

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

**Permit No: 0010181**  
**Insp Area: 2**

**Site Address: 644 BRICKYARD DR SAC**  
Parcel No: 030-0490-062

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

CONTRACTOR  
SNOOK ROOFING  
3444 MARSHALL AV  
CARMICHAEL CA 95608

OWNER  
ELIZABETH UNG  
644 BRICKYARD DR  
SACRAMENTO CA 95831

ARCHITECT

**Nature of Work:** TO REROOF WITH LITE 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 C-39 License Number 765368 Date 9/12/00 Contractor Signature [Signature]

**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 9/12/00 Applicant/Agent Signature [Signature]

**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 285-00NIT 0000582 Exp Date 01/01/2001

(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.

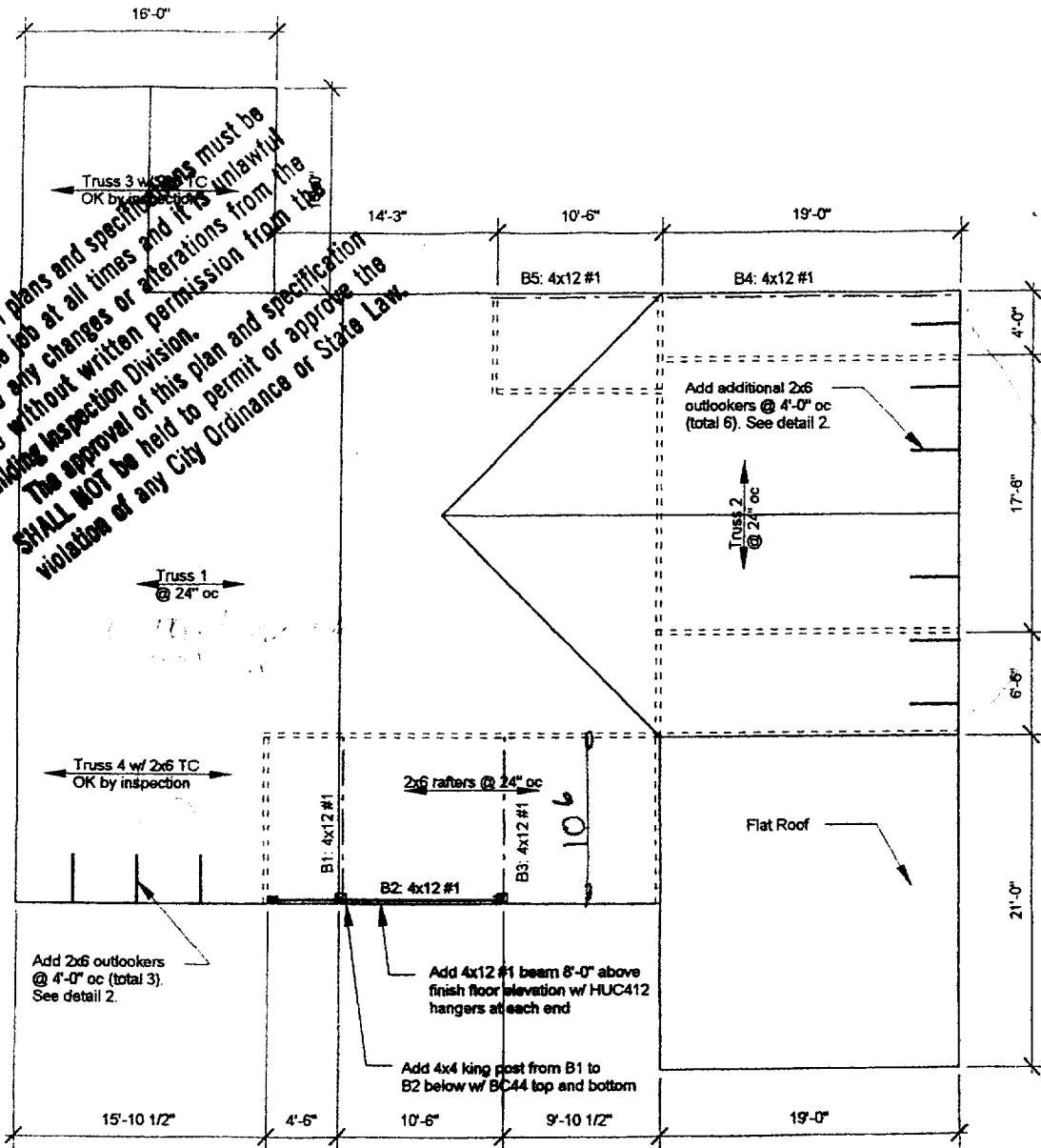
Date 9/12/00 Applicant Signature [Signature]

