THE DEVIL IS IN THE DETAILS

Presented by MBCI

Credit: 1 AIA LU/HSW

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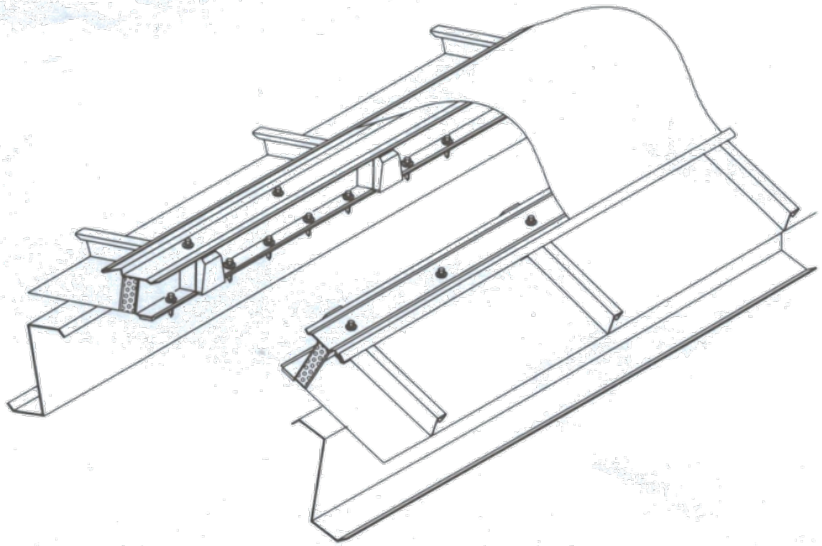
~~Questions related to specific materials, methods, and services will~~ be addressed at the conclusion of this presentation.

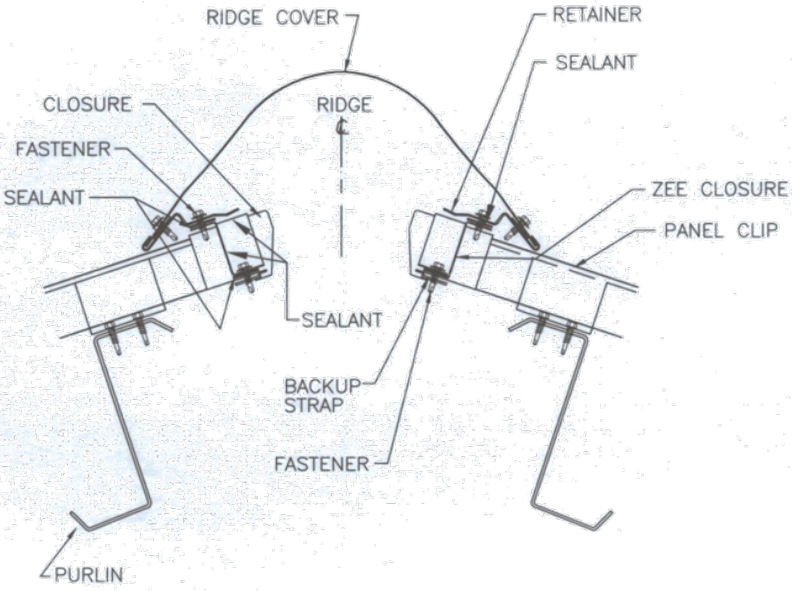
LEARNING OBJECTIVES

After this course, you should be able to:

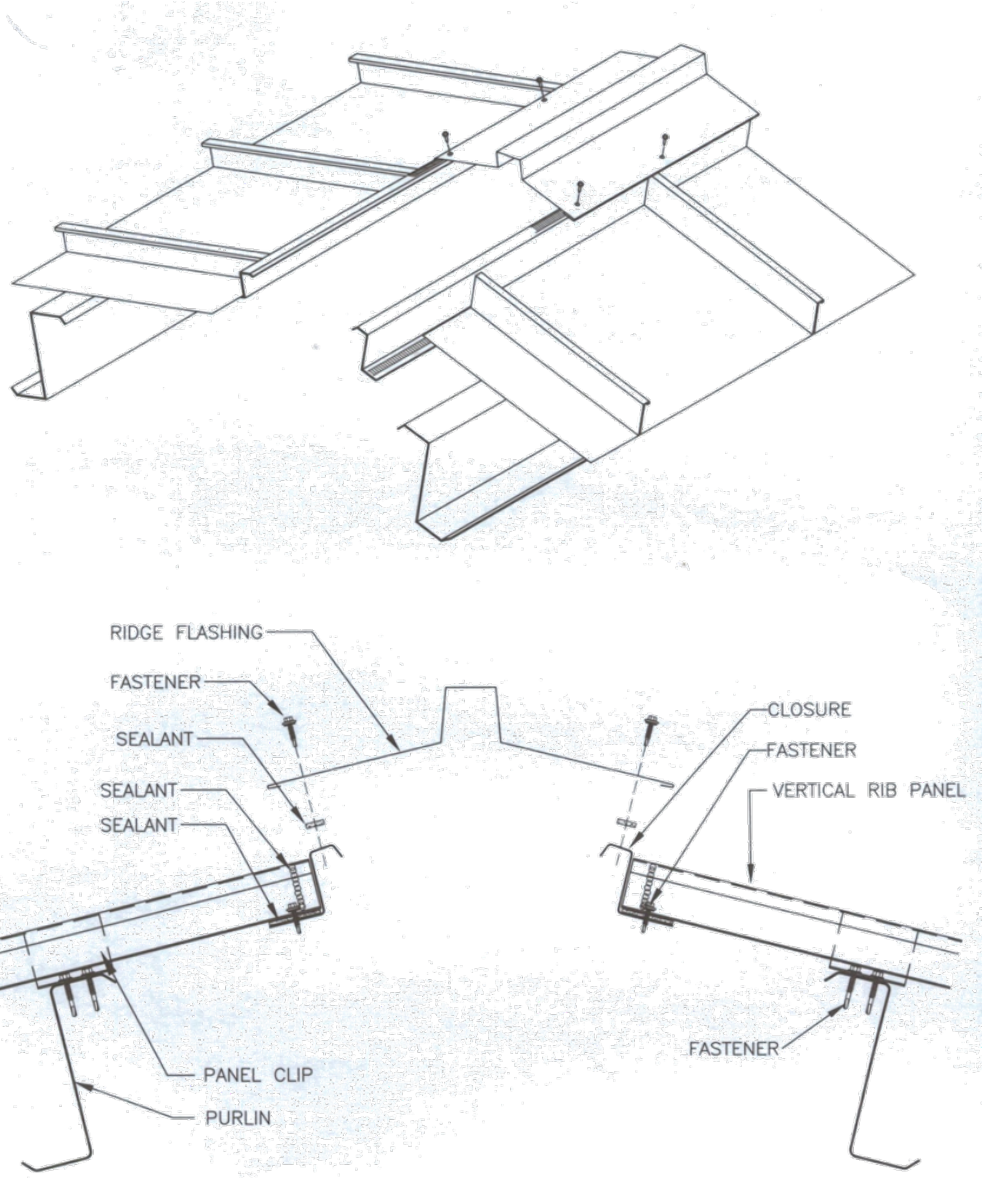
1. Understand that long term roof system performance requires long term thinking when designing details incorporated into a metal roof system.
2. Distinguish between correct and incorrect details and know conditions that are best avoided when possible.
3. Understand how roof penetrations should be specified and installed to provide long term weathertightness.
4. Recognize what dissimilar metals are and how they affect a roof's service life.

RIDGE DETAIL





RIDGE DETAIL



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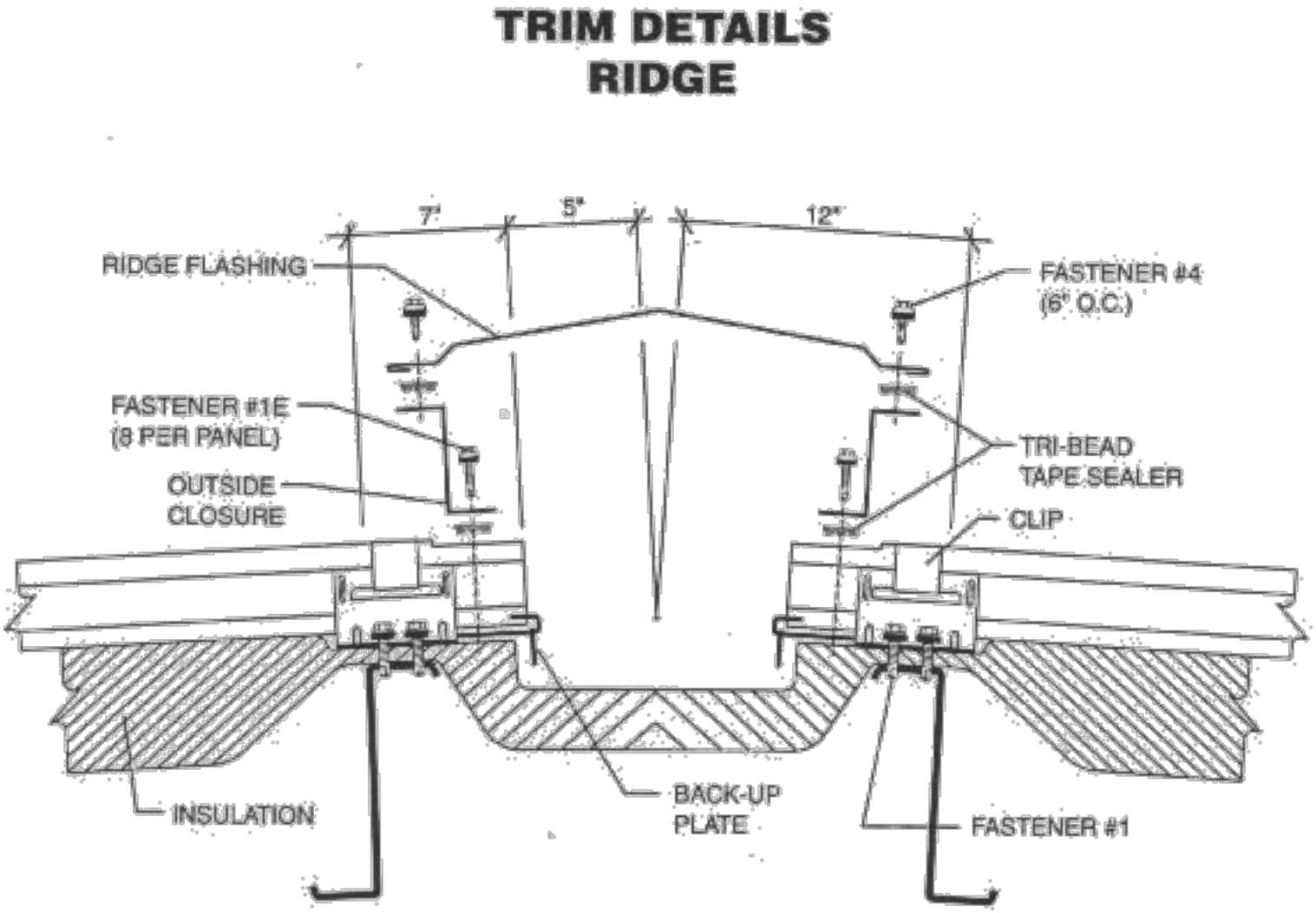


