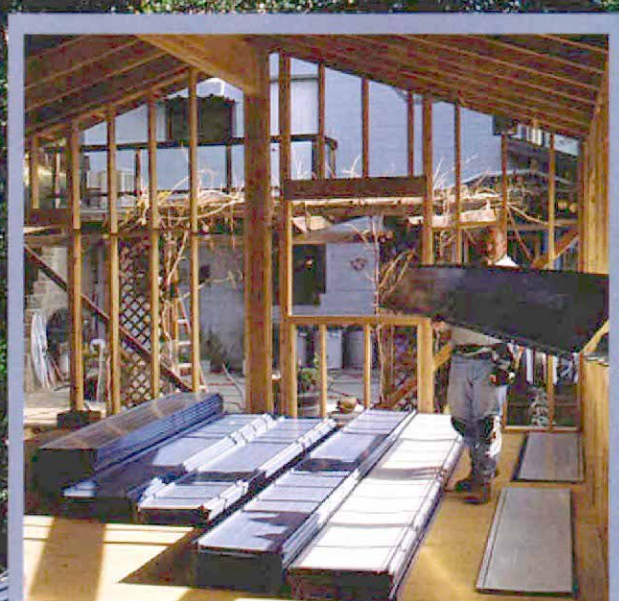


# Installing Steel Roofing

A little more expensive but a lot longer lasting, steel roofing is an easy-to-install, attractive alternative to shingle or tile roofs

BY JOHN LA TORRE JR.



**Let the factory do the cutting.** Steel roofing comes precut to all the lengths you'll need. Here, the different lengths are laid out awaiting installation on the different-size sections of the roof.



**D**uring the dry season here in the foothills of the Sierra Nevada, the forests become tinderboxes waiting for a wayward bolt of lightning or a spark from a lighted match. The resulting wildfires create a unique terror for local residents as the fires leave decimated acres of woodland as well as charred subdivisions in their wake.

So when Ben and Sandy Smith asked me to build a garage next to their house, the first

thing that I pointed out was that trees had to be removed for safe clearance from fire danger. Ben responded, "The trees are staying. We're going to build a fireproof garage with a steel roof."

## An argument for steel roofing

In addition to its fire resistance, metal roofing is long-lasting, lightweight, easy to install and easy to maintain. The metal roofing

that I installed on Ben's garage is guaranteed to last for the entire life of the building. Only the very best asphalt shingle carries such a warranty.

Asphalt shingles also degrade when exposed to sun, wind and carpenters' feet. The painted finish on a metal roof will not break down from exposure to weather. And because metal roofing is one solid panel from eaves to peak and is screwed to the roof



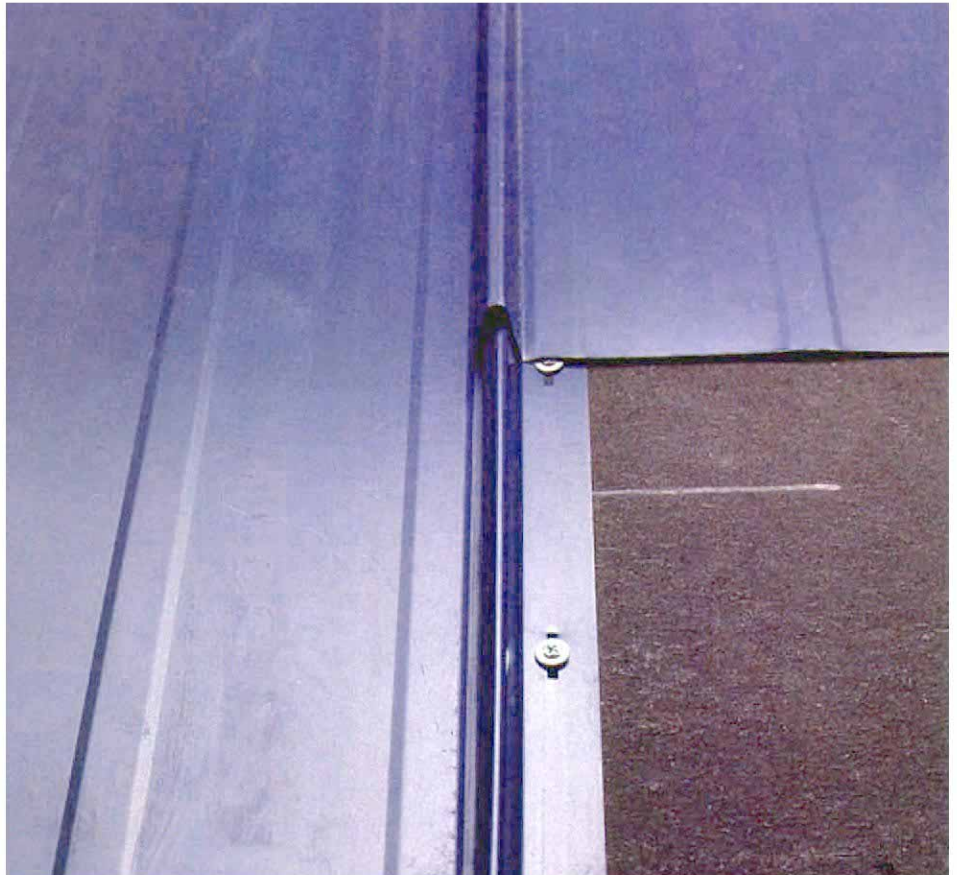
**Panel layout is marked along the top and bottom of the roof.** Marks are made every 16 in. along the top and bottom edges of each roof section. The edge of each panel is lined up with the marks before being screwed down.

