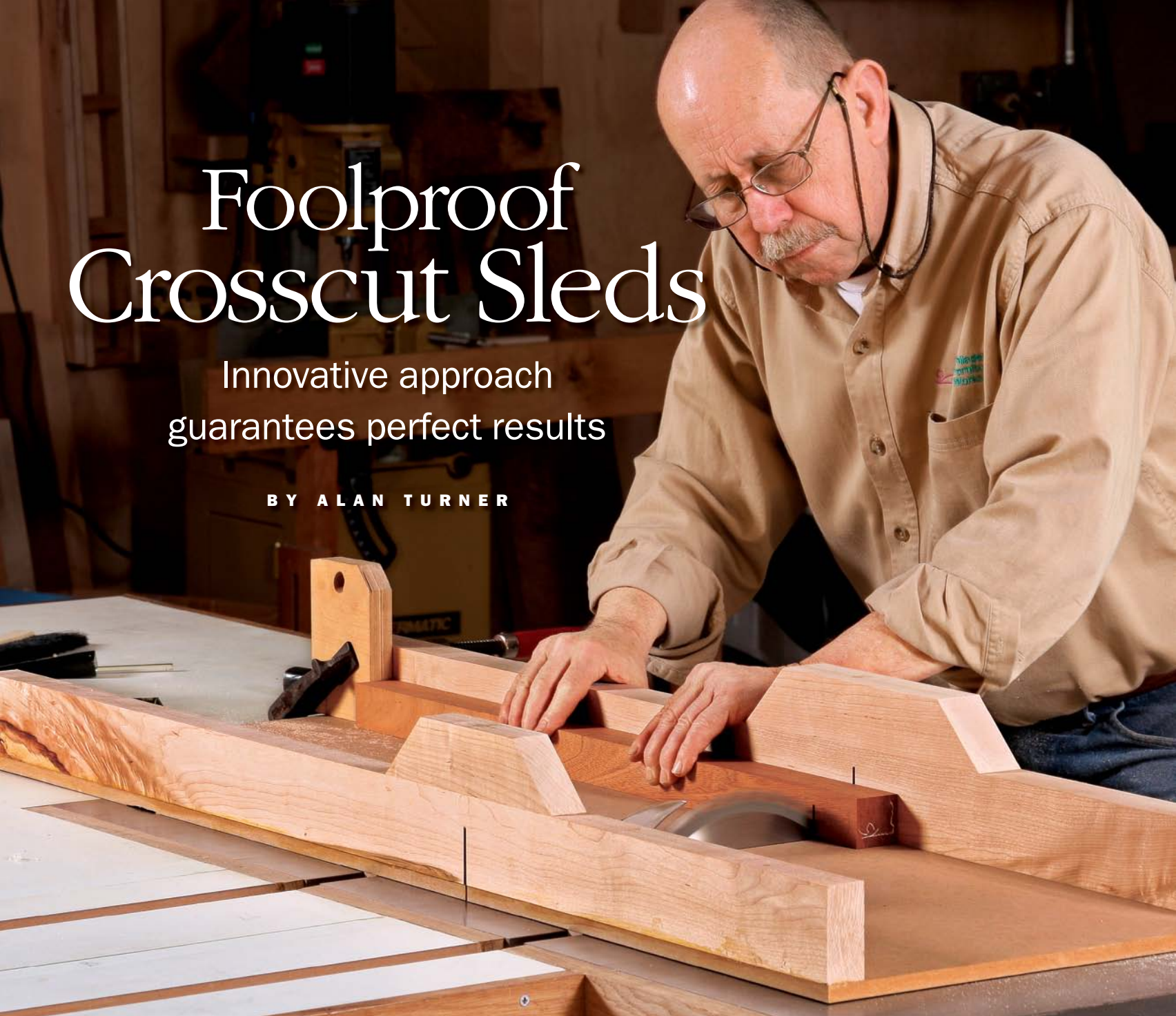


Foolproof Crosscut Sleds

Innovative approach
guarantees perfect results

BY ALAN TURNER



The tablesaw may be your shop's most valuable cutting tool, but for precise, repeatable crosscuts it needs a little help from a sled. The sled holds the work securely with its long edge at a precise right angle to the blade, so you get perfectly square ends when cutting pieces to length, the key to gap-free joinery. With a zero-clearance slot cut through it, the sled even prevents chipout at the edges.

