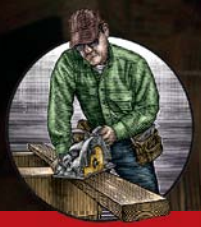
A New Approach to Concrete



Master Carpenter

A glass-fiber-reinforced mix creates an elegant, lightweight vanity counter and sink

BY BUDDY RHODES

The craftsman

For the past 20 years, Buddy Rhodes has been at the leading edge of concrete design in both residential and commercial applications. Buddy was trained as a potter, but influenced by his builder father, he soon found himself working with concrete, which is similar to clay but doesn't need a kiln. He soon switched from bowls to bricks, planters, tiles, and countertops. Lately, he's been working with a new lightweight concrete mix that doesn't need traditional reinforcement, so the material can be much thinner. His website is buddyrhodes.com.

Online members can watch this *Master Carpenter* video at **FineHomebuilding.com/extras.**

Concrete countertops have become popular over the past 20 years, and with good reason. Of course, they look great. Because they're cast, they can be made in almost any shape or style, and unlike other counter materials, they're practically bombproof. Best of all, almost anyone can make one with a few basic tools, which brings the price below that of most other materials.

I began working with concrete about 30 years ago. I made countertops, benches, big planters, and decorative tiles. Most of these were made either with a traditional aggregate mix or a dry-pack technique I devised that yields a variegated look (see "Casting a Concrete Fireplace Surround," *FHB* #174). Made in molds, the objects were finished by hand-troweling or by rubbing with successively finer abrasive pads.

A few years ago, I started fooling with a technique borrowed from the world of commercial concrete. For some time now, fabricators have made exterior panels for high-rise buildings with a mix that yields a strong, lightweight concrete. Their secret is to substitute fiberglass fibers and mesh for the traditional steel reinforcement. Because there's no need to bed the steel reinforcement in inches of concrete, the concrete can be made as thin as 1¼ in. Perhaps best of all, the finished surface is sprayed into the form before the rest of the concrete is added, which cancels the need for almost all the surface polishing and work at the end of the project.

Here, I'll show how I made a vanity counter and integral sink bound for *Fine Homebuilding*'s Project House. The first step in the process is to make the mold for the sink from fiberglass-resin-impregnated cloth and plywood, then attach it to the countertop form. Once it's complete, I use a drywall-texture spray gun to coat the form with a thin layer of tinted concrete, then mix a thicker batch with fiberglass fibers and hand-pack it to the final thickness. When the concrete has cured, the counter is nearly complete and needs only a light buffing and a couple of coats of sealer before being installed.

Start with the sink mold

The first step in making the mold is to determine the shape of the sink. You can make a sink in almost any shape or depth, as long as it directs water to the drain. The depth of the bowl is established by plywood ribs glued to a base that represents the sink rim. This frame

MOLD THE SINK

The first step is to build the sink mold, which represents the inside, rather than the outside, of the sink. It starts as a plywood structure that's then tightly wrapped with polyester cloth, coated with fiberglass and polyester resins, and sanded smooth.

1

Think negatively. *The sink mold starts with a base of ¾-in. melamine that's cut to the shape of the bowl's lip. Temporary backer ribs pocket-screwed to the back provide rigidity. The depth of the bowl is defined by ⅜-in. bending plywood hot-glued to the base. A length of pipe sets the location and depth of the drain.*

2

No wrinkles. *The foundation for the mold is a piece of polyester-fleece material (available from a fabric supply store) that's stretched tightly over the form and stapled to the edge of the base.*

3

Polyester on polyester. *The first base coat is a two-part fiberglass resin (3M; about $65 per gal.) that's applied with a brush over the form so that the material is coated. Be sure to wear an organic-vapor respirator when applying the resin. Set it aside to dry overnight.*

4

Build a smooth coat. *After sanding the base coat, mix auto-body filler (Bondo) into a batch of the same fiberglass resin until it has the consistency of thick molasses. Pour it onto the form, and use a brush to coat the form evenly. Let it dry, then sand smooth.*

then is covered with resin-impregnated cloth that hardens into a negative of the sink bowl. The trick here is to use different forms of polyester—polyester fleece cloth, two-part fiberglass resin, and auto-body filler—that bond together perfectly.

