CITY OF SACRAMENTO

1231 I Street, Sacramento, CA 95814

Permit No: 0602845
Insp Area: 2
Thos Bros: 336G3

Site Address: 395 COUNTRY RIVER WY SAC
Parcel No: 031-1020-019

PAID
CITY OF SACRAMENTO
MAR 02 2006
NEIGHBORHOODS PLANNING AND DEVELOPMENT SERVICES

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

CONTRACTOR
MONARCH ROOFING INC
8262 ALPINE AVE SUITE A
SACRAMENTO, CA 95826

OWNER
LEDESMA JAMES/LENNA A
395 COUNTRY RIVER WY
SACRAMENTO, CA 95831

ARCHITECT

Nature of Work: REROOF - T/O; RESHEET; INSTALL METAL BATTEN SYSTEM; INSTALL 23SQ EAGLELITE TILE ON 2-STORY SFD

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'sAddress_____

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 C39 License Number 806787 Date 3-2-06 Contractor 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 herby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

Date 3-2-06 Applicant/Agent 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 AMERICAN HOME ASSURANCE Policy Number 005-00016796 Exp Date 04/30/2006

_____ (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, Ishall 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 3-2-06 Applicant 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.

Ledesma #0602845 395 COUNTRY RIVER

PZSE, Inc. – Structural Engineers
4701 Lakeside Way
Fair Oaks, CA 95628

TEL: (916) 961-3960
FAX: (916) 961-6552
e-mail: paul@pzse.com

PZSE, Inc. - Structural Engineers - San Diego

February 22, 2006

CITY COPY

REGISTERED PROFESSIONAL ENGINEER
PAUL KENNETH ZACHER
No. S3878
Exp. 3-31-07
STRUCTURAL
STATE OF CALIFORNIA

Monarch Roofing
8262 Alpine Avenue, Suite A
Sacramento, CA 95826
TEL: (916) 978-3182
FAX: (916) 456-1703

Attn.: Mr. Neal Weber,

re: Job 2006019: LEDESMA

Subject: Structural Investigation Report of the Roof for the Residence located at 395 Country River Way, Sacramento, CA 95831.

As requested by Mr. Neal Weber, this is a report to determine what needs should be addressed to correct any structural deficiencies of the roof. Paul Zacher visited the site January 31, 2006. 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 with 2001 CBC Title 24 Amendments.

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

DEPT OF PLANNING AND DEVELOPMENT
APPROVED
UNDER TITLE 8 S16 CITY CODE CITY OF SACRAMENTO, CALIF.
BUILDING INSPECTION 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.

3-3-06

DESCRIPTION:

Type of Facility:	Residence.
Year Built:	Estimated 1980's vintage.
Occupancy:	Residential.
No. of Stories:	Two.
Dimensions:	Approximately 3000 square feet.

CONSTRUCTION:

Roof:

The roof covering will consist of a Light Weight Concrete Tile over a batten system. The roof structure is framed with pre-engineered wood trusses spaced at 24" on center. One area had no access and was not inspected.

CONCLUSIONS:

Roof:

The roof structure has sufficient structural capacity for the applied live and dead loads. No conclusion is drawn for the area that is inaccessible and not inspected.

PZSE, Inc. – Structural Engineers
4701 Lakeside Way
Fair Oaks, CA 95628

TEL: (916) 961-3960
FAX: (916) 961-6552
e-mail: paul@pzse.com

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. After the roofing material has been removed, the contractor shall verify that the framing in the inaccessible portion of the structure does not exceed the following:
   Vaulted Ceiling Portion:
   c. 2x8 @ 24" oc - max span = 13'-9"
   If the framing differs from the above, the contractor shall supply the engineer with diagrams showing the member sizes and span lengths. The engineer shall then determine if the structure can adequately support the applied dead and live loads and a supplemental report shall be issued. See detail 1.

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, S.E.

DESIGN LOADING:

Roof Pitch	6	in 12
Pitch Adjustment Factor	1.12	

LOCATION: VAULT BATTEN SYSTEM

MATERIAL	WEIGHT	
Light Weight Tile	7.30	psf
Roofing felt	0.30	psf
Batten system	0.50	psf
1x4 skip sht'g	1.09	psf
2x8 rafters @ 24" oc	1.32	psf
Batt/blown insul	0.50	psf
1/2" Gypboard	2.50	psf
Load	13.5	psf
Roof Pitch Adjustment	1.60	psf
Total Load	15.1	psf

The dead and live load on truss top chord is placed along the length of the top chord. Therefore, the live load is as follows:

Live Load on top chord	14.3	psf

LOCATION: TOP CHORD BATTEN SYSTEM

MATERIAL	WEIGHT	
Light Weight Tile	7.30	psf
Roofing felt	0.30	psf
Batten system	0.50	psf
1x4 skip sht'g	1.09	psf
2x4 truss @ 24" oc	0.64	psf
Total Load	9.8	psf

LOCATION: BOTTOM CHORD BATTEN SYSTEM

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

PAUL ZACHER- STRUCTURAL ENGINEERS, INC.
Job #: 06_019
Date: 02/22/2006

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

LOADING:

Vault:

Dr = 15.1 psf x 2'-0" = 30.2 plf
Lr = 16.0 psf x 2'-0" = 32.0 plf

2x8 #2

30.2 / 32.0
13'-9"

B1:

Dr = 14.9 psf x 4'-0" = 60 plf
Lr = 16.0 psf x 4'-0" = 64 plf

4x12 #2

60 / 64
16'-0"

B2:

Dr = 15.1 psf x 10'-0" = 151 plf
Lr = 16.0 psf x 10'-0" = 160 plf

4x12 #1

151 / 160
12'-0"

PZSE, Inc

Structural Engineering

Title :
Dsgnr:
Description :

Scope :

Job #
Date: 5:54PM, 22 FEB 06

Timber Beam & Joist

Description RAFTERS AND BEAMS

Timber Member Information

Code Ref: 1997/2001 NDS, 2000/2003 IBC, 2003 NFPA 5000. Base allowables are user defined

		vault	B1	B2
Timber Section		2x8	4x12	4x12
Beam Width	in	1.500	3.500	3.500
Beam Depth	in	7.250	11.250	11.250
Le: Unbraced Length	ft	0.00	0.00	0.00
Timber Grade		Douglas Fir - Larch, No.2	Douglas Fir - Larch, No.2	Douglas Fir - Larch, No.1
Fb - Basic Allow	psi	875.0	875.0	1,000.0
Fv - Basic Allow	psi	95.0	95.0	95.0
Elastic Modulus	ksi	1,600.0	1,600.0	1,700.0
Load Duration Factor		1.250	1.250	1.250
Member Type		Sawn	Sawn	Sawn
Repetitive Status		Repetitive	No	No

Center Span Data

Span	ft	13.75	16.00	12.00
Dead Load	#/ft	30.20	60.00	151.00
Live Load	#/ft	32.00	64.00	160.00

