Flash and Caulk

by William Lotz

The "wet buildings" I see have water-penetration problems for a number of reasons. Some buildings have poorly installed or punctured vapor barriers, others have inadequate ventilation. Sometimes, the building has a wet basement or crawlspace, or the owner may be at fault (four cords of wet firewood in the basement, for instance, or a clothes dryer vented indoors). But the most common problem I see is inadequate caulking and flashing.

Faulty Flashing

Let's review a few cases. Recently, I was called to look at a water problem at a hospital in the Midwest. The exterior wall was brick. Behind the brick there was a small air gap. Then came a layer of gypsum, 6 inches of insulation, and, finally, foil-backed drywall. The problem was that the gypsum and insulation were soaked, and water was sweeping through to the drywall.

Upon examination, it was clear that large quantities of water had poured into the cavity between the gypsum sheathing and the brick exterior. The builder had intended to install elastomeric flashing at each floor level to channel rain penetration out through the weep holes. But the flashing installation was sloppy and water was everywhere inside the wall cavity.

Now 100,000 square feet of brick exterior is being removed to retrofit a vapor barrier (see Figure 1). This case turned into a $4 million dollar lawsuit; it is still in litigation.

It is especially important to install flashing with meticulous care when it is in an inaccessible location. The retrofit on this hospital will use the same flashing principle, but the flashing will not be elastomeric. Rather, they will use a flashing laminated from copper, glass-fiber, and kraft paper. The laminate has a thin layer of copper on the wet side, for durability. The other side of the flashing, the dry side, has a glass-fiber-reinforced kraft paper that gives it tensile strength and puncture resistance.

Figure 1. *Elastomeric flashing was supposed to channel rain penetration out through weep holes in the brick veneer. But the flashing installation was sloppy and water was everywhere inside the wall cavity.*

Moisture From Inside and Out

The second case involves an apartment building in Portland, Maine. The building was only two years old, but the paint was peeled off from the clapboard in sheets. After taking over 1,000 readings for moisture and examining a few wall sections we cut out with a chain saw, we concluded that there were three causes for the peeling. First, the electricians had cut holes in the poly vapor barrier, allowing inside moisture to get in behind the wall. Second, the occupants weren't using their bath-exhaust fans (the fans were cheap and noisy). Third, the flashing was poor in three crucial areas: where the balconies were attached to the house, where the roof and walls intersected, and all along the sill trim board (see Figure 2).

Some of the apartments have second-story balconies, supported by cantilevered 4x6s. Where the beams penetrated the wall, the flashing didn't work and water from the balcony ran inside the wall cavity. When we tore the wall apart, the plywood sheathing was black with mold. The clapboards under the balconies had moisture contents of about 30 to 50 percent. Clapboards that were not near the balcony or the holes slashed in the poly had an acceptable moisture content of 10 to 14 percent.

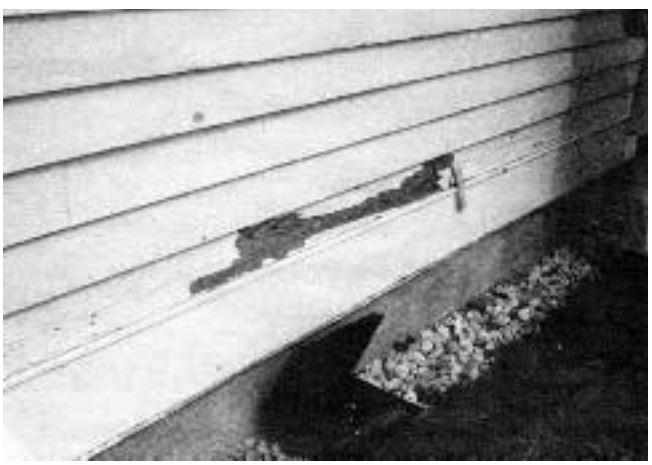

Figure 2. *The flashing above the trim board was tilted inward causing the bottom clapboard to be constantly wet.*

Figure 3. *Where this roof and wall meet, the flashing leaked, and water saturated the clapboards, causing the paint to peel.*

Finally, the architect on this project had designed a variety of "interesting" intersections of roofs and wall cavities. The flashing was either forgotten or poorly done, and as a result, the clapboards under these areas were saturated and the paint was peeling (see Figure 3). By the end of the year, the contractor will have spent $250,000 repairing the problems with the vapor barrier and the flashing on this project.

No Roof Overhangs Causes Problems

Finally, there is the case of an 18-month-old building in Maine. By the time I was called to look at it, paint was already peeling around the windows. The architect had designed the sloped roof with no overhang. The result was that water cascaded down the clapboards and over the windows whenever it rained. The aluminum flashing over the window trim was overwhelmed by the volume of water. So, the water flowed back up under the 3/8-inch lip on the flashing and into the wall cavity around the window. The result was wet trim boards and peeling paint.

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I recommended retrofitting the building with an 8-inch roof overhang. We sprayed water with a garden hose on the building as a test and also found that the joints in the window frames leaked. This, took, had to be repaired.

Flashing

Aluminum, copper, lead, copper-paper laminates, and elastomeric are the most common flashing materials. Sometimes, when I specify a product, the contractor will call me and say that the product is unavailable. I am slowly learning that when I specify materials that are not available from the typical lumber yard, I should put a supplier's phone number on my design drawing. Premodeled elastomeric pipe flashing for where pipes penetrate the roof is available. Call your supplier to confirm.

Caulk

The purpose of caulking is to control air and water leaks. But a lot of the buildings I see with water problems have no caulk anywhere. Sometimes caulk is used, but it is the wrong type. Each type of caulk is designed for a specific application (a certain crack size, substrate, and flexibility, for instance).

It is frustrating to see silicone caulk used in many applications where it should not be used (and it's often twice the price of the correct caulk). Silicone is best used to seal metal to metal, metal to glass, or glass to glass. Silicone was never intended to seal joints in wood. I am not aware of any caulk that is used against bare wood. Caulk is meant to be used only with primed wood.

No matter what kind of caulk you use, if you are filling a large gap, you may need to have poly-foam rope backing to support the caulk. For all-around residential use, I've found the best caulks are acrylic-latex or butyl. They are available at every lumber-yard. ■

William Lotz is a consulting engineer from Acton, Maine.