Asphalt Shingle Nailing

Q. *Can asphalt shingles be nailed above the adhesive strip? I have seen leaking low-slope roofs with relatively new asphalt shingles, where the leaks followed the nailing pattern. In the attic, there were rows of drip holes in the cellulose insulation on the attic floor. In this case, the shingles were nailed below the line of the self-seal adhesive, according to the manufacturer's instructions. (We use fiberglass shingles with a solid line of adhesive.) Wouldn't it be better to nail above the adhesive, where no rain can blow up to get at the nail heads?*

A. *Architect and roofing consultant Harrison McCampbell responds:* Asphalt shingles should always be installed according to the manufacturer's instructions, which are usually printed on the shingle wrapper. Because the thickness, weight, and shape of shingles vary, manufacturer's instructions vary slightly. But virtually all manufacturers agree that nails should be installed below the adhesive strip. To keep a warranty intact, follow the manufacturer's nailing and installation instructions closely. If you deviate, whether you think it is a better installation or not, be prepared to roll with the directive from the manufacturer if there is a leak or performance question.

If you nail too low, nail heads can be exposed, with the potential for water entry. If you nail within the adhesive strip, the nail head cuts down on the amount of asphalt surface available to hold the shingle down.

If you nail too high (above the adhesive strip), the nails may miss the top of the next shingle underneath. Most people don't realize that each nail holds down two shingles at once. If the nail is not at least 1/4 to 1/2 inch below the top of the shingle below, it may tear through. Proper nailing is especially important with the new "dimensional" (thicker and heavier) shingles, which, if not nailed properly, have a tendency to slide.

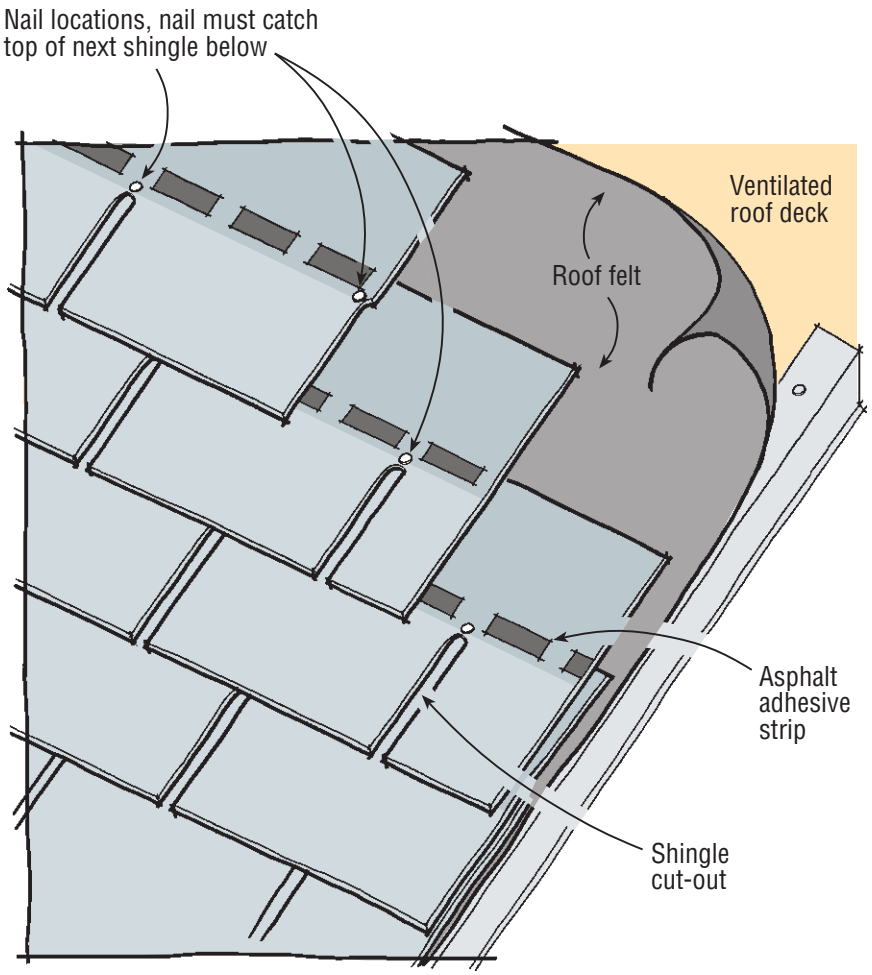
In the case of the dripping nails, it is possible that the drips were caused by condensation, not roof leaks. If a roof is cold or snow-covered and the air in the attic is relatively warm and humid, condensation can form on the underside of the roof sheathing and drip from projecting nail points.

