Installing Fiberglass Roof Decks

An easy-to-install, weatherproof surface that you can walk on

by Nathaniel Eldon

Fiberglass is a common material for decks in my region of coastal New Jersey, especially when the deck is installed over living space, or when the client wants a porch roof that provides maximum protection from the weather. But when I talk to builders from other parts of the country, I find that this practice is almost unknown beyond the Jersey shore.

Fiberglass decks would easily work elsewhere, though. As with most fiberglass work, the process is messy, but straightforward. The materials are readily available because many of them are also used in boat building and boat repair, a local industry for any area that has access to recreational or commercial boating. And the detailing of the subsurface is not much different from that for an EPDM membrane or other flat roofing material.

Framing

The deck in this project was a porch roof with parapet walls (**Figure 1**). I sized and spaced the beams and posts as I would for any traditional deck design. When I sized the joists, I took into account the fact that the joists had to taper to pitch the deck surface enough to shed water off; a slope of ¼ inch per foot is optimal. To create the taper, we stacked the joists on sawhorses, snapped chalk lines across each joist's crowned edge, and ripped all of the tapers with a circular saw.

While the deck framing consisted of three sections that stretched across the front of the house, the pitch of the floors was the same across all the sections, with a flat and unbroken floor surface. The parapet running around

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Figure 1. The joists were cut with a taper so that the roof deck would drain toward the perimeter (A). Water drains through scuppers cut into the bases of the parapet walls (B). To ease the transition between the flat roof deck and vertical walls, cant strips ripped with a 45-degree angle were installed in all of the corners (C). In addition to covering the subfloor with smooth ½-inch AC plywood underlayment, the crew eased the edges of the parapet wall with a grinder to prep the deck for the fiberglass contractor.

the entire perimeter of the deck would act as a base for the railing.

Once the floor framing was completed, we glued and nailed ¾-inch AdvanTech T&G subfloor to the sloped joists. Then we framed the parapet walls with 2x4s—letting the framing extend up at each corner and facet to create posts—and sheathed the walls with ½-inch CDX plywood.

To allow water to drain from the deck surface, we cut holes for scuppers into the sheathed parapet walls. The actual scuppers are made from 4-inch-by-4-inch-square vinyl sleeves (the same ones used to cover posts in the railing and fencing industry). These sleeves are set flush with the inside of the parapet wall sheathing and rest on top of the subfloor. We set the scuppers at a slightly increased pitch and let them extend through the parapet wall just beyond the edge of the roofing.

Prep Work

It is critical to this process to have dry weather for a couple of days in a row, so we waited for a clear weather window before scheduling the fiberglassing contractor, Brian Scheeler, of Atlantic Shores Fiberglass. We needed the better part of a day to prepare for his arrival. We first put down an underlayment layer of ½-inch AC plywood on top of the subfloor with the sanded side up, staggering the joints of the plywood between courses. We glued down the AC plywood with construction adhesive and nailed it into the joists through the subfloor using ring-shank nails.

Next, we milled 1½-inch-by-1½-inch cant strips by ripping 2-by material at a 45-degree angle, and fastened them along any corners where the flat deck and any of the vertical walls (house and parapet) intersected. The cant strips ease the 90-degree bend for the fiberglass mat that will eventually cover the deck, softening the transition and preventing voids from forming between the mat and the layers below.

Figure 2. Working from the top down, all the surfaces that would receive the fiberglass covering were primed with a "hot coat" of resin, including the top of the parapet wall (left). After the resin was allowed to cure for a day and then sanded smooth and thoroughly vacuumed, a layer of 1.5-ounce chopped fiberglass mat was spread out over the deck surface (right). Note how the mat extends up the parapet walls, to create a pan.

Laying Up Fiberglass

Once we'd completed the preparation details, the fiberglass contractor could begin his work. For those who aren't familiar with fiberglass, you should know that it tends to be nasty stuff in many regards. To avoid skin contact with the fiberglass resin and catalyst, it's always a good idea to wear gloves. And an organic vapor cartridge is usually required to avoid breathing the vapors of fiberglass resin, especially when you're working in tight, confined spaces. Because Brian was working a stone's throw from the ocean with its steady prevailing winds, he opted not to use a respirator when he did this project.

The fiberglass resin and the gelcoat (finish coat) used on these decks are both two-part mixes that require a hardener or catalyst. When a catalyst is added to the polyester resin, an exothermic reaction occurs, producing heat and curing the fiberglass (resin and catalyst are highly combustible and should always be treated with extreme care). Typically, 1.5 to 2 ounces of hardener are used for each gallon of resin, but that's only a general guideline. The ratio can vary with air temperature and humidity, and it takes a little practice to know how much catalyst to add to a mixture in various weather conditions. When too much hardener is added, the mixture can become so hot that it starts smoking—and it will burn your skin if you touch it.

