Roof Inspections

Presented by:

G. Stephens & Associates, Inc.

Glenn Stephens, President/Inspector/Instructor

CRC1327314 – 08/06/2004 (DBPR/CILB)

CCC1329969 – 05/25/2012 (DBPR/CILB)

HI418 – 10/13/2010 (DBPR)

RPI0856 – 07/20/2016 (FABI)

CMI16080827 – 08/08/2016 (NACHI)

ACI261873 – 09/14/2016 (ASHI)

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DBPR Provider #0007273

G. Stephens & Associates, Inc.

CILB Course #:0612390

HI Course #:0001179

Course Objectives

- What to look for when inspecting a roof.
- Where to walk when inspecting a roof.
- When is a roof beyond its useable life.
- How to perform a roof inspection.

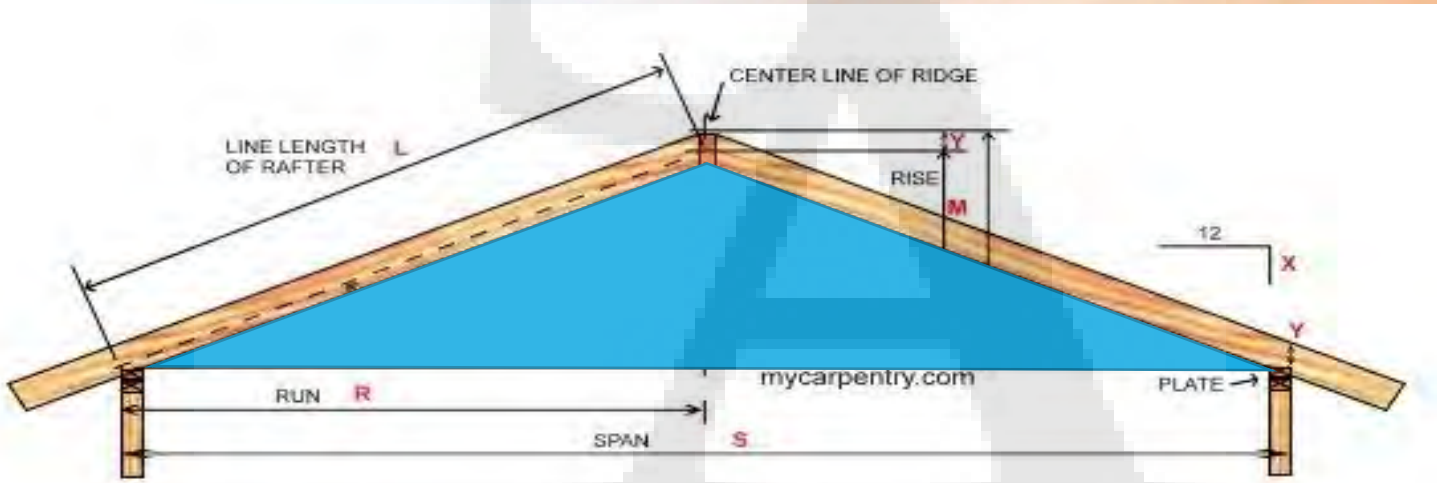
What to look for…

What are these on Commercial Buildings

Roof Slope vs Roof Pitch

- **Slope** is the incline of the roof expressed as a ratio of the vertical rise to the horizontal run, where the run is some portion of the span. This ratio is always expressed as inches per foot.
- 4” rise in a 12” run has a Slope of 4:12

- **Pitch** is the incline of the roof expressed as a fraction derived by dividing the rise by the span, where the roof span is the distance between the outside of one wall's top plate to another.
- A Roof rise of 8’ over a 24’ span has a Pitch of 1 to 3 or 1/3



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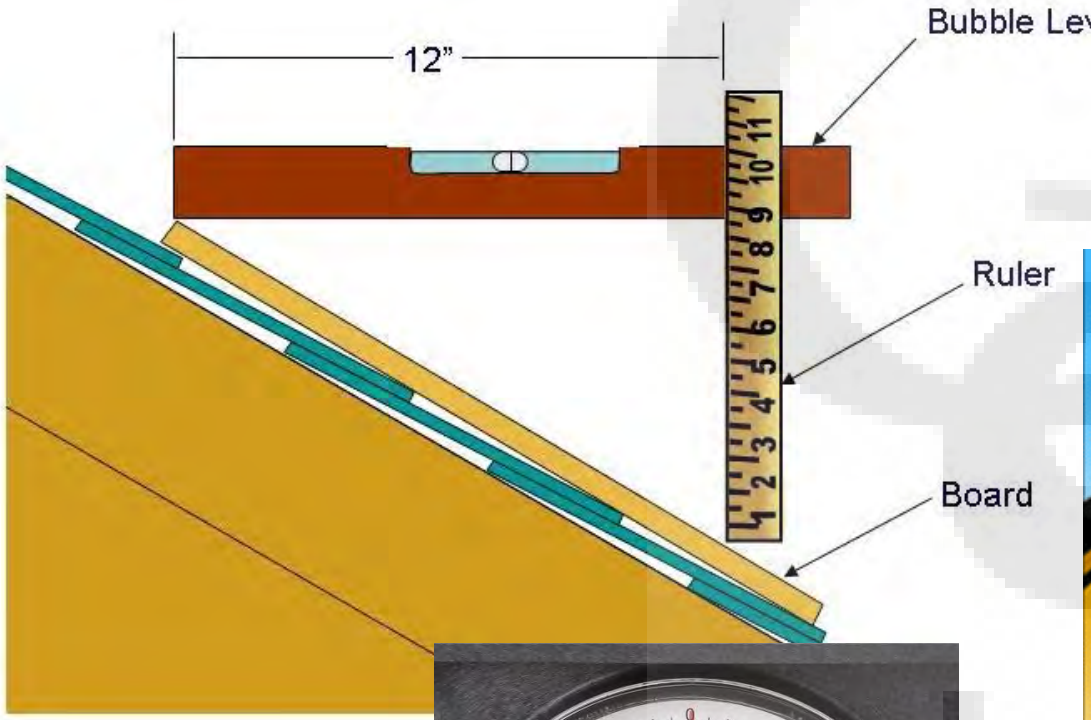
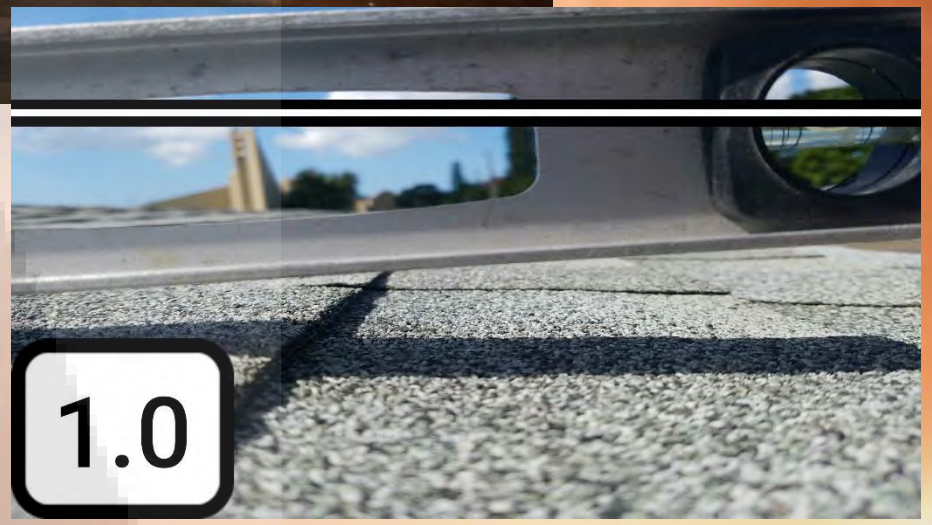
Measuring the Slope



Shingles on 1¼:12 - is this acceptable?



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Wind Zone Map Risk Category II

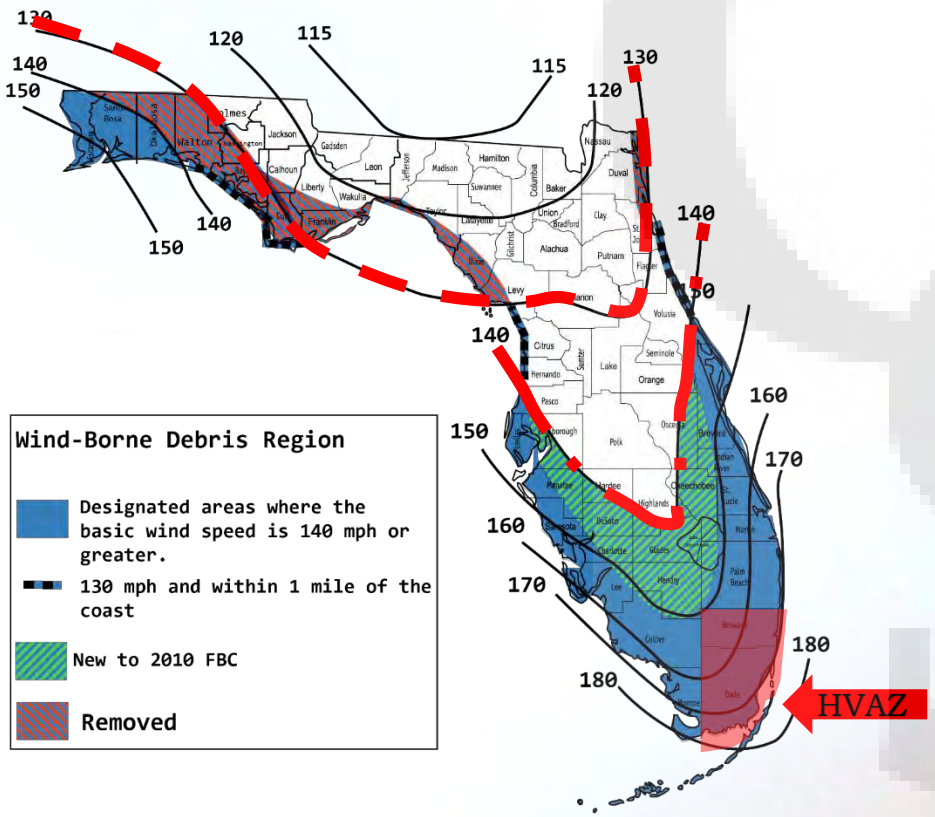

Figure 1609A Wind-Borne Debris Region, Category II and III Buildings and Structures except health care facilities

- WBDR – Wind-Borne Debris Region
  - Land located in wind zones of 140mph or greater
  - Land located in the 130mph wind zone and within 1 mile of the coast line
- HVHZ – High Velocity Hurricane Zone
  - Miami-Dade & Broward Counties Only

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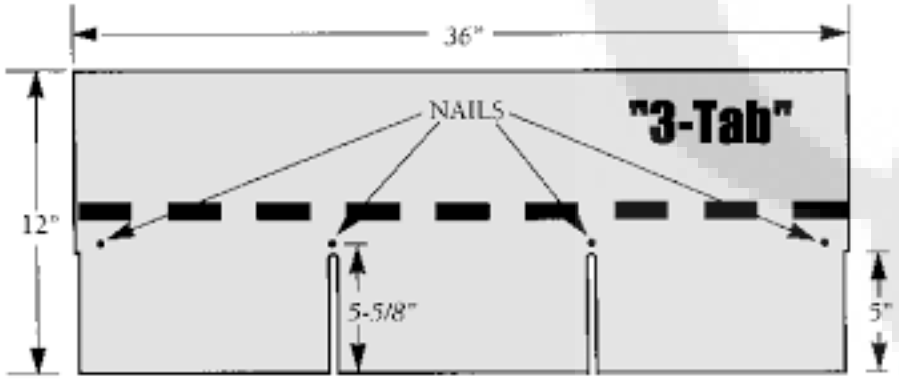
Fiberglass/Asphalt/Composite Shingles

