Simple Crosscut Sled

Accuracy and versatility without bells, whistles, or lots of measuring and fussing

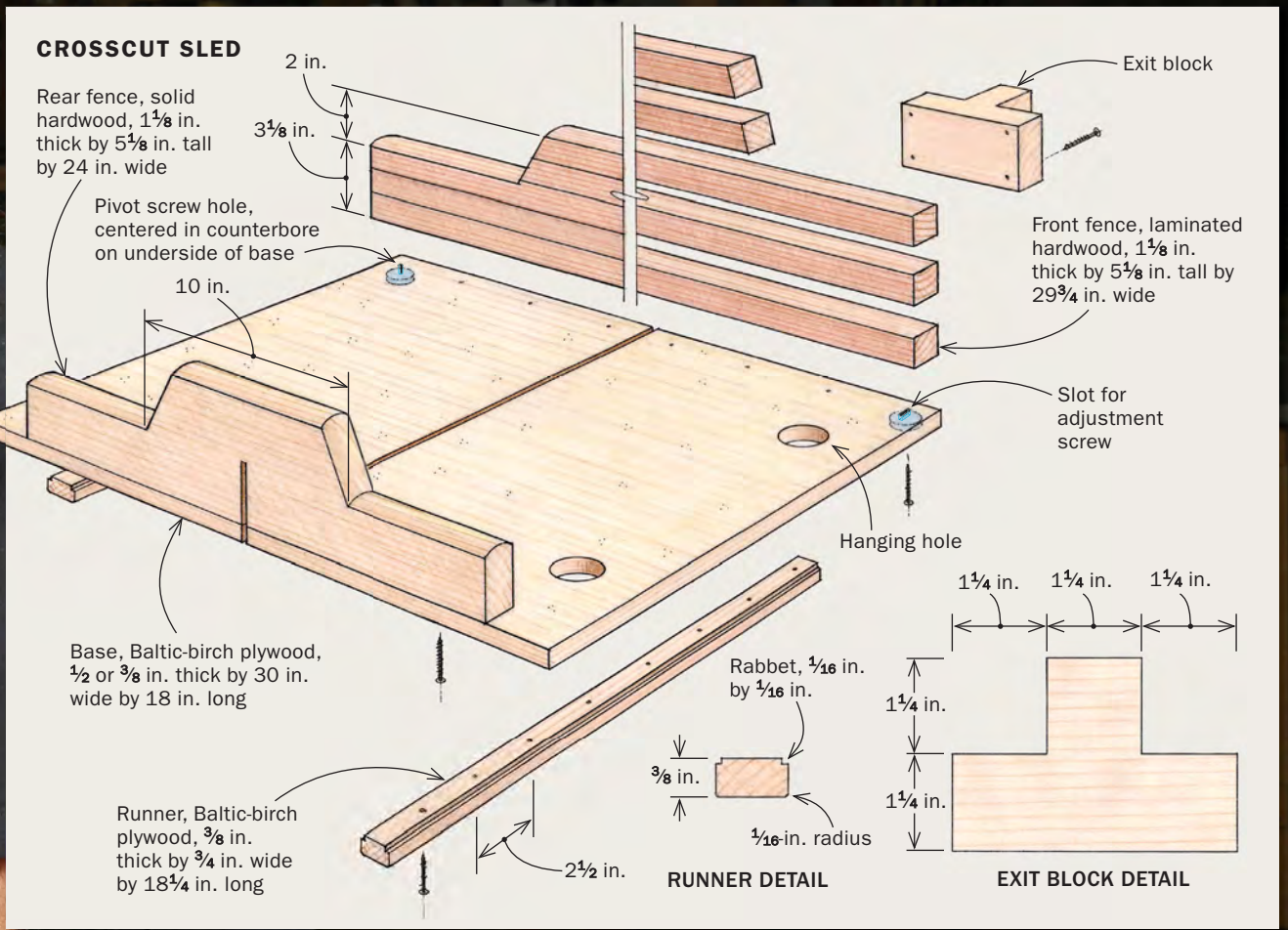
BY BOB VAN DYKE

As far as accessories for my table saw go, I cannot imagine anything more useful and versatile than a well-made and accurate crosscut sled. Call it what you will, a boat, a carriage jig, or a sled, it is well worth taking a few hours to make at least one for your saw.