Results

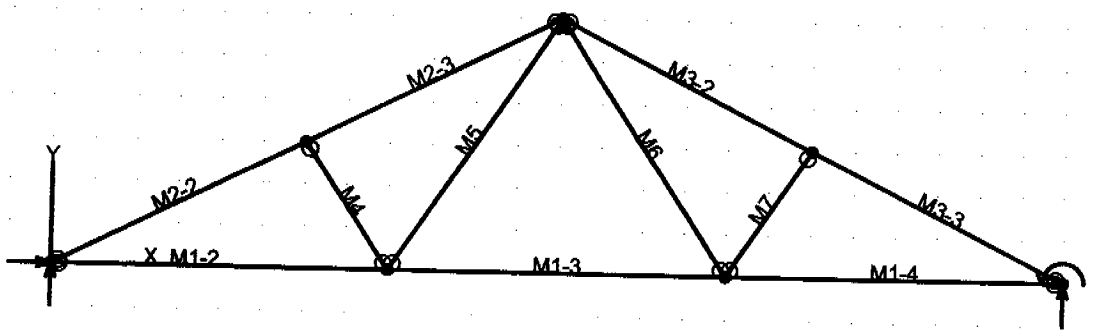
Ratio =		0.8894	0.5361	0.6617
Mmax @ Center	in-k	17.64	47.62	67.18
@ X =	ft	6.87	8.00	6.00
fb : Actual	psi	1,342.4	645.0	909.9
Fb : Allowable	psi	1,509.4	1,203.1	1,375.0
		Bending OK	Bending OK	Bending OK
fv : Actual	psi	54.3	33.6	60.3
Fv : Allowable	psi	118.8	118.8	118.8
		Shear OK	Shear OK	Shear OK

Reactions

@ Left End DL	lbs	207.62	480.00	906.00
LL	lbs	220.00	512.00	960.00
Max. DL+LL	lbs	427.62	992.00	1,866.00
@ Right End DL	lbs	207.62	480.00	906.00
LL	lbs	220.00	512.00	960.00
Max. DL+LL	lbs	427.62	992.00	1,866.00

Deflections

		Deflection OK	Deflection OK	Deflection OK
Center DL Defl	in	-0.319	-0.133	-0.100
L/Defl Ratio		517.8	1,442.0	1,443.1
Center LL Defl	in	-0.338	-0.142	-0.106
L/Defl Ratio		488.6	1,351.9	1,361.9
Center Total Defl	in	-0.656	-0.275	-0.206
Location	ft	6.875	8.000	6.000
L/Defl Ratio		251.4	697.7	700.6


Y
X
M1-2
M1-3
M1-4
M2-2
M2-3
M3-2
M3-3
M4
M5
M6
M7

Truss 1

VisualAnalysis 4.00 Report
Company: Paul Zacher - Structural Engineers Engineer: Paul Zacher
File: C:\Documents and Settings\Paul\Desktop\Ledesma06_019\Truss 1.vap

Nodes

Node	X ft	Y ft	Fix DX	Fix DY	Fix RZ
N1	0.00	0.00	Yes	Yes	No
N2	24.00	0.00	No	"	Yes
N3	12.00	6.00	"	No	No
N4	8.00	0.00	"	"	"
N5	16.00	0.00	"	"	"
N6	6.00	3.00	"	"	"
N7	18.00	3.00	"	"	"

Member Elements

Member	Section	Material	Length ft
M1-2	SS2x4	Wood	8.00
M1-3	"	"	8.00
M1-4	"	"	8.00
M2-2	"	"	6.71
M2-3	"	"	6.71
M3-2	"	"	6.71
M3-3	"	"	6.71
M4	"	"	3.61
M5	"	"	7.21
M6	"	"	7.21
M7	"	"	3.61

Section Properties

Category	Section	Ax in^2	Iz in^4	Sy+ in^3	Sy- in^3
Wood Sha	SS2x4	5.25	5.36	3.06	3.06

Material Properties

Material	Strength psi	Elasticity psi	Poisson	Density lb/ft^3
Wood	-NA-	1200000.00	0.36	40.47

Load Combination Summary

Equation Case: UBC97 12.8a
Combination: 1D+1Lr
Contributing Cases & Source
Dead Load (Dead loads)
Roof Live Load (Roof Live loads)

Nodal Reactions

7

Node	Load Case	FX	FY	MZ

		lb	lb	lb-ft
N1	UBC97 12.8a	0.00	681.60	-NA-
N2	"	-NA-	681.60	0.00

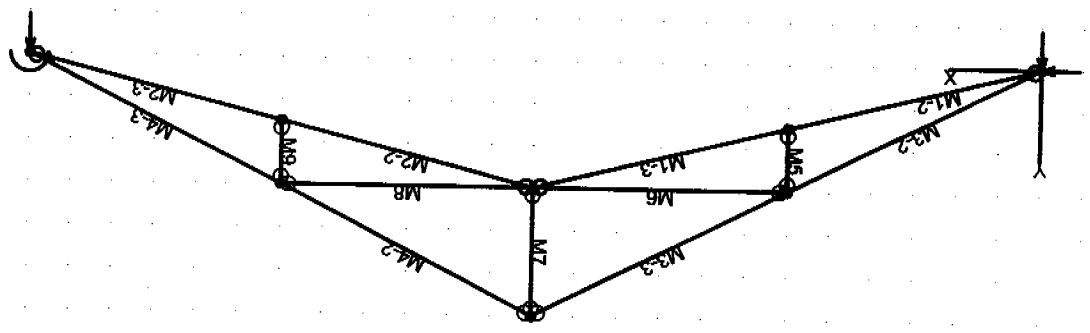
Member Results

Member	Fx lb	Vy lb	Mz lb-ft	Dx in	Dy in
M1-2	1084.93	-40.32	-47.34	0.02	-0.11
"	1084.93	-17.38	29.57	0.01	-0.13
"	1084.93	5.55	45.35	0.01	-0.10
"	**1084.93**	28.48	0.00	0.00	0.00
M1-3	678.02	-34.40	-47.34	0.03	-0.11
"	678.02	-11.47	13.79	0.02	-0.13
"	678.02	11.47	13.79	0.02	-0.13
"	678.02	34.40	-47.34	0.02	-0.11
M1-4	1084.93	-28.48	0.00	0.04	0.00
"	1084.93	-5.55	45.35	0.04	-0.10
"	1084.93	17.38	29.57	0.03	-0.13
"	1084.93	40.32	-47.34	0.03	-0.11
M2-2	**-1262.4**	98.97	0.00	0.00	0.00
"	-1219.3	12.75	**124.82**	-0.01	-0.15
"	-1176.2	-73.48	56.92	-0.01	-0.16
"	-1133.1	**-159.70**	**-203.70**	-0.02	-0.11
M2-3	-1093.2	**159.70**	-203.70	-0.02	-0.11
"	-1050.1	73.48	56.92	-0.02	-0.19
"	-1007.0	-12.75	124.82	-0.02	**-0.22**
"	-963.88	-98.97	0.00	-0.03	-0.11
M3-2	-1093.2	-159.70	-203.70	0.05	-0.09
"	-1050.1	-73.48	56.92	0.06	-0.17
"	-1007.0	12.75	124.82	0.06	-0.20
"	-963.88	98.97	0.00	0.07	-0.09
M3-3	-1262.4	-98.97	0.00	0.04	**0.02**
"	-1219.3	-12.75	124.82	0.04	-0.13
"	-1176.2	73.48	56.92	0.05	-0.14
"	-1133.1	159.70	-203.70	0.05	-0.09
M4	-321.88	0.00	0.00	0.10	-0.05
"	-321.88	0.00	0.00	0.10	-0.04
"	-321.88	0.00	0.00	0.10	-0.03
"	-321.88	0.00	0.00	0.10	-0.03
M5	411.68	0.00	0.00	-0.08	-0.08
"	411.68	0.00	0.00	-0.08	-0.08
"	411.68	0.00	0.00	-0.08	-0.08
"	411.68	0.00	0.00	**-0.08**	-0.07
M6	411.68	0.00	0.00	0.10	-0.04
"	411.68	0.00	0.00	0.10	-0.04
"	411.68	0.00	0.00	0.10	-0.04
"	411.68	0.00	0.00	**0.11**	-0.04
M7	-321.88	0.00	0.00	-0.08	-0.08
"	-321.88	0.00	0.00	-0.08	-0.08
"	-321.88	0.00	0.00	-0.08	-0.07
"	-321.88	0.00	0.00	-0.08	-0.06

