



AL-IMAN Group, LLC
Engineering • Construction • Management

Mr. Dorian Breuer
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September 27, 2018

**RE: Rao Residence – 17606 Karli Lane, Orland Park, IL 60467
AIG# 18.924 (Rev. 2)**

Mr. Breuer:

We have reviewed the proposed solar array drawings and the structure(s) at the above referenced address. The array consists of (59) solar modules on the structure, mounted on an Iron Ridge racking system (or equal), with a maximum attachment spacing in accordance with the recommendations of Iron Ridge.

We hereby certify that the existing structure, with the addition of the proposed solar energy devices, is capable of supporting the design load referenced in the 2012 International Residential Code and ASCE 7-10, **including a Ground Snow Load of 30 psf.**

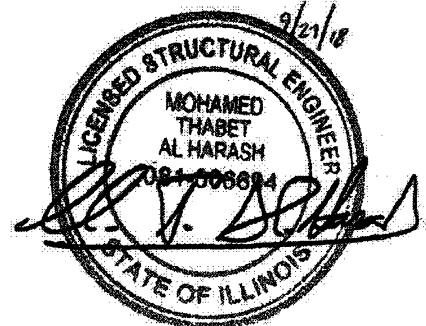
We have attached the calculation for the critical roof member – a 2x10 rafter, checked for bending stress and deflection in accordance with ASCE 7-10.

Please feel free to contact us should you have any comments or questions

Respectfully yours,

Mohamed T. AL HARASH

Dr. Mohamed T. AL HARASH, Sc.D., P.E., S.E. - NCEES
Director of Operations



Rao Residence
Critical Roof Member
2x10 Rafter
Dead Load 13 psf with solar
Ground Snow 30 psf

Title :
Dsgnr:
Description :
Scope :

Job #
Date: 2:20PM, 24 SEP 18

Rev: 580005
User: KW-0603478, Ver 5.8.0, 1-Dec-2003
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Timber Beam & Joist

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Description

Timber Member Information

Base allowables are user defined

Timber Section		
Beam Width	in	2.000
Beam Depth	in	10.000
Le: Unbraced Length	ft	0.00
Timber Grade		Spruce - Pine - Fir, No. 1/No. 2
Fb - Basic Allow	psi	875.0
Fv - Basic Allow	psi	135.0
Elastic Modulus	ksi	1,400.0
Load Duration Factor		1.000
Member Type		Manuf/Pine
Repetitive Status		Repetitive

Center Span Data

Span	ft	18.00
Dead Load	#/ft	17.30
Live Load	#/ft	39.90

Results

Ratio = 0.8288

Mmax @ Center	in-k	27.80
@ X =	ft	9.00
fb : Actual	psi	834.0
Fb : Allowable	psi	1,006.3
		Bending OK
fv : Actual	psi	35.2
Fv : Allowable	psi	135.0
		Shear OK

Reactions

@ Left End	DL	lbs	155.70
	LL	lbs	359.10
	Max. DL+LL	lbs	514.80
@ Right End	DL	lbs	165.70
	LL	lbs	359.10
	Max. DL+LL	lbs	514.80

Deflections

Ratio OK

Center DL Defl	in	-0.175
L/Defl Ratio		1,233.5
Center LL Defl	in	-0.404
L/Defl Ratio		534.8
Center Total Defl	in	-0.579
Location	ft	9.000
L/Defl Ratio		373.1