

**CITY OF SACRAMENTO**

**1231 I Street, Sacramento, CA 95814**

**Permit No: 0112529**

**Insp Area: 2**

**Thos Bros: 336J3**

**Site Address: 9 EASTWIND CT SAC**

**Parcel No: 031-0700-030**

**Sub-Type: REM**

**Housing (Y/N): N**

**CONTRACTOR**

ZIMMERMAN ROOFING, INC  
3675 R STREET  
SACRAMENTO, CA 95816

**OWNER**

MASSEY HUBERT E  
9 EASTWIND CT  
SACRAMENTO CA 95831

**ARCHITECT**

**Nature of Work: REROOF, TEAR-OFF, RESHEET INSALL 34 SQ 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 557559 Date 10/9/01 Contractor Signature Billy Cory

**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 herby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

Date 10/9/01 Applicant/Agent Signature Billy Cory

**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:

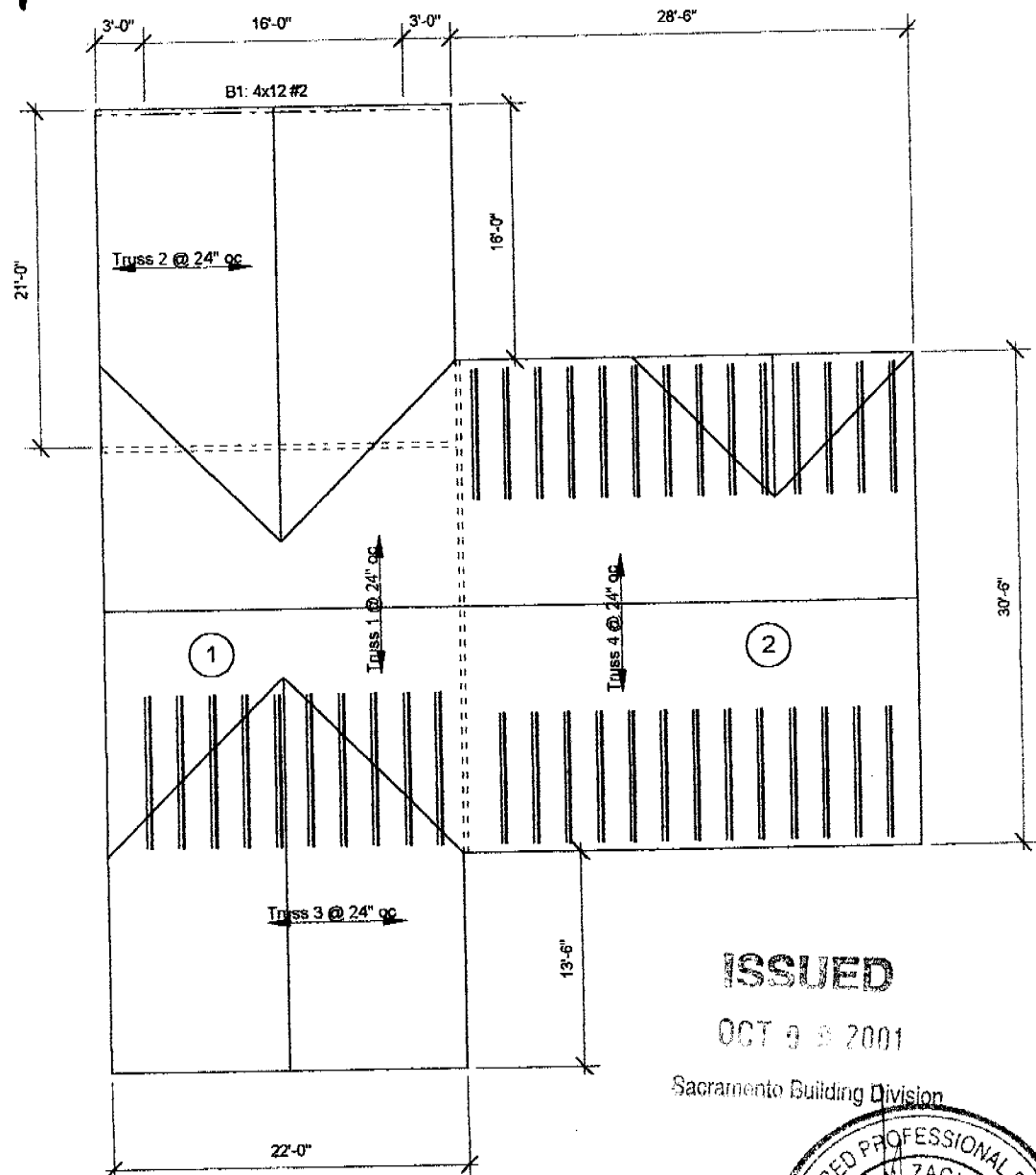
Carrier STATE FUND Policy Number 713-0002021 Exp.Date 10/01/2002

(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 10/9/01 Applicant Signature Billy Cory

**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.**

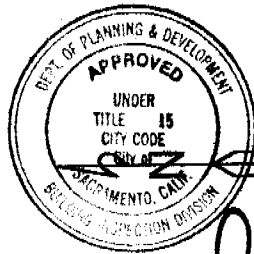
**THIS PERMIT SHALL EXPIRE BY LIMITATION IF WORK IS NOT COMMENCED WITHIN 180 DAYS.**



ISSUED

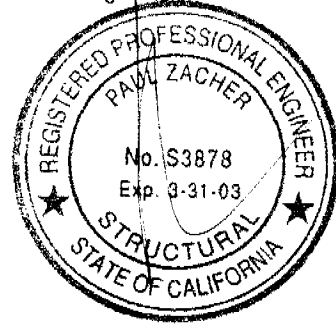
OCT 9 9 2001

Sacramento Building Division



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.



*Julial 10/4/01*

FRAMING NOTES:

1. Scab a 2x4 DF#2 x 11'-0" long rafter to the top chord of the existing truss #1 (total 10). See detail 2.
2. Scab a 2x4 DF#2 x 10'-0" long rafter to the top chord of the existing truss #1 (total 26). See detail 2.

