

CITY OF SACRAMENTO
1231 I Street, Sacramento, CA 95814

PAID
CITY OF SACRAMENTO
Permit No: 0511219
Insp Area: 2
Thos Bros: 336H2

Site Address: 815 COBBLE COVE LN SAC
Parcel No: 031-1240-011

JUL 28 2005
NORTH PERMIT
CENTER

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

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

OWNER
KIM CHUNG ILL/KYU HAE
815 COBBLE COVE LN
SACRAMENTO, CA 95831

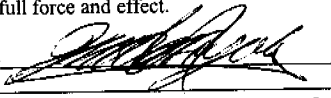
ARCHITECT

Nature of Work: T/O WOODSHAKE & INSTALL ENGINEERED LIGHT WEIGHT TILE ROOFING

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.

X License Class C39 License Number 806787 Date 7-28-05 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.)

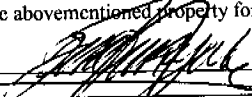
I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) 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 hereby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

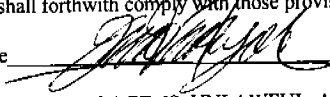
X Date 7-28-05 Applicant/Agent Signature 

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:

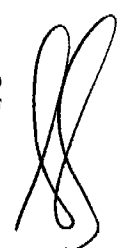
Carrier VIRGINIA SURETY COMPANY, INC Policy Number 005-00016796 Exp Date 01/01/2006

(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, 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.

X Date 7-28-05 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.



0511219 815 Cobble Cove Lane

Kim



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

TEL: 916.961.3960
FAX: 916.961.6552

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July 24, 2005

Monarch Roofing
8262 Alpine Avenue, Suite A
Sacramento, CA 95826
TEL: (916) 392-1829
FAX: (916) 395-4258

Attn.: Mr. Neal Weber,

re: Job 2005347: KIM

Subject: Structural Investigation Report of the Roof for the Residence located at 815 Cobble Cove Lane, Sacramento, CA 95831.

PAID
CITY OF SACRAMENTO
JUL 28 2005
NORTH DEPARTMENT



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 July 20, 2005. 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.

DESCRIPTION:

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

This set of plans and specifications must be kept on the job at all times and the contractor shall make any changes or alterations to the plans without written permission from the Building Inspection Division. The approval of this plan and specification shall NOT be held to permit or approval of the violation of any City Ordinance or State Law.
Approved By: AAAB
07-28-05

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 except for the vaulted ceiling areas. The vaulted ceiling is constructed of 6x8 rafters spaced at 48" on center supported at the ridge by a Glulam beam. One area had no access and was not inspected.

OFFICE / CITY COPY

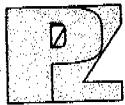
CONCLUSIONS:

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. No conclusions are drawn for the areas that are inaccessible and not inspected.

Field Verify:

- Tile weight
- Structural modifications for this report (11 pages)
- "Inaccessible areas" addressed for this report

Kim



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

TEL: 916.961.3960
FAX: 916.961.6552

RECOMMENDATIONS:

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

Roof Structure:

1. After the roofing material has been removed, , 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.
2. Extend the hat channels at all gable end overhangs with a minimum back span of 6'-0". See detail 1.
3. Scab a 1 3/4"x 11 1/4"LVL to the existing header. Jack up the existing beam as required where the existing sag occurs to provide an even contour at the roof level before installation of the LVL. 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	

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

<u>MATERIAL</u>	<u>WEIGHT</u>	
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	<u>0.64</u>	psf
Total Load	9.8	psf

LOCATION: BOTTOM CHORD BATTEN SYSTEM

<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

LOCATION: VAULT BATTEN SYSTEM

<u>MATERIAL</u>	<u>WEIGHT</u>	
Light Weight Tile	7.30	psf
Roofing felt	0.30	psf
Batten system	0.50	psf
1x4 skip sht'g	1.09	psf
6x8 rafters @ 48" oc	2.43	psf
Batt/blown insul	0.50	psf
1/2" Gypboard	<u>2.50</u>	psf
Load	14.6	psf
Roof Pitch Adjustment	<u>1.73</u>	psf
Total Load	16.3	psf

PAUL ZACHER- STRUCTURAL ENGINEERS, INC.

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

Job #: 05-347

Date: 07/24/2005

LOADING:

Vault:

Dr = 16.3 psf x 4'-0" = 65 plf
Lr = 16.0 psf x 4'-0" = 64 plf

6x8 #1

65 / 64

10'-6"

B1:

Dr = 14.1 psf x 9'-0" = 133 plf
Lr = 16.0 psf x 9'-0" = 144 plf

4x12 #2 + 1-3/4"x11-1/4" LVL

133 / 144

16'-0"

B2:

Dr = 16.3 psf x 17'-0" = 277 plf
Lr = 16.0 psf x 17'-0" = 272 plf

5" x 19" GLB

277 / 272

24'-0"

4

Paul Zacher Structural Engr's, Inc.
 4701 Lakeside Way
 Fair Oaks, CA 95628

Title :
 Dsgnr:
 Description :

Job #
 Date: 8:57AM, 26 JUL 05

Scope :

Rev: 580006
 User: KW-0602844, Ver 5.8.0, 1-Dec-2003
 (c)1983-2003 ENERCALC Engineering Software

Timber Beam & Joist

Kim.ecw:Calculations

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		6x8 4x12#2+1.75x11.875		5.125x19.5
Beam Width	in	5.500	6.186	5.125
Beam Depth	in	7.500	11.250	19.500
Le: Unbraced Length	ft	0.00	0.00	0.00
Timber Grade		Douglas Fir - Larch, No.1	Custom, DF#2 + LVL	Douglas Fir, 24F - V4
Fb - Basic Allow	psi	1,350.0	1,450.0	2,400.0
Fv - Basic Allow	psi	85.0	1,670.0	240.0
Elastic Modulus	ksi	1,600.0	1,666.7	1,800.0
Load Duration Factor		1.250	1.250	1.250
Member Type		Sawn	Manuf/Pine	GluLam
Repetitive Status		Repetitive	No	No

Center Span Data

Span	ft	17.00	16.00	24.00
Dead Load	#/ft	65.00	133.00	277.00
Live Load	#/ft	64.00	144.00	272.00

Results

		Ratio =		
Mmax @ Center	in-k	55.92	106.37	474.34
@ X =	ft	8.50	8.00	12.00
fb : Actual	psi	1,084.5	815.2	1,460.4
Fb : Allowable	psi	1,940.6	1,812.5	2,819.9
		Bending OK	Bending OK	Bending OK
fv : Actual	psi	37.0	42.4	86.2
Fv : Allowable	psi	106.3	2,087.5	300.0
		Shear OK	Shear OK	Shear OK