Here, I wanted a fairly conventional bowl, so I started with the shape of the rim, which was an oval with squared-off ends. After cutting out the shape from a piece of melamine, I attached 4-in.-wide reinforcing ribs to the form base with pocket screws. These ribs keep the shape from deforming during the resin's curing process.

After I determine the depth and profile of the bowl, I cut out four pieces of ⅜-in. bending plywood, one for each side of the bowl. I attach them to the base with small blocks and hot glue. I cover this structure with polyester cloth (otherwise known as fleece, the same stuff they make pajamas from).

After coating the sink form, then sanding and sealing it, I lay out the shape of the counter with 1½-in.-wide strips of melamine (the final thickness of the counter) screwed down on edge on a full sheet of ¾-in. melamine. While I'm at it, I make on the same sheet a form for a 4-in.-wide backsplash that's ¾ in. thick.

Remember that any imperfection in the form will be passed on to the counter, so everything should be as smooth as possible. Once I've placed the sink mold, I detail the form by filling all corners with silicone caulk and screw holes with modeling clay. Knockouts displace the areas meant for plumbing, such as the faucets and drain. Because wood absorbs water from the concrete and swells, it can't be removed once the counter has dried, so knockouts should be made from Styrofoam or cast rubber. I make mine with VytaFlex 40, a two-part urethane rubber from Smooth-On.

Spray the first layers of concrete

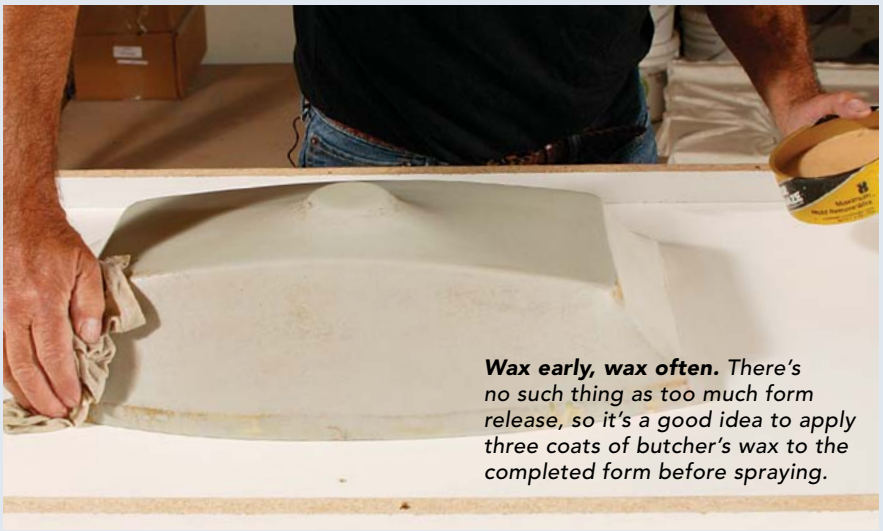
The finished surface of the counter is made by spraying a thin mix of portland cement and sand with a popcorn sprayer. The most important thing at this stage is to make sure that the spray coats are applied uniformly to the surface of the form. When spraying, try to keep a consistent distance between the gun and the form, and sweep the gun back and forth in a slow, fluid motion. If you're not familiar with the technique of spraying, it's a good idea to practice on a piece of cardboard first to get a feel for the process.

CREATE THE COUNTER FORM

The counter form needs to be flat and smooth. The easiest way to make a form is to lay out the shape on a full sheet of ¾-in. melamine.

Establish the perimeter. *Strips of melamine screwed to the sheet define the edges and depth of the counter. (The depth in this instance was 1½ in.) If needed, make the form for the backsplash at the same time.*

Attach the sink mold. *After trimming away any excess along the sink mold's bottom edge, mark the sink location on the counter form. Squeeze a bead of silicone caulk onto the sink bottom, and press firmly into position.*



Wax early, wax often. *There's no such thing as too much form release, so it's a good idea to apply three coats of butcher's wax to the completed form before spraying.*

TRICK OF THE TRADE

Shopmade beading tool

I use this tool to create a consistent profile in the freshly silicone-caulked joints, which form the slight radiused edge of the counter. I made it by gluing a ¼-in.-dia. ball bearing with epoxy onto the end of a 3-in.-long bolt.

