)	1'	14.0	-	25.0	low roof dead and snow load
7 - Point (lb)	10' 2" (Back)	N/A	220	-	550	low roof ridge beam dead and snow load
8 - Point (lb)	14' 6" (Back)	N/A	99	-	697/-33	Linked from: B-2, Support 2
9 - Point (lb)	5' 10" (Back)	N/A	687	373	1039	Linked from: B-2B, Support 3

ForteWEB Software Operator	Job Notes
Mario D. Alvarado Jr. Quantum Consulting Engineers (206) 957-3904 malvarado@quantumce.com	

Low Roof, Ridge beam

2 piece(s) 2 x 8 Douglas Fir-Larch No. 2



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

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	693 @ 5' 9 1/2"	2813 (1.50")	Passed (25%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	544 @ 5' 2 1/4"	3002	Passed (18%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	975 @ 2' 11 3/4"	2720	Passed (36%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.028 @ 2' 11 3/4"	0.281	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.036 @ 2' 11 3/4"	0.375	Passed (L/999+)	--	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 0/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Top Edge Bracing (Lu): Top compression edge must be braced at 5' 10" o/c based on loads applied, unless detailed otherwise.
- Bottom Edge Bracing (Lu): Bottom compression edge must be braced at 5' 10" o/c based on loads applied, unless detailed otherwise.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beam - HF	3.50"	3.50"	1.50"	162	572	734	Blocking
2 - Hanger on 7 1/4" HF beam	3.50"	Hanger[1]	1.50"	168	596	764	See note [1]

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.
- At hanger supports, the Total Bearing dimension is equal to the width of the material that is supporting the hanger
- [1] See Connector grid below for additional information and/or requirements.

Connector: Simpson Strong-Tie

Support	Model	Seat Length	Top Fasteners	Face Fasteners	Member Fasteners	Accessories
2 - Face Mount Hanger	LUS26-2	2.00"	N/A	4-10d	3-10d	

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Snow (1.15)	Comments
0 - Self Weight (PLF)	0 to 5' 9 1/2"	N/A	5.5	--	
1 - Uniform (PLF)	0 to 6' 1" (Front)	N/A	24.5	96.0	Linked from: Rj-1, Support 2
2 - Uniform (PLF)	0 to 6' 1" (Back)	N/A	24.5	96.0	Linked from: Rj-1, Support 2

Member Notes

ridge beam for low roof

Weyerhaeuser Notes

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

ForteWEB Software Operator	Job Notes
Mario D. Alvarado Jr. Quantum Consulting Engineers (206) 957-3904 malvarado@quantumce.com	

Weyerhaeuser

Wood Column

Lic. # : KW-06005835 — QUANTUM CONSULTING ENGINEERS

DESCRIPTION: P-1 supporting B-2 beam

Code References

Calculations per 2005 NDS, IBC 2009, CBC 2010, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Analysis Method :	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height	9 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir - Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**3-2x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**4.50** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.30
Area	24.750 in^2	Cf or Cv for Compression	1.10
Ix	62.391 in^4	Cf or Cv for Tension	1.30
Iy	41.766 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Factor	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for buckling ABOUT Y-Y Axis = 10 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 10 ft, K = 1.0

Applied Loads

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

Column self weight included : 48.278 lbs * Dead Load Factor
AXIAL LOADS . . .
b-2 R#1: Axial Load at 9.0 ft, D = 1.50, S = 3.20 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.4262 : 1**

Load Combination	+D+S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	4.748 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	450.181 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.90D
Location of max.above base	9.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.602	0.150	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+S	1.150	0.508	0.4262	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750S	1.150	0.508	0.3544	PASS	0.0 ft	0.0	PASS	9.0 ft
+0.90D	1.600	0.391	0.1169	PASS	0.0 ft	0.0	PASS	9.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					1.548				
+D+S					4.748				
+D+0.750S					3.948				