**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.**

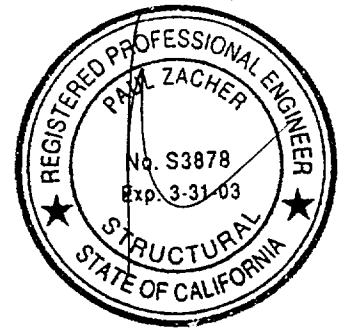


This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations from the same without written permission from the Building Inspection Division. The approval of this plan and specification SHALL NOT be held to permit or approve the violation of any City Ordinance or State Law.



Existing truss roof - V.I.F.

See work req'd per report, highlighted on plan.



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 rafters are 2x6 DF#2 and hips and valleys are 2x8 DF#2 unless otherwise noted.
3. All existing rafter, hips, valleys, rafter ties, and purlins are braced per UBC Section 2320.12 "Roof and Ceiling Framing" unless otherwise shown.
4. All structural wood members that were observed appear to be in sound condition and without structural defect.

1

ROOF PLAN - ONG

Not to Scale

16

Matt P. 9/6/00

ong



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

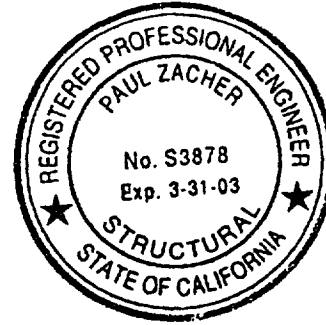
TEL: 916.961.3960  
FAX: 916.961.6552

July 19, 2000

Ong  
644 Brickyard Drive  
Sacramento, CA 95831  
TEL: (916) 422-8455

Attn.: Ms. Elizabeth Ong,

re: Job 2000\_190: ONG



Subject: Structural Investigation Report of the Roof for the Residence located at 644 Brickyard Drive, Sacramento, CA 95831.

As requested by Ms. Elizabeth Ong, this is a report to determine what needs should be addressed to correct any structural deficiencies of the roof. Paul Zacher visited the site July 19, 2000. 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 1970's vintage.  
Occupancy: Residential.  
No. of Stories: One.  
Dimensions: Approximately 2500 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 area is conventionally framed with 2x6 rafters spaced at 24" on center and with pre-engineered wood trusses spaced at 24" on center.

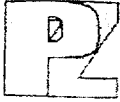
**CONCLUSIONS:**

Roof:  
The living area lacks sufficient structural capacity for the applied live and dead loads.

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1/16

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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. Provide 2x6 outlookers spaced at 48" on center. See details 1 and 2.
2. Add a 4x12 DF#1 beam (B2) with Simpson HUC412 hangers at each end. Attach one end of the beam (B2) to the side of the existing beam (B3). Attach the other end of the beam (B2) to the double studs at the corner of the exterior wall. Support the existing ridge beam (B1) to the new beam (B2) below with a 4x4 king post. Use Simpson BC44 at the top and bottom of the king post.