- 3-Tab Shingles



RUL: 10-15 years

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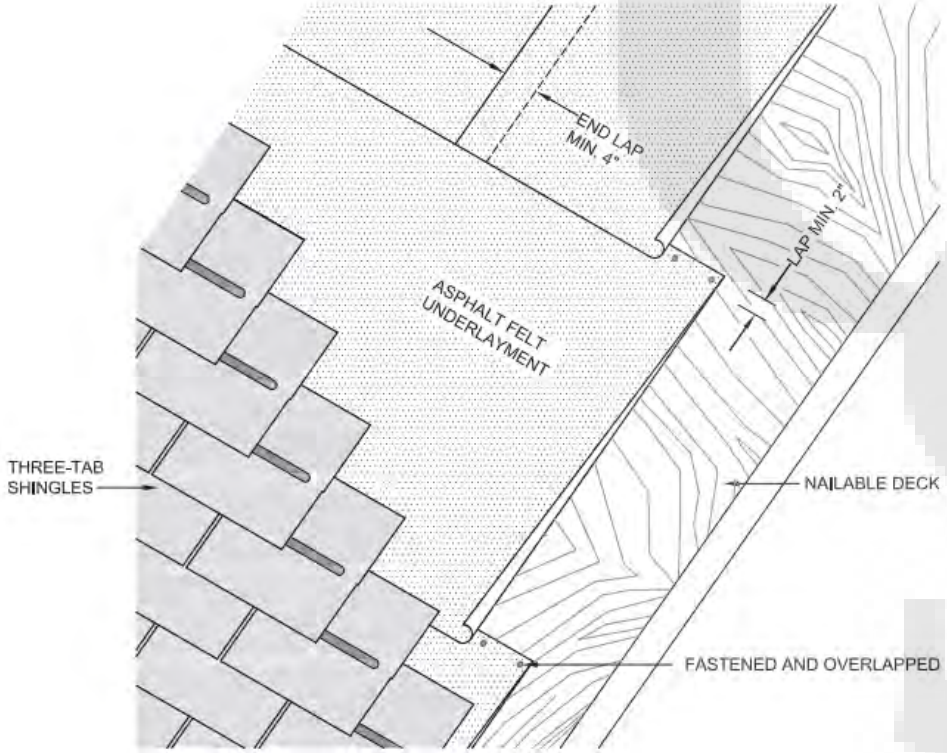
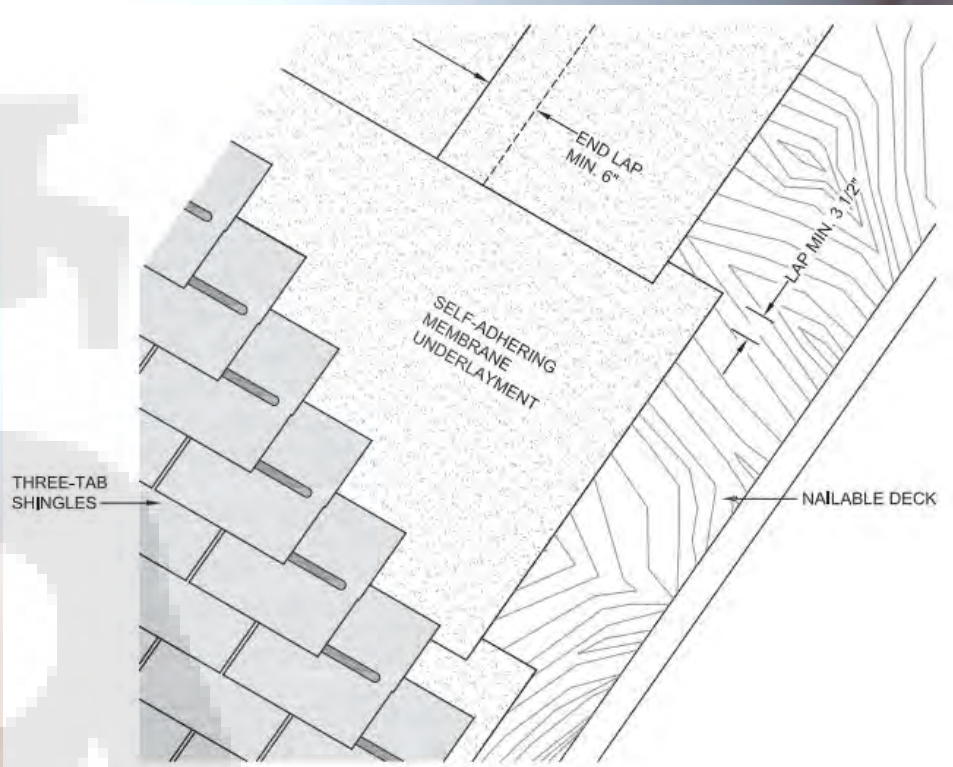
RUL = Remaining Useable Life

Three-Tab Asphalt Shingle Roof System



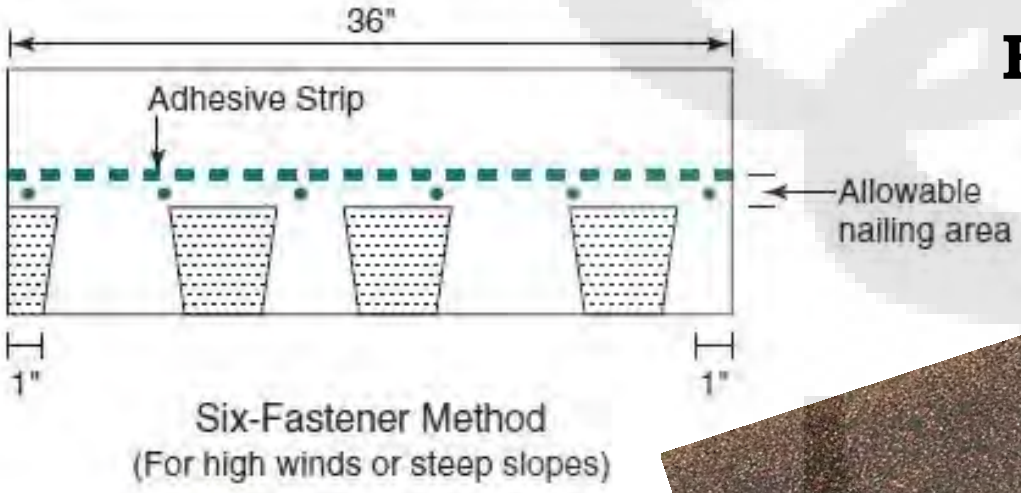
ASPHALT SHINGLE ROOF SYSTEM WITH SINGLE LAYER OF MECHANICALLY ATTACHED UNDERLAYMENT
(THREE-TAB SHINGLE AND ASPHALT FELT UNDERLAYMENT SHOWN)



ASPHALT SHINGLE ROOF SYSTEM WITH SINGLE LAYER OF SELF-ADHERING UNDERLAYMENT
(THREE-TAB SHINGLE AND SELF-ADHERING MEMBRANE UNDERLAYMENT SHOWN)

Fiberglass/Asphalt/Composite Shingles

- Architectural/Dimensional Shingles



Six-Fastener Method
(For high winds or steep slopes)

RUL: 15-25 years

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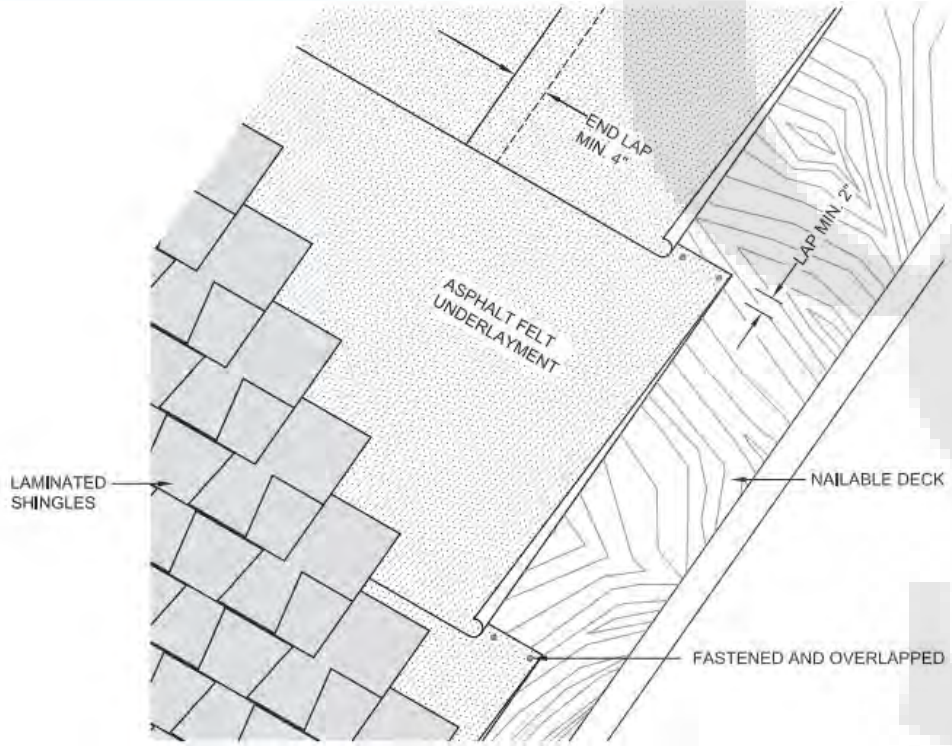
RUL = Remaining Useable Life