sheathing, it's not likely to blow off in a gale as asphalt shingles often do.

The tile roofing common in these parts is resistant to fire as well as weather, but its rough surface can collect leaves and debris, especially in roof valleys. Removing debris from a tile roof is complicated by the fact that walking on the tiles can damage them. The maker of this steel roof assures us that it's okay to walk on the roofing. Also, the



**Panels are screwed down before ribs are snapped together.** Each new panel is first lined up on the layout marks, and screws are driven at the top and bottom. After the entire flange is screwed down, the seams can be snapped together with gentle pressure from the palm of your hand or the sole of your shoe.



**Interlocking ribs snap together.** The rib on one side of the panel overlaps and snaps onto the rib of the adjacent panel, hiding the fasteners in the process. Exposed fasteners on the edge of the roof have a rubber grommet to make them weatherproof.



**Dueling snips.** To cut straight lines in a roofing panel, right-handed and left-handed snips are used side by side, and the waste curls up harmlessly in between.



**Munching metal.** A tool called a nibbler can cut just about any shape in a metal-roofing panel, but the shavings are messy.



**Special pliers help to bend the roofing.** To make a rib for the edge of a roofing section, special pliers called hand seamers bend the edge in gradual increments.

smooth painted surface of steel roofing discourages debris from accumulating. And when properly installed, it's just plain tough to beat the crisp, clean, colorful lines of a steel roof.

To give you an idea of how the cost of steel roofing stacks up, let's compare the costs of three different types of roofing. In my area, asphalt-shingle roofs are by far the most common and up-front the most economical to install. A 25-year shingle roof costs about \$140 per square (\$80 for materials and \$60 labor). Tile roofs are the most expensive, and although cost varies according to the choice of tile and the shape of the roof, an average tile roof costs about \$500 per square (1300 for materials and \$200 labor).

Steel roofing falls somewhere in between those two choices. Roofing materials (roof panels and trim) cost around \$200, and labor is generally around \$150, or about \$350 per square total for steel roofing. But when you consider the longevity of a steel roof over asphalt shingles, steel becomes the economical choice.

### Be sure to order the right lengths

One of the trickiest parts of installing a steel roof is ordering the materials correctly. The factory precuts each piece according to your order (inset photo, p. 98), so you must first figure out exactly how many pieces you'll need and how long each piece must be.

Working off the building plan, I first sketch in each piece of roofing.

The standing-seam roofing that we were using for Ben's garage comes in panels 16 in. wide. With a total roof length of 40 ft., we needed 30 panels (at two different lengths) to cover the front of the roof. The back of the roof was divided into two parts. The first section was 24 ft., 8 in. long, which required 19 panels, and the other section, at 17 ft. 4 in., required 13 panels. The back side of the roof required two more panels than the front side because one section of the back roof overhangs the other.