Wood Column

DESCRIPTION: P-1 supporting B-2 beam

Maximum Reactions

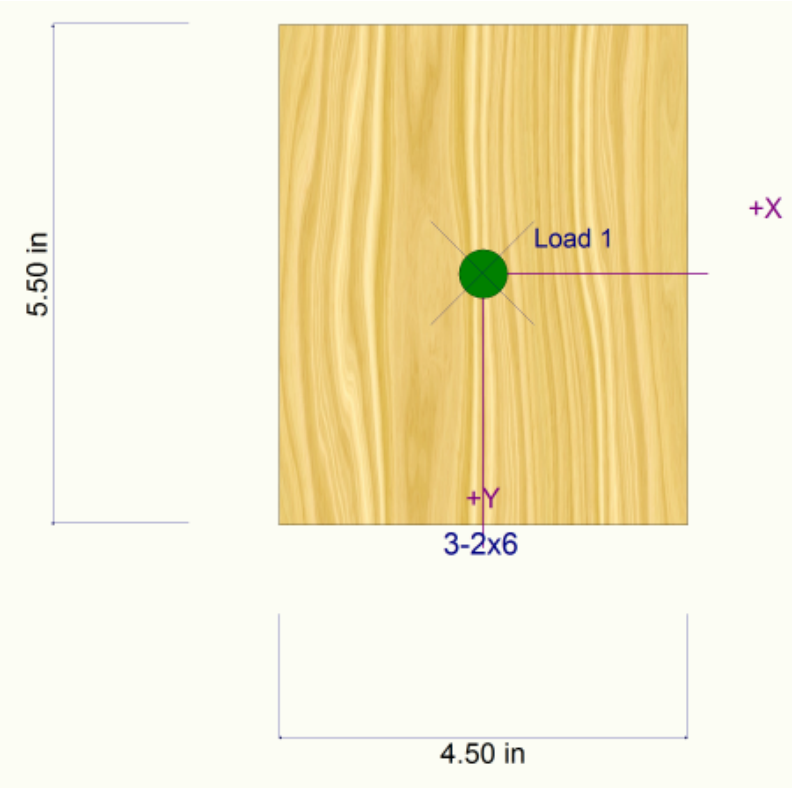
Note: Only non-zero reactions are listed.

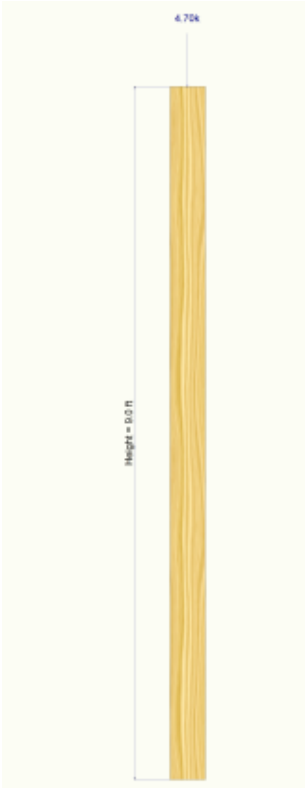
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+0.90D						1.393					
S Only						3.200					

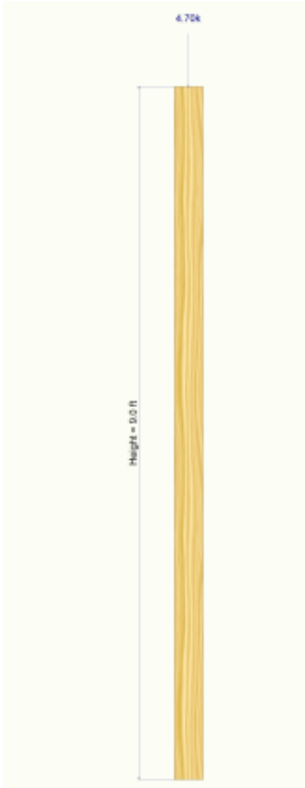
Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Sketches







Wood Column

Lic. # : KW-06005835 — QUANTUM CONSULTING ENGINEERS

DESCRIPTION: P-2 supporting EB-1 beam

Code References

Calculations per 2005 NDS, IBC 2009, CBC 2010, ASCE 7-10
Load Combinations Used : ASCE 7-10

General Information

Analysis Method :	Allowable Stress Design		
End Fixities	Top & Bottom Pinned		
Overall Column Height	9 ft		
(Used for non-slender calculations)			
Wood Species	Douglas Fir - Larch		
Wood Grade	No.2		
Fb +	750.0 psi	Fv	170.0 psi
Fb -	750.0 psi	Ft	475.0 psi
Fc - Prll	700.0 psi	Density	31.210 pcf
Fc - Perp	625.0 psi		

E : Modulus of Elasticity . . .	x-x Bending	y-y Bending	Axial
Basic	1,300.0	1,300.0	1,300.0 ksi
Minimum	470.0	470.0	

