

**G & S Structural Engineers**  
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Idaho Falls, ID 83402

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February 28, 2019  
#19023

Mr. Greg Armstrong  
Armstrong Construction  
417 Cranbrook Lane  
Idaho Falls, ID 83404

Re: Frye Residence  
Idaho Falls, Idaho

Dear Mr. Armstrong,

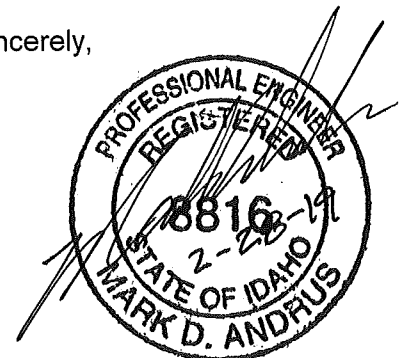
This letter is to document that G&S Structural Engineers has reviewed the design for the framing at the front porch slab over the basement cold storage area. The design is based upon the requirements established by the 2015 International Building Code (IBC 2015).

The details and joist schedule on the plan sheet A4 from Sundance drafting & design, dated February 11, 2019 describe the connection and joist size for the cold storage porch. Given that the cold storage measures 6'-7" by 20'-2" the joists will span the shorter direction. Per the details on sheet A4 the joists will have a clear span of 5'-11". I have checked the joist design for a 6'-0" clear span and as the table on sheet A4 describes, a 2x6 joist spaced at 16" centers is adequate and appropriate for this span with up to a maximum 6" concrete topping depth. I have enclosed both design calculations for your records.

The topping slab should be reinforced and tied to the exterior perimeter concrete walls as specified in the details. The SDS ledger screws at the house should also be spaced at 5" centers staggered.

G&S Structural Engineers designed only the cold storage framing referenced above, no additional items were designed or reviewed by G&S Structural Engineers. It is G&S Structural Engineers' understanding that the remaining structural items not addressed will be designed by others. The structural design is to be used for the project referenced above only and shall not be reused for any other purpose or project regardless of owner or the lack of changes. Due to the limited involvement of G&S Structural Engineers regarding this project and the lack of control over the structural documents and the construction of the project, G&S Structural Engineers is limiting its liability to fees rendered. If there are any questions regarding the design or if I can be of further assistance please don't hesitate to contact me.

Sincerely,



Mark D. Andrus, PE

Encl.: Supporting calculations (2 pages)



**WoodWorks**<sup>®</sup>  
SOFTWARE FOR WOOD DESIGN

**COMPANY**  
G&S Structural Engineers  
Mark Andrus  
Feb. 28, 2019 09:46

**PROJECT**  
  
Beam1

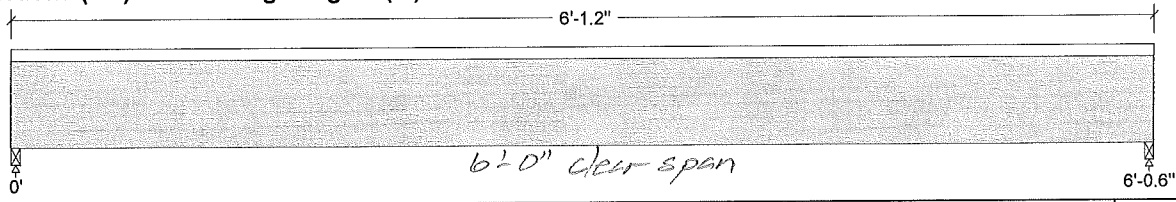
**Design Check Calculation Sheet**  
WoodWorks Sizer 10.4

**Loads:**

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
Load1	Dead	Full Area				60.00	(16.0")	psf
Load2	Live	Full Area				77.00	(16.0")	psf
Self-weight	Dead	Full UDL				2.0		plf

Dead load with 4" concrete and 10 psf Misc. load (60psf)  
Maximum Live Load (77psf)

**Maximum Reactions (lbs) and Bearing Lengths (in) :**



Unfactored:			
Dead	250		250
Live	313		313
Factored:			
Total	563		563
Bearing:			
Length	0.60		0.60
Min req'd	0.60		0.60

**Lumber-soft, D.Fir-L, No.2, 2x6 (1-1/2"x5-1/2")**

Supports: All - Timber-soft Beam, D.Fir-L No.2  
Floor joist spaced at 16.0" c/c; Total length: 6'-1.2"; volume = 0.3 cu.ft.;  
Lateral support: top= full, bottom= at supports; Repetitive factor: applied where permitted (refer to online help);