TWO BASIC PRINCIPLES

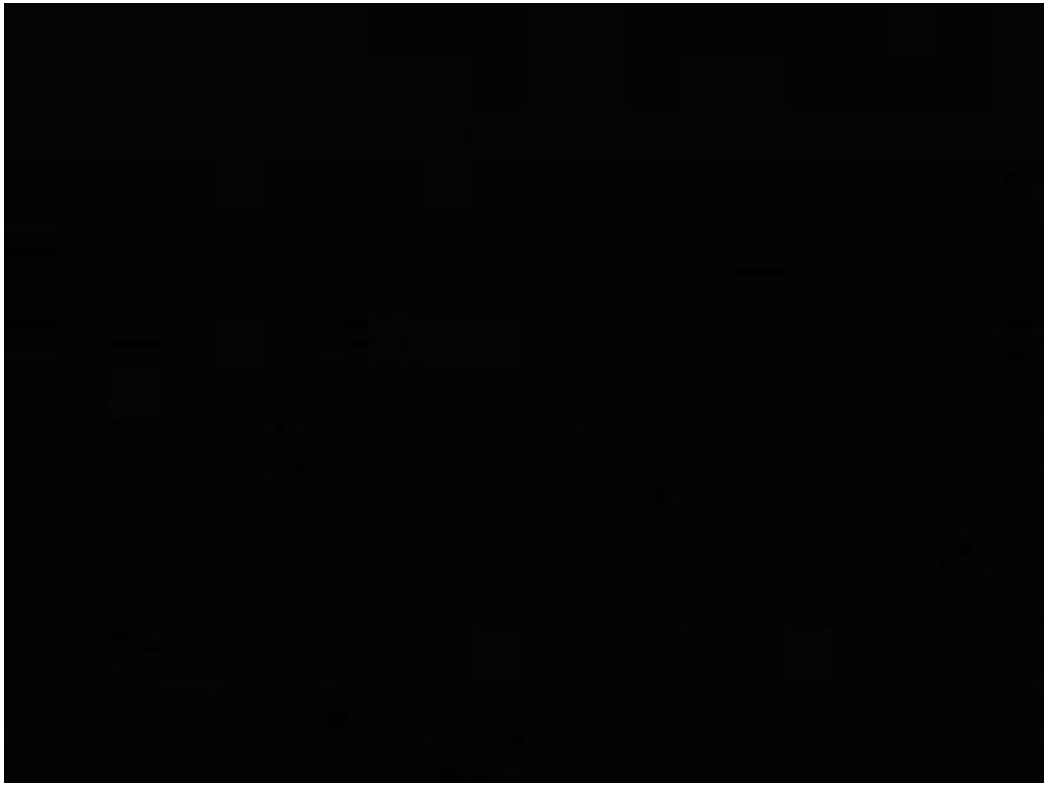
- Think Long Term (20 Years)
  - Don’t count on exposed sealant to be a long-term solution.
  - Use trim, fasteners and accessories that will last as long as the roof.

RUSTED FASTENERS

RUSTED VALLEY GUTTER

RUSTED FLASHING

VIDEO



TWO BASIC PRINCIPLES

- Think 20 years down the road
- The harder you make something, the less chance it will be done right

WHERE DO METAL ROOFS LEAK?

- Penetrations
  - Roof Curbs

ROOF CURBS

- Use curbs made from aluminum or stainless steel
- Use under/over curbs
- Require a minimum of 12” between the panel end and the diverter on the upslope end and 6” between the curb sides and panel seams
- Use rib-to-rib curbs
- Require roof contractor to supply and install curbs, not the HVAC contractor

ROOF CURB

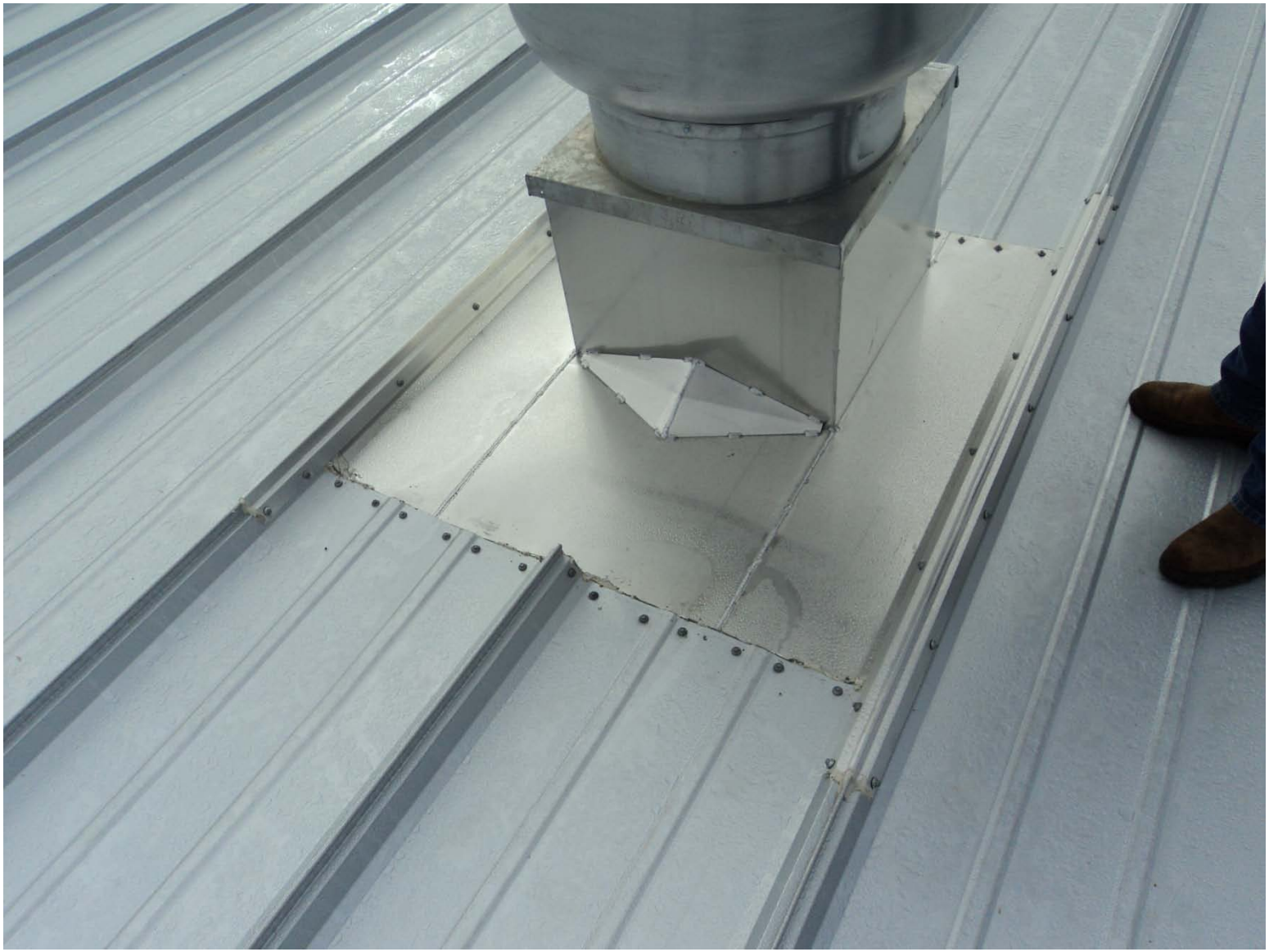
ROOF CURB

ROOF CURB

ROOF CURB

ROOF CURB

ROOF CURB



WHERE DO METAL ROOFS LEAK?

- Penetrations
  - Roof Curbs
  - Pipes/Structural Members

PIPE/STRUCTURAL PENETRATIONS

- Do not use residential pipe jacks
- Do not penetrate the panel seam
- Do not block the flow of water
- Require the roofing contractor to install or supervise all pipe and structural penetrations