Wood Section Name	**4-2x6**		
Wood Grading/Manuf.	Graded Lumber		
Wood Member Type	Sawn		
Exact Width	**6.0** in	Allow Stress Modification Factors	
Exact Depth	**5.50** in	Cf or Cv for Bending	1.30
Area	33.0 in^2	Cf or Cv for Compression	1.10
Ix	83.188 in^4	Cf or Cv for Tension	1.30
Iy	99.0 in^4	Cm : Wet Use Factor	1.0
		Ct : Temperature Factor	1.0
		Cfu : Flat Use Factor	1.0
		Kf : Built-up columns	1.0 *NDS 15.3.2*
		Use Cr : Repetitive ?	No

Brace condition for deflection (buckling) along columns :
X-X (width) axis : Unbraced Length for buckling ABOUT Y-Y Axis = 10 ft, K = 1.0
Y-Y (depth) axis : Unbraced Length for buckling ABOUT X-X Axis = 10 ft, K = 1.0

Applied Loads

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

Column self weight included : 64.371 lbs * Dead Load Factor
AXIAL LOADS . . .
EB-1 R#1: Axial Load at 9.0 ft, D = 3.20, L = 1.50, S = 2.80 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.3364 : 1**

Load Combination	+D+0.750L+0.750S
Governing NDS Forumla	Comp Only, fc/Fc'
Location of max.above base	0.0 ft
At maximum location values are . . .	
Applied Axial	6.489 k
Applied Mx	0.0 k-ft
Applied My	0.0 k-ft
Fc : Allowable	584.53 psi

PASS Maximum Shear Stress Ratio = **0.0 : 1**

Load Combination	+0.90D
Location of max.above base	9.0 ft
Applied Design Shear	0.0 psi
Allowable Shear	272.0 psi

Maximum SERVICE Lateral Load Reactions . .

Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Lateral Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination : n/a
Along X-X 0.0 in at 0.0 ft above base
for load combination : n/a

Other Factors used to calculate allowable stresses . . .

	Bending	Compression	Tension

Load Combination Results

Load Combination	C_D	C_P	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.900	0.743	0.1922	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+L	1.000	0.709	0.2645	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+S	1.150	0.660	0.3144	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750L	1.250	0.629	0.2196	PASS	0.0 ft	0.0	PASS	9.0 ft
+D+0.750L+0.750S	1.150	0.660	0.3364	PASS	0.0 ft	0.0	PASS	9.0 ft
+0.90D	1.600	0.535	0.1350	PASS	0.0 ft	0.0	PASS	9.0 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction k @ Base	@ Top	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments k-ft @ Base	@ Top	Mx - End Moments @ Base	@ Top
D Only					3.264				

Wood Column

DESCRIPTION: P-2 supporting EB-1 beam

Maximum Reactions

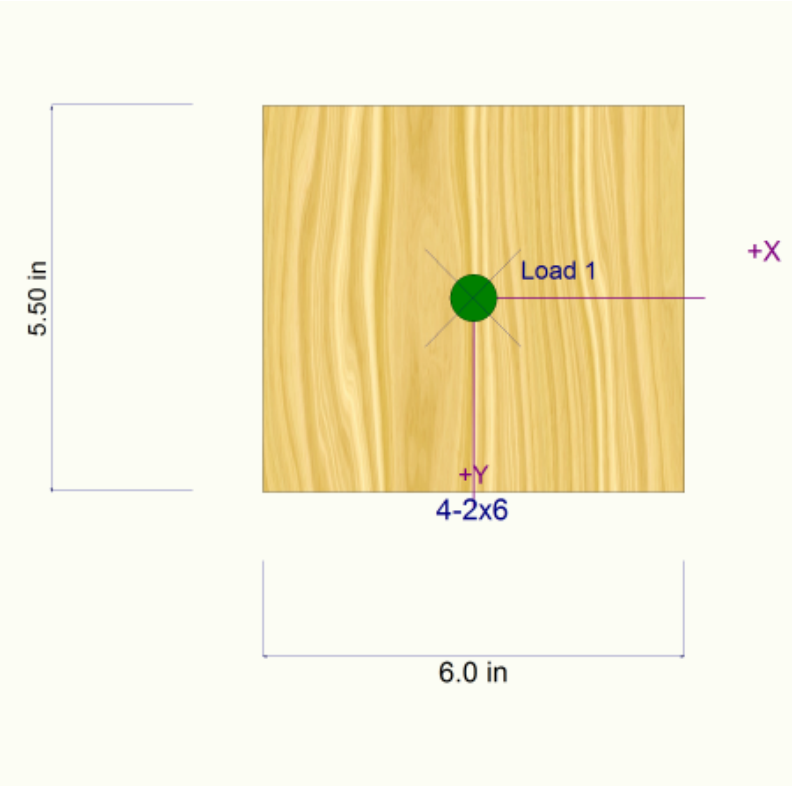
Note: Only non-zero reactions are listed.