The trick to building an accurate sled has always been to get the runners to fit the miter slots snugly without any wiggle room, and to attach the rear fence perfectly square to the blade—neither is easy to pull off. The technique I use at the Philadelphia Furniture Workshop simplifies both tasks and ensures dead-accurate results.

For starters, I assemble the base in two pieces, first attaching the

runners at the bench. Then, with the runner in the miter slot, I trim each individual base piece with a sawcut that creates a zero-clearance edge that is perfectly parallel to the blade.

To help ensure that the runners don't wiggle in the miter slots and yield inaccurate cuts, I lightly clamp them snug against the inside edge of the slots when gluing on the front fence.

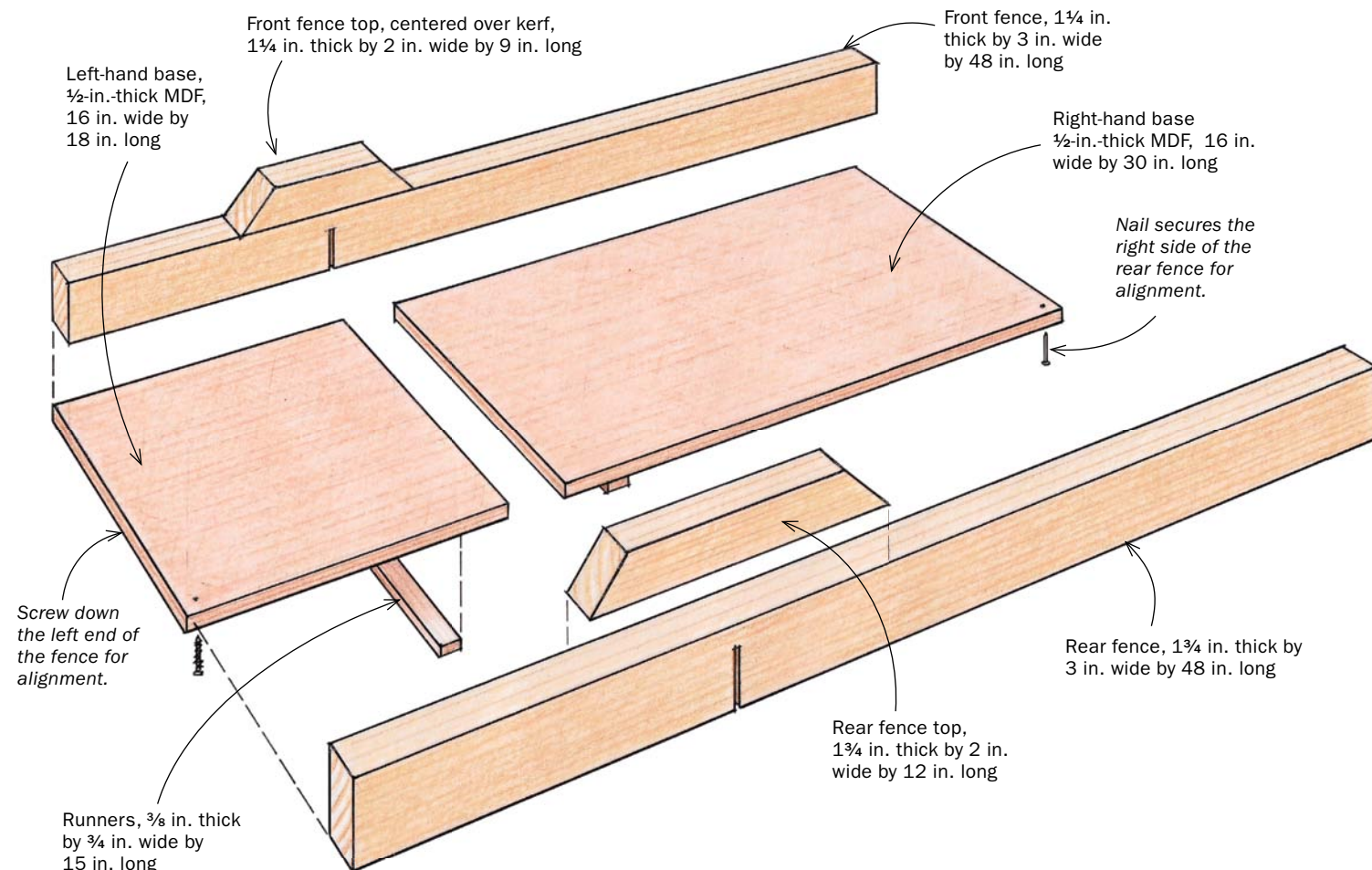
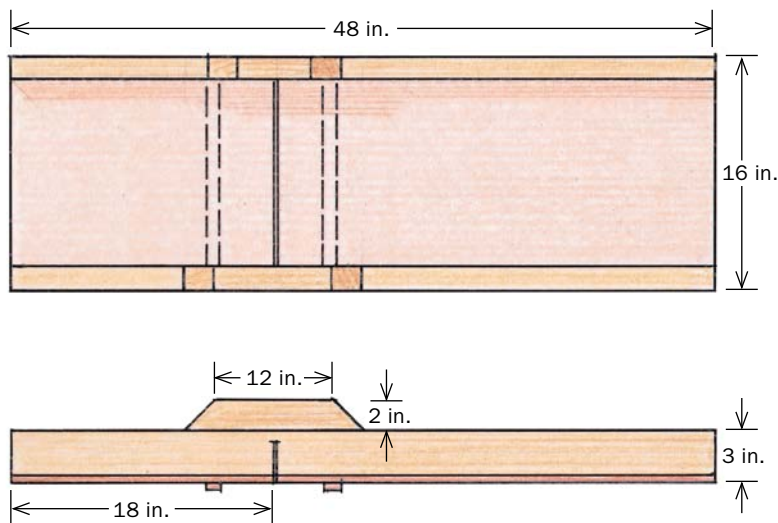
