

Stained Vinyl Floors

Q. *I've built a number of homes with staple-up radiant heat tubing under vinyl flooring in the kitchens and baths. Recently a client complained of staining in his vinyl floors. In the bathroom, long dark streaks are bleeding up through the vinyl, and in the kitchen, small dark circles about the size of a quarter are forming. The staining is getting worse with time. The vinyl manufacturers claim that it's a problem with the radiant heating and the subflooring. I lifted the vinyl and discovered that wherever discoloration occurred, there was a bleeding knot in the plywood below. I have never experienced this problem before. Any ideas?*

A. *Paul Fiset, director of the Building Materials and Wood Technology program at the University of Massachusetts in Amherst, responds:* The problem you describe is not unique, though it's fairly uncommon. What is happening, as you guessed, is that volatile compounds are being released from the plywood and are reacting with the vinyl to cause the staining. White and light-colored vinyls are usually the only ones that experience this discoloration. The problem has three aspects: the radiant heating, the underlayment, and the flooring itself.

The "long dark streaks" sound like they could be associated with the "striping" effect that happens with radiant floors when the tubes are spaced too far apart and the fluid temperature is too high (see "Hardwood Flooring Over Radiant Heat," 9/98, for more on striping). With staple-up systems in particular, the fluid temperature is typically higher, to compensate for having to drive the heat through the plywood subfloor. Since the tubing has no conductive medium to disperse the heat — like the concrete in radiant slabs — the striping effect may be more pronounced

with staple-up systems. It's quite possible that these "hot spots" are causing a reaction between the vinyl flooring and volatile compounds in the plywood or chemicals in the vinyl adhesive.

You might check with your hvac contractor to see if the fluid temperature in the tubing can be reduced. On future jobs, plan to space the tubing closer so the fluid temperatures can be lower.

The second aspect of the problem is the underlayment. According to the APA (American Plywood Association), rated underlayments should not experience problems from the low temperatures associated with radiant heat. By this they mean that no structural damage will ensue, but they make no guarantee that volatile compounds won't be released. A frustrating part of this issue is that manufacturers of underlayment and vinyl flooring have not worked together to craft a solution, and seem more inclined to point fingers at each other. APA holds vinyl as the villain: It claims that plasticizers and other chemicals found in moderate- to low-cost vinyl react with pitch and volatile compounds naturally found in the wood panels, and that exposure to heat and sunlight speeds the darkening process along. APA's recommendation is for builders to use better quality vinyl.

On the other hand, makers of resilient flooring, the third piece of this puzzle, claim there is nothing wrong with the vinyl but rather that the underlayment and adhesives used to glue subflooring to the floor joists contaminate the vinyl. Like the APA, vinyl manufacturers typically warrant the use of their products with radiant heat, but limit the temperatures involved. Armstrong, for instance, limits floor surface temperature to 85°F.

As for solving your problem, represen-

tatives of the vinyl industry recommend that you strip the discolored vinyl, remove the offending underlayment, then replace it with an underlayment whose manufacturer will guarantee it won't stain the finish flooring. (Good luck with that one!)

You might want to consider using lauan plywood as an underlayment, since it contains far fewer volatile compounds. However, be advised that using lauan may void the warranty on some flooring products, because underlayment-grade plywood is virtually the only material allowed in warranty specs.

Beyond these suggestions, your options are limited. If you're using a perimeter-attached vinyl and you can clearly identify the locations of the spotting, peel the flooring back and tape (use masking tape) pieces of aluminum foil over the offending knots to block the diffusion of volatiles and pitch. If you are using a fully-adhered sheet vinyl, use an underlayment that is guaranteed not to react with vinyl — if you can find one. You might also encourage your clients to choose darker vinyl colors.

One encouraging note for the future: Problems like yours are reportedly becoming a thing of the past as vinyl flooring manufacturers, aware of the problem, develop products that resist reactive staining. I would always choose a major manufacturer and a higher-quality product.

Electrical Fluctuations

Q. *I am having an electrical problem on a second-story addition I am currently building. The clients report that the lights dim periodically during the early morning hours, but that it's not related to the refrigerator starting nor any other piece of electrical equipment in the house. I have tested*

the voltage and have found no fluctuations greater than two or three volts during the course of a day.

The service is 200 amps, and the entire house has been completely rewired within the past six years. The wiring looks to have been properly installed.

Is there something I have overlooked in trying to determine the cause of these electrical surges? The adjacent houses have not reported any surges.

A. *Rex Cauldwell, a master electrician in Copper Hill, Va., responds:* Dimming of lights is not caused by a surge but by a lowering of voltage. When the full voltage and brilliance of the lights return, it just looks like a surge.

I would advise you to hire an electrician skilled in advanced troubleshooting. The problem with situations like these is that you have to be there when the dimming occurs to be able to isolate the cause. I once had to move into a house for a couple of days to troubleshoot an intermittent problem.

Most of the time, however, that's not

necessary. There's a good chance you can simulate the conditions that are causing the problem. Despite the homeowners' insistence that the dimming is not related to electrical equipment (homeowners are often wrong in what they report), the early morning hours are usually a time of heavy electrical usage — hairdryers going, cooking in the kitchen, lots of lights on, the well pump if there is one, and so forth. I've also seen lights dim when a gas dryer was running — the belt was too tight and the motor was having a hard time starting.

First, try to verify whether the utility is responsible for incoming low voltage. To do this, I turn off the breaker for the electric stove — usually the heaviest power draw in the house. I then turn all the cooking elements and the oven on high. With my VO meter probes on the panel's main lugs, I then throw on the stove breaker to see if the voltage drops below 240. If it goes down 10% or more, then there's probably a problem at the transformer.

If the voltage remains steady, next test

the two phases. Use a portable electric space heater to load first one side, then the other. With the heater running, measure the voltage between each phase and neutral. If one phase goes down several volts while the other phase goes up several volts, then most likely the SEC (service entrance cable) neutral is starting to deteriorate and the SE cable will have to be replaced.

Another possibility is that the SEC neutral splice at the panel or the meter has loosened and needs attention. This happens with SE cable because the soft aluminum compresses under the lug and loses contact.

The problem could also be caused by a bad neutral on the utility side as well. This is verified by measuring at the meter base, but you'll have to have the utility there to cut the seal.



GOT A QUESTION? Send it to On the House, JLC, 932 West Main St., Richmond, VT 05477; or e-mail to jlc@bginet.com.