If the low-slope roof is actually leaking, the installation may have been incorrect. All shingle roofs should include a layer of unperforated organic (not fiberglass-based) felt underlayment. Shingles should not be installed on slopes of less than 4 in 12, unless specific issues have been addressed. This is both a code requirement and a requirement of most shingle manufacturers.

Radiant Heat Barriers

Q. *I have seen many ads for radiant barriers designed to save energy. Is there any evidence that these radiant barriers can reduce home energy costs? If so, in what climates are they most effective? How should they be installed?*

Asphalt Shingle Nailing



A. *David Beal, building scientist at the Florida Solar Energy Center, responds:* In cooling climates, radiant barriers can and do save cooling energy. Testing at the Florida Solar Energy Center and other laboratories have consistently shown that a radiant barrier can reduce the amount of heat entering a home through the ceiling by 25 to 40 percent. The amount of energy saved depends on the level of conventional insulation in the attic. For those with a thick layer of attic insulation, a 40% reduction in the small amount of heat coming through the ceiling is correspondingly small. For those with minimal attic insulation, on the other hand, a 40% reduction in heat flow through the ceiling is a much larger amount.

Two rules of thumb:

- If you have R-30 or better attic insulation, the payback period for the installation of a radiant barrier may be long, although it will save energy.
- In a cooling climate, a house with a radiant barrier and R-19 attic insulation, compared to R-19 with no radiant barrier, should see a reduction in cooling energy requirements of about 10 to 12 percent.

Radiant barriers are not recommended in heating-dominated climates. To my knowledge, there has been no testing of radiant barriers in a heating climate.

The easiest and cheapest way to install a radiant barrier in new construction is to install roof sheathing with a radiant barrier. Several manufacturers now offer OSB or plywood roof sheathing with a laminated radiant barrier. A radiant barrier system can also be installed under the bottom of the top chord of a roof truss, or to the bottom edge of rafters. Installing a radiant barrier on an attic floor is not recommended, since such barriers easily get dirty, reducing the performance of the radiant barrier significantly. For more information, contact the Florida Solar Energy Center at 407/638-1000.

Copper Dip Tubes

Q. *I have an A.O. Smith water heater with a faulty polypropylene dip tube. Your report on dip-tube failures (*Notebook*, 7/99) said that a faulty dip tube may need to be replaced with a new copper dip tube. However, the tech support people at A.O. Smith told me that using a copper dip tube will destroy my water heater, and is not recommended. What's the story?*

A. *Master plumber Rex Cauldwell responds:* The report was mistaken in advising that defective polypropylene dip tubes should be replaced with copper dip tubes.

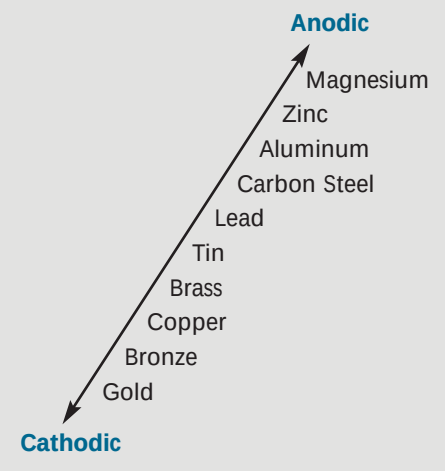
For those of us old enough to remember, dip tubes were originally made of glass. Since they had a habit of breaking during transit, the transition to plastic was inevitable. And perhaps it was just as inevitable that they would keep making them cheaper until they failed. Most plastic dip tubes have not had any problems. The only dip tubes with reported failures are polypropylene dip tubes manufactured by Perfection Corporation between August 1993 and October 1996. More information on the failures and the class-action settlement can be found at www.diptubesettlement.com.

Failed dip tubes are repaired by either replacing the water heater (usually at your expense) or by installing a new plastic dip tube (usually at the manufacturer's expense). Copper dip tubes should not be used, for several reasons. A copper dip tube would void the warranty of the water heater. Corrosive water can attack a copper dip tube. Finally, since copper is more "noble" than a water heater's anode rod, the anode rod will die an early death, and so will the steel water tank, as the tank tries to give itself up to save the copper.

Pressure-Treated Lumber and Steel Roofing

Q. *I am considering installing steel roofing over 2x4 pressure-treated purlins. Can the chemicals used to treat lumber attack steel roofing?*

A. *Paul Fisette responds:* I would not recommend using pressure-treated purlins under steel roofing without taking special precautions. A metal can corrode when minuscule amounts of electricity travel through an electrolyte connecting dissimilar metals. Water is an electrolyte. Since condensation is very likely to collect on the underside of metal roofing, you have an electrical conduit waiting to be plugged in.



This chart ranks various metals from anodic to cathodic. A metal higher in the list can degrade when placed in contact with a metal that is lower.