I measure the panel lengths directly from the roof. Because this roof was to include a ridge



**Rubber roof jack seals smaller pipes.**

Small round roof penetrations such as gas-vent pipes are sealed with a rubber roof jack that is caulked and screwed to the roofing.



**When a chimney falls on a seam.** When a large penetration such as a chimney is in the middle of a rib, a special rib is built into the lower apron of the flashing (photo above). Roofing sections are then cut, fit and screwed over the upper part of the flashing (photo below).



**When a chimney falls between seams.** If the penetration is between seams, the edges of the chimney flashing are bent up to form ribs and installed over the lower-panel section (top photo). An upper-panel section then fits over the flashing and is screwed into place (bottom photo).

vent, the plywood roof sheathing was held 2 in. back from the ridge. To figure the length of each section, I measure from the top edge of the sheathing (where the roofing will end) to the bottom edge and then add an inch so that the roofing extends over the gutter.

Trim and flashing are available to match the color of the roofing. For this project, we needed four different types of trim: sidewall flashing where the side edge of the roof ends at a vertical wall; end-wall flashing where the top end of a shed roof meets a vertical wall; rake trim or gable flashing for the gables; and vented ridge flashing.

Each type of trim and flashing must be anticipated and included in the order. Trim pieces typically come in 10½-ft. lengths, but just adding the total footage and dividing by 10½ might force you to use short pieces to finish a run. Instead, I order the number of 10½-ft. pieces needed to complete each separate run.

The roofing order should also include painted self-tapping screws with rubber gaskets. For standing-seam roofing, painted

screws are used for the trim and wherever a screw has to be left exposed to the weather. The screws that secure the roofing panels are hidden, so I use 1-in. truss-head screws that are available at my local hardware store.

**Steel roofing requires no special prep work**

Manufacturers of steel roofing recommend that it be installed over plywood sheathing (oriented-strand-board sheathing doesn't offer enough holding strength for the screws). We used 5/8-in. plywood for Ben's garage roof.

We then covered the sheathing with 30-lb. felt paper as recommended by the roofing manufacturer. The gutters on the garage were also installed before the roofing. At the roof peak, we installed a length of L-shaped galvanized metal along the top edge of the sheathing as a baffle for any rain that might blow in under the vented ridge flashing. This strip is mostly hidden by the ridge cover, but I painted it blue anyway because I'm fussy.

Where the sheathing was held back from the peak to allow for airflow, I installed a

metal insect screen. Metal-roofing companies sell perforated steel for this particular application, but the insect screening is a lot less expensive.

**Panels must be perfectly spaced and square to the bottom edge**

To keep the bottom edge of the roof perfectly straight and even, the panels must be installed square to the bottom edge. I begin by marking a large 3-4-5 triangle from the bottom edge of the sheathing to check the roof for square. If it's square, I pull the layout marks directly from the edge of the rake.

If the roof isn't perfectly square, I install the first panel parallel to my square line, making sure that the first rib does not hang over the gable edge of the roof sheathing. (Any overhang can prevent the gable trim from fitting tight against the rake.) In this case, the roof was square, and I pulled the layout marks from the edge of the sheathing.

Marking the layout properly is a crucial step to a successful installation. Measuring from the edge of the roof at the peak, I make



**Chalklines guide ridge-vent installation.** Marks are made on the roofing from a scrap of ridge vent, and lines are snapped between the marks (photo left). The vent is held to the chalkline and screwed down to keep it running in a straight line (photo right).

my first mark at 17½ in., which is the total width of one panel, including the screw tab. From there, I make marks every 16 in. all the way across the roof using a soapstone marker (available at welders' supply stores) that shows up well on the black felt paper (photo left, p. 99). I duplicate my measurements and make a second set of marks along the bottom edge of the roof as well.

### Screw first, snap later

We line up the first panel on its top and bottom marks and then screw the panel in place. Special care has to be taken not to overdrive the screws. The screw flange is slotted to allow for slight panel movement during normal expansion and contraction. The screws should be snugged against the flange, but not so snug that the flange deflects under the screw head.