Create the space for the drain. *Mount a rubber drain gasket (available from any hardware store) and a length of 1¼-in. PVC pipe to form the drain recess.*

Do a final inspection before the pour. *After using a razor blade to remove excess dried silicone caulk, liberally coat the form with multiple layers of wax.*

Make a knockout for the faucet. *This one is made of cast urethane, but the plug that creates a space for the plumbing also can be made from Styrofoam.*

SOURCES

For information on concrete-countertop materials, go to concretenetwork.com/suppliers or buddyrhodes.com.

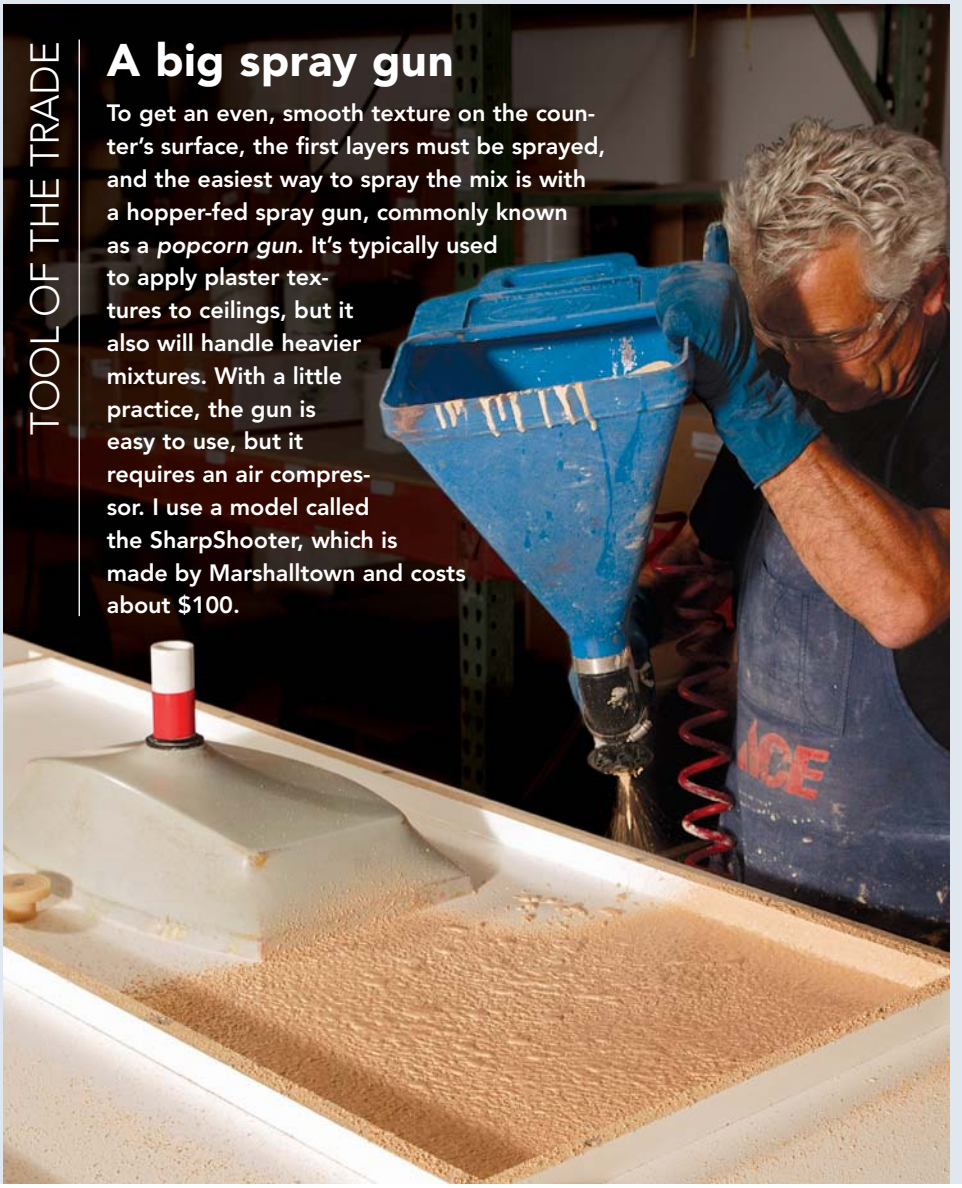
SPRAY IN THE COUNTER'S FINISH SURFACE

For this technique, the first layer of concrete in the form gives the sink its smooth surface. The mix is sprayed in two coats, each about ⅛ in. thick. For every 25 lb. of spray mix (portland cement-to-sand ratio of 1:1), the mix uses 1½ qt. of water, ½ qt. of curing compound, 2 oz. of water reducer, and 220 g of pigment. Mix in a 19-gal. bucket, liquids first, then add half the dry mix at a time.

