

**2906 74TH AVE SE RESIDENCE
2906 74TH AVE SE, MERCER ISLAND, WA 98040
ATTACHMENTS FOR RESPONSE TO STRUCTURAL CORRECTIONS**

**PROJECT NO: 20242 DATE:08-30-22
PREPARED BY: BASRI BASRI PE, SE**

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RH-1 HEADER



Project: Mercer Island Home

Location: **RH-1**

Multi-Span Floor Beam

[2015 International Building Code(2012 NDS)]

3.5 IN x 10.75 IN x 12.0 FT 4X10 HEADER SCREWED WITH WALL DOUBLE TOP PLATE AND 2X4 NAILER (ACTUAL DEPTH ~ 13 3/4")

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 4.3%

Controlling Factor: Moment

Dennis
StruCalc 9.0

StruCalc Version 10.2.1.0

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DEFLECTIONS		Center
Live Load	0.19	IN L/754
Dead Load	0.08	in
Total Load	0.27	IN L/525
Live Load Deflection Criteria: L/360		Total Load Deflection Criteria: L/240

REACTIONS		A	B
Live Load	1425	lb	1425
Dead Load	619	lb	619
Total Load	2044	lb	2044
Bearing Length	0.93	in	0.93

BEAM DATA		Center
Span Length	12	ft
Unbraced Length-Top	0	ft
Unbraced Length-Bottom	12	ft
Floor Duration Factor	1.15	
Notch Depth	0.00	

MATERIAL PROPERTIES

#2 - Douglas-Fir-Larch

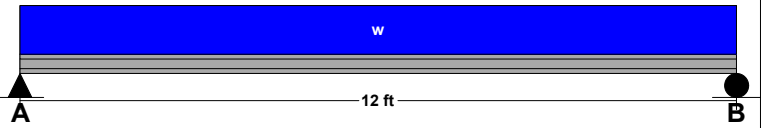
	Base Values	Adjusted
Bending Stress:	Fb = 900 psi Cd=1.15 CF=1.10	Fb' = 1139 psi
Shear Stress:	Fv = 180 psi Cd=1.15	Fv' = 207 psi
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi
Comp. \perp to Grain:	Fc \perp = 625 psi	Fc \perp ' = 625 psi

Controlling Moment: 6132 ft-lb
6.0 Ft from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: 1758 lb
At a distance d from left support of span 2 (Center Span)
Created by combining all dead loads and live loads on span(s) 2

Comparisons with required sections:	Req'd	Provided
Section Modulus:	64.63 in3	67.41 in3
Area (Shear):	12.74 in2	37.63 in2
Moment of Inertia (deflection):	173.11 in4	362.34 in4
Moment:	6132 ft-lb	6396 ft-lb
Shear:	1758 lb	5192 lb

LOADING DIAGRAM



FLOOR LOADING

	Center
Floor Live Load	FLL = 25 psf
Floor Dead Load	FDL = 10 psf
Floor Tributary Width Side One	TW1 = 9.5 ft
Floor Tributary Width Side Two	TW2 = 0 ft
Wall Load	WALL = 0 plf

BEAM LOADING

	Center
Reduced Floor Live Load	25 psf
Total Live Load	238 plf
Total Dead Load	95 plf
Beam Self Weight	8 plf
Total Load	341 plf

Project: Mercer Island Home

Location: RB-5

Roof Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 7.25 IN x 8.5 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 275.9%

Controlling Factor: Moment

Dennis
StruCalc 9.0

StruCalc Version 10.2.1.0

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DEFLECTIONS		Center
Live Load	0.03	IN L/3085
Dead Load	0.02	in
Total Load	0.05	IN L/1881
Live Load Deflection Criteria: L/240		Total Load Deflection Criteria: L/180

REACTIONS		A	B
Live Load	133 lb	133 lb	
Dead Load	94 lb	94 lb	
Total Load	227 lb	227 lb	
Bearing Length	0.10 in	0.10 in	