Most people think of a sled for cutting large parts like plywood panels, and they make the sleds correspondingly massive. Considering that most of the work you typically cut is within the 4-in. to 8-in. width, isn't it more sensible to make a small, lightweight sled that is easy to put on and take off the saw while giving you enough capacity so you can crosscut almost all the pieces you typically handle? In my school, each saw has its dedicated small sled with a 12-in. crosscut capacity, and then a larger sled that accommodates up to 20 in. One saw even has a sled that cuts 36 in. easily.

A well-made sled should be simple, relatively lightweight, dead accurate, and built to stay that way.

Photos: Anissa Kapsales; drawings: Vince Babak



I have seen countless sled articles over the years, so why am I subjecting the world to yet another? Because this method is so simple and straightforward, and there are no gadgets or adjustments waiting to go out of square.

Start with the fences

A perfectly straight and stable front fence and strong, easy-gliding runners make this sled superb at what it does. Because riftsawn mahogany is extremely dimensionally stable and is lightweight, I make the front fence from flatsawn mahogany scraps, ripped into strips and laminated to form a riftsawn board.

After allowing the glue on the front fence to dry, joint one face flat and straight and plane the other face parallel. Set this piece on edge to rest overnight. The next day re-flatten one face, plane it to 1⅛ in. thick, and joint the bottom edge perfectly square to the face. Cut it to length and mark the centerpoint on the bottom edge of both faces.

Make a simple fence for the back of the sled from 6/4 or 8/4 poplar. The back fence doesn't need to span the entire width of the base.

Move on to the runners

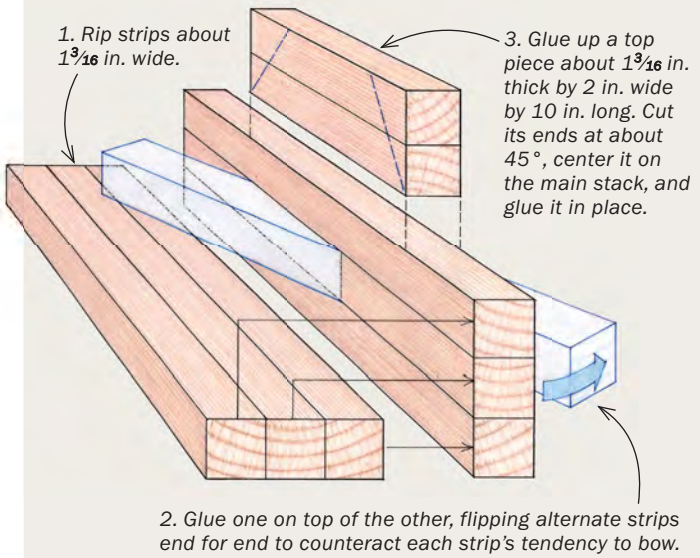
Most people make the runners from hardwood, but I have had much more success using ⅜-in. or ½-in Baltic-birch plywood. I rip strips

A FENCE AND STABLE RUNNERS ARE THE KEY

The heart of the sled is a perfectly straight and stable front fence and tough, well-fitting runners.

MAKE A RIFTSAWN FENCE

For an extremely stable fence, rip flatsawn mahogany into strips and stack-laminate the strips.



Comfort first. *The fence's top piece keeps your hands away from the blade, supports work held vertically, and, once you've cut through the fence, it holds the two halves together. Round over the top edges to remove sharp edges and make the fence more comfortable to use.*

to a strong 13/16 in. wide and then, holding two strips together side by side, run them on edge through the planer. A carbide-knife planer holds up better when planing plywood. Run the strips at the edge of the bed if you are using high-speed steel knives. Plane both edges until the strip fits the miter-gauge slot with absolutely no slop and is just loose enough to slide freely. It is vital to get the fit just right, and edge-planing will yield a more consistent width than the table saw.

At the router table, run a 1/16-in. radius roundover bit along the edges of one face of the strip and cut a small rabbet along the edges of the opposite face. The

Mill the runners. *After ripping strips of plywood to near final width, run them on edge through the planer to get them to exact size. Cut a small rabbet along the edges of the face that will meet the bottom of the sled, and gently round over the edges of the other face.*

Prep the runners for screws. *At the drill press, add a counterbore with a Forstner bit, and finish with a 1/8-in. bit as a pilot hole as well as a clearance hole.*

rabbeted face will go against the bottom of the sled, making it easier to trim the width of the runner should it end up feeling too tight in the miter-gauge slot.

