Reroofing With EPDM Rubber

Roll roofing was the wrong material for the flat roof under this second-story deck

by Matt Wright

In April 2011 I got a call from some Indianapolis homeowners who had a pocket deck that leaked heavily during rainstorms. (They'd placed seven buckets around the room below to catch all the water.) The roof had been installed only three years earlier, but the owners didn't want to call the original contractor back; instead, they contacted me, because they'd heard that my company had a history of successfully completing low-slope roofs.

The previous contractor had covered the roof with granulated modified torch-down roll roofing, then installed a walking deck over it. The roof pitched just 1 inch over a span of 11 feet — way too shallow for roll roofing. When we pulled the decking we found that the roof surface had cracked, letting water into the structure (**see Figure 1, next page**). At the wall, where the roll roofing terminated, the contractor had installed coil-stock flashing, but unfortunately he'd used many overlapping short lengths of coil stock instead of long ones, further increasing the likelihood of leaks. The plywood decking below was rotted and moldy.

My roofer, Steve Cuffe of Indy Exteriors, and I came up with a plan: We'd remove the old deck, reroof with EPDM rubber — installed over fiberboard underlayment and glued down with

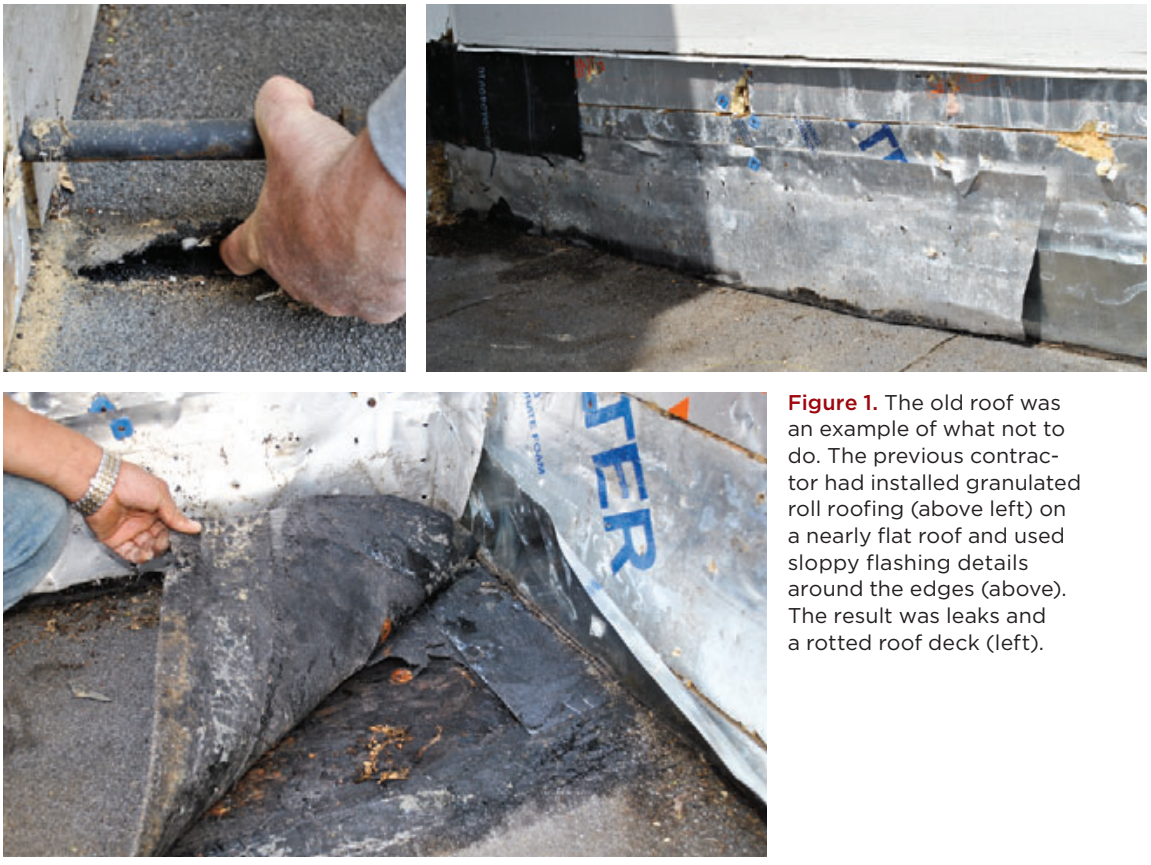

Figure 1. The old roof was an example of what not to do. The previous contractor had installed granulated roll roofing (above left) on a nearly flat roof and used sloppy flashing details around the edges (above). The result was leaks and a rotted roof deck (left).

latex bonding adhesive — then rebuild the deck using as many of the old pieces of decking as possible. EPDM is perfect for shallow-pitched roofs, because it can be installed as a single sheet with no seams. And unlike roll roofing, it can be folded up the wall without tearing, helping to make roof-wall intersections watertight.

We also decided to pitch the roof a bit more to help with water runoff. Once the old plywood was removed, we placed new 2-by sleepers over the existing sleepers, tapering them to create a slope of about 4 inches over 11 feet. Then we installed new OSB roof decking (**Figure 2, next page**). Now we were ready for the rubber roof.