Notes:

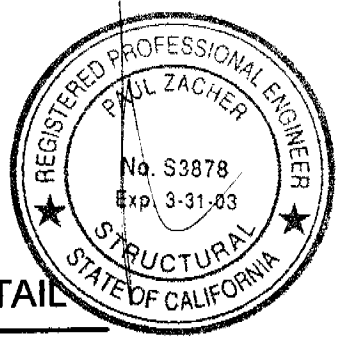
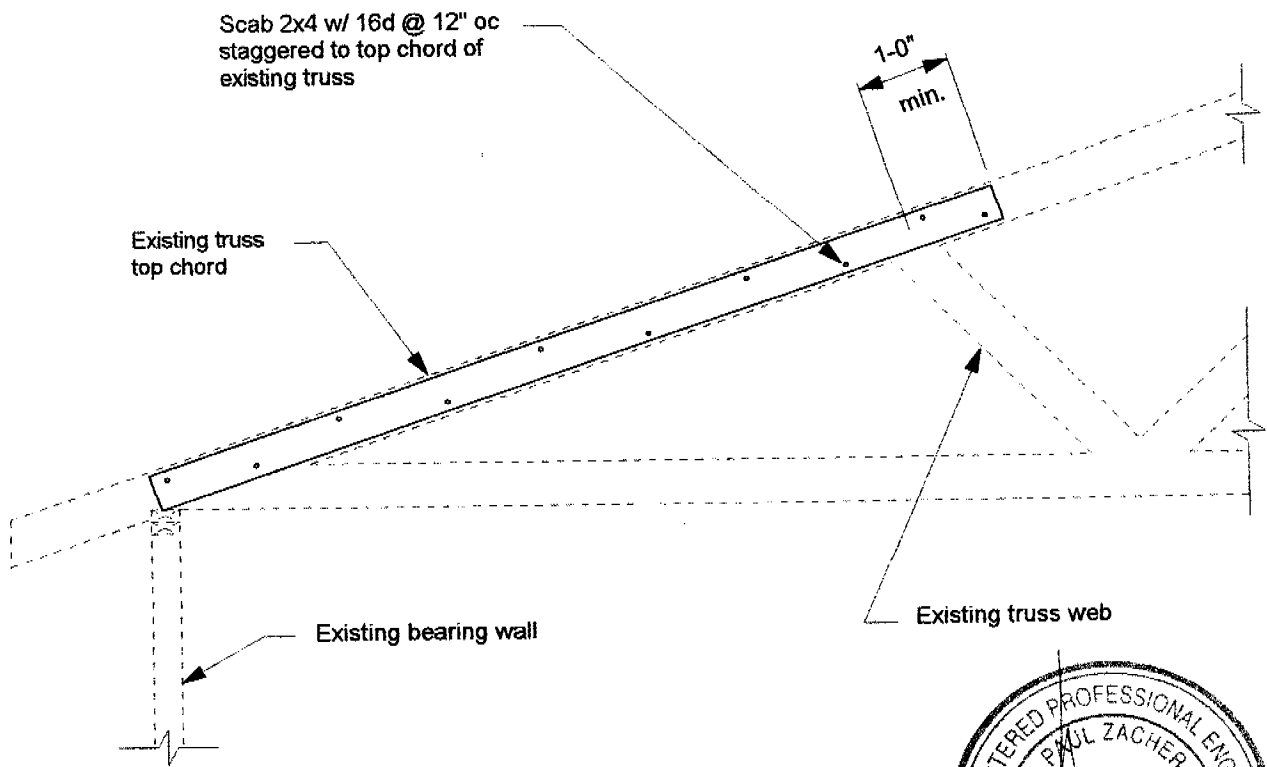
- A. This is a reroof project. The new roofing material shall be a Light Weight Concrete Tile. The tile shall weigh less than or equal to 7.0 psf.
- B. All structural wood members that were observed appear to be in sound condition and without structural defect.



ROOF PLAN - MASSEY

Not to Scale

24



2

TRUSS REINFORCEMENT DETAIL

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

25

Massey

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

TEL: 916.961.3960  
FAX: 916.961.6552

September 19, 2001

Zimmerman Roofing  
3675 R Street  
Sacramento, CA 95816  
TEL: (916) 454-3667  
FAX: (916) 392-6853

Attn.: Mr. Jeff Tucker,

re: Job 2001\_192: MASSEY

Subject: Structural Investigation Report of the Roof for the Residence located at 9 Eastwind Court, 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 September 19, 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:**

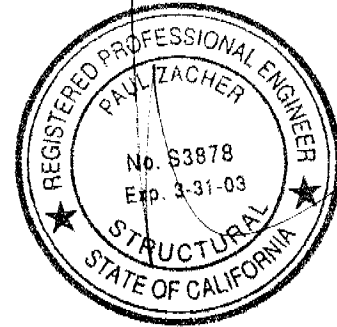
Type of Facility: Residence.  
Year Built: Estimated 1980's vintage.  
Occupancy: Residential.  
No. of Stories: One.  
Dimensions: Approximately 2000 square feet with a first story plate height of 8 feet.

**CONSTRUCTION:**

Roof:  
The roof covering will consist of a Light Weight Concrete Tile over 1/2" solid sheathing. The roof is framed with pre-engineered wood spaced at 24" on center.

**CONCLUSIONS:**

Roof:  
The roof structure currently lacks sufficient structural capacity for the applied live and dead loads. See "Recommendations" for location and repair to bring the roof structure up to the required capacity.



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**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.