Counterbore and drill clearance holes to receive the round-head screws that will, along with glue and brads, attach the runners. Don't use flathead screws; their funnel-shaped head will distort the width of the runner slightly as they are tightened.

Base plate holds it all together and creates accuracy

Baltic-birch plywood, ⅜ in. or ½ in. thick, makes a robust base. It is important to use plywood that is reasonably flat. The size is up to you, but I typically make my everyday fence with a base about 30 in. wide by 18 in. deep. Mark the center of the base (left to right) and lay out the position of the fences on the bottom face of the base.

The key to dialing in the accuracy of the sled lies in installing a pivot screw through the base and into one end of the front fence, and a second screw through a slotted hole in the opposite end of the fence. This allows the fence to be adjusted for square before being attached permanently.

Drill a shallow counterbore on the bottom face of the base about 1 in. from each

STALWART BASE

Baltic-birch plywood, ⅜ in. or ½ in. thick, makes a robust base. It is important to use plywood that is reasonably flat.

Hanger holes first and foremost. *The first thing Van Dyke does to the base is to drill hanger holes. If you take care of the sled, hanging it on the wall when not in use rather than leaning it against a wall or machine or on the floor, it will last decades and stay in square.*

Pivot screw on one end of base. *In a shallow recess made with a Forstner bit in the underside of the base, drill a clearance hole right through. This will accept a screw going into the bottom edge of the fence, allowing the fence to pivot on the base.*

Slotted hole on other end of the base. *In a second recess at the other end of the base, cut a slot by drilling three through-holes and chiseling out the waste between them. This will allow you to adjust the fence for square before permanently securing it to the base.*

INSTALLING THE RUNNERS

Accurate placement and secure attachment starts with a pin nailer and ends with screws.

Use the table-saw fence as a stop. *Set the fence to half the width of the base. Place the runners in the miter slots with spacers underneath to bump them up slightly. With the base pushed against the fence, use a square or a squared block to mark the location of the runners on the base. Carry those lines across the top of the base to guide the pin nailer in the next steps.*

end of the fence layout and centered on the fence thickness. The depth should be just enough that the head of the screw does not protrude. Using the dimple left by the Forstner bit as a guide, drill a 3/16-in. hole centered in each counterbore. Using the same drill bit and a small chisel or a round rasp, elongate one of the holes—1/4 in. to 3/8 in. long is more than enough.

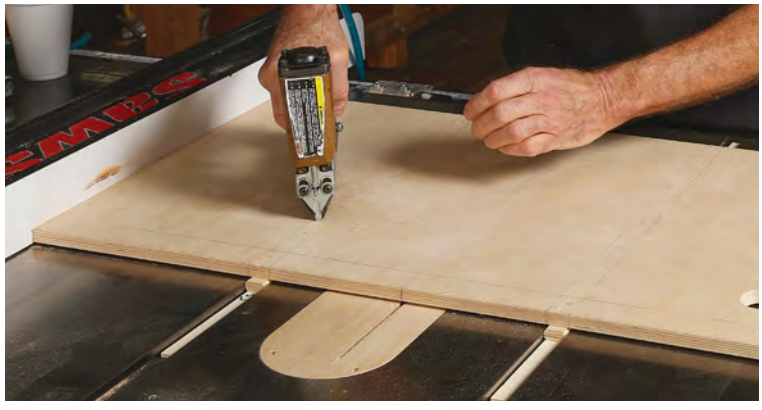
Drill about a dozen evenly spaced countersunk holes through the base for the flathead screws that will mount the fence to the base permanently (keep these at least 1 in. to either side of the blade line).

No-measure method for the runners

Set the table-saw fence to half the width of the base (in my case 15 in.). Before laying the runners in the miter-gauge slots (rabbet side up), lay a strip of 1/8-in. plywood in each slot. These will hold the runners slightly above the height of the saw table, allowing you to really exert downward pressure from the base onto the runners when gluing them together. Put the base on top of the runners and push the end of the base against the fence. The blade should be at the middle of the base.