Installing the Membrane

We used .060-inch-thick EPDM on this project, just as we do for all our rubber roofs. It costs about 10 percent more than the .045-inch version, but the extra expense is worth it because the thicker membrane is less prone to punctures during installation.

We began by covering the roof surface with ½-inch fiberboard underlayment (**Figure 3, next page**). This material has enough porosity to form a bond with roofing adhesive, and it's easy to install: You score and cut it like cement board, then fasten it in place with galvanized screws and large-diameter washers.

To ensure a good bond, we made sure that the fiberboard was swept clean. Then we poured latex bonding adhesive on the surface and spread it with a ½-inch-nap paint roller. The adhesive has the consistency of paint and needs to be spread in such a way that there's no puddling.

Once the adhesive is on the roof, you have to be prepared to move quickly. The EPDM roofing membrane can be installed as soon as the adhesive is tacky, which takes about five minutes. After that, the installer has only 15 minutes or so to get the membrane smoothed out. Despite the need for speed, the membrane must be handled very carefully. Although it's unlikely to tear, even the thicker membrane that we use can be punctured by a stray nail.

The best way to deal with the time pressure — and encourage proper handling — is to cover the roof surface in sections rather than all at once. On this job, for instance, we cut a piece of roofing big enough for the entire roof but glued down only half of it at a time, folding the extra membrane back over the installed half while we spread the adhesive for the second half. This strategy also makes it easier for the installers to work without stepping on wet adhesive.

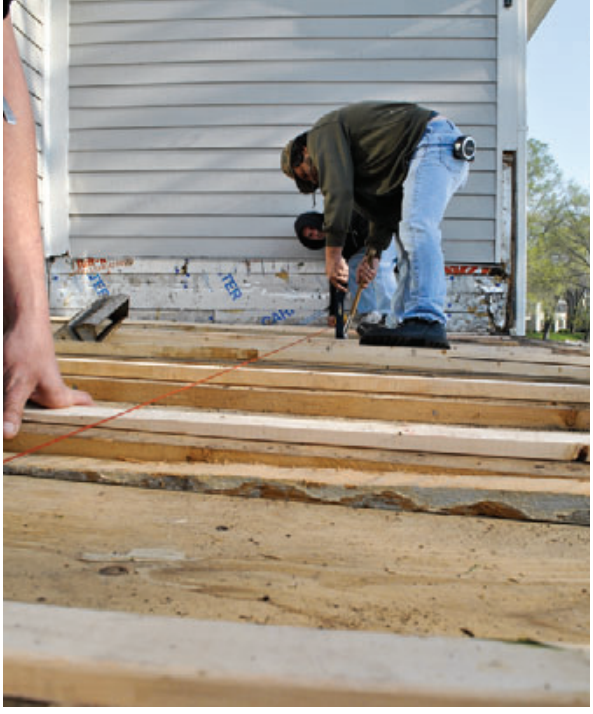

Figure 2. Since the sheathing had to be replaced anyway, the author increased the roof slope by adding tapered 2-by sleepers on top of the joists (left). The new OSB decking slopes 4 inches over 11 feet — an additional 3 inches of rise (above).

