

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

**Permit No: 0006623**  
**Insp Area: 2**

**Site Address: 840 KLEIN WY SAC**  
Parcel No: 031-0610-011

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

CONTRACTOR  
ZIMMERMAN ROOFING  
3675 R ST  
SACRAMENTO CA 95816

OWNER  
YEW BERNICE L/CURTIS T  
840 KLEIN WY  
SACRAMENTO CA 95831

ARCHITECT

**Nature of Work: TEAR OFF & REROOF WITH PIONEER 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-31 License Number 557559 Date 6/15/00 Contractor Signature Billy Coy

**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 6/15/00 Applicant/Agent Signature Billy Coy

**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 COMP INS FUND Policy Number 713-99-2021 Exp Date 10/01/2000

\_\_\_\_\_, (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 6/15/00 Applicant Signature Billy Coy

**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.**



DEPARTMENT OF  
PLANNING AND DEVELOPMENT

CITY OF SACRAMENTO  
CALIFORNIA

1231 I STREET  
ROOM 200  
SACRAMENTO, CA  
95814-2978

Permit Services  
916-264-7819  
FAX 916-264-7066

*Curtis Yew  
840 Klein Way  
Sacto., CA. 95831*

TILE ROOF WORKSHEET

This worksheet must be filled out whenever any type of tile roof is applied for.

If the answer to question #5 is yes, a written engineering report from a registered engineer must be provided with each application.