BENDING & COMP: TRUSS 1 - MEMBER 2-2
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	1133	lbs
Max Reaction, R	159	lbs
Max Moment, M	203	ft-lbs
Max LL Deflection	0.06	inches
Max TL Deflection	0.11	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 =	1.18	
fc =	216	psi
Fce=	1142	psi
Fc*=	2084	psi
F'c=	972	psi
fb=	795	psi
F'b=Fb*=	2156	psi
Shear D/C ratio	0.38 < 1.0, Member OK	
Interaction equation: (fc/F'c)^2 + fb/ (F'b(1-fc/Fce)) =	0.50 < 1.0, Member OK	
Live Load defl ratio	0.18 < 1.0, Member OK	
Total Load defl ratio	0.25 < 1.0, Member OK	


M4-3
M2-3
M8
M2-2
M1-3
M6
M1-2
M2-1
M4-2
M3-3
M7
Y
X

Truss 2

VisualAnalysis 4.00 Report
Company: Paul Zacher - Structural Engineers Engineer: Paul Zacher
File: C:\Documents and Settings\Paul\Desktop\Ledesma06_019\Truss 2.vap

Nodes

Node	X *ft*	Y *ft*	Fix DX	Fix DY	Fix RZ
N1	24.00	0.00	No	Yes	Yes
N2	0.00	0.00	Yes	"	No
N3	12.00	6.00	No	No	"
N4	12.00	3.00	"	"	"
N5	6.00	1.50	"	"	"
N6	18.00	1.50	"	"	"
N7	6.00	3.00	"	"	"
N8	18.00	3.00	"	"	"

Member Elements

Member	Section	Material	Length *ft*
M1-2	SS2x4	Wood	6.18
M1-3	"	"	6.18
M2-2	"	"	6.18
M2-3	"	"	6.18
M3-2	"	"	6.71
M3-3	"	"	6.71
M4-2	"	"	6.71
M4-3	"	"	6.71
M5	"	"	1.50
M6	"	"	6.00
M7	"	"	3.00
M8	"	"	6.00
M9	"	"	1.50

Section Properties

Category	Section	Ax *in^2*	Iz *in^4*	Sy+ *in^3*	Sy- *in^3*
Wood	Sha SS2x4	5.25	5.36	3.06	3.06

Material Properties

Material	Strength *psi*	Elasticity *psi*	Poisson	Density *lb/ft^3*
Wood	-NA-	1200000.00	0.36	40.47

Load Combination Summary

Equation Case: UBC97 12.8a
Combination: 1D+1Lr
Contributing Cases & Source
Dead Load (Dead loads)
Roof Live Load (Roof Live loads)

Nodal Reactions

Node	Load Case	FX lb	FY lb	MZ lb-ft
N1	UBC97 12.8a	-NA-	**674.40**	**0.00**
N2	"	**0.00**	674.40	-NA-

Member Results

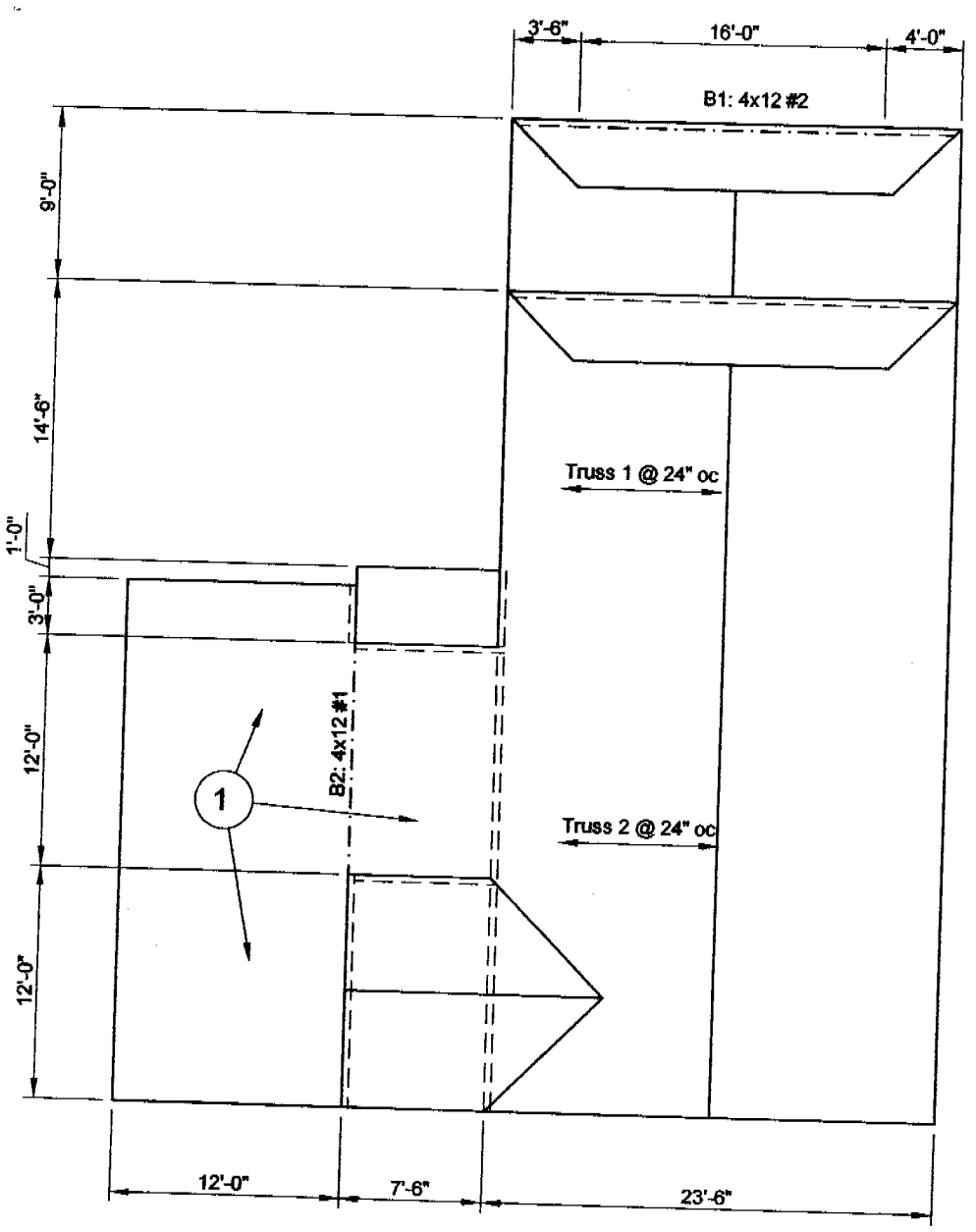
Member	Fx lb	Vy lb	Mz lb-ft	Dx in	Dy in
M1-2	2176.19	28.07	0.00	0.00	0.00
"	2180.36	11.38	40.65	0.01	-0.19
"	2184.53	-5.31	46.91	0.02	-0.34
"	2188.70	-21.99	18.79	0.03	-0.43
M1-3	2177.71	21.99	18.79	0.03	-0.43
"	2181.88	5.31	46.91	0.03	-0.49
"	2186.05	-11.38	40.65	0.04	-0.51
"	**2190.22**	-28.07	0.00	0.05	-0.47
M2-2	2177.71	-21.99	18.79	0.29	-0.35
"	2181.88	-5.31	46.91	0.29	-0.41
"	2186.05	11.38	40.65	0.28	-0.43
"	2190.22	28.07	0.00	0.27	-0.39
M2-3	2176.19	-28.07	0.00	0.32	0.08
"	2180.36	-11.38	40.65	0.31	-0.11
"	2184.53	5.31	46.91	0.30	-0.26
"	2188.70	21.99	18.79	0.29	-0.35
M3-2	**-2419.8**	103.72	0.00	0.00	0.00
"	-2377.3	18.57	**136.65**	-0.01	-0.29
"	-2334.7	-66.58	82.98	-0.02	-0.41
"	-2292.1	**-151.73**	**-161.01**	-0.03	-0.45
M3-3	-1583.8	**151.73**	-161.01	-0.03	-0.45
"	-1541.2	66.58	82.98	-0.04	-0.57
"	-1498.7	-18.57	136.65	-0.04	**-0.60**
"	-1456.1	-103.72	0.00	-0.05	-0.47
M4-2	-1583.8	-151.73	-161.01	0.32	-0.30
"	-1541.2	-66.58	82.98	0.33	-0.42
"	-1498.7	18.57	136.65	0.34	-0.45
"	-1456.1	103.72	0.00	0.34	-0.32
M4-3	-2419.8	-103.72	0.00	0.29	0.15
"	-2377.3	-18.57	136.65	0.30	-0.14
"	-2334.7	66.58	82.98	0.31	-0.27
"	-2292.1	151.73	-161.01	0.32	-0.30
M5	45.34	0.00	0.00	0.41	0.13
"	45.34	0.00	0.00	0.41	0.14
"	45.34	0.00	0.00	0.41	0.16
"	45.34	0.00	0.00	**0.41**	0.17
M6	-769.22	0.00	0.00	0.16	-0.45
"	-769.22	0.00	0.00	0.17	-0.44
"	-769.22	0.00	0.00	0.17	-0.42
"	-769.22	0.00	0.00	0.17	-0.41
M7	1116.87	0.00	0.00	**-0.45**	-0.16
"	1116.87	0.00	0.00	-0.44	-0.16
"	1116.87	0.00	0.00	-0.44	-0.16
"	1116.87	0.00	0.00	-0.44	-0.16
M8	-769.22	0.00	0.00	0.16	-0.45
"	-769.22	0.00	0.00	0.16	-0.44
"	-769.22	0.00	0.00	0.16	-0.42
"	-769.22	0.00	0.00	0.16	-0.41
M9	45.34	0.00	0.00	0.41	0.16
"	45.34	0.00	0.00	0.41	0.17
"	45.34	0.00	0.00	0.41	0.18
"	45.34	0.00	0.00	0.41	**0.20**

