by Paul Johnson

Keeping Water Out of Decks

Careful detailing of trouble spots ensures longevity

Here in the Pacific Northwest, it rains for months at a time. Last year it didn't stop until the end of June and then it started back up at the end of September. Predictably, our climate causes a lot of water-related problems, making good flashing details paramount to the longevity of decks and the houses they are attached to.

Water needs help to get into the wood, either from gravity, wind, or capillary motion. The effects of gravity are easy to anticipate — water flows downhill. But wind can act against gravity and move water sideways and even uphill, opening up more potential avenues for water to travel. And then there's capillary action, which comes into play when two surfaces are close enough that water's surface tension will allow it to bridge the gap between them; the surfaces create a path that water can flow along. A common example is a bubble of water climbing up the inside of a thin straw. Wood's end grain can wick water the same way — up, down, or sideways.

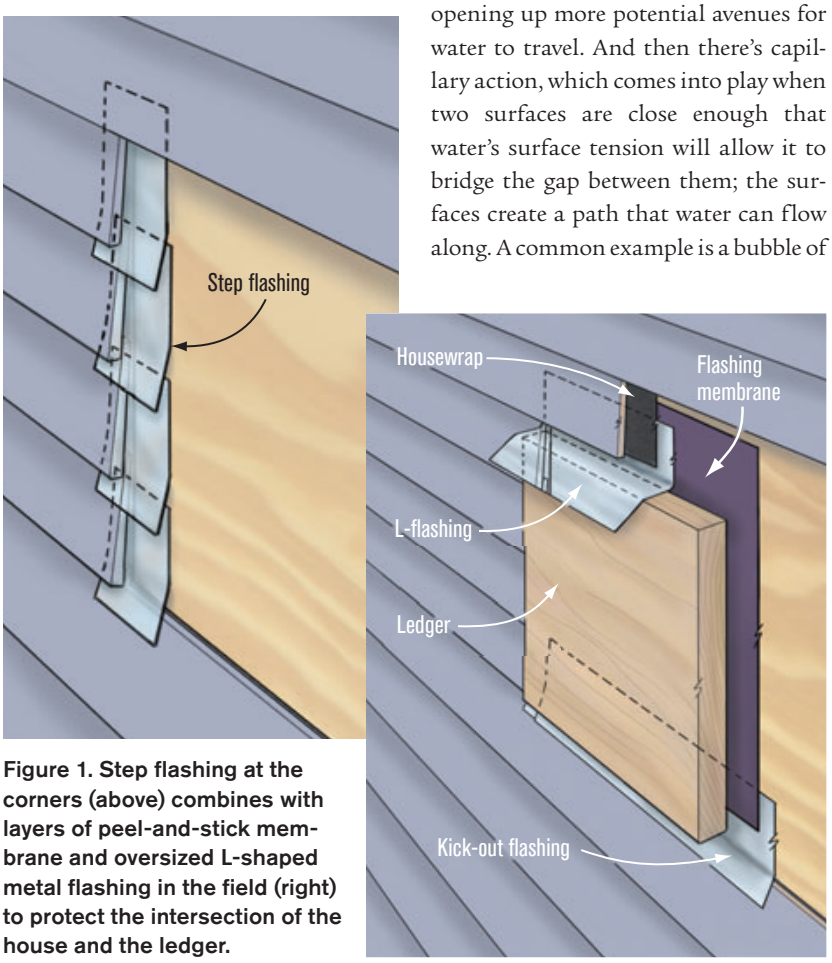

Figure 1. Step flashing at the corners (above) combines with layers of peel-and-stick membrane and oversized L-shaped metal flashing in the field (right) to protect the intersection of the house and the ledger.

Protecting a house against water intrusion starts with creating a barrier, such as siding, that moves water away from the structure. Behind that should be a drainage plane, such as housewrap, that will keep moving water away if it gets behind the siding.

