

BY TIM LEAHY

We've all seen it. A drive through almost any neighborhood in the nation reveals homes whose paint is perfect and pristine next to others whose paint is bubbled, peeling, or actually flaking off. Paint failure not only looks bad, but it invites water and weather inside the building envelope where it can cause serious damage.

In the coastal New England communities where I work, a good exterior paint job should last about three years. In a less harsh environment, a paint job on exterior wood should last five years or more. When premature paint failure occurs, it leaves homeowners, contractors, and paint suppliers with the same question: Why?

Although there are some telltale signs that point to a specific cause for a paint job gone bad, many of the factors leading to premature paint failure are related to conditions during application, making assessment after the fact difficult. It is far easier to identify conditions that can lead to failure and eliminate them at the time of application—before they result in separation of the paint from the surface it was designed to protect and beautify.

Tim Leahy has been a professional painter for 25 years. Technical assistance provided by Dow Coating Materials.

Poor surface prep The bond between paint and wood is a mechanical one, so sanding the surface is critical for strong adhesion. New clapboards, in particular, have a dense, shiny "mill glaze" that, unless removed, interferes with the ability of the primer or stain to penetrate the wood. When repainting previously coated surfaces, it is important to ensure that the old paint is adhering well and that the surface is abraded so the new coat grabs tight. **1 4 5 8 9**

No primer Primer seals in tannins, fills pores, and binds wood fibers to create a nonabsorptive, sandable surface to which topcoats readily adhere; it also protects end grain from damaging moisture. Without primer, paint can absorb into the wood, which will make it dry too fast, compromising film integrity. **3 4 5 6 9**

Sun and wind Water-based paints (the term "latex" is really a misnomer; modern water-based paints contain no latex) dry when their solvent (water) evaporates, moving the binder and pigment closer together in what is called binder coalescence. Oil paints cure when their solvent (oil) reacts with oxygen in the air (oxidation). For both, excessive heat, UV exposure, or wind can accelerate surface drying, especially with darker pigments, leaving the paint beneath uncured and compromising long-term adhesion and durability. **3 4 5 7 9**

Cold If applied at too low a temperature (below 50°F, generally), the binder in water-based paint is unable to fully coalesce with the pigment into a durable film. Cold retards the curing of oil paints as well but results more often in surface imperfections than film failure. **3 4 5 7**

Contaminants Where there is dust, mildew, or salt glaze, paint will adhere to that and not the surface. These can be removed with specialized house washes such as Jomax. **3 4 5 6**



Photos: center, Patrick McCombe; bottom, courtesy of the Paint Quality Institute, Dow

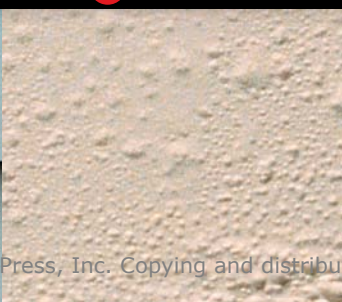
1 Alligatoring



2 Chalking



3 Blistering



4 Cracking/flaking



5 Peeling



failure



Surface moisture Paint applied too soon after power washing or rain, or when condensation is present (a risk when the temperature is within 5°F of the dewpoint), exposes the new film to excess moisture and weakens it in ways that might not show up until later. This affects both oil-based and water-based products. When a moisture meter reads above 15%, it's best before painting to allow the surface to dry or to correct the condition causing the moisture. **3 5 9**

Humidity High relative humidity slows the drying of water-based paint and affects the curing of oil-based paint, compromising film formation. **3 5 6 9**

Incompatible coats Modern formulations have negated many rules of thumb regarding the application of oil paint over water-based paint or vice versa. Without those guidelines, it is critical to adhere to manufacturers' instructions for compatibility with other paints or primers. Recoating old oil paint with modern acrylic paint, however, often leads to failure as the new flexible coating bonds to the old brittle paint, yanking it off the surface. **1 4 5 8**

Consistency Overthinning weakens the molecular structure of all paints, resulting in a weaker surface (think of a latex glove being stretched too thin). Modern paints rarely need thinning, but if a paint is too thick, it will dry on the surface but not underneath, causing failure due to improper curing. **2 4 7 10**

Poor quality Water-based paints that contain 100% acrylic binders provide superior flexibility and durability. Paints that contain blends of acrylic and other resins may not perform as well. **1 2 3 4 5 6 7 8 9 10**

The wrong product Exterior and interior paints and primers are engineered for specific surfaces and conditions. Exterior paints are formulated to stand up against UV radiation, temperature swings, and surface movement. Interior paints are formulated for easy leveling and durability against cleaning. Primers are formulated to create an optimal surface for paint. Choosing the right product yields the best results. **1 2 3 4 5 6 7 8 9 10**

6 Mildew

7 Gloss retention

8 Incompatibility

9 Wrinkling

10 Fading