Each panel connects to its neighbor via overlapping ribs that snap together (photo bottom right, p. 99), and the temptation is to snap the ribs together before you screw down the panel. But I've found that some of the panels get slightly stretched or compressed in shipping. So if you snap the ribs together first, you may not be able to push or pull the screw flange to its proper location. Unless you follow the layout exactly, you can gain or lose up to ⅛ in. per panel. Over the course of

a 40-ft. roof, this discrepancy could add up to almost 4 in.

Instead, the bottom edge of each panel is lined up with its neighbor. The screw flange is then set at the marks and screwed down before the ribs are snapped together (photo top right, p. 99). Because installation goes pretty quickly, we often screw down two or three panels, and then one crew member goes back and snaps the ribs together with gentle shoe or palm pressure.

When we reach the other end of the roof, we again make sure that the last panel does not stick out past the edge of the barge rafter. If we don't end with a rib along the edge (as was the case with one of the back sections of Ben's roof), we measure the remaining distance, add an inch and cut the panel to that width. The extra inch of material is bent up with a hand seamer (Malco; 800-328-3530; [www.malcotools.com](http://www.malcotools.com)) to form a rib (photo bottom right, p. 100).

There are a number of ways to cut sheet metal quickly and accurately. I own an electric nibbler that munches its way through metal roofing, following almost any pattern I want (photo top right, p. 100). I try to do my nibbling over a trash barrel to catch the tiny metal shavings that the machine produces.

But the quickest, cleanest way I've found to do straight-line cutting is with dueling tin



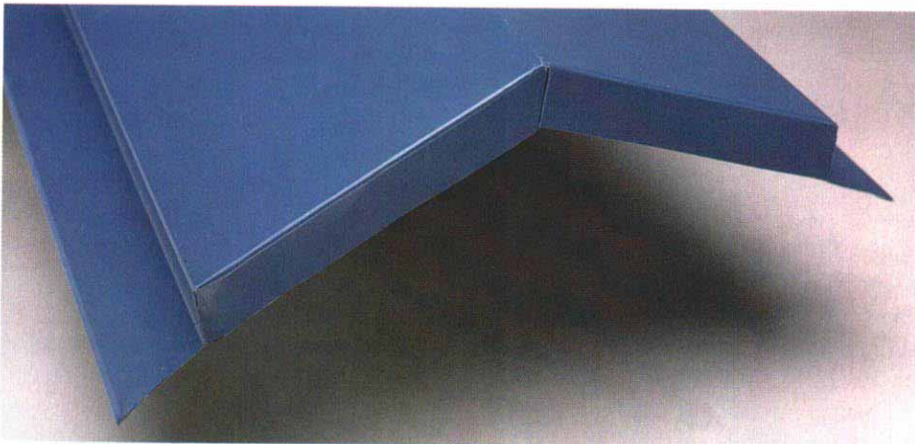
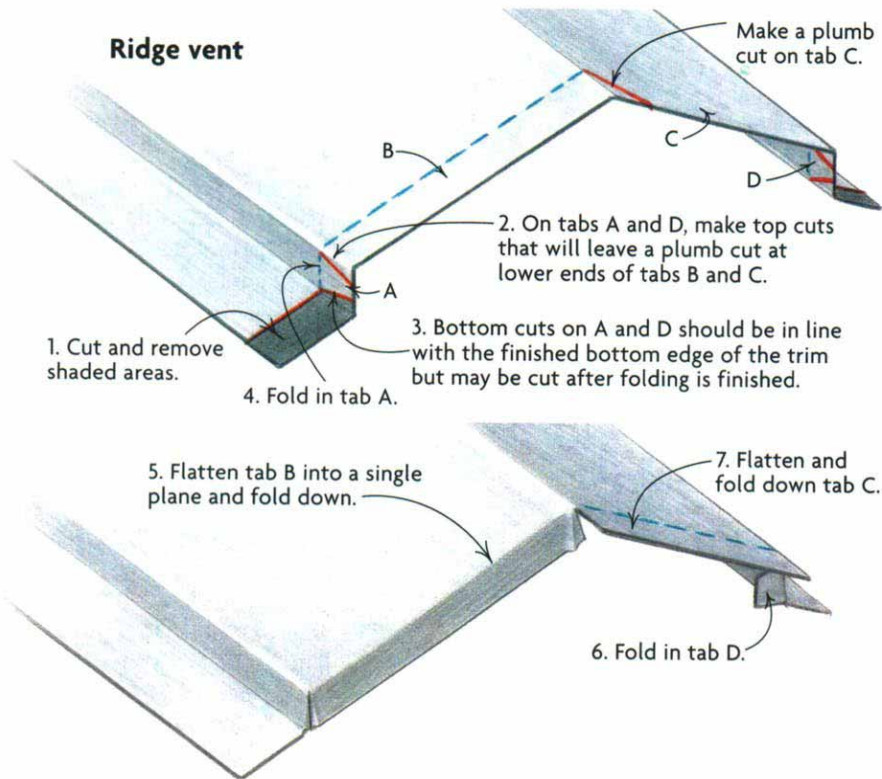
**Overlap trim pieces in long runs.** When a run of trim requires two or more pieces of trim, the pieces of metal are overlapped about 6 in. and then held in place with gasketed screws.