**Roof Structure:**

1. Scab a 2x4 DF#2 x 11'-0" long rafter to the top chord of the existing truss. See details 1 and 2.
2. Scab a 2x4 DF#2 x 10'-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: 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 |                       | <u>0.64</u>   | psf |
|                    | Load                  | 10.5          | psf |
|                    | Roof Pitch Adjustment | <u>1.24</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 |      | 1.28          | psf |
| 1/2" Gypboard      |      | <u>2.50</u>   | 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 #: 01-192

Date: 9/19/01

LOADING

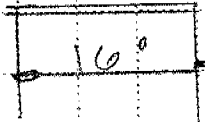
B1

OP = 16.1 pcf  $\times 4' = 64$  pcf

4 x 12 # 2

64/64

LP = 10.0  $\times 4' = 40$



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

Title :  
 Dsgnr:  
 Description :  
 Scope :

Job #  
 Date: 9:53PM, 19 SEP 01

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 BEAMS

**Timber Member Information** Calculations are designed to 1997 NDS and 1997 UBC Requirements

|                      |     |                      |
|----------------------|-----|----------------------|
| Timber Section       |     | B1                   |
| Beam Width           | in  | 4x12<br>3.500        |
| Beam Depth           | in  | 11.250               |
| Le: Unbraced Length  | ft  | 2.00                 |
| Timber Grade         |     | Douglas Fir - Larch, |
| Fb - Basic Allow     | psi | 875.0                |
| Fv - Basic Allow     | psi | 95.0                 |
| Elastic Modulus      | ksi | 1,600.0              |
| Load Duration Factor |     | 1.250                |
| Member Type          |     | Sawn                 |
| Repetitive Status    |     | No                   |

**Center Span Data**

|           |      |       |
|-----------|------|-------|
| Span      | ft   | 16.00 |
| Dead Load | #/ft | 64.00 |
| Live Load | #/ft | 64.00 |

**Results** Ratio = 0.5557

|                |      |            |
|----------------|------|------------|
| Mmax @ Center  | in-k | 49.15      |
| @ X =          | ft   | 8.00       |
| fb : Actual    | psi  | 665.8      |
| Fb : Allowable | psi  | 1,198.1    |
|                |      | Bending OK |
| fv : Actual    | psi  | 34.6       |
| Fv : Allowable | psi  | 118.8      |
|                |      | Shear OK   |

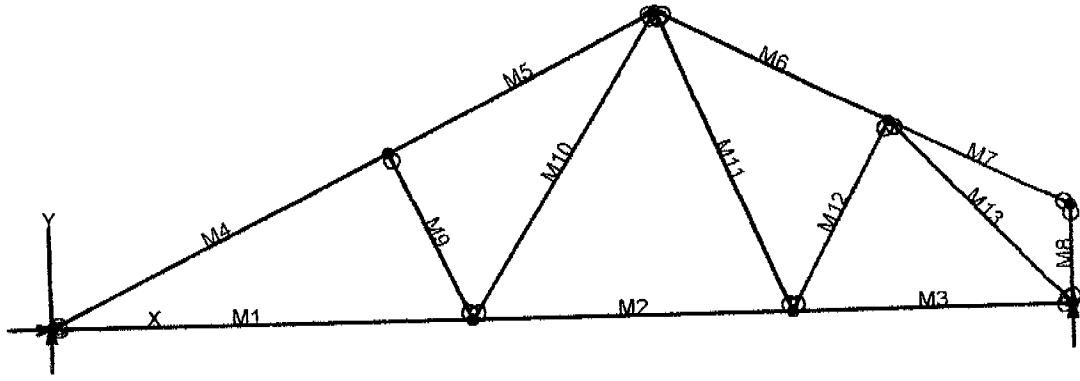
**Reactions**

|             |            |     |          |
|-------------|------------|-----|----------|
| @ Left End  | DL         | lbs | 512.00   |
|             | LL         | lbs | 512.00   |
|             | Max. DL+LL | lbs | 1,024.00 |
| @ Right End | DL         | lbs | 512.00   |
|             | LL         | lbs | 512.00   |
|             | Max. DL+LL | lbs | 1,024.00 |

**Deflections** Ratio OK

|                   |    |         |
|-------------------|----|---------|
| Center DL Defl    | in | -0.142  |
| L/Defl Ratio      |    | 1,351.9 |
| Center LL Defl    | in | -0.142  |
| L/Defl Ratio      |    | 1,351.9 |
| Center Total Defl | in | -0.284  |
| Location          | ft | 8.000   |
| L/Defl Ratio      |    | 675.9   |





6

# VisualAnalysis 3.50.c Report

09/19/01 21:25:32

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<br>ft | Y<br>ft | Fix | DX | Fix | DY | Fix | RZ |
|------|---------|---------|-----|----|-----|----|-----|----|
| N1   | 0.00    | 0.00    | Yes |    | Yes |    | No  |    |
| N2   | 10.50   | 0.00    | No  |    | No  |    | "   |    |
| N3   | 18.50   | 0.00    | "   |    | "   |    | "   |    |
| N4   | 25.50   | 0.00    | "   |    | Yes |    | "   |    |
| N5   | 8.50    | 4.25    | "   |    | No  |    | "   |    |
| N6   | 15.25   | 7.63    | "   |    | "   |    | "   |    |
| N7   | 21.00   | 4.75    | "   |    | "   |    | "   |    |
| N8   | 25.50   | 2.50    | "   |    | "   |    | "   |    |

## Member Elements

| Member | Section | Material | Length<br>ft |
|--------|---------|----------|--------------|
| M1     | SS2x4   | Wood     | 10.50        |
| M2     | "       | "        | 8.00         |
| M3     | "       | "        | 7.00         |
| M4     | "       | "        | 9.50         |
| M5     | "       | "        | 7.55         |
| M6     | "       | "        | 6.43         |
| M7     | "       | "        | 5.03         |
| M8     | "       | "        | 2.50         |
| M9     | "       | "        | 4.70         |
| M10    | "       | "        | 8.98         |
| M11    | "       | "        | 8.29         |
| M12    | "       | "        | 5.37         |
| M13    | "       | "        | 6.54         |

## Section Properties

| Category | Section | Ax<br>in <sup>2</sup> | Iz<br>in <sup>4</sup> | Sy+<br>in <sup>3</sup> | Sy-<br>in <sup>3</sup> |
|----------|---------|-----------------------|-----------------------|------------------------|------------------------|
| Wood Sha | SS2x4   | 5.25                  | 5.36                  | 3.06                   | 3.06                   |

## Material Properties

| Material | Strength<br>psi | Elasticity<br>psi | Poisson | Density<br>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<br>lbs | FY<br>lbs | MZ<br>lb-ft |
|------|-----------------|-----------|-----------|-------------|
| N1   | Equation Case 1 | -0.00     | 902.22    | -NA-        |
| N4   | "               | -NA-      | 902.22    | -NA-        |

