

**CITY OF SACRAMENTO**  
1231 I Street, Sacramento, CA 95814

**Permit No: 0105786**  
**Insp Area: 2**

**Site Address: 884 SHELLWOOD WY SAC**  
Parcel No: 031-0730-035

Sub-Type: RES  
Housing (Y/N): N

**CONTRACTOR**  
ZIMMERMAN ROOFING, INC  
3675 R STREET  
SACRAMENTO, CA 95816

**OWNER**  
PERRIN MICHAEL L  
884 SHELLWOOD WY  
SACRAMENTO CA 95831

**ARCHITECT**

**Nature of Work: REROOF; TEAR OFF; INSTALL 28-SQ OF LIGHT WEIGHT TILE**

**CONSTRUCTION LENDING AGENCY:** I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C)

Lender's Name \_\_\_\_\_ Lender's Address \_\_\_\_\_

**LICENSED CONTRACTORS DECLARATION:** I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with section 7000) of Division 3 of the Business and Professions Code and my license is in full force and effect.

License Class C31 License Number 557559 Date 5-11-01 Contractor Signature Alme Gonzalez

**OWNER-BUILDER DECLARATION:** I hereby affirm under penalty of perjury that I am exempt from the contractors License Law for the following reason (Sec. 7031.5, Business and Professions Code; any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 8 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500.00).

I, as a owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professional Code). The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his/her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he/she did not build or improve for the purpose of sale.

I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code). The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.

I am exempt under Sec. \_\_\_\_\_ B & PC for this reason: \_\_\_\_\_

Date \_\_\_\_\_ Owner Signature \_\_\_\_\_

**IN ISSUING THIS BUILDING PERMIT,** the applicant represents, and the city relies on the representation of the applicant, that the applicant verified all measurements and locations shown on the application or accompanying drawings and that the improvement to be constructed does not violate any law or private agreement relating to permissible or prohibited locations for such improvements. This building permit does not authorize any illegal location of any improvement or the violation of any private agreement relating to location of improvements.

I certify that I have read this application and state that all information is correct. I agree to comply with all city and county ordinances and state laws relating to building construction and hereby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

Date 5-11-01 Applicant/Agent Signature Alme Gonzalez

**WORKER'S COMPENSATION DECLARATION:** I hereby affirm under penalty of perjury one of the following declarations:

I have and will maintain a certificate of consent to self-insure for workers' compensation as provided for by Section 3700 of the Labor Code, for the performance of work for which the permit is issued.

I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

Carrier STATE FUND Policy Number 713-00-2021 Exp Date 10/01/2001

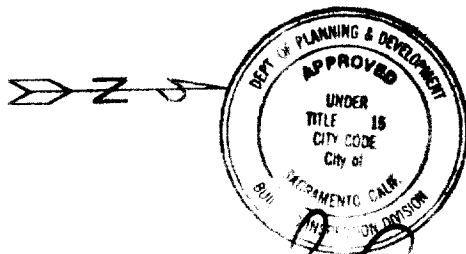
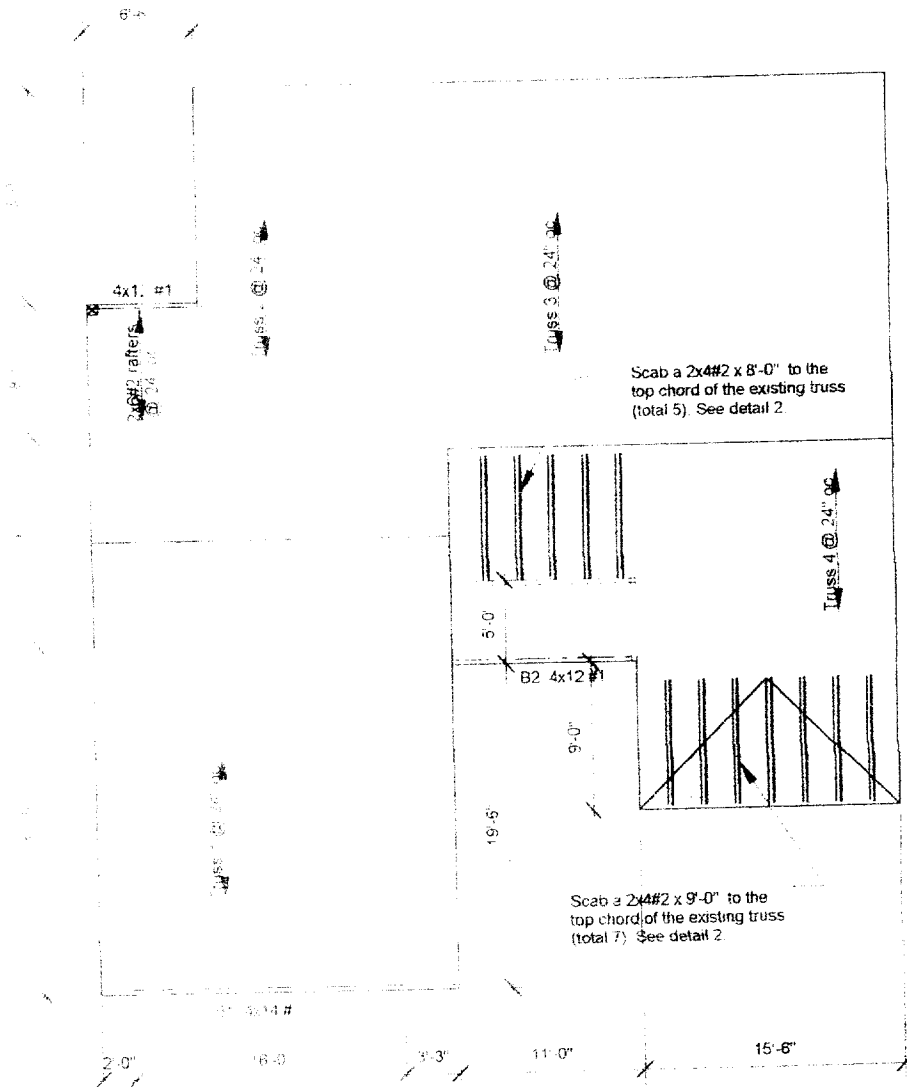
(This section need not be completed if the permit is for \$100 or less) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Date 5-11-01 Applicant Signature Alme Gonzalez

**WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000) IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST AND ATTORNEY'S FEE.**

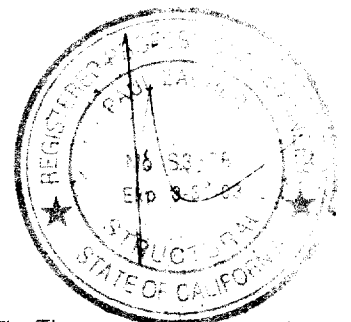
**THIS PERMIT SHALL EXPIRE BY LIMITATION IF WORK IS NOT COMMENCED WITHIN 180 DAYS.**

# 884 SHELLWOOD WAY



**This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division.**

**The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.**



**Notes**

1. This is a reroof project. The new roofing material shall be a Light Weight Concrete Tile. The tile shall weigh less than or equal to 7.0 psf.
2. All structural wood members that were observed appear to be in sound condition and without structural defect.