Figure 3. The EPDM installation started with a 1/2-inch-thick fiberboard underlayment engineered to bond with the roofing adhesive. It scores and cuts like cement board and is fastened in place with galvanized screws and washers (above). After sweeping the surface clean, the crew applies latex bonding adhesive, folding the membrane back on itself so it can be glued down a section at a time (right).

Figure 4. As the cement sets, a worker uses a broom to press out air bubbles and create a strong bond (above left). The membrane is left long, then folded up the wall and trimmed to its final length. To minimize cuts, the corners are folded over (above). After the entire sheet is adhered, brooming continues until all the bubbles are worked out at the upper edge (left).

The membrane needs to be pulled as tightly as possible over the roof surface, then worked with a push broom (**Figure 4**). Brooming is a good way to help the membrane bond to the adhesive, work the membrane into edges and corners, and smooth out any bubbles. On a two-step roof like ours, bubbling tends to be more of a problem for the second half of the membrane, because it's easier to pull the first half tight.

Since this job had a roof-wall intersection, we cut the rubber long in all directions. Once the main part of the roofing was installed and smoothed out, we folded the excess up the wall and trimmed it to its final dimension. Then we rolled some adhesive onto the back of this flap and tacked the top edge to the wall with roofing nails. The glue and nails were a temporary measure — they would hold the wall portion of the membrane in place until we got the ledger and siding installed.

Wall corners are a common source of leaks, so we didn't make any cuts or seams there; instead, we folded the membrane over. The only cuts on this job were around the kitchen exhaust vent and a nearby gas pipe that penetrated both the roof and the wall.

Once the wall membrane was installed and held in place, we went over the main roof surface with the broom once again to make sure that all bubbles had been removed.

Detailing Edges and Penetrations

At the outer edge of the roof, we folded the membrane over, pulled it tight, and tacked it temporarily into place with roofing nails (**Figure 5 <next page**). Then we nailed down a length of gutter apron (a type of drip edge). We applied a transparent glue called Dewitt Pro Primer Activator — which is a bit thicker than paint — to the surface of the apron, then covered it with seam tape, using a hard rubber roller to press the tape into place. (The seam tape is self-adhesive, but we always add glue anyway, as an extra precaution.) We also used seam tape and glue to seal around the exhaust vent on the wall.

The biggest potential for a leak on this roof surface was around the gas-pipe penetration. In the past, this area would have been detailed with seam tape and roofing cement — an imperfect solution that seldom lasts the life of the roof. Today, however, there's an easier and more effective way: a PVC donut, available from roofing suppliers (**Figure 6, next page**). The donut is usually thought of as

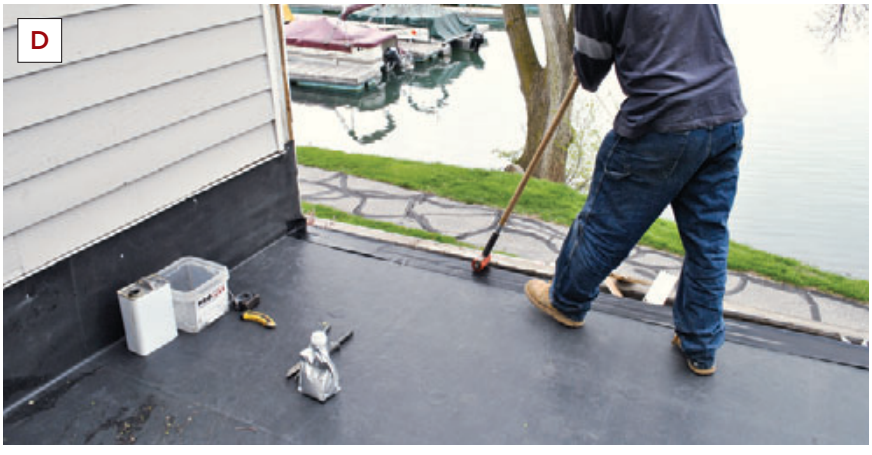

Figure 5. The roofers pull the EPDM tight and tack it in place (A), leaving it long enough to ensure that water flows into — rather than behind — the gutter. The roof edge is protected with a gutter apron. Glue is applied to the apron (B), followed by seam tape (C), which is pressed into place with a rubber roller (D). Although the tape is self-adhering, the author uses glue as an extra precaution.

Figure 6. The author seals pipe penetrations with PVC donuts. First the donut is cut in half to fit around the pipe (A), then it's glued to the roof with a pourable sealant (B, C), which is also used to fill the center (D). The cured sealant (E) stays flexible over time so it can adapt to movement in the roof without losing its seal.

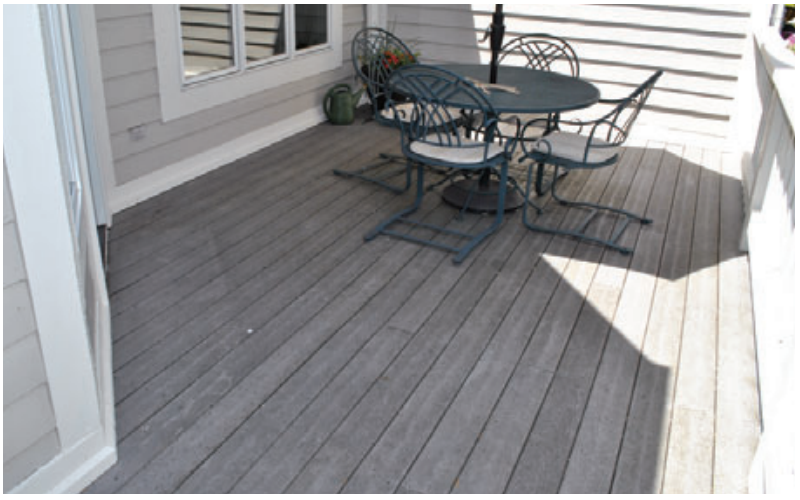

Figure 7. A pressure-treated deck ledger (above left), flashed with Ice & Water Shield (above), supports the inboard end of the new joists. The original decking and railing were reinstalled to complete the roofing job (left).

a commercial product, but it's great for residential jobs, too.

We cut the donut in half so that it would fit around the pipe, then glued the two halves to the roof and to each other with 1-Part Pourable Penetration Sealant, a caulk-like material that comes in a bag. Then we filled the donut with the sealant. A big advantage of this product is that the sealant doesn't dry completely hard — it retains some flexibility so it can adapt to movement in the roof.

Adding the Deck

After completing the rubber roof, we turned our attention to the deck (**Figure 7**). We bolted the ledger to the house, flashing it with Grace Ice & Water Shield. We then installed a triple 2x10 girder at the outer edge of the roof, supporting it with metal hangers on the walls at each end and stiffening it in the middle with a single block. To protect the finished roof surface, we placed a piece of scrap roofing — folded over itself three or four times — between the roof and the block.

With the girder and ledger in place, we installed the 2x8 joists in hangers, then flashed the wall ledger with aluminum — a critical step, since the peel-and-stick membrane is meant to serve only as a backup watershed. We extended the metal flashing 5 inches horizontally past the face of the ledger, to help keep water off the joist hangers.

The final step was to re-install the old railing and Trex decking. Once we'd trimmed the base of the wall, there was no way to tell that decking had been replaced — except, of course, that the roof no longer leaked.

The job — including interior water-damage repairs — cost about $8,900. It took two to three workers approximately two weeks from start to finish: one day for demolition; one day to install the new roofing; three to four days for the interior carpentry and painting; and two to three days to build the outside ledger, decking, and handrail and do all the exterior painting.

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