Not a Roofing Problem

by William A. Lotz

The building owner complained of roof leaks. The "leaks" were worse in the winter and spring, and seldom occurred in the summer or fall. The ceilings were stained everywhere I looked. Had the roofer screwed up? Probably not.

I have seen many, many cases that follow this pattern, but not a single one involved a roof leak. The "leaks" were from condensation due to no poly vapor barrier in the ceiling.

The following are recent examples of problems that resulted when the ceiling vapor barrier was omitted.

New Hampshire House

The house was designed by a good architect—he had specified a poly vapor barrier—as a woman's retirement home. It had a hot tub in the ell off the living room. The contractor had ignored the specified poly vapor barrier for the ceiling, and had installed the ceiling's foil-faced batts and drywall before the architect's inspection. There was no attic.

The home was built in the summer of 1985, and my inspection was in the spring of '86. All winter long, it had "rained" indoors. The ceiling was stained everywhere in the house. In early April, the indoor humidity was 40 to 50 percent with a dew point of 41 to 46°F. This means that whenever the outdoor temperature went below 40 degrees (a frequent occurrence in New Hampshire), water condensed on the roof sheathing. The hot tub was the major contributor to the moisture level in the house. However, I have seen many buildings without hot tubs that had similar indoor rainfall and staining.

The cure for this house's problems included a tight-fitting hot-tub cover, a complete poly vapor barrier (with sealed joints) on the ceiling, and new drywall and paint. (Fortunately, the home owner had held back a sizable retainage from the contractor.) The contractor had previously made an offhand remark that he was "afraid of poly"—supposedly, he felt poly caused problems. I have never seen properly installed poly cause a problem. I have, however, frequently seen badly installed—or no—poly cause considerable grief.

Luxury Home for the Elderly

This was a design/build project with no one in charge of the design. There may have been antiques in the lobby, but there was no vapor barrier in the ceiling.

The only moisture source in this new, congregate-living retirement home was the people—their cooking, breathing, and bathing. The bathrooms and kitchen had exhaust fans. All winter, it rained inside the building in most of the expensive bedrooms. Embarrassing!

The 1/2-inch CDX roof sheathing was wet or frosty all winter, which caused severe warping of the plywood and the cheap roofing shingles. The ceiling had fiberglass batts with no poly vapor barrier. There were gaps everywhere in the batts; you could even see a pattern on the roof where several batts had fallen out of place or were forgotten during construction. In one gable end, there were no batts (oops!).

Because the owners thought the problem was external, the roof was shoveled after each snowfall, with resultant damage to the shingles. No provision was made on the 4-in-12-pitch roof for preventing ice backup. And despite all this, the attic was hot since none of the heating ducts or pipes were insulated. Penny-wise and pound-foolish!

The solution was to replace the warped plywood sheathing, redo the roofing system, and install a continuous poly vapor barrier in the ceiling (a horrible job to do). The owners may have saved the architect's and engineer's fee, but they will spend *much* more than that for the repairs.

Vermont Ski Condos

The architect for these southern Vermont condos had specified "kraft-faced fiberglass" in the ceiling. The condo owners' association hired me to solve the problem of the "leaky skylights."

The ceilings were stained and the drywall tape was dangling as a result of water damage. We cut several holes in the drywall ceiling and could find no evidence of skylight leaks. The problem was condensation.

I suggested painting the ceilings with two coats of Glidden Insul-Aid vapor-barrier paint. If that doesn't work, they will have to tear out the drywall and install poly.

Costly Lessons

In each of these three cases, it would have been much less expensive to install the 4-mil poly during construction.

I have seen dozens of buildings where the foil or kraft facing on fiberglass batts was totally ineffective as a vapor retarder. (Vapor "barrier" and vapor "retarder" both refer to materials that reduce vapor flow to prevent condensation problems.) To be an effective *vapor* barrier, the material must also be an *air* barrier.

It rained all winter in most of the expensive bedrooms. Because the owners thought the problem was external, they shoveled the roof after each snowfall.

Forty years ago, someone defined a vapor barrier as any material of 1 perm or less. That definition is no longer valid; to be an *effective* vapor barrier, today's energy-efficient construction requires a .1-perm system. The vapor barrier must be both sealed and continuous to protect the construction from condensation damage.

There are still a lot of contractors out there who don't understand vapor barriers. But in our climate (4,000 or more degree-days), poly vapor barriers are necessary in the walls and ceilings of houses *and* commercial buildings.

It is also discouraging to see consistently sloppy fiberglass-batt installation. I have been in countless attics this year. In every one that was insulated with fiberglass batts, I could look down and see drywall through the cracks. Two-inch spaces between adjacent batts are not uncommon. Several of the buildings had two 6-inch layers of batts—and you could still see drywall everywhere you looked.

As a result, I now recommend to my clients that they insulate attics with 6-inch batts, then 6 inches of fiberglass blowing wool. That way, the cracks get filled up with insulation. ■

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