New Access Door for an Old Basement

BY EMANUEL SILVA

Photos by Emanuel Silva

As is typical of original basement-access doors in older homes in the Northeast, this one had rotted out. The first task is tearing out the old door and cleaning up the opening **(1)**. A PVC form will be filled with concrete to bring the new threshold above grade **(2)**. Expanding foam will keep the form in place while it's filled; note the rebar that has been inserted into holes drilled in the existing concrete **(3)**. The author screws PVC blocks to the brick foundation for attaching the pre-hung door **(4)**.

Homes that are more than 100 years old are the norm in the part of the country where I work, and many of them have very small basement-access doors that were made to fit the height of the exposed foundation. These undersized openings were built primarily for moving things in and out of the basement, but they don't work well for large items such as appliances, and they certainly don't make good entrances for a finished basement.

The doors were often cobbled together from construction scraps such as beadboard or 1-by stock left over when the original house was built. And occasionally builders simply used an interior door and modified it to fit the foundation opening.

I recently was asked to replace one of these access doors in a client's home. The grade outside the door was too high relative to the wooden threshold, and the wood had rotted. The interior door that had been used was not insulated, nor was the opening sealed, which made for a cold basement. My plan was to install an insulated fiberglass door with a composite jamb that would offer energy savings and rot resistance. Additionally, I would trim the outside of the door assembly with low-maintenance PVC material.

RAISING THE THRESHOLD

I started by removing the existing door, jambs, and threshold **(1)** and thoroughly vacuuming the entire opening. The foundation of the home consisted of two layers of brick with an air space between the layers. The bottom of the door opening—which was also the top step of concrete stairs that led down to the basement floor—sat about 4 inches below grade, probably because the grade around these old houses tends to fill in and build up over the years.

I wanted the new door to sit above the

The author slides the door unit into place **(5)** and attaches the hinge jamb to his PVC blocks **(6)**. Flashing tape seals the jambs to the foundation **(7)**. An extension screws to the back of the exterior trim to accommodate the out-of-plumb foundation **(8)**.

grade, so I custom-ordered a new door from my local lumberyard that was slightly shorter than the original door to allow for raising the threshold. The new door was also a little narrower than the original to provide space for insulation and for better attachment along the side jambs.

So that the new door sill would be above grade, I formed and poured a small concrete curb on top of the existing concrete step. I made the form for the curb out of 1-by PVC stock, with spacers between the two sides to strengthen the form.

After setting the form into the opening, I lined it up with the exterior foundation walls and leveled it in both directions **(2)**. To anchor the curb to the original concrete, I located holes for three lengths of 1/2-inch rebar where they wouldn't interfere with form spacers and then removed the form to drill the holes. After inserting the rebar, I reinstalled the form in the opening. To seal around the form and to help keep it in place during the pour, I sprayed foam insulation around the edges **(3)**.

Before pouring the concrete, I applied a coat of Quikrete bonding adhesive inside the form to help bond the new concrete to the old. After pouring quick-setting concrete into the form and letting it set for a while, I screeded the top with a board for a smooth finish. The rot-proof PVC form stayed in place after the pour.

PREPPING THE OPENING

Although the bricks and the mortar in the old foundation of this home were in good shape, I did not want to attach the door jambs directly to the brick. To create more-reliable attachment points and to address the space between the inside and outside layers of brick, I installed spacer blocks made from scraps of 1-by PVC stock—two on the hinge side of the opening and three on the latch side **(4)**. The blocks bridged the gap between the brick layers and acted to stabilize them.

For the strongest connection, I had to make sure that the fasteners for attaching the blocks went into the brick, not into the mortar joints. After drilling the appropriate size holes in the brick with a hammer drill, I drove Tapcon masonry anchors to secure the blocks to the brick.

INSTALLING THE DOOR UNIT

Before setting the door in the opening, I screwed a metal security plate to the back of the latch jamb. This plate has openings for both the deadbolt and the latch and will help to keep the jamb from splitting in case someone tries to break open the door.

When I dry-fit the door in the opening, the first thing I noticed was that the foundation was out of plumb—the outer layer of brick leaned in quite a bit at the top—a problem I decided to take care of with the installation of the exterior trim. The only good news was that the bricks leaned in about the same amount on both sides of the opening.