1 BRAND AND MODEL OF TILE Lite weight

2 TILE WEIGHT PER SQUARE 730 lbs

3 WEIGHT OF ROOF SYSTEM PER SQUARE 180 lbs

4 TOTAL WEIGHT OF ROOF SYSTEM 910 lbs

5 DOES TOTAL WEIGHT OF ROOF SYSTEM EXCEED 750# PER SQUARE?  YES  NO

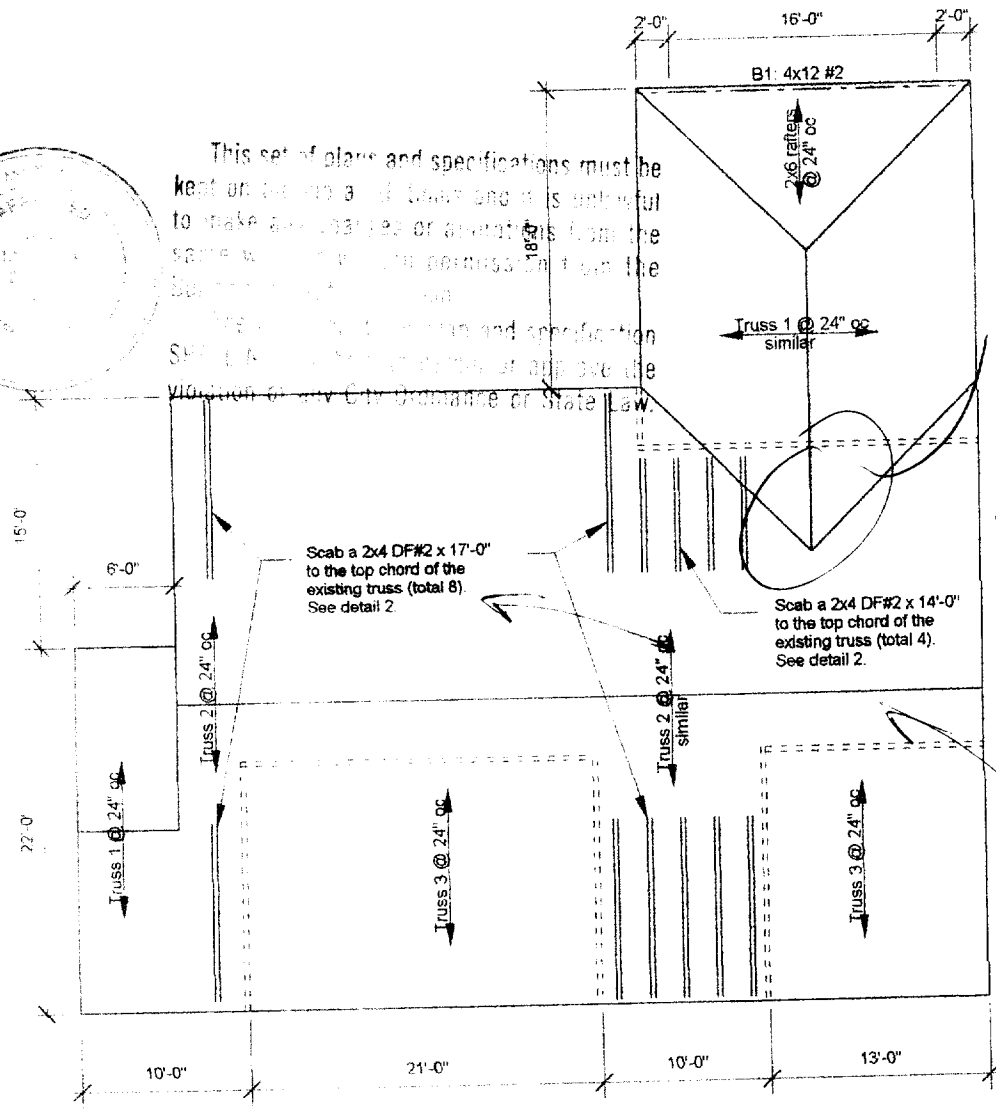
6 ROOF SLOPE 4/12

PLEASE PROVIDE A SEPARATE WORKSHEET FOR EACH APPLICATION INVOLVING A TILE ROOF

*All attached engin. report*



This set of plans and specifications must be kept on the job site. If there are any changes or amendments to this set of plans, they must be made in the presence of the Engineer. The Engineer shall not be responsible for the violation of any City, Ordinance or State Law.



Support req'd for valley & ridge. Calif. frame?

See detail, next sheet

Max span for roof rafter is 12'  
see site for engineering



ISSUED  
JUN 15 2000

CONTRACT DEVELOPMENT SERVICES DIV



Notes:

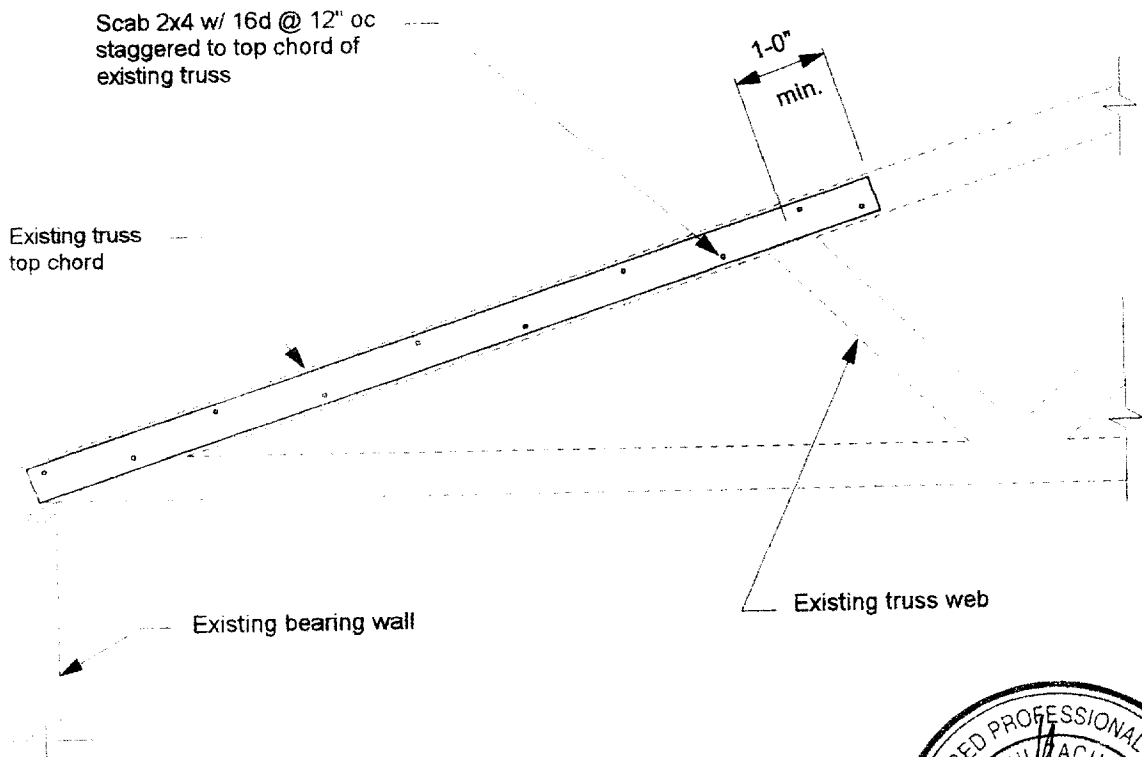
- 1 This is a reroof project. The new roofing material shall be a Light Weight Concrete Tile. The tile shall weigh less than or equal to 7.0 psf.
- 2 All structural wood members that were observed appear to be in sound condition and without structural defect.