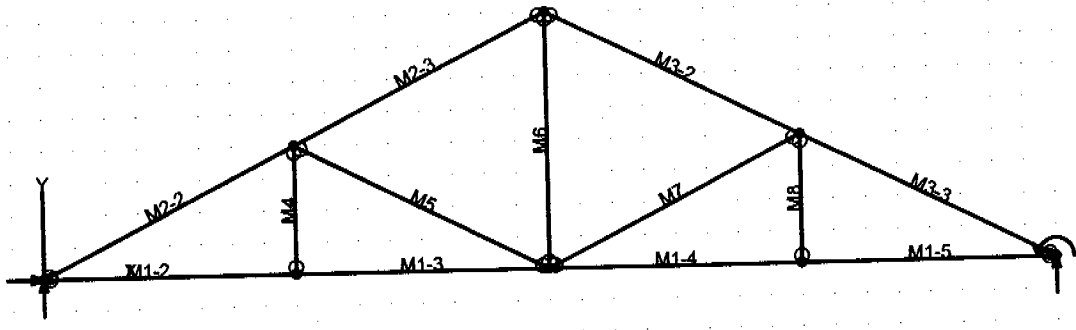
Reactions

@ Left End	DL	lbs	552.50	1,064.00	3,324.00
	LL	lbs	544.00	1,152.00	3,264.00
	Max. DL+LL	lbs	1,096.50	2,216.00	6,588.00
@ Right End	DL	lbs	552.50	1,064.00	3,324.00
	LL	lbs	544.00	1,152.00	3,264.00
	Max. DL+LL	lbs	1,096.50	2,216.00	6,588.00

Deflections

		Ratio OK	Deflection OK	Deflection OK
Center DL Defl	in	-0.395	-0.160	-0.363
L/Defl Ratio		516.7	1,197.7	793.9
Center LL Defl	in	-0.389	-0.174	-0.356
L/Defl Ratio		524.8	1,106.2	808.5
Center Total Defl	in	-0.784	-0.334	-0.719
Location	ft	8.500	8.000	12.000
L/Defl Ratio		260.4	575.0	400.6

5



Truss X 1

VisualAnalysis 4.00 Report

Company: Paul Zacher - Structural - Engineers Engineer: Paul Zacher
File: C:\Documents and Settings\Owner\Desktop\Kim05_347\Truss 1.vap

Nodes

Node	X ft	Y ft	Fix	DX	Fix	DY	Fix	RZ
N1	0.00	0.00	Yes		Yes		No	
N2	32.00	0.00	No		"		Yes	
N3	16.00	8.00	"		No		No	
N4	8.00	0.00	"		"		"	
N5	16.00	0.00	"		"		"	
N6	24.00	0.00	"		"		"	
N7	8.00	4.00	"		"		"	
N8	24.00	4.00	"		"		"	

Member Elements

Member	Section	Material	Length ft
M1-2	SS2x4	Wood	8.00
M1-3	"	"	8.00
M1-4	"	"	8.00
M1-5	"	"	8.00
M2-2	SS2x6	"	8.94
M2-3	"	"	8.94
M3-2	"	"	8.94
M3-3	"	"	8.94
M4	SS2x4	"	4.00
M5	"	"	8.94
M6	"	"	8.00
M7	"	"	8.94
M8	"	"	4.00

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
"	SS2x6	8.25	20.80	7.56	7.56

Material Properties

Material	Strength psi	Elasticity psi	Poisson	Density lb/ft ³
Wood	-NA-	1800000.00	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)

7

Nodal Reactions

Node	Load Case	FX lb	FY lb	MZ lb-ft
N1	UBC97 12.8a	0.00	908.80	-NA-
N2	"	-NA-	908.80	0.00

Member Results

Member	Fx lb	Vy lb	Mz lb-ft	Dx in	Dy in
M1-2	1458.67	-39.91	-44.05	0.01	-0.10
"	1458.67	-16.97	31.77	0.01	-0.11
"	1458.67	5.96	46.45	0.00	-0.08
"	1458.67	28.89	0.00	0.00	0.00
M1-3	1458.67	-34.63	-45.88	0.03	-0.11
"	1458.67	-11.70	15.86	0.02	-0.12
"	1458.67	11.24	16.47	0.02	-0.12
"	1458.67	34.17	-44.05	0.01	-0.10
M1-4	1458.67	-34.17	-44.05	0.04	-0.10
"	1458.67	-11.24	16.47	0.04	-0.12
"	1458.67	11.70	15.86	0.03	-0.12
"	1458.67	34.63	-45.88	0.03	-0.11
M1-5	1458.67	-28.89	0.00	0.06	0.00
"	1458.67	-5.96	46.45	0.05	-0.08
"	1458.67	16.97	31.77	0.05	-0.11
"	1458.67	39.91	-44.05	0.04	-0.10
M2-2	-1698.1	134.67	0.00	0.00	0.00
"	-1640.7	19.71	230.00	-0.00	-0.10
"	-1583.2	-95.25	117.39	-0.01	-0.13
"	-1525.7	-210.22	-337.84	-0.01	-0.11
M2-3	-1127.5	210.22	-337.84	-0.01	-0.11
"	-1070.1	95.25	117.39	-0.01	-0.16
"	-1012.6	-19.71	230.00	-0.02	-0.17
"	-955.14	-134.67	0.00	-0.02	-0.10
M3-2	-1127.5	-210.22	-337.84	0.06	-0.08
"	-1070.1	-95.25	117.39	0.07	-0.13
"	-1012.6	19.71	230.00	0.07	-0.15
"	-955.14	134.67	0.00	0.07	-0.08
M3-3	-1698.1	-134.67	0.00	0.05	0.03
"	-1640.7	-19.71	230.00	0.06	-0.08
"	-1583.2	95.25	117.39	0.06	-0.10
"	-1525.7	210.22	-337.84	0.06	-0.08
M4	74.08	0.00	0.00	0.10	0.01
"	74.08	0.00	0.00	0.10	0.02
"	74.08	0.00	0.00	0.10	0.03
"	74.08	0.00	0.00	0.10	0.04
M5	-608.36	0.00	0.00	0.07	-0.08
"	-608.36	0.00	0.00	0.08	-0.08
"	-608.36	0.00	0.00	0.08	-0.08
"	-608.36	0.00	0.00	0.08	-0.08
M6	613.40	0.00	0.00	-0.11	-0.03
"	613.40	0.00	0.00	-0.11	-0.03
"	613.40	0.00	0.00	-0.10	-0.03
"	613.40	0.00	0.00	-0.10	-0.03
M7	-608.36	0.00	0.00	-0.03	-0.11
"	-608.36	0.00	0.00	-0.03	-0.10
"	-608.36	0.00	0.00	-0.02	-0.11
"	-608.36	0.00	0.00	-0.02	-0.11
M8	74.08	0.00	0.00	0.10	0.02
"	74.08	0.00	0.00	0.10	0.03
"	74.08	0.00	0.00	0.10	0.04
"	74.08	0.00	0.00	0.10	0.04