I took the door back out of the opening and applied a generous bead of Geocel sealant to the interior edge of the curb where the back of the aluminum door sill would sit. I then set the door in place, keeping it centered side-to-side in the opening **(5)**. To deal with the out-of-plumb foundation, I kept the tops of the jambs flush with the brick

and let the jambs sit just inside the opening at the bottom.

I checked to be sure that the sill was level sitting on the new curb. Then starting on the hinge side, I shimmed and plumbed that jamb in both directions, driving screws through the side jamb and into the block to secure it in place **(6)**. I attached the latch jamb the same way, making sure the door opened and closed evenly. Before moving on to the next step, I cut PVC plugs and tapped them into the screw holes in the jambs and then cut the plugs flush with a handsaw.

FLASHING AND TRIMMING THE DOOR

To keep air and moisture from entering around the jamb, I applied a layer of 4-inch Vicor self-adhering flashing around the opening **(7)**. The pieces were wide enough to bridge from the edge of the jambs to the brick foundation. I applied the membrane to the sides first and the top last to create the proper drainage plane.

It was pretty easy to attach the tape to the smooth flat surface of the jamb edge. But making sure that there was good contact over the uneven surface of the brick foundation wall—especially in the mortar joints between the brick courses—required more care.

I preassembled trim kits for the interior and exterior on my workbench. I used 1x4 PVC stock for the exterior and wood for the interior. The exterior trim was made in two layers. To adjust for the out-of-plumb foundation, I glued and screwed a jamb extension onto the back of the trim **(8)**. I made the extension slightly thicker than the distance that I had stepped back the bottom of the door to make it plumb, which gave me room to seal the trim to the brick.

I secured the exterior trim kit to the jamb using Cortex screws **(9)** and filled the screw holes with PVC plugs. That still left a gap between the brick and the back of the trim from the leaning foundation. I filled that gap with foam backer rod **(10)** and then applied OSI Quad sealant to weather-seal the opening.

On the inside of the door, I first sprayed low-expansion foam insulation around the door between the jamb and the brick to help air-seal the opening **(11)**. With two layers of brick and a 1-inch space between them, the foundation was more than 8 inches thick. The prefabricated door jambs were sized for a 2x6 wall, which meant that I either had to build extension jambs for the inside trim, or just scribe the trim to fit inside the brick. Because the inside was an unfinished basement, I opted for the second choice.

With the interior trim preassembled and ready to go, I slipped the kit into place and fastened it to the jambs before the foam insulation had a chance to cure, which helped to keep the foam from expanding out past the jamb **(12)**. I finished with a bead of caulk to seal the spaces between the brick and interior trim.

In the end, my clients had a new access door for getting in and out of their basement that should last as long as the house. But more importantly, this door is much more secure than the old one, and with the drafts sealed out, their basement should be a lot warmer this coming winter.

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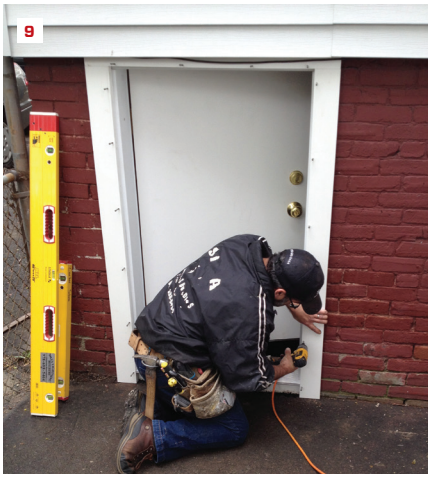
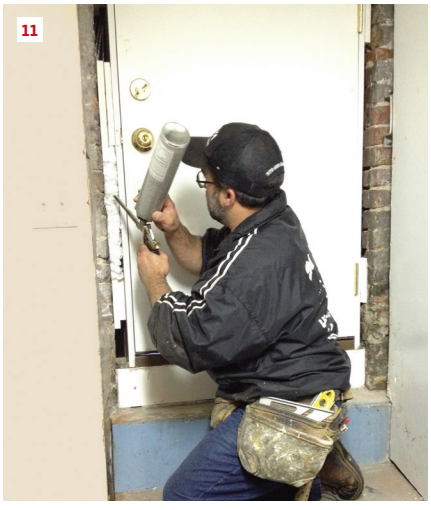




After screwing the exterior trim to the jamb **(9)**, the author uses backer rod and caulk to seal behind the trim **(10)**. On the inside, he air-seals the space between the jamb and the foundation with foam **(11)** before installing the interior trim **(12)**.