1

ROOF PLAN - YEW

Not to Scale

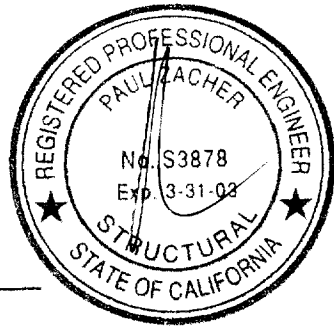
Matt P. 6/15/00



2

**TRUSS REINFORCEMENT DETAIL**

scale: 1/2" = 1'-0"



22

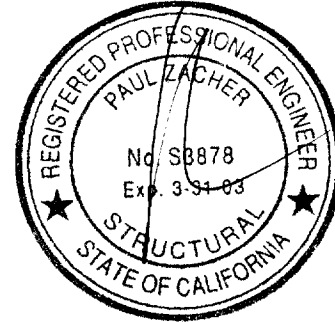
yew

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

TEL: 916.961.3960  
FAX: 916.961.6552

June 13, 2000

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



Attn: Mr. Jeff Tucker,

re: Job 2000\_162: YEW

Subject: Structural Investigation Report of the Roof for the Residence located at 840 Klein 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 June 13, 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 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.

yew



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 to the existing top chord of the pre-engineered wood truss. See details 1 and 2.

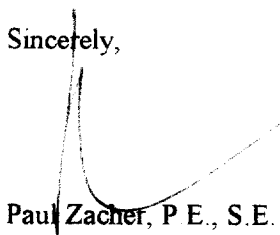
It shall be noted that small hairline cracking may occur at exterior stucco and interior gypboard finished walls that are load bearing or distributing roof strut loads. These cracks are a natural occurrence as the existing structure re-distributes the new roof weight. They are cosmetic in nature and 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 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	1.00	psf
	Load	10.9 psf
	Roof Pitch Adjustment	0.59 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
2x4 truss @ 24" oc	1.28	psf
	Load	11.2 psf
	Roof Pitch Adjustment	0.60 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	2.50	psf
	Load	3.6 psf

P K Zacher S E

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

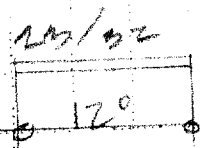
Job # 11-12

Date: 9/5/00

20052

20052 12' 12" 12' 12" 12' 12"

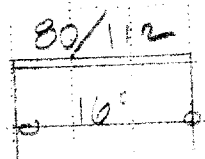
2x12<sup>#2</sup>



01

01 115' 7" 12' 12" 12' 12"

4x12<sup>#2</sup>





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

Title :  
 Dsgnr:  
 Description :

Job #  
 Date: 12:54PM, 13 JUN 00

Scope :

Rev: 510304  
 User: KW-0602844, Ver: 5.1.3.22, Jun 1999, Win32  
 (c) 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	B3
Timber Section	2x6	4x12	6x14
Beam Width	in 1.500	3.500	5.500
Beam Depth	in 5.500	11.250	13.500
Le: Unbraced Length	ft 0.00	0.00	0.00
Timber Grade	Douglas Fir - Larch	Douglas Fir - Larch	Douglas Fir - Larch
Fb - Basic Allow	psi 875.0	875.0	1,350.0
Fv - Basic Allow	psi 95.0	95.0	85.0
Elastic Modulus	ksi 1,600.0	1,600.0	1,600.0
Load Duration Factor	1.250	1.250	1.250
Member Type	Sawn	Sawn	Sawn
Repetitive Status	Repetitive	No	No

#### Center Span Data

Span	ft	12.00	16.00	15.00
Dead Load	#/ft	23.00	80.00	
Live Load	#/ft	32.00	112.00	
Point #1 DL	lbs			1,470.00
LL	lbs			1,520.00
@ X	ft			5.500

#### Results

Ratio = 0.9607 0.8300 0.4482

Mmax @ Center	in-k	11.88	73.73	124.72
@ X =	ft	6.00	8.00	5.52
fb: Actual	psi	1,570.9	998.6	746.5
Fb: Allowable	psi	1,635.2	1,203.1	1,665.6
		Bending OK	Bending OK	Bending OK
fv: Actual	psi	55.7	52.0	38.3
Fv: Allowable	psi	118.8	118.8	106.3
		Shear OK	Shear OK	Shear OK