Mark the location of the runners on the top face of the base. At the same time,

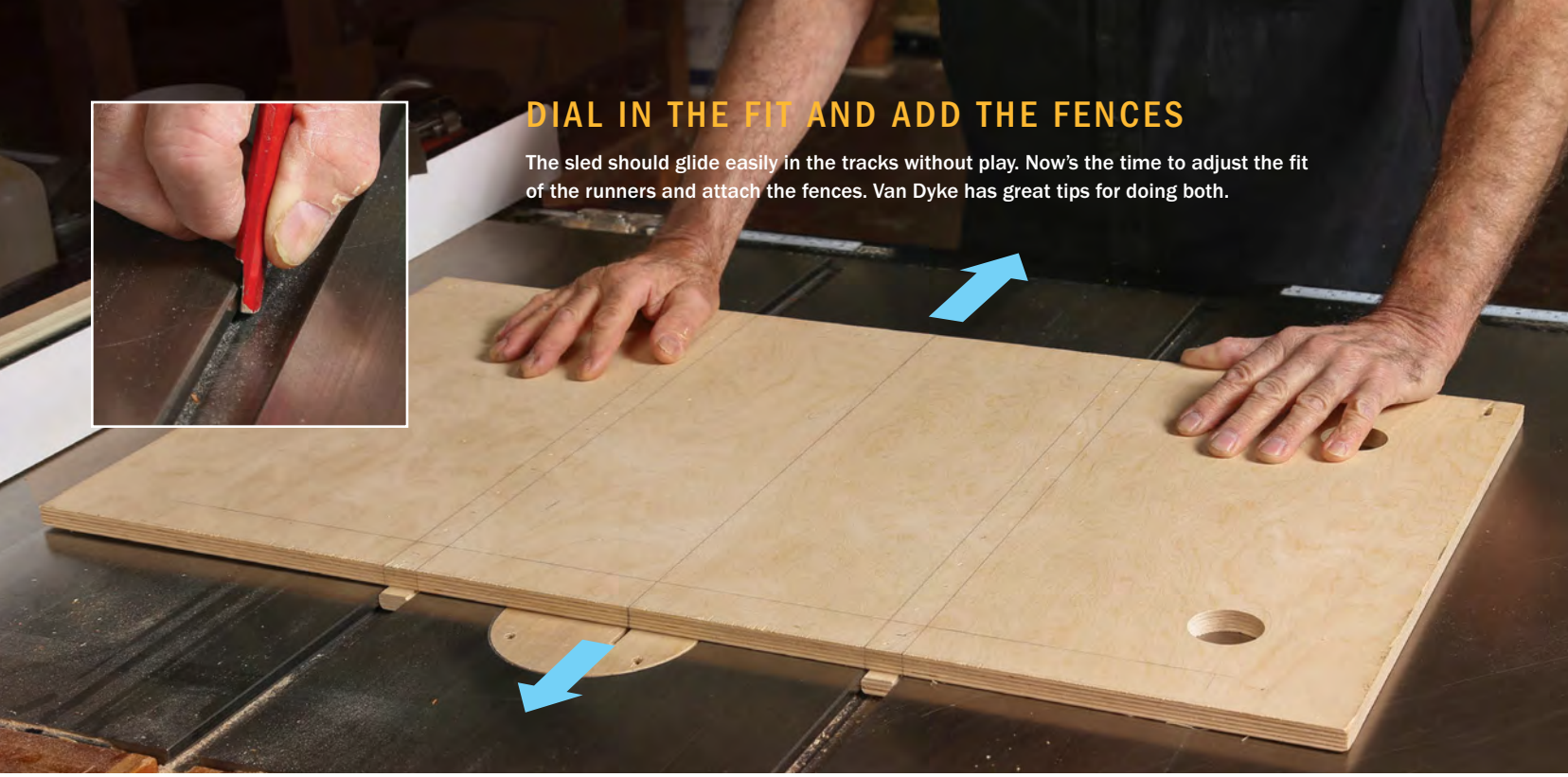
Glue the runners to the base. *With the runners in the tracks (rabbet side up), apply glue. Set the base back in place on the runners. Apply body pressure and let the glue set a bit before pin-nailing the base to the runners. To avoid pinning through the screw holes, pencil them in beforehand. Leave the assembly in place until the glue is fully dry.*



Permanently attach the runners. *When the glue has dried, take the assembly out, turn it upside down, and screw the runners in place with round-head screws.*

DIAL IN THE FIT AND ADD THE FENCES

The sled should glide easily in the tracks without play. Now's the time to adjust the fit of the runners and attach the fences. Van Dyke has great tips for doing both.