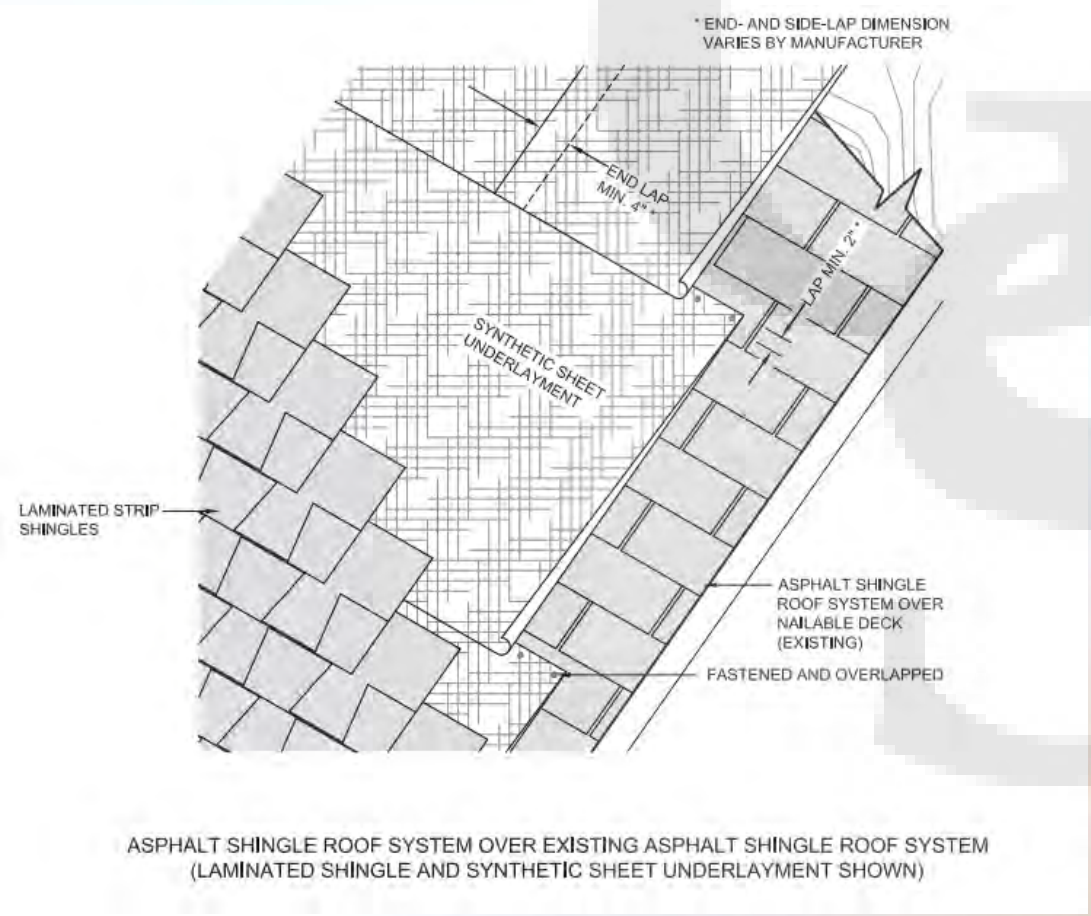
Laminated Asphalt Shingle Roof System



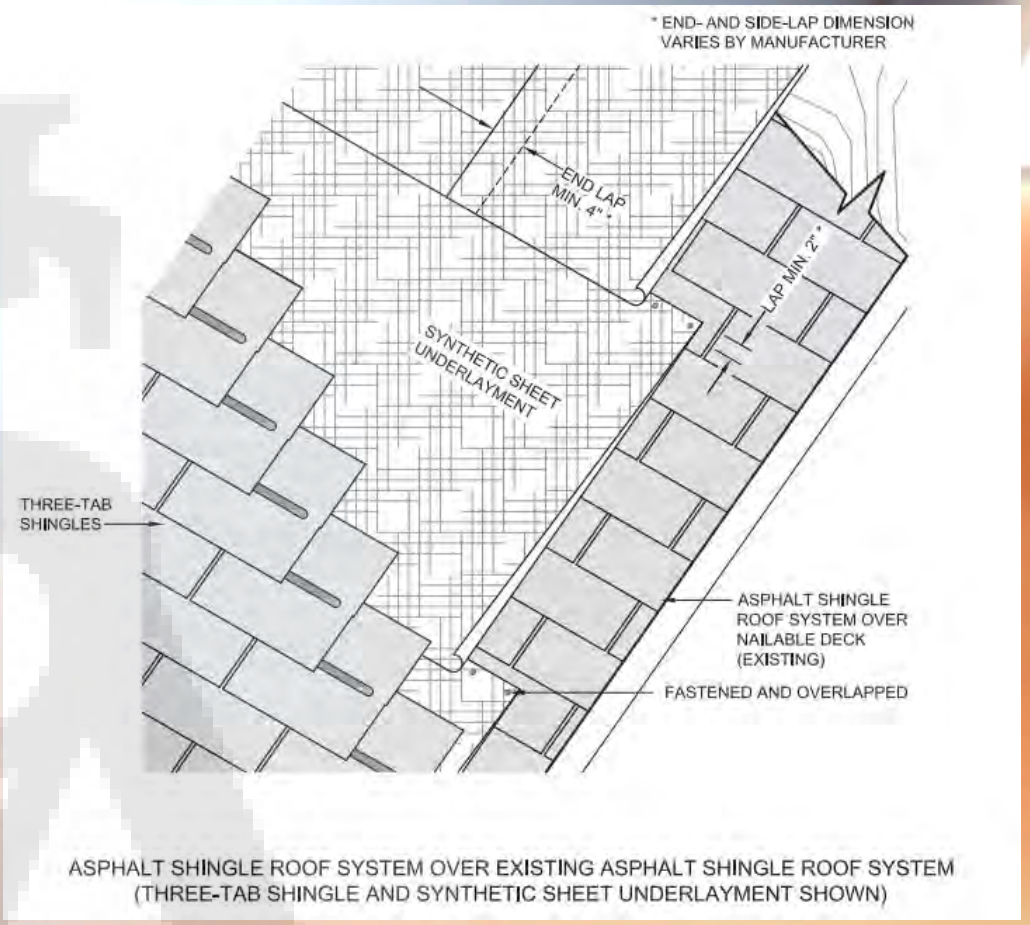
ASPHALT SHINGLE ROOF SYSTEM WITH SINGLE LAYER OF MECHANICALLY ATTACHED UNDERLAYMENT
(LAMINATED SHINGLE AND ASPHALT FELT UNDERLAYMENT SHOWN)

ASPHALT SHINGLE ROOF SYSTEM WITH SINGLE LAYER OF SELF-ADHERING UNDERLAYMENT
(LAMINATED SHINGLE AND SELF-ADHERING MEMBRANE UNDERLAYMENT SHOWN)

Roof Over Shingle Roof System



ASPHALT SHINGLE ROOF SYSTEM OVER EXISTING ASPHALT SHINGLE ROOF SYSTEM
(LAMINATED SHINGLE AND SYNTHETIC SHEET UNDERLAYMENT SHOWN)



ASPHALT SHINGLE ROOF SYSTEM OVER EXISTING ASPHALT SHINGLE ROOF SYSTEM
(THREE-TAB SHINGLE AND SYNTHETIC SHEET UNDERLAYMENT SHOWN)

Built-up Roofs

- Typically any low-slope roof consisting of:
  - Tar & Gravel

Built-up (Rolled) Roofs

- Typically any low-slope roof consisting of:
  - Tar & Gravel
  - Modified Bitumen
    - Hot-mopped

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Built-up (Rolled) Roofs

- Typically any low-slope roof consisting of:
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    - Hot-mopped
    - Torched Down

Built-up (Rolled) Roofs

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Built-up (Rolled) Roofs

- Typically any low-slope roof consisting of:
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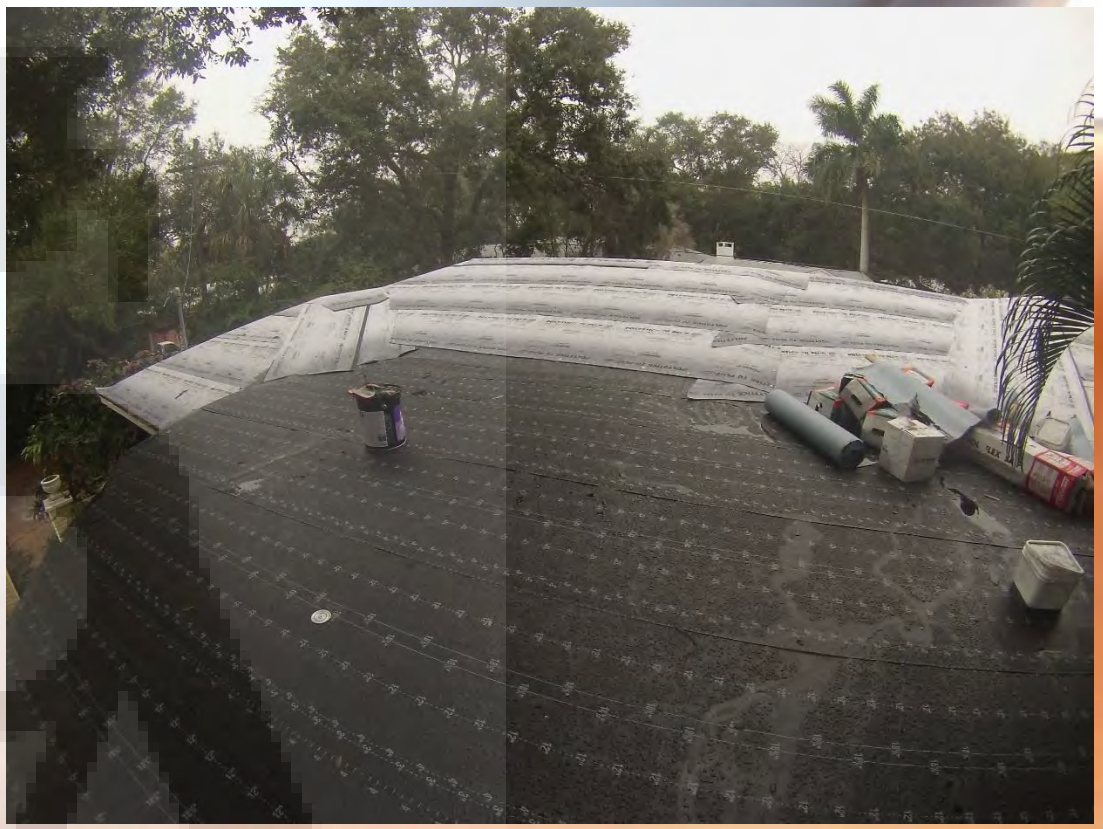
    - Hot-mopped
    - Torched Down
    - Self-Adhered (Peel-n-Stick)



Single-ply Roof Membranes

- Four common thermoplastic membranes:
  - PVC – Polyvinyl chloride
  - PVC alloys
    - CPA – Copolymer alloy
    - EIP – Ethylene interpolymer
    - NBP – Nitrile alloy
  - TPO – Thermoplastic polyolefin
  - KEE – Ketone ethylene ester

Metal

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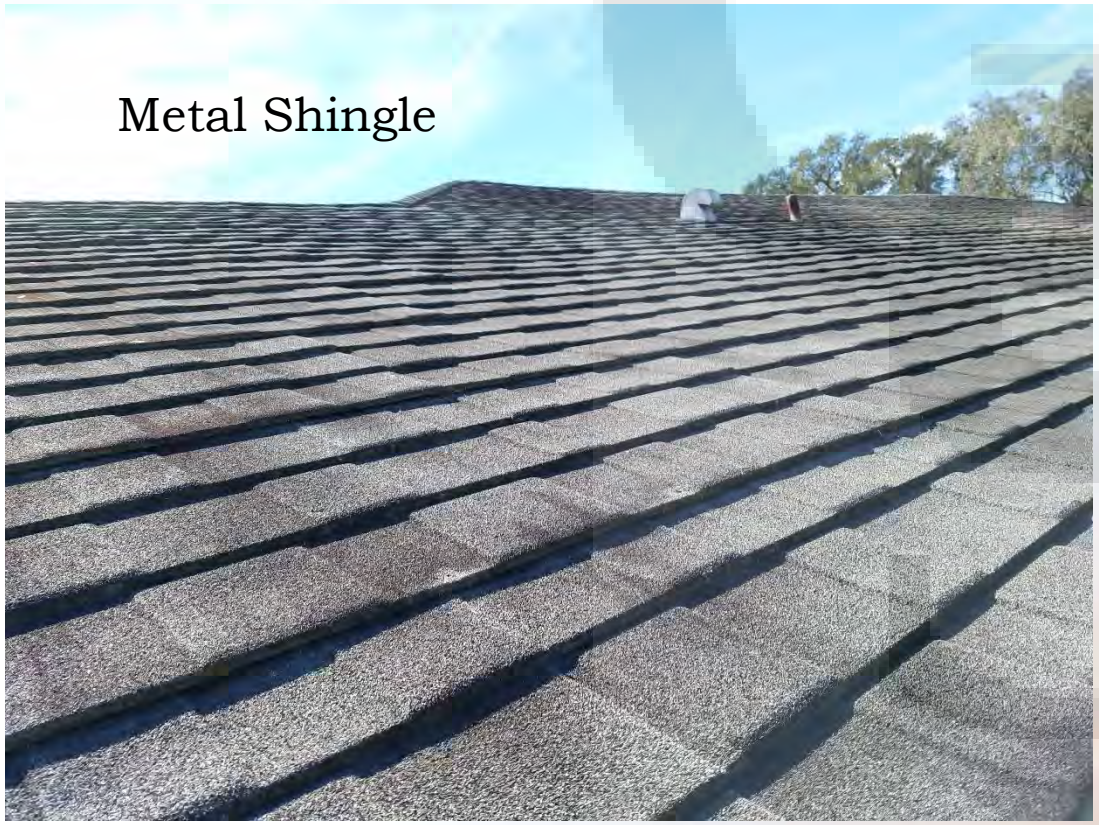
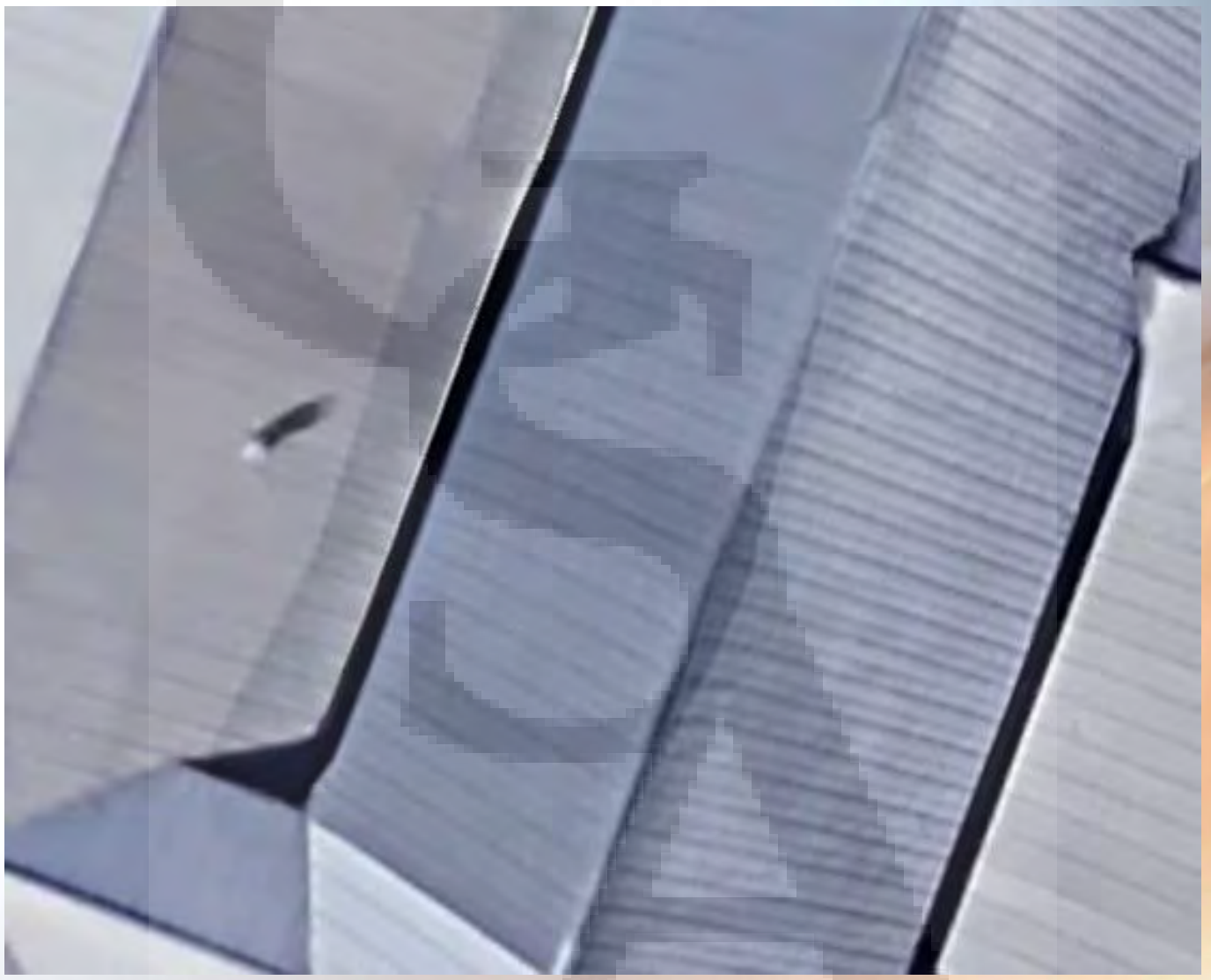
Metal