12

BENDING & COMP: TRUSS 2 - MEMBER 3-2
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	2292 lbs	
Max Reaction, R	151 lbs	
Max Moment, M	161 ft-lbs	
Max LL Deflection	0.23 inches	
Max TL Deflection	0.45 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 =	1.18	
fc =	437 psi	
Fce=	1142 psi	
Fc*=	2084 psi	
F'c=	972 psi	
fb=	631 psi	
F'b=Fb*=	2156 psi	
Shear D/C ratio	0.36 < 1.0, Member OK	
Interaction equation: (fc/F'c)^2 + fb/ (F'b(1-fc/Fce)) =	0.68 < 1.0, Member OK	
Live Load defl ratio	0.69 < 1.0, Member OK	
Total Load defl ratio	1.01 OK, only 1% over	



FRAMING NOTES:

1. No Access. See "Recommendations" for allowable rafter spans.

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 7.3 psf.
B. All framing members including rafters, purlins, joists and beams are existing unless otherwise noted in the framing notes above.
C. All rafters are 2x6 DF#2 and hips and valleys are 2x8 DF#2 unless otherwise noted.
D. All existing rafter, hips, valleys, rafter ties, and purlins are braced per UBC Section 2320.1 "Roof and Ceiling Framing" unless otherwise shown.
E. All structural wood members that were observed appear to be in sound condition and without structural defect.

1 ROOF PLAN - LEDESMA

Not to Scale

ICBO Evaluation Service, Inc.

5360 WORKMAN MILL ROAD • WHITTIER, CALIFORNIA 90601-2299

A subsidiary corporation of the International Conference of Building Officials

EVALUATION REPORT

ER-4488

Reissued May 1, 2000

Filing Category: WALL COVERING (288)

THERMO-SHEATH SHEATHING

NATIONAL SHELTER PRODUCTS, INC.
22525 S.E. 64TH PLACE, SUITE 230
ISSAQUAH, WASHINGTON 98027

1.0 SUBJECT

Thermo-Sheath Sheathing.

2.0 DESCRIPTION

2.1 General:

Thermo-Sheath sheathing, a laminated board consisting of a kraft-paper core with aluminized facings, is recognized as a bracing material and weather-resistive barrier for wood-framed wall construction and as an underlayment for concrete roof tiles. The sheathing has a nominal size of either 48 3/4 by 96 inches (1238 by 2438 mm) or 48 by 96 inches (1219 by 2438 mm). Four sheathings are recognized:

1. Thermo-Sheath Standard, nominal 0.078 inch (2 mm) thick, green print identification.
2. Thermo-Sheath Structural, nominal 0.105 inch (2.7 mm) thick, red print identification.
3. Thermo-Sheath Structural Plus, nominal 0.115 inch (2.9 mm) thick, black print identification.
4. Thermo-Sheath Super Structural, nominal 0.137 inch (3.5 mm) thick, blue print identification.

2.2 Materials:

2.2.1 Core: The core consists of multiple layers of filler and paperboard adhered with a polyvinyl alcohol adhesive.

2.2.2 Facings: The facing materials consist of either aluminum foil or aluminized polyethylene adhered to 40-pound (18 kg) kraft paper.

2.3 Installation:

2.3.1 Walls: Sheathing, having a nominal thickness of 0.105, 0.115, and 0.137 inch (2.7, 2.9 and 3.5 mm), complies as bracing for wood-framed construction in accordance with Section 2320.11.3 of the code when installed vertically on wood framing. The 0.078-inch-thick (2 mm) sheathing is restricted to nonstructural applications. The sheathing edges are supported by studs, top and bottom plates and solid blocking. Table 1 provides installation details for sheathing used structurally, including fastener details, stud spacing and allowable shear values.

Nonstructural applications of the sheathing require that wood-framed walls be braced in accordance with Section 2320.11.3 of the code. Fasteners shall be stainless steel, aluminized, hot-dipped galvanized or electrogalvanized steel. Table 1 lists the fastener schedule for structural applications. Nonstructural sheathing applications require similar fasteners with maximum spacing of 4 inches (102 mm) on center at panel edges and 8 inches (204 mm) on center at intermediate supports.

Panel edges are butt joints or are lapped a minimum of 3/4 inch (19 mm).

2.3.2 Underlayment: Sheathing having a nominal thickness of 0.078 inch (2 mm) complies as an underlayment for concrete and clay roof tiles specifically recognized in an NES or ICBO ES evaluation report. The tile report holder must approve this use. The Thermo-Sheath product is installed under the spaced sheathing and is fastened 12 inches (305 mm) on center along each rafter with 1-inch-long (25.4 mm) galvanized roofing nails or No. 16-gage galvanized staples having 1-inch-long (25.4 mm) legs and 3/8-inch-wide (9.5 mm) crowns. The sheathing installation requires a minimum 2-inch (51 mm) horizontal lap.