## Member Results

| Member | Axial<br>lbs    | Vy<br>lbs      | Mz<br>lb-ft    | Dy<br>in       |
|--------|-----------------|----------------|----------------|----------------|
| M1     | 1308.19         | -52.62         | -78.41         | -0.0883        |
| "      | 1308.19         | -22.52         | 52.8133        | -0.1818        |
| "      | 1308.19         | 7.5824         | 78.9500        | -0.1724        |
| "      | <b>1308.19</b>  | 37.6824        | 0.0000         | -0.0000        |
| M2     | 723.63          | -29.15         | -36.42         | -0.0552        |
| "      | 723.63          | -6.2180        | 10.5855        | -0.0675        |
| "      | 723.63          | 16.7153        | -3.4109        | -0.0723        |
| "      | 723.63          | 39.6486        | -78.41         | -0.0883        |
| M3     | 741.84          | -24.90         | 0.0000         | -0.0000        |
| "      | 741.84          | -4.8304        | 34.5649        | -0.0459        |
| "      | 741.84          | 15.2363        | 22.4246        | -0.0602        |
| "      | 741.84          | 35.3030        | -36.42         | -0.0552        |
| M4     | <b>-1556.71</b> | 188.23         | 0.0000         | -0.0000        |
| "      | -1477.95        | 30.6975        | <b>345.51</b>  | <b>-0.5129</b> |
| "      | -1399.18        | -126.84        | 193.24         | -0.4474        |
| "      | -1320.41        | <b>-284.37</b> | <b>-456.82</b> | -0.0907        |
| M5     | -1333.09        | <b>248.18</b>  | -456.82        | -0.0907        |
| "      | -1270.54        | 123.08         | 9.3684         | -0.1217        |
| "      | -1207.99        | -2.0185        | 161.64         | -0.1715        |
| "      | -1145.44        | -127.12        | -0.0000        | -0.0586        |
| M6     | -931.01         | -191.77        | -205.19        | -0.0370        |
| "      | -877.72         | -85.20         | 90.9991        | -0.1275        |
| "      | -824.44         | 21.3659        | 159.39         | -0.1548        |
| "      | -771.16         | 127.93         | 0.0000         | -0.0599        |
| M7     | -42.16          | -84.32         | -0.0000        | 0.0102         |
| "      | -0.4583         | -0.9166        | 71.1206        | -0.0252        |
| "      | 41.2417         | 82.4834        | 2.7248         | -0.0288        |
| "      | 82.9417         | 165.88         | -205.19        | -0.0370        |
| M8     | -94.27          | 0.0000         | 0.0000         | 0.0234         |
| "      | -94.27          | 0.0000         | 0.0000         | 0.0267         |
| "      | -94.27          | 0.0000         | 0.0000         | 0.0300         |
| "      | -94.27          | 0.0000         | 0.0000         | <b>0.0332</b>  |
| M9     | -532.70         | 0.0000         | 0.0000         | -0.0209        |
| "      | -532.70         | 0.0000         | 0.0000         | -0.0193        |
| "      | -532.70         | 0.0000         | 0.0000         | -0.0178        |
| "      | -532.70         | 0.0000         | 0.0000         | -0.0162        |
| M10    | 676.58          | 0.0000         | 0.0000         | -0.0624        |
| "      | 676.58          | 0.0000         | 0.0000         | -0.0529        |
| "      | 676.58          | 0.0000         | 0.0000         | -0.0433        |
| "      | 676.58          | 0.0000         | 0.0000         | -0.0338        |
| M11    | 59.5054         | 0.0000         | 0.0000         | -0.0273        |
| "      | 59.5054         | 0.0000         | 0.0000         | -0.0174        |
| "      | 59.5054         | 0.0000         | 0.0000         | -0.0074        |
| "      | 59.5054         | 0.0000         | 0.0000         | 0.0025         |

|     |          |         |         |         |
|-----|----------|---------|---------|---------|
| M12 | 10.9772  | -0.0000 | 0.0000  | -0.0489 |
| "   | 10.9772  | -0.0000 | -0.0000 | -0.0399 |
| "   | 10.9772  | -0.0000 | -0.0000 | -0.0308 |
| "   | 10.9772  | -0.0000 | -0.0000 | -0.0217 |
| M13 | -1078.66 | -0.0000 | 0.0000  | -0.0276 |
| "   | -1078.66 | -0.0000 | -0.0000 | -0.0103 |
| "   | -1078.66 | -0.0000 | -0.0000 | 0.0069  |
| "   | -1078.66 | -0.0000 | -0.0000 | 0.0241  |

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## BENDING & COMP: TRUSS 1 - MEMBER 4

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

### Grading:

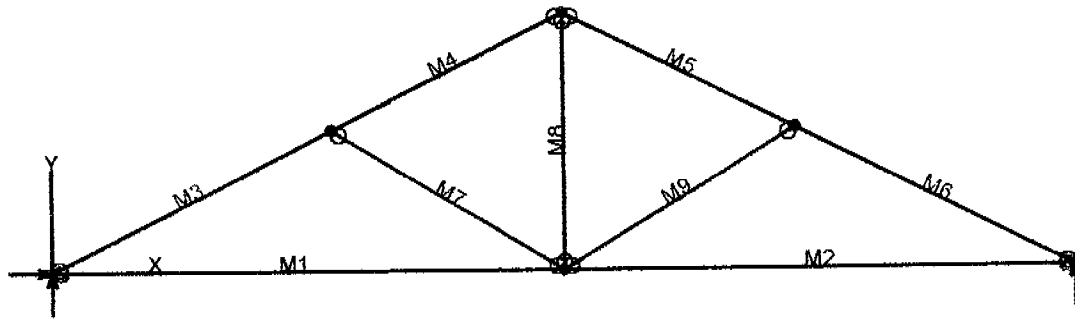
2x or 4x

Doug-fir 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                  | 9.5 feet                       |
| Max Axial Comp, C       | 1320 feet                      |
| Max Reaction, R         | 284 feet                       |
| Max Moment, M           | 456 feet                       |
| Max LL Deflection       | 0.04 feet                      |
| Max TL Deflection       | 0.09 feet                      |
| 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 =   | 1.26                           |
| fc =                    | 126 psi                        |
| Fce=                    | 606 psi                        |
| Fc*=                    | 2084 psi                       |
| F'c=                    | 564 psi                        |
| fb=                     | 893 psi                        |
| F*b=Fb*=                | 2156 psi                       |
| Shear D/C ratio         | 0.34 < 1.0, Member OK          |
| Interaction equation:   |                                |
| (fc/F'c)^2 +            |                                |
| fb/ (F*b(1-fc/Fce)) =   | 0.57 < 1.0, Member OK          |
| Live Load defl ratio    | 0.08 < 1.0, Member OK          |
| Total Load defl ratio   | 0.14 < 1.0, Member OK          |