Metal

Metal Roof at an Amusement Park



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Found the fasteners coming out

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Where to walk…

Why should you check the attic prior to walking the roof?

Check Roof Deck from Attic

Check Roof Deck from Attic

- Monier Tile in the ’80s allowed their product to be installed over a batten deck system.

Tile

- Would you walk a flat tile roof?
  - Under normal circumstances yes.

Tile

- Would you walk a flat tile roof?
  - Under normal circumstances yes.
  - With a deflection in the roof deck?

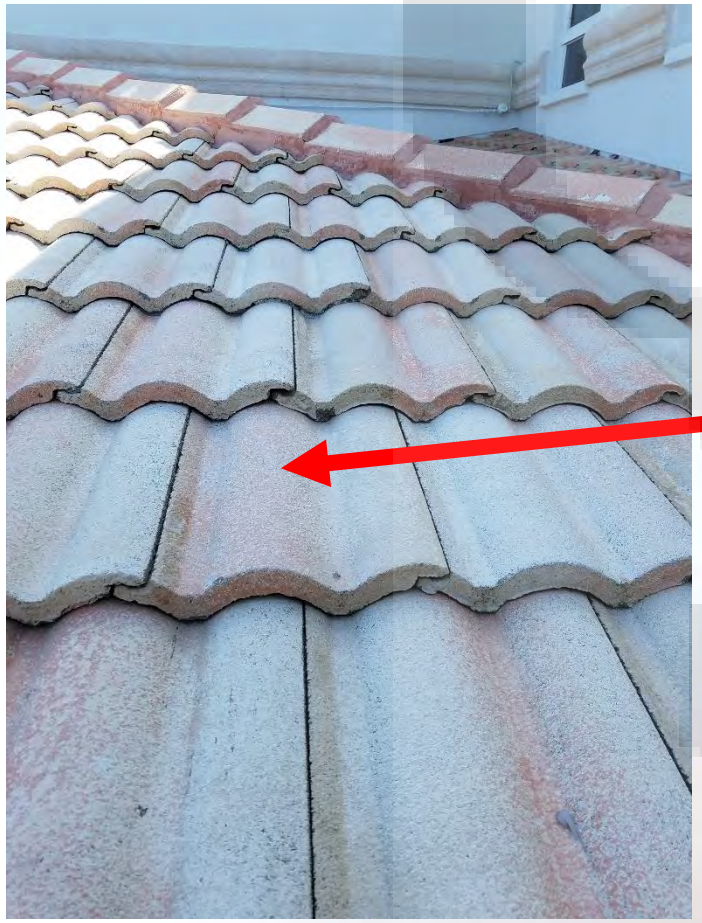
Tile

- Would you walk a barrel tile roof?

Tile

- Would you walk a barrel tile roof?
  - Yes, but where would you step?

Tile

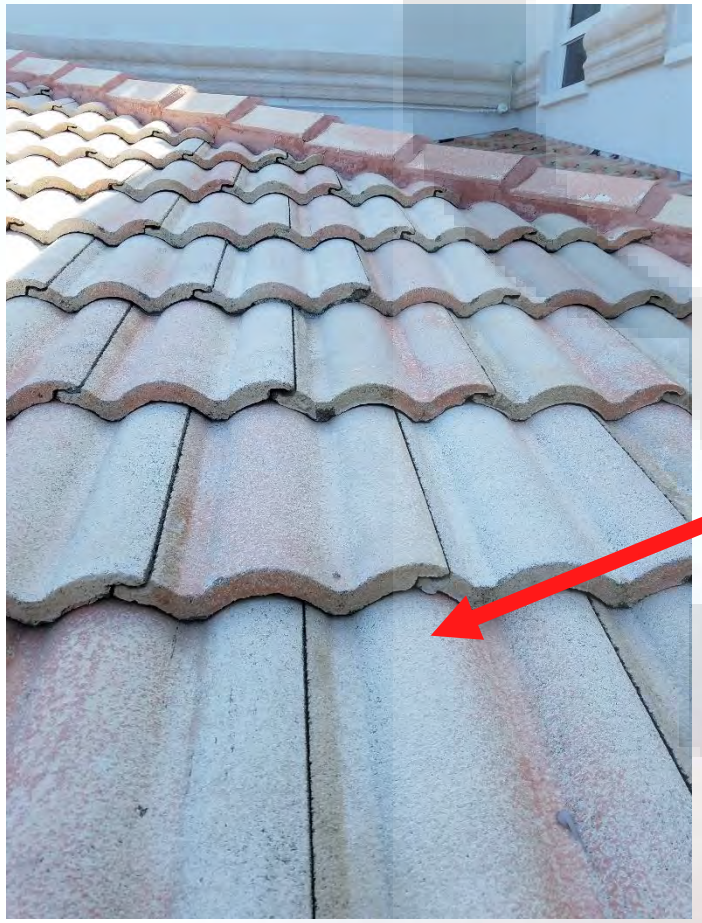


- Would you walk a barrel tile roof?
  - Yes, but where would you step?
  - Try not to step in the middle of the tile.

Tile

- Would you walk a barrel tile roof?
  - Yes, but where would you step?
  - Not at the water channel.

Tile



- Would you walk a barrel tile roof?
  - Yes, but where would you step?
  - Not at the tops.

Tile

- Would you walk a barrel tile roof?
  - Yes, but where would you step?
  - Right here where it has the most support.

Metal

Useable Life

Remaining Useful Life (RUL)

Life Expectancy

Material	Industry RUL	SWFL RUL
3-Tab Shingles	10-15 years * 10-12 years **	15 years
Architectural Shingles	15-25 years * 15-20 years **	Prior FBC '07 – 20yrs After FBC '07 – 25+yrs
Tile (Clay/Concrete)	25-35 years * 80+ years **	Prior FBC '07 – 20yrs After FBC '07 – 25+yrs
Metal (within 7-miles of Salt/Brackish)	25+ years * 17-20 years **	Prior FBC '07 – 20yrs After FBC '07 – 25+yrs
Mod-BUR (Rolled Roofing)	15+ years * 10 years **	Prior FBC '07 – 15yrs After FBC '07 – 20+yrs
Membrane	15+ years * 10-12 years **	Prior FBC '07 – 20yrs After FBC '07 – 25yrs

* - RUL used by Insurance Industry
** - RUL used by InterNACHI

Factors

- Material used
- Underlayment
- Proper flashing
- Installation
- Fastening system
- Attic ventilation
- Roof complexity
- Multiple roof layers
- Vegetation coverage
- Maintenance
- Prior repairs

Roof Age

OLD

NEW

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Roof Age

OLD

NEW

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Roof Age

How do you know if it is OLD?

- If there aren't permits:
  - Look for brittle/dry shingles

Roof Age

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  - Look for loose or excessive granules in gutters

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How do you know if it is OLD?

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  - Broken shingles showing the original color

Roof Age

How do you know if it is OLD?

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  - Look at the flashing/bull. Is it dry and cracking?

Roof Age

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  - Is the drip-edge showing signs of oxidation or rust?

Roof Age

How do you know if it is OLD?

- If there aren't permits:
  - Look for brittle/dry shingles
  - Look for loose or excessive granules in gutters
  - Broken shingles showing the original color or tile
  - Look at the flashing/flash. Is it dry and cracking?
  - Is the drip-edge showing signs of oxidation or rust?
  - How about water ponding?

Causes of Water Damage

View from the Attic

Underlayment at the Rake

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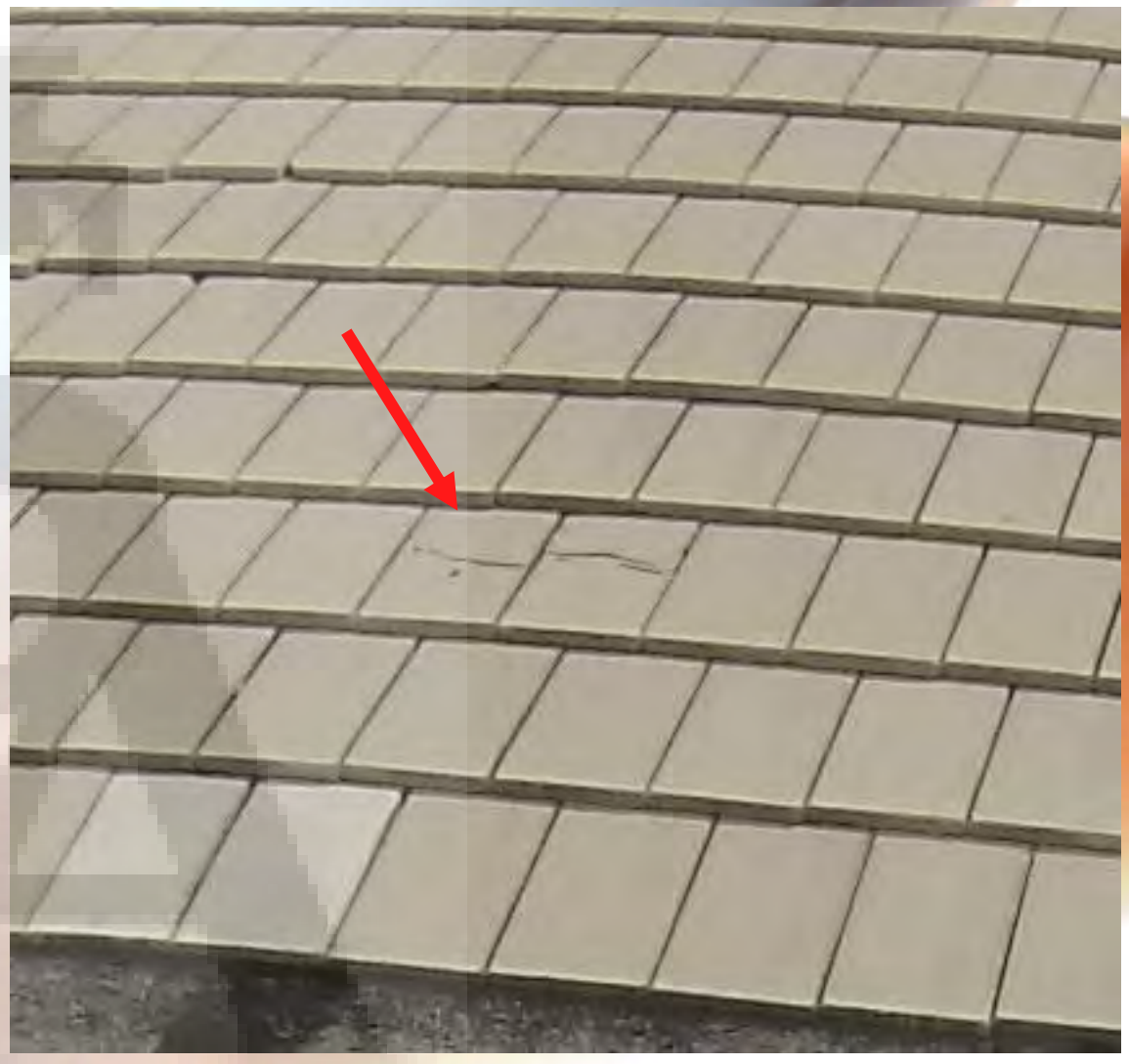
What do you see?