And, at the critical step of attaching the rear fence, I found a way to easily fine-tune the angle during glue-up so that it is perfectly square to the blade and stays that way. Armed with these simple techniques, you can crank out a number of sleds suited to specific tasks, instead of struggling to make just one. Instead of the typical medium-size sled, which is undersized for plywood cuts but too bulky for narrow crosscuts in solid stock, you really want the

So simple, you'll want to make two

The truth is you really need at least two different tablesaw sleds, and this method is so straightforward that now you can have them.

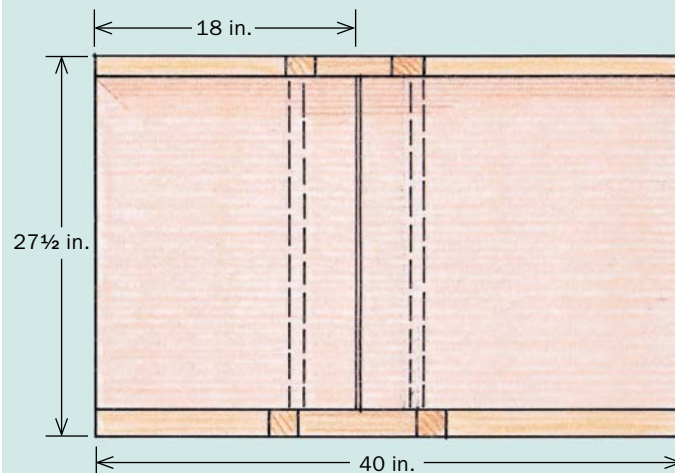
NARROW SLED HANDLES MOST TASKS

The advantage of this sled is its compact size. At 13 in. between the front and rear fences and 48 in. wide, it is light and convenient for everyday use. The space between the fences is narrow to minimize bulk and weight while still offering enough room for most solid stock. There is extra length on the right to support longer pieces like table legs and shelves.