1

## ROOF PLAN - PERRIN

Not to Scale

25

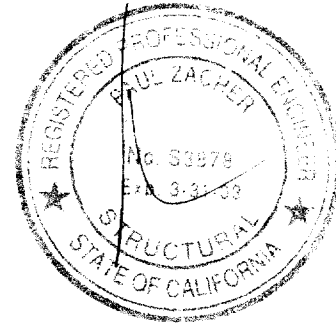
Perrin

Paul Zacher – Structural Engineers  
4701 Lakeside Way  
Fair Oaks, CA 95628

TEL: 916.961.3960  
FAX: 916.961.6552

May 2, 2001

Zimmerman Roofing  
3675 R Street  
Sacramento, CA 95816  
TEL: 916.454.3667  
FAX: 916.455.3784



Attn: Mr. Jeff Tucker,

re. Job 2001-095 PERRIN

**Subject:** Structural Investigation Report of the Roof for the Residence located at 884 Shellwood Way, Sacramento, CA 95831

As requested by Mr. Jeff Tucker, this is a report to determine what needs should be addressed to correct any structural deficiencies of the roof. Paul Zacher visited the site May 2, 2001. The investigation was made to determine the existing condition of the structure. All information, data and analysis contained within this report are based on the 1997 Uniform Building Code.

The following is based on visual observations with no subsurface investigation being made.

#### DESCRIPTION

Type of Facility	Residence
Year Built	Estimated 1980's vintage.
Occupancy	Residential
No. of Stories	One.
Dimensions	Approximately 3000 square feet with a first story plate height of 8 feet.

#### CONSTRUCTION:

##### Roof:

The roof covering will consist of a Light Weight Concrete Tile over 1/2" solid sheathing. The living and garage areas are framed with pre-engineered wood trusses spaced at 24" on center.

#### CONCLUSIONS

##### Roof:

The living area lacks sufficient structural capacity for the applied live and dead loads. The garage has sufficient structural capacity for the applied live and dead loads. See "Recommendations" for location and repair.

Perrin

Paul Zacher – Structural Engineers  
4701 Lakeside Way  
Fair Oaks, CA 95628

TEL: 916.961.3960  
FAX: 916.961.6552

### RECOMMENDATIONS:

If any of the following recommendations do not correspond to actual field conditions, the engineer of record shall be notified for further investigation and evaluation before continuing work.

#### Living Area

- 1 Scab a 2x4 DF#2 x 8'-0" long rafter to the top chord of the existing truss. See details 1 and 2.
- 2 Scab a 2x4 DF#2 x 9'-0" long rafter to the top chord of the existing truss. See details 1 and 2.

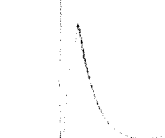
It shall be noted that small hairline cracking may occur at exterior stucco and interior gypboard finished walls that are load bearing or distributing roof strut loads. These cracks are a natural occurrence as the existing structure re-distributes the new roof weight. They are cosmetic in nature and are not an indication of a structural hazard or failure.

It shall be noted that some deflection of the rafters may be evident after installation of the tile. The existing roof framing has deflected but this may not be readily evident due to the uneven nature of the existing roofing material. Concrete tile is a very consistent and uniform product and when installed in an even plane, even small deflections can become apparent. This is only a cosmetic issue and not a structural concern.

The inspection consisted of visual observation only, made solely to determine the structural capacity of the existing roof. Analysis does not determine any effects on the overall structure under lateral forces or effects on the foundation unless specifically noted in the calculations and in this document. No warranties, expressed or implied, are made or intended in conjunction with this report. The inspection was made only to the portions that were accessible. The specific items noted were those that were observable and there may be defects that are not observable, or are hidden by architectural and structural materials.

If you have any questions on the above, do not hesitate to call.

Sincerely,



Paul Zacher, P.E., S.E.  
file

**DESIGN LOADING:**

Roof Pitch	6	in 12
Pitch Adjustment Factor	1.12	

**LOCATION: ROOF**

<u>MATERIAL</u>	<u>WEIGHT</u>	
Light Weight Tile	7.00	psf
Roofing felt	0.30	psf
1/2" OSB/ plywood	1.50	psf
1x4 skip sht'g	1.09	psf
2x6 rafters @ 24" oc	1.00	psf
	Load	10.9 psf
Roof Pitch Adjustment	1.29	psf
Total Load	12.2	psf

**LOCATION: TOP CHORD**

<u>MATERIAL</u>	<u>WEIGHT</u>	
Light Weight Tile	7.00	psf
Roofing felt	0.30	psf
1x4 skip sht'g	1.09	psf
1/2" OSB/ plywood	1.50	psf
2x4 truss @ 24" oc	0.64	psf
	Load	10.5 psf
Roof Pitch Adjustment	1.24	psf
Total Load	11.8	psf

**LOCATION: BOTTOM CHORD**

<u>MATERIAL</u>	<u>WEIGHT</u>	
Batt/blown insul	0.50	psf
2x4 truss @ 24" oc	1.28	psf
1/2" Gypboard	2.50	psf
	Load	4.3 psf

P K Zacher S E

4701 Lakeside Way  
Fair Oaks, CA 95628  
TEL: (916) 961-3960  
FAX: (916) 961-6552

Job #

Date:

5, 2017

244/200

12°

EXU #2

169/158

16°

EXU #1

37/38

11°

EXU #1

Paul Zacher - Structural Engineers  
 4701 Lakeside Way  
 Fair Oaks  
 TEL: (916) 961-3960  
 FAX: (916) 961-6552

Title :  
 Dsgnr:  
 Description :  
 Scope :

Job #  
 Date: 5:25PM, 2 MAY 01

Rev: 316304  
 User: KW 0602844, Ver: 1.1.1, 10/1/99, Win  
 © 1983-99 ENERCALC

### Timber Beam & Joist

c:\enercalc\test ecw\Calculations

### Description RAFTERS AND BEAMS

#### Timber Member Information

Calculations are designed to 1997 NDS and 1997 UBC Requirements

	Rafter	B1	B2
<b>Timber Section</b>	2x6	4x14	4x12
Beam Width	in: 1.500	3.500	3.500
Beam Depth	in: 5.500	13.250	11.250
Le: Unbraced Length	ft: 0.00	0.00	0.00
<b>Timber Grade</b>	Douglas Fir - Larch	Douglas Fir - Larch	Douglas Fir - Larch
Fb - Basic Allow	psi: 875.0	1,000.0	1,000.0
Fv - Basic Allow	psi: 95.0	95.0	95.0
Elastic Modulus	ksi: 1,600.0	1,700.0	1,700.0
Load Duration Factor	1.250	1.250	1.250
Member Type	Sawn	Sawn	Sawn
Repetitive Status	Repetitive	No	No

