How Durable Is Water-Based Urethane?

Q. *The new water-based urethane finishes are easier to apply than the old solvent-based polyurethanes. But are they as durable?*

A. *Painter Dan Greenough, a member of PaintCraft Associates, a San Francisco Bay-area guild of professional finishers, responds:* I have found that with most water-based varnishes, an extra coat is required for adequate coverage and protection of the surface. According to Flecto, a manufacturer of varnishes (800/635-3286), their water-based Varathane Diamond Finish is "very close" in hardness to their oil-based Liquid Plastic Interior Wood Finish. Experience and logic tell me that most water-based clear finishes are not quite as hard as their conventional oil-based equivalents.

Water-based finishes have some definite advantages. Because they have relatively little odor, they are appropriate for use in occupied homes where the clients are sensitive to odors. Water-based finishes dry quickly, allowing several coats to be applied in one day. They also dry clear, without the yellowing associated with oil-based polyurethanes.

These advantages also point to some potential disadvantages. Fast drying sometimes results in more prominent brush strokes. Some clients prefer the amber color of oil-based polyurethanes. Finally, water-based clear finishes always raise the grain of the wood. This increases the sanding time, which is an additional cost.

Fixing a Moldy Crawlspace

Q. *A homeowner wants me to eliminate the moldy smell from a crawlspace. The crawlspace has a concrete floor, with fiberglass batt insulation between the floor joists. There are two louvered vents that are left open year-round. Would it help to insulate the walls with rigid foam and seal the vents shut?*

A. *Bill Rose, architect and building researcher at the University of Illinois Urbana-Champaign, responds:* You want the crawlspace to be clean and dry when you're finished. First, do whatever is necessary to make sure that rainwater cannot enter the crawlspace. Install gutters at the roof eaves, if necessary. Be sure that the discharge ends of any downspouts are as far as possible from the foundation. Keep the exterior grade at a minimum 5% slope away from the foundation, for a good 10 feet. If there is a persistent wet spot in the crawlspace, install a sump pump there. The existing concrete slab will be enough to keep evaporation from the surface down to a manageable level.

Any work in a smelly crawlspace should be approached as a mold remediation project. For any overhead work, goggles are a must. If the expected amount of visible mold colonization is minimal, then N-95 respirators and gloves should offer good protection. If the anticipated black area is large (more than 2 square feet), then P-100 respirators and disposable clothing are recommended. If the colonized area is very large — over 30 square feet — you should call for help.

If you are tackling the project, isolate the crawlspace from the basement and the rest of the house until the moldy smell is long gone. Install an exhaust fan at a vent opening. Remove any debris or stored material and anything else that is removable. Remove the fiberglass insulation from between the floor joists. See if there are black spots in the insulation, and keep track of any locations that seem to have gotten moldy.

If the band joist is moldy, it may be easier to remove it and replace it than to clean it from inside. (First, provide blocking so the joists don't collapse.) Look for mold spots near toilet and shower locations. Check the concrete floor and the crawlspace walls for any sign of water entry.

Use a powerful vacuum cleaner outside the building, a long hose to the work area, and a wide assortment of scraping tools. Scrape any questionable surfaces, and vacuum away all the scrapings. Dispose of the vacuum bag or filter and clean the vacuum cleaner and hose thoroughly. Don't use bleach around concrete — when bleach comes in contact with anything having a pH less than 8, chlorine gas is formed. TSP (trisodium phosphate) plus rinsing and drying may help to disinfect wood and concrete surfaces.

If you intend to insulate, I suggest that you insulate the foundation at the exterior. For now, and until termites evolve, my preferred insulation material is borate-treated expanded polystyrene or extruded polystyrene. Don't re-insulate the floor framing — the heat from the house will help keep the crawlspace dry.

Keep the exhaust fan running as long as the smell persists. If you're unsure by smell when the job is done, then have an industrial hygienist take some air samples. Once the air is back to fresh, the vents can and usually should be closed.

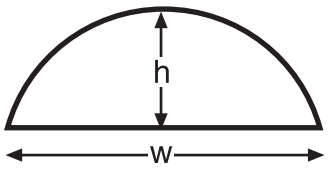
Fibermesh Reinforcement

Q. *I'm working on a project with a 2-inch thick colored concrete topping slab installed over a 5-inch thick structural slab on grade. There will be #15 felt installed between the two slabs, so they can move*

Finding the Center of a Circle Using a Formula

*In the "*On the House*" column in the October 2000 issue, we described a method for finding the radius of a circle when only an arc of the circle is known. This problem needs to be solved when laying out an arch-top window opening or a barrel-vaulted ceiling.*

Two readers, Warren Barstad of Fertile, Minn., and Peter Hueber of Truckee, Calif., wrote to suggest that the problem can be solved a different way, using a mathematical formula. Here is the formula to find the radius (r) of a circle, when presented with an arc measuring w inches wide and h inches high:



$$r = \frac{w^2 + 4(h^2)}{8h}$$

independently. I am considering using fibermesh to minimize cracks in the topping slab. If I use fibermesh, can I omit the usual welded wire mesh? Also, I have heard that there is a type of sealer that can be mixed into the concrete to help preserve the color and finish of the topping slab. Do you know about this product?

A. *Jay Meunier, contracting specialist at S.T. Griswold and Co. in Williston, Vt., responds:* Fibermesh is typically not used in conjunction with wire mesh. The function of either fibermesh or wire mesh is to reduce the physical size (width and length) of the cracks that appear in a slab as it cures and shrinks. For a 2-inch thick colored topping slab, it would be best to use a microfiber, which is smaller in diameter than the standard fiber and more easily worked. Even with fibermesh, the topping slab will still require control joints to reduce the risks of random cracking.

I do not know of a sealer that can be mixed into the concrete to preserve the color or finish. If the concrete is colored by adding pigment to the concrete mix, or if pigment is broadcast onto the fresh concrete (the "dry shake" method), then a wax-based curing compound containing compatible pigment should be applied. This type of pigmented curing compound will form a heavy film, and is typically available from the pigment supplier.

If the concrete is to be colored by painting or staining after finishing, the slab should be wet-cured and curing compound should be avoided. We have found that stained slabs are susceptible to surface contamination and discoloration, and require that activities on the slab be kept to a minimum.

GOT A QUESTION? Send it to On the House, *JLC*, 186 Allen Brook Ln., Williston, VT 05495; or e-mail to *jlc@bginet.com*.