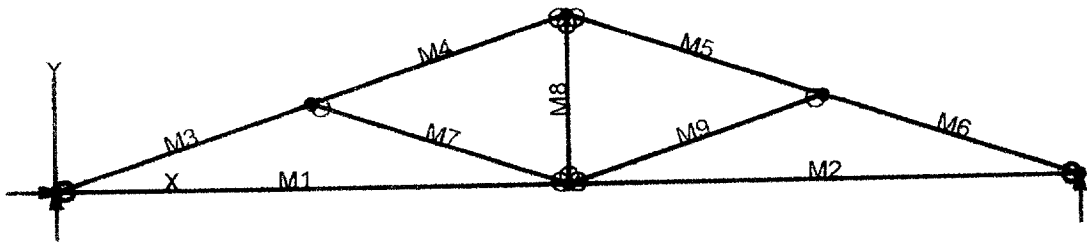
#### Reactions

@ Left End DL	lbs	138.00	640.00	931.00
LL	lbs	192.00	896.00	962.67
Max. DL+LL	lbs	330.00	1,536.00	1,893.67
@ Right End DL	lbs	138.00	640.00	539.00
LL	lbs	192.00	896.00	557.33
Max. DL+LL	lbs	330.00	1,536.00	1,096.33

#### Deflections

Ratio OK Deflection OK Deflection OK

Center DL Defl	in	-0.322	-0.178	-0.090
L/Defl Ratio		446.5	1,081.5	2,000.1
Center LL Defl	in	-0.449	-0.249	-0.093
L/Defl Ratio		320.9	772.5	1,934.3
Center Total Defl	in	-0.771	-0.426	-0.183
Location	ft	6.000	8.000	6.960
L/Defl Ratio		186.7	450.6	983.3



# VisualAnalysis 3.50.c Report

06/13/00 13:00:33

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	11.00	0.00	No	No	"
N3	22.00	0.00	"	Yes	"
N4	5.50	1.83	"	No	"
N5	16.50	1.83	"	"	"
N6	11.00	3.67	"	"	"

## Member Elements

Member	Section	Material	Length ft
M1	SS2x4	Wood	11.00
M2	"	"	11.00
M3	"	"	5.80
M4	"	"	5.80
M5	"	"	5.80
M6	"	"	5.80
M7	"	"	5.80
M8	"	"	3.67
M9	"	"	5.80

## 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

## 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	695.20	-NA-
N3	"	-NA-	695.20	-NA-

## Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
M1	1627.74	-50.53	-96.02	-0.1448
"	1627.74	-22.66	37.9109	-0.1992
"	1627.74	5.2045	69.9166	-0.1779
"	<b>1627.74</b>	33.0712	0.0000	-0.0000
M2	1627.74	-33.07	0.0000	-0.0000
"	1627.74	-5.2045	69.9166	-0.1779
"	1627.74	22.6622	37.9109	-0.1992
"	1627.74	50.5288	-96.02	-0.1448
M3	<b>-1753.53</b>	114.37	0.0000	-0.0000
"	-1721.35	17.6503	<b>127.07</b>	-0.1117
"	-1689.17	-79.07	67.7389	-0.1444
"	-1656.99	<b>-175.79</b>	<b>-178.01</b>	-0.1399
M4	-1184.97	175.69	-178.01	-0.1399
"	-1152.64	79.0266	67.7389	-0.1921
"	-1120.30	-17.64	127.07	<b>-0.2070</b>
"	-1087.96	-114.31	0.0000	-0.1428
M5	-1184.97	-175.69	-178.01	-0.1246
"	-1152.64	-79.03	67.7389	-0.1768
"	-1120.30	17.6407	127.07	-0.1917
"	-1087.96	114.31	0.0000	-0.1275
M6	-1753.53	-114.37	-0.0000	<b>0.0152</b>
"	-1721.35	-17.65	127.07	-0.0965
"	-1689.17	79.0697	67.7389	-0.1292
"	-1656.99	<b>175.79</b>	-178.01	-0.1247
M7	-589.90	0.0000	0.0000	-0.1298
"	-589.90	0.0000	0.0000	-0.1265
"	-589.90	0.0000	0.0000	-0.1233
"	-589.90	0.0000	0.0000	-0.1200
M8	473.53	0.0000	0.0000	-0.0241
"	473.53	0.0000	0.0000	-0.0241
"	473.53	0.0000	0.0000	-0.0241
"	473.53	0.0000	0.0000	-0.0241
M9	-589.90	-0.0000	0.0000	-0.1450
"	-589.90	-0.0000	-0.0000	-0.1417
"	-589.90	-0.0000	-0.0000	-0.1385
"	-589.90	-0.0000	-0.0000	-0.1352

**BENDING & COMP: TRUSS 1 - MEMBER 3**

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

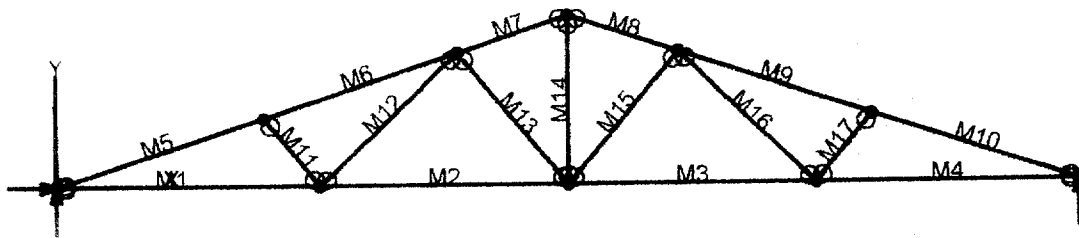
Grading:

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	3.5 inches
Length	5.8 feet
Max Axial Comp. C	1656 lbs
Max Reaction, R	175 lbs
Max Moment, M	178 ft-lbs
Max LL Deflection	0.06 inches
Max TL Deflection	0.14 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	1.5    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 =	1.17
fc =	315 psi
Fce=	1420 psi
Fc*=	1869 psi
F'c=	1102 psi
fb=	697 psi
F'b=Fb*=	1887 psi
Shear D/C ratio	0.42 < 1.0, Member OK
Interaction equation:	
(fc/F'c)^2 +	
fb/ (F'b(1-fc/Fce)) =	0.56 < 1.0, Member OK
Live Load defl ratio	0.21 < 1.0, Member OK
Total Load defl ratio	0.36 < 1.0, Member OK



# VisualAnalysis 3.50.c Report

06/13/00 13:09:55

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	9.50	0.00	No		No			
N3	18.50	0.00	"		"			
N4	27.50	0.00	"		"			
N5	37.00	0.00	"		Yes			
N6	7.50	2.50	"		No			
N7	29.50	2.50	"		"			
N8	14.50	4.83	"		"			
N9	22.50	4.83	"		"			
N10	18.50	6.17	"		"			

## Member Elements

Member	Section	Material	Length ft
M1	SS2x4	Wood	9.50
M2	"	"	9.00
M3	"	"	9.00
M4	"	"	9.50
M5	"	"	7.91
M6	"	"	7.38
M7	"	"	4.22
M8	"	"	4.22
M9	"	"	7.38
M10	"	"	7.91
M11	"	"	3.20
M12	"	"	6.95
M13	"	"	6.27
M14	"	"	6.17
M15	"	"	6.27
M16	"	"	6.95
M17	"	"	3.20

## 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	5.36	3.06	3.06

## 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	1169.20	-NA-
N5	"	-NA-	1169.20	-NA-

## Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
M1	2902.42	-40.07	-37.74	-0.3852
"	2902.42	-16.01	50.8585	-0.3496
"	2902.42	8.0604	63.4395	-0.2291
"	<b>2902.42</b>	32.1270	0.0000	-0.0000
M2	2159.22	-35.69	-51.13	-0.4208
"	2159.22	-12.89	21.5626	-0.4387
"	2159.22	9.9128	26.0242	-0.4294
"	2159.22	32.7128	-37.74	-0.3852
M3	2159.22	-32.71	-37.74	-0.3852
"	2159.22	-9.9128	26.0242	-0.4294
"	2159.22	12.8872	21.5626	-0.4387
"	2159.22	35.6872	-51.13	-0.4208
M4	2902.42	-32.13	0.0000	-0.0000
"	2902.42	-8.0604	63.4395	-0.2291
"	2902.42	16.0063	50.8585	-0.3495
"	2902.42	40.0730	-37.74	-0.3852
M5	-3113.05	160.90	0.0000	-0.0000
"	-3069.10	29.0286	249.38	-0.3677
"	-3025.14	-102.84	152.13	-0.4452
"	-2981.19	<b>-234.71</b>	-291.76	-0.3593
M6	-2819.99	203.81	-291.76	-0.3593
"	-2779.02	80.7131	57.3292	-0.4350
"	-2738.04	-42.38	104.46	<b>-0.4730</b>
"	-2697.07	-165.47	-150.36	-0.4197
M7	-1904.60	141.08	-150.36	-0.4196
"	-1881.05	70.7894	-1.6408	-0.4193
"	-1857.50	0.4956	48.4782	-0.4227
"	-1833.95	-69.80	-0.0000	-0.4109
M8	-1904.60	-141.08	-150.36	-0.3794
"	-1881.05	-70.79	-1.6408	-0.3792
"	-1857.50	-0.4956	48.4782	-0.3825
"	-1833.95	69.7983	0.0000	-0.3708
M9	-2819.99	-203.81	-291.76	-0.3194
"	-2779.02	-80.71	57.3292	-0.3951
"	-2738.04	42.3803	104.46	-0.4331
"	-2697.07	165.47	-150.36	-0.3798
M10	<b>-3113.05</b>	-160.90	-0.0000	<b>0.0400</b>
"	-3069.10	-29.03	<b>249.38</b>	-0.3278