INCORRECT PIPE JACK

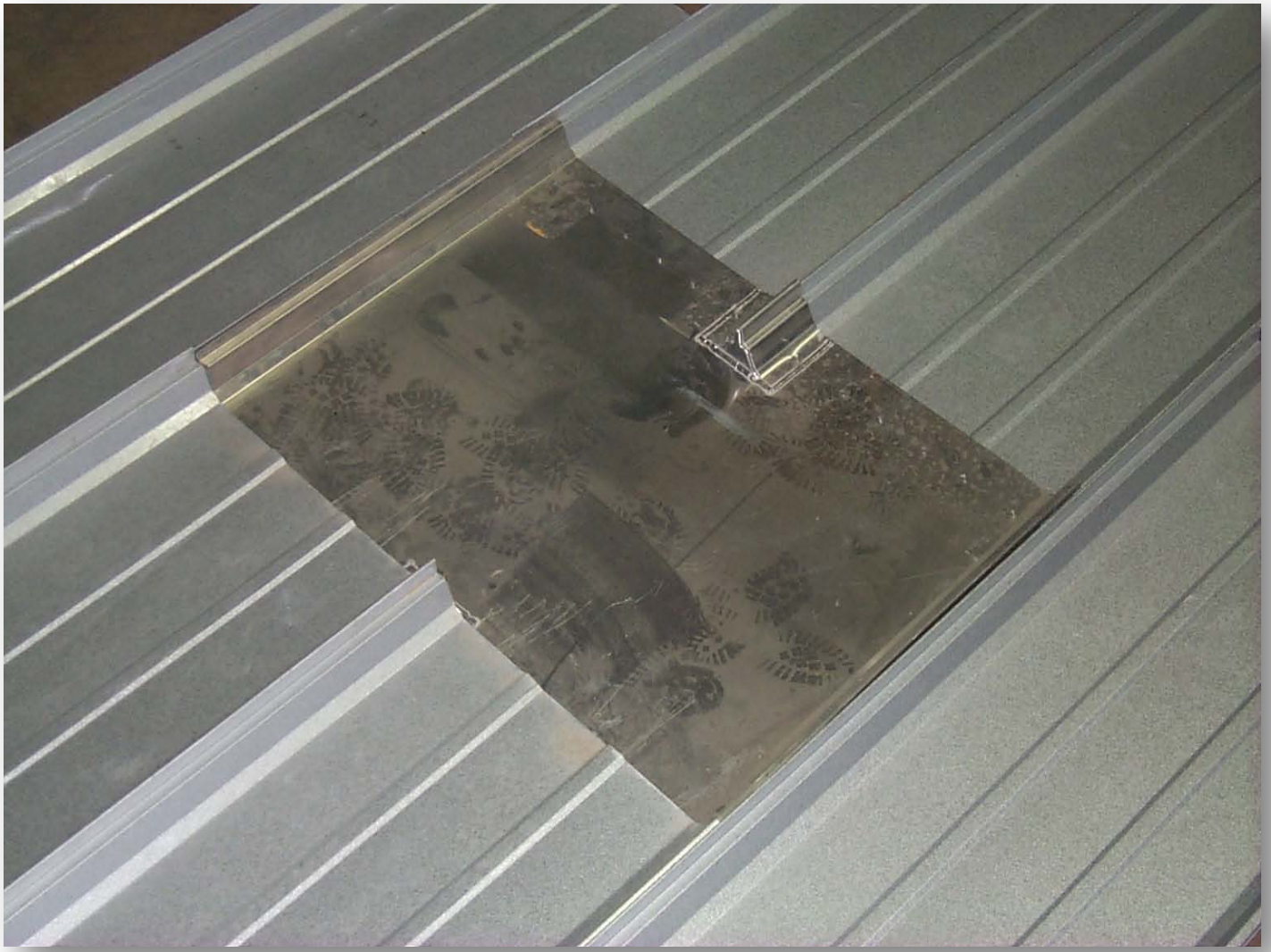
INCORRECT PIPE JACK

INCORRECT INSTALLATION

CORRECT PIPE PENETRATION

INCORRECT INSTALLATION

CURB BASE



CORRECT PIPE PENETRATION

CORRECT PIPE PENETRATION

PENETRATIONS BY OTHER TRADES

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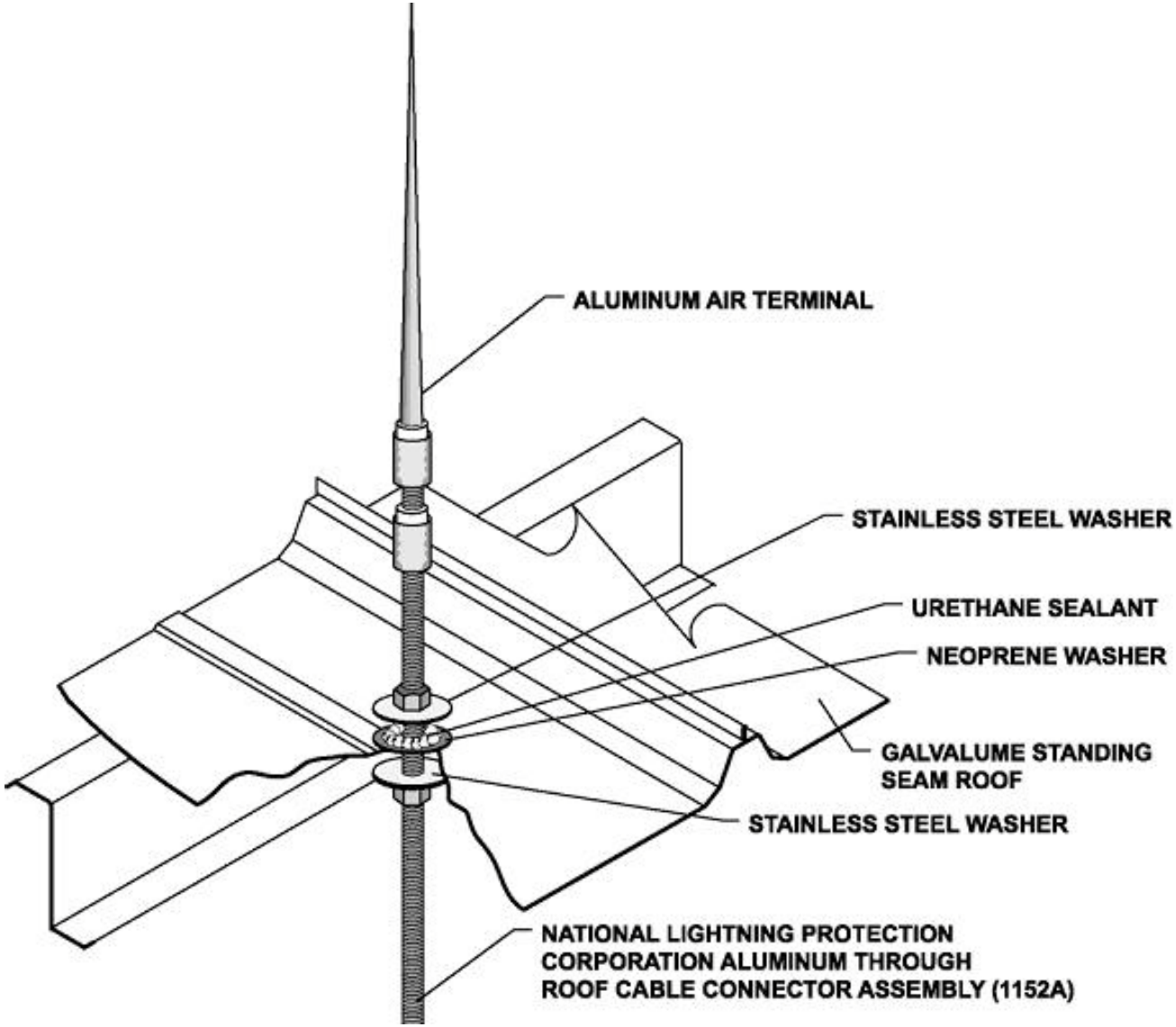

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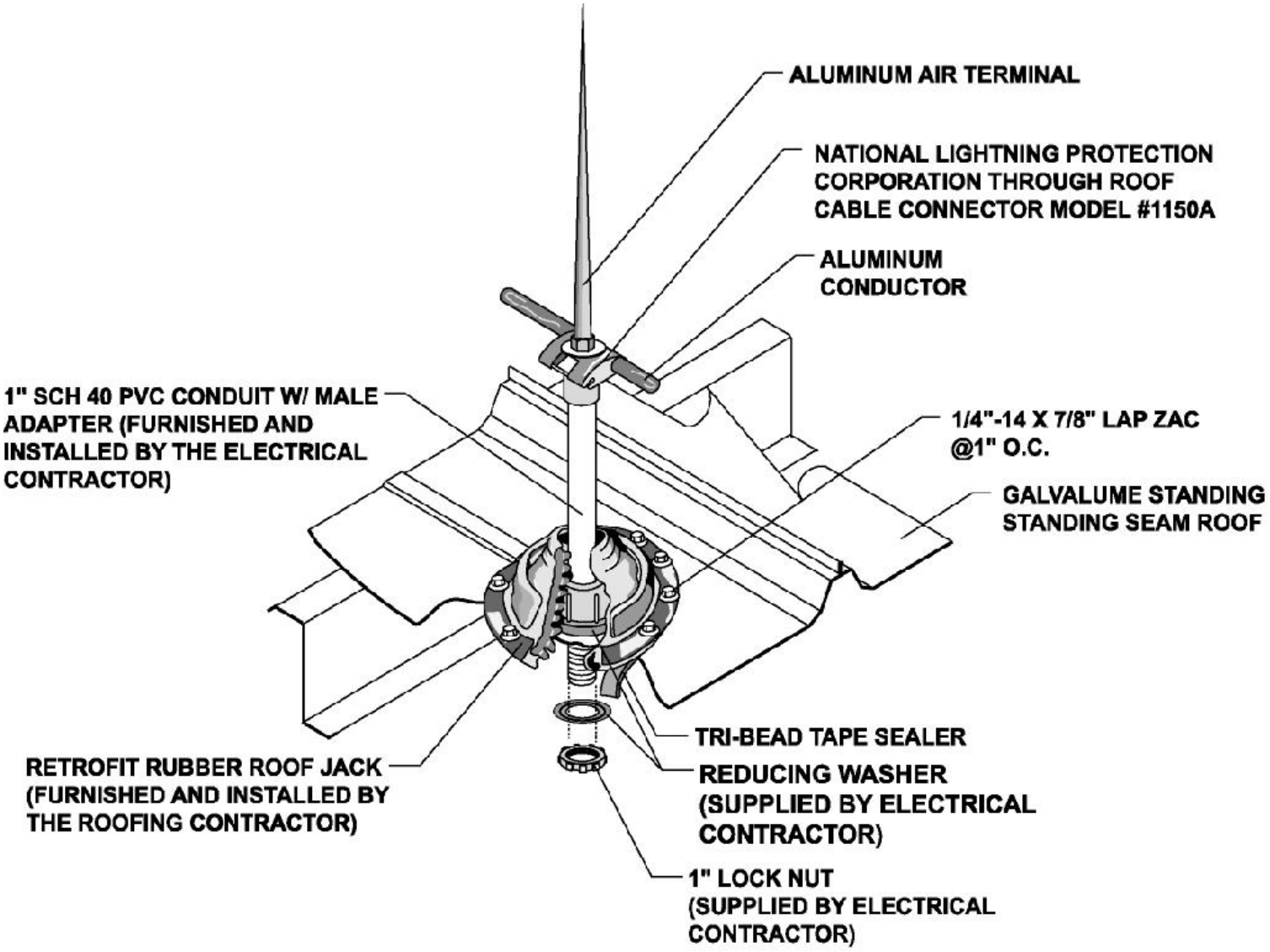


PENETRATIONS BY OTHER TRADES

PENETRATIONS BY OTHER TRADES

WHERE DO METAL ROOFS LEAK?

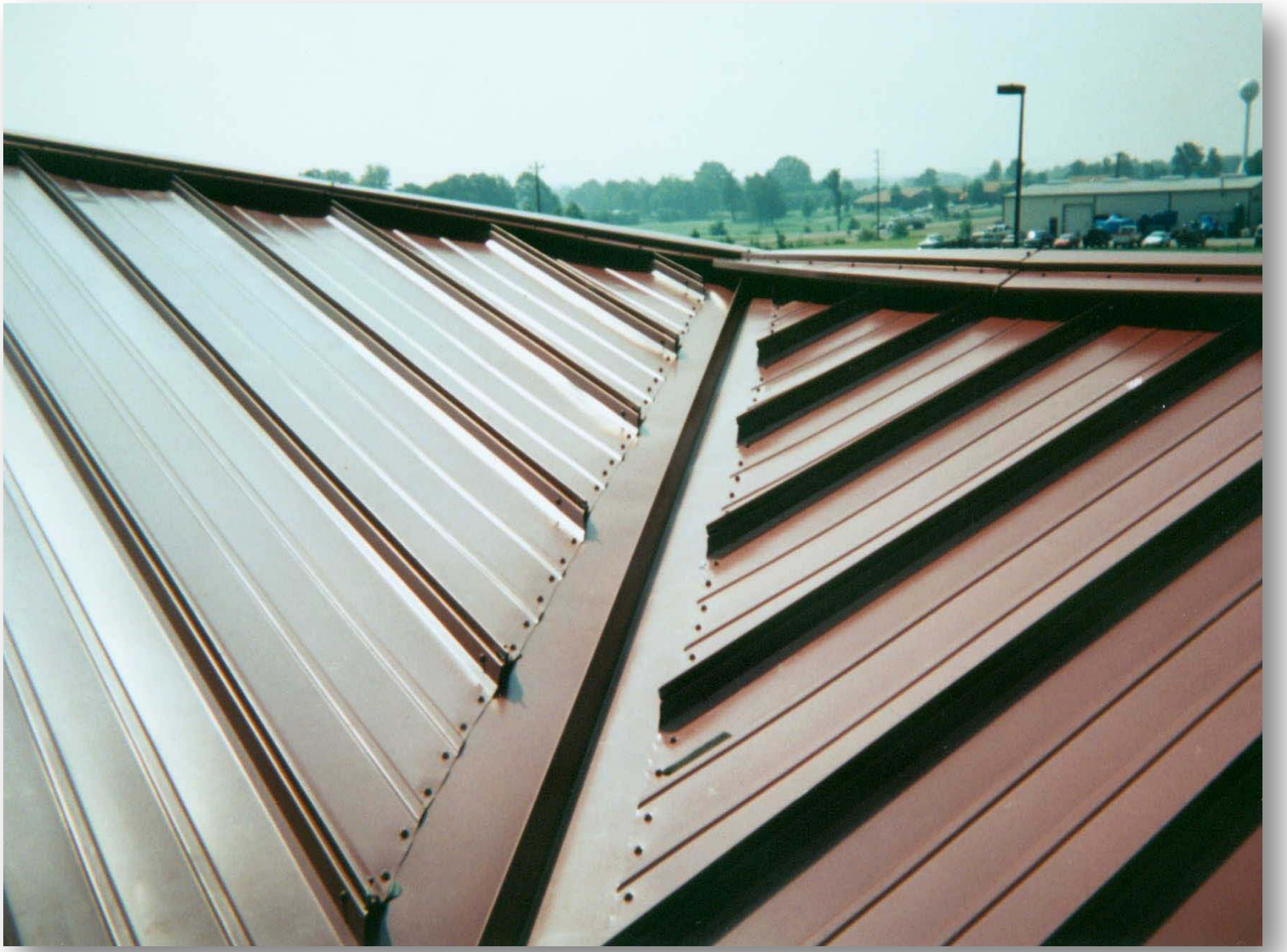
- Penetrations
  - Roof Curbs
  - Pipes/Structural Members
- Details