BENDING & COMP: TRUSS 1 - MEMBER 2-2

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

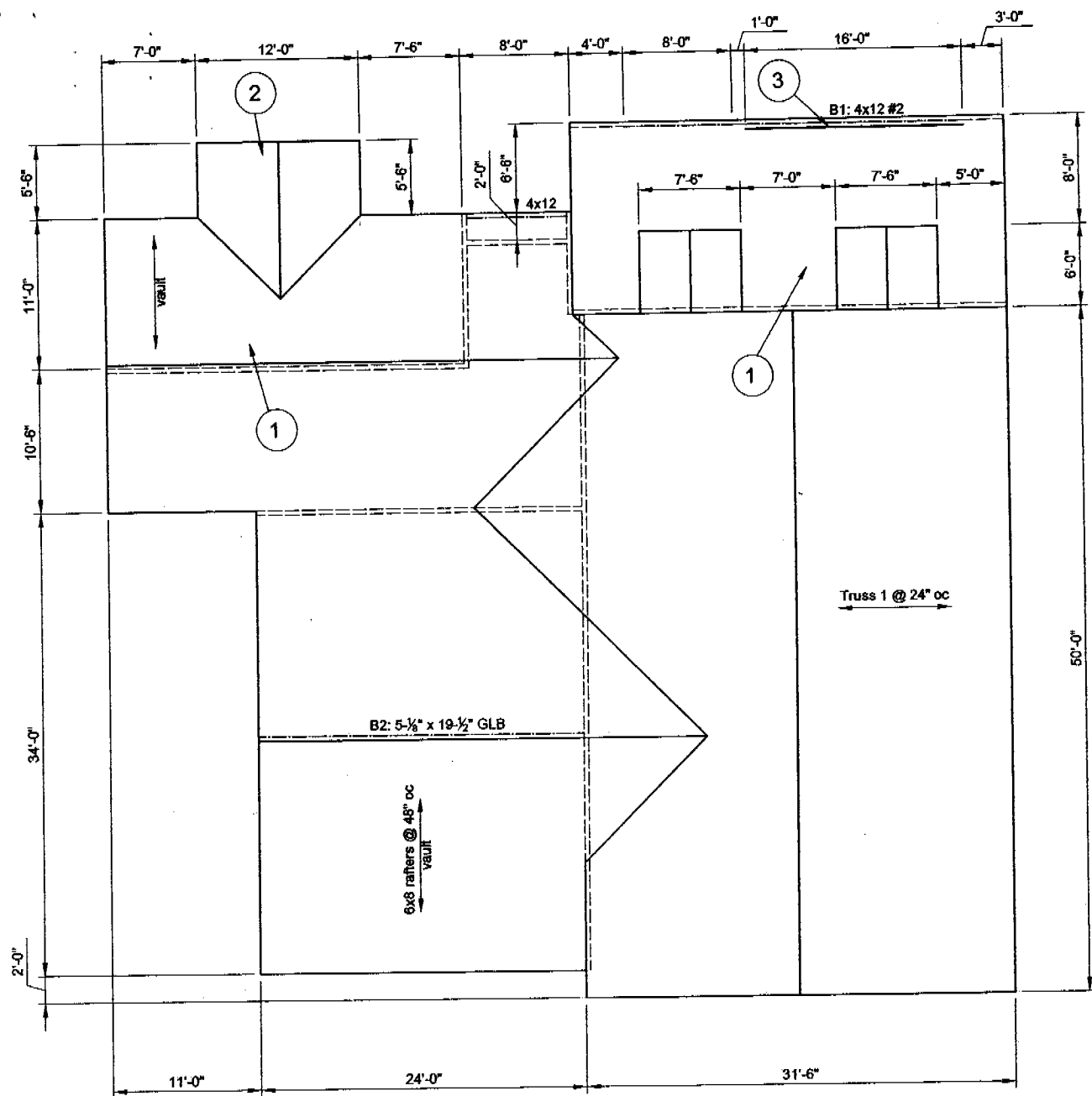
Grading:

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	5.5 inches
Length	8.94 feet
Max Axial Comp, C	1525 lbs
Max Reaction, R	210 lbs
Max Moment, M	337 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 =	1.25
fc =	185 psi
Fce =	1670 psi
Fc* =	2084 psi
F'c =	1272 psi
fb =	535 psi
F'b = Fb* =	2156 psi
Shear D/C ratio	0.32 < 1.0, Member OK
Interaction equation:	
(fc/F'c) ² +	
fb / (F'b(1-fc/Fce)) =	0.30 < 1.0, Member OK
Live Load defl ratio	0.13 < 1.0, Member OK
Total Load defl ratio	0.18 < 1.0, Member OK



FRAMING NOTES:

1. No Access. See "Recommendations" for allowable rafter spans.
2. Extend the hat channels at all gable end overhangs with a minimum back span of 6'-0".
3. Scab a 1 3/4" x 11 1/4" LVL to the existing 4x12 beam. See detail 2.

NOTES:

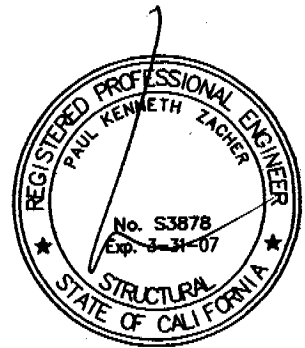
- A. This is a reroof project. The new roofing material shall be a Light Weight Concrete Tile. The tile shall weigh less than or equal to 7.3 psf.
- B. All framing members including rafters, purfins, joists and beams are existing unless otherwise noted in the framing notes above.
- C. All structural wood members that were observed appear to be in sound condition and without structural defect.