Before mixing anything, Brian used a rotary grinder outfitted with an abrasive disc to soften and clean up any sharp or rough plywood edges. Then he mixed up a batch of polyester putty—similar to auto-body filler—and covered the nail holes as well as the plywood joints. He also puttied around the scuppers, filling in any gaps between the sleeves and the plywood.

The next step was "hot coating" all the deck surfaces by applying resin with a thick-nap paint roller (**Figure 2**). Working with fiberglass calls for many single-use tools—once the resin cures, paint rollers and brushes become rock hard. So Brian uses disposable products: cheap paint rollers, disposable paintbrushes, and 5-gallon-bucket liners. For detail work, he also uses plastic or aluminum rollers that are reusable and that are made specifically for fiberglass work. These tools can be cleaned with acetone before the resin cures,

Figure 3. A combination of different applicators, including paint rollers (top) and disposable brushes (bottom) were used to thoroughly saturate the fiberglass mat with resin.

but it's challenging and the fumes are dangerous.

On some projects that he's worked on with us, he has applied a strip of the fiberglass mat along the transition between the deck and the walls at the hot-coating stage—the mat strips help to reinforce and ease the transition between the horizontal and vertical surfaces. He skipped that step with this project, opting to extend the mat up the walls at the next step, on the second day.

At the thresholds of the doors leading onto the deck, he applied resin up the framing and sheathing. Finally, he put a liberal coat of resin over the entire flat surface of the deck. It should also be noted that Brian mixes only a little resin at a time. The working time of mixed resin is limited and a large volume of material will usually "kick" more quickly. Smaller batches ensure that the resin does not begin curing before it is applied. Once the hot-coat resin cures, the deck is temporarily sealed. A rainstorm at this stage would not be ideal, but it wouldn't ruin the project.

The next day, Brian started by grinding all the hot-coated surfaces, again using a small grinder fitted with an abrasive disc. This process removes irregularities and abrades the surface for the next coat. When finished, he blew the dust off the deck with an electric leaf blower.

Next, he laid out 1.5-ounce chopped fiberglass mat over the deck surface. He let the mat extend up the parapet walls

Figure 4. After the lay-up was completed and the resin had cured another day, the fiberglassed surfaces were sanded and then dusted off to prep them for the gelcoat finish. Nooks and crannies were painted with a brush (left), while a paint roller was used to cover larger areas (center). The cured gelcoat (right) provides a durable, weatherproof walking surface, though PT sleepers could also be glued to the fiberglass and standard decking applied for clients who don't like the look or feel of fiberglass.

about 6 inches and lapped it about 4 inches into the scuppers. He used smaller scraps to complete the mat layer around the scuppers, both inside the parapet walls and where the scuppers exited on the outside.

He cut strips of mat about a foot wide for the tops of the parapet walls and let the strips extend up a few inches at each post and down the sides of the parapet, overlapping onto the coil stock. At the door thresholds, where we had added temporary dam strips to protect the floors inside, Brian ran the mat up onto the dams, again adding small strips to complete the corners of the mat layer. At the seams in the field, the mat sections overlapped by 4 inches to 5 inches.

When all the pieces were cut, Brian began soaking the mat with the mixed resin, starting with the tops of the parapet walls (**Figure 3**). For the larger surfaces, he again used a disposable paint roller. For tighter details like inside corners, he soaked the resin into the mat with a disposable brush. When completely soaked with resin, the mat becomes transparent.

After finishing the tops of the parapet walls, he turned his attention to the door thresholds. This time he used a specialty roller to push the resin into the mat. The roller also helps to work out any voids or air bubbles under the mat.

Next, Brian worked on the base of the parapet walls, using a paint roller to soak the resin into the mat where it extended up the walls. Finally, he poured resin over the main surface of the floor and pushed it around with a paint roller until the entire mat was saturated and transparent.

Gelcoat Finish

Once the resin-impregnated fiberglass mat has cured (usually within a few hours), the deck surface is virtually watertight—think of the hull of a fiberglass boat. The horizontal surfaces are completely sealed, and the sealed surface extends up the vertical surfaces, as well. But fiberglass boat hulls are smooth and opaque. The main task on the third day is applying the gelcoat, the protective finish that also protects the fiberglass from UV degradation.

The first step was to grind all the surfaces once again to roughen the surface and to smooth out any unevenness in the mat. As before, Brian used a grinder with an abrasive disc, and he blew off the dust with a leaf blower.

When the surface was abraded and dust-free, he applied the fiberglass gelcoat to the surface, beginning with detail areas such as thresholds. The gelcoat is a two-part product that has the consistency of paint. Brian used a disposable paintbrush to make sure that all the nooks and crannies received a liberal layer of the gelcoat (**Figure 4**).

As with the resin layers, Brian used a paint roller to coat the tops of the parapet walls and the transition between the inside parapet walls and the horizontal deck surface. Then he rolled out the main deck surface and his job was done. ❖

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