# VisualAnalysis 3.50.c Report

09/19/01 21:27:45

Project: Truss 2

File: Untitled.Vap

Company: PK Associates Engineers

Engineer: Paul Zacher

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

## Nodes

| Node | X<br>ft | Y<br>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   | 6.00    | 3.00    | "   |    | No  |    | "   |    |
| N5   | 11.00   | 5.50    | "   |    | "   |    | "   |    |
| N6   | 16.00   | 3.00    | "   |    | "   |    | "   |    |

## Member Elements

| Member | Section | Material | Length<br>ft |
|--------|---------|----------|--------------|
| M1     | SS2x4   | Wood     | 11.00        |
| M2     | "       | "        | 11.00        |
| M3     | "       | "        | 6.71         |
| M4     | "       | "        | 5.59         |
| M5     | "       | "        | 5.59         |
| M6     | "       | "        | 6.71         |
| M7     | "       | "        | 5.83         |
| M8     | "       | "        | 5.50         |
| M9     | "       | "        | 5.83         |

## Section Properties

| Category | Section | Ax<br>in <sup>2</sup> | Iz<br>in <sup>4</sup> | Sy+<br>in <sup>3</sup> | Sy-<br>in <sup>3</sup> |
|----------|---------|-----------------------|-----------------------|------------------------|------------------------|
| Wood Sha | SS2x4   | 5.25                  | 5.36                  | 3.06                   | 3.06                   |

## Material Properties

| Material | Strength<br>psi | Elasticity<br>psi | Poisson | Density<br>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<br>lbs | FY<br>lbs | MZ<br>lb-ft |
|------|-----------------|-----------|-----------|-------------|
| N1   | Equation Case 1 | 0.00      | 778.39    | -NA-        |
| N3   | "               | -NA-      | 778.39    | -NA-        |

## Member Results

| Member | Axial<br>lbs    | Vy<br>lbs      | Mz<br>lb-ft    | Dy<br>in       |
|--------|-----------------|----------------|----------------|----------------|
| M1     | 1185.98         | -58.16         | -119.47        | -0.0811        |
| "      | 1185.98         | -26.63         | 35.6875        | -0.1549        |
| "      | 1185.98         | 4.9059         | 75.5103        | <b>-0.1615</b> |
| "      | <b>1185.98</b>  | 36.4392        | 0.0000         | -0.0000        |
| M2     | 1185.98         | -36.44         | -0.0000        | -0.0000        |
| "      | 1185.98         | -4.9059        | 75.5103        | -0.1615        |
| "      | 1185.98         | 26.6274        | 35.6875        | -0.1549        |
| "      | 1185.98         | 58.1608        | -119.47        | -0.0811        |
| M3     | <b>-1392.59</b> | 133.23         | 0.0000         | -0.0000        |
| "      | -1336.99        | 22.0326        | <b>172.97</b>  | -0.1472        |
| "      | -1281.39        | -89.17         | 97.9113        | -0.1500        |
| "      | -1225.79        | <b>-200.37</b> | <b>-225.18</b> | -0.0790        |
| M4     | -984.19         | 179.28         | -225.18        | -0.0790        |
| "      | -937.86         | 86.6142        | 22.1246        | -0.1000        |
| "      | -891.53         | -6.0525        | 97.1835        | -0.1156        |
| "      | -845.19         | -98.72         | -0.0000        | -0.0766        |
| M5     | -984.19         | -179.28        | -225.18        | -0.0633        |
| "      | -937.86         | -86.61         | 22.1246        | -0.0844        |
| "      | -891.53         | 6.0525         | 97.1835        | -0.0999        |
| "      | -845.19         | 98.7191        | 0.0000         | -0.0609        |
| M6     | -1392.59        | -133.23        | 0.0000         | <b>0.0157</b>  |
| "      | -1336.99        | -22.03         | 172.97         | -0.1315        |
| "      | -1281.39        | 89.1674        | 97.9113        | -0.1343        |
| "      | -1225.79        | <b>200.37</b>  | <b>-225.18</b> | -0.0633        |
| M7     | -450.00         | -0.0000        | -0.0000        | -0.0606        |
| "      | -450.00         | -0.0000        | -0.0000        | -0.0578        |
| "      | -450.00         | -0.0000        | -0.0000        | -0.0551        |
| "      | -450.00         | -0.0000        | 0.0000         | -0.0524        |
| M8     | 579.37          | 0.0000         | 0.0000         | -0.0175        |
| "      | 579.37          | 0.0000         | 0.0000         | -0.0175        |
| "      | 579.37          | 0.0000         | 0.0000         | -0.0175        |
| "      | 579.37          | 0.0000         | 0.0000         | -0.0175        |
| M9     | -450.00         | 0.0000         | 0.0000         | -0.0786        |
| "      | -450.00         | 0.0000         | 0.0000         | -0.0759        |
| "      | -450.00         | 0.0000         | 0.0000         | -0.0732        |
| "      | -450.00         | 0.0000         | 0.0000         | -0.0704        |