DETAILS VALLEY

- Use a vertical leg SSR when possible
- Use a valley trim that is wide enough to handle the flow of water
- At fixed eave valleys, use triple bead tape sealer and place fasteners at a close enough spacing to prevent “fish mouthing”
- Do not use offset cleat method on roofs with low pitches

INCORRECT BEVEL CUTTING

CORRECT BEVEL CUTTING



VERTICAL RIB PANEL INSTALLATION

OFFSET CLEAT

TRIM INTERSECTIONS

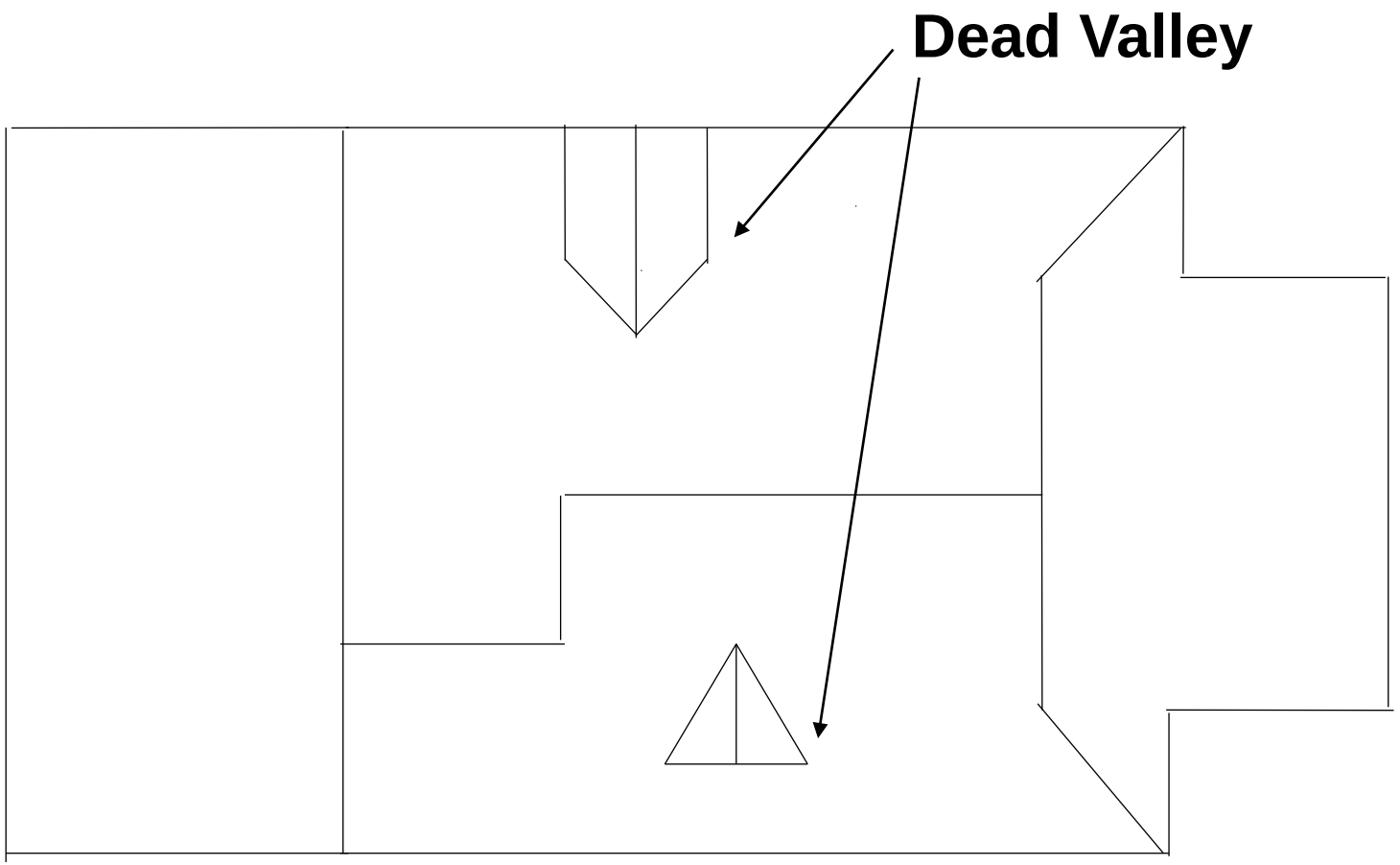
- Seal properly between trim pieces
- Shingle trim where required
- Make attachments “in the high” when you can

VALLEY INTERSECTION AT UPSLOPE END OF DORMER

VALLEY INTERSECTION AT UPSLOPE END OF DORMER

VALLEY INTERSECTION AT UPSLOPE END OF DORMER

PLAN REVIEW



DETAILS DEAD VALLEY

- Create an end lap in the roof panel where the valley trim terminates
- Try to lay out panels so a panel seam does not hit at the valley termination point
- You may need to press break a special panel