#### Center Span Data

		12.00	16.00	11.00
Span	ft			
Dead Load	#/ft	24.40	169.00	37.00
Live Load	#/ft	32.00	168.00	38.00

#### Results

Ratio = 0.9852 1.0109 0.1341

Mmax @ Center	in-k	12.18	129.41	13.61
@ X =	ft	6.00	8.00	5.50
fb Actual	psi	1,610.9	1,263.6	184.4
Fb Allowable	psi	1,635.0	1,250.0	1,375.0
		Bending OK	Over Stress	Bending OK
fv Actual	psi	57.1	75.3	13.1
Fv Allowable	psi	118.8	118.8	118.8
		Shear OK	Shear OK	Shear OK

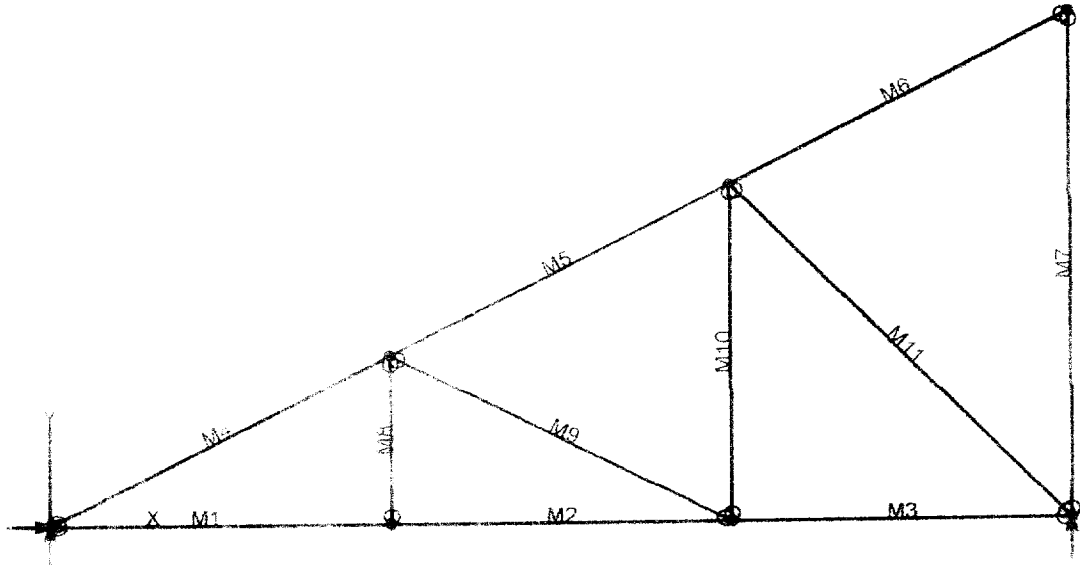
#### Reactions

@ Left End	DL	lbs	146.40	1,352.00	203.50
	LL	lbs	192.00	1,344.00	209.00
	Max. DL+LL	lbs	338.40	2,696.00	412.50
@ Right End	DL	lbs	146.40	1,352.00	203.50
	LL	lbs	192.00	1,344.00	209.00
	Max. DL+LL	lbs	338.40	2,696.00	412.50

#### Deflections

Ratio OK Deflection OK Deflection OK

Center DL Defl	in	-0.342	-0.216	-0.017
L/Defl Ratio		420.9	888.7	7,645.8
Center LL Defl	in	-0.449	-0.215	-0.018
L/Defl Ratio		320.9	894.0	7,444.6
Center Total Defl	in	-0.791	-0.431	-0.035
Location	ft	6.000	8.000	5.500
L/Defl Ratio		182.1	445.7	3,771.9





# VisualAnalysis 3.50.c Report

07/02/01 16:21:57

Project: Truss 1

File: Untitled.vap

Company: PK Associates Engineers

Engineer: Paul Zacher

Default Units: Feet, Pounds, Degrees, Fahrenheit, Seconds.

## Nodes

Node	X ft	Y ft	Fix DX	Fix DY	Fix RZ
1	0.00	0.00	Yes	Yes	No
2	7.00	0.00	No	No	
3	14.00	0.00			
4	21.00	0.00		Yes	
5	7.00	3.50		No	
6	14.00	7.00			
7	21.00	10.50			

## Member Elements

Member	Section	Material	Length ft
1	SS2x4	Wood	7.00
2	"	"	7.00
3	"	"	7.00
4	"	"	21.00
5	"	"	7.00
6	"	"	7.00
7	"	"	7.00
8	"	"	10.50
9	"	"	7.00
10	"	"	7.00
11	"	"	7.00
12	"	"	7.00

## Section Properties

Category	Section	Ax in <sup>2</sup>	Iz in <sup>4</sup>	Sy+ in <sup>3</sup>	Sy- in <sup>3</sup>
Wood Sha	SS2x4	5.25	5.34	3.06	3.06

## Material Properties

Material	Strength psi	Elasticity psi	Poisson	Density lb/ft <sup>3</sup>
0030	-NA-	1900000.00	0.34	40.47

## Load Combination Summary

Equation Case: Equation Case 1

Combination: 1D+1L+1E

Contributing Cases & Source

Service Case 1 (Dead loads)

Service Case 2 (Roof Live loads)

# Member Uniform Loads

If this item is empty, check the selection state, or report properties.

## Nodal Reactions

Node	Load Case	FX lbs	FY lbs	MZ lb-ft
1	Equation Case 1	0.00	743.01	-NA-
21	"	-NA-	743.01	-NA-

## Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
1	1082.41	-34.21	-28.80	-0.0637
2	1082.41	-14.15	77.5034	-0.0707
3	1082.41	5.9195	77.1038	0.0523
4	<b>1082.41</b>	15.9851	0.0000	-0.0000
5	1082.41	-41.92	-41.57	-0.0440
6	1082.41	-11.86	9.3899	-0.0578
7	1082.41	8.0095	13.6455	-0.0658
8	1082.41	18.2762	28.80	-0.0637
9	544.97	-14.16	0.0000	-0.0000
10	544.97	-4.0946	12.8482	-0.0393
11	544.97	15.9720	8.9917	-0.0497
12	544.97	16.0387	-41.57	-0.0440
13	<b>-1268.80</b>	157.26	0.0000	-0.0000
14	-1223.93	21.5230	<b>240.18</b>	-0.2536
15	-1159.07	-102.21	142.16	-0.1336
16	-1094.20	<b>-231.94</b>	292.08	-0.0647
17	-705.73	142.87	292.08	-0.0647
18	-640.88	17.1345	10.8158	-0.0705
19	-575.99	-46.60	16.2970	-0.0591
20	-511.12	196.33	<b>305.82</b>	-0.0361
21	-116.94	<b>233.68</b>	305.82	-0.0361
22	-51.97	103.94	133.77	0.1038
23	12.8954	-15.79	235.00	0.2318
24	77.7621	155.52	0.0000	0.0069
25	-173.88	0.0000	0.0000	0.0201
26	-173.88	0.0000	0.0000	0.0050
27	-173.88	0.0000	0.0000	0.0103
28	-173.88	0.0000	0.0000	<b>0.0255</b>
29	62.4911	0.0000	0.0000	0.0102
30	62.4911	0.0000	0.0000	0.0127
31	62.4911	0.0000	0.0000	0.0152
32	62.4911	0.0000	0.0000	0.0177
33	-600.88	0.0000	0.0000	-0.0489
34	-600.88	0.0000	0.0000	0.0426
35	-600.88	0.0000	0.0000	-0.0364
36	-600.88	0.0000	0.0000	-0.0302
37	336.68	0.0000	0.0000	-0.0204
38	336.68	0.0000	0.0000	-0.0122
39	336.68	0.0000	0.0000	-0.0063
40	336.68	0.0000	0.0000	0.0008
41	-770.70	0.0000	0.0000	-0.0094
42	-770.70	0.0000	0.0000	0.0136
43	-770.70	0.0000	0.0000	0.0022
44	-770.70	0.0000	0.0000	0.0180

## BENDING & COMP: TRUSS 1 - MEMBER 4

Design based on 1997 UBC 2321 Division V and ANSI/TPI 1-1995

### Grading

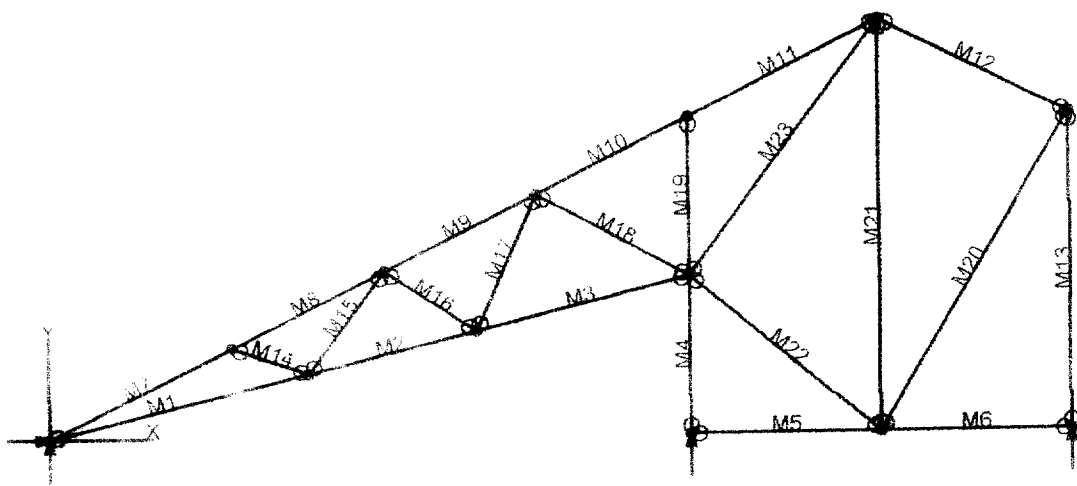
2x or 4x

Doug-fir tarch: No 2

### Assumptions:

Solid sheathing on top chord of truss. Therefore,  
continuous lateral support is provided along compression face  
Maximum center-center spacing = 24"

Width, b	3.5 inches
Depth, d	3.5 inches
Length	7.83 feet
Max Axial Comp. C	1094 lbs
Max Reaction, R	231 lbs
Max Moment, M	292 ft-lbs
Max LL Deflection	0.03 inches
Max TL Deflection	0.06 inches
LL Defl Criteria = L <sub>c</sub>	240
TL Defl Criteria = L <sub>c</sub>	180
Duration factor, C <sub>d</sub>	1.25
Repetitive Factor, C <sub>r</sub>	1.15
Size Factor, C <sub>f</sub> bending	1.5 (1.5 for 2x4, 1.3 for 2x6)
Size Factor, C <sub>f</sub> comp	1.15 (1.15 for 2x4, 1.1 for 2x6)
Buckling Factor, C <sub>T</sub>	1.22
E <sub>c</sub> =	308 psi
F <sub>cc</sub> =	860 psi
f <sub>c</sub> *=	3084 psi
F <sub>b</sub> =	770 psi
f <sub>b</sub> =	1144 psi
F <sup>*</sup> b=F <sub>b</sub> *=	2150 psi
Shear D/C ratio	0.56 < 1.0, Member OK
Interaction equation (f <sub>c</sub> /F <sub>c</sub> ) <sup>2</sup> +	
f <sub>b</sub> / (F <sup>*</sup> b(1-f <sub>c</sub> /F <sub>cc</sub> )) =	0.77 < 1.0, Member OK
Live Load defl ratio	0.08 < 1.0, Member OK
Total Load defl ratio	0.10 < 1.0, Member OK



# VisualAnalysis 3.50.c Report

05/07/01 16:32:40

Project: Truss 2

File: C:\Program Files\IES\VA35\truss2.vap

Company: PK Associates Engineers

Engineer: Paul Zacher

Default Units: Feet, Pounds, Degrees, Fahrenheit, Seconds.

## Nodes

Node	X ft	Y ft	Fix DX	Fix DY	Fix RZ
N1	0.00	0.00	Yes	Yes	No
N2	8.50	0.13	No	No	No
N3	14.00	0.50	No	No	No
N4	21.00	0.25	No	No	No
N5	21.00	0.00	No	Yes	No
N6	27.25	0.00	No	No	No
N7	33.50	0.00	No	Yes	No
N8	6.00	0.00	No	No	No
N9	11.00	0.50	No	No	No
N10	16.00	0.00	No	No	No
N11	21.00	0.50	No	No	No
N12	27.25	0.63	No	No	No
N13	33.50	0.50	No	No	No

## Member Elements

Member	Section	Material	Length ft
M1	SS2x4	wood	8.50
M2	"	"	5.50
M3	"	"	5.50
M4	"	"	5.50
M5	"	"	5.50
M6	"	"	5.50
M7	"	"	5.50
M8	"	"	5.50
M9	"	"	5.50
M10	"	"	5.50
M11	"	"	5.50
M12	"	"	5.50
M13	"	"	10.50
M14	"	"	7.25
M15	"	"	4.75
M16	"	"	5.25
M17	"	"	4.75
M18	"	"	5.75
M19	"	"	5.25
M20	"	"	17.25
M21	"	"	13.00
M22	"	"	8.50
M23	"	"	10.40

## Section Properties

Category	Section	Ax in <sup>2</sup>	Ix in <sup>4</sup>	Sy+ in <sup>3</sup>	Sy- in <sup>3</sup>
Wood	Sha SS2x4	5.25	5.74	4.04	3.06

# Material Properties

Material	Strength psi	Elasticity psi	Poisson	Density lb/ft <sup>3</sup>
W10	-NA-	290000.00	0.35	49.47

# Load Combination Summary

Equation Case: Equation Case 1  
 Combination: -100+1L+1L1  
 Contributing Cases & Source  
 Service Case 1: Dead loads;  
 Service Case 2: Roof Live loads;

# Member Uniform Loads

This item is empty. Check the selection state, or report properties.