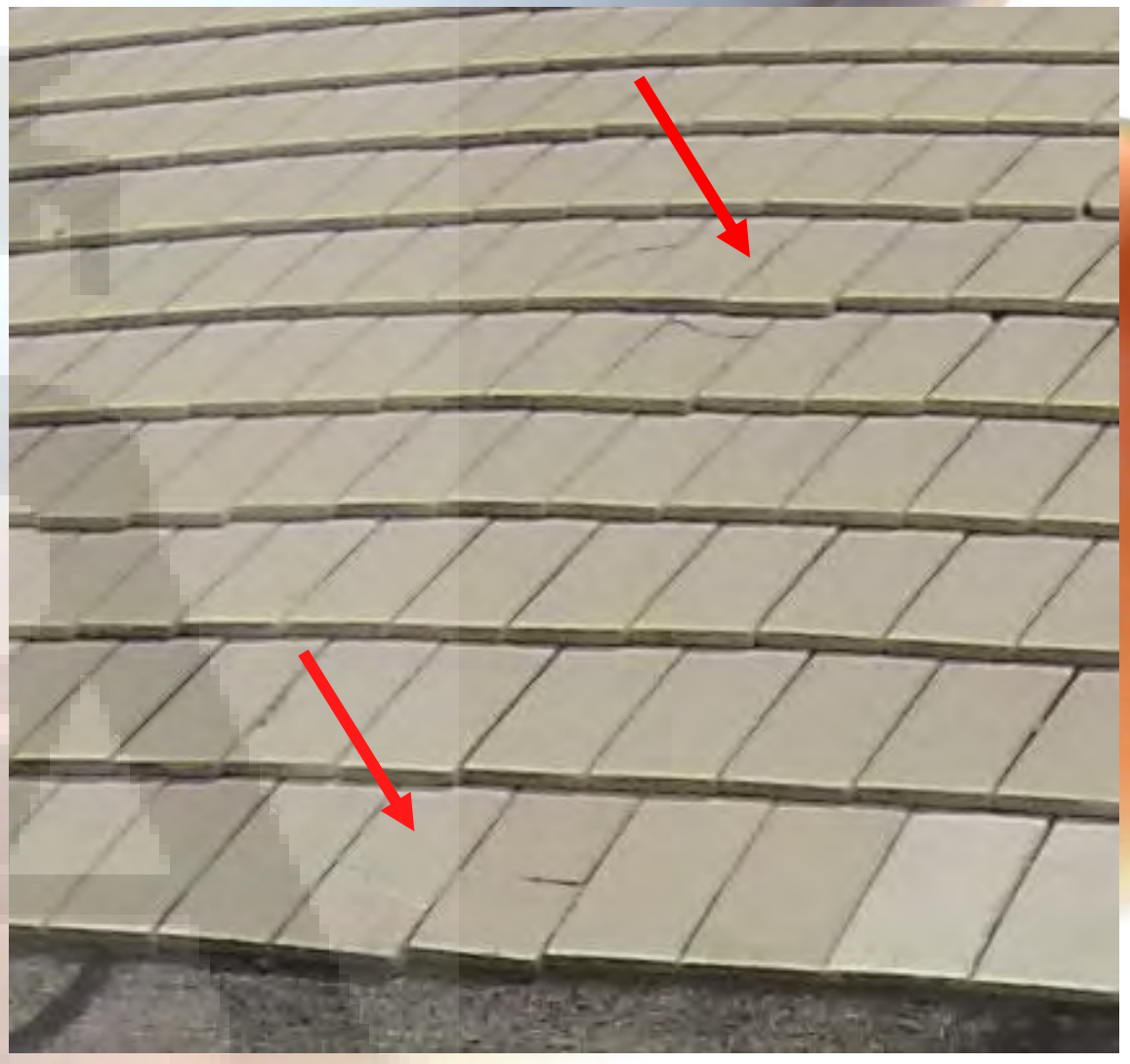
What do you see?

What do you see?

What do you see?



What do you see?



What do you see?

What do you see?

What would cause this?

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What would cause this?

What about this one?

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What about this one?

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Metal Roof

- Limited or No Warranty:
  - Within 1,500 feet of salt/brackish water environments
  - Owner not washing the roof with tap water twice a year and not maintaining records of such
  - Not exposed to rain
  - Less than ½:12 slope

Inspecting the Roof

Two properties with similar roofs

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First Property
Is this a new or old roof?

Flat Section

Tile Section

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First Property

Flat Section

Tile Section

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How do we know?

Flat Section

Closer Look

How do we know?

Flat Section

Closer Look

Why is the Tile "Unknown?"

Tile Section

Online Information

- Manatee County Property Appraiser shows a permit # from April 2000;
- The City of Bradenton shows the same permit # from Jan. 2007 with a different address.

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Why is the Tile “Unknown?”

Tile Section

Observations – Broken Tile

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Why is the Tile “Unknown?”

Tile Section

Observations – Chipped Tile

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Why is the Tile “Unknown?”

Tile Section

Observations – Tile Slippage

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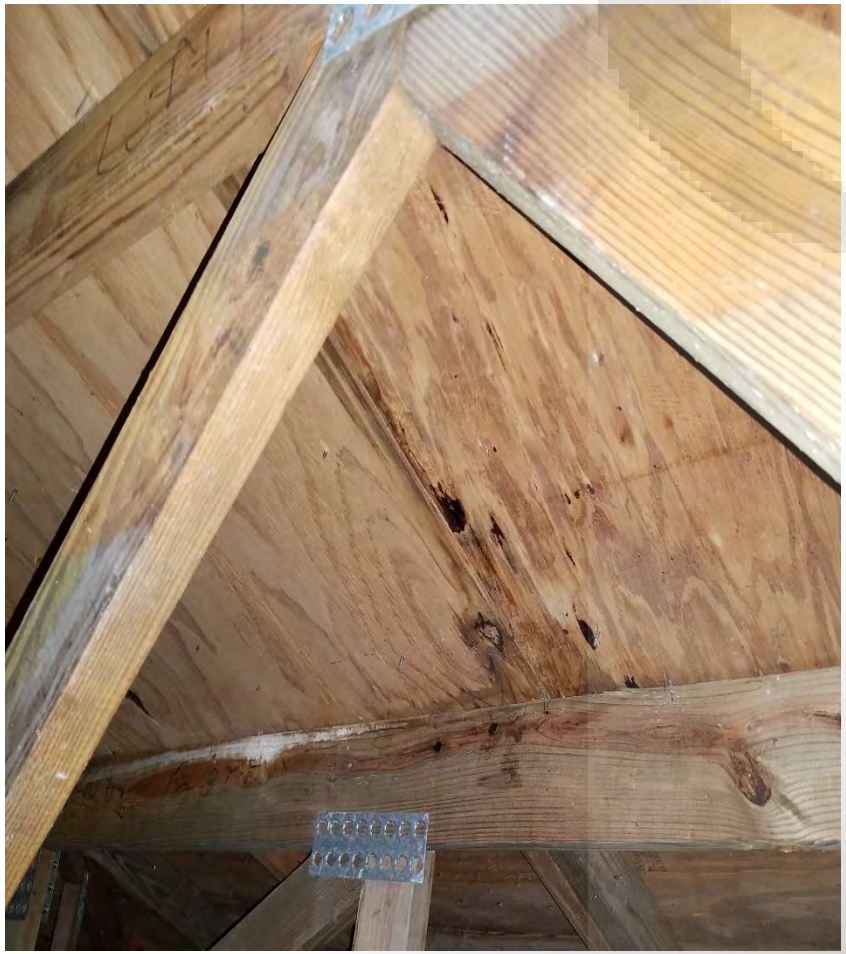
Why is the Tile “Unknown?”

Tile Section

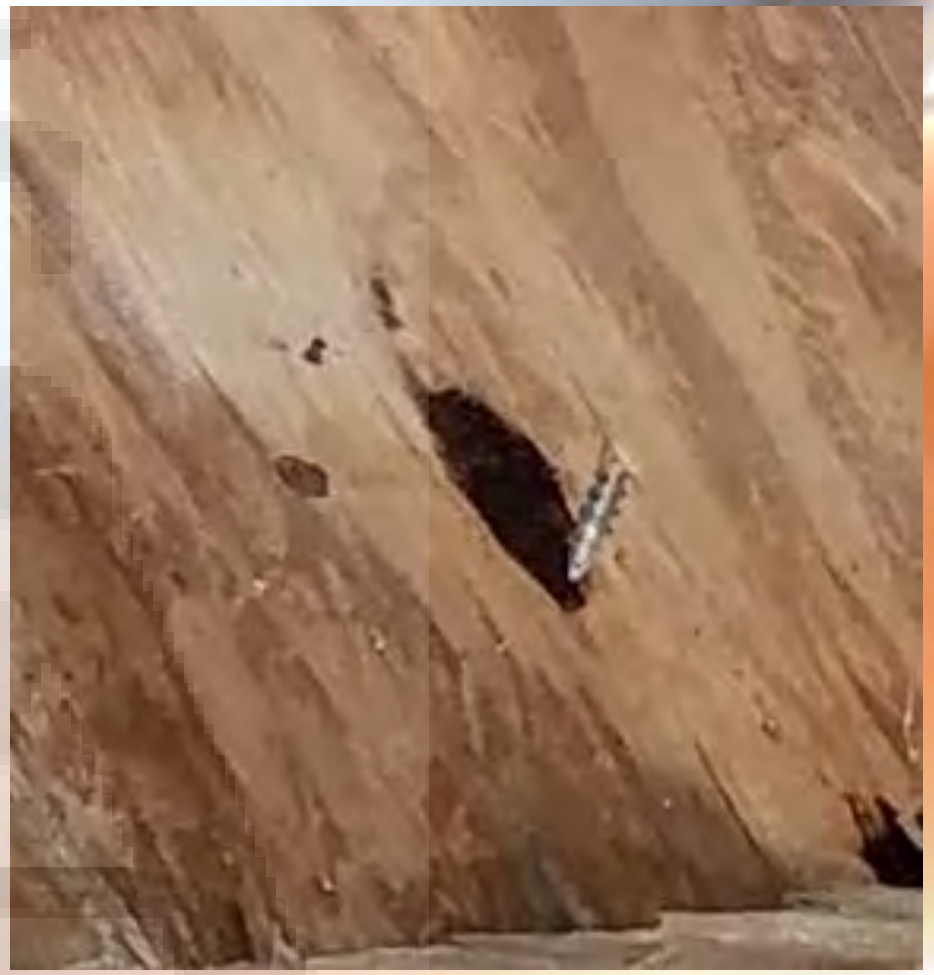
Observations – Underside/Roof Deck

Why is the Tile “Unknown?”

Is the stain new or old?