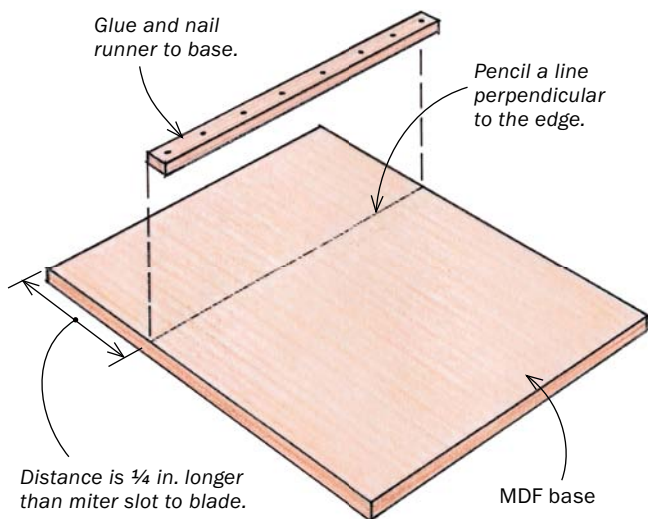


FOR SHEET GOODS, A DEEPER VERSION

To handle sheet goods for cabinet projects, you need a sled that will handle a 24-in.-wide piece of plywood. Most home woodworkers will use this sled far less than the one shown at right, but they'll need one eventually.



Make the base in halves



Mill the runners. Start by cutting the pieces oversize to relieve internal stresses that might cause the wood to move. Then trim them to final dimension. Orient the grain as shown so that most of the swelling or shrinking will be vertical and will not affect the runner's fit in the slot.



Glue the runner in place. Turner uses an MDF template clamped to the sled's base (above) to help locate the runner and ensure it is straight. While pulling the runner against the MDF template, Turner secures it with 18-gauge nails (right).



Trim each base for a perfect fit. With the runner in the miter slot, cut away the excess MDF. The resulting edge is a perfect zero-clearance fit against the saw's blade.

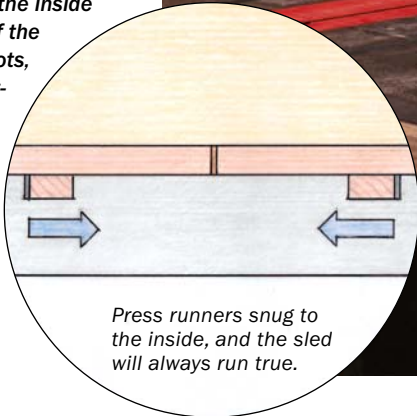
TIP

If you want to save the time spent on milling hardwood runners for a precise fit, you can buy a set of longer-lasting aluminum ones from Kreg. They are pre-drilled and come with nylon adjustment screws for a perfect fit in the miter slots. A 30-in. bar that can be halved to make the smaller sled is \$24 at [amazon.com](https://www.amazon.com). Attach the bars using the procedure for the hardwood runners, but substitute cyanoacrylate glue with accelerator for the yellow glue, and use screws with a centering bit instead of nails.



Add the front fence

Lightly clamp the base together. When gluing the front fence in place, a long bar clamp keeps the halves aligned. It also holds the runners snug against the inside edges of the miter slots, eliminating any slop.



two shown on p. 43. You might even add one with a wider slot for dados and bevel cuts. I'll build the smaller sled here, the one you'll use 90% of the time. Let's get started.