Most pressure-treated wood is treated with chromated copper arsenate. The metal present in the treatment chemical (copper) is dissimilar to the metal roofing (steel). I would be concerned that galvanic corrosion could degrade the metal roofing or fasteners.

Galvanic corrosion occurs when electrons move away from an anode toward a cathode. This electron transfer causes the anode to degrade, while the cathode stays intact. If you remove one of the three components (the anode, cathode or electrolyte), you can prevent corrosion.

The easiest way to avoid this potential problem is to use untreated purlins. If you insist on using pressure-treated purlins — for example, for termite protection — you could paint the purlins or the back of the roofing to break the electrical connection. Perhaps installing a plastic spacer or a strip of self-adhering roofing membrane between the metal and pressure-treated purlins would be a more practical way to separate the dissimilar metals.

Insulative Sheathing Question

Q. *The architect for a new home in Virginia has specified a product called Energy Brace sheathing instead of plywood or OSB. The product feels like cardboard covered with foil. The manufacturer claims that the product has energy benefits. Am I right to be doubtful?*

A. *Corresponding editor Paul Fisette responds:* I believe that the energy benefit of this sheathing product is marginal at best — for all practical purposes, the benefit is nonexistent in cold to moderate climates. The R-value of the sheathing is less than the R-value of 1/2-inch OSB or plywood. The manufacturer's energy claims are based on the ability of the foil to reflect radiant heat. In order for foil to work as a reflective barrier, an air space must be maintained on at least one side. If the reflective surface comes in contact with another surface on both sides — for example, siding on one side and insulation on the other — then heat can be conducted through the sheathing, and the amount of reflected radiation will be insignificant.

The other problem is that the foil surface's ability to reflect radiant energy works best when it is bright and shiny. When the surface collects dust, the reflective efficiency drops.

Finishing a Pine Floor

Q. *I am installing 1x12-inch-wide Eastern white pine flooring throughout a new home, including the kitchen. Since the flooring is used in high-traffic areas, I want to choose a finish that will provide long service. What do you recommend?*

A. *Flooring contractor Howard Brickman responds*: If the customer expects a finish that will provide long service, they are likely to be disappointed. In this case, your most important job is to lower the expectations of your client. Eastern white pine (*pinus strobus*) is a low-density species. It has a specific gravity of 0.35, which is roughly half as dense as oak or maple. You need to prepare your customer for the eventual denting and scratching that is characteristic of pine floors.

Pine floors get scratched when they are walked on. There is no such thing as a no-maintenance floor, so the floors will need a fresh coat of finish when traffic marks start to show. Choose a low-sheen finish, since the higher the gloss, the more quickly scratches and scuffs will become visible.

Estimating Software for Pole Buildings

Q. *I recently had the opportunity to bid on a pole building. Do any software companies sell estimating software for post-frame construction?*

A. *Martin Holladay responds:* Although such software is available, it isn't cheap. Two sources of Windows-compatible post-frame estimating software are 20-20 Technologies of Barrie, Ontario (705/725-1966), which sells a program called 20-20 Lumber Pack for $2,695; and Washington Software of Weatherford, Texas (817/599-3372), which sells the Washsoft Estimating System for $995.

How Rain Screens Work

Q. *I plan to install wood siding over a vented rain screen on a house in Seattle, where we get rain for long periods during the winter. My question is, how can the air cavity dry if the exterior relative humidity is 100 percent? Assuming the air cavity temperature is the same as the exterior temperature, the air coming through the cavity can't pick up any additional moisture.*

A. *Corresponding editor Paul Fisette responds:* If the relative humidity is in fact 100 percent, then of course there will be no drying. However, since the relative humidity is not 100 percent all the time, some drying will occur during these periods.

Remember, the rain screen provides you with insurance. The siding keeps most of the liquid water out of your wall system, and the screen provides backup protection. The air space allows any water that gets past the siding to drain, and the circulating air helps dry the back of the siding and the wall when they get wet.

EPDM Roofing Bubbles

Q. *After installing an EPDM roof, I noticed that there are a few air bubbles under the roofing. Is this a problem? If so, is there any remedy?*

A. *Roofer Joseph Bublick responds:* In most cases, bubbles in EPDM roofing are just a cosmetic problem, as long as they aren't growing. Usually, bubbles are not associated with leaks.

The most common cause of bubbles is the application of rubber to the deck or insulation board too soon, before the adhesive is dry enough. In some cases, a contributing factor can be high pressure in the roof system. If this is the problem, the solution is to install pressure-relief vents. Pressure-relief vents, which are one-way air vents typically measuring about 2 to 3 inches in diameter, are available from roofing manufacturers.

To repair bubbles, cut them out and repair the areas according to the roofing manufacturer's instructions.

GOT A QUESTION? Send it to On the House, *JLC*, 186 Allen Brook Lane, Williston, VT 05495; or e-mail *jlc@bginet.com*.