Look for rust/oxidation on fasteners



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Second Property

OLD

NEW

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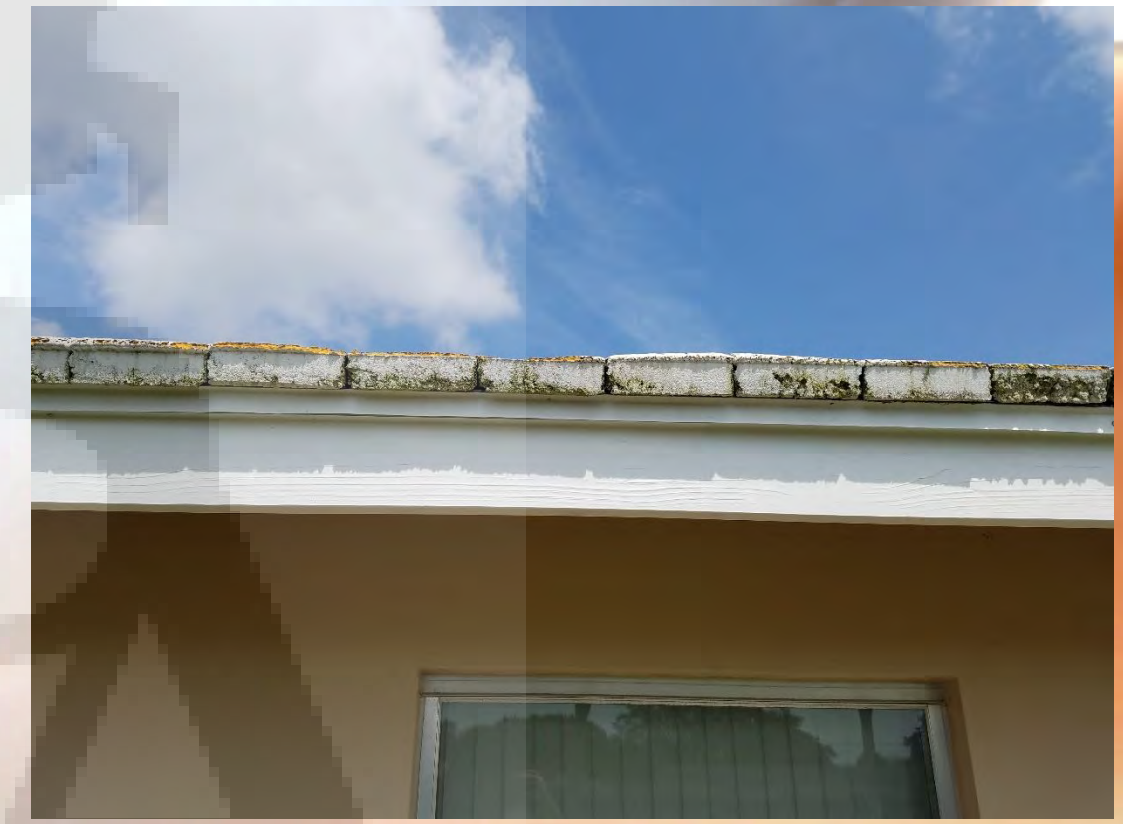
Original Inspection

Right elevation

From the ground



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Original Inspection

From the ground

Close-up look

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Original Inspection

Close-up look

What are we looking at?

- Original drip edge

Original Inspection

Close-up Look

What are we looking at?

- Original drip edge
- 6” flat concrete tile

Original Inspection

Close-up look

What are we looking at?

- Original drip edge
- 6” flat concrete tile
- Polyurethane spray foam
  - Coat of white paint
  - Exposed edges

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Time to Walk the Roof

Flat roof over carport

Unknown material peeling up

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Time to Walk the Roof

Curb between units

Extreme ponding and deterioration of paint exposing foam below

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Time to Walk the Roof

Foam on tile & flat roofs

Exposed foam above skylight

Time to Walk the Roof

Exposed foam between roof systems

Plumbing stacks constricted

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Now Re-Roofed

Right elevation

And what did I see?

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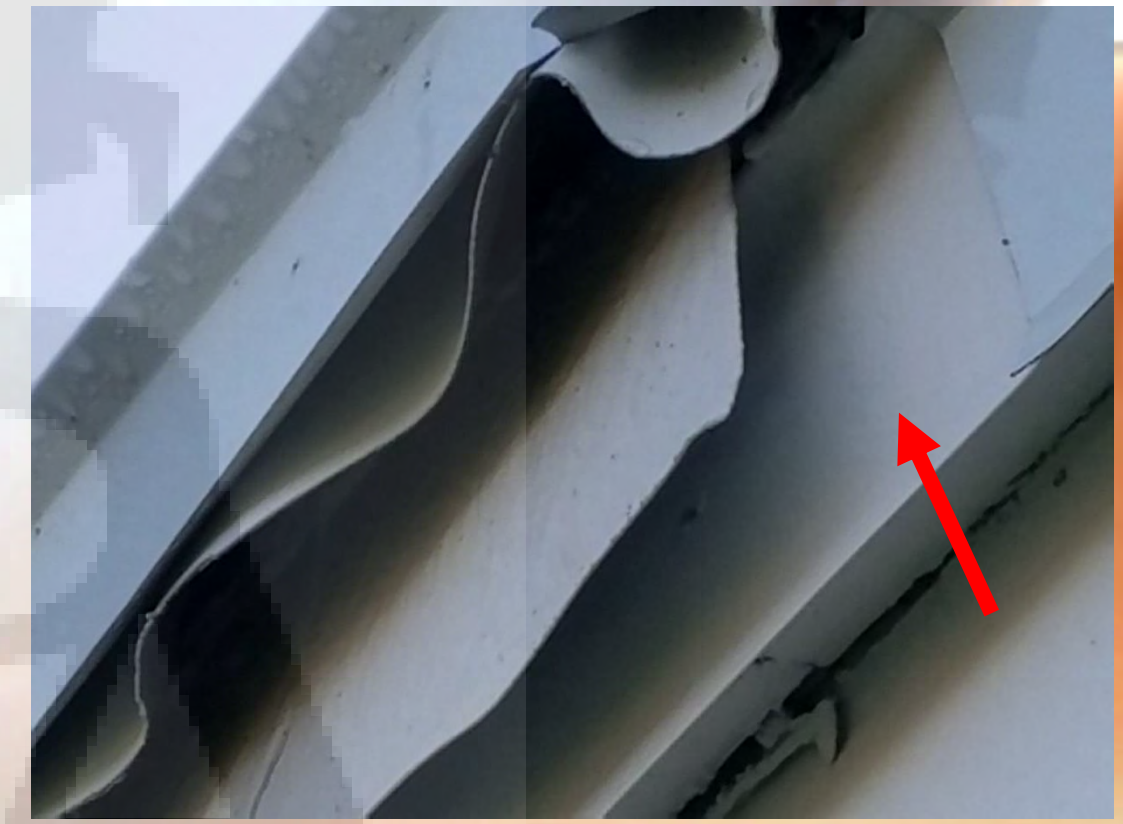
How Many Roof Layers?

WAY TOO MANY!!!

Closer look



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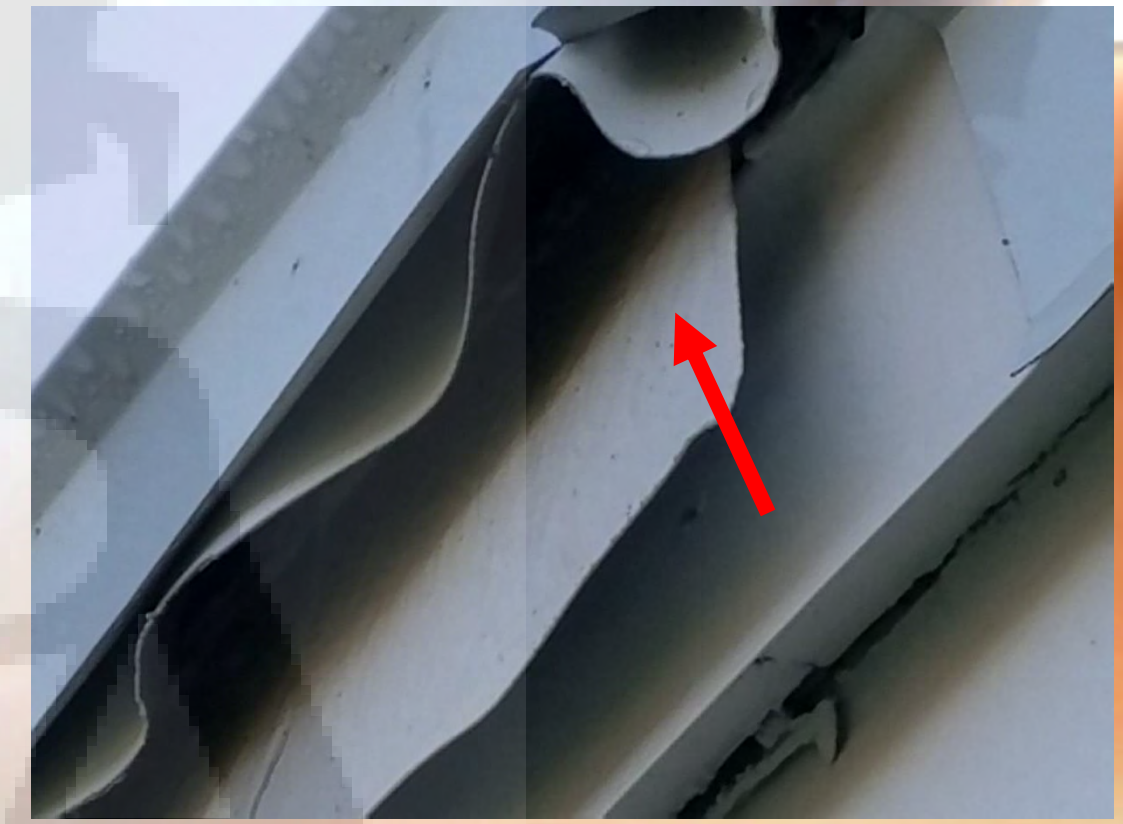

How Many Roof Layers?

WAY TOO MANY!!!

Closer look

Issues Observed

View from above

Wait… What the ???

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Issues Observed

Polyglass (Peel-n-Stick) above TPO

How about peel-n-stick seam tape?

Per the manufacturer: TPO is not an acceptable substrate for self-adhered products

How Many Roof Layers?

Same roof, different location

Closer look

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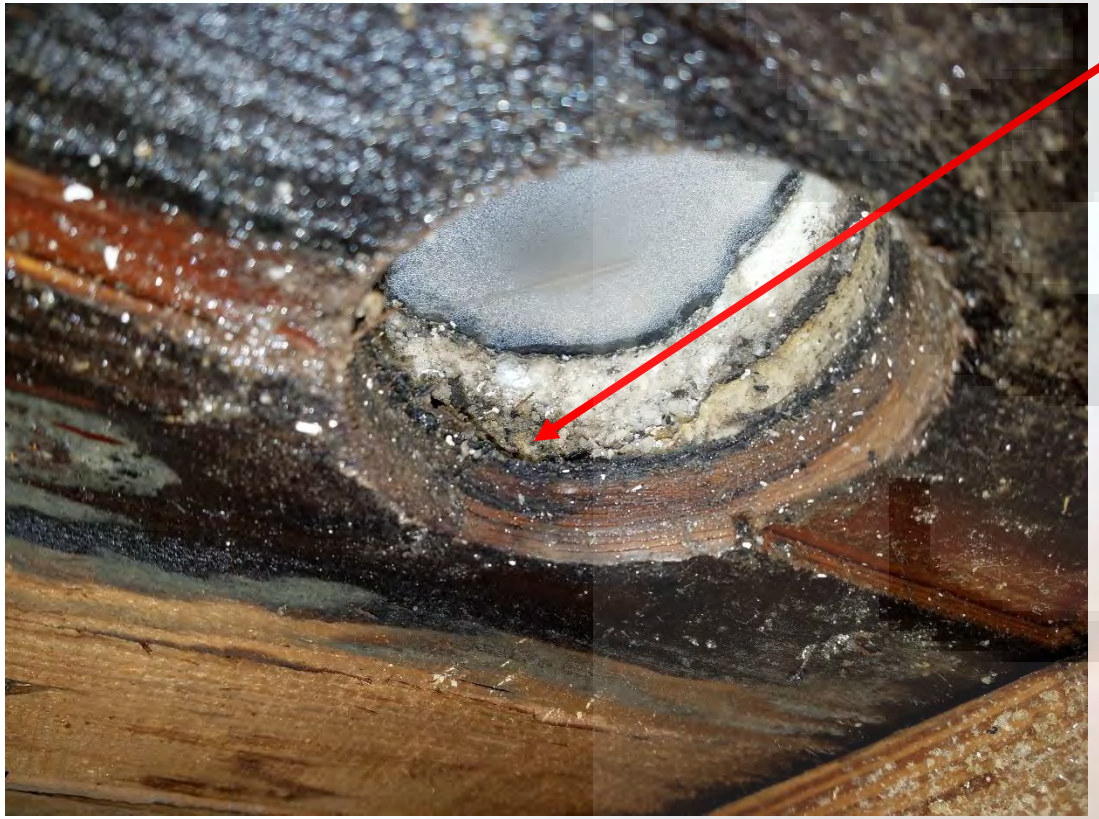
How Many Roof Layers?