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 4 in 12  
Pitch Adjustment Factor 1.05

**LOCATION: ROOF**

<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
2x6 rafters @ 24" oc	<u>1.00</u>	psf
	Load	10.9 psf
	Roof Pitch Adjustment	<u>0.59</u> psf
	Total Load	11.5 psf

**LOCATION: TOP CHORD**

<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 truss @ 24" oc	<u>1.28</u>	psf
	Load	11.2 psf
	Roof Pitch Adjustment	<u>0.60</u> 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	0.64	psf
1/2" Gypboard	<u>2.50</u>	psf
	Load	3.6 psf

Job # 00-190

Date: 7/19/00

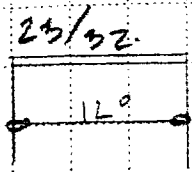
LOADING

BASE

$OR = 11.5 \text{ pWF} \cdot 2^\circ = 23 \text{ pWF}$

$Z < 6" Z$

$LR = 16.0 \cdot \dots = 32 \cdot$



B1

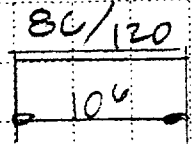
$OR = 11.5 \text{ pWF} \cdot 7^\circ = 80 \text{ pWF}$

$4 \times 12" 1$

$LR = 16.0 \cdot \dots = 120 \cdot$

$Z_2 = 452/630$

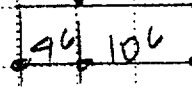
$452/630$



B2

$P_{O/L} = 452/630 - B1$

$4 \times 12" 1$

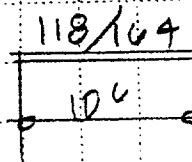


B3

$OR = 11.5 \text{ pWF} \cdot 10^\circ = 118 \text{ pWF}$

$4 \times 12" 1$

$LR = 16.0 \cdot \dots = 164 \cdot$

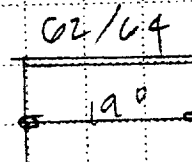


B4

$OR = 15.4 \text{ pWF} \cdot 4^\circ = 62 \text{ pWF}$

$4 \times 12" 1$

$LR = 16.0 \cdot \dots = 64 \cdot$

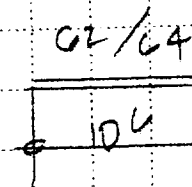


B5

$OR = 15.4 \text{ pWF} \cdot 4^\circ = 62 \text{ pWF}$

$4 \times 12" 1$

$LR = 16.0 \cdot \dots = 64 \cdot$



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

Title :  
 Dsgnr:  
 Description :  
 Scope :

Job #  
 Date: 9:36PM, 19 JUL 00

**Timber Beam & Joist**

c:\enercalc\test.ecw\Calculations

Rev. 510304  
 User: KW-0602844, Ver 5.1.3, 22 Jun 1999, Win32  
 (c) 1983-99 ENERCALC

Description RAFTERS AND BEAMS

Calculations are designed to 1997 NDS and 1997 UBC Requirements

**Timber Member Information**

	rafter	B1	B2	B3	B4	B5
Timber Section	2x6	4x12	4x12	4x12	4x12	4x12
Beam Width	1.500	3.500	3.500	3.500	3.500	3.500
Beam Depth	5.500	11.250	11.250	11.250	11.250	11.250
Le: Unbraced Length	0.00	0.00	0.00	0.00	0.00	0.00
Timber Grade	Douglas Fir - Larch	Douglas Fir - Larch	Douglas Fir - Larch	Douglas Fir - Larch	Douglas Fir - Larch	Douglas Fir - Larch
Fb - Basic Allow	875.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Fv - Basic Allow	95.0	95.0	95.0	95.0	95.0	95.0
Elastic Modulus	1,600.0	1,700.0	1,700.0	1,700.0	1,700.0	1,700.0
Load Duration Factor	1.250	1.250	1.250	1.250	1.250	1.250
Member Type	Sawn	Sawn	Sawn	Sawn	Sawn	Sawn
Repetitive Status	Repetitive	No	No	No	No	No

**Center Span Data**

		rafter	B1	B2	B3	B4	B5
Span	ft	12.00	10.50	15.00	10.50	19.00	10.50
Dead Load	#/ft	23.00	86.00		118.00	62.00	62.00
Live Load	#/ft	32.00	120.00		165.00	64.00	64.00
Point #1 DL	lbs			452.00			
LL	lbs			630.00			
@ X	ft			4.500			