Integrating the deck ledger with these two systems — without compromising them — is critical for the house and the deck. Otherwise, water will get behind the ledger board and cause damage to the siding and the sheathing. It could also enter the house and damage finished surfaces. And if the house framing rots where the ledger attaches to it, the deck could pull away from the house and collapse.

The rest of the deck is no less susceptible than the ledger to water intrusion and potential damage. A little forethought can protect the entire deck, your clients, and your business.

Deck-to-House Intersection

Because I'm a remodeling contractor, the existing siding and trim is usually in place when I build and attach decks. To permit a positive ledger-to-house connection, the siding needs to be cut back, and in the process, the weather barrier behind the siding is usually cut too, which disrupts the existing drainage plane.

Figure 2. Pressure treatment doesn't force the preservatives all the way into the wood. That's why additional steps are required to keep water from soaking in.

Figure 3. Spacing double joists with pieces of pressure-treated plywood allows the members to dry.

Before installing the ledger, I integrate flashing with the existing weather barrier so that should water get behind the ledger, it can't sit there and rot the wood (**Figure 1, previous page**). To tie into the siding and the weather barrier at the ends of the ledger, I slide several small pieces — which I find is easier than trying to work in one large piece — of step flashing behind and over the siding.

I install self-adhesive flashing membrane behind the existing weather barrier above the ledger, lapping the flashing membrane over the top of the siding below. The self-adhesive flashing also helps to seal around the lag screws or bolts that penetrate into the house framing.

I always bolt the ledger tight to the house. While I like the idea of spacing the ledger from the house to allow for drainage and ventilation, I don't think the connection is as positive, and I worry that it creates opportunity for the ledger to move slightly over time as it shrinks and expands.

Once the ledger and the joists are installed, I cap them with an L-shaped flashing over the top of the ledger that slips up behind the siding and the weather barrier, if possible. This flashing should extend a few inches past the face of the ledger and bend downward so that water sheds away from the ledger.

I then put a good bead of silicone sealant — shaped so that water flows away, rather than becoming trapped — at the intersection of the flashing and siding to keep water from wicking behind the siding. I use silicone in a lot of applications. However, it doesn't take paint well and should be used cautiously near areas that will be painted. A high-quality elastomeric exterior sealant can be used instead.

Figure 4. Flashing the tops of joists with peel-and-stick membrane protects them from water and seals penetrations from decking screws.

Deck Framing

I expect the tropical hardwood decking I usually install to last for 50 years or more. The weak link is the treated-lumber frame. Cut open a piece of pressure-treated wood and you can usually see how far the chemicals penetrate; any cuts or holes in the lumber can expose untreated wood (**Figure 2**).

With a little extra work, though, the deck frame can last just as long as the decking. Before even beginning to frame the deck, I lay out and plan for areas that may be problem spots. Anywhere that two pieces of wood join together, for example, is a potential source for water problems. Doubled-up joists and headers, post connections, and even where the decking meets the framing all are places where water can collect without having a way to drain.

There are a few ways to protect the tops of doubled-up joists. One way to stop water from collecting in the groove in between them is to space the joists apart with pressure-treated plywood spacers (**Figure 3**). Because I usually flash the tops of the joists with peel-

Figure 5. Two pieces of L-shaped flashing sealed with a bead of silicone protect the tops of beams.

Figure 7. A bead of silicone sealant will keep water out of the joint between the railing post and the framing.

Figure 6. The complex framing used to secure railing posts makes a perfect place for water to collect.

and-stick flashing, I don't need to space them (**Figure 4, previous page**). There are some pre-manufactured flashings on the market specifically designed for deck joists (Grace Deck Protector being one, and Joist Jackets another), but I usually cut my joist flashing from larger rolls of peel-and-stick membrane that I have on hand anyway. This saves a bit of money and gives me more flexibility for sizing the pieces when I feel more protection is needed.

Another advantage of the peel-and-stick flashing is that it seals around the decking screws, keeping the screw holes from taking on water over time as the framing expands and contracts. I've seen framing rot from water entering screw holes, even in pressure-treated lumber.