# Nodal Reactions

Node	Load Case	FX lbs	FY lbs	MZ lb-ft
1	Equation Case 1	0.00	543.75	-NA-
2	"	NA	1729.51	-NA-
3	"	NA	102.84	-NA-

# Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
1	1447.94	33.3158	0.0000	0.0000
2	1454.03	4.3491	11.2481	0.1297
3	1460.12	-15.52	11.5105	0.1700
4	1466.21	29.88	29.15	0.1363
5	668.68	22.5240	-29.15	-0.1363
6	672.63	3.7573	1.6202	0.1184
7	676.57	-9.0094	-1.7481	-0.1033
8	680.51	24.78	35.60	0.0923
9	-87.03	15.0334	35.60	-0.0923
10	-82.20	14.9667	4.4114	0.0943
11	-77.19	5.0999	-4.2770	-0.0737
12	-72.17	-25.17	0.0000	0.0178
13	-1708.49	1.1303	-11.119	0.0250
14	-1708.49	1.1303	7.4562	0.0281
15	-1708.49	1.1303	3.7281	0.0281
16	-1708.49	1.1303	-0.0000	0.0147
17	-2.1303	12.73	36.50	0.0134
18	-2.1303	-14.81	12.8531	0.0203
19	-2.1303	3.1072	15.0431	-0.0192
20	-2.1303	11.0238	0.0000	0.0000
21	0.0000	-11.02	0.0000	0.0000
22	0.0000	3.1072	15.0431	0.0192
23	0.0000	14.8095	12.8531	0.0203
24	0.0000	12.7262	36.50	-0.0134
25	-1649.43	139.82	0.0000	0.0000
26	-1592.83	28.6181	187.00	-0.1863
27	-1538.23	82.58	127.38	-0.2147
28	-1482.67	-193.78	181.00	-0.1405

M9	-1148.35	150.62	181.00	0.1405
"	-1102.02	57.9555	12.8991	-0.1350
"	-1055.68	34.71	34.5558	0.1302
"	-1009.35	-127.38	-116.03	-0.1119
M10	-265.55	140.81	116.03	0.1119
"	-219.21	48.1398	59.5786	-0.1245
"	-172.88	-44.53	-2.9445	-0.1071
"	-126.55	137.19	105.93	-0.0576
M10	794.65	114.62	105.93	-0.0576
"	840.98	21.9561	20.8868	0.0357
"	887.31	-70.71	-24.54	-0.0093
"	933.65	-163.38	<b>242.20</b>	-0.0082
M11	745.37	<b>208.41</b>	-242.20	-0.0082
"	803.29	92.5781	107.66	-0.1233
"	861.20	-23.26	188.39	-0.1502
"	919.12	-139.09	0.0000	-0.0063
M12	-29.21	173.75	0.0000	-0.0013
"	28.7065	-57.92	269.13	-0.2585
"	86.6232	57.9167	<b>269.13</b>	<b>-0.2618</b>
"	144.54	173.75	0.0000	-0.0113
M13	-81.82	0.0000	0.0000	-0.0006
"	-81.82	0.0000	0.0000	0.0073
"	-81.82	0.0000	0.0000	0.0152
"	-81.82	0.0000	0.0000	0.0232
M14	-479.95	0.0000	0.0000	-0.1080
"	-479.95	0.0000	0.0000	-0.1068
"	-479.95	0.0000	0.0000	-0.1056
"	-479.95	0.0000	0.0000	-0.1045
M15	513.38	0.0000	0.0000	-0.1162
"	513.38	0.0000	0.0000	-0.1074
"	513.38	0.0000	0.0000	-0.0985
"	513.38	0.0000	0.0000	-0.0897
M16	-576.45	0.0000	0.0000	-0.0748
"	-576.45	0.0000	0.0000	-0.0651
"	-576.45	0.0000	0.0000	-0.0553
"	-576.45	0.0000	0.0000	-0.0456
M17	617.18	0.0000	0.0000	-0.0744
"	617.18	0.0000	0.0000	-0.0594
"	617.18	0.0000	0.0000	-0.0444
"	617.18	0.0000	0.0000	-0.0294
M18	-782.80	0.0000	0.0000	-0.0522
"	-782.80	0.0000	-0.0000	-0.0343
"	-782.80	0.0000	0.0000	-0.0164
"	-782.80	0.0000	0.0000	0.0016
M19	-416.74	2.1303	-11.18	0.0252
"	-416.74	-2.1303	-7.4562	0.0165
"	-416.74	2.1303	3.7281	0.0034
"	-416.74	2.1303	0.0000	-0.0117
M20	-100.84	0.0000	0.0000	0.0001
"	-100.84	0.0000	0.0000	0.0090
"	-100.84	0.0000	0.0000	0.0179
"	-100.84	0.0000	0.0000	0.0268
M21	193.64	0.0000	0.0000	-0.0056
"	193.64	0.0000	-0.0000	0.0040
"	193.64	-0.0000	-0.0000	0.0136
"	193.64	0.0000	-0.0000	0.0232
M22	-64.58	0.0000	-0.0000	-0.0070
"	-64.58	0.0000	-0.0000	-0.0062
"	-64.58	0.0000	-0.0000	-0.0054
"	-64.58	0.0000	0.0000	-0.0046
M23	-1184.29	-0.0000	0.0000	-0.0274
"	-1184.29	-0.0000	-0.0000	-0.0188
"	-1184.29	-0.0000	-0.0000	-0.0101
"	-1184.29	-0.0000	-0.0000	-0.0014