**Results**

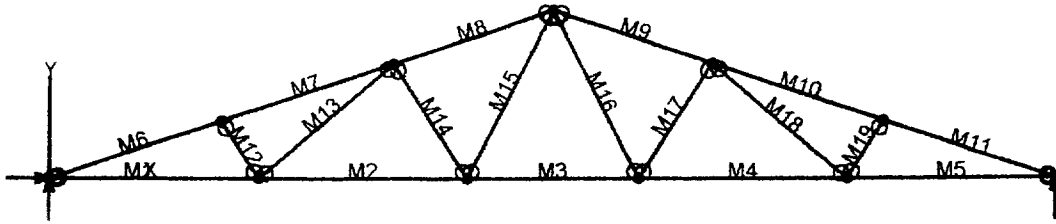
Ratio =	0.9607	0.3356	0.4029	0.4610	0.6721	0.2053
Mmax @ Center	11.88	34.07	40.90	46.80	68.23	20.84
@ X =	6.00	5.25	4.50	5.25	9.50	5.25
fb : Actual	1,570.9	461.4	554.0	633.9	924.2	282.2
Fb : Allowable	1,635.2	1,375.0	1,375.0	1,375.0	1,375.0	1,375.0
	Bending OK	Bending OK	Bending OK	Bending OK	Bending OK	Bending OK
Fv : Actual	55.7	33.9	28.9	46.6	41.2	20.8
Fv : Allowable	118.8	118.8	118.8	118.8	118.8	118.8
	Shear OK	Shear OK	Shear OK	Shear OK	Shear OK	Shear OK

**Reactions**

		rafter	B1	B2	B3	B4	B5
@ Left End DL	lbs	138.00	451.50	316.40	619.50	589.00	325.50
LL	lbs	192.00	630.00	441.00	866.25	608.00	336.00
Max. DL+LL	lbs	330.00	1,081.50	757.40	1,485.75	1,197.00	661.50
@ Right End DL	lbs	138.00	451.50	136.60	619.50	589.00	325.50
LL	lbs	192.00	630.00	189.00	866.25	608.00	336.00
Max. DL+LL	lbs	330.00	1,081.50	324.60	1,485.75	1,197.00	661.50

**Deflections**

		rafter	B1	B2	B3	B4	B5
Center DL Defl	in	-0.322	-0.033	-0.062	-0.046	-0.258	-0.024
L/Defl Ratio		446.5	3,782.1	2,885.6	2,756.5	885.4	5,246.2
Center LL Defl	in	-0.449	-0.046	-0.087	-0.064	-0.266	-0.025
L/Defl Ratio		320.9	2,710.5	2,070.3	1,971.3	857.8	5,082.2
Center Total Defl	in	-0.771	-0.080	-0.149	-0.110	-0.523	-0.049
Location	ft	6.000	5.250	6.720	5.250	9.500	5.250
L/Defl Ratio		186.7	1,578.9	1,205.5	1,149.3	435.7	2,581.5





# VisualAnalysis 3.50.c Report

07/19/00 21:44:38

Project: Truss 1

File: C:\Program Files\IES\VA35\truss 1.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	0.00	No	No	"
N3	17.00	0.00	"	"	"
N4	24.00	0.00	"	"	"
N5	32.50	0.00	"	"	"
N6	41.00	0.00	"	Yes	"
N7	7.00	2.33	"	No	"
N8	34.00	2.33	"	"	"
N9	14.00	4.67	"	"	"
N10	27.00	4.67	"	"	"
N11	20.50	6.83	"	"	"

## Member Elements

Member	Section	Material	Length ft
M1	SS2x4	Wood	8.50
M2	"	"	8.50
M3	"	"	7.00
M4	"	"	8.50
M5	"	"	8.50
M6	SS2x6	"	7.38
M7	"	"	7.38
M8	"	"	6.85
M9	"	"	6.85
M10	"	"	7.38
M11	"	"	7.38
M12	SS2x4	"	2.77
M13	"	"	7.22
M14	"	"	5.55
M15	"	"	7.67
M16	"	"	7.67
M17	"	"	5.55
M18	"	"	7.22
M19	"	"	2.77