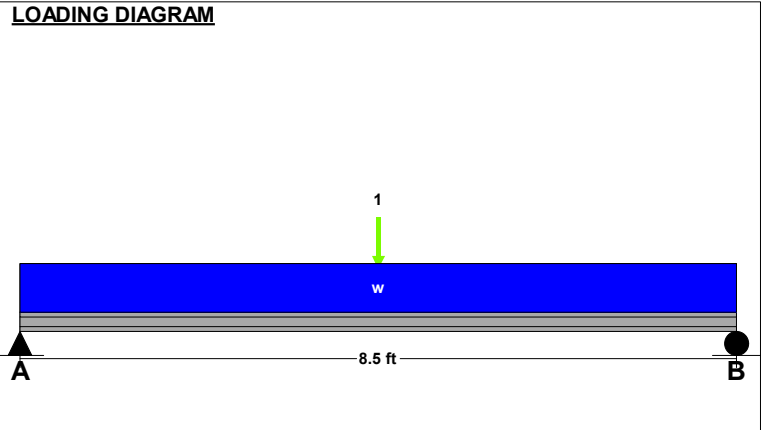
BEAM DATA	
Span Length	8.5 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	0 ft
Roof Pitch	4 :12
Roof Duration Factor	1.15
Notch Depth	0.00

MATERIAL PROPERTIES			
#2 - Douglas-Fir-Larch			
	Base Values	Adjusted	
Bending Stress:	Fb = 900 psi	Fb' = 1346 psi	
	Cd=1.15 CF=1.30		
Shear Stress:	Fv = 180 psi	Fv' = 207 psi	
	Cd=1.15		
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi	
Comp. \perp to Grain:	Fc - \perp = 625 psi	Fc - \perp ' = 625 psi	

Controlling Moment: 915 ft-lb
4.25 ft from left support
Created by combining all dead and live loads.

Controlling Shear: 224 lb
At a distance d from support.
Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	8.16 in ³	30.66 in ³
Area (Shear):	1.62 in ²	25.38 in ²
Moment of Inertia (deflection):	10.64 in ⁴	111.15 in ⁴
Moment:	915 ft-lb	3438 ft-lb
Shear:	224 lb	3502 lb



ROOF LOADING	
Side One:	
Roof Live Load: LL =	0 psf
Roof Dead Load: DL =	0 psf
Tributary Width: TW =	0 ft
Side Two:	
Roof Live Load: LL =	0 psf
Roof Dead Load: DL =	0 psf
Tributary Width: TW =	0 ft
Wall Load: WALL =	0 plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS		
Adjusted Beam Length:	Ladj =	8.5 ft
Beam Self Weight:	BSW =	6 plf
Beam Uniform Live Load:	wL =	0 plf
Beam Uniform Dead Load:	wD_adj =	6 plf
Total Uniform Load:	wT =	6 plf

POINT LOADS - CENTER SPAN	
Load Number	One *
Live Load	266 lb
Dead Load	141 lb
Location	4.25 ft

* Load obtained from Load Tracker. See Summary Report for details.

Project: Mercer Island Home

Location: RR-4

Roof Rafter

[2015 International Building Code(2015 NDS)]

1.5 IN x 5.5 IN x 5.0 FT (4.5 + 0.5) @ 24 O.C.

#2 - Hem-Fir - Dry Use

Section Adequate By: 395.4%

Controlling Factor: Moment

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DEFLECTIONS	<u>Center</u>		<u>Right</u>	
Live Load	0.02	IN L/2634	0.00	IN 2L/MAX
Dead Load	0.01	in	0.00	in
Total Load	0.04	IN L/1796	0.00	IN 2L/∞
Live Load Deflection Criteria: L/240		Total Load Deflection Criteria: L/180		

REACTIONS	<u>A</u>	<u>B</u>
Live Load	113 lb	139 lb
Dead Load	53 lb	67 lb
Total Load	166 lb	206 lb
Bearing Length	0.27 in	0.34 in

SUPPORT LOADS	<u>A</u>	<u>B</u>
Live Load	57 plf	70 plf
Dead Load	27 plf	34 plf
Total Load	83 plf	103 plf

MATERIAL PROPERTIES

#2 - Hem-Fir

	<u>Base Values</u>	<u>Adjusted</u>
Bending Stress:	Fb = 850 psi	Fb' = 1461 psi
	Cd=1.15 CF=1.30 Cr=1.15	
Shear Stress:	Fv = 150 psi	Fv' = 173 psi
	Cd=1.15	
Modulus of Elasticity:	E = 1300 ksi	E' = 1300 ksi
Comp. ⊥ to Grain:	Fc ⊥ = 405 psi	Fc ⊥' = 405 psi

Controlling Moment: 186 ft-lb

2.247 Ft from left support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2

Controlling Shear: -118 lb

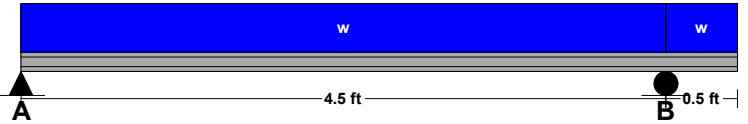
At a distance d from right support of span 2 (Center Span)

Created by combining all dead loads and live loads on span(s) 2, 3

Comparisons with required sections:

	<u>Req'd</u>	<u>Provided</u>
Section Modulus:	1.53 in ³	7.56 in ³
Area (Shear):	1.03 in ²	8.25 in ²
Moment of Inertia (deflection):	2.08 in ⁴	20.8 in ⁴
Moment:	186 ft-lb	921 ft-lb
Shear:	-118 lb	949 lb

LOADING DIAGRAM



RAFTER DATA

	<u>Interior</u>	<u>Eave</u>
Span Length	4.5 ft	0.5 ft
Rafter Pitch	8	:12
Roof sheathing applied to top of joists-top of rafters fully braced.		
Roof Duration Factor	1.15	
Peak Notch Depth	0.00	
Base Notch Depth	0.00	

RAFTER LOADING

Uniform Roof Loading

Roof Live Load:	LL =	25 psf
Roof Dead Load:	DL =	10 psf

Slope Adjusted Spans And Loads

Interior Span:	L-adj =	5.41 ft
Eave Span:	L-Eave-adj =	0.6 ft
Interior Live Load:	wL-adj =	35 plf
Eave Live Load:	wL-Eave-adj =	35 plf
Interior Dead Load:	wD-adj =	17 plf
Eave Dead Load:	wD-Eave-adj =	17 plf
Interior Total Load:	wT-adj =	51 plf
Eave Total Load:	wT-Eave-adj =	51 plf

VERTICAL REACTIONS

Live Load:	Vert-LL-Rxn =	266 lb
Dead Load:	Vert-DL-Rxn =	211 lb
Total Load:	Vert-TL-Rxn =	477 lb

COLUMN DATA

Total Column Length:	10 ft
Unbraced Length (X-Axis) Lx:	10 ft
Unbraced Length (Y-Axis) Ly:	10 ft
Column End Condition-K (e):	1
Axial Load Duration Factor	1.15

COLUMN PROPERTIES

#2 - Hem-Fir

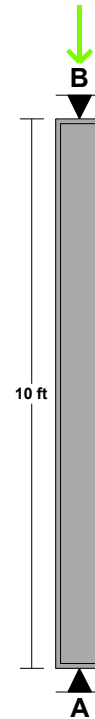
	Base Values	Adjusted
Compressive Stress:	Fc = 1300 psi	Fc' = 264 psi
	Cm=0.80 Cf=1.15 Cp=0.24 Ci=0.80	
Bending Stress (X-X Axis):	Fbx = 850 psi	Fbx' = 997 psi
	Cm=0.85 CF=1.50 Ci=0.80	
Bending Stress (Y-Y Axis):	Fby = 850 psi	Fby' = 997 psi
	Cm=0.85 CF=1.50 Ci=0.80	
Modulus of Elasticity:	E = 1300 ksi	E' = 1112 ksi

Column Section (X-X Axis):	dx =	3.5 in
Column Section (Y-Y Axis):	dy =	3.5 in
Area:	A =	12.25 in ²
Section Modulus (X-X Axis):	Sx =	7.15 in ³
Section Modulus (Y-Y Axis):	Sy =	7.15 in ³
Slenderness Ratio:	L _{ex} /dx =	34.29
	L _{ey} /dy =	34.29

Column Calculations (Controlling Case Only):

Controlling Load Case: Axial Total Load Only (L + D)		
Actual Compressive Stress:	Fc =	39 psi
Allowable Compressive Stress:	Fc' =	264 psi
Eccentricity Moment (X-X Axis):	Mx-ex =	0 ft-lb
Eccentricity Moment (Y-Y Axis):	My-ey =	0 ft-lb
Moment Due to Lateral Loads (X-X Axis):	Mx =	0 ft-lb
Moment Due to Lateral Loads (Y-Y Axis):	My =	0 ft-lb
Bending Stress Lateral Loads Only (X-X Axis):	Fbx =	0 psi
Allowable Bending Stress (X-X Axis):	Fbx' =	997 psi
Bending Stress Lateral Loads Only (Y-Y Axis):	Fby =	0 psi
Allowable Bending Stress (Y-Y Axis):	Fby' =	997 psi
Combined Stress Factor:	CSF =	0.15

LOADING DIAGRAM



AXIAL LOADING

Live Load:	PL =	266 lb *
Dead Load:	PD =	188 lb *
Column Self Weight:	CSW =	23 lb
Total Axial Load:	PT =	477 lb

* Load obtained from Load Tracker. See Summary Report for details.

Project: Mercer Island Home

Location: F-1

Footing

[2015 International Building Code(2015 NDS)]

Footing Size: 1.5 FT Round Diameter X 18.00 IN Deep

Reinforcement: #4 Bars @ 1.89 IN. O.C. E/W / (6) min.

Section Footing Design Adequate

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FOOTING PROPERTIES

Allowable Soil Bearing Pressure: Qs = 1500 psf
Concrete Compressive Strength: F'c = 2500 psi
Reinforcing Steel Yield Strength: Fy = 40000 psi
Concrete Reinforcement Cover: c = 3 in

FOOTING SIZE

Diameter: Dia. = 1.5 ft
Effective Depth to Top Layer of Steel: d = 14.25 in

COLUMN AND BASEPLATE SIZE

Column Type: Wood
Column Width: m = 4 in
Column Depth: n = 4 in

FOOTING CALCULATIONS

Bearing Calculations:

Ultimate Bearing Pressure: Qu = 270 psf
Effective Allowable Soil Bearing Pressure: Qe = 1275 psf
Required Footing Area: Areq = 0.37 sf
Area Provided: A = 1.77 sf

Baseplate Bearing:

Bearing Required: Bear = 679 lb
Allowable Bearing: Bear-A = 44200 lb

Beam Shear Calculations (One Way Shear):

Beam Shear: Vu1 = 0 lb
Allowable Beam Shear: Vc1 = 17049 lb

Punching Shear Calculations (Two Way Shear):

Critical Perimeter: Bo = 0 in
Punching Shear: Vu2 = 0 lb
Allowable Punching Shear (ACI 11-35): vc2-a = 0 lb
Allowable Punching Shear (ACI 11-36): vc2-b = 0 lb
Allowable Punching Shear (ACI 11-37): vc2-c = 0 lb
Controlling Allowable Punching Shear: vc2 = 0 lb

Bending Calculations:

Factored Moment: Mu = 1354 in-lb
Nominal Moment Strength: Mn = 574608 in-lb

Reinforcement Calculations:

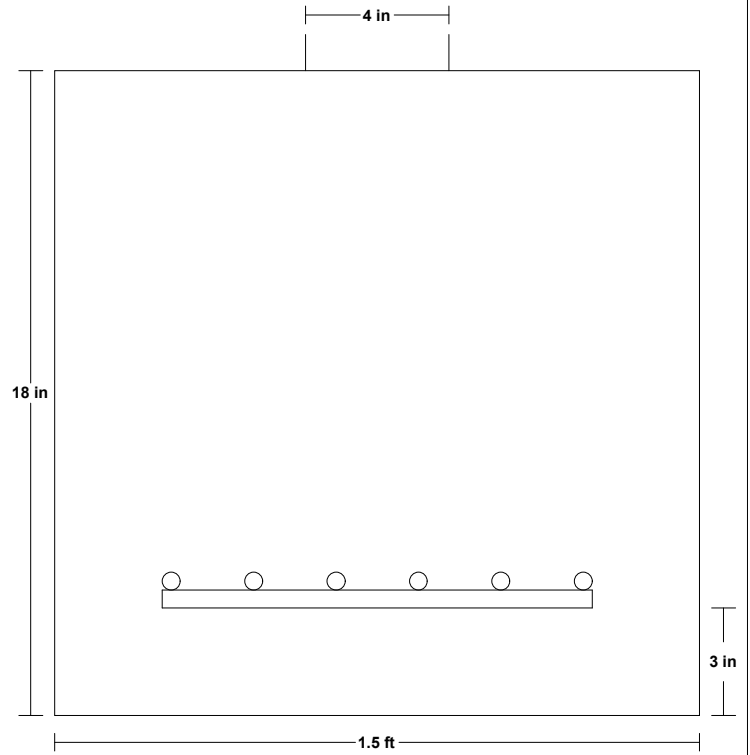
Concrete Compressive Block Depth: a = 1.39 in
Steel Required Based on Moment: As(1) = 0.00 in2
Min. Code Req'd Reinf. Flex. Members (ACI-150.1): As(2) = 1.14 in2
Controlling Reinforcing Steel: As-reqd = 1.14 in2
Selected Reinforcement: #4's @ 1.9 in. o.c. e/w (6) Min.
Reinforcement Area Provided: As = 1.18 in2

Development Length Calculations:

Development Length Required: Ld = 15 in
Development Length Supplied: Ld-sup = 4.98 in

Note: Plain concrete adequate for bending,
therefore adequate development length not required.

LOADING DIAGRAM



FOOTING LOADING

Live Load: PL = 266 lb *
Dead Load: PD = 211 lb *
Total Load: PT = 477 lb *
Ultimate Factored Load: Pu = 679 lb
Footing plus soil above footing weight: Wt = 256 lb
* Load obtained from Load Tracker. See Summary Report for details.

Project: Mercer Island Home

Location: RB-4

Roof Beam

[2015 International Building Code(2015 NDS)]

3.5 IN x 7.25 IN x 5.0 FT

#2 - Douglas-Fir-Larch - Dry Use

Section Adequate By: 575.6%

Controlling Factor: Moment

Dennis
StruCalc 9.0

StruCalc Version 10.2.1.0

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DEFLECTIONS		Center
Live Load	0.01	IN L/7142
Dead Load	0.00	in
Total Load	0.01	IN L/4661
Live Load Deflection Criteria: L/240		Total Load Deflection Criteria: L/180

REACTIONS		A	B
Live Load	266	lb	266
Dead Load	141	lb	141
Total Load	407	lb	407
Bearing Length	0.19	in	0.19

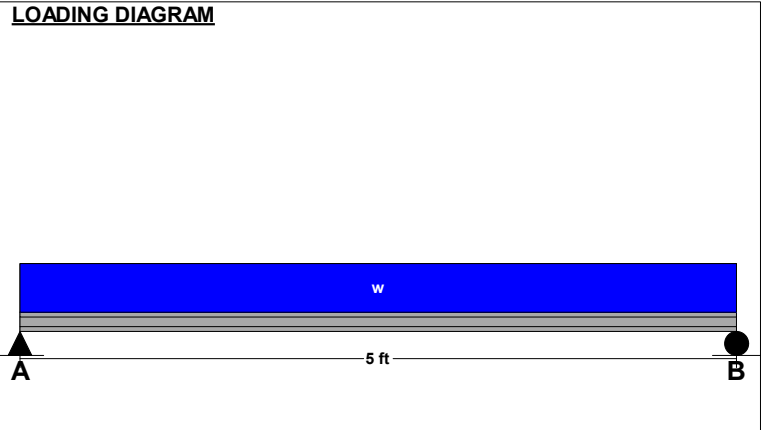
BEAM DATA	
Span Length	5 ft
Unbraced Length-Top	0 ft
Unbraced Length-Bottom	0 ft
Roof Pitch	8 :12
Roof Duration Factor	1.15
Notch Depth	0.00

MATERIAL PROPERTIES			
#2 - Douglas-Fir-Larch			
	Base Values	Adjusted	
Bending Stress:	Fb = 900 psi	Fb' = 1346 psi	
	Cd=1.15 CF=1.30		
Shear Stress:	Fv = 180 psi	Fv' = 207 psi	
	Cd=1.15		
Modulus of Elasticity:	E = 1600 ksi	E' = 1600 ksi	
Comp. \perp to Grain:	Fc - \perp = 625 psi	Fc - \perp ' = 625 psi	

Controlling Moment: 509 ft-lb
 2.5 ft from left support
 Created by combining all dead and live loads.

Controlling Shear: 309 lb
 At a distance d from support.
 Created by combining all dead and live loads.

Comparisons with required sections:	Req'd	Provided
Section Modulus:	4.54 in ³	30.66 in ³
Area (Shear):	2.24 in ²	25.38 in ²
Moment of Inertia (deflection):	4.29 in ⁴	111.15 in ⁴
Moment:	509 ft-lb	3438 ft-lb
Shear:	309 lb	3502 lb



ROOF LOADING			
Side One:			
Roof Live Load:	LL =	25	psf
Roof Dead Load:	DL =	10	psf
Tributary Width:	TW =	4.3	ft
Side Two:			
Roof Live Load:	LL =	0	psf
Roof Dead Load:	DL =	0	psf
Tributary Width:	TW =	0	ft
Wall Load:	WALL =	0	plf

SLOPE/PITCH ADJUSTED LENGTHS AND LOADS			
Adjusted Beam Length:	Ladj =	5	ft
Beam Self Weight:	BSW =	6	plf
Beam Uniform Live Load:	wL =	106	plf
Beam Uniform Dead Load:	wD_adj =	57	plf
Total Uniform Load:	wT =	163	plf

NEW GARAGE FOUNDATION
(NW PORTION)



12" wide x 10" deep, footing w/ 6" wide stem wall

NEW CONCRETE FOUNDATION WALL (PHOTO TAKEN NORTH OF NEW PATIO, NEXT TO NEW OFFICE)