Closer look

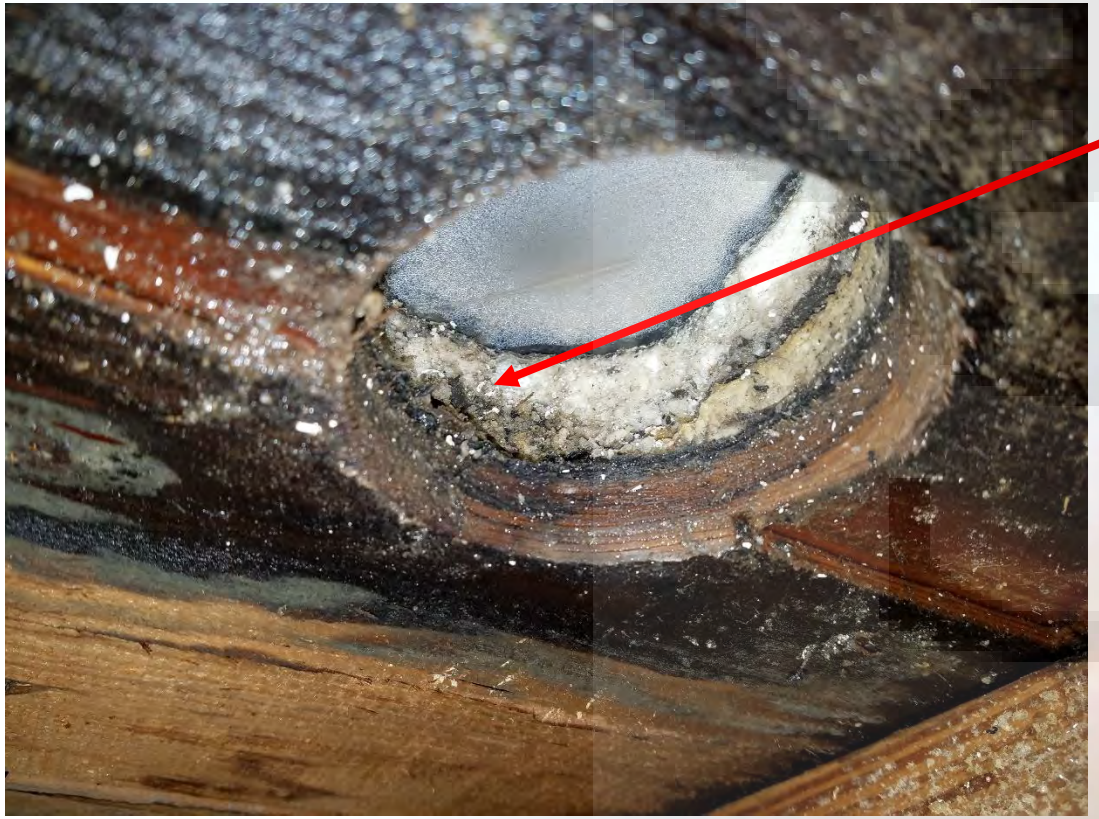


Let's count

1. Original gravel underlayment

How Many Roof Layers?

Closer look

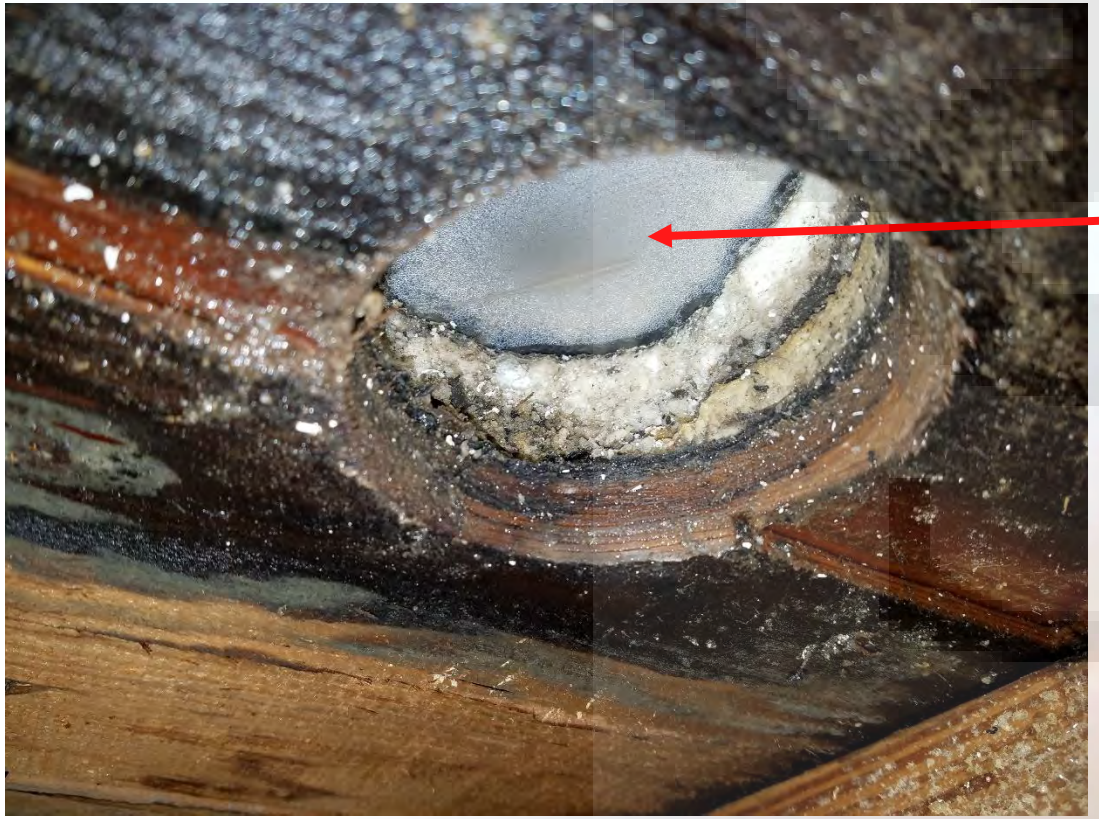


Let's count

1. Original gravel underlayment
2. Foam layer (A)

How Many Roof Layers?

Closer look



Let's count

1. Original gravel underlayment
2. Foam layer (A)
3. Metal plate covering hole

How Many Roof Layers?

Closer look

Let's count

1. Original gravel underlayment
2. Foam layer (A)
3. Metal plate covering hole
4. Foam layer (B)

How Many Roof Layers?

Closer look

Let's count

1. Original gravel underlayment
2. Foam layer (A)
3. Metal plate covering hole
4. Foam layer (B)
5. New TPO membrane

Inspection Continued

How about the tile?

Adhesive bleeding from below tile

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Inspection Continued

Missing vent boots

Rake not replaced

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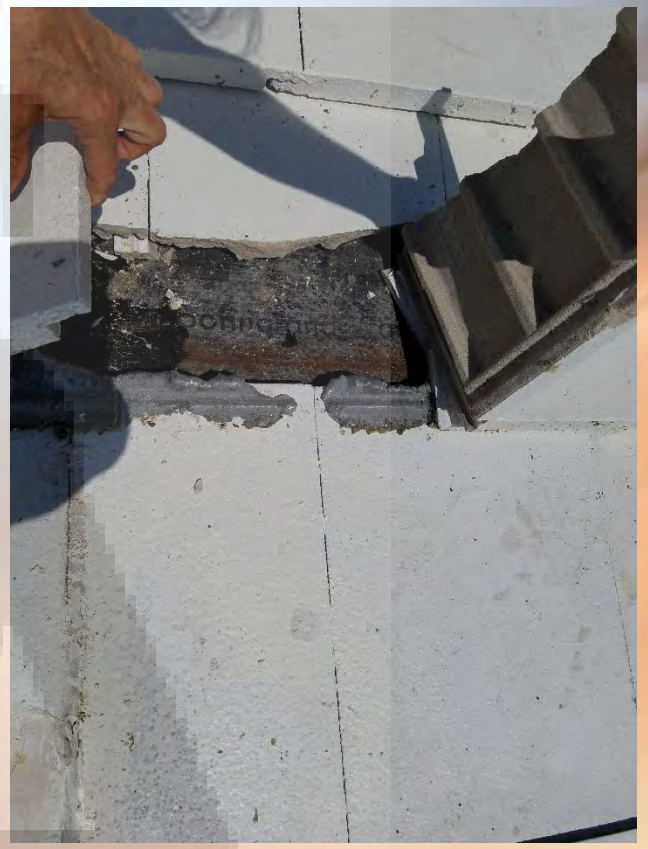
Inspection Continued

New tile - BROKEN

Not adhered



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Inspection Continued

Exposed adhesive

Off-ridge vent is damaged

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New Construction

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Bonus Round

Thoughts?

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Roofing Spray Foam FAIL!!!

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Roofing Spray Foam FAIL!!!

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Roofing Spray Foam FAIL!!!

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What Kind of Material?

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Asbestos

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Remember This One?

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Not Only a Bad Slope, But…

STEPHENS & ASSOCIATES, INC.

Consistency in Photos is Important

OLD (01-30-17)

NEW (05-16-17)

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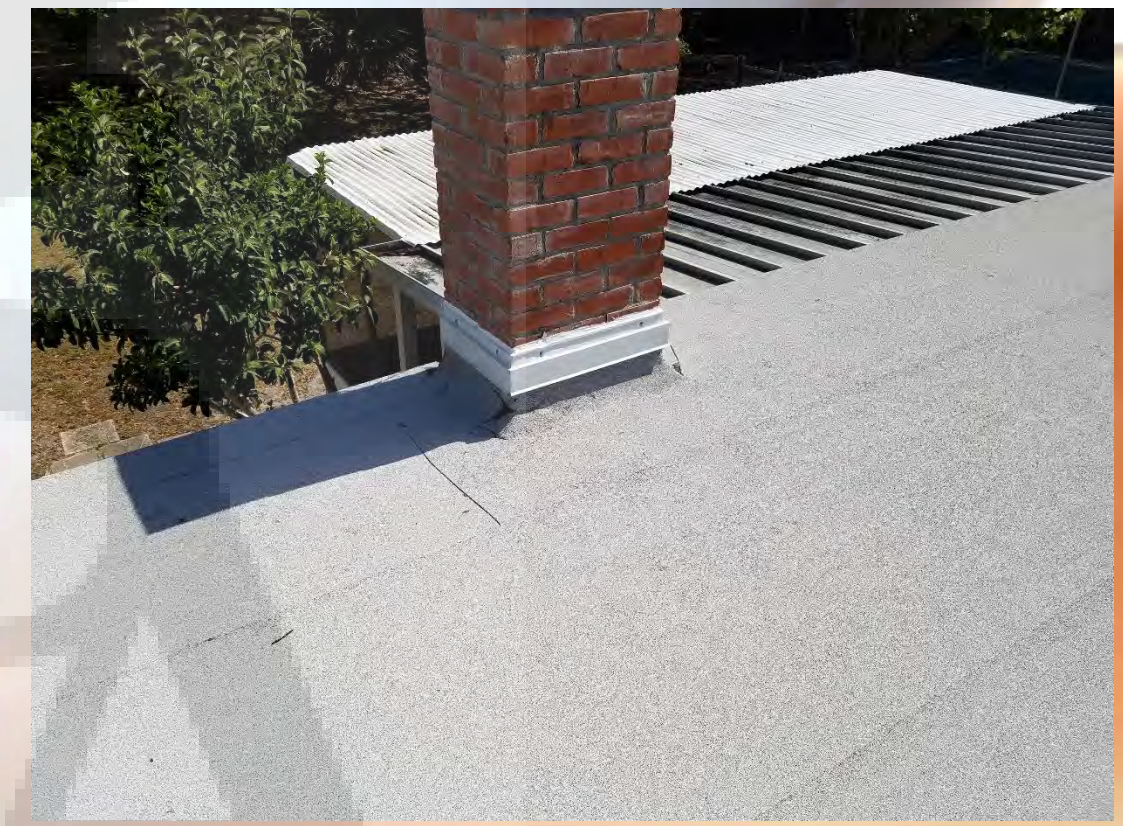

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Consistency in Photos is Important

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NEW (05-16-17)

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What's Wrong with Foil Radiant Barriers?