DEAD VALLEY

DEAD VALLEY

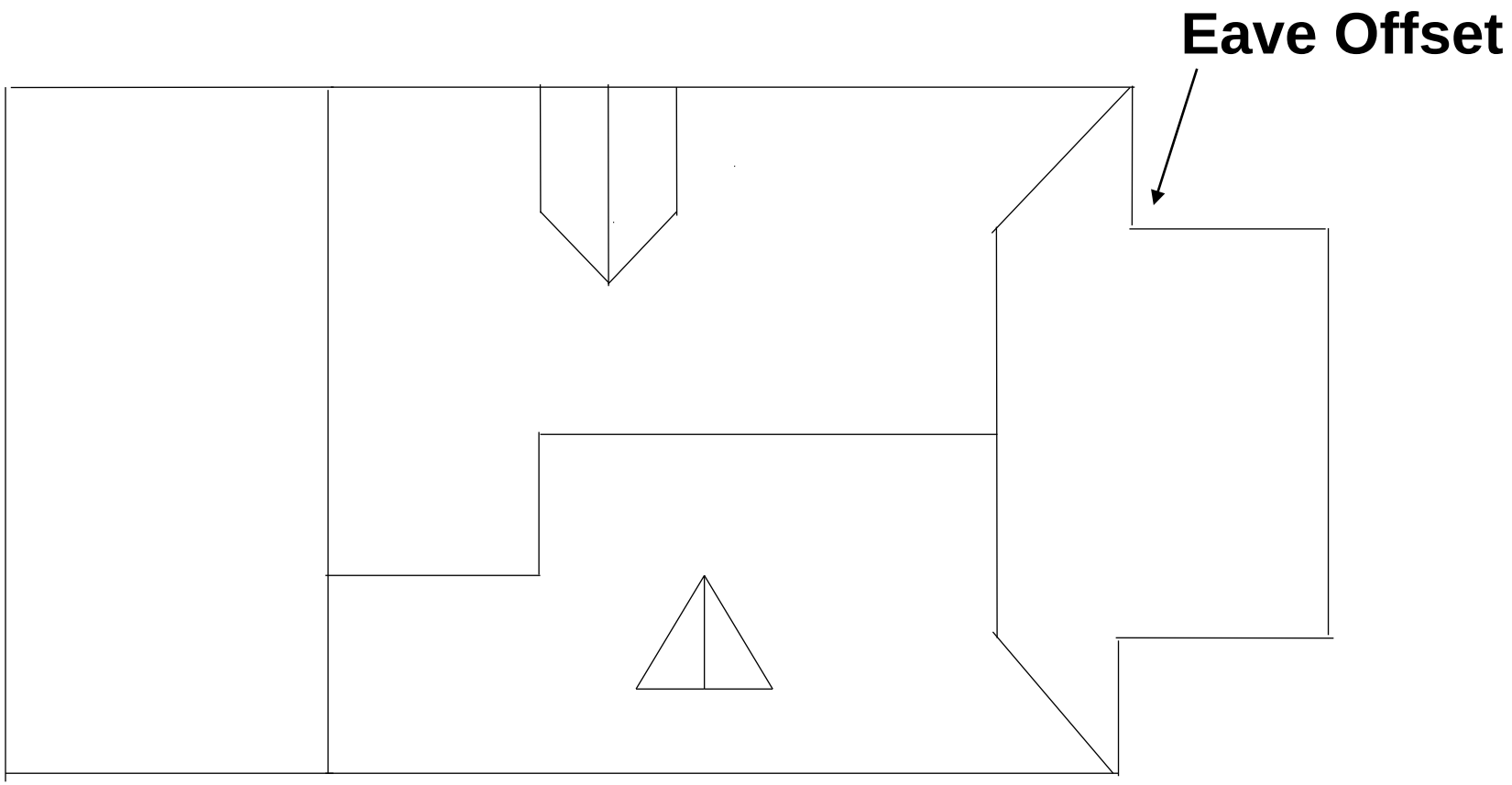
DEAD VALLEY

DEAD VALLEY

DEAD VALLEY

DEAD VALLEY

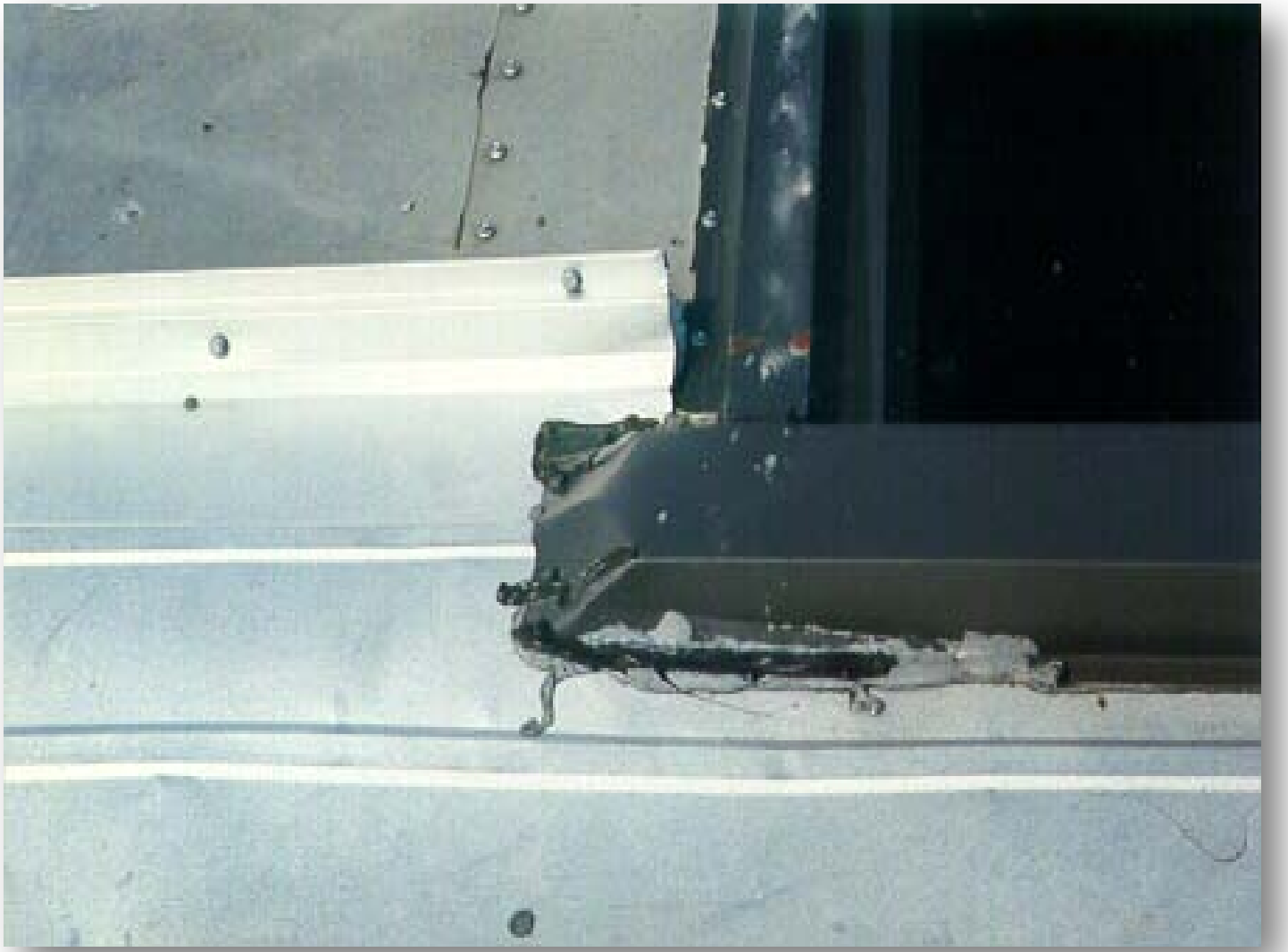
PLAN REVIEW



DETAILS EAVE OFFSET

- On short offsets, consider using gutter in lieu of rake trim
- On long offsets, install a slip joint to allow for the differential in thermal movement

EAVE OFFSET



EAVE OFFSET

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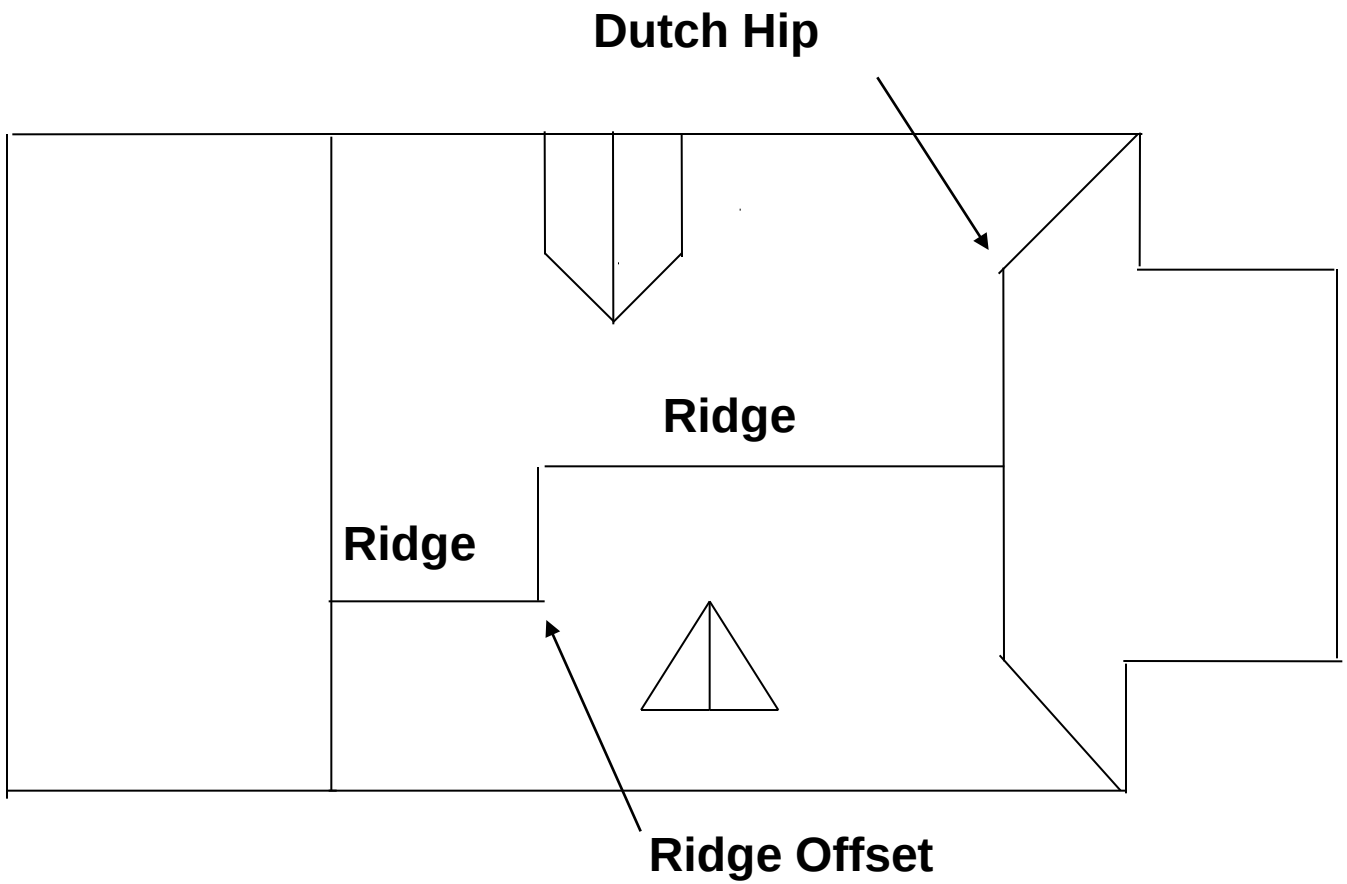
PLAN REVIEW

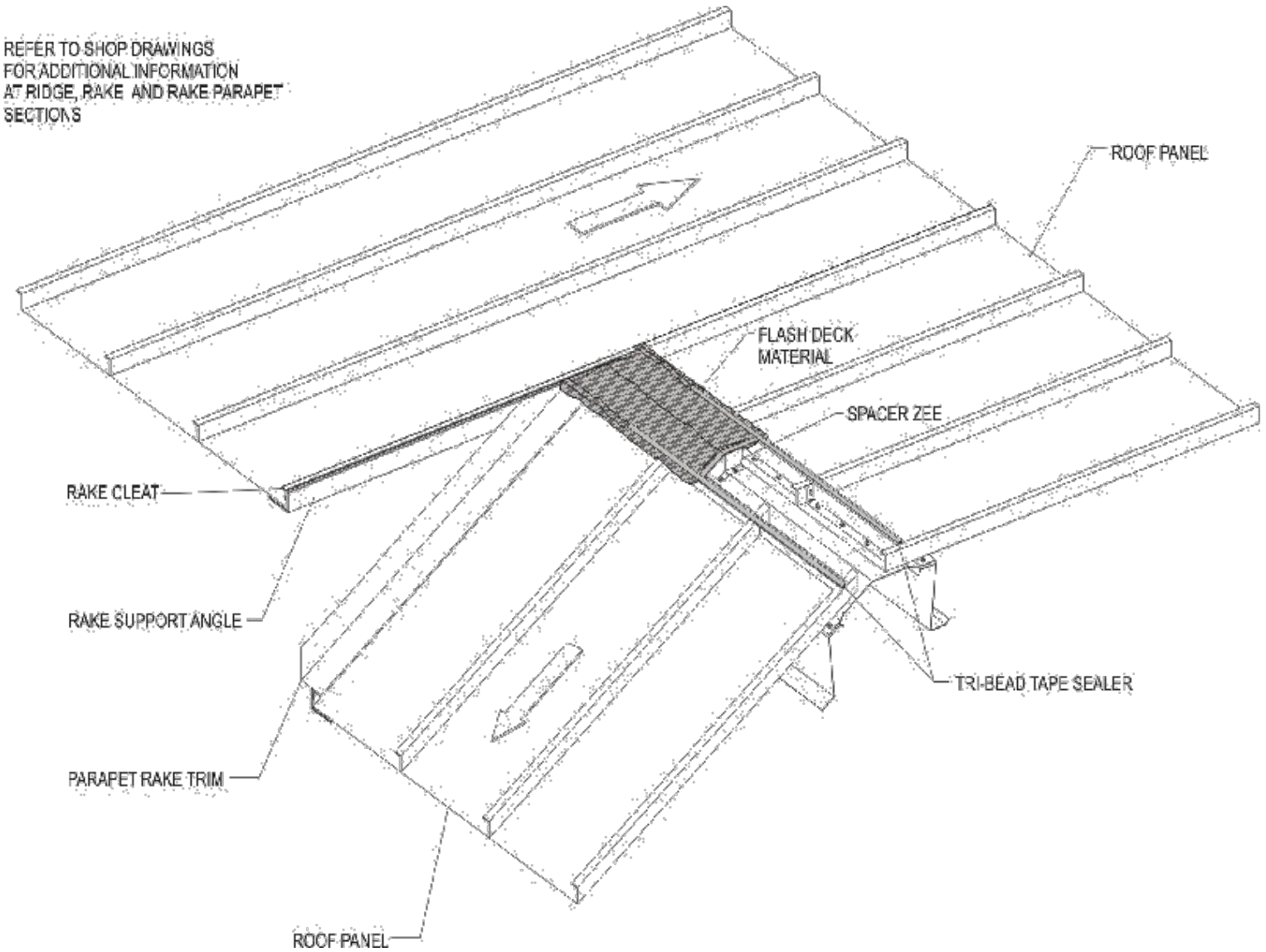


DETAILS RIDGE OFFSET

- Where possible, fix the roof at the ridge and use a simple ridge flash
- Install an EPDM membrane under the trim intersection at the ridge