TOOL OF THE TRADE

A big spray gun

To get an even, smooth texture on the counter's surface, the first layers must be sprayed, and the easiest way to spray the mix is with a hopper-fed spray gun, commonly known as a *popcorn gun*. It's typically used to apply plaster textures to ceilings, but it also will handle heavier mixtures. With a little practice, the gun is easy to use, but it requires an air compressor. I use a model called the SharpShooter, which is made by Marshalltown and costs about $100.



Thin and wet. *Because this layer is sprayed, it must have a thin consistency. Mix the liquids first in a 19-gal. bucket with a paddle in a ½-in. drill, then add the dry ingredients in stages. Note the shop-vacuum hose, which helps to control the dust during the mix. A dust mask is required equipment.*

Make sure the spray is evenly distributed. *After the first coat, use a chip brush to push the wet mix into any voids that might create air pockets in the surface.*

The layer that gives the counter its strength is a mixture of concrete, glass fibers, and mesh. The fiberglass has been treated so that it won't break down in the highly alkaline environment of the concrete.

I apply handfuls of the fairly dry mix to make a 1-in. layer. After packing around the drain plug, I use a trowel to level the area directly at the base of the plug. I also check that I haven't left any voids, especially around the knockouts.

After filling the form, I cover it with a plastic sheet, which keeps the concrete from curing too quickly, and leave it overnight. The next day, I remove the form sides, and with the help of an assistant, flip over the counter. We support it on two identically sized buckets, one on each side of the sink.

Finish touch-ups

The best part about this method is that once the counter is out of the form, there's little finishing to do. To fill the pin holes left by air bubbles, I make a paste of portland cement, dye, and water, and squeegee it into the surface. When it's dry, I lightly buff the counter with a nylon abrasive pad. Finally, I apply three coats of sealer: first, a penetrating sealer; second, a satin sealer; and third, a coat of beeswax. They are absorbed into the surface and protect it. □

Photos by Charles Bickford.

ADD CONCRETE, FIBER, AND MESH

This counter derives its strength from fiberglass fibers and mesh. Start the mix with 5 qt. of water, 2 qt. of curing compound, and 8 oz. of water reducer, then add 2 lb. of powdered dye and mix well. Next, add 100 lb. of the portland cement/sand mix (no aggregate), and when fully combined, fold in 2 lb. of alkaline-resistant fiberglass fibers. It's important not to break the fibers with excessive mixing.

Add mesh for support. *Along the length of the counter, lay a piece of 4-in.-wide fiberglass mesh on each side of the sink, then cover it with the backing mix. The mesh should extend over the sink bowl.*

Pack and smooth. *Apply the backing mix by packing handfuls onto the form. The backing should have a consistent thickness of about 1¼ in. everywhere in the form. Use a float to smooth the final surface.*

TRICK OF THE TRADE

Form the overflow drain

To create the sink's overflow drain, first apply a 1½-in.-wide, ½-in.-thick strip of Styrofoam reinforced with packing tape on the side of the sink mold's outer edge so that it extends from the drain stub to about 1 in. from the sink rim. Cover the strip with the same depth of backing mix. After you remove the counter from the form, use a masonry bit to drill a ½-in. hole just below the sink rim where the end of the Styrofoam sits. Pour a few tablespoons of lacquer thinner through a empty caulk-tube funnel into the hole. The solvent dissolves the foam, leaving the open overflow drain.

In a perfect world, a counter pops right out of the mold

With the amount of mold release used, you'd think the counter would pop out in a hurry, but it rarely does. After driving two screws into the melamine sink-form top, we tried to lever it out, but the screws just pulled out. Compressed air didn't work either. Finally, I cut an oblong hole in the top and supported a short 2x4 with blocks on each side. We attached two short bar clamps to the 2x4 and underneath the hole, then tightened the clamps at the same rate until the mold popped out.