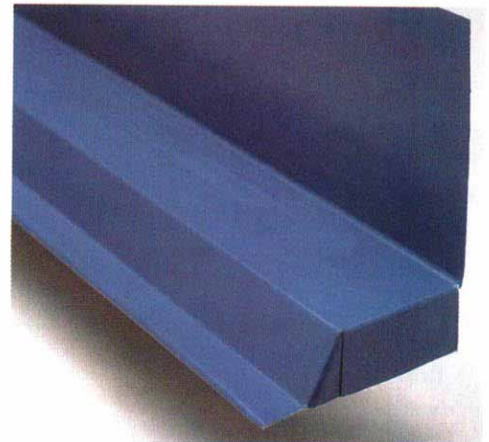
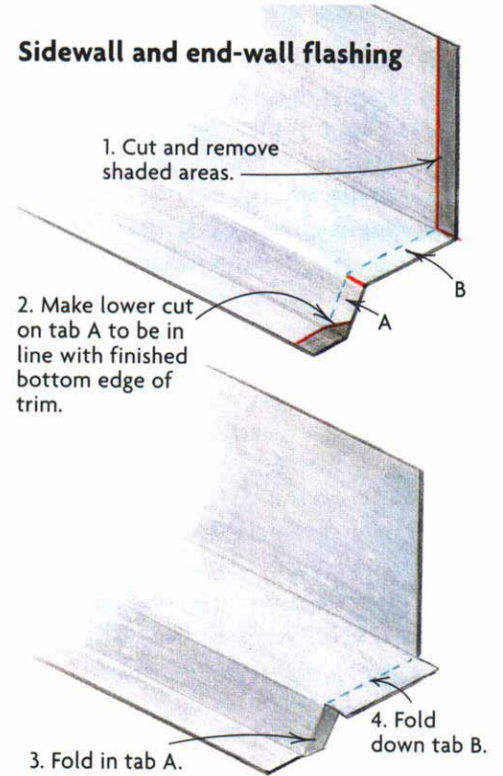
**Screws keep the bottom edge flat.** Gasketed screws are driven between the ribs of each panel along the bottom edge to keep the panel flat.

