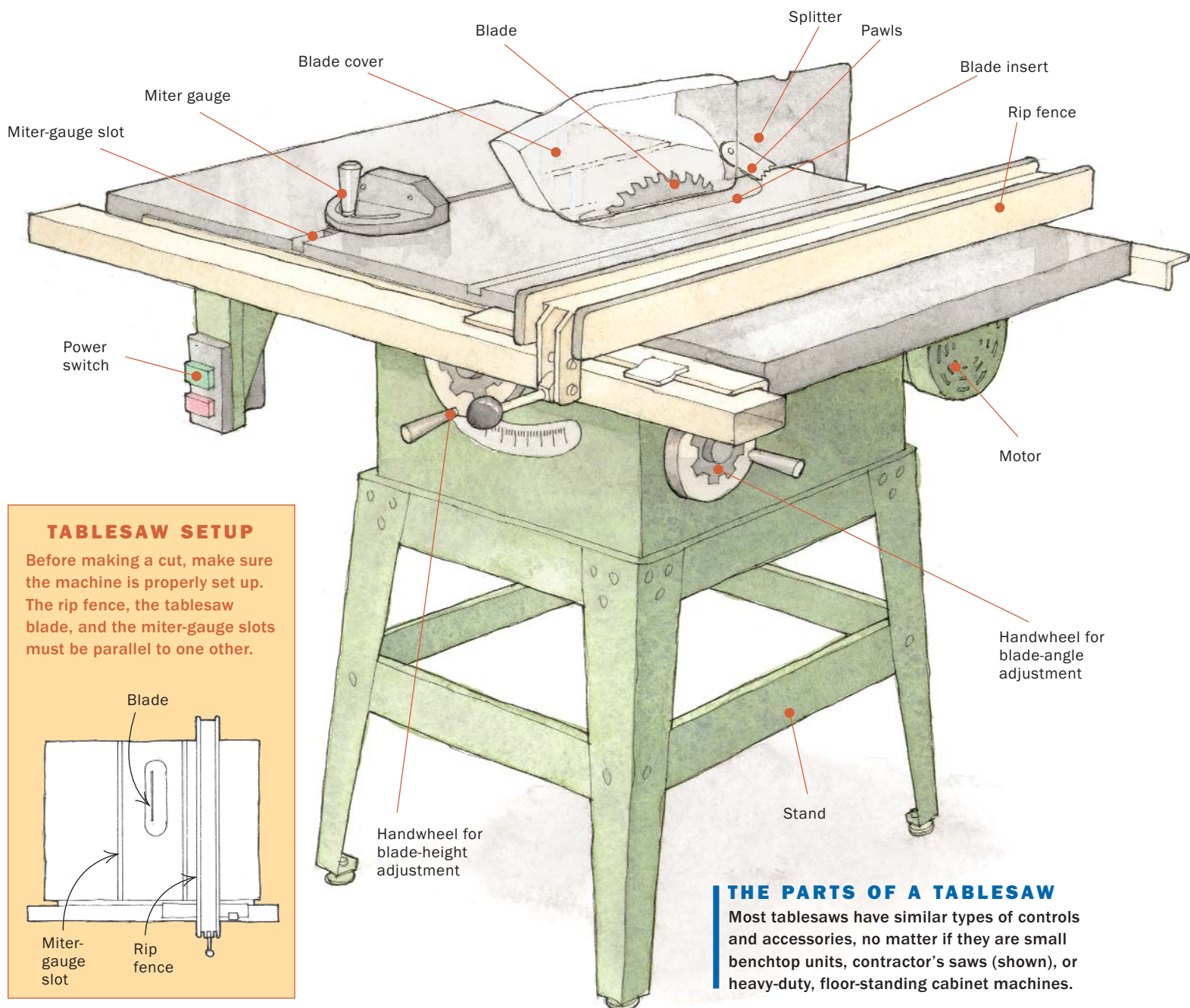


A Tablesaw Primer

Ripping and Crosscutting

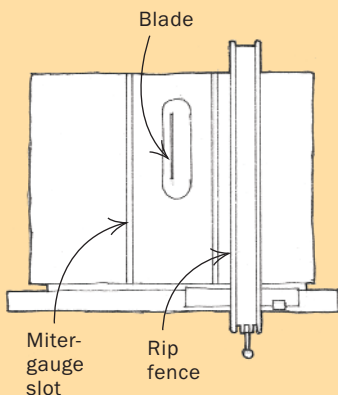
The proper techniques help ensure accurate and safe cuts

BY KELLY MEHLER



TABLESAW SETUP

Before making a cut, make sure the machine is properly set up. The rip fence, the table saw blade, and the miter-gauge slots must be parallel to one other.



THE PARTS OF A TABLESAW

Most table saws have similar types of controls and accessories, no matter if they are small benchtop units, contractor's saws (shown), or heavy-duty, floor-standing cabinet machines.

With its flat, circular spinning blade doing the hard work, the tablesaw can make all sorts of cuts, among them grooves, dados, rabbets, and a variety of other wood-working joints. However, the tablesaw most commonly is called upon to do just two basic tasks: make wide boards narrower, a process called ripping, and make long boards shorter, a process called crosscutting. When ripping, the rip fence is used to guide the stock. Crosscutting is done with the aid of the miter gauge.

Because so much tablesaw run time is spent ripping and crosscutting, it's especially important to have good work habits while making these two fundamental cuts. After all, when used properly, a good tablesaw can produce remarkably smooth and accurate cuts safely and with little effort.

The saw must be set up properly for best results

A tablesaw won't cut easily, accurately, or safely if it's improperly set up. So before making any rip- or crosscut, make sure the saw is in good working order and properly adjusted. Also, the table of the saw should be flat, with any deviation limited to no more than 0.010 in. The same goes for any extension tables. And when assembled, those tables all should be flush.

Then, too, the sawblade should be sharp. A sharp combination blade can produce good cuts when ripping and crosscutting.

Use the blade cover, splitter, and pawls—The saw must have a blade guard that includes a cover, splitter, and pawls. Granted, such a guard system isn't a foolproof device