### BENDING & COMP: TRUSS 2 - MEMBER 3

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

#### Grading:

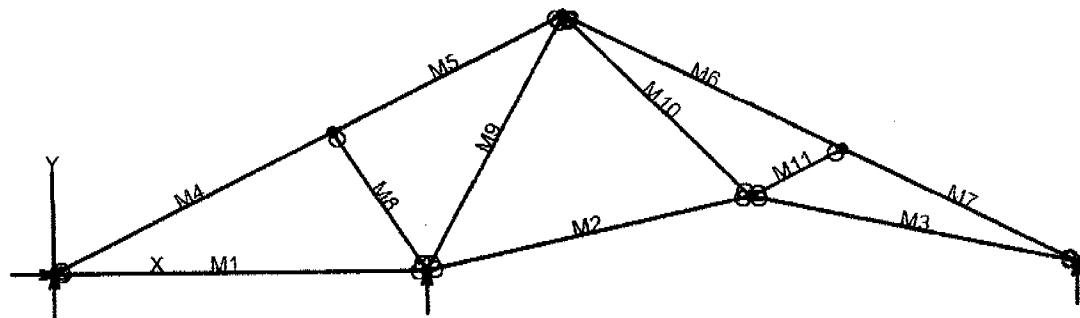
2x or 4x

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                  | 6.71 feet                      |
| Max Axial Comp, C       | 1225 feet                      |
| Max Reaction, R         | 200 feet                       |
| Max Moment, M           | 225 feet                       |
| Max LL Deflection       | 0.03 feet                      |
| Max TL Deflection       | 0.07 feet                      |
| 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 =   | 1.18                           |
| fc =                    | 233 psi                        |
| Fce =                   | 1142 psi                       |
| Fc* =                   | 2084 psi                       |
| F'c =                   | 972 psi                        |
| fb =                    | 882 psi                        |
| F'b = Fb* =             | 2156 psi                       |
| Shear D/C ratio         | 0.48 < 1.0, Member OK          |
| Interaction equation:   |                                |
| (fc/F'c)^2 +            |                                |
| fb / (F'b(1-fc/Fce)) =  | 0.57 < 1.0, Member OK          |
| Live Load defl ratio    | 0.09 < 1.0, Member OK          |
| Total Load defl ratio   | 0.16 < 1.0, Member OK          |



# VisualAnalysis 3.50.c Report

09/19/01 21:30:20

Project: Truss 3

File: Untitled.Vap

Company: PK Associates Engineers

Engineer: Paul Zacher

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

## Nodes

| Node | X<br>ft | Y<br>ft | Fix | DX | Fix | DY | Fix | RZ |
|------|---------|---------|-----|----|-----|----|-----|----|
| N1   | 0.00    | 0.00    | Yes |    | Yes |    | No  |    |
| N2   | 8.00    | 0.00    | No  |    | "   |    | "   |    |
| N3   | 15.00   | 1.50    | "   |    | No  |    | "   |    |
| N4   | 22.00   | 0.00    | "   |    | Yes |    | "   |    |
| N5   | 6.00    | 3.00    | "   |    | No  |    | "   |    |
| N6   | 11.00   | 5.50    | "   |    | "   |    | "   |    |
| N7   | 17.00   | 2.50    | "   |    | "   |    | "   |    |

## Member Elements

| Member | Section | Material | Length<br>ft |
|--------|---------|----------|--------------|
| M1     | SS2x4   | Wood     | 8.00         |
| M2     | "       | "        | 7.16         |
| M3     | "       | "        | 7.16         |
| M4     | "       | "        | 6.71         |
| M5     | "       | "        | 5.59         |
| M6     | "       | "        | 6.71         |
| M7     | "       | "        | 5.59         |
| M8     | "       | "        | 3.61         |
| M9     | "       | "        | 6.26         |
| M10    | "       | "        | 5.66         |
| M11    | "       | "        | 2.24         |

## Section Properties

| Category | Section | Ax<br>in <sup>2</sup> | Iz<br>in <sup>4</sup> | Sy+<br>in <sup>3</sup> | Sy-<br>in <sup>3</sup> |
|----------|---------|-----------------------|-----------------------|------------------------|------------------------|
| Wood Sha | SS2x4   | 5.25                  | 5.36                  | 3.06                   | 3.06                   |

## Material Properties

| Material | Strength<br>psi | Elasticity<br>psi | Poisson | Density<br>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<br>lbs | FY<br>lbs | MZ<br>lb-ft |
|------|-----------------|-----------|-----------|-------------|
| N1   | Equation Case 1 | -0.00     | 12.12     | -NA-        |
| N2   | "               | -NA-      | 1205.51   | -NA-        |
| N4   | "               | -NA-      | 341.89    | -NA-        |