RIDGE OFFSET

RIDGE OFFSET



DETAILS PARAPET WALLS

- Allow for thermal movement
- Surface mount counter flashing is the least likely method to stay watertight
- Build in redundancy at “less than perfect conditions”
- Use welded aluminum crickets and other appurtenances where needed

RIDGE/PARAPET INTERSECTION

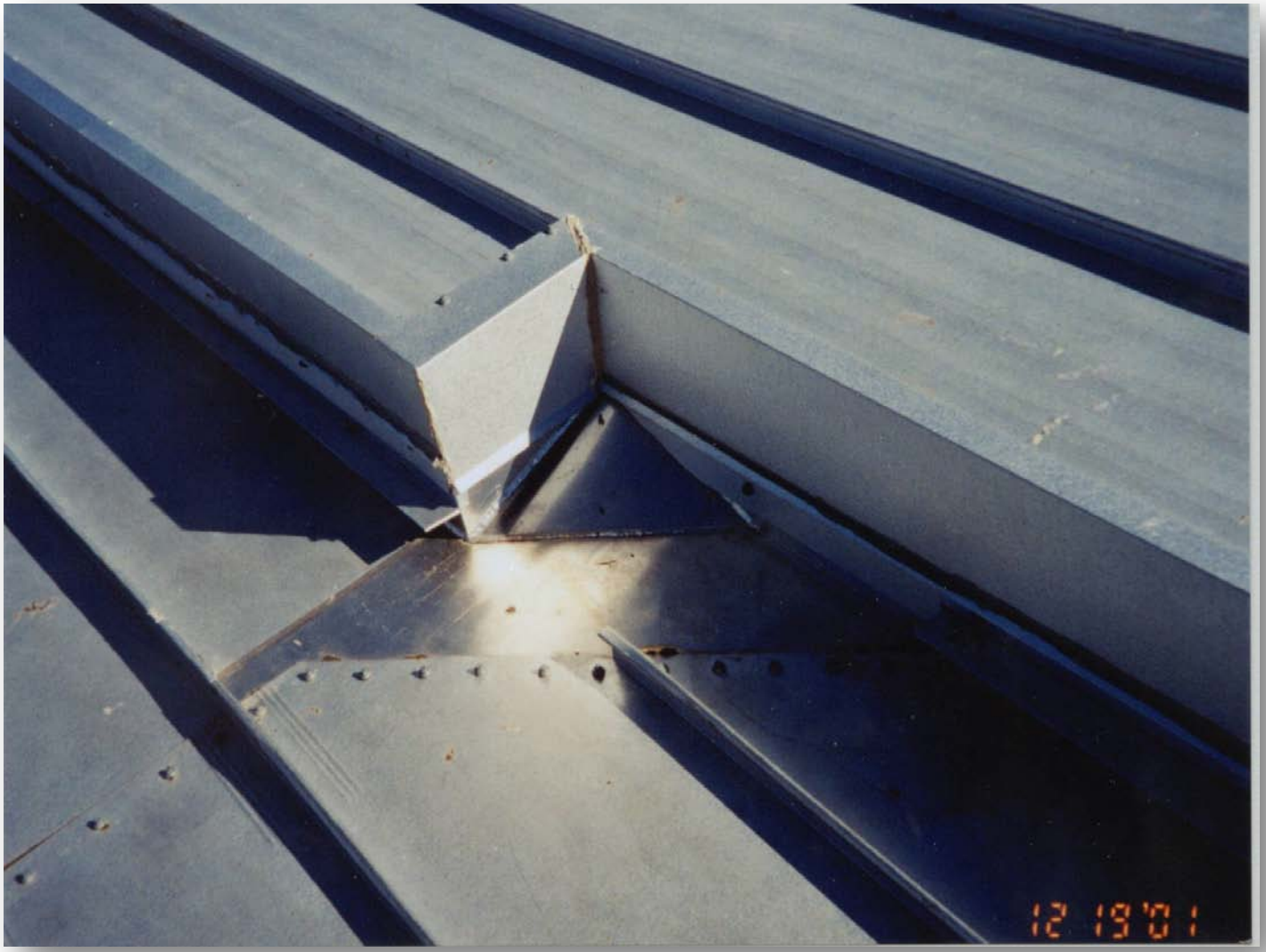
RIDGE/PARAPET INTERSECTION

HIGH EAVE/PARAPET INTERSECTION

HIGH EAVE/PARAPET INTERSECTION

LOW EAVE/PARAPET INTERSECTION

PARAPET OFFSET



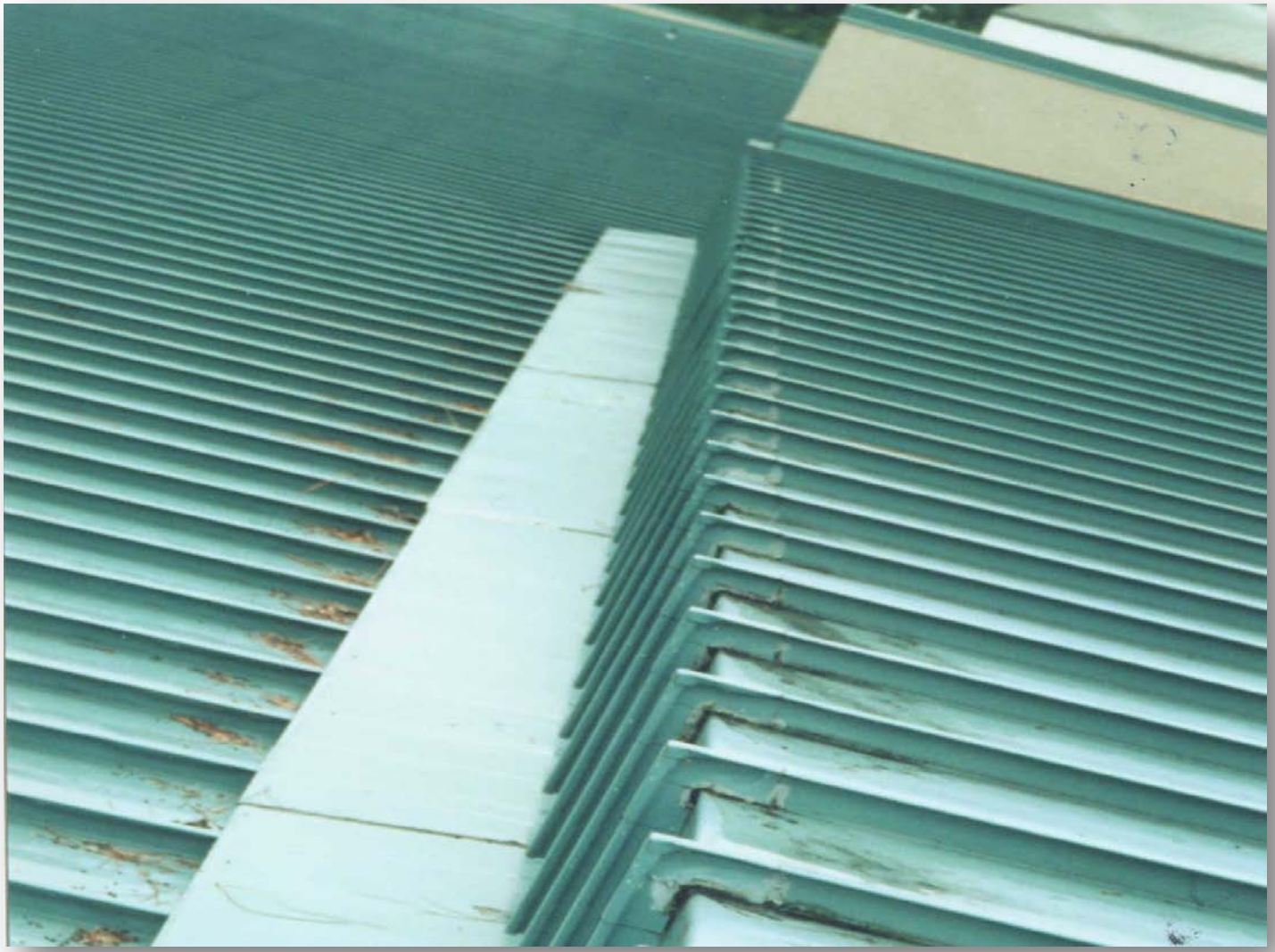
PARAPET OFFSET

PARAPET

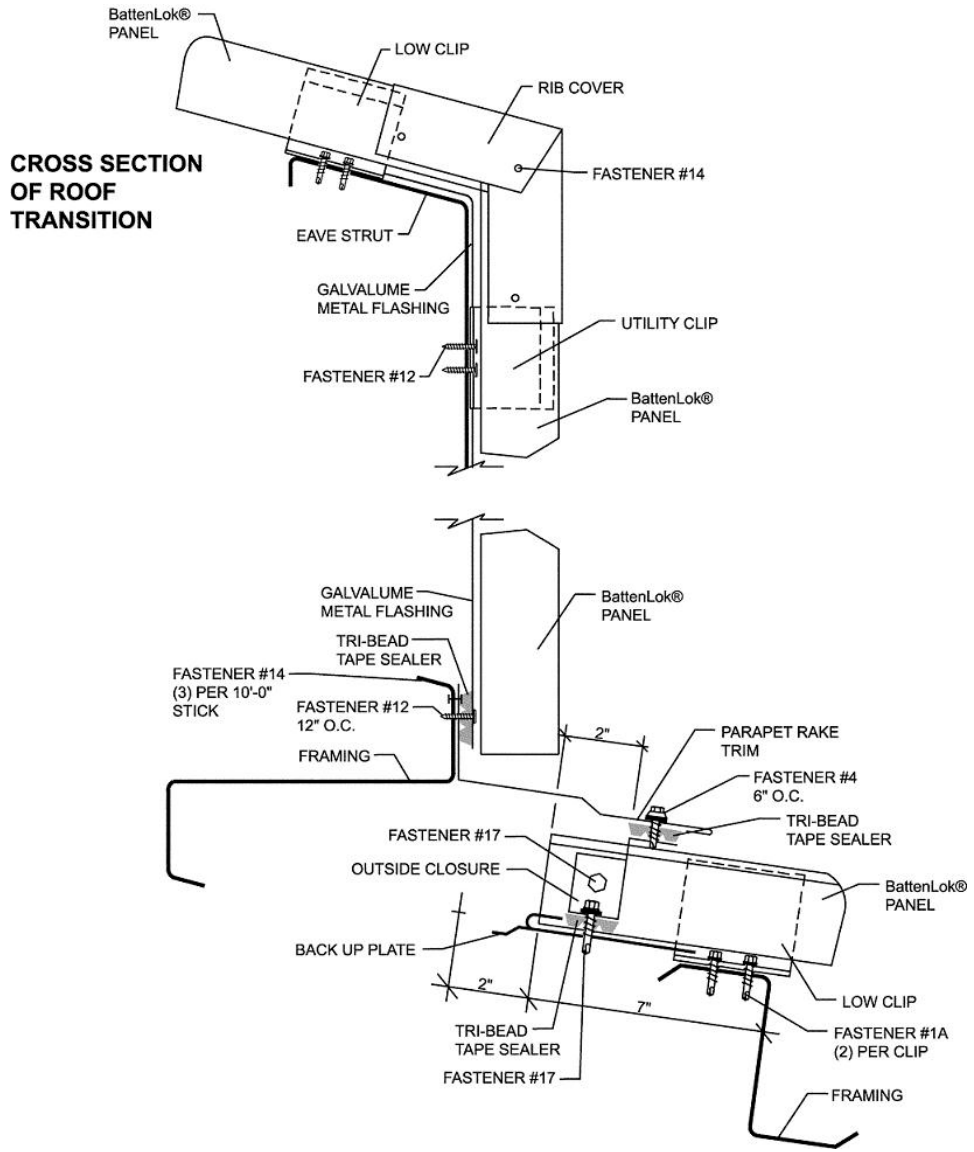
DETAILS ROOF TRANSITIONS

- Try to keep transitions outside the building envelope
- If this is not possible, seal the wall area with metal or a waterproof membrane before installing the roof
- Use with caution in areas that experience heavy ice and snow