## BENDING & COMP: TRUSS 2 - MEMBER 7

Design based on 1997 UBC 2321 Division V and ANSI/TPI 1-1995

### Grading

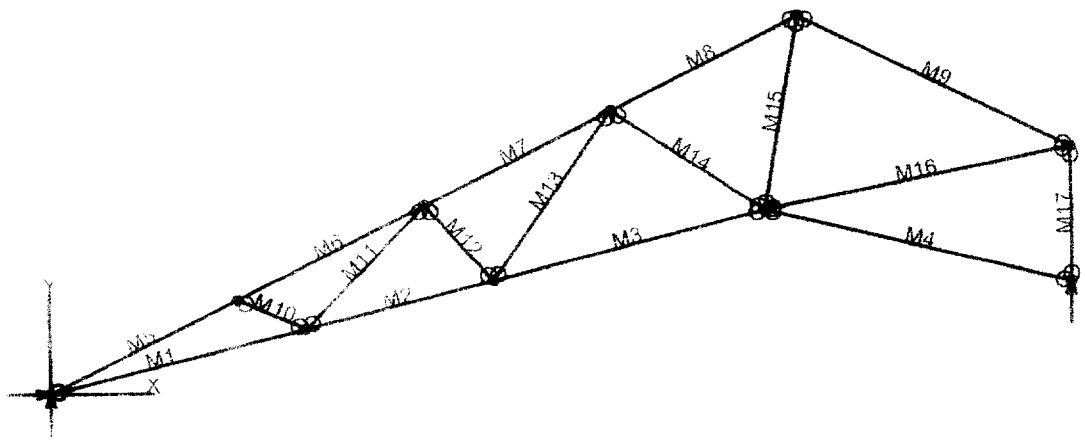
2x or 4x Doug-fir larch, No. 2

### Assumptions:

Solid sheathing on top chord of truss. Therefore, continuous lateral support is provided along compression face  
Maximum center-center spacing = 24"

Width, b	3.5 inches
Depth, d	3.5 inches
Length	6.71 feet
Max Axial Comp. C	1482 lbs
Max Reaction, R	193 lbs
Max Moment, M	181 ft-lbs
Max LL Deflection	0.16 inches
Max TL Deflection	0.14 inches
LL Defl Criteria = L	240
TL Defl Criteria = L/2	180
Duration factor, Cd	1.25
Repetitive Factor, Cr	1.15
Size Factor, Cf bending	1.5 1.5 for 2x4, 1.3 for 2x6
Size Factor, Cf comp	1.15 1.15 for 2x4, 1.1 for 2x6
Buckling Factor, C <sub>T</sub>	1.18
f <sub>c</sub> =	282 psi
F <sub>ce</sub> =	1142 psi
F <sub>c</sub> * =	2084 psi
F <sub>c</sub> =	972 psi
F <sub>b</sub> =	709 psi
F <sub>b</sub> * = F <sub>b</sub> * =	2156 psi
Shear D/C ratio	0.46 < 1.0, Member OK
Interaction equation $(f_c/F_c)^2 +$	
$f_b / (F_b(1-f_c/F_{ce})) =$	0.52 < 1.0, Member OK
Live Load defl ratio	0.48 < 1.0, Member OK
Total Load defl ratio	0.31 < 1.0, Member OK





# VisualAnalysis 3.50.c Report

5/11/01 17:01:08

Project: Truss 3

File: C:\Program Files\AIES\A35\Truss 3.dwg

Company: PK Associates Engineers

Engineer: Paul Zacher

Default Units: Feet, Pounds, Degrees, Fahrenheit, Seconds.

## Nodes

Node	X ft	Y ft	Fix	DX	Fix	DY	Fix	RZ
1	0.00	0.00	Yes		Yes		Yes	
2	7.50	1.88	No		No		No	
3	13.00	3.25	No		No		No	
4	21.00	4.25	No		No		No	
5	30.00	5.00	No		Yes		No	
6	5.50	3.75	No		No		No	
7	11.00	4.50	No		No		No	
8	16.50	5.25	No		No		No	
9	22.00	6.00	No		No		No	
10	30.00	7.00	No		No		No	

## Member Elements

Member	Section	Material	Length ft
M1	SS2x4	Wood	7.50
M2	"	"	5.50
M3	"	"	5.50
M4	"	"	8.00
M5	"	"	9.00
M6	"	"	8.00
M7	"	"	6.00
M8	"	"	6.00
M9	"	"	6.00
M10	"	"	6.00
M11	"	"	6.00
M12	"	"	6.00
M13	"	"	6.00
M14	"	"	6.00
M15	"	"	6.00
M16	"	"	6.00
M17	"	"	4.00

## Section Properties

Category	Section	Ax in <sup>2</sup>	Iz in <sup>4</sup>	Sy+ in <sup>3</sup>	Sy- in <sup>3</sup>
Wood	Sha SS2x4	5.25	5.10	3.06	3.06

## Material Properties

Material	Strength psi	Elasticity psi	Poisson	Density lb/ft <sup>3</sup>
Wood	NA	700000	0.00	40.47

# Load Combination Summary

Equation Case: Equation Case 1

Combination: +1D+1L+1E

Contributing Cases & Source

Service Case 1 (Dead Loads)

Service Case 2 (Roof Live Loads)

## Member Uniform Loads

This item is empty. Check the selection state, or report properties.

## Nodal Reactions

Node	Load Case	FX lbs	FY lbs	MZ lb-ft
1	Equation Case 1	-0.00	1065.41	-NA-
2	"	NA-	1065.41	-NA-

## Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
1	3609.74	38.5408	0.0000	0.0000
2	3615.12	18.0408	-8.3225	-0.2397
3	3620.49	-8.4592	7.3800	0.4017
4	<b>3625.87</b>	27.96	11.1714	0.4771
5	2823.22	10.3248	11.1714	-0.4721
6	2827.16	-9.4419	17.7100	-0.4860
7	2831.10	21.21	18.5290	0.4773
8	2835.04	36.98	42.33	0.4612
9	2002.96	34.5385	-42.33	-0.4610
10	2008.69	18.6051	-4.6318	0.4563
11	2014.43	-8.3282	18.7555	-0.4090
12	2020.16	29.26	0.0000	0.2991
13	-9.6750	38.70	0.0000	0.0532
14	-3.2250	12.90	-9.5826	0.1920
15	3.2250	10.9000	9.5826	0.2653
16	9.6750	38.7000	0.0000	0.2261
17	<b>-3992.32</b>	134.20	0.0000	-0.0000
18	-3941.36	32.2654	170.09	-0.2592
19	-3890.39	-59.67	131.75	0.3961
20	-3839.42	171.60	115.00	-0.4428
21	-3571.40	150.02	115.00	-0.4428
22	-3520.44	18.0894	87.5178	0.6065
23	-3469.47	53.84	81.6202	0.5141
24	-3418.50	-155.78	132.69	-0.4702
25	-2764.33	143.52	-132.69	-0.4702
26	-2713.36	11.5849	56.4924	-0.4642
27	-2662.39	-60.35	47.2829	0.4269
28	-2611.43	162.28	<b>-190.38</b>	0.3721
29	-1498.91	183.86	-190.38	-0.3730
30	-1447.95	31.9270	11.4926	-0.3908
31	-1396.98	-20.01	144.90	-0.3568
32	-1346.01	121.94	0.0000	0.3213
33	-1361.93	<b>-222.40</b>	0.0000	0.0462
34	-1287.80	74.13	440.94	-0.7203
35	-1213.67	14.1333	<b>440.94</b>	<b>-0.8053</b>
36	-1139.55	<b>222.40</b>	0.0000	-0.1090
37	-418.66	0.0000	0.0000	0.3507
38	-418.66	0.0000	0.0000	-0.3366