The paint-grade paneling on the first floor **(1)** and the mahogany paneling on the second floor **(2)** of this two-story tower **(3)** on Long Island, N.Y., were made with laminated stiles and rails and 1/4-inch plywood, using the same basic techniques. The plywood fits into a rabbet formed between the laminations in the stiles and rails.

Curved Paneling for a Circular Room

BY MARK LUZIO

One of the more interesting trim jobs I've done was on a two-story tower attached to a Shingle-style beach house on the eastern end of Long Island, N.Y. **(1)**. I came on the job after the tower had been framed. It wasn't a perfect cylinder, like a grain silo, but had a conical shape. The frame had 12 glulam columns laid out in a spoke pattern and tilted inward at roughly 3 degrees. Between the columns were curved wall panels interspersed with trapezoid windows that were wider at the base than at the head.

The first floor was a circular breakfast room connected to the kitchen, and I trimmed it out in curved painted panels and mahogany HVAC grills **(2)**. The room on the second floor was an extension of the master bedroom and was trimmed out with solid mahogany column covers and mahogany stiles and rails with flitch-matched veneered panels **(3)**. In this article, I'll focus on the method I used to make the curved stile-and-rail paneling, which I developed with Jed Dixon, a master stair builder and frequent presenter at JLC Live. Drinking coffee and sketching at his kitchen table, we applied our shared experiences of dealing with curved millwork to design an efficient fabrication system.

LAYOUT

The first step for any large-scale curved trim work is to make a full-size plan and section drawing. Jed and I drew the plans on CAD to work out the geometry and printed a few full-size templates. I cut

Photos: Post Pattern Woodworking

1/4-inch plywood sheets to fit each floor and screwed them to the subfloor. I found my center point and drew the position of each glulam column. Then I measured the diameter from post to post and drew all the radii using a trammel point. (The best trammel points I have used are General 523 adjustable ones, which allow you to make the beam that fits between the trammels as stout as you need to; you can also switch out one of the steel points for a pencil.)

Because the tower walls tilted inward **(4)**, I had to measure the room diameter at each "level"—that is, at the floor; at the sill height and head height for the main windows; at the sill height and head height for the transom windows; and at the very top of the paneling where it joined the base of the domed ceiling. At each of these levels, the diameter grows increasing smaller, but because the change is gradual, we did not have to change the radius of all top and bottom rails for each panel section. The larger, upper finish panels are actually trapezoid in elevation, like the windows. But the smaller panels below the windows were left square. Over 18 inches, the difference in the panel width is less than 1/16 inch.

I transferred each diameter to my plywood templates (we had one template for each floor). My finished plan was a series of smaller diameters, with copious notes written on the plywood about all observed site details. I brought the templates back to my shop and screwed them to the floor. During each step of construction, I could refer to these full-scale drawings to retrieve any measurements I needed. The templates also served as a helpful build pattern.

FABRICATION

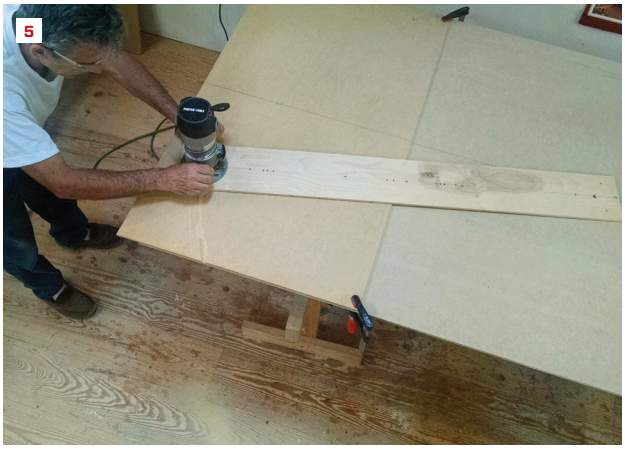
With flat trim work, you can often jump right in, but with curved millwork, you need to take time to make accurate patterns first. I use 3/8-inch MDF for my pattern stock. I cut the MDF with a shop-made trammel jig attached to a router fitted with a 1/4-inch straight cutter **(5)**. A CNC machine, if you have access to one, is even faster and more precise. There are companies that will make up a series of templates in a matter of minutes. Once you have all the correct patterns, then you can lay up the blanks, flush-trim them, and make any molding detail with a ball-bearing guide on the shaper.

