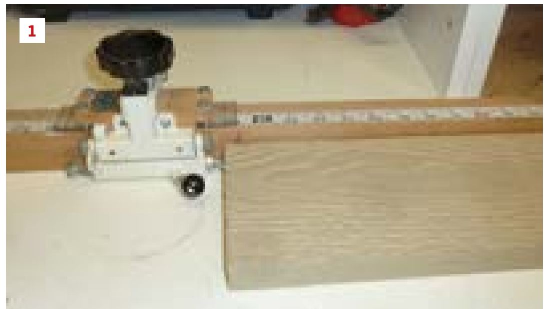
BY GREG BURNET



Preassembling Exterior Trim

In my article "Installing Engineered Horizontal Siding" (May/15), I wrote that preassembling exterior trim details can streamline the siding process. It can also dramatically improve the quality of the installations. We fabricate door and window trim, corner boards, and sometimes soffits and cornices safely on the ground or in the shop and then install them in one piece.

WINDOW AND DOOR TRIM

Many flanged or block-frame windows have a minimalist "modern" look when installed, and we often dress them up with additional trim. I first measure all but the biggest windows that we'll be trimming (larger windows are easier to trim on site), and I develop a cut list for each unit.

Because there are often many windows of a similar size on a job, I group them together and cut all the components at the same time. A trim package for a typical window consists of a sill nosing or extension, two vertical legs, a head, and an apron. If the window is plumb, level, and square, then the sill and the header trim are one length, and the two legs are another, so I need to calculate only two lengths for each window.

With a cut list in hand, I set the repetitive stop on the miter-saw stand to the appropriate position and cut all the components to length **(1)**. To minimize confusion and error, I label each piece as it comes off the saw, before prepping the pieces for assembly.

POCKET-SCREW JOINERY

For preassembling trim packages for doors and windows, using pocket screws is the fastest and strongest way to join the pieces. Pocket-screwed joints also stay tight in almost any environment. There are several

Photos: Sue Burnet

commercially available jigs for drilling the screw holes. We use a Kreg jig, which places the screws at a 15-degree angle to the face of the board. The jig clamps onto the back surface of the material being fastened and a specialized stepped drill bit with a stop collar creates the holes **(2)**. We usually place one screw every 2 to 3 inches.

Before the trim is assembled, it's important to seal any cut ends with quick-drying primer **(3)**. We also seal the screw holes **(4)**. Without sealer, exposed fibers can allow moisture to migrate into the material, which can lead to failure of the joint or of the material itself.

We place the pieces for each frame face down on an assembly table and put a bead of sealant in the joints **(5)**. We clamp each corner firmly to the table to keep the outer faces flush and to prevent the pieces from moving while we drive the screws.

The screws themselves are designed specifically for pocket-screw joinery; they have washer heads and self-tapping threads to minimize splitting and to draw the pieces together. We use fine-thread screws with dense materials like hardwood, and coarse-thread screws with softer woods and most engineered materials used for trim. (For more about fastening PVC, see "Fastening and Finishing PVC Trim," 09/14.)

We drive the screws using a long square-head driver bit. We've found that a cordless drill with clutch settings is the best tool for driving the screws **(6)**; impact drivers can strip the threads out of the wood or overdrive the screws. We use corrosion-resistant screws for all exterior applications.

CORNER BOARDS

Corner boards can be built more neatly and efficiently on the ground. This is especially true for multistory buildings where the walls are not always in the same plane from one floor to the next. Instead of wrestling with individual pieces, trying to get the joints tight, we preassemble entire corners on our cutting table and install them as one piece. Full-length corner assemblies bridge any framing irregularities and allow us to make slight adjustments to the corners of a building, if necessary.

The most common method for building outside corners is a butt assembly, where the two corner boards are fastened to each other along one edge to form a right angle. To make the corners the same dimension on both sides, we first set the blade at a slight angle (2 or 3 degrees) **(7)** to create a tighter-fitting joint; and then we rip down—by the thickness of the material we're using—the board that will be less visible **(8)**. For example, to make 5/4 by 5 ½-inch corners, we rip the

abutting piece to a width of 4 ½ inches. When the corner is assembled and installed, it will read the same on both sides of the building **(9)**.

Again, we seal all cut edges with primer before assembling the pieces. Then we run a bead of sealant along the long edge of the ripped piece **(10)** and bring the two sides together, clamping them as needed. We drill holes for 8d stainless steel box nails **(11)**, which we then drive by hand **(12)**. We avoid pneumatic nailers when fastening corners; the dense, engineered material that we use can cause gun-driven nails to drift—and often to exit through the face of the trim.

Another corner detail we sometimes use consists of two boards of equal width. But rather than the two boards overlapping, they just touch each other at their back corners and a piece of ¾-inch-diameter quarter-round molding fills in the space between the two boards. This type of corner can be installed piece-by-piece or preassembled and installed as a single unit. Preassembly is relatively straightforward, with the two boards joined by trim screws or finish nails driven through the quarter-round molding and into the mating corners. However, the completed corner tends to be a bit delicate.

Regardless of the corner detail we choose, we always steer clear of bevel rips, miters, and scarf joints in the boards. These joints are likely to open and provide a path for water to enter the assembly or to make its way behind the trim where it can become trapped. Instead, we opt for butt joints on all trim that isn't profiled. Unlike solid wood, most engineered material has no end grain, so exposing the core of the material is fine, as long as it's properly sealed.