	-3025.14	102.84	152.14	-0.4052
	-2981.19	<b>234.71</b>	<b>-291.76</b>	-0.3193
M11	-466.04	0.0000	0.0000	-0.2117
"	-466.04	0.0000	0.0000	-0.1926
"	-466.04	0.0000	0.0000	-0.1736
"	-466.04	0.0000	0.0000	-0.1546
M12	628.55	0.0000	0.0000	-0.3527
"	628.55	0.0000	0.0000	-0.3361
"	628.55	0.0000	0.0000	-0.3194
"	628.55	0.0000	0.0000	-0.3028
M13	-624.12	-0.0000	-0.0000	-0.2197
"	-624.12	-0.0000	-0.0000	-0.2156
"	-624.12	-0.0000	-0.0000	-0.2115
"	-624.12	-0.0000	0.0000	-0.2075
M14	1032.74	0.0000	0.0000	-0.0632
"	1032.74	0.0000	0.0000	-0.0632
"	1032.74	0.0000	0.0000	-0.0632
"	1032.74	0.0000	0.0000	-0.0632
M15	-624.12	0.0000	0.0000	-0.3171
"	-624.12	0.0000	0.0000	-0.3130
"	-624.12	0.0000	0.0000	-0.3089
"	-624.12	0.0000	0.0000	-0.3048
M16	628.55	0.0000	0.0000	-0.2649
"	628.55	0.0000	0.0000	-0.2483
"	628.55	0.0000	0.0000	-0.2316
"	628.55	0.0000	0.0000	-0.2150
M17	-466.04	-0.0000	0.0000	-0.3104
"	-466.04	-0.0000	-0.0000	-0.2914
"	-466.04	-0.0000	-0.0000	-0.2723
"	-466.04	-0.0000	-0.0000	-0.2533

## **BENDING & COMP: TRUSS 2 - MEMBER 5**

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

### Grading:

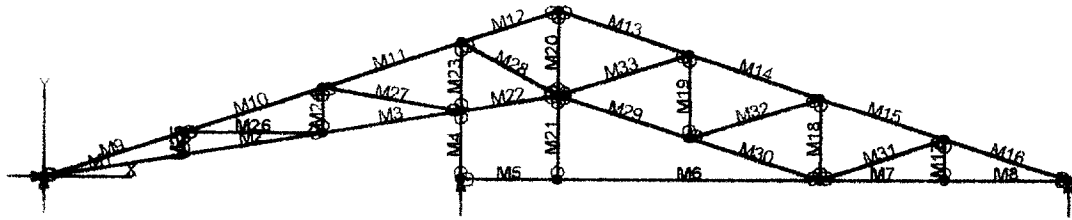
2x or 4x

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	7.91 feet
Max Axial Comp, C	2981 lbs
Max Reaction, R	234 lbs
Max Moment, M	291 ft-lbs
Max LL Deflection	0.14 inches
Max TL Deflection	0.35 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	1.5 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 =	1.23
fc =	284 psi
Fce=	804 psi
Fc*=	1869 psi
F'c=	715 psi
fb=	570 psi
F'b=Fb*=	1887 psi
Shear D/C ratio	0.28 < 1.0, Member OK
Interaction equation: (fc/F'c)^2 +	
fb/ (F'b(1-fc/Fce)) =	0.62 < 1.0, Member OK
Live Load defl ratio	0.35 < 1.0, Member OK
Total Load defl ratio	0.66 < 1.0, Member OK



# VisualAnalysis 3.50.c Report

13/00 13:28:25  
 Project: Truss 3  
 File: C:\Program Files\IES\VA35\truss 3.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	5.00	0.83	No		No		"	
N3	10.00	1.67	"		"		"	
N4	15.00	2.50	"		"		"	
N5	15.00	0.00	"		Yes		"	
N6	18.50	0.00	"		No		"	
N7	23.25	1.54	"		"		"	
N8	28.00	0.00	"		"		"	
N9	32.50	0.00	"		"		"	
N10	37.00	0.00	"		Yes		"	
N11	5.00	1.67	"		No		"	
N12	10.00	3.33	"		"		"	
N13	15.00	5.00	"		"		"	
N14	18.50	6.17	"		"		"	
N15	23.25	4.59	"		"		"	
N16	18.50	3.08	"		"		"	
N17	28.00	3.00	"		"		"	
N18	32.50	1.50	"		"		"	