All the curved sills were cut 1/16 inch fat, flush-trimmed, and profile-molded on the shaper with a ball-bearing guide.

Column covers. The 12 column covers were made from three pieces of solid mahogany and a back plate (see again photo 4). The front piece was milled before assembly with a custom-made knife for a Williams & Hussey molder. The sides and back plate were ripped at 15 degrees. This allowed each window sill to be cut at 90 degrees on site and fitted to each bay.

Curved rails. There are two difficult problems to overcome in making a curved stile and rail panel system: making a curved rail with a rabbet and making a curved panel.

The fabrication of a curved rail with a rabbet that will accept the panel is the first hurdle. I make curved rails with a bent lamination of five pieces of solid wood **(6)**. The strips are 4 inches wide and 1/16 inch thick. I rip the laminations oversized on a table saw and run them through a planer.



The tower walls tilted inward about 3 degrees, a detail that was largely unnoticeable in each room, except in the taper of jamb panels for the doorway leading into the main house **(4)**. To create a curved form, the author uses a trammel jig for his router to cut MDF at the radius of each rail **(5)**.

Each curved rail is formed from five laminations **(6)**. The center lamination is ripped narrower than the others to create a rabbet to receive 1/4-inch plywood. The laminations are bent around an MDF form. Using clamps **(7)** can work, but the best way to create a smooth curve is to glue up the lamination in a vacuum press **(8)**.

To form the rails, I use 3/4-inch MDF to make clamping forms to match the finish radius, screwing multiple laminations together into a stack. The best way is to use both an inside and an outside radius, squeezing the rail between the two forms. This allows you to use fewer clamps and get even pressure. But a single outside radius form with multiple clamps works, too **(7)**.

Another method is to use a vacuum bag to press the blanks **(8)**. Vacuum pressure is absolutely even and produces a truly fair curve. (Clamps can leave slight undulations in the rail that can sometimes be visible in flat light.)

A bent lamination's radius is retained by the glue line; overnight cure is critical. There are rigid-set glues (like resorcinol) available that are traditionally favored by boat builders for curved laminations, but Titebond 3 will work fine for a large radius. Because the glue is slightly flexible, there will be some "spring back"—about 3/8 inch on each end for the radii on this project. When it's critical to hit an exact radius, do a test run and adjust your mold as necessary.

The center strip in the lamination is exactly the thickness of the 1/4-inch birch plywood—a bit thinner than the back and front strips. After overnight clamping, this center lamination in the curved rail creates a perfect panel rabbet. I think everyone reading this can appreciate how difficult and painstakingly slow it would be to manually cut a rabbet into a curved rail instead of forming it.

Stiles and rails. When the radii are longer than 50 inches, the edges of the stiles can be milled with square edges. Each end cut on the rails needs a slight bevel cut (less than 90 degrees). Do a test cut.

To fasten the rails to the stiles, the joint can be made with a double biscuit or a Festool Domino. Kreg system pocket screws will also work. I think the Domino creates the strongest joint.

Panels. I would never use 1/4-inch plywood for ordinary flat panels; it is too thin and has too much flex for quality work. But for a curved panel, 1/4-inch ply works great. Most of the 1/4-inch hardwood veneered plywood I've seen has three plies that bend easily into a 50-inch or larger radius when the face grain is oriented vertically. Bending the panel and working it into the curved rabbet creates a drum effect that keeps it rigid. The panel is taut and feels as rigid as 1/2-inch or thicker plywood. This solves the second major problem referred to earlier—having to make up curved panels.

All panels are cut from flat stock. For paint-grade work, standard hardwood-veneered ply would work, but to get the finished look required for this job, I custom-veneered the panels with flitch-matched mahogany.

Note: There was no panel molding on the tower project. For a project that requires paint-grade panel molding, some type of flex product would be the quickest option. I use Duraflex moldings from ResinArt East (resinart.com).

Curved paneling makes for a unique detail in a custom house. And even if the budget doesn't allow for full-wall paneling, these methods can easily be adapted for any curved trim, such as a curved wainscot or baseboard.

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