**Analysis vs. Allowable Stress and Deflection using NDS 2012 :**

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 85	Fv' = 180	psi	fv/Fv' = 0.47
Bending(+)	fb = 1340	Fb' = 1345	psi	fb/Fb' = 1.00
Dead Defl'n	0.07 = L/977			
Live Defl'n	0.09 = L/780	0.20 = L/360	in	0.46
Total Defl'n	0.20 = L/355	0.30 = L/240	in	0.68

**Additional Data:**

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cf <sub>rt</sub>	Ci	Cn	LC#
Fv'	180	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	900	1.00	1.00	1.00	1.000	1.300	1.00	1.15	1.00	1.00	-	2
F <sub>cp</sub> '	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million	1.00	1.00	1.00	-	-	-	-	1.00	1.00	-	2
E <sub>min</sub> '	0.58 million	1.00	1.00	1.00	-	-	-	-	1.00	1.00	-	2

**CRITICAL LOAD COMBINATIONS:**

Shear : LC #2 = D+L, V = 559, V design = 469 lbs  
Bending(+): LC #2 = D+L, M = 845 lbs-ft  
Deflection: LC #2 = D+L (live)  
LC #2 = D+L (total)

D=dead L=live S=snow W=wind I=impact L<sub>r</sub>=roof live L<sub>c</sub>=concentrated E=earthquake

All LC's are listed in the Analysis output

Load combinations: ASCE 7-10 / IBC 2012

**CALCULATIONS:**

Deflection: EI = 33.3e06 lb-in<sup>2</sup>  
"Live" deflection = Deflection from all non-dead loads (live, wind, snow...)  
Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.

**Design Notes:**

- WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
- Please verify that the default deflection limits are appropriate for your application.
- Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.



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Feb. 28, 2019 09:48

**PROJECT**

Beam1

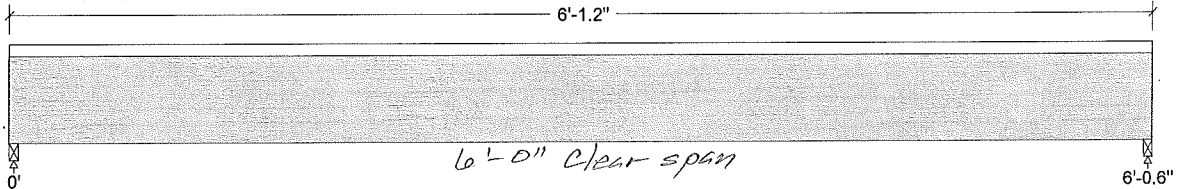
**Design Check Calculation Sheet**  
WoodWorks Sizer 10.4

**Loads:**

Load	Type	Distribution	Pat-tern	Location [ft]		Magnitude		Unit
				Start	End	Start	End	
Load1	Dead	Full Area				85.00	(16.0")	psf
Load2	Live	Full Area				52.00	(16.0")	psf
Self-weight	Dead	Full UDL				2.0		plf

Dead load with 6" concrete and 10 psf floor load (85 psf)  
Maximum live load (52 psf)

**Maximum Reactions (lbs) and Bearing Lengths (in) :**



Unfactored:			
Dead	352		352
Live	211		211
Factored:			
Total	563		563
Bearing:			
Length	0.60		0.60
Min req'd	0.60		0.60

**Lumber-soft, D.Fir-L, No.2, 2x6 (1-1/2"x5-1/2")**

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

Floor joist spaced at 16.0" c/c; Total length: 6'-1.2"; volume = 0.3 cu.ft.;

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

**Analysis vs. Allowable Stress and Deflection using NDS 2012 :**

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	$f_v = 85$	$F_v' = 180$	psi	$f_v/F_v' = 0.47$
Bending(+)	$f_b = 1340$	$F_b' = 1345$	psi	$f_b/F_b' = 1.00$
Dead Defl'n	$0.10 = L/695$			
Live Defl'n	$0.06 = <L/999$	$0.20 = L/360$	in	0.31
Total Defl'n	$0.22 = L/330$	$0.30 = L/240$	in	0.73

**Additional Data:**

FACTORS:	F/E (psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cf <sub>rt</sub>	Ci	Cn	LC#
F <sub>v</sub> '	180	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
F <sub>b</sub> ' <sup>+</sup>	900	1.00	1.00	1.00	1.000	1.300	1.00	1.15	1.00	1.00	-	2
F <sub>cp</sub> '	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-	-
E'	1.6 million	1.00	1.00	-	-	-	-	-	1.00	1.00	-	2
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Deflection: LC #2 = D+L (live)

LC #2 = D+L (total)

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Total Deflection = 1.50(Dead Load Deflection) + Live Load Deflection.

**Design Notes:**

1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2012), the National Design Specification (NDS 2012), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.