## 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	5.36	3.06	3.06
"	SS2x6	8.25	20.80	7.56	7.56

## Material Properties

Material Strength Elasticity Poisson Density

	psi	psi	lb/ft^3
Wood	-NA-	1700000.00	0.36 40.47

## Load Combination Summary

Equation Case: Equation Case 1  
 Combination: +1D+1L+1Lr  
 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
N1	Equation Case 1	-0.00	1295.60	-NA-
N6	"	-NA-	1295.60	-NA-

## Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
M1	3279.85	-35.60	-28.05	-0.3497
"	3279.85	-14.07	42.1607	-0.2945
"	3279.85	7.4670	51.5096	-0.1826
"	3279.85	29.0004	0.0000	-0.0000
M2	2602.23	-33.20	-35.67	-0.4101
"	2602.23	-11.66	27.7300	-0.4259
"	2602.23	9.8699	30.2708	-0.4071
"	2602.23	31.4032	-28.05	-0.3497
M3	1942.76	-26.60	-35.67	-0.4101
"	1942.76	-8.8667	5.6049	-0.4125
"	1942.76	8.8667	5.6049	-0.4124
"	1942.76	26.6000	-35.67	-0.4101
M4	2602.23	-31.40	-28.05	-0.3497
"	2602.23	-9.8699	30.2708	-0.4071
"	2602.23	11.6634	27.7300	-0.4259
"	2602.23	33.1968	-35.67	-0.4101
M5	3279.85	-29.00	0.0000	-0.0000
"	3279.85	-7.4670	51.5096	-0.1826
"	3279.85	14.0663	42.1607	-0.2944
"	3279.85	35.5996	-28.05	-0.3497
M6	-3512.00	165.93	0.0000	-0.0000
"	-3471.03	42.8334	255.93	-0.1742
"	-3430.06	-80.26	209.91	-0.2803
"	-3389.09	-203.35	-138.06	-0.3316
M7	-3292.34	171.11	-138.06	-0.3316
"	-3251.21	48.0697	130.80	-0.3856
"	-3210.08	-74.97	97.7108	-0.4082
"	-3168.95	-198.01	-237.34	-0.4093
M8	-2442.04	206.13	-237.34	-0.4093
"	-2404.05	91.8100	102.13	-0.4369
"	-2366.06	-22.51	181.25	-0.4439
"	-2328.07	-136.83	-0.0000	-0.4103
M9	-2442.04	-206.13	-237.34	-0.3612
"	-2404.05	-91.81	102.13	-0.3888

"	-2366.06	22.5099	181.25	-0.3958
"	-2328.07	136.83	0.0000	-0.3621
M10	-3292.34	-171.11	-138.06	-0.2831
"	-3251.21	-48.07	130.80	-0.3371
"	-3210.08	74.9710	97.7108	-0.3598
"	-3168.95	198.01	-237.34	-0.3608
M11	-3512.00	-165.93	0.0000	0.0482
"	-3471.03	-42.83	255.93	-0.1260
"	-3430.06	80.2601	209.91	-0.2320
"	-3389.09	203.35	-138.06	-0.2834
M12	-390.91	-0.0000	-0.0000	-0.1578
"	-390.91	-0.0000	-0.0000	-0.1397
"	-390.91	-0.0000	-0.0000	-0.1215
"	-390.91	-0.0000	0.0000	-0.1034
M13	611.35	-0.0000	-0.0000	-0.3640
"	611.35	-0.0000	-0.0000	-0.3396
"	611.35	-0.0000	-0.0000	-0.3152
"	611.35	-0.0000	0.0000	-0.2909
M14	-647.19	-0.0000	-0.0000	-0.1651
"	-647.19	-0.0000	-0.0000	-0.1574
"	-647.19	-0.0000	-0.0000	-0.1496
"	-647.19	-0.0000	0.0000	-0.1419
M15	679.04	0.0000	0.0000	-0.2535
"	679.04	0.0000	0.0000	-0.2513
"	679.04	0.0000	0.0000	-0.2491
"	679.04	0.0000	0.0000	-0.2469
M16	679.04	-0.0000	0.0000	-0.1176
"	679.04	-0.0000	-0.0000	-0.1154
"	679.04	-0.0000	-0.0000	-0.1132
"	679.04	-0.0000	-0.0000	-0.1109
M17	-647.19	0.0000	0.0000	-0.2936
"	-647.19	0.0000	0.0000	-0.2859
"	-647.19	0.0000	0.0000	-0.2782
"	-647.19	0.0000	0.0000	-0.2704
M18	611.35	0.0000	0.0000	-0.2651
"	611.35	0.0000	0.0000	-0.2408
"	611.35	0.0000	0.0000	-0.2164
"	611.35	0.0000	0.0000	-0.1920
M19	-390.91	0.0000	0.0000	-0.2862
"	-390.91	0.0000	0.0000	-0.2681
"	-390.91	0.0000	0.0000	-0.2499
"	-390.91	0.0000	0.0000	-0.2318