## Member Elements

Member	Section	Material	Length ft
M1	SS2x4	Wood	5.07
M2	"	"	5.07
M3	"	"	5.07
M4	"	"	2.50
M5	"	"	3.50
M6	"	"	9.50
M7	"	"	4.50
M8	"	"	4.50
M9	"	"	5.27
M10	"	"	5.27
M11	"	"	5.27
M12	"	"	3.69
M13	"	"	5.01
M14	"	"	5.01
M15	"	"	4.74
M16	"	"	4.74
M17	"	"	1.50
M18	"	"	3.00
M19	"	"	3.05
M20	"	"	3.09
M21	"	"	3.08
M22	"	"	3.55
M23	"	"	2.50
M24	"	"	1.66
M25	"	"	0.84
M26	"	"	5.00
M27	"	"	5.07
M28	"	"	3.99

M29	"	"	4.99
M30	"	"	4.99
M31	"	"	4.74
M32	"	"	4.97
M33	"	"	4.98

## 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

## 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	249.55	-NA-
N5	"	-NA-	1546.69	-NA-
N10	"	-NA-	542.16	-NA-

## Member Results

Member	Axial lbs	Vy lbs	Mz lb-ft	Dy in
M1	652.75	22.8102	0.0000	-0.0000
"	654.83	10.3146	27.9290	-0.0425
"	656.90	-2.1811	34.7996	-0.0708
"	658.97	-14.68	20.6119	-0.0812
M2	655.10	9.8428	20.6119	-0.0812
"	657.20	-2.6488	26.6381	-0.0776
"	659.29	-15.14	11.6061	-0.0606
"	661.39	-27.63	-24.48	-0.0382
M3	-318.96	17.3487	-24.48	-0.0381
"	-316.89	4.8531	-5.7825	-0.0231
"	-314.81	-7.6426	-8.1389	-0.0121
"	-312.74	-20.14	-31.55	-0.0064
M4	-1545.96	0.0000	0.0000	-0.0009

"	-1545.96	0.0000	0.0000	0.0020
"	-1545.96	0.0000	0.0000	0.0048
"	<b>-1545.96</b>	0.0000	0.0000	0.0077
M5	0.0000	-35.88	-44.02	-0.0318
"	0.0000	17.01	-19.02	-0.0173
"	0.0000	-8.1425	-4.3532	-0.0080
"	0.0000	0.7242	0.0000	-0.0000
M6	0.0000	-36.42	-47.05	-0.0823
"	0.0000	-12.35	29.9828	<b>-0.1113</b>
"	0.0000	11.7140	30.9940	-0.0951
"	0.0000	35.7807	-44.02	-0.0318
M7	1243.52	-1.3156	23.9808	-0.0814
"	1243.52	10.0844	17.3614	-0.0852
"	1243.52	21.4844	-6.3152	-0.0821
"	1243.52	32.8844	-47.05	-0.0823
M8	1243.52	-22.43	-0.0000	-0.0000
"	1243.52	-11.03	25.0508	-0.0384
"	1243.52	0.3709	33.0444	-0.0666
"	1243.52	11.7709	23.9808	-0.0814
M9	-720.11	111.56	0.0000	-0.0000
"	-690.75	23.6644	<b>118.42</b>	-0.0823
"	-661.39	-64.23	82.7787	-0.1027
"	-632.04	<b>-152.12</b>	-106.92	-0.0821
M10	285.73	128.98	-106.92	-0.0821
"	314.93	41.0296	41.9695	-0.0832
"	344.12	-46.92	36.8001	-0.0671
"	373.32	-134.86	-122.43	-0.0369
M11	1311.14	131.98	-122.43	-0.0369
"	1340.50	44.0889	31.8802	-0.0400
"	1369.85	-43.80	32.1298	-0.0318
"	<b>1399.21</b>	-131.70	-121.68	-0.0121
M12	211.24	125.25	-121.68	-0.0121
"	231.81	63.7321	-5.6307	-0.0211
"	252.37	2.2118	34.9289	-0.0334
"	272.94	-59.31	0.0000	-0.0375
M13	202.64	-151.37	<b>-130.48</b>	-0.0584
"	230.42	-67.83	52.0490	-0.0764
"	258.21	15.7007	95.5433	-0.0728
"	285.99	99.2341	0.0000	-0.0249
M14	-579.95	-116.67	-87.64	-0.0779
"	-552.01	-33.19	37.1177	-0.0825
"	-524.06	50.2937	22.8362	-0.0735
"	-496.12	133.77	-130.48	-0.0584
M15	-902.13	-119.05	-89.41	-0.0786
"	-875.76	-39.93	35.9645	-0.0907
"	-849.39	39.1856	36.5567	-0.0905
"	-823.01	118.31	-87.64	-0.0779
M16	-1344.06	-99.83	-0.0000	0.0045
"	-1317.68	-20.71	94.9823	-0.0586
"	-1291.31	58.4104	65.1773	-0.0816
"	-1264.94	<b>137.53</b>	-89.41	-0.0786
M17	13.0865	0.0000	0.0000	-0.0042
"	13.0865	0.0000	0.0000	-0.0006
"	13.0865	0.0000	0.0000	0.0031
"	13.0865	0.0000	0.0000	0.0067
M18	-52.87	-0.0000	-0.0000	-0.0009
"	-52.87	-0.0000	-0.0000	-0.0002
"	-52.87	-0.0000	-0.0000	0.0005
"	-52.87	-0.0000	0.0000	0.0012
M19	189.85	0.0000	0.0000	-0.0016
"	189.85	0.0000	0.0000	0.0025
"	189.85	0.0000	0.0000	0.0067
"	189.85	0.0000	0.0000	0.0109
M20	-327.21	0.0000	0.0000	0.0058
"	-327.21	0.0000	0.0000	0.0105
"	-327.21	0.0000	0.0000	0.0152
"	-327.21	0.0000	0.0000	0.0199
M21	61.6565	0.0000	0.0000	-0.0009