INSTALLATION

Once the preassembly is done, we begin the installation, starting with corners and window trim. Because the fasteners are exposed, we always use 8d stainless-steel ring-shank nails. The stainless fasteners minimize the potential for rust streaks and bleeding under finishes.

We nail corner boards in place every 12 inches, staggering the nails between sides. Window trim is fastened with similar spacing, although we take care not to drive nails through the fins on flanged windows, which could restrict the window's movement (particularly on vinyl units) and even cause the frame to crack in colder weather.

For inside corners, we usually use square rips of 5/4 stock. We seat them tightly between the intersecting walls and nail them every 12 inches or so. As with siding, we always pay close attention to the depth the nails are driven. It's better to underdrive nails and finish them off with a hammer than drive them too deep, which reduces their holding power.

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Insulated Footings for a High-Performance Home

BY TED CUSHMAN

By code, occupied-basement walls in cold climates must be insulated. For most builders, it's less common to insulate beneath the concrete footings—which typically are buried deep enough to rest below the frostline—for those walls. But to eke out a little more efficiency, some high-performance builders surround the whole building with insulation—even under footings and basement slabs.

That's the strategy Auburndale Homes employed in Wayland, Mass., in the high-end Passive House project shown here. Passive House consultant Michael Hindle specced out the insulating detail using Pittsburgh Corning Foamglas and Roxul rock wool, after succeeding with the same approach on another building in mountainous western Maryland (where, surprisingly, because of the altitude and distance from the coast, January winter temperatures are actually a few degrees colder than in Boston).

Hindle explained his reasoning to *JLC* in a phone interview: "The footing is not exposed to weather, but it sure is exposed to cold temperatures," he said. Ground temperatures vary with depth as well as seasonally, but in a New England winter, temperatures below the frostline average about 50°F. "50°F is about equal to the average outdoor air temperature of your cold shoulder months, when you do have a heating load," Hindle pointed out. "So there is a heating load associated with foundation ground contact."

Ground temperatures lag outdoor temperatures by about five weeks at a 5-foot depth and by about nine weeks at a 12-foot depth, according to consultant Marc Rosenbaum. "So," said Hindle, "you could have cold temperatures in your basement right into June. In modeling, I've found that when I have a lot of ground exposure, I have heating loads for a lot longer than I would have thought. And when I insulate ground-contact elements well, that load goes away."

Even if you're not trying to hit a precise energy consumption limit, said Hindle, "you probably still want to avoid condensation, and that means knowing the dew point of your interior air and making sure the surface temperatures in the corners of your basement don't get

too cold. And in this case, I can tell you that if you were to pull out that footing insulation, that edge of that slab would be cold."

Some builders use high-density expanded polystyrene (EPS) or extruded polystyrene (XPS) to insulate foundations. But for environmental reasons, Hindle has been searching for a way to avoid plastic. For the Wayland job, he specified Foamglas insulation (made from 100% glass) under the footings, and rock wool under the slab. Handling and installing those materials fell to Auburndale project manager Mike Dutra and his crew.

The entire house sits on an 18-inch base of "trap rock"—large, angular crushed stone that compacts well and has excellent bearing strength. But Foamglas, while it won't crush under a concrete wall, is brittle and needs a smooth, flat surface to support it. So on top of the trap rock, Dutra's crew shoveled on "crusher run"—a graded mix of small gravel and fine dust that compacts well **(1)**.

Actually, Dutra said, he would have preferred to use stone dust instead of crusher run. But in February, when the foundation work started, every pile of stone dust in Massachusetts was frozen solid. The drawback to the crusher run was that, while smoother than trap rock, it still had some sharp gravel that could have damaged the Foamglas. So the crew added a thin layer of mason's sand for protection **(2)**, then set the pieces of Foamglas into the 2-foot-deep forms **(3)**.

After learning that Foamglas comes in 18-inch by 36-inch blocks 6 inches thick, Dutra asked architect Donald Grose to redraw the home's perimeter footings at 3 feet wide instead of 4. Said Dutra, "Foamglas is expensive and you don't want to waste it. We ended up with just two trash bags of scrap." Where pieces did need cutting, said Dutra, the crew started out using a sharp-pointed drywall "jab saw," as suggested by Pittsburgh Corning. But the crew discovered that a sharp mason's trowel worked even better for making fast, accurate cuts **(4)**. (By the way, use caution: Workers cutting Foamglas should wear respirators because the fine glass particles carry a risk of causing lung damage.)

When you pour concrete on top of Foamglas, a plastic "slip sheet" is required to isolate the rough surface of the glass from the wet concrete **(6)**. Without this separation, the concrete will bite into the glass, and the glass is likely to fracture when the concrete shrinks or expands, either during curing or in service. But other than that, no special precautions are required when placing concrete **(7)**.

Once the concrete had set, the crew applied a capillary break of Mel-Rol waterproofing membrane from W. R. Meadows and sealed the rebar penetrations with Meadows' Pointing Mastic **(8)** as well as Siga Wigluv tape. After stripping the footing forms, the crew placed Roxul rock wool against the sides of the footings **(9)**, using construction adhesive to hold the Roxul batts in place until gravel could be placed to hold the insulation permanently.

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