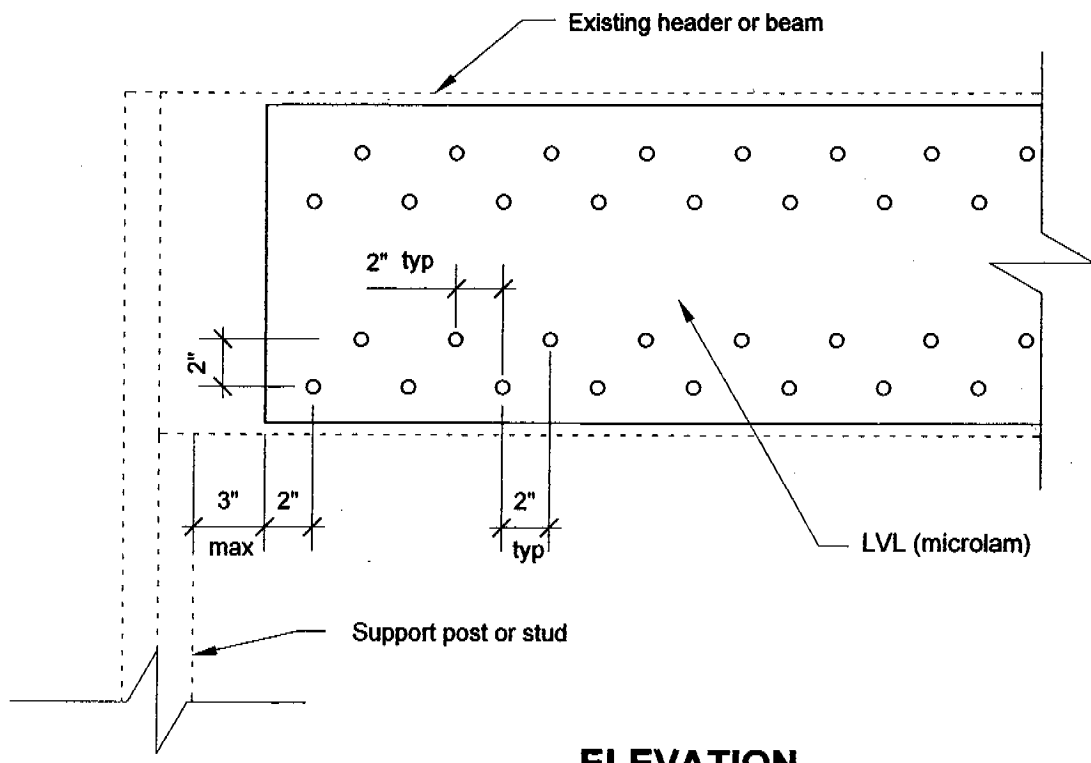


ROOF PLAN - KIM

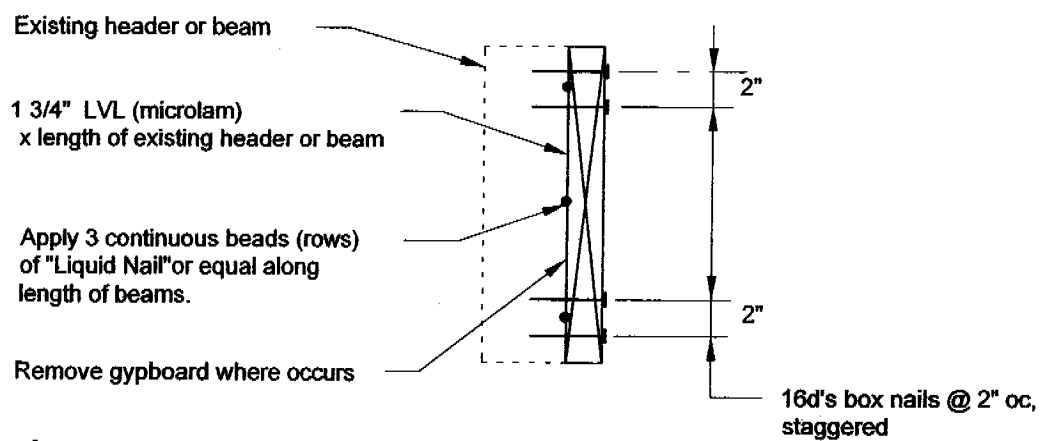
Not to Scale

10





ELEVATION



SECTION

2

DETAIL

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





ICBO Evaluation Service, Inc.

6380 WORKMAN MILL ROAD • WHITTIER, CALIFORNIA 90601-2299

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EVALUATION REPORT

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ER-2656

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Filing Category: ROOF COVERING AND ROOF DECK CONSTRUCTION—Roof Covering (202)

EXTRUDED CONCRETE INTERLOCKING ROOF TILES

MONIER LIFETILE LLC
7575 IRVINE CENTER DRIVE
IRVINE, CALIFORNIA 92618-2930

1.0 SUBJECT

Extruded Concrete Interlocking Roof Tiles: Roma; Classic "100," Homestead, Mission "S," Shake, Slate, Split Shake, Split Slate, Country Shake, Country Slate, Country Split Shake, Country Split Slate, Cedarlite, Espana, Espana Tejas, Capri, Villa, Sentry Classic and Traditions.

2.0 DESCRIPTION

2.1 Materials:

2.1.1 Regular-weight Tiles:

The extruded concrete roof tiles are interlocking elements having the dimensions and configurations shown in the accompanying table and figures. Accessory tile units are available for ridge, hip and gable areas. The regular-weight tiles are composed of portland cement and selected sand aggregates. The mix proportions are accurately maintained to ensure tile production in accordance with the specifications. Anchor lugs, located on the underside of all tiles, except Cedarlite, overlap wood battens, purlins or spaced sheathing for anchorage in the plane of the roof. Holes are provided in each tile for fastening where required by the installation. Interlocking ribs are provided on the longitudinal edges of the tiles to restrict lateral movement and provide a water stop. In addition, transverse bars are provided on the underside to serve as weather checks. Mineral coloring oxides are either applied to the exposed surface in a cementitious material or mixed integrally with the tile mix to produce a through-colored product. The tiles are cured to reach required strength before shipment. See Table 1 for product designations, dimensions and installed weights. See Figure 1 for tile profiles.

2.1.2 Lightweight Tiles: Duralite tiles are manufactured in the same manner and size, and with the same profiles, as regular-weight tiles, but the tiles are comprised of portland cement, lightweight aggregate and proprietary ingredients. See Table 1 for product dimensions and installed weights.

2.1.3 Cedarlite: Cedarlite tiles are manufactured in the same manner as regular-weight tiles, except they are comprised of portland cement, lightweight aggregate and proprietary ingredients, and have a wood shake appearance and flat backside.

2.2 Installation—New Construction:

2.2.1 General: Installation shall be in accordance with Tables 15-D-1 and 15-D-2 of the code, except as noted in this report. Care must be taken to ensure both horizontal and vertical alignment on the roof. Foreign particles must be cleaned from all interlocking areas, to ensure correct fit and prevent

water damming. Cracked or broken tiles must not be installed or allowed to remain on the roof.

2.2.2 Sheathing: Sheathing must be structurally adequate to support the loads involved. At a minimum, spaced sheathing boards must be nominal 1-by-6 lumber spanning a maximum of 24 inches (610 mm). Solid and spaced sheathing must be fastened in accordance with the code.

2.2.3 Underlayment: Tiles installed on roofs with slopes less than 2 1/2:12 (21% slope) are considered decorative only, and must be applied over an approved roof covering, subject to local building official approval.

On roofs with slopes of 2 1/2:12 (21% slope) to less than 3:12 (25% slope), an approved built-up roof applied in accordance with Table 15-D-1 of the code or an approved single-ply roof membrane assembly must be installed prior to installation of the tiles.

On solidly sheathed roofs with slopes of 3:12 (25% slope) to less than 4:12 (33% slope), underlayment may be as described in this section for roof slopes of 2 1/2:12 (21% slope) to less than 3:12 (25% slope), or may be a single layer of Type 90, granular-surfaced; asphalt roll roofing, or two layers of Type 30 felt installed shingle fashion, or other approved single-ply systems installed in accordance with the code or an ICBO ES evaluation report.

Over solid sheathing, on roofs with slopes of 4:12 (33% slope) or greater, underlayment must be one layer of minimum Type 30 felt either complying with ASTM D 226 or recognized in an ICBO ES evaluation report, and must completely cover the decking.

When the tiles are installed over spaced sheathing, the underlayment must comply with the ICBO ES Acceptance Criteria for Concrete Tile Underlayment on Spaced Sheathing (AC08). The underlayment must be draped over the rafters, with a 4-inch (152 mm) headlap and a 6-inch (152 mm) side-lap.

Underlayment must be lapped over hips and ridges, and lapped or laced through the valleys. Hip and ridge nailers must also be covered.