Reroofing applications require that the sheathing be applied over the existing spaced sheathing boards and be fastened to the rafters as previously described.

2.4 Identification:

Each sheet bears a stamped label indicating the company name, National Shelter Products, Inc.; the product name; the board thickness; the evaluation report number (ER-4488); and the name of the quality control agency, Ramtech Laboratories, Inc. The labels are color-coded to facilitate easier product identification in the field. See Table 1.

3.0 EVIDENCE SUBMITTED

Reports on racking shear, transverse strength, tensile strength, mullen-burst strength, water absorption, moisture vapor transmission, and linear expansion tests, and a quality control manual.

4.0 FINDINGS

That the Thermo-Sheath Sheathing described in this report complies with the 1997 *Uniform Building Code*™, subject to the following conditions:

4.1 Installation complies with this report and the manufacturer's instructions.

4.2 An approved exterior wall covering, capable of resisting loads perpendicular to the face of the wall, is installed over the sheathing.

4.3 When sheathing is installed as an approved weather-resistive barrier, the sheathing joints have minimum 3/4-inch (19 mm) laps or approved flashing.

4.4 The 0.105-, 0.115-, and 0.137-inch-thick (2.7, 2.9 and 3.5 mm) sheathing complies as bracing as specified in Section 2320.11.3 of the code when installed in accordance with Table 1.

4.5 The 0.078-inch-thick (2 mm) sheathing is permitted to be an underlayment for concrete and clay roof tiles specifically recognized in an evaluation report.

4.6 The sheathing is manufactured for National Shelter Products, Inc., in Constantine, Michigan, with quality control inspections by Ramtech Laboratories, Inc. (AA-655).

This report is subject to re-examination in two years.

TABLE 1—ALLOWABLE SHEAR LOAD (PLF)[1,2,3]

THERMO-SHEATH PRODUCT NAME	PRODUCT IDENTIFICATION COLOR	SHEATHING THICKNESS (inch)	FASTENER	FASTENER SPACING (inches on center)	WOOD STUD SPACING (inches on center)	ALLOWABLE SHEAR LOAD (lbs. per foot)
Structural Sheathing	Red	0.105	No. 11 ga. galv. roofing nails or No. 16 ga. x 7/16-inch-crown staples. Minimum fastener length is 1 1/4 inches	3 — panel edges 6 — intermediate supports	16	130
Structural Plus Sheathing	Black	0.115	No. 11 ga. galv. roofing nails or No. 16 ga. x 7/16-inch-crown staples. Minimum fastener length is 1 1/4 inches	3 — panel edges 6 — intermediate supports	16	150
			No. 16 ga. x 1-inch-crown staples. Minimum fastener length is 1 1/4 inches	2 — panel edges 6 — intermediate supports	16	180
Super Structural Sheathing	Blue	0.137	No. 11 ga. galv. roofing nails or No. 16 ga. x 7/16-inch-crown staples. Minimum fastener length is 1 1/4 inches	3 — panel edges 3 — intermediate supports	24	185

For SI: 1 inch = 25.4 mm, 1 lb/ft = 14.6 kN/m.

[1]For wind or seismic forces, in pounds per foot, for panels installed vertically on Douglas fir-larch or southern pine studs having a nominal thickness not less than 2 inches (51 mm).

[2]Staple crown must not puncture the sheathing. Staples are installed with the crown parallel to the framing.

[3]The sheathing is applied in minimum 4-by-8-foot (1.2 by 2.4 m) sheets. Blocking having a nominal thickness not less than 2 inches (51 mm) is provided at horizontal joints when the wall height exceeds the length of the sheathing panel. The maximum height-to-width ratio is 2:1.

LEGACY REPORT

ER-4660

Reissued June 1, 2003.

ICC Evaluation Service, Inc.
www.icc-es.org

Business/Regional Office • 5360 Workman Mill Road, Whittier, California 90601 • (562) 699-0543
Regional Office • 900 Montclair Road, Suite A, Birmingham, Alabama 35213 • (205) 599-9800
Regional Office • 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 • (708) 799-2305

Legacy report on the 1997 *Uniform Building Code*™

DIVISION: 07—THERMAL AND MOISTURE PROTECTOR
Section: 07320—Roof Tile

EAGLE AND EAGLELITE INTERLOCKING CONCRETE ROOFING TILES

EAGLE ROOFING PRODUCTS
3546 NORTH RIVERSIDE AVENUE
RIALTO, CALIFORNIA 92377

1.0 SUBJECT

Eagle and Eaglelite™ Interlocking Concrete Roofing Tiles.

2.0 DESCRIPTION

2.1 General:

2.1.1 Eagle Tiles: Eagle conventional-weight interlocking concrete roofing tiles are produced in high-profile (Capistrano), low-profile (Malibu), and flat-profile styles with either smooth surfaces (Bel Air Standard, Bel Air Estate or Bel Air Double Eagle) or textured surfaces (Ponderosa Standard, Ponderosa Estate, Ponderosa Double Eagle or Ponderosa Golden Eagle). Ridge and rake trim units are produced to match each product.

The tiles are composed of Type II portland cement, washed sand, and proprietary additives. Mineral coloring oxides are added to or are mixed with portland cement and water for surface application following extrusion. Units are cured under controlled temperature and humidity conditions. Tiles are 17 inches (432 mm) long, 12⅜ inches (315 mm) wide, and nominally ½ inch (12.7 mm) thick. They are manufactured in either flat or profile style with ¾-inch-wide (19 mm) interlocking sidelaps designed to resist surface water penetration and maintain proper alignment. All tiles have protruding head lugs on the underside, which provide for mechanical attachment over wooden battens, or provide a stable foundation for nail attachment to solid decking. Two nail holes are provided in each tile for use where half tiles are needed at roof edges, chimneys, skylights, etc. Approximate installed dry weights with 3-inch (76 mm) head laps are 9.6 psf (46 kg/m²) for Capistrano tiles, 9.5 psf (46 kg/m²) for Malibu tiles and 10.0 psf (49 kg/m²) for Ponderosa and Bel Air tiles.

2.1.2 Eaglelite Tiles: Eaglelite tiles are produced in the same size, manner and shapes as the conventional-weight Eagle tiles described in Section 2.1.1, except for substitution of lightweight aggregates and additives for sand. Approximate installed dry weights with 3-inch (76 mm) head laps are 6.7 psf (25 kg/m²) for Capistrano tiles, 5.5 psf (27 kg/m²) for Malibu tiles and 7.0 psf (34 kg/m²) for Ponderosa and Bel Air tiles.

2.2 Installation:

2.2.1 New Construction: Installation shall be in accordance with the Concrete and Clay Roof Tile Installation Manual for Moderate Climate Regions. See evaluation report ER-6034P.

2.2.2 Reroofing: Eagle tiles, as described in Section 2.1.1, provide a Class A roof when installed over existing asphalt shingle roofs. Care should be taken to ensure both horizontal and vertical alignment on the roof. Foreign matter must be cleaned from all interlocking areas. Cracked or broken tiles must be removed from the roof. Damaged or rusted flashing should be replaced. Existing framing must be adequate for the additional load. Structural data verifying adequacy should be submitted to the building official. The existing roof must be inspected in accordance with Appendix Chapter 15, Section 1515, of the 1997 *Uniform Building Code*™ (UBC). When reroofing wood shake roofs, existing shakes must be removed and solid decking and tile must be installed, as with new construction. When installed over existing spaced sheathing boards, underlayment complying with the UBC or an underlayment recognized specifically for this type of use in an ICC-ES evaluation report, installed with or without battens, may be used: One layer of No. 30 felt or approved equal underlayment must be installed on the roof prior to application of tile; in lieu of this underlayment's being provided, the building official may determine that the existing roof covering provides the required underlayment protection.