	418.68	0.0000	0.0000	0.3123
	-418.68	0.0000	0.0000	0.3084
41	555.49	0.0000	0.0000	0.4230
	555.49	0.0000	0.0000	0.4221
	555.49	0.0000	-0.0000	-0.4213
	555.49	-0.0000	0.0000	0.4204
41	-501.41	0.0000	0.0000	-0.1818
	-501.41	0.0000	-0.0000	0.1757
	-501.41	0.0000	-0.0000	-0.1878
	-501.41	-0.0000	0.0000	0.1812
M1	794.40	0.0000	0.0000	0.2870
	794.40	0.0000	-0.0000	0.3541
	794.40	-0.0000	0.0000	-0.2213
	794.40	0.0000	-0.0000	0.2884
M1	-834.45	0.0000	0.0000	0.2571
	834.45	0.0000	0.0000	0.2139
	-834.45	0.0000	0.0000	-0.1801
	-834.45	0.0000	0.0000	0.1413
M1	815.65	-0.0000	0.0000	0.1954
	815.65	-0.0000	-0.0000	-0.1489
	815.65	-0.0000	-0.0000	-0.1018
	815.65	-0.0000	-0.0000	-0.0548
M	1139.64	-0.0000	0.0000	0.2950
	1139.64	-0.0000	-0.0000	0.2057
	1139.64	-0.0000	-0.0000	-0.1165
	1139.64	-0.0000	-0.0000	0.0273
M	-1025.52	0.0000	0.0000	0.1144
	-1025.52	0.0000	0.0000	0.1494
	-1025.52	0.0000	0.0000	0.1845
	-1025.52	0.0000	0.0000	0.2195

### BENDING & COMP: TRUSS 3 - MEMBER 9

Design based on 1997 NBC 2321 Division V and ANSI/TPI 1-1995

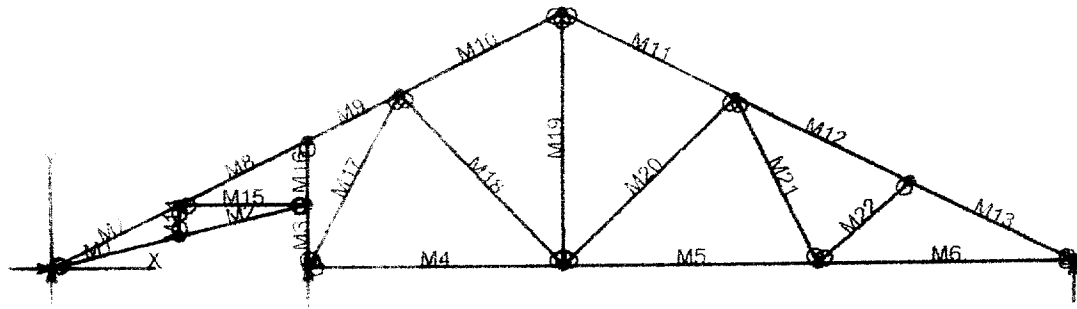
#### Grading:

2x or 4x Doug-fir larch No. 2

#### Assumptions:

Solid sheathing on top chord of truss. Therefore,  
continuous lateral support is provided along compression face  
maximum center-center spacing = 24"

Width, b	3 inches
Depth, d	3.5 inches
Length	8.94 feet
Max Axial Comp. C	213 lbs
Max Reaction, R	74 lbs
Max Moment, M	440 ft-lbs
Max LL Deflection	0.17 inches
Max TL Deflection	0.39 inches
LL Defl Criteria = L <sub>1</sub>	240
TL Defl Criteria = L <sub>2</sub>	180
Duration factor, C <sub>d</sub>	1.25
Repetitive Factor, C <sub>r</sub>	1.15
Size Factor, C <sub>f</sub> bending	1.5 1.5 for 2x4, 1.3 for 2x6
Size Factor, C <sub>f</sub> comp	1.15 1.15 for 2x4, 1.1 for 2x6
Buckling Factor, C <sub>T</sub>	1.25
f <sub>c</sub>	116 psi
F <sub>ce</sub>	576 psi
F <sub>c</sub> *=	2084 psi
F' <sub>c</sub> =	623 psi
f <sub>b</sub>	862 psi
F' <sub>b</sub> =F <sub>b</sub> *=	2156 psi
Shear D/C ratio	0.09 < 1.0, Member OK
Interaction equation: (f <sub>c</sub> /F' <sub>c</sub> ) <sup>2</sup> +	
f <sub>b</sub> / (F' <sub>b</sub> (1-f <sub>c</sub> /F <sub>ce</sub> )) =	0.52 < 1.0, Member OK
Live Load defl ratio	0.38 < 1.0, Member OK
Total Load defl ratio	0.65 < 1.0, Member OK



# VisualAnalysis 3.50.c Report

08/07/91 17:11:00

Project: Truss 4

File: C:\Program Files\VEB\VA35\truss 4.rap

Company: PK Associates Engineers

Engineer: Paul Zacher

Default Units: Feet Pounds, Degrees, Wahrenheit, Seconds.

## Nodes

Node	X ft	Y ft	Fix	DX	Fix	DY	Fix	RZ
N1	0.00	0.00	Yes		Yes		No	
N2	5.50	1.38	No		No			
N3	11.00	2.75						
N4	11.00	4.00			Yes			
N5	22.00	5.00			No			
N6	33.00	5.00						
N7	44.00	5.00			Yes			
N8	5.50	6.75			No			
N9	11.00	8.50						
N10	15.00	10.25						
N11	22.00	12.00						
N12	29.50	13.25						
N13	37.00	14.50						

## Member Elements

Member	Section	Material	Length ft
M1	SS2x4	Wood	5.50
M2	"	"	5.50
M3	"	"	2.75
M4	"	"	11.00
M5	"	"	11.00
M6	"	"	11.00
M7	"	"	8.12
M8	"	"	8.12
M9	"	"	4.47
M10	"	"	7.80
M11	"	"	8.33
M12	"	"	9.33
M13	"	"	7.80
M14	"	"	1.38
M15	"	"	5.50
M16	"	"	2.75
M17	"	"	8.50
M18	"	"	10.25
M19	"	"	11.00
M20	"	"	10.40
M21	"	"	8.08
M22	"	"	5.20

## Section Properties

Category	Section	Ax in <sup>2</sup>	Iz in <sup>4</sup>	Sy+ in <sup>3</sup>	Sy- in <sup>3</sup>
Wood	Sha SS2x4	5.25	5.34	3.06	3.06

# Material Properties

Material	Strength psi	Elasticity psi	Poisson	Density lb/ft <sup>3</sup>
Steel	-NA	1700000.00	0.30	49.47

# Load Combination Summary

Equation Case: Equation Case 1  
 Combination: +1D+1L+1Br  
 Contributing Cases & Source  
 Service Case 1 (Dead loads)  
 Service Case 2 (Roof Live loads)

# Member Uniform Loads

This item is empty. Check the selection state, or report properties.