See Section 2.2.9 for application of underlayment in areas subject to roof ice buildup.

2.2.4 Battens:

2.2.4.1 Cedarlite Tiles: Battens installed for Cedarlite tiles must be nominal 1-by-3 wood. The battens must be fastened as described in Section 2.2.4.3, and spaced at 10 inches (254 mm) on center. The top edge of the Cedarlite tile must be aligned with the top of the batten.

2.2.4.2 All Other Tiles: Battens are required on solidly sheathed roofs with slopes below 3:12 (25% slope) in order to minimize membrane penetration, and above 7:12 (58.3% slope) to provide positive tile anchorage. Battens must be fastened either with corrosion-resistant 8d common or box nails

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or approved equal, spaced at 24 inches (610 mm) on center, or with 1 1/2-inch-long (38 mm), 7/16-inch-crown (11.1 mm), No. 16 gage, corrosion-resistant staples spaced a maximum of 12 inches (305 mm) on center.

On roofs with slopes of 2 1/2:12 (21% slope) to less than 3:12 (25% slope), nominal 3/8-inch (9.5 mm), decay-resistant wood lath strips are attached vertically to framing over the underlayment, from eave to ridge, at 24 inches (610 mm) on center. Battens must be structurally adequate to support expected loads, but not smaller than nominal 1-by-2 boards, and must be fastened through the vertical lath with minimum 8d corrosion-resistant box nails or approved equal.

When used on roofs with slopes of 3:12 to 21:12 (25% slope to 175% slope), battens must be fastened to the roof deck at a maximum of 24 inches (610 mm) on center. Battens must have provisions for drainage either by providing a 1/2-inch (12.7 mm) separation at the batten ends every 4 feet (1219 mm), or by shimming with decay-resistant wood or strips of material such as asphalt cap sheet or shingles spaced no more than 12 inches (305 mm) on center. Battens must be spaced to maintain a minimum 3-inch (76 mm) headlap when tiles are installed.

See Section 2.2.9 for installation of battens in severe climate areas.

2.2.5 Eaves: An eave closure strip or other approved special accessory must be installed to ensure that the eave course of tiles lies in the same plane as the remainder of the field. In areas determined by local building officials to be subject to blowing dust or snow, eave closure strips are required with Espana and Mission "S" tiles. Where solid fascia material is attached to rafter ends and extends above the plane of the deck to act as a first-course riser, an anti-ponding device must be used to support the underlayment.

2.2.6 Fastenings:

2.2.6.1 Field Tiles: Tiles shall be fastened in accordance with Tables 15-D-1 and 15-D-2 of the code. Tile nails shall be minimum No. 11 gage corrosion-resistant steel nails having a minimum 7/16-inch (7.9 mm) head diameter, and sufficient length to penetrate 3/4 inch (19 mm) into framing or battens or through the thickness of the sheathing, whichever is less. When battens are not used, every tile shall be nailed.

Cedar tile tiles must be fastened to the sheathing with two nails per tile in accordance with Table 15-D-1 of the code. As an alternative, on minimum 7/16-inch-thick (11.1 mm) oriented strand board or minimum 1 1/2-inch-thick (11.9 mm) plywood, a single buglehead wood screw, in the center fastener hole, may be used. The screw must be of sufficient length to penetrate through the deck approximately 1/4 inch (6.4 mm) minimum. The screw head is driven to a point that allows the face end of the tile to lift 1/4 to 1/2 inch (6.4 to 12.7 mm) above the tile below. The buglehead screw must have a head diameter of 0.328 inch (8.3 mm) and a shank diameter, between threads, of 0.192 inch (3.35 mm).

2.2.6.2 Trim Tiles: Nailer boards of sufficient height to adequately support hip or ridge tiles either must be fastened into framing with two 10d nails at 24 inches (610 mm) on center or two 20d nails at 48 inches (1219 mm) on center, or are secured using galvanized steel strapping or special galvanized steel attachment devices at 48 inches (1219 mm) on center. Each hip and ridge tile is attached to the nailer board with one No. 11 gage, corrosion-resistant nail of sufficient length to penetrate 3/4 inch (19.1 mm) into or through the thickness of the supporting member. Nose ends must be set in a bed of roofer's mastic or an adhesive complying with ASTM C 920-87 that also covers the nail head. All rake tiles must be fastened with two nails. The junction of the field tile and the hip and/or ridge must be weatherproofed with a dry ridge/hip system; a bed of mortar or other approved bedding material, in accordance with the manufacturer's instructions.

2.2.7 Flashing: Valley flashing must be in accordance with Section 1509 of the code. All other flashing must comply with

Section 1509 of the code. Openings through the tile for penetrations such as vents must be flashed in accordance with the code and supported by additional blocking or roof framing as required. Flashing around pipes, vents and flues shall consist of a sub-flashing at the deck and a top flashing filled in with the tile application. Flashing for profile tile must be made of lead or other approved flexible material and must be formed to the contours of the tile.

A weatherblock is required at headwalls, hips and ridges when installing Espana or Mission "S" tiles. Weatherblock is optional for all other profiles. Weatherblock materials include mortar, foil-backed pressure-sensitive adhesive, flexible metal formed to fit the tile, preformed plastic, neoprene or metal formed to fit the tile, and coated rigid foam.

2.2.8 Broken Tile Replacement: The broken tile is first removed. If battens were used originally, existing nails, if any, are cut and new tile inserted. If no battens were used, the old fastener is removed and the hole in the underlayment repaired with roofing cement. A 6-inch-by-8-inch-by-1/2-inch (152 mm by 152 mm by 12.7 mm) plywood piece is nailed to the deck to act as a batten. The new tile is then inserted.

2.2.9 Severe Climate Considerations: In areas designated by local building departments as subject to rooftop accumulation of sand, snow or rain driven by high winds, openings at hips, ridges and walls must be closed with metal or mortar, or approved sealant material. In areas subject to severe ice build-up at the eaves, tiles must not be installed on roof slopes below 4:12 (33% slope). Roof ventilation described in Section 1505.3 of the code must be provided.

Horizontal battens must be installed on top of nominal 1-by-4 vertical battens, to allow air flow between the roof deck and the installed tile. Vertical battens must be installed at 12 or 16 inches (305 or 406 mm) on center, or at up to 24 inches (610 mm) on center if fastened into rafters. Horizontal battens must be minimum 1-by-4 wood, fastened through the vertical battens. All tiles are nailed through horizontal battens. In areas where basic wind speeds exceeding 80 mph (129 km/h) exist, directions in Table 15-D-2 of the code must be followed. Underlayment application must comply with Tables 15-D-1 and 15-D-2 of the UBC.

2.3 Installation—Reroofing Applications:

2.3.1 General: Reroofing shall comply with Chapter 15 and Appendix Chapter 15 of the UBC. Care must be taken to ensure both horizontal and vertical alignment of tiles and battens on the roof. Foreign matter shall be cleaned from all interlocking areas. Cracked or broken tiles shall not remain on the roof. Damaged or rusted flashings should be replaced. Existing framing must be adequate for the additional load. The existing roof must be inspected in accordance with Appendix Chapter 15, Section 1515, of the code. When installed over existing spaced sheathing boards, with or without battens, either plywood, or an underlayment complying with the code or an underlayment specifically recognized for this type of use in an ICC-ES evaluation report may be used. When installed over solid sheathing, one layer of Type 30 felt or approved equivalent underlayment shall be installed on the roof prior to application of the tile. In lieu of this underlayment, the building official may determine that the existing roof covering provides the equivalent underlayment protection.