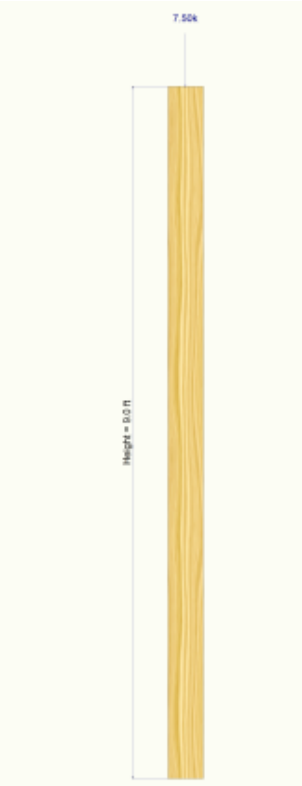
Load Combination	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Axial Reaction @ Base	My - End Moments @ Base	@ Top	k-ft	Mx - End Moments @ Base	@ Top
+D+L						4.764					
+D+S						6.064					
+D+0.750L						4.389					
+D+0.750L+0.750S						6.489					
+0.90D						2.938					
L Only						1.500					
S Only						2.800					

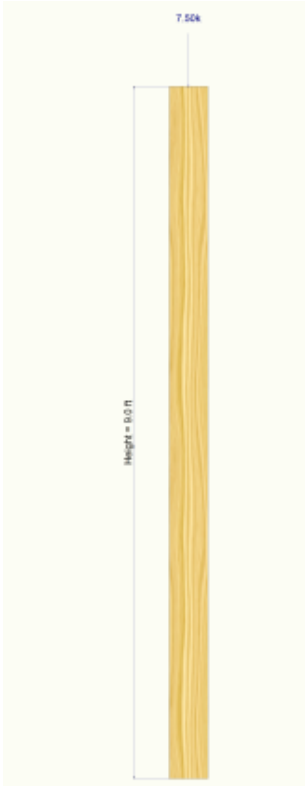
Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Sketches







DUBEY RES. ELEVATOR
8140 WEST MERCER WAY.
MERCER IS., WA 98040

QUANTUM JOB NUMBER: 20130.01

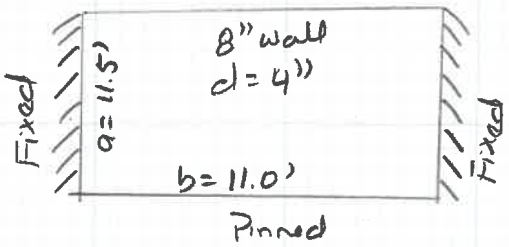
RETAIN WALL DESIGN

11'6" Retain Wall

I- Generals.

* Depth (a) = 11.5 Ft ; Length (b) = 11.0 Ft ; f'_c = 2,500 psi
  Fy = 60 ksi
  EFP = 55 lb/Ft³
* Bracing Cond.: Braced @ sides & Bott, free @ Top
* Use "Rectangular Conc. Tanks, 5th Ed." From PCA

II- Calculations.



* $b/a = 11.5'/11.0' = 1.05 \approx$ say 1.50

$$Mu = \frac{C*(EFP)*a^3*12"}{1000^2} * 1.6 \text{ (ULT)}$$

$$Mu = \frac{C*(55)*11.5^3*12}{1000^2}(1.6) = C*1.6$$

→ **Horizontal Bending** (From pag 2-14 Table; $b/a = 1.5$)

* $C_1 = +28$, $C_2 = -63$
* $M_{u+} = C_1 * 1.6 = +28 * 1.6 = 45$ k·in/Ft (@ C_L)
* $M_{u-} = C_1 * 1.6 = -63 * 1.6 = -101$ k·in/Ft (@ ends)

— As Req'd $\approx \frac{Mu}{\phi Fy\, d\, (0.9)} \approx \frac{-101}{0.9(60)(4)(0.9)} = 0.52 \text{ in}^2$ (GR 60)

