

Peeling Paint Blues

by William A. Lotz, P.E.



Paint companies sell a lot of paint as a result of moisture problems. I have seen several expensive houses this year that were built in the fall of 1986 and by January 1987, the paint was failing. When the paint manufacturer's representative was called to the site by the builder to determine the cause of the failure, the contractor was left with more questions than answers. As they typically do, the sales rep pricked the clapboards with a moisture meter, declared "excessive moisture," and left with the comment that his paint was not to blame.

When two different brands of paint (primer and finish coat) are used on the building, the contractor makes it very easy for both manufacturers' reps to blame the problem on the "other" brand of paint. The moral to that story is don't mix brands unless you know what you are doing and/or are willing to risk the repair costs.

Most of the exterior paint failure I see, however, is a result of internal moisture problems. When you combine excessive humidity in a building with no poly vapor barrier or one with major holes in it, then you run the risk of paint failures in cold climates (over 4,000 heating degree days).

The vapor travels from the warm, moist building interior, through the drywall, through the fiberglass batts, and condenses on the plywood sheathing. The water then wets the

back side of the clapboard and eventually, usually on the first warm spring day, pushes the paint film away from the wood in the form of a blister. When you cut into a blister, the wood is very damp—30 percent or more moisture content.

"Excessive" moisture is usually a result of the building occupants using a humidifier, not using bath and kitchen exhaust fans, venting the clothes-dryer indoors, wet basements, crawl spaces, or hot tubs.

Paint fails for a variety of other reasons including: excessive external moisture (dripping and/or snow), excessive paint thickness, poor surface preparation, incompatibility between

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paint layers, old age. These problems may interact with the "primary" cause of paint failure—excessive internal

moisture.

Poorly Picked Paints

The large colonial style home was built in Massachusetts during the summer and fall of 1986. The house was occupied in December. Both red cedar and hemlock clapboards were used. The house had an attached garage. The bath exhaust fan was seldom used and it was vented into the attic—both very poor practices. There was no kitchen exhaust fan, and the basement had an open sump pit.

In January of 1987, the paint started to blister and peel. When I saw the house in May, it was a mess. The paint was blistered or peeled everywhere I looked on the north or east sides of the house (see photo). Some paint distress was evident on the south and west sides but it was much less severe. Usually the peeling is more severe on the downwind sides of the building when there is a prevailing wind direction.

The photo shows two problems. First, the two layers of paint (different brands) separated from each other. The two types of paint were incompatible. The primer was applied to the clapboards and then the house was spray painted with a popular brand of white stain.

Second, the primer peeled off from the clapboards in sheets. Moisture readings taken in the wood clapboards ranged from 10 percent to over 30 percent. Moisture readings in the plywood sheathing were off the scale (over 30 percent). I assume "construction moisture" played a part in the wetness of this house—how much is difficult to say until next year. The paint manufacturers took samples of the peeled paint film and stated nothing was wrong with the paint formulation based upon laboratory analysis of the samples.

My recommendations to the

worried builder included: install bath and kitchen exhaust fans ducted outdoors, paint the entire interior of the house with two coats of Glidden Insul-Aid vapor barrier paint plus a finish coat of paint, remove the existing exterior paint and repaint with primer and finish paint of the same manufacturer, and cover the sump pit hole with a moisture-tight cover.

Hidden Humidifier

An expensive home in Portland, Maine, is the next example. The main part of the house was built in 1937 and a two-room addition was added around 1980. The house had warm-air heat. The paint on the clapboards of the main part of the house was severely peeled whereas the clapboards on the 1980 addition looked like new. The main house has been painted twice since 1981. The house had a single occupant who did not generate much moisture.

However, unknown to the owner, the house did have a humidifier. I turned off the water valve at the humidifier and told the homeowner she could now repaint and expect the paint to last for many years. The difference between the main house and the new addition was fairly obvious—the main house had no vapor barrier and the addition had a good poly vapor barrier.

Leaky Vapor Barriers

The next example was actually three similar \$300,000-plus houses built in various towns in southeastern New Hampshire. These houses were built by the same builder during the summer and early fall of 1986 and occupied in the late fall of 1986. During the spring of 1987, the three new homeowners noticed blisters in the paint on their clapboards.

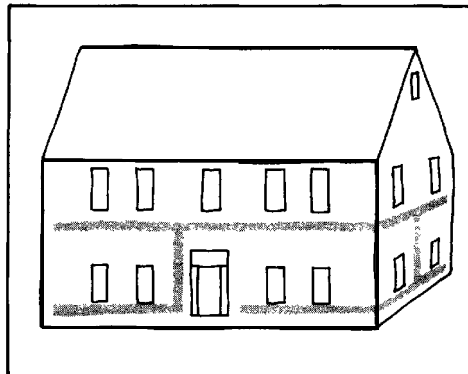
The clapboards were red cedar. The primer was an oil base with the final



This shelf gets dripped on from the roof and sits in snow all winter. These are tough conditions for even the best paint job.



Completed in the fall, this Mass. house started peeling badly by mid-winter. Two problems are cited: high interior moisture levels, which caused peeling, and incompatibility of primer and paint (actually white stain), which caused the two to separate. Each paint company blamed the moist wood—and the other paint product.



Three houses built by the same contractor in southeastern New Hampshire all showed the same pattern of blistering. It occurred primarily at the band joists and at partition places with no poly vapor barriers.

coat an alkyd eggshell paint applied with an airless spray. Moisture readings taken on the clapboards by the paint rep ranged from 15 to 28 percent. Two of the houses had no bath exhaust fans and the third house had a humidifier.

A close observation (see sketch) of the blistering pattern revealed the problem. The builder had installed a poly vapor barrier in the walls of these two-story houses. However, there was no poly—or any other vapor barrier from the sill up 12 inches to the first floor level, none between floors, none at interior wall partitions and the electrician had punctured the poly to install a wall-mounted light fixture. The solution will require reducing the indoor humidity (disconnecting the humidifier and installing bath exhaust fans). Hopefully some of the blistering was caused by “construction moisture” and hence next year, things might be okay. Otherwise, the homeowner may have to put up with the present pattern of blisters.

Don't Cover Up Problems

One of the classic “solutions” to a house that constantly peels paint is to cover up the clapboards with aluminum or vinyl siding. In my opinion, this is the worst possible action. If a house peels paint every year, solve the moisture problem and *then* put on whatever siding you desire. To cover up a moisture problem with a vapor dam such as vinyl or aluminum siding will make things worse and probably cause the walls to rot.

In summary, energy-efficient houses need a good, continuous vapor barrier and adequate exhaust fans to reduce indoor relative humidity. These two features will greatly reduce the probability of paint peeling—assuming the painter is doing a competent job.

If the paint on a home is blistering or peeling, find out why before you repaint. ■

William A. Lotz, P.E. is a consulting engineer in Acton, Maine.