**BENDING & COMP: TRUSS 1 - MEMBER 11**

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	1.5 inches
Depth, d	5.5 inches
Length	7.38 feet
Max Axial Comp, C	3389 lbs
Max Reaction, R	203 lbs
Max Moment, M	138 ft-lbs
Max LL Deflection	0.12 inches
Max TL Deflection	0.28 inches
LL Defl Criteria = L/	240
TL Defl Criteria = L/	180
Duration factor, Cd	1.25
Repetitive Factor, Cr	1.15
Size Factor, Cf bending	1.3 1.5 for 2x4, 1.3 for 2x6
Size Factor, Cf comp	1.1 1.15 for 2x4, 1.1 for 2x6
Buckling Factor, CT =	1.22
fc =	411 psi
Fce=	2251 psi
Fc*=	1788 psi
F'c=	1366 psi
fb=	219 psi
F*b=Fb*=	1635 psi
Shear D/C ratio	0.31 < 1.0, Member OK
Interaction equation: (fc/F'c)^2 +	
fb/ (F*b(1-fc/Fce)) =	0.25 < 1.0, Member OK
Live Load defl ratio	0.33 < 1.0, Member OK
Total Load defl ratio	0.57 < 1.0, Member OK

# VisualAnalysis 3.50.c Report

07/19/00 21:53:36

Project: Truss 2

File: C:\Program Files\IES\VA35\truss 2.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	4.00	0.00	No		"		"	
N3	12.75	1.45	"		No		"	
N4	21.50	0.00	"		Yes		"	
N5	28.00	0.00	"		"		"	
N6	4.00	1.33	"		No		"	
N7	21.50	2.17	"		"		"	
N8	14.00	4.67	"		"		"	

## Member Elements

Member	Section	Material	Length ft
M1	SS2x4	Wood	4.00
M2	"	"	8.87
M3	"	"	8.87
M4	"	"	6.50
M5	SS2x6	"	4.22
M6	"	"	10.54
M7	"	"	7.91
M8	"	"	6.85
M9	SS2x4	"	1.33
M10	"	"	8.75
M11	"	"	8.78
M12	"	"	2.17
M13	"	"	3.45

## 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	5.36	3.06	3.06
"	SS2x6	8.25	20.80	7.56	7.56

## Material Properties

Material	Strength psi	Elasticity psi	Poisson	Density lb/ft <sup>3</sup>
Wood	-NA-	1700000.00	0.36	40.47

## Load Combination Summary

Equation Case: Equation Case 1

Combination: +1D+1L+1Lr

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
N1	Equation Case 1	0.00	14.57	-NA-
N2	"	-NA-	793.44	-NA-
N4	"	-NA-	819.03	-NA-
N5	"	-NA-	142.56	-NA-

## Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
M1	70.0949	-15.20	0.0000	-0.0000
"	70.0949	-5.0667	13.4773	-0.0042
"	70.0949	5.0667	13.4773	-0.0042
"	70.0949	15.2000	0.0000	-0.0000
M2	65.6150	32.8026	0.0000	-0.0001
"	69.2389	10.9342	64.4911	-0.1106
"	72.8628	-10.93	64.4911	-0.1232
"	76.4867	-32.80	-0.0000	-0.0377
M3	-27.01	-32.80	-0.0000	0.0022
"	-23.38	-10.93	64.4911	-0.1083
"	-19.76	10.9342	64.4911	-0.1208
"	-16.14	32.8026	0.0000	-0.0353
M4	-21.28	-24.70	0.0000	-0.0000
"	-21.28	-8.2333	35.5886	-0.0290
"	-21.28	8.2333	35.5886	-0.0290
"	-21.28	24.7000	0.0000	-0.0000
M5	-66.32	-22.71	0.0000	-0.0000
"	-42.93	-93.06	-81.58	0.0140
"	-19.54	-163.40	-261.75	0.0192
"	3.8536	-233.75	-540.53	-0.0014
M6	-765.42	314.95	-540.53	-0.0014
"	-706.71	139.16	255.88	-0.1731
"	-647.99	-36.62	436.06	-0.2207
"	-589.28	-212.41	-0.0000	-0.0360
M7	-729.07	-243.63	-362.30	0.0017
"	-685.12	-111.76	105.10	-0.0494
"	-641.16	20.1056	225.86	-0.0744
"	-597.21	151.97	0.0000	-0.0325
M8	-17.13	-118.53	0.0000	0.0041
"	21.0131	-4.2634	139.59	-0.0165
"	59.1607	110.00	18.8244	-0.0072
"	97.3084	224.27	-362.30	0.0017
M9	-756.61	0.0000	0.0000	0.0003
"	-756.61	0.0000	0.0000	0.0003
"	-756.61	0.0000	0.0000	0.0004
"	-756.61	0.0000	0.0000	0.0004
M10	556.18	0.0000	0.0000	-0.0371
"	556.18	0.0000	0.0000	-0.0252
"	556.18	0.0000	0.0000	-0.0133
"	556.18	0.0000	0.0000	-0.0014
M11	638.05	-0.0000	0.0000	-0.0375

"	638.05	-0.0000	-0.0000	-0.0260
"	638.05	-0.0000	-0.0000	-0.0146
"	638.05	-0.0000	-0.0000	-0.0032
M12	-757.55	-0.0000	0.0000	0.0121
"	-757.55	-0.0000	-0.0000	0.0125
"	-757.55	-0.0000	-0.0000	0.0128
"	-757.55	-0.0000	-0.0000	0.0132
M13	32.0636	0.0000	0.0000	0.0182
"	32.0636	0.0000	0.0000	0.0189
"	32.0636	0.0000	0.0000	0.0196
"	32.0636	0.0000	0.0000	<b>0.0202</b>

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## **BENDING & COMP: TRUSS 2 - MEMBER 6**

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	1.5 inches
Depth, d	5.5 inches
Length	10.54 feet
Max Axial Comp, C	648 lbs
Max Reaction, R	37 lbs
Max Moment, M	436 ft-lbs
Max LL Deflection	0.09 inches
Max TL Deflection	0.22 inches
LL Defl Criteria = L/	240
TL Defl Criteria = L/	180
Duration factor, Cd	1.25
Repetitive Factor, Cr	1.15
Size Factor, Cf bending	1.3 1.5 for 2x4, 1.3 for 2x6
Size Factor, Cf comp	1.1 1.15 for 2x4, 1.1 for 2x6
Buckling Factor, CT =	1.31
fc =	79 psi
Fce=	1187 psi
Fc*=	1788 psi
F'c=	963 psi
fb=	692 psi
F*b=Fb*=	1635 psi
Shear D/C ratio	0.06 < 1.0, Member OK
Interaction equation:	
(fc/F'c)^2 +	
fb/ (F*b(1-fc/Fce)) =	0.46 < 1.0, Member OK
Live Load defl ratio	0.17 < 1.0, Member OK
Total Load defl ratio	0.31 < 1.0, Member OK