The minimum allowable roof slope is 3:12 (25% slope). Details not covered under this section are identical to those described in Section 2.2. Fasteners shall be of sufficient length to penetrate through the roof sheathing or a minimum of 3/4 inch (19.1 mm) into the structural framing, whichever is less. Battens shall be installed in accordance with Section 2.2.4.

2.3.2 Deck Preparation:

2.3.2.1 Asphalt Shingles: Wood batten strips shall be provided for roofs with slopes over 7:12 (58.3% slope).

2.3.2.2 Rock or Gravel Roofs: The existing roof deck shall be swept clean of all loose rock and gravel. One layer of minimum Type 40 coated base sheet shall be applied.

prior to installation of battens in accordance with Section 2.2.4.

2.3.3 Eave Preparation: Existing roof material shall be cut back to allow installation of a raised fascia board or eave closure material, flush with the end of the roof sheathing in accordance with Section 2.2.5.

2.3.4 Flashing: New pipe flashing and minimum 24-inch-wide (610mm) metal valley flashing shall be installed over existing flashing. Existing chimney and wall-counter flashing shall be used only if they are in good condition and sufficient height exists to insert new tile flashing. Flexible flashing shall be used with profiled tiles.

2.3.5 Wood Shakes and Shingles: Existing wood shakes and shingles shall be removed and tiles installed as for new construction.

2.4 Roof Classification:

When installed in accordance with Section 2.2 of this report, the roof tiles are noncombustible roof coverings in accordance with Section 1504.1 of the UBC. When installed over minimum 1 1/2-inch-thick (11.9 mm) plywood, in accordance with Section 2.2 and in the reroofing applications described in Sections 2.3.1 through 2.3.4 of this report, the tiles are Class A roof coverings, in accordance with Section 1504.2 of the code.

2.5 Identification:

The underside of each field tile is imprinted with the Monier Lifelle LLC logo or the name Monier, Lifelle or Boral Lifelle. Pallets bear a tag with the Monier Lifelle LLC name and address, the evaluation report number (ICBO ES ER-2858) and the installed weight of the product. Cedarille tiles also have an "M" imprinted on the top side of the tile.

3.0 EVIDENCE SUBMITTED

Reports of tests conducted in accordance with the ICBO ES Acceptance Criteria for Special Roofing Systems (AC07), dated April 1999, and installation and quality control details.

4.0 FINDINGS

That the extruded concrete interlocking roof tiles described in this report comply with the 1997 *Uniform Building Code*, subject to the following conditions:

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

4.2 They are manufactured at plants located in Phoenix, Arizona; French Camp, California; Gilroy, California; Lathrop, California; Rialto, California; San Bernardino, California; Kapolei, Hawaii; Henderson, Nevada; Katy, Texas; and Tacoma, Washington.

This report is subject to re-examination in one year.

TABLE 1—TILE DIMENSIONS AND WEIGHTS

TILE DESIGNATION	INSTALLED WEIGHT (psf)	LENGTH (inches)	WIDTH (inches)	HEIGHT (inches)
Hispina • Regular weight • Duralite	9.0 5.3	17	12 3/8	3
Hispina, Tejas Mission "S" • Monier 2000	9.0	16 1/2	12 3/8	3
Capt • Regular weight • Duralite	9.5	16 1/2	13 1/8	2 3/4
Sentry Classic	9.3 5.3	17	13	2 1/2
Villa • Monier 2000 • Duralite	9.3	16 1/2	12 3/8	2 1/8
Roma	9.3 5.3	16 1/2	13	2 1/4
Classic "100"	9.3	16 1/2	13	2 1/8
Shake, Country Slate, Country Shake, Colonial Slate, and Split Shake • Regular weight	9.5	16 1/2	13	2
Shake, Sentry Slate, Country Slate, Country Slate, Country Split Shingle and Country Split Slate (Split Slate—Texas plant only) • Regular weight	10.3	17	12 3/8	1 3/4
Homestead	10.3	16 1/2	13	1 1/4
Split Shake and Slate Flat • Tradition • Frontier Duralite	9.5	16 1/2	13	1 1/4
Cedarille	10.3 7.4	16 1/2	13	1 1/4
Monier 2000 Split Shake and Monier 2000 Slate Duralite Split Shake and Duralite Slate	5.6	13 1/2	13	1 1/16
	9.3	16 1/2	13	3/4
	5.7	16 1/2	13	1

1 ft = 12 in = 304.8 mm, 1 psf = 0.0479 kPa.
 Installed weight was determined with a 3-inch headlap.