Build the base from two pieces

For the sled's two-part base, I favor 1/2-in. MDF for its flat surfaces and consistent thickness. MDF also takes a finish well, which lets wax work effectively as a lubricant on the sled's bottom.

For the runners, I suggest either maple or white oak, milled with the end grain running vertically to minimize the effect of seasonal swelling and shrinking. Mill the pieces slightly oversize, wait 24 hours, and then trim them to final dimension. Their final thickness should be less than the depth of the miter slots to leave room for debris in the bottom of the slots. Trim each runner to precise width for its slot and then mark them for right and left—the slots may vary slightly in width.

Attach the runners—With the runners prepared, it is easy to attach and align them.

Measure the distance from the slot to the blade on each side of the blade, and then mount each runner with yellow glue so that each half of the base overhangs the sawblade path by at least 1/4 in. I use a piece of MDF as a template to help locate the runner and to brace against to keep the runner straight. While the glue is still wet, secure the runners with a nail gun, or clamps.

When the glue dries, it's time to trim each sled half for a precise fit around the blade. For each piece, place the runner in the slot and use the saw to cut away the excess 1/4 in. The inside edge of each panel now



Screws hold the fence. With the front fence glued down, Turner drives a series of screws into pre-drilled holes to lock it in place. Its squareness is not critical.

How to align the rear fence perfectly

The sled's rear fence must be perfectly perpendicular to the blade to ensure square crosscuts. A glued-down fence provides lasting accuracy, but you must get it right before the glue sets. Here's how:

1 GET IT CLOSE
Position the fence as square as possible to the blade and mark its location.

2 GLUE, SCREW, AND NAIL
Apply glue and set the fence back in place. Drive a screw from under the left end to act as a pivot, then add one nail at the other end.

3 TEST AND ADJUST
Make test cuts in wide stock and move the fence accordingly with a tap or two.

matches the exact path of the sawblade, one on the right and one on the left.

Attach the front fence and square the rear one

Use an accurate combination square to mark lines perpendicular to the sawcut edge for the front fence. Some 8/4 hard maple, carefully milled, is a good choice for the front and rear fences because it is hard and stable, and its light color reflects light well, making knife lines and other marks easier to see. To reduce weight but add stiffness, add a piece about 8 in. long to the center of the front fence where the blade comes through. The main section of the fence is about 3 in. tall; the added piece is 2 in. tall. To attach the fence, apply glue, pop in some nails to hold it in place, and then add screws for a better glue joint. It's only there to hold the halves together, so it doesn't matter if it is not exactly square to the blade.

Carefully prepare the stock for the rear fence. It has a built-up section similar to the front fence, but its surfaces must be flat, square, and parallel to one another. Milling in stages will relieve any internal stresses, so glue on the extra piece and then mill the fence over-size, letting it rest a few days before taking it down to final dimension. The front and rear fences don't have to be the same thickness; I used what I had on hand. Just be sure the front fence is at least 1 in. thick and the rear fence at least 1½ in. thick.

With the partially assembled sled on the saw, place the head of a combination square against the sawblade and use the rule to mark a line square to the blade where you will position the rear fence. Place the fence on this mark and pencil a line along the fence's entire length.

Now comes the most important part: attaching the rear fence dead-square to the sawblade path so that

1 ALIGN AND MARK



Square it. Hold the combination square against a front and rear tooth and align the fence with the square's blade (above). Pencil a line on the base along the edge of the fence so you can keep track of its location (right).



2 SECURE THE FENCE



Apply glue and one screw. The fence will pivot on this screw while you adjust it to its final position.