ROOF TRANSITION



ROOF TRANSITION



ROOF TRANSITION

OTHER AREAS OF CONCERN

- Corrosion
  - Cutting Metal Panels

CORROSION FROM IMPROPER CUTTING OF PANELS

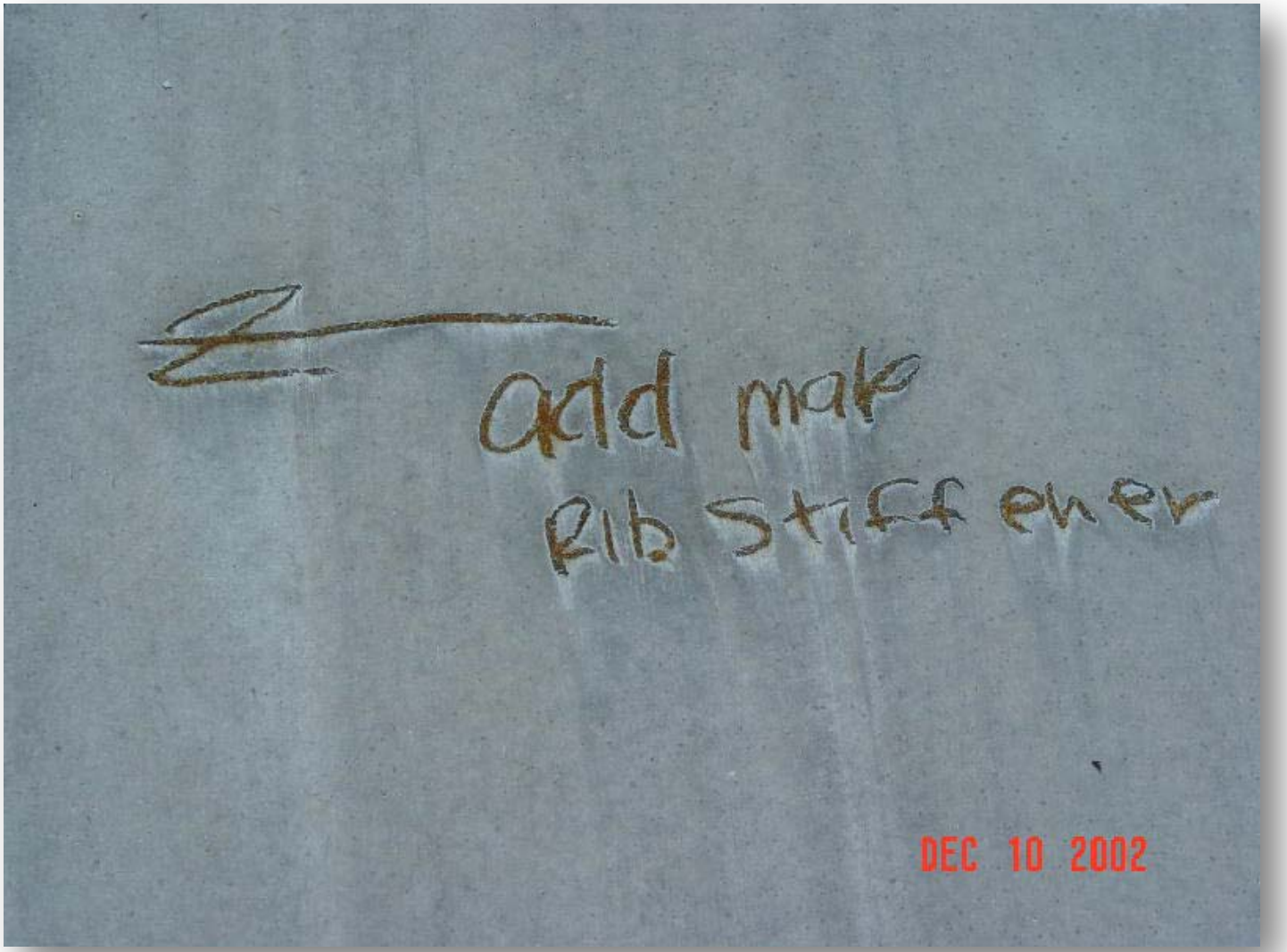
RUST DEBRIS FROM CUTTING PANELS ON ROOF

OTHER AREAS OF CONCERN

- Corrosion
  - Cutting Metal Panels
  - Dissimilar Metals

LEAD ROOF JACK

GRAPHITE ON ROOF



COPPER LIGHTNING CABLE

COPPER

AC CONDENSATE

AC CONDENSATE

TREATED WOOD

TREATED WOOD

S-5! CLAMPS

OTHER AREAS OF CONCERN

- Corrosion
  - Cutting Metal Panels
  - Dissimilar Metals
- Underlayments

FELT UNDERLAYMENT

FELT UNDERLAYMENT

RED ROSIN PAPER

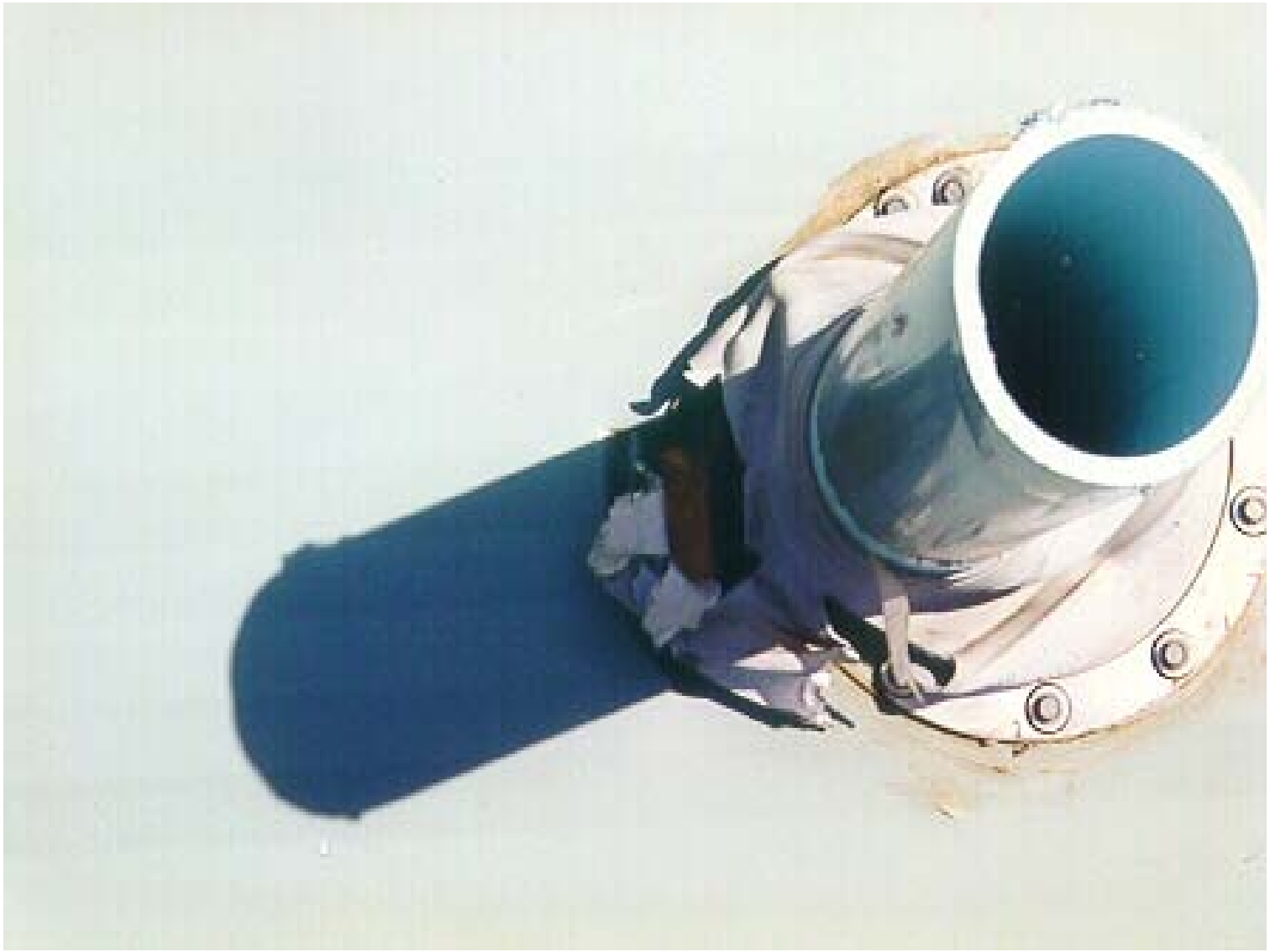
RED ROSIN PAPER