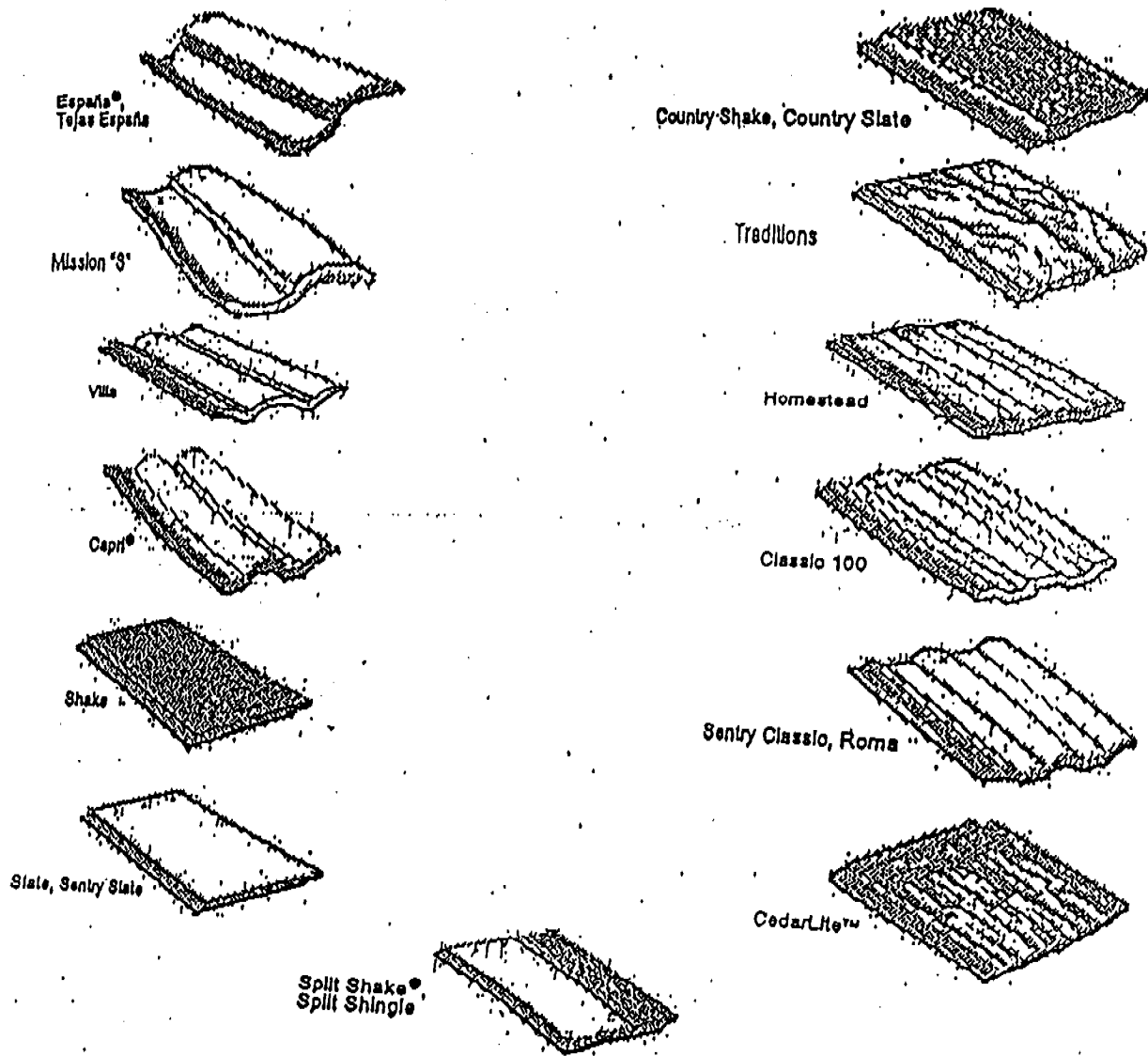
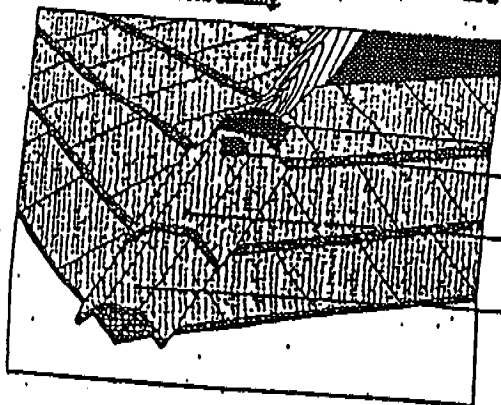


FIGURE 1—TILE PROFILES

HIP TRIM DETAILS

It should be noted that the installation of hip trim tiles, whether flat or profile, is similar. The options for hip trim tiles lie in the various treatments of end condition detailing.



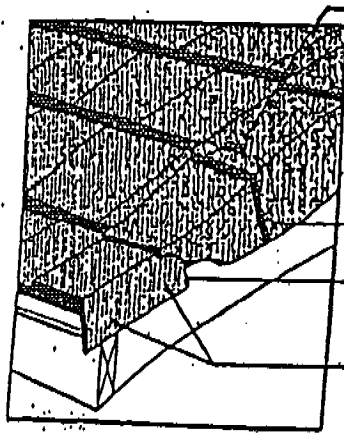
Hold the shingle in place with an average of 4/8" of nailer board.
Nail each tile with a corrosion-resistant nail of sufficient length to penetrate nailer board a minimum 3/4".
Cut tiles without nail holes may be drilled, notched and nailed as allowed with the square, wire and/or cut tile clips.

Nailer's grade or the adhesive must be applied at overlap to cover nail hole.
Provide a minimum 3" overlap.

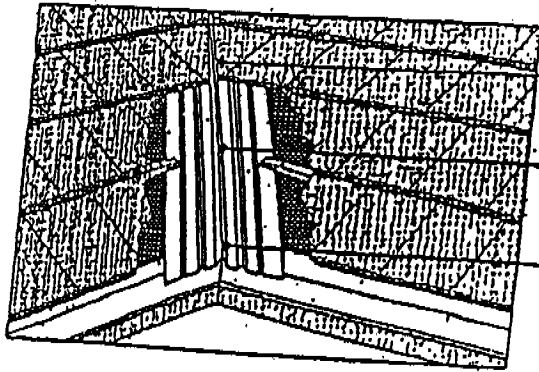
Hold back hip nailer 1/2" from eave edge.
Suggested nailer steps for Mission are 2" x 6". All others require 2" x 4".
When counter-battens are used, the nailer board must be increased accordingly. Steep pitches may require reduction in nailer board size.
Nailer Mission must be sealed in all regions.
2" x 8" nailer may be necessary when using high barrel tiles.

FIGURE 2—TYPICAL INSTALLATION DETAILS

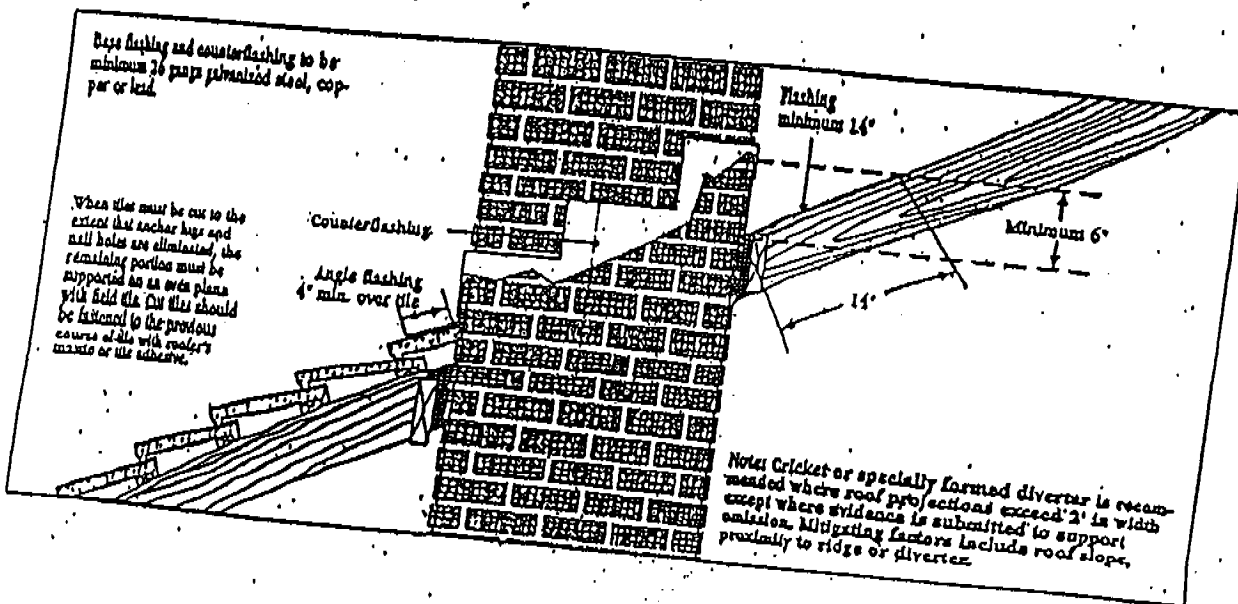
It should be noted that the installation of metal tiles, whether flat or profile, is similar. The options for metal tiles is in the various treatments of end conditions detailing.