Details not covered under this section are identical to those described in Section 2.2.1.

2.3 Roof Classification:

When installed over solid sheathing in accordance with this report, Eagle and Eaglelite roofing tiles are Class A roof coverings in accordance with Section 1504.1 of the UBC. When installed over spaced or solid sheathing in accordance with this report, the tiles are noncombustible roof coverings in accordance with Section 1504.2 of the UBC. The tiles are Class A roof coverings when installed over existing asphalt shingles in accordance with Section 2.2.2 of this report.

2.4 Identification:

The name EAGLE and the evaluation report number (ER-4660) are imprinted on each tile. A tag on each shipping pallet indicates the producing plant location, product identification and the installed weight. Each Eaglelite tile is identified by the product name "Eaglelite" on a tag and a light-colored strip across the headlap area.

3.0 EVIDENCE SUBMITTED

Results of tests in accordance with the ICC-ES Interim Criteria for Clay and Concrete Roof Tiles (AC160), dated January 2002, and a quality control manual.

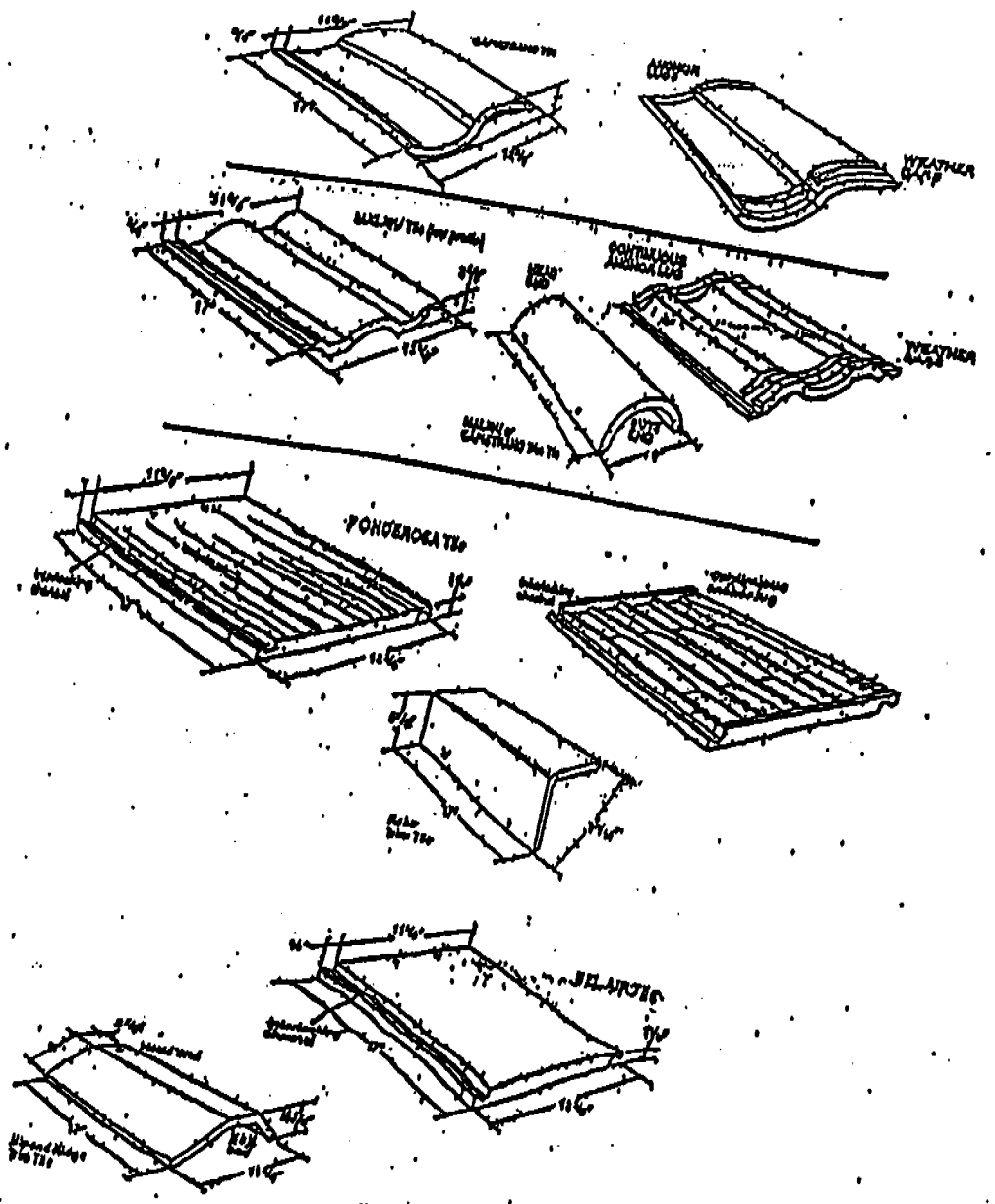
4.0 FINDINGS

Thalitile Eagle Concrete Roofing Tiles described in this report comply with the *1997 Uniform Building Code*™, subject to the following conditions:

4.1 Tiles are manufactured, identified and installed in accordance with this report and the manufacturer's instructions.

4.2 Tiles are manufactured at Eagle Roofing Products facilities located in Rialto, California, and Phoenix, Arizona.

This report is subject to re-examination in two years.



FIELD AND TRIM SPECIFICATIONS

Batten system reqs

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

TEL: 916.961.3960
FAX: 916.961.3960

June 15, 2002

Monarch Roofing
8250 Alpine Avenue, Suite H
Sacramento, CA 95826
TEL: (916) 978-3182
FAX: (916) 452-5140

Attn.: Mr. Neal Weber,

re: Job 2002234
Subject: Installation of the Batten / Counter Batten System.

Per Mr. Neal Weber's request, the following items for the installation of Light Weight Concrete Tile are addressed:

1. Loading
2. Flexural properties and capacity of batten.
3. Flexural properties and capacity of counter batten.
4. Axial load capacity of the counter batten (tension only).
5. Fastener capacity (shear and tensile) at counter batten to deck (16d).
6. Fastener capacity (shear and tensile) at batten to counter batten (screw).
7. Fastener capacity (shear and tensile) at tile to batten.

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

Sincerely,

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

REGISTERED PROFESSIONAL ENGINEER
PAUL ZACHER
No. S3878
Exp. 3-31-03
STRUCTURAL
STATE OF CALIFORNIA

1/10

PAUL ZACHER Structural Engineers

P.K. Zacher, S.E.
4701 Lakeside Way
Fair Oaks, CA 95628
TEL: (916) 961-3960
FAX: (916) 961-6552

Job #: 02-234

Date: 6/15/02

LOADING

WIND UPLIFT = 10.97 PSF ↑

TILE (DL) = 8.0 PSF (INCLUDES STAGGER)

TILE (SLIDING ON 6:12 SLOPE) = 8.0 PSF × 6/√180 = 4.77 PSF

THERMO PLY = 0.5 PSF

FLEXURAL CAPACITY OF BATTEN (22 GAGE)

DL = 8.5 PSF × 13½/12 = 9.6 PSF

LL = 16.0 × 18.0

$$S_{REQ'D} = \frac{1.5(27.6)(2)^2}{33{,}000} = 0.0050 \text{ IN}^3$$

$$S_{ACTUAL} = I/C = \frac{0.0147}{7/16"} = 0.0297 \text{ IN}^3 > 0.005 \text{ O.K.}$$

9.6/18.0

2°

FLEXURAL CAPACITY OF COUNTER BATTEN (22 GAGE)

NOT APPLICABLE AS THIS MEMBER IS PLACED DIRECTLY OVER AND IS SUPPORTED BY A WOOD RAFTER

AXIAL CAPACITY OF COUNTER BATTEN (25 GAGE)

AREA = 0.104 IN²

T = 4.77 PSF × 2' × 2' = 19#

T_ALLOW = 0.6 × 33,000 × 0.104 = 2059# > 19# O.K.