Use #5 @ 6" O.C // (GR 60)
(0.62 in²)

+ As Req'd $= \frac{Mu}{\phi Fy\, d\, (0.9)} = \frac{45}{(0.9)(60)(4)(0.9)} = 0.23 \text{ in}^2$ (GR 60)

Use #5 @ 12" O.C // (GR 60)
(0.31 in²)

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www.quantumce.com

Dubay Res. Elevator (project)	04/08/2020 (date)	20130.01 (project no.)	
	MDA (designer)	#1 (sheet)	
Tutmarc Associates (client)	(checked by)		

Vertical Banding

* $C_1 = +27$

* $M_{u+} = C_1 * 1.60 = 27 * 1.6 = 43.2$ k·in/ft (@ CL)

* As Req'd $= \frac{M_u}{0.9(60)(4)(0.9)} = \frac{43.2}{(0.9)(60)(4)(0.9)} = 0.22 in^2$ GR-60

USE #5 @ 12" O.C // GR-60

(0.31 in2)

III - Design Summary

* 8" Conc. Wall, Rebar placed @ CL wall, d = 4"

* @ CL of wall use : #5 @ 12" O.C (GR-60) horizontal
#5 @ 12" O.C (GR-60) Vertical

* @ Corners of Wall use : #5 @ 6" O.C (GR-60) 3'0" / 3'0"

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Dubay Res. Elevator.	04/08/2020	20130.01	
project	date	project no.	
	MDA	#2	
	designer	sheet	
Tutmarc Associates			
client	checked by		

6'-4" Basement Wall

I- Generals

Depth (a) = 9.7' ; Length (b) = 7.5' ; f'c = 2,500 psi

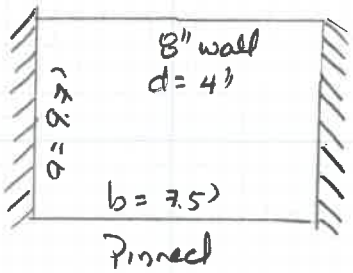
fy = 60 ksi

EFP = 55 lb/ft³

+ Bracing Cond = Braced @ sides & Bott., Free @ Top

* Use "Rectangular Conc. Tanks, 5th Ed." From PCA. //

II - Calculations



* $b/a = 7.5'/9.7' = 0.77 \simeq$ say 1.50

$$Mu = \frac{C * EFP * a^3 * 12''}{1000^2} * 1.6 \text{ (ult)}$$

$$Mu = \frac{C (55)(9.7)^3 * 12}{1000^2} (1.6) = C * 0.96$$

→ **Horizontal Bending** (From pg. 2-14 Table, $b/a = 1.5$)

* $C_1 = +28$; $C_2 = -63$
* $Mu = C_1 * 0.96 = +28 * 0.96 =$ 27 k·in/ft (@ CL)
* $Mu = C_2 * 0.96 = -63 * 0.96 =$ 60.5 k·in/ft (@ Ends)

– As Req'd $= \frac{Mu}{\phi Fy d (0.9)} = \frac{60.5}{(0.9)(60)(4)(0.9)} = 0.31 in^2$ GR 60

use #5 @ 12" O.C // (6R-60)
(0.31 in²)

+ As Req'd $= \frac{Mu}{\phi Fy d (0.9)} = \frac{27}{(0.9)(60)(4)(0.9)} = 0.14 in^2$ (6R60)

use #5 @ 12" O.C // (6R-60)
(0.31 in²)

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Dubey Res + Elevator — project
04/10/2020 — date
20130.01 — project no.
NDA — designer
#1 — sheet
Tutmarc & Associates — client
checked by

→ Vertical Bending

* $C_1 = +27$

* $M_{u+} = C_1 * 0.96 = 27 * 0.96 = 26$ k·in/ft

* As Req'd $= \frac{M_u}{0.9(60)(4)(0.9)} = \frac{26}{(0.9)(60)(4)(0.9)} = 0.13\ in^2$ (6R-60)

use #5 @ 12" O.C // (6R-60)
(0.3 in^2)

III - Design Summary

* 8" Conc. Wall, Rebar Placed @ CL wall, d = 4"

* @ CL of Wall use: #5 @ 12" O.C (6R-60) Horizontal
#5 @ 12" O.C (6R-60) Vertical

* @ Corners of wall: #5 @ 12" O.C (6R-60) 3'0" / 3'0"