# Nodal Reactions

Node	Load Case	FX lbs	FY lbs	MZ lb-ft
N	Equation Case 1	0.00	366.36	-NA-
N	"	-NA-	1590.62	-NA-
N	"	-NA-	1159.49	-NA-

# Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
M	839.65	21.7754	0.0000	0.0000
	843.59	21.0088	28.0679	0.0372
	847.53	18.7579	26.4152	-0.0570
	851.47	24.52	-4.9582	0.0606
N	839.65	21.5246	4.9582	0.0606
	843.15	18.7579	26.4152	0.0587
	847.10	21.0088	28.0679	0.0405
	851.04	22.78	0.0000	-0.0051
M1	-487.69	28.3222	77.89	0.0137
	-487.69	28.3222	51.92	0.0024
	-487.69	28.3222	25.96	-0.0170
	-487.69	28.3222	0.0000	-0.0406
M2	539.73	-56.77	104.22	-0.0964
	539.73	-25.24	45.8537	-0.1867
	539.73	-5.2922	20.5934	-0.1836
	539.73	27.8255	0.0000	-0.0000
Y2	1339.63	-46.12	-91.21	-0.1462
	1339.63	-14.58	19.7836	-0.1525
	1339.63	16.9489	15.4488	-0.1322
	1339.63	48.4822	-104.22	-0.0964
B1	1891.46	-39.01	0.0000	-0.0000
	1891.46	-7.4744	24.9282	-0.2151
	1891.46	24.0589	14.5233	-0.2381
	<b>1891.46</b>	55.5923	-91.21	-0.1462
B2	-978.56	123.31	0.0000	-0.0000
	-927.59	21.3737	147.74	-0.1079
	-876.62	-80.56	27.0983	-0.1120
	-825.66	-182.49	-181.97	-0.0601
B3	-18.85	164.38	181.97	-0.0601



	321.167	1.4463	-9.971	0.0000
	83.0739	0.0149	0.5008	0.0000
	134.74	141.42	0.0000	0.0000
10	-7.2051	1.7407	0.0000	0.0000
	29.8618	1.6074	51.000	0.0000
	66.9280	1.0053	100.000	0.0000
	103.99	1.0456	161.000	0.0000
10	-976.71	1.17195	161.000	0.0000
	-911.87	18.2180	162.588	0.0000
	-847.00	1.1152	250.000	0.0000
	-782.11	1.6125	0.0000	0.0000
11	-988.25	<b>250.98</b>	<b>356.21</b>	0.0000
	-918.75	1.1198	150.000	0.0000
	-849.25	1.0199	<b>268.81</b>	0.0000
	779.75	1.6602	0.0000	0.0000
12	-1820.45	1.0177	299.000	0.0000
	-1750.98	1.6277	58.9859	0.0000
	-1681.45	1.1345	50.1600	0.0000
	-1611.95	1.1500	356.000	0.0000
13	-2192.87	1.15630	0.0000	0.0000
	-2128.00	1.2657	237.000	0.0000
	-2063.14	1.0317	137.000	0.0000
	-1998.17	<b>232.90</b>	299.000	0.0000
14	50.5587	0.0000	0.0000	0.0000
	50.5587	0.0000	0.0000	0.0000
	50.5587	0.0000	0.0000	0.0000
	50.5587	0.0000	0.0000	0.0000
15	-876.75	0.0000	0.0000	0.0000
	-876.75	0.0000	0.0000	0.0000
	-876.75	0.0000	0.0000	0.0000
	-876.75	0.0000	0.0000	0.0000
16	-259.19	18.32	0.0000	0.0000
	-259.19	18.32	15.9620	0.0000
	-259.19	18.32	11.9240	0.0000
	-259.19	18.32	7.8860	0.0000
17	-1207.11	0.0000	0.0000	0.0000
	-1207.11	0.0000	0.0000	0.0000
	-1207.11	0.0000	0.0000	0.0000
	-1207.11	0.0000	0.0000	0.0000
18	339.93	0.0000	0.0000	0.0000
	339.93	0.0000	0.0000	0.0000
	339.93	0.0000	0.0000	0.0000
	339.93	0.0000	0.0000	0.0000
19	405.78	0.0000	0.0000	0.0000
	405.78	0.0000	0.0000	0.0000
	405.78	0.0000	0.0000	0.0000
	405.78	0.0000	0.0000	0.0000
20	-789.94	0.0000	0.0000	0.0000
	-789.94	0.0000	0.0000	0.0000
	-789.94	0.0000	0.0000	0.0000
	-789.94	0.0000	0.0000	0.0000
21	456.35	0.0000	0.0000	0.0000
	456.35	0.0000	0.0000	0.0000
	456.35	0.0000	0.0000	0.0000
	456.35	0.0000	0.0000	0.0000
22	-469.63	0.0000	0.0000	0.0000
	-469.63	0.0000	0.0000	0.0000
	-469.63	0.0000	0.0000	0.0000
	-469.63	0.0000	0.0000	0.0000

### **BENDING & COMP: TRUSS 4 - MEMBER 13**

Design based on 1997 UBC 2321 Division V and ANSI/TPI 1-1995

#### Grading:

2x or 4x                      Doug-fir larch, No. 2

#### Assumptions:

Solid sheathing on top chord of truss. Therefore,  
continuous lateral support is provided along compression face

Maximum center-center spacing = 24"

Width, b	3 inches
Depth, d	3.5 inches
Length	7.83 feet
Max Axial Comp. C	1998 lbs
Max Reaction, R	232 lbs
Max Moment, M	299 ft-lbs
Max LL Deflection	0.05 inches
Max TL Deflection	0.12 inches
LL Defl Criteria = L/240	240
TL Defl Criteria = L/180	180
Duration factor, Cd	1.25
Repetitive Factor, Cr	1.15
Size Factor, Cf bending	1.5    1.5 for 2x4, 1.3 for 2x6
Size Factor, Cf comp	1.15    1.15 for 2x4, 1.1 for 2x6
Buckling Factor, CT	1.22
fc =	190 psi
Fce =	860 psi
Fc* =	2084 psi
F'c =	770 psi
Fb =	580 psi
F'b = Fb* =	2156 psi
Shear D/C ratio	0.28 < 1.0, Member OK
Interaction equation (fc/F'c)^2 +	
Fb / (F'b(1-fc/Fce)) =	0.41 < 1.0, Member OK
Live Load defl ratio	0.13 < 1.0, Member OK
Total Load defl ratio	0.23 < 1.0, Member OK