	61.6565	0.0000	0.0000	0.0013
	61.6565	0.0000	0.0000	0.0036
	61.6565	0.0000	0.0000	0.0058
M22	-1304.61	8.8928	-31.55	-0.0064
"	-1304.61	8.8928	-21.04	-0.0103
"	-1304.61	8.8928	-10.52	-0.0198
"	-1304.61	8.8928	0.0000	-0.0321
M23	-1192.56	0.0000	0.0000	0.0077
"	-1192.56	0.0000	0.0000	0.0087
"	-1192.56	0.0000	0.0000	0.0097
"	-1192.56	0.0000	0.0000	0.0107
M24	206.18	0.0000	0.0000	0.0094
"	206.18	0.0000	0.0000	0.0113
"	206.18	0.0000	0.0000	0.0131
"	206.18	0.0000	0.0000	0.0150
M25	23.5630	-0.0000	-0.0000	0.0177
"	23.5630	-0.0000	-0.0000	0.0190
"	23.5630	-0.0000	-0.0000	0.0202
"	23.5630	-0.0000	0.0000	0.0215
M26	-959.49	0.0000	0.0000	-0.0793
"	-959.49	0.0000	0.0000	-0.0650
"	-959.49	0.0000	0.0000	-0.0506
"	-959.49	0.0000	0.0000	-0.0362
M27	-986.93	0.0000	0.0000	-0.0337
"	-986.93	0.0000	0.0000	-0.0238
"	-986.93	0.0000	0.0000	-0.0138
"	-986.93	0.0000	0.0000	-0.0039
M28	1191.90	-0.0000	-0.0000	-0.0249
"	1191.90	-0.0000	-0.0000	-0.0176
"	1191.90	-0.0000	-0.0000	-0.0103
"	1191.90	-0.0000	0.0000	-0.0029
M29	539.72	1.2497	0.0000	-0.0282
"	539.72	1.2497	2.0805	-0.0413
"	539.72	1.2497	4.1610	-0.0534
"	539.72	1.2497	6.2415	-0.0632
M30	859.71	-1.2499	-0.0000	-0.0786
"	859.71	-1.2499	2.0805	-0.0749
"	859.71	-1.2499	4.1610	-0.0702
"	859.71	-1.2499	6.2415	-0.0633
M31	-448.33	0.0000	0.0000	0.0759
"	-448.33	0.0000	0.0000	0.0766
"	-448.33	0.0000	0.0000	0.0772
"	-448.33	0.0000	0.0000	0.0778
M32	-319.36	-0.0000	-0.0000	0.0626
"	-319.36	-0.0000	-0.0000	0.0681
"	-319.36	-0.0000	-0.0000	0.0737
"	-319.36	-0.0000	0.0000	<b>0.0793</b>
M33	-789.97	0.0000	0.0000	0.0318
"	-789.97	0.0000	0.0000	0.0430
"	-789.97	0.0000	0.0000	0.0542
"	-789.97	0.0000	0.0000	0.0654

### **BENDING & COMP: TRUSS 3 - MEMBER 16**

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	3.5 inches
Length	4.74 feet
Max Axial Comp. C	1264 lbs
Max Reaction, R	137 lbs
Max Moment, M	89 ft-lbs
Max LL Deflection	0.03 inches
Max TL Deflection	0.07 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	1.5 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 =	1.14
fc =	241 psi
Fce =	2069 psi
Fc* =	1869 psi
F'c =	1355 psi
fb =	349 psi
F'b = Fb* =	1887 psi
Shear D/C ratio	0.33 < 1.0, Member OK
Interaction equation:	
(fc/F'c)^2 +	
fb / (F'b(1-fc/Fce)) =	0.24 < 1.0, Member OK
Live Load defl ratio	0.13 < 1.0, Member OK
Total Load defl ratio	0.22 < 1.0, Member OK