## Member Results

| Member | Axial<br>lbs   | Vy<br>lbs      | Mz<br>lb-ft    | Dy<br>in       |
|--------|----------------|----------------|----------------|----------------|
| M1     | -335.04        | -34.40         | 0.0000         | -0.0000        |
| "      | -335.04        | -11.47         | 61.0027        | -0.0754        |
| "      | -335.04        | 11.4667        | 61.0027        | -0.0754        |
| "      | -335.04        | 34.4000        | 0.0000         | -0.0000        |
| M2     | -129.62        | 30.1000        | 0.0000         | 0.0008         |
| "      | -125.32        | 10.0333        | 47.7654        | -0.0610        |
| "      | -121.02        | -10.03         | 47.7654        | -0.0754        |
| "      | -116.72        | -30.10         | -0.0000        | -0.0426        |
| M3     | 711.47         | -30.10         | -0.0000        | 0.0043         |
| "      | 715.77         | -10.03         | 47.7654        | -0.0580        |
| "      | 720.07         | 10.0333        | 47.7654        | -0.0730        |
| "      | <b>724.37</b>  | 30.1000        | 0.0000         | -0.0408        |
| M4     | 309.63         | 129.90         | 0.0000         | -0.0000        |
| "      | 365.23         | 18.7031        | 165.53         | -0.1113        |
| "      | 420.83         | -92.50         | 83.0211        | -0.0852        |
| "      | 476.43         | <b>-203.70</b> | <b>-247.51</b> | 0.0006         |
| M5     | 524.80         | <b>183.28</b>  | -247.51        | 0.0006         |
| "      | 571.13         | 90.6096        | 7.2345         | -0.0226        |
| "      | 617.47         | -2.0570        | 89.7385        | -0.0500        |
| "      | 663.80         | -94.72         | -0.0000        | -0.0278        |
| M6     | -410.74        | -200.24        | -224.35        | -0.0389        |
| "      | -355.14        | -89.04         | 98.4644        | -0.1271        |
| "      | -299.54        | 22.1563        | <b>173.25</b>  | <b>-0.1410</b> |
| "      | -243.94        | 133.36         | 0.0000         | -0.0103        |
| M7     | -834.27        | -98.87         | -0.0000        | <b>0.0092</b>  |
| "      | -787.94        | -6.2009        | 97.4601        | -0.0453        |
| "      | -741.61        | 86.4658        | 22.6777        | -0.0450        |
| "      | -695.27        | 179.13         | -224.35        | -0.0389        |
| M8     | -389.98        | -0.0000        | -0.0000        | -0.0030        |
| "      | -389.98        | -0.0000        | -0.0000        | -0.0008        |
| "      | -389.98        | -0.0000        | -0.0000        | 0.0014         |
| "      | -389.98        | -0.0000        | 0.0000         | 0.0036         |
| M9     | -899.91        | 0.0000         | 0.0000         | -0.0274        |
| "      | -899.91        | 0.0000         | 0.0000         | -0.0172        |
| "      | -899.91        | 0.0000         | 0.0000         | -0.0070        |
| "      | <b>-899.91</b> | 0.0000         | 0.0000         | 0.0032         |
| M10    | 563.23         | 0.0000         | 0.0000         | -0.0271        |
| "      | 563.23         | 0.0000         | 0.0000         | -0.0185        |
| "      | 563.23         | 0.0000         | 0.0000         | -0.0098        |
| "      | 563.23         | 0.0000         | 0.0000         | -0.0012        |
| M11    | -474.22        | 0.0000         | 0.0000         | -0.0426        |
| "      | -474.22        | 0.0000         | 0.0000         | -0.0418        |
| "      | -474.22        | 0.0000         | 0.0000         | -0.0409        |
| "      | -474.22        | 0.0000         | 0.0000         | -0.0401        |

**BENDING & COMP: TRUSS 3 - MEMBER 7**

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

Grading:

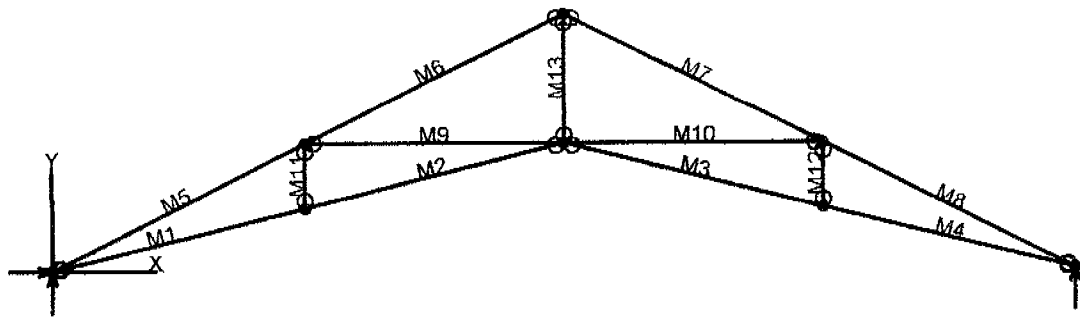
2x or 4x

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                | 1.5 inches                     |
| Depth, d                | 3.5 inches                     |
| Length                  | 5.59 feet                      |
| Max Axial Comp, C       | 695 feet                       |
| Max Reaction, R         | 179 feet                       |
| Max Moment, M           | 224 feet                       |
| Max LL Deflection       | 0.01 feet                      |
| Max TL Deflection       | 0.03 feet                      |
| 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 =   | 1.15                           |
| fc =                    | 132 psi                        |
| Fce=                    | 1602 psi                       |
| Fc*=                    | 2084 psi                       |
| F'c=                    | 1239 psi                       |
| fb=                     | 878 psi                        |
| F'b=Fb*=                | 2156 psi                       |
| Shear D/C ratio         | 0.43 < 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    | 0.04 < 1.0, Member OK          |
| Total Load defl ratio   | 0.08 < 1.0, Member OK          |



# VisualAnalysis 3.50.c Report

09/19/01 21:34:34

Project: Truss 4

File: C:\Program Files\IES\VA35\truss 4.vap

Company: PK Associates Engineers

Engineer: Paul Zacher

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

## Nodes

| Node | X<br>ft | Y<br>ft | Fix | DX | Fix | DY | Fix | RZ |
|------|---------|---------|-----|----|-----|----|-----|----|
| N1   | 0.00    | 0.00    | Yes |    | Yes |    | No  |    |
| N2   | 7.50    | 1.84    | No  |    | No  |    | "   |    |
| N3   | 23.00   | 1.84    | "   |    | "   |    | "   |    |
| N4   | 7.50    | 3.75    | "   |    | "   |    | "   |    |
| N5   | 15.25   | 3.75    | "   |    | "   |    | "   |    |
| N6   | 23.00   | 3.75    | "   |    | "   |    | "   |    |
| N7   | 15.25   | 7.63    | "   |    | "   |    | "   |    |
| N8   | 30.50   | 0.00    | "   |    | Yes |    | "   |    |

## Member Elements

| Member | Section | Material | Length<br>ft |
|--------|---------|----------|--------------|
| M1     | SS2x4   | Wood     | 7.72         |
| M2     | "       | "        | 7.98         |
| M3     | "       | "        | 7.98         |
| M4     | "       | "        | 7.72         |
| M5     | "       | "        | 8.39         |
| M6     | "       | "        | 8.66         |
| M7     | "       | "        | 8.66         |
| M8     | "       | "        | 8.39         |
| M9     | "       | "        | 7.75         |
| M10    | "       | "        | 7.75         |
| M11    | "       | "        | 1.91         |
| M12    | "       | "        | 1.91         |
| M13    | "       | "        | 3.88         |

## Section Properties

| Category | Section | Ax<br>in <sup>2</sup> | Iz<br>in <sup>4</sup> | Sy+<br>in <sup>3</sup> | Sy-<br>in <sup>3</sup> |
|----------|---------|-----------------------|-----------------------|------------------------|------------------------|
| Wood Sha | SS2x4   | 5.25                  | 5.36                  | 3.06                   | 3.06                   |