Gliding is the goal. *If the runners are tight, you can find the high spots by modifying a contractor's pencil and rubbing graphite against the slot. Push the sled into the tracks and move it back and forth.*

Pencil marks the spots. *The pencil will rub off on any tight spots. Skim these with a shoulder plane or a 120-grit sanding stick.*

mark the location of the screw holes. These marks will be your guide when you pin-nail the base to the runners. Remove the base temporarily, run a bead of glue down the upper face of the runners, and place the base back on them, making sure the end of the base is up against the fence. Let the glue set for 10 minutes and then shoot a number of ⅝-in. brads through the base into the runners. Allow the glue to set completely before removing the assembly from the saw. Then turn the base over and drill centered pilot holes through the counterbored clearance holes you made earlier. Use a Vix bit for these pilot holes; an off-center pilot hole can distort the runner enough that it won't slide freely.

Rear fence. *Clamp the back fence in place, predrill and countersink holes, and then screw the fence in place.*

Temporarily screw the front fence in place. *Clamp the fence to the base. From the underside, first drive the pivot screw, then drive a screw into the center of the slotted hole on the other end.*

Cut a kerf. *With the front fence held in place with just its two end screws, cut a kerf through the rear fence and the base, stopping just short of the front fence. If you nick the fence, don't worry.*

Check the runners. If they are a little tight, apply some paste wax or paraffin to them. If that does not make things slide easily, adjust the tight spots with a shoulder plane or a 120-grit sanding stick.

Install the fences

Install the rear fence with countersunk screws through the base. To begin attaching and squaring the front fence, drive two #8 washer-head screws up through the base, one at each end of the fence. One goes through the pilot hole made earlier and is the pivot screw; the other goes through the middle of the slot made earlier and is the adjustment screw. The fence should be roughly square to the end of the base, but it will be fine-tuned later.

Raise the table-saw blade and cut through the rear fence and the base. Stop before the blade touches the front fence. Then fit a spacer into the kerf you just made. I use a piece of ⅛-in. plywood 1 in. wide by 10 in. long. Add blue tape on

Add a spacer, and square up the fence. *Wedge a spacer into the kerf; it should be a snug fit. Place an architect's triangle against the spacer and tap the fence until it is perfectly square to the spacer. Verify that your triangle is actually square.*

Secure the fence temporarily. *Once you tap the fence square to the spacer, add a clamp, tighten the screw in the slotted hole, and drive a temporary screw an inch or two away to stabilize things.*

Make a test cut. *Using a scrap piece of ¼-in. MDF with one edge jointed straight, make a test cut, again stopping before you cut through the front fence. Check the cut with a square you know is truly square. When the cut is square, clamp the fence to the base again so it will not shift and drive the permanent screws all along its length.*

Attach a wooden exit guard. *Don't neglect this simple safety device. When you use the sled, the blade will come right through the front fence. Your hand should never be near there, but just in case it is, this block will protect you from the blade.*

one side until it fits snugly in the kerf.

Using an architect's triangle, adjust the fence exactly square to the kerf spacer. Slide the sled off the saw just far enough to clamp the fence to the base and tighten the adjustment screw. Drive a countersunk screw through the base into the fence to stabilize it while testing for square.

Testing for square

I use a 10-in.-wide piece of ¼-in. MDF with one edge jointed straight to test for square. Hold the jointed edge firmly against the fence and cut about ⅛ in. off one end. Use a good quality 12-in. square to test the squareness of the cut. The goal is to see no light between the test piece and the square. If you nail it the first time, congratulations! Take the sled off the saw, add a few clamps, and screw all the permanent screws into the countersunk holes. Add the wooden exit guard.

If you did not get a square cut the first time, loosen the adjustment screw, remove the second screw you put in to stabilize the fence, and try again. When the sled is cutting square, clamp the fence in place and drive in the permanent screws.

I have found this method of squaring to be more than adequate; it is exactly how I test furniture parts that I cut with the sled. But if you feel the square test is not enough, you could try a simple three-cut method I learned from Tom McLaughlin a few years ago. For a link to Tom's video, go to FineWoodworking.com/308.

Treat the sled like the precision tool it is and you will get years of accurate cuts with it. □

Bob Van Dyke runs The Connecticut Valley School of Woodworking in Manchester, Conn.

Elongating the fence adds space for stops. *You can make an auxiliary plywood fence to give you extra length for stops when you're cutting longer stock. Clamp it in place, and screw it securely to the front fence.*

Online Extra

Van Dyke's stops add versatility to the sled. You can easily make repeat cuts, handle small parts safely, and create accurate joinery. To see all the stops and how to make and use them, go to FineWoodworking.com/308.