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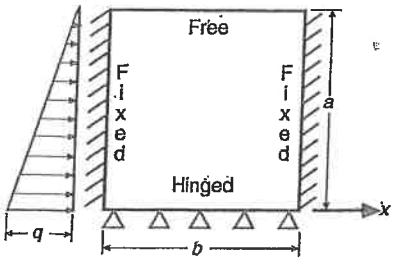
Dubay Res + Elevator (project)	04/10/2020 (date)	20130.01 (project no.)
	NOA (designer)	#2 (sheet)
Tutmore Associates (client)	(checked by)	

$\frac{b}{a} = 1.75$



Moment = Coef. × $qa^2/1000$

M_x

	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	-12	0	0	0	0	0
0.9a	-15	-5	0	2	4	4
0.8a	-15	-6	1	6	9	10
0.7a	-15	-5	4	11	15	16
0.6a	-15	-4	7	16	21	22
0.5a	-15	-2	11	20	26	28
0.4a	-15	0	14	24	30	32
0.3a	-13	2	16	25	30	32
0.2a	-10	4	16	23	27	28
0.1a	-6	4	11	15	17	18
BOT.	0	0	0	0	0	0

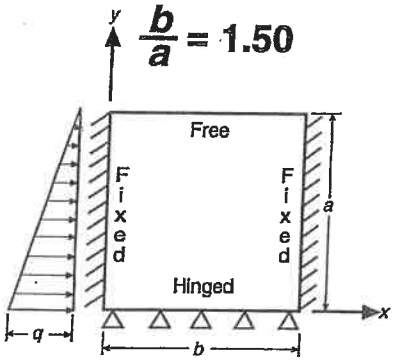
M_y

	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	-58	-36	-4	19	33	37
0.9a	-75	-34	-3	19	32	36
0.8a	-75	-33	-1	20	32	36
0.7a	-77	-31	0	20	32	35
0.6a	-77	-29	2	21	31	34
0.5a	-77	-26	4	21	30	32
0.4a	-73	-21	6	20	27	29
0.3a	-65	-16	6	18	23	25
0.2a	-51	-10	6	14	17	18
0.1a	-30	-5	4	8	10	10
BOT.	0	0	0	0	0	0

M_{xy}

	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	0	2	4	5	3	0
0.9a	0	0	3	3	2	0
0.8a	0	0	2	3	2	0
0.7a	0	1	3	4	3	0
0.6a	0	2	5	5	3	0
0.5a	0	4	8	8	5	0
0.4a	0	8	11	10	6	0
0.3a	0	12	15	13	7	0
0.2a	0	16	19	15	8	0
0.1a	0	20	22	17	9	0
BOT.	0	21	23	18	10	0

$\frac{b}{a} = 1.50$



Moment = Coef. × $qa^2/1000$

M_x

	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	-8	0	0	0	0	0
0.9a	-11	-4	-1	1	2	3
0.8a	-11	-5	0	4	6	7
0.7a	-12	-4	2	7	11	12
0.6a	-12	-3	5	12	16	17
0.5a	-13	-2	8	16	20	22
0.4a	-12	0	11	19	24	26
0.3a	-11	1	13	21	25	27
0.2a	-9	3	13	19	23	24
0.1a	-5	3	9	13	15	16
BOT.	0	0	0	0	0	0

M_y

	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	-37	-27	-4	13	24	27
0.9a	-53	-25	-3	14	24	27
0.8a	-56	-25	-2	15	24	28
0.7a	-59	-25	0	16	25	28
0.6a	-62	-24	1	17	26	28
0.5a	-63	-22	3	17	25	28
0.4a	-62	-19	4	17	24	26
0.3a	-56	-15	5	16	21	22
0.2a	-45	-10	5	12	16	17
0.1a	-27	-5	3	7	9	9
BOT.	0	0	0	0	0	0

M_{xy}

	END	0.1b	0.2b	0.3b	0.4b	0.5b
		0.9b	0.8b	0.7b	0.6b	
TOP	0	1	1	2	1	0
0.9a	0	2	0	1	1	0
0.8a	0	2	1	0	0	0
0.7a	0	1	0	1	1	0
0.6a	0	0	1	2	1	0
0.5a	0	2	4	4	2	0
0.4a	0	4	7	6	4	0
0.3a	0	8	11	9	5	0
0.2a	0	12	14	12	7	0
0.1a	0	15	17	14	7	0
BOT.	0	17	19	14	8	0