P.K. Zacher, S.E.
9701 Lakeside Way
Fair Oaks, CA 95628
TEL: (916) 961-3960
FAX: (916) 961-6552

Job #: 02-234

Date: 6/15/02

FASTENER CAPACITY

COUNTER BATTEN TO DECK

SHEAR

$V = 477\ plf \times 2' \times 2' = 19^{\#}$

$\beta = F_{em} / F_{es} = \frac{4650}{33,000} = 0.141$

$K_1 = -1 + \left[2(1+0.141) + \frac{2(100{,}000)(1+2(141))(0.135)^2}{3 \times 4650\ (3/4)^2} \right]^{1/2}$

$= -1 + \left[4.282 + 0.0273 \right]^{1/2} = 0.596$

$K_2 = -1 + \left[\frac{1(1+0.141)}{0.141} + \frac{2(10000)(2+0.141)(0.135)^2}{3 \times 4650\ (0.027)^2} \right]^{1/2}$

$K_2 = -1 + \left[16.18 + 625.745 \right]^{1/2} = 24.656$

MODE III$_m$

$Z = \frac{K_1 D t_m F_{em}}{K_D (1+2\beta)} = \frac{.596(0.135)(3/4)4050}{2.2(1+2(0.141))} = 405^{\#}$

MODE III$_s$

$Z = \frac{K_2 D t_s F_{em}}{K_D (2+\beta)} = \frac{24.656(0.135)0.0240(4050)}{2.2(2+0.141)} = 97^{\#}$

P.K. Zacher, S.E.
Job #: 02.234
Date: 6/15/02
4701 Lansdale Way
Fair Oaks, CA 95628
TEL: (916) 961-3960
FAX: (916) 961-6552

MODE IV

$$Z = \frac{D^2}{K_D}\left[\frac{2 F_{em} F_{fb}}{3(1+R_d)}\right]^{1/2}$$

$$Z = \frac{(0.175)^2}{2.2}\left[\frac{2 \times 4650 \times 100{,}000}{3(1+0.141)}\right]^{1/2} = 132^{\#}$$

$\therefore Z = 97^{\#} > 19^{\#}$ OK.

COUNTER FAITH TO DECK

UPLIFT

$T = (11\,psf - 8\,psf)\,2' \times 2' = 12^{\#}$

NAIL CAPACITY = $33^{\#} \times 3\frac{1}{2}" \times 115^{\#} > 12^{\#}$

HAT CHANNEL CAPACITY

SINCE THE HEAD OF THE 1/4" BOLT HAS IS EQUIVALENT TO THE DIAMETER OF A #6 SCREW, THE PULL OUT (OR PULL THROUGH) VALUE IS 32 lbs PER THE ATTACHED CHART. THIS IS ADEQUATE TO RESIST THE APPLIED UPLIFT FORCE OF 12 lbs.

P.K. Zacher, S.E.
Job #: 02-234
Date: 10/15/02
Fair Oaks, CA 95628
TEL: (916) 961-3960
FAX: (916) 961-6552

BATTEN TO COUNTER BATTEN

SHEAR:

V = 4.77 PSF × 2' × 2' = 19#

A #8 SCREW HAS A SHEAR VALUE OF 96 lbs PER THE ATTACHED CHART THIS VALUE IS ADEQUATE TO RESIST THE APPLIED SHEAR FORCE OF 19 lbs

UPLIFT:

T = (11 PSF - 8 psf) 2' × 2' = 12#

A #8 SCREW HAS A PULLOUT VALUE OF 47. lbs PER THE ATTACHED CHART THE VALUE IS ADEQUATE TO RESIST THE APPLIED UPLIFT FORCE OF 12. lbs.

TILE TO BATTEN:

THE FOLLOWING IS BASED ON THE ASSUMPTION THAT TILE IS EQUIVALENT TO GYPSUM BOARD IN SHEAR, BEARING IS FLEXURAL STRENGTH

SHEAR:

V = 4.77 psf × 12 (1 screw per tile) = 4.77 PSF

A QUIKDRIVE #10WFSD1142, 1582 SCREW HAS A CAPACITY OF 140 lbs / 3 = 47 lbs (BASED ON A SAFETY FACTOR OF 3) THIS VALUE IS ADEQUATE TO RESIST THE APPLIED SHEAR FORCE

P.K. Zacher, S.E.
4701 Lakeside Way
Fair Oaks, CA 95628
TEL: (916) 961-3960
FAX: (916) 961-6552

Job #: 02-234
Date: 6/15/02

TILE TO SUBFLOOR

UPLIFT:

+Y = (1 psf + 8 psf) = 40 lbs

NO VALUES ARE GIVEN FOR THE PULL OUT OF GYP BOARD (TILE) TO 2x6 METAL STUDS, HOWEVER, THE UPLIFT FAILURE MAY BE BROKEN INTO A MINIMUM OF 2 COMPONENTS. FOR PURPOSES OF THIS DOCUMENT, THE 2 COMPONENTS OF CONCERN ARE THE SCREW TO TILE FAILURE AND THE SCREW TO SUBFLOOR FAILURE. THE SCREW TO SUBFLOOR CAPACITY IS PER THE ATTACHED QUIKDRIVE CHART AND IS 105 lbs/in = 75 lbs (16 ga NAIL W/ A SAFETY FACTOR = 3) THIS VALUE IS ADEQUATE TO RESIST THE APPLIED UPLIFT FORCE. THE SCREW TO TILE CAPACITY IS ADDRESSED AS FOLLOWS. THESE SCREWS ARE USED TO HOLD GYPSUM BOARD CEILINGS IN PLACE SINCE 1/2" THICK GYP BD WEIGHS 5 PSF (SUSTAINED LONG TERM LOAD) AND THE APPLIED UPLIFT FORCE IS 8 psf (SHORT TERM WIND LOAD). THESE SCREWS ARE ADEQUATE FOR OBSERVATION.