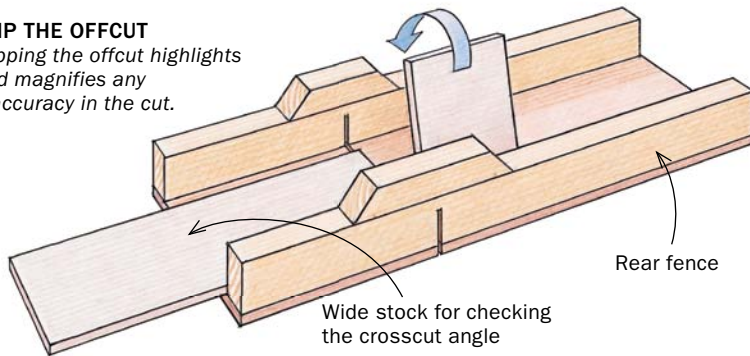
Nail the other end. The nail will flex just enough to allow subtle adjustments to the fence's position, but will otherwise hold the fence in place.

3

FINE-TUNE IT WHILE THE GLUE IS WET

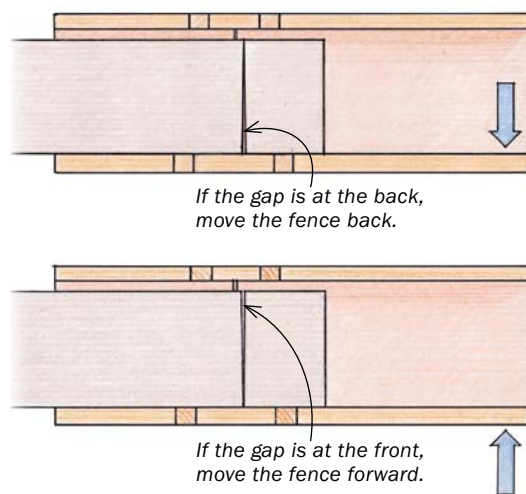
FLIP THE OFFCUT

Flipping the offcut highlights and magnifies any inaccuracy in the cut.



THE GAP DIRECTS THE ADJUSTMENT

Work quickly before the glue tacks up and tap the fence to adjust for square.



Butt the pieces together. A gap indicates that the fence is slightly out of square.



A tap closes the gap. First mark the base with a pencil line to help show the fence's movement. A new test cut shows no space between the workpiece and offcut (right).



Put the glue-up in clamps. Then, after the glue dries, drive a series of screws from underneath to complete the assembly.

Make a test cut. Right away, make a crosscut in wide stock to test whether the rear fence is square.

you will be able to crosscut at exactly 90° for years to come. Here's how you do it.

Get everything ready. Rip a piece of MDF about 12 in. wide and 3 ft. long with straight, parallel edges. This will be used to test the accuracy of the rear fence. Now drill from the bottom for a screw on one end of the sled base, and be ready to shoot a single 18-ga. nail from the bottom on the opposite end. Apply the glue, set the fence on the line carefully, then drive the screw and nail. Now crosscut the MDF test piece.

Pull the sled back and slide the two freshly cut edges together, keeping them snug against the fence. If the rear fence is straight, the edges should meet tightly, with no gap. Now, flip over one of the test pieces, keeping the same just-cut edges together, and put the two halves together against the rear fence. If there still is no gap, the cut is perfectly square. If there is a gap, this gap is double the amount the fence is out of square. With a steel hammer, tap the nailed end of the fence to correct, and test cut again, using the same procedure. Assuming that you've screwed down the left side of the fence and nailed the right, if the gap is at the fence, tap the right-hand end of the fence back. If the gap is away from the fence, tap the right side forward. With ordinary yellow woodworking glue, you should have about 3 to 5 minutes of open time to test and adjust, so work quickly.

When you have it dialed in just right, put clamps on to secure the rear fence to the sled base until the glue dries. Then go back and install screws from the bottom to be sure. You now have a sled that will cut dead square, every time, for many years to come. □

Alan Turner is an attorney, woodworker, and owner of Philadelphia Furniture Workshop, a woodworking school.