On the beams, a piece of coil stock bent with a sheet-metal brake to fit snugly over the top is best. A layer of peel-and-stick flashing underneath it protects screw and nail holes where fasteners penetrate the flashing and also adds a layer of protection between the flashing and the ACQ pressure-treated wood to help prevent corrosion. If I don't have the time or budget to have my local sheet-metal shop bend me a piece, I overlap two pieces of off-the-shelf L-flashings with a bead of silicone between them to stop water intrusion, thus forming the same cap for the beam (**Figure 5**). If you have a sheet-metal brake, no problem.

Protecting Posts and Railings

With the hardware now required by code, it usually works out that a post is bordered by joists and blocking on at least two sides if not more, making a great place for water to build up (**Figure 6**). The joists are usually wrapped over the top with adhesive flashing, but it's impractical and aesthetically unpleasing to wrap the peel-and-stick up the posts unless they're covered by a hollow post or trim.

If the post does get trimmed out, I make sure the trim is finished on all four sides. If the post isn't covered, I usually run a bead of clear sealant around it to the framing intersection (**Figure 7**). I slope the sealant slightly so that water flows away from the post and the joint.

I've thought of various ways to drill holes, or cut relief channels in the

Figure 8. The numerous joints in railings make them vulnerable to water. Sealing end grain before assembly and using silicone sealant where railings meet the house help keep water out.

Figure 9. The end grain of decking and wood trim is coated with a preservative-sealant before assembly.

Figure 10. Deck screws loosen up as the decking shrinks. Plan to return a year or two after building the deck to retighten them.

posts to help drain water, but it seems like most smaller holes would get clogged with debris before too long, and I wouldn't want to compromise the post's structural stability by drilling larger holes in it.

There are lots of joints and intersections in the average railing, and many of the components are made of thinner, smaller material that's more susceptible to rot (**Figure 8**). If the railing attaches to the house, first make sure that intersection is sealed. If the guard rail gets physically attached to the siding, I put a good dab of silicone behind it to help seal any holes in the siding made by the fasteners. I then run a small bead of sealant around the joint between the railing and the house to keep water out. I don't seal along the bottom edge, though, to give water that does get between the rail and the siding somewhere to drain.

Most manufactured top and bottom rails have an integral slope, whether with a profiled top or beveled edges. If I'm building my own railings, I bevel the bottom rail to drain water away.

Railing systems and styles vary so much that there is no one-size-fits-all approach for water mitigation. The main points are to keep all joints shedding water and seal any penetrations in the wood where water might sit.

Keeping Decking Dry

If there are any gaps between the framing and the deck boards, water will collect there and capillary action will then pull it as far into the gap as it can go. Adhesive flashing over the top of the framing helps protect the framing and seals around the screw holes, but it potentially makes things worse for the decking. Because flashing doesn't breathe, the water can't wick away into the framing or evaporate as quickly.

The best defense is to minimize gapping between the decking and the framing and to keep the decking well fastened. Fastening the boards down near the edges helps the boards lay flat; otherwise they tend to curl up when the hot sun hits the top surface but the underside remains damp. To prevent water from entering the end grain of the decking through capillary action, coat cut ends with a wood preservative-sealant (**Figure 9**).

The screws that hold down decking can loosen up over time. I favor exposed screws when aesthetically feasible, and I make it a plan to return after a year or two and tighten down the decking (**Figure 10**). Even kiln-dried hardwood decking boards usually shrink by 1/32 inch to 1/16 inch in thickness after the first hot summer.

When you plan a deck, remember that wood moves and water follows the path of least resistance. The better you anticipate what wood and water will do, the longer the lifespan of the deck will be. Homeowners looking at the bottom line don't always understand the need for careful detailing, but educating them is part of every sales pitch I make. ❖

Paul Johnson is a deck builder and remodeling contractor in Portland, Ore.