- Note: For additional fastening to regions subject to compressive loads, a minimum 1" lap of tile adjacency is recommended at overlap.
- Factory-finished butt end exposed—flush with and toward ridge.
- Butt ends that to course above.
- Cut off butt end of last row that is factory-finished butt end to flush with next course tile.
- Two overlapping metal tiles per joint the of sufficient length to penetrate the water or large board's minimum of 3/4" (96 minimum).



- CLOSED VALLEY
- Standard closed valley treatment.
- Cur tiles not attached to battens or batten extender must be attached by wire and/or adhesive or cut tile clips.
- No. 26 gauge (minimum) galvanized ribbed valley flashing
- No. 26 gauge (1-99) galvanized ribbed valley flashing
- Minimum 1" flashing seam splash diverter
- Remove portion of the heading where tile rests on metal flashing to prevent water leakage.



Base flashing and counterflashing to be minimum 26 gauge galvanized steel, copper or lead.

When tiles must be cut to the extent that neither hips and nail holes are eliminated, the remaining portion must be supported as an even plane with field tile. Cut tiles should be fastened to the previous course of tile with roofer's mastic or tile adhesive.

Counterflashing
Angle flashing
4" min. over tile

Flashing minimum 14"
Minimum 6"
14"

Note: Cricket or specially formed diverter is recommended where roof projections exceed 2' in width unless evidence is submitted to support omission. Mitigating factors include roof slope, proximity to ridge or diverter.

FIGURE 2—TYPICAL INSTALLATION DETAILS—(Continued)



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Legacy report on the 1997 Uniform Building Code™

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

Mallbu Tiles and 7.0 psf (34 kg/m²) for Ponderosa and Bel Air Tiles.

EAGLE AND EAGLELITE INTERLOCKING CONCRETE ROOFING TILES

2.2 Installation:

EAGLE ROOFING PRODUCTS
3646 NORTH RIVERSIDE AVENUE
RIALTO, CALIFORNIA 92377

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-8034P.

1.0 SUBJECT

Eagle and Eaglelite™ Interlocking Concrete Roofing Tiles.

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 ICC-ES evaluation report, installed with or without battens, 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.

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 (Mallbu), 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.

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

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, 12³/₄ inches (315 mm) wide, and nominally 1/2 inch (12.7 mm) thick. They are manufactured in either flat or profile style with 1/4-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 weight with 3-inch (76 mm) head laps are 9.5 psf (46 kg/m²) for Capistrano Tiles, 9.5 psf (46 kg/m²) for Mallbu Tiles and 10.0 psf (49 kg/m²) for Ponderosa and Bel Air Tiles.

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.

2.1.2 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 weight with 3-inch (76 mm) head laps are 5.7 psf (28 kg/m²) for Capistrano Tiles, 5.5 psf (27 kg/m²) for

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.

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3.0 EVIDENCE SUBMITTED

Results of tests in accordance with the ICC-ES Interim Criteria for Clay and Concrete Roof Tiles (AC108), dated January 2002, and a quality control manual.

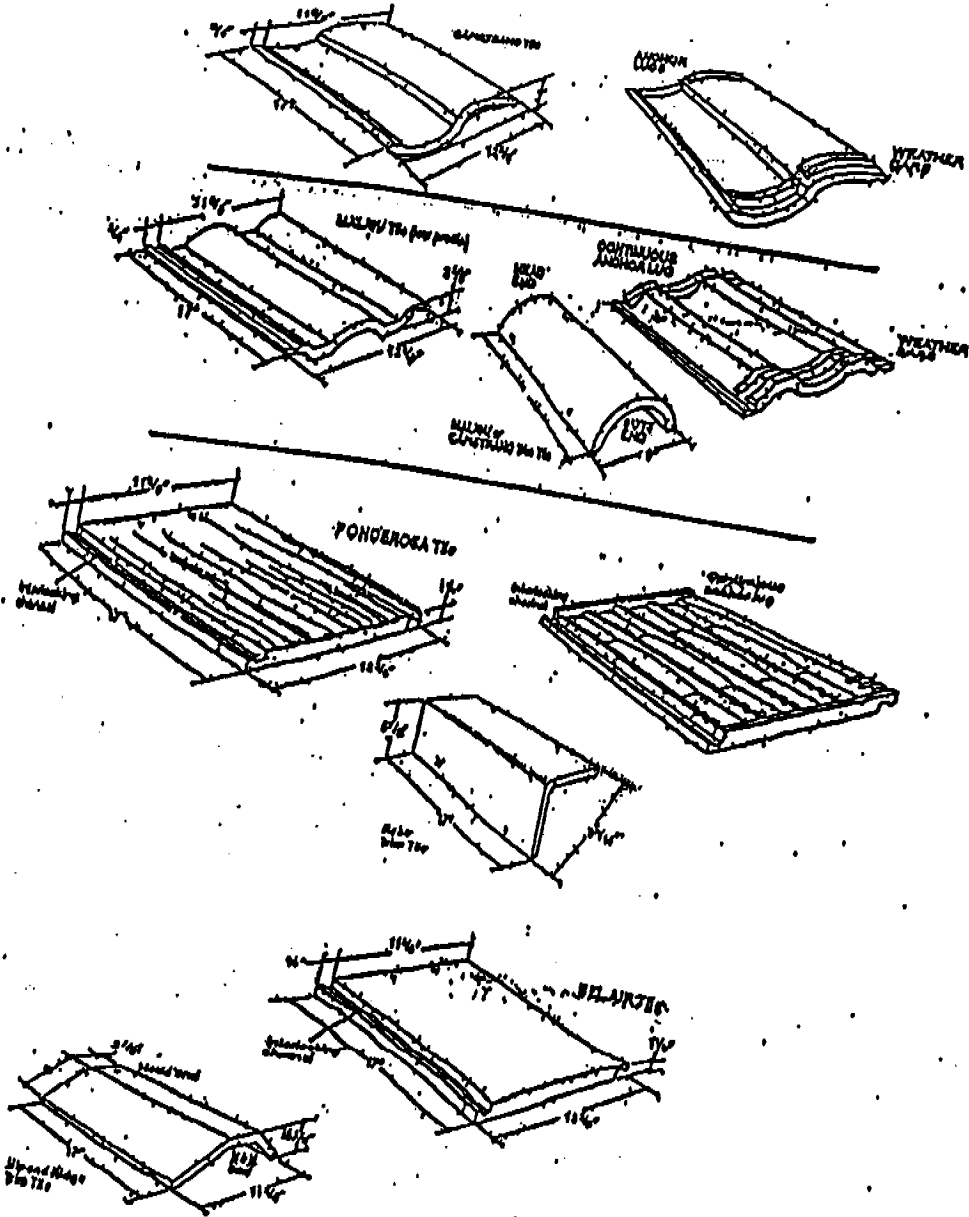
4.0 FINDINGS

That the 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