Does Stain Protect Decks?

Q I'm not convinced that staining really protects wood. In my experience, wood cracks and splits with or without stain. Would floor paint prevent wood from cracking?

A *PDB* editor Andy Engel responds: Wood has two main enemies, water and sun. Stains do help against both, but long-term protection depends on proper preparation and reapplication.

Water and Wood

Changes in moisture content make wood move across its grain. When wood gets wet, it swells; when it dries, it shrinks. That movement, shrinking in particular, can result in cracks. Also, when a board is screwed or nailed down, as on a deck, the fasteners restrict cross-grain movement, generating stresses that can cause cracks. (Hidden fasteners that engage grooves in the boards' edges allow movement, and decking so secured should crack less than face-screwed or -nailed boards; however, I have seen decking that shrank so much it disengaged from its edge fasteners.)

The ends of boards are especially susceptible to cracking. Think about a tree: Hundreds of gallons of water move through capillary action from the roots to leaves that could be higher than 100 feet in the air. End grain is a cross-section of that capillary pump; if you don't inhibit its efficient moisture transportation, the board will dry, or get wet, much more quickly near its end than in the middle. Measure a new SG (surfaced green) board that's been in the sun for a few days. Likely, it will be narrower at the ends than in the middle because the ends have dried more. This differential shrinkage causes cracks near the ends — look at any wood pile in a lumberyard and you'll see plenty of examples.

Though a small crack may not start out being much of an issue, each crack provides additional surface area, which both lets in more water and speeds drying (depending on whether it's rainy or sunny respectively), exacerbating the problem. Water-repellent finishes slow wetting and drying, thereby moderating wood's movement and reducing its tendency to crack. Trouble is, the water-repellent components of stains deteriorate pretty quickly — lasting a year or two at best — so it's important to regularly restain.

Sun Damage

Wood also needs protection from the sun. Wood is composed mainly of cellulose fibers and lignin, which is the glue that holds the fibers together. Ultraviolet (UV) light from the sun destroys lignin. Without the lignin, there's nothing holding on to the surface fibers, and they fuzz up and wear off. That exposes more lignin to UV, continuing the cycle. A good stain will protect the lignin with inhibitors that reflect or absorb UV and so combat sun damage.

Because walking on the finish abrades it, UV inhibitors require regular reapplication. If a deck has gone too long without being stained, odds are that the lignin has suffered UV damage and you'll just be coating cellulose fibers that will quickly wear off — taking the stain with them. With such decks, it's important to sand the surface before staining or restaining, or the finish won't last. If the boards aren't seriously cupped, you don't have to sand much, as UV damage penetrates only a few mils. Then you should restain within a few weeks, particularly in areas that get a lot of sun. And, by the way, this is true for paint too.

Surface Prep

A lot of pressure-treated decking comes with a waxy surface treatment to slow drying and wetting — and therefore cracking. Water-based products simply bead up on these surfaces, so whenever possible, I use a solvent-based stain. Most solvents dissolve wax, and I think that improves the stain's penetration.

Most finish manufacturers recommend waiting up to six months before staining a new deck because weathered decking soaks up more stain. In a way, that makes sense. More stain means more water repellents and UV inhibitors. However, I have two issues with waiting to stain, both of which are easily addressed.

First, to minimize cracking, I want to seal the end grain as soon as possible. Therefore, when installing the decking, I double-coat the end grain with stain to slow both drying and water absorption. One contractor I know uses a wax emulsion, Anchorseal Green Wood Sealer (U-C Coatings Corp.; 888/363-2628, uccoatings.com), on the end grain. Anchorseal practically stops end-grain moisture movement, a good thing. I don't use it because if it gets on the decking's surface, it can inhibit stain absorption. But that contractor is careful and has success with this method.

Second, leaving decking unfinished for six months invites significant UV damage. So after the waiting period,

but before staining, I sand the decking. I use a drywall pole sander and 60-grit drywall sanding screens to remove any UV-damaged wood and expose a fresh surface. It doesn't take a heavy sanding to do this, and it adds maybe an hour to the finish time. I'm sure it adds months to the life of the finish, though. You could probably get away with pressure washing instead of sanding, but then you have to wait for the wood to dry. And if the water raises the grain, well, you'll need to sand anyway (see "Maintenance and Restoration of Wood Decks," March/April 2007). Pressure washing first is a good idea when refinishing, though, because it quickly removes ground-in dirt.

Most paints and solid-body stains don't last on decks. Once foot traffic wears through, water gets into the wood and the paint peels off quickly. Then you're stuck scraping to bare wood before you can refinish. I'd much rather just restain annually, a relatively uninvolved task. ❖