WIND FORCE DISTRIBUTION:

DESCRIPTION: Lateral Design Front - Rear Direction

METHOD 2: Primary Frames and Systems

P = Ce Cq qs I		Formula 18-1
Ce = Exposure factor	B	Table 16-G
Cq = Pressure coeff.	1.3 or 1.4	Table 16-H
Basic wind speed	70	Figure 16-1
qs = wind stag. pressure	12.6	Table 16-F
Iw = Importance factor	1	Table 16-K
Roof Pitch:	N	Ex: enter 6 if 6:12. For gabled end or hip roof elevation only. Otherwise, enter N

Level	Story Ht feet	Exposed Width (ft)	Projected Area (sf)	Diaphragm Shear (lbs)	Story Shear
Top of Roof	21	60			
1st floor top plate	9	78.75	1074.375	12671	
1st floor	0	78.75			12671

P uplift = Ce Cq qs I 8.44 psf

Note: The exposure coefficient, Ce is taken at the mean roof height

METHOD 1: Elements and Components

Not in areas of discontinuities (enclosed or unenclosed):

Interpolate between tributary areas of 10 and 100 sf

	Wall Elements:		
	Direction of wind	Tributary Area (sf)	Pressure, p (psf)
Slope > 12:12	Inward	10	10.13
		100	7.60
	Outward	10	10.13
		100	7.60

	Roof Elements:		
	Direction of wind	Tributary Area (sf)	Pressure, p (psf)
Slope < 7:12	Outward	10	10.97
		100	8.44
Slope 7:12 to 12:12	Inward	10	10.97
		100	18.27
	Outward	10	10.97
		100	8.44

Channel Properties

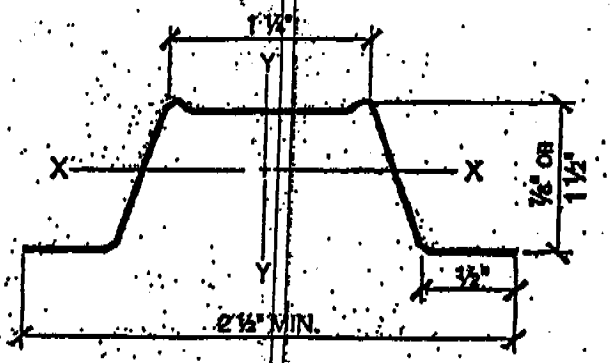
SCAFCO Corporation

(Hat) Furring (F) Channel Section Properties

22 GAGE.

057F125-18	0.0179	0.0188	0.070	0.008	26.4
057F125-27	0.0269	0.0283	0.104	0.013	44.8
057F125-30	0.0296	0.0312	0.118	0.014	50.3
057F125-33	0.0329	0.0346	0.127	0.015	55.4
057F125-43	0.0428	0.0451	0.163	0.019	70.1
150F125-18	0.0179	0.0188	0.093	0.029	56.4
150F125-27	0.0269	0.0283	0.140	0.045	93.4
150F125-30	0.0296	0.0312	0.154	0.050	104.9
150F125-33	0.0329	0.0346	0.170	0.055	115.8
150F125-43	0.0428	0.0451	0.220	0.070	147.5

[1] Minimum bare metal thickness is 95% of design thickness.
[2] Moment of inertia given is for deflection calculations.
[3] Effective properties are given as the minimum value for either positive or negative bending.
[4] Effective properties based on Fy = 33 ksi.



(Hat) Furring (F) Channel Allowable Ceiling Spans L/240

057F125	18	33	Single	6'-2"	4'-9"	4'-1"	4'-6"	4'-1"	3'-7"	3'-6"	3'-2"	2'-9"
			Multiple	6'-9"	6'-10"	6'-1"	5'-7"	5'-1"	4'-2"	4'-0"	3'-6"	2'-10"
	30	33	Single	6'-5"	6'-7"	4'-10"	5'-4"	4'-10"	4'-3"	4'-2"	3'-6"	3'-3"
			Multiple	7'-7"	8'-1"	6'-0"	6'-8"	6'-0"	5'-3"	5'-1"	4'-6"	3'-11"
	43	33	Single	6'-10"	6'-2"	5'-6"	6'-6"	5'-5"	4'-6"	4'-7"	4'-2"	3'-6"
			Multiple	8'-5"	7'-5"	6'-6"	7'-5"	6'-5"	5'-10"	5'-6"	5'-2"	4'-6"
150F125	18	33	Single	7'-10"	7'-11"	6'-5"	6'-10"	6'-3"	5'-5"	5'-3"	4'-6"	3'-11"
			Multiple	9'-4"	8'-10"	7'-6"	8'-8"	7'-6"	6'-1"	6'-10"	5'-1"	3'-11"
	30	33	Single	9'-4"	9'-5"	7'-5"	8'-2"	7'-5"	6'-5"	6'-3"	5'-6"	5'-0"
			Multiple	11'-5"	10'-9"	9'-2"	10'-1"	9'-2"	8'-0"	7'-9"	6'-11"	5'-8"
	43	33	Single	10'-6"	9'-9"	8'-3"	9'-2"	8'-3"	7'-3"	7'-1"	6'-5"	5'-7"
			Multiple	12'-11"	11'-9"	10'-3"	11'-3"	10'-3"	8'-11"	8'-9"	7'-11"	6'-8"

Allowable ceiling spans based on 'effective' properties.
Multiple span indicates two or more equal spans with channel continuous over center support.
Bearing length = 0.75".

Fasteners (Screws and Welds)

SCAFCO Corporation

Screw Table Notes

1. Screw spacing and edge distance shall not be less than 3 x D. (D = Nominal screw diameter)
2. The allowable screw values are based on the steel properties of the members being connected, per AISI section E4.
3. When connecting materials of different metal thicknesses or yield strength, the lowest applicable values should be used.
4. Screw strength needs to be verified by the screw manufacturer.
5. Values include a 3.0 factor of safety.
6. Applied loads may be multiplied by 0.75 for seismic or wind loading, per AIDI A 5.1.3.
7. Penetration of screws through joined materials should not be less than 3 exposed threads. Screws should be installed and tightened in accordance with screw manufacturer's recommendations.
8. Values based on a tensile to yeld steel property ratio of 1.08.

BATTEN TO COUNTER BATTEN
METAL TO METAL

Allowable Loads For Screw Connections

12 GAGE

16	0.0188	33	36	45	28	96	47	56	36	60	41
27	0.0283	33	36	68	39	111	82	104	54	110	62
30	0.0312	33	36	102	43			120	60	128	68
68	0.0713	33	36	316	99	375	118	414	137	441	158
97	0.1017	33	36	450	142	536	168	620	195	705	222
54	0.0566	50	54	378	120	412	142	444	165	473	187
68	0.0713	50	54	476	151	568	179	627	207	669	236
97	0.1017	50	54	682	215	811	255	939	296	1069	336

Weld Table Notes

1. Weld capacities based on AISI, section E2.
2. When connecting materials of different metal thickness or yield strength, the lowest applicable values should be used.
3. Values include a 2.5 factor of safety.
4. Applied loads may be multiplied by 0.75 for seismic or wind loading per AISI A 5.1.3.
5. Values based on a tensile to yeld steel property ratio of 1.08.

Allowable Loads For Fillet Welds And Flare Groove Welds

43	0.0451	33	36	492
54	0.0566	33	36	605
43	0.0451	50	54	731
54	0.0566	50	54	917

Pull & Shear Testing

Test data provided by screw suppliers and is not certified by Quik Drive USA, Inc.

SCREW	Ultimate Loads (lbs)					
Pull test for screws: one place metal (steel gauge)	14	16	18	20	22	26
DWF114, 158	826	634	450	272		185
PHSS-1, 34, 114	826	634	450	272		185
PHSD-1, 34, 114	735	590	344	288		160
→ DWFSD114Z, 158Z	705	523	320	231		105
DWC114, 158, 178	624	536		270		

Shear strength test for screws: metal to metal ultimate load (lbs)

(steel gauge)	12	14	16	18	20	22	26
DWF114, 158			957		690	670	320
PHSS-1, 34, 114			957		690	670	320
PHSD-1, 34, 114			1140	1040	805	658	320
DWFSD114Z, 158Z			1220	760	613	505	

Shear test: gypsum board to metal (pounds)

(steel gauge)	18ga	18ga	22ga
→ DWFSD114Z, 158Z	130	135	140
DWF114, 114-PH, 158	147	153	160

FOR ATTACHING TILE TO METAL LATTEN