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They Fail & Hide Problems

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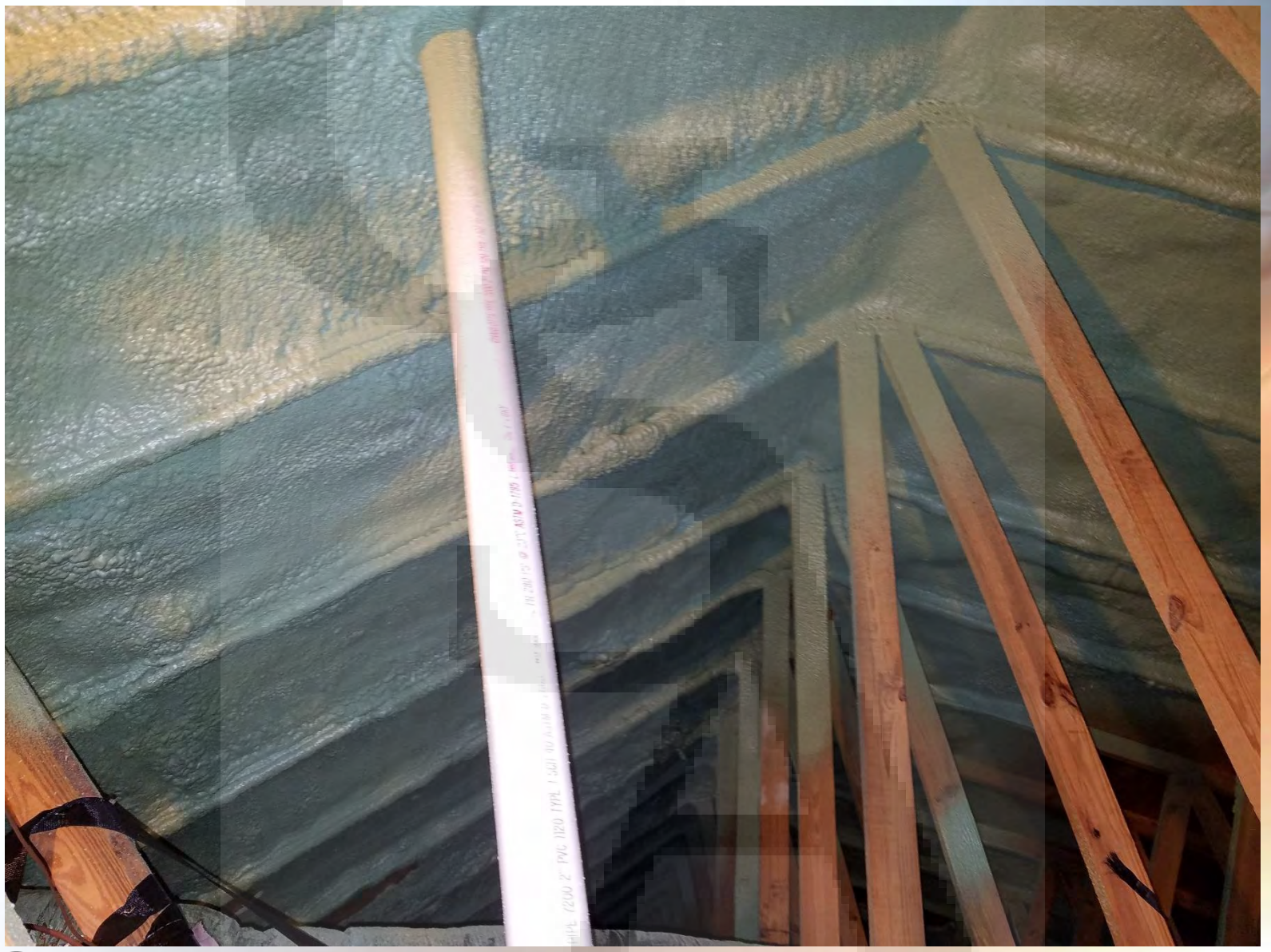
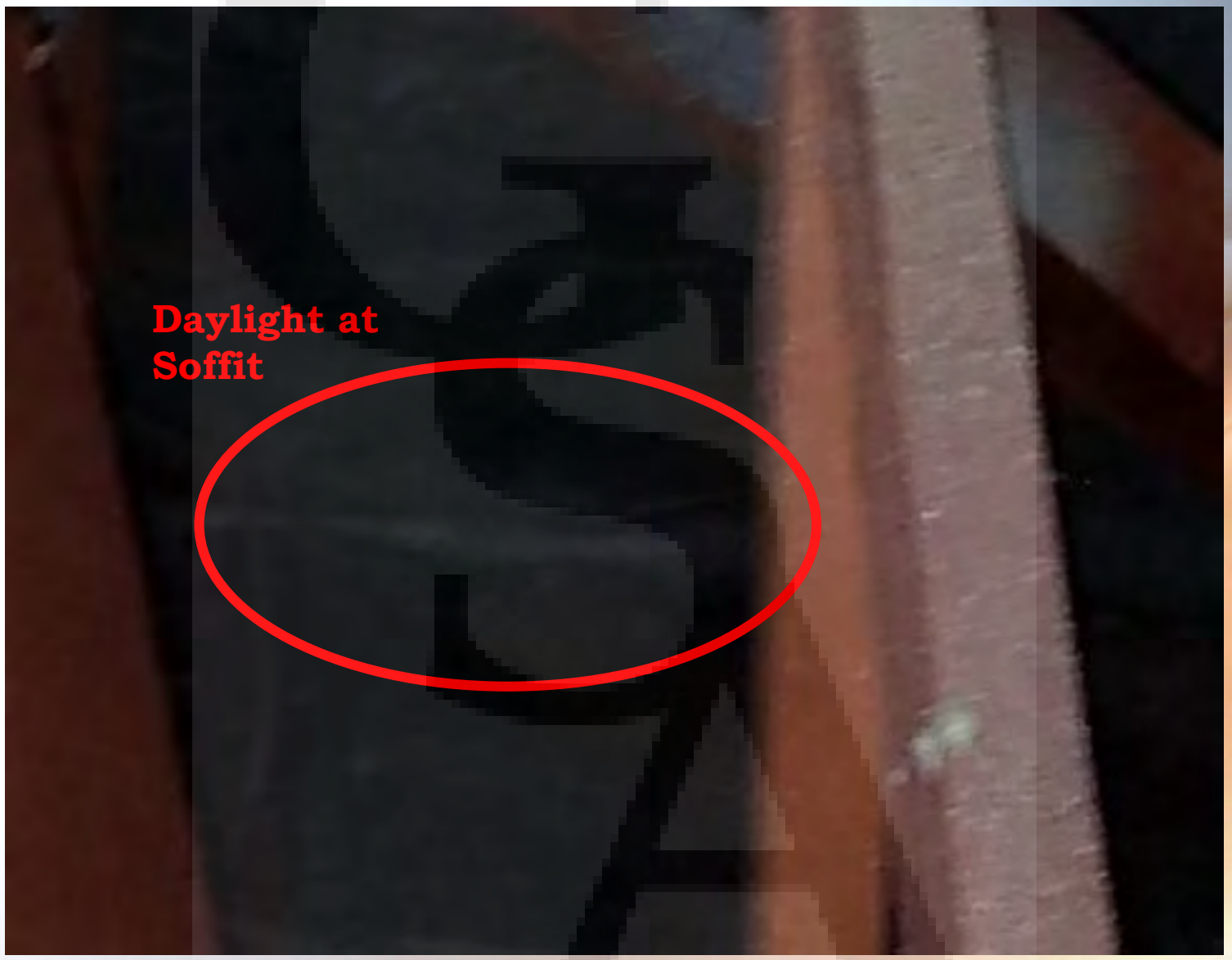
What's Wrong with Foam Insulation?

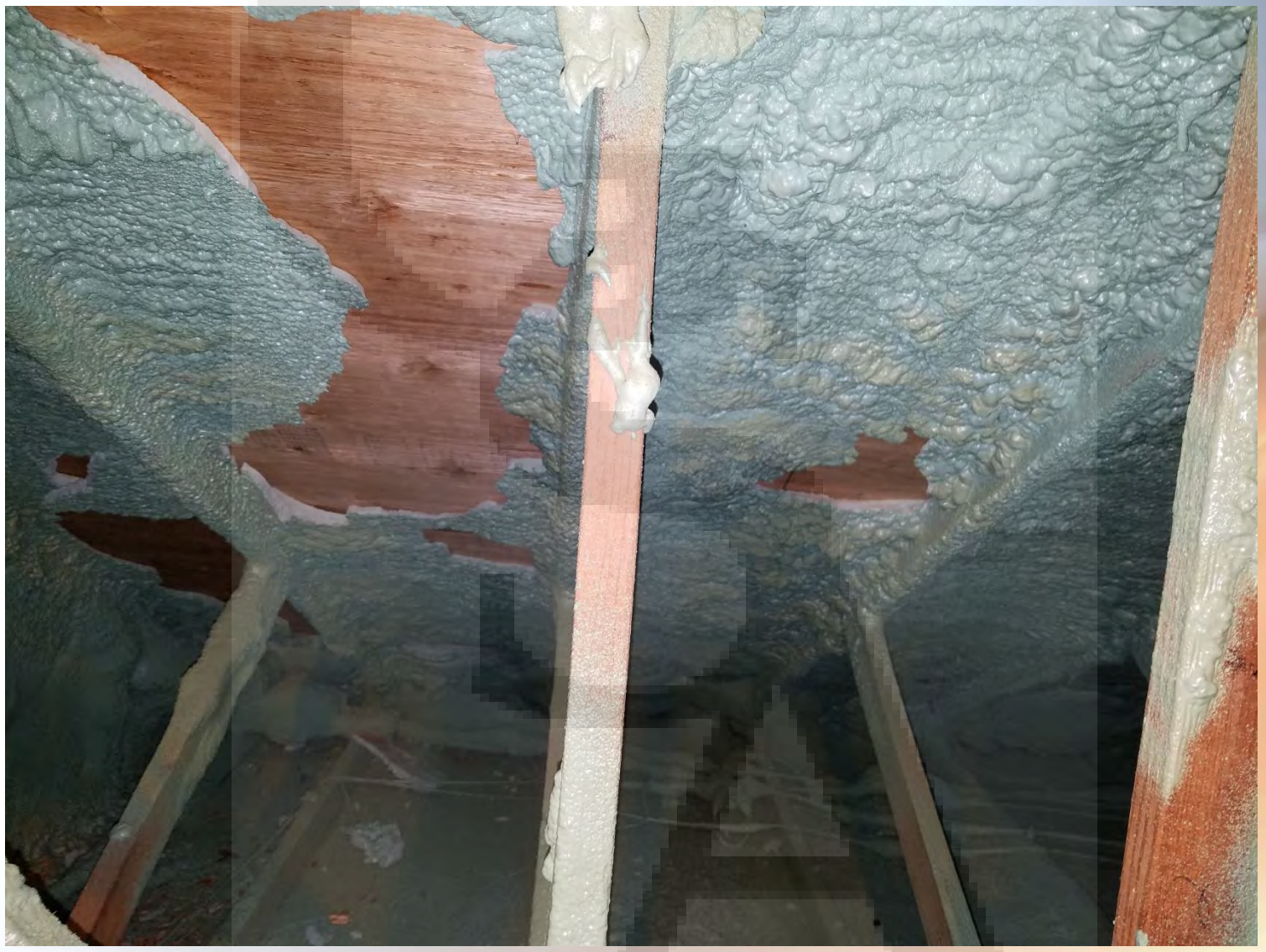


Stephens & Associates, Inc.

They are Often Installed Wrong



And Hide Leaks



Stand Up for Your Client

- Take photos.
  - Document your observations
- Do your research.
  - Contact the manufacturers
  - Go to the NRCA website
  - Go to the FBC website
  - Research permits
- When in doubt get a second opinion from a trusted roofing contractor.

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BUILDING INSPECTORS
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CERTIFIED
MASTER
INSPECTOR
CMI
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Thank You!!!
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