PEEL AND STICK UNDERLAYMENT

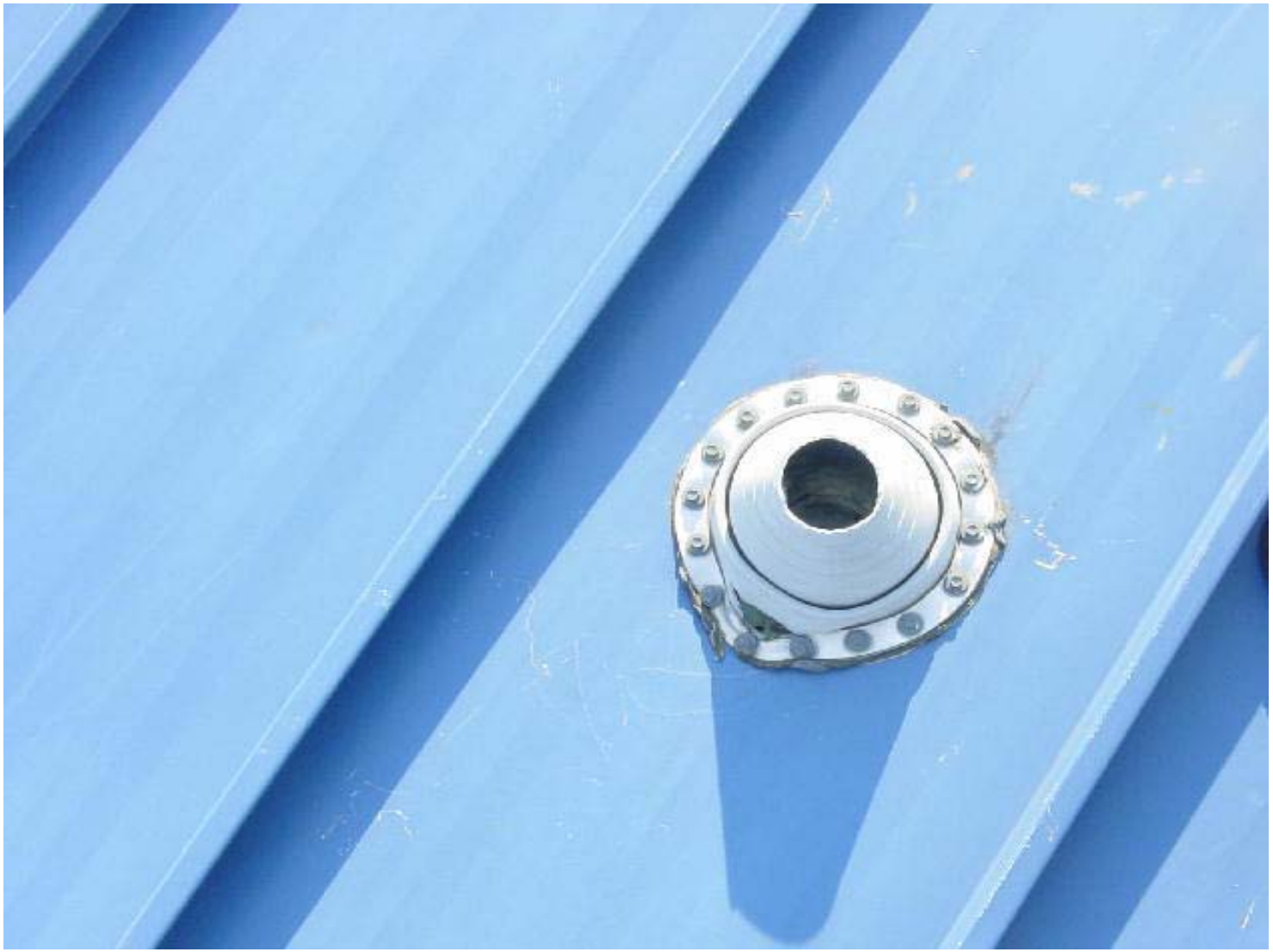
OTHER AREAS OF CONCERN

- Corrosion
  - Cutting Metal Panels
  - Dissimilar Metals
  - Improper Repairs
- Underlayments
- Ice and Snow

ICE AND SNOW



ICE AND SNOW



ICE AND SNOW

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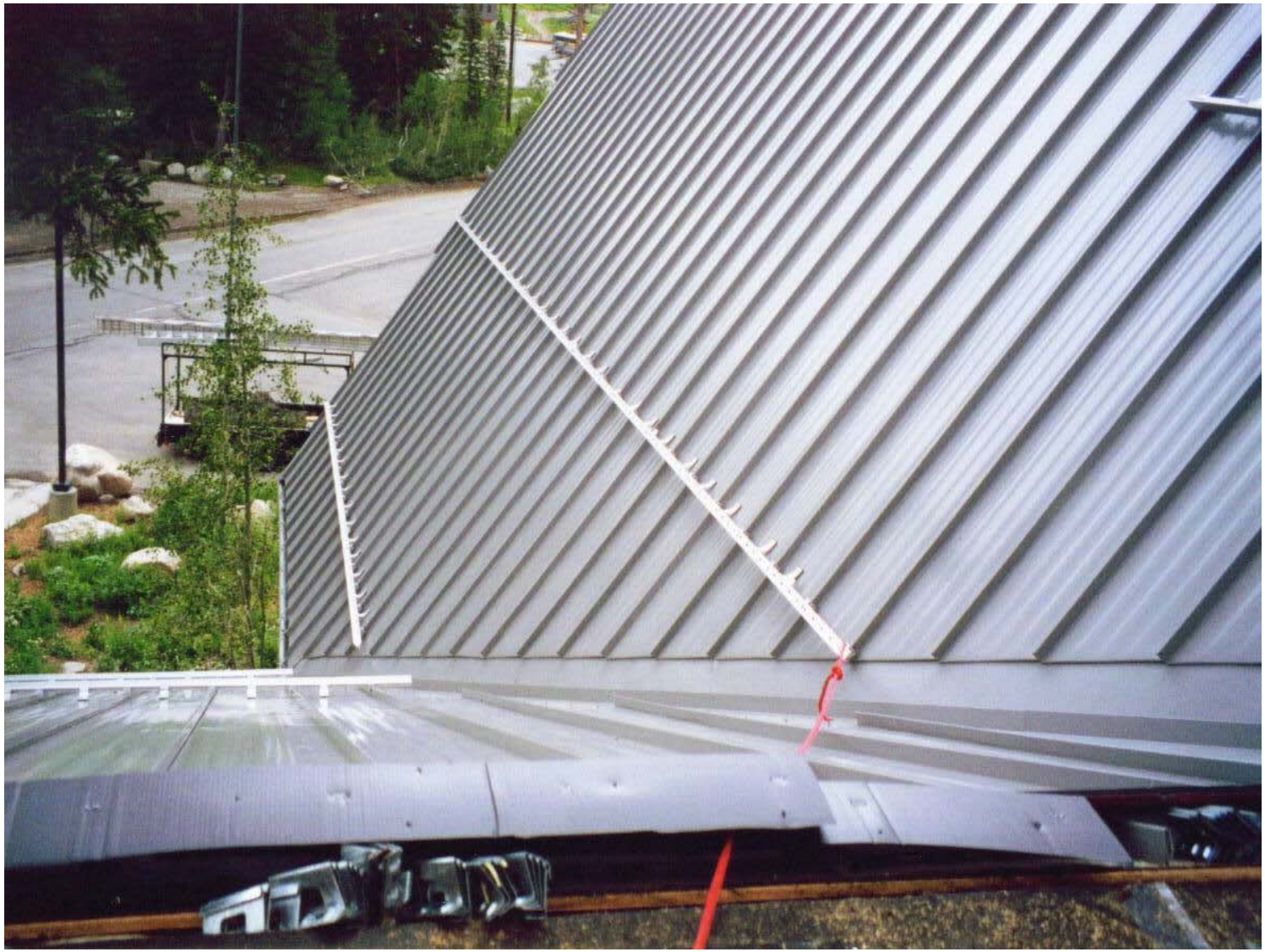

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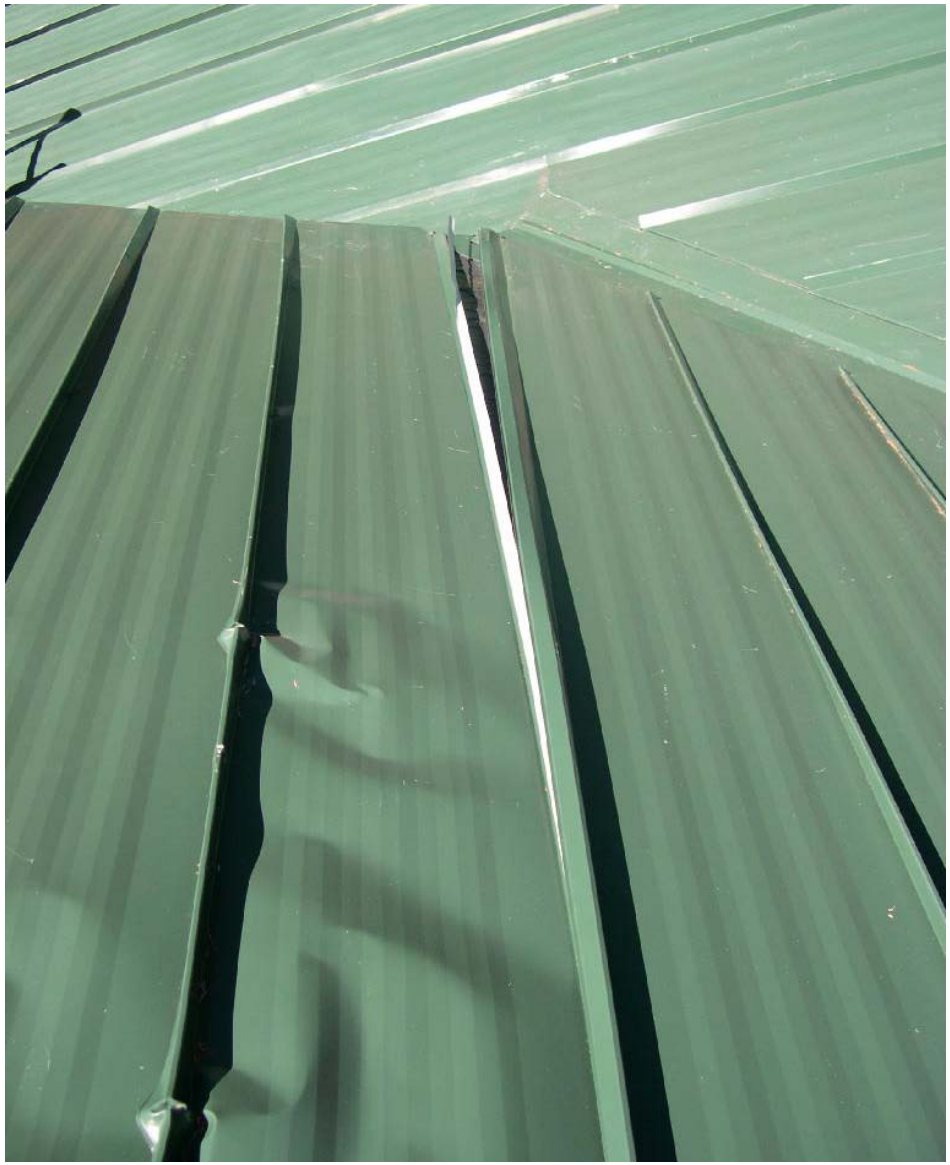

ICE AND SNOW

S-5! COLORGUARD

PLASTIC SNOW GUARDS

THANK YOU FOR YOUR TIME

THIS CONCLUDES THE AMERICAN INSTITUTE OF ARCHITECTS CONTINUING EDUCATION SYSTEMS COURSE.

QUESTIONS?

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