## Material Properties

| Material | Strength<br>psi | Elasticity<br>psi | Poisson | Density<br>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<br>lbs | FY<br>lbs | MZ<br>lb-ft |
|------|-----------------|-----------|-----------|-------------|
| N1   | Equation Case 1 | -0.00     | 1083.04   | -NA-        |
| N8   | "               | -NA-      | 1083.04   | -NA-        |

## Member Results

| Member | Axial<br>lbs    | Vy<br>lbs      | Mz<br>lb-ft    | Dy<br>in       |
|--------|-----------------|----------------|----------------|----------------|
| M1     | 3497.35         | 33.2833        | 0.0000         | -0.0000        |
| "      | 3502.62         | 11.7833        | 57.8654        | -0.2710        |
| "      | 3507.90         | -9.7167        | 60.5252        | -0.4750        |
| "      | 3513.17         | -31.22         | 7.9794         | -0.6088        |
| M2     | 3498.45         | 32.3253        | 7.9794         | -0.6088        |
| "      | 3503.93         | 10.1086        | 64.2822        | -0.7058        |
| "      | 3509.41         | -12.11         | 61.6224        | -0.7232        |
| "      | <b>3514.88</b>  | -34.32         | 0.0000         | -0.6644        |
| M3     | 3498.45         | -32.33         | 7.9794         | -0.4987        |
| "      | 3503.93         | -10.11         | 64.2822        | -0.5957        |
| "      | 3509.41         | 12.1080        | 61.6224        | -0.6130        |
| "      | 3514.88         | 34.3247        | 0.0000         | -0.5542        |
| M4     | 3497.35         | -33.28         | -0.0000        | 0.1097         |
| "      | 3502.62         | -11.78         | 57.8654        | -0.1613        |
| "      | 3507.90         | 9.7167         | 60.5252        | -0.3653        |
| "      | 3513.17         | 31.2167        | 7.9794         | -0.4991        |
| M5     | <b>-3887.68</b> | 162.55         | 0.0000         | -0.0000        |
| "      | -3818.18        | 23.5549        | 259.12         | -0.4830        |
| "      | -3748.68        | -115.45        | 130.70         | -0.6301        |
| "      | -3679.18        | -254.45        | <b>-385.26</b> | -0.6299        |
| M6     | -2509.24        | <b>259.91</b>  | -385.26        | -0.6299        |
| "      | -2437.42        | 116.28         | 156.97         | -0.9011        |
| "      | -2365.61        | -27.35         | <b>285.39</b>  | <b>-0.9771</b> |
| "      | -2293.79        | -170.99        | 0.0000         | -0.6561        |
| M7     | -2509.24        | <b>-259.91</b> | -385.26        | -0.4239        |
| "      | -2437.42        | -116.28        | 156.97         | -0.6952        |
| "      | -2365.61        | 27.3536        | 285.39         | -0.7711        |
| "      | -2293.79        | 170.99         | 0.0000         | -0.4502        |
| M8     | -3887.68        | -162.55        | -0.0000        | 0.2059         |
| "      | -3818.18        | -23.55         | 259.12         | -0.2772        |
| "      | -3748.68        | 115.45         | 130.70         | -0.4241        |
| "      | -3679.18        | 254.45         | -385.26        | -0.4239        |
| M9     | -1276.46        | 1.5309         | 0.0000         | -0.5824        |
| "      | -1276.46        | 1.5309         | 3.9548         | -0.6041        |
| "      | -1276.46        | 1.5309         | 7.9095         | -0.6207        |
| "      | -1276.46        | 1.5309         | 11.8643        | -0.6275        |
| M10    | -1276.46        | -1.5309        | 0.0000         | -0.5824        |
| "      | -1276.46        | -1.5309        | 3.9548         | -0.6041        |
| "      | -1276.46        | -1.5309        | 7.9095         | -0.6207        |
| "      | -1276.46        | -1.5309        | 11.8643        | -0.6275        |
| M11    | 61.6277         | 0.0000         | 0.0000         | 0.1804         |
| "      | 61.6277         | 0.0000         | 0.0000         | 0.2014         |
| "      | 61.6277         | 0.0000         | 0.0000         | 0.2225         |
| "      | 61.6277         | 0.0000         | 0.0000         | 0.2435         |



|     |         |         |         |               |
|-----|---------|---------|---------|---------------|
| M12 | 61.6277 | -0.0000 | 0.0000  | 0.2169        |
| "   | 61.6277 | -0.0000 | -0.0000 | 0.2380        |
| "   | 61.6277 | -0.0000 | -0.0000 | 0.2590        |
| "   | 61.6277 | -0.0000 | -0.0000 | <b>0.2801</b> |
| M13 | 1745.76 | 0.0000  | 0.0000  | 0.2302        |
| "   | 1745.76 | 0.0000  | 0.0000  | 0.2302        |
| "   | 1745.76 | 0.0000  | 0.0000  | 0.2302        |
| "   | 1745.76 | 0.0000  | 0.0000  | 0.2302        |

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### BENDING & COMP: TRUSS 4 - 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                  | 8.39 feet                      |
| Max Axial Comp, C       | 3679 feet                      |
| Max Reaction, R         | 254 feet                       |
| Max Moment, M           | 385 feet                       |
| Max LL Deflection       | 0.24 feet                      |
| Max TL Deflection       | 0.48 feet                      |
| 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 =                    | 350 psi                        |
| Fce =                   | 759 psi                        |
| Fc* =                   | 2084 psi                       |
| F'c =                   | 690 psi                        |
| fb =                    | 754 psi                        |
| F'b = Fb* =             | 2156 psi                       |
| Shear D/C ratio         | 0.31 < 1.0, Member OK          |
| Interaction equation:   |                                |
| (fc/F'c)^2 +            |                                |
| fb / (F'b(1-fc/Fce)) =  | 0.91 < 1.0, Member OK          |
| Live Load defl ratio    | 0.57 < 1.0, Member OK          |
| Total Load defl ratio   | 0.86 < 1.0, Member OK          |