## TIDYING UP THE ENDS OF THE TRIM

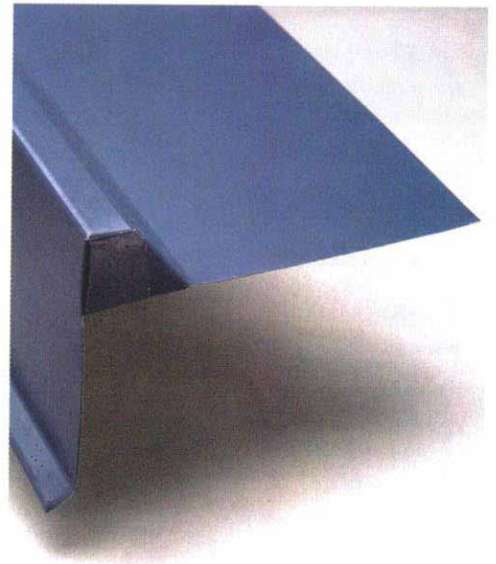
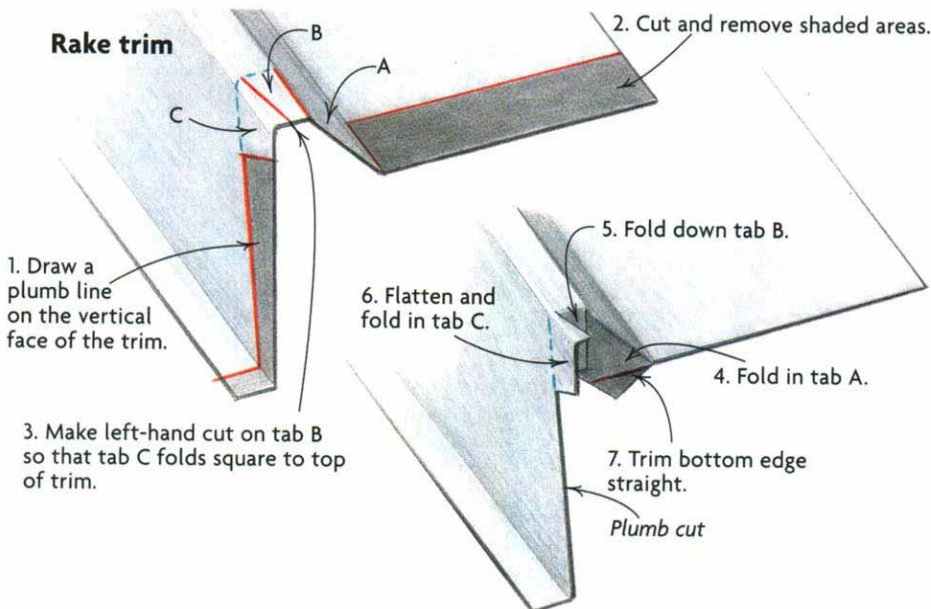
### Ridge vent



### Sidewall and end-wall flashing



### Rake trim



## Sources of steel

Steel roofing can be divided into two basic types, through fastener and standing seam. A through-fastener roof is installed with pre-painted screws driven through the ribs.

Standing-seam roofing, as was used on this project, has interlocking vertical seams. The fasteners are hidden beneath the seams for a cleaner profile and (less chance of rain getting in at the fasteners. But the trim is still fastened with exposed screws, reducing this advantage.

Standing-seam roofing typically costs about 25% more than through-fastener roofing; the labor and trim cost about the same. Steel roofing is available in a wide variety of colors.

The steel roofing for this project was made by BHP Steel Building Products (800-360-2477; [www.bhpsbp.com](http://www.bhpsbp.com)), but here are some other companies that make metal roofing.

—J.L.

**AEP-Span, (800) 527-2503,  
[www.aep-span.com](http://www.aep-span.com)**

**American Buildings Co.,  
(888) 307-4338,  
[www.americanmetalroofing.com](http://www.americanmetalroofing.com)**

**Atas International, (800) 468-144T,  
[www.atas.com](http://www.atas.com)**

**Fabral, (800) 477-2741,  
[www.fabral.com](http://www.fabral.com)**

**Follansbee Steel, (800) 624-6906,  
[www.follansbeeroofing.com](http://www.follansbeeroofing.com)**

**McElroy Metal, (800) 950-6531,  
[www.mcelroymetal.com](http://www.mcelroymetal.com)**

**Metal Sales, (800) 406-7387,  
[www.mtlsales.com](http://www.mtlsales.com)**

**Morin Corp., (800) 640-9501,  
[www.morincorp.com](http://www.morincorp.com)**

**Nu-Ray Metals, (800) 700-7228,  
[www.nuraymetals.com](http://www.nuraymetals.com)**

**Pacific West Steel,  
[www.thegrid.net/pacweststeel](http://www.thegrid.net/pacweststeel)**

**Wheeling Corrugating Co.,  
(877) 333-0900, [www.wpsc.com](http://www.wpsc.com)**

snips (photo left, p. 100). When installing metal roofing, I keep pairs of right-handed and left-handed snips in my tool belt at all times (and yes, for the nautically inclined, the left-handed snips have red handles, and the right-handed have green).

The trick is using one pair in each hand at the same time. The first pair of snips follows the cutline, and the other makes a parallel cut about an inch away. The waste curls up safely and easily between the two snips. I'm able to do the cutting right there on the roof, and there are no metal shavings or extra power tools to contend with.

### Special details for roof penetrations

Anything that goes through a metal roof is a potential cause for a leak. Small penetrations such as plumbing vents or gas vents are sealed with special flashings called roofjacks made specifically for metal roofing (photo left, p. 101). These roofjacks consist of a conical boot and a flat flange made of soft, flexible rubber.

The ribs on a standing-seam roof are too abrupt to mold around the roof jacks, so vents must fall between ribs, which is easy to plan for with new construction such as Ben's garage. First, caulking is applied in a double bead to the bottom of the flange. Then the jack is pushed down over the pipe until the flange contacts the roof. Next, I drive gasketed screws every inch or so around the perimeter of the flange.

Large penetrations such as chimneys need a different treatment. This roof had two metal fireplace chimneys and an evaporative cooler. The cooler spanned two roof panels, so I turned to my trusty sheet-metal man, Dave Doyle, to make a custom roofjack of flat 26-ga. galvanized steel.

Dave made the cooler jack as one piece, and the roofing panels were cut around it. The bottom jack apron has a raised rib that covers the standing seam of the panels below. The top apron was kept flat so that the roofing panels could lie on top of the jack.

Each chimney required special attention as well. The first chimney fell smack dab in the middle of a rib. But Dave's artistry made the solution simple. The roofjack supplied by the chimney company could not be modified, so Dave took a roofjack made for a gas vent and welded a raised rib on the bottom apron (photo top center, p. 101). Again, the top apron was left flat, and I just had to cut and screw down the roofing panels around the chimney (photo bottom center, p. 101).

The second chimney fell between ribs, but this time, the roof jack from the chimney

company was too large. Fortunately, the same size roofjack that Dave had modified for the first chimney fit beautifully between the ribs. I cut the apron, leaving extra material on each side that I bent up to tie in with the roofing ribs (photo top right, p. 101). I cut the roofing panel so that it ended just short of the chimney. The jack then overlapped that piece, and a top panel section overlapped the flashing and wrapped around the chimney (photo bottom right, p. 101).

By the way, cutting through a rib with snips inevitably crushes the rib. To bang it back out, turn the panel upside down, and open up the rib with a nail set.

### Finishing the trim: origami in steel

Screwing down the roof panels always goes quickly. Installing the trim is the more time-consuming part.

On runs of more than 10½ ft. that require more than one length of trim, I overlap the pieces by 6 in. or so (photo top right, p. 102). The material is thin enough that the overlaps are not noticeable. Trim is attached with gasketed screws; again, I take care to drive the screws enough to flatten the rubber washer but not enough to deflect the roofing or the trim.

The tricky part is finishing the ends of each trim run. Most varieties of trim have an open space when they are viewed from the end. Not all steel-roofing installers go to the trouble of shaping the ends of the trim to close these spaces, and I've seen metal roofs with openings that were big enough to throw a cat through. It may take a bit more time, but I prefer to cut and fold the ends of the trim to give the roof a more finished look (drawings, photos, p. 103).

Rake trim should be installed from the bottom of the roof, working up to the peak with each upper piece overlapping the one below. For the ridge vent, I place a short section on the peak so that it lies evenly side to side. I mark the outside edges, and then I repeat the process at the other end. Chalklines are snapped between the marks (photo left, p. 102), and the ridge vent is set on these lines as it's installed (photo center, p. 102).

When we've finished with the trim, the final step is driving a couple of gasketed screws along the bottom edge of each panel (photo bottom right, p. 102). The only recommended maintenance is an annual washing with clean water. And if this year is any indication, I'm pretty sure Mother Nature will take care of that. □

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