

Structural Calculations

for

ADDITIONS & ALTERATIONS

Knotz Residence

6020 94th Ave SE

Mercer Island, WA 98040

1ST CORRECTION CYCLE RESPONSE

prepared by:

O.G. Engineering, PLLC

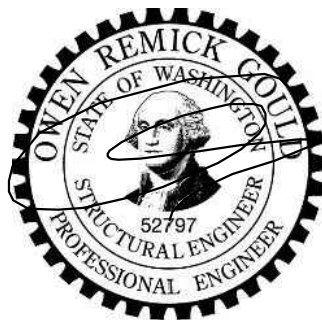
3201 1st Ave S, Ste 101

Seattle, WA, 98134

(206) 290-4608

Job No. 22050

Date: 9/27/23



DECK FRAMING

DR1 DECK JOISTS

SPAN = 11'3"

$w = \frac{10 \text{ lb/ft}}{2 \text{ ft}}$

$V_{DE} = 2 \times 10 \text{ @ } 16" \text{ o.c.}$

DR2 DECK BEAM

SPAN = 9'-9" MAX

$w = \frac{10 \text{ lb/ft}}{2 \text{ ft}}$

TRIS = 11'6"

$V_{DE} = 5 \frac{1}{2} \times 9 \text{ PT } 6 \text{ LB}$

FOUNDATIONS | (ELEMENTS NOT EXPLICITLY CALLED OUT BY INSPECTION)

(F1) Deck ASD FOUNDATION

$$P = \frac{(10+60)(10')(11')}{2 \cdot 4} = \frac{1100 + 6600 \#}{2 \cdot 4} \quad \text{Use } 2 \times 8 \text{ Joists} \\ \text{6000 for } 2 \times 8 \text{ Joists} = 9000 \#$$

ok

Multiple Simple Beam

Project File: 22050_Knotz.ec6

LIC# : KW-06018000, Build:20.22.12.28

O.G. ENGINEERING, PLLC

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Description : Deck Framing

Wood Beam Design : DJ1 - Deck Joists

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **2x10, Sawn, Fully Braced**

Using Allowable Stress Design with IBC 2021 Load Combinations, Major Axis Bending

Wood Species : Hem-Fir

Wood Grade : No.2

Fb - Tension	850 psi	Fc - Prll	1300 psi	Fv	150 psi	Ebend- xx	1300 ksi	Density	26.84 pcf
Fb - Compr	850 psi	Fc - Perp	405 psi	Ft	525 psi	Eminbend - xx	470 ksi		

Applied Loads

Unif Load: D = 0.010, L = 0.060 k/ft, Trib= 1.330 ft

Design Summary

Max fb/Fb Ratio = **0.961** : 1
 fb : Actual : 826.27 psi at 5.625 ft in Span # 1
 Fb : Allowable : 860.20 psi
 Load Comb : +D+L
 Max fv/FvRatio = **0.422** : 1
 fv : Actual : 49.07 psi at 10.500 ft in Span # 1
 Fv : Allowable : 116.40 psi
 Load Comb : +D+L



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	0.07		0.45				
Right Support	0.07		0.45				

Max Deflections

Transient Downward	0.250 in	Total Downward	0.291 in
Ratio	540	Ratio	463
LC: L Only		LC: +D+L	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	

Wood Beam Design : DB2 - Deck Beam

Calculations per NDS 2018, IBC 2018, CBC 2019, ASCE 7-16

BEAM Size : **5.5x9, GLB, Fully Braced**

Using Allowable Stress Design with IBC 2021 Load Combinations, Major Axis Bending

Wood Species : DF/DF

Wood Grade : 24F-V8

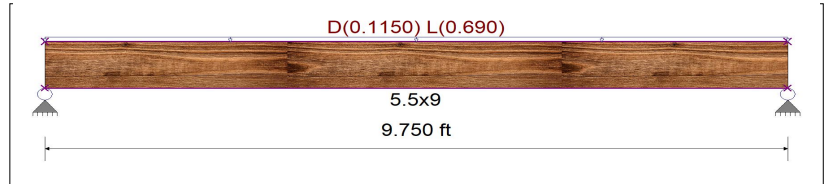
Fb - Tension	2400 psi	Fc - Prll	1650 psi	Fv	265 psi	Ebend- xx	1800 ksi	Density	31.21 pcf
Fb - Compr	2400 psi	Fc - Perp	650 psi	Ft	1100 psi	Eminbend - xx	950 ksi		

Applied Loads

Unif Load: D = 0.010, L = 0.060 k/ft, Trib= 11.50 ft

Design Summary

Max fb/Fb Ratio = **0.644** : 1
 fb : Actual : 1,545.97 psi at 4.875 ft in Span # 1
 Fb : Allowable : 2,400.00 psi
 Load Comb : +D+L
 Max fv/FvRatio = **0.380** : 1
 fv : Actual : 100.69 psi at 9.003 ft in Span # 1
 Fv : Allowable : 265.00 psi
 Load Comb : +D+L



Max Reactions (k)	D	Lr	L	S	W	E	H
Left Support	0.56		3.36				
Right Support	0.56		3.36				

Max Deflections

Transient Downward	0.235 in	Total Downward	0.274 in
Ratio	498	Ratio	427
LC: L Only		LC: +D+L	
Transient Upward	0.000 in	Total Upward	0.000 in
Ratio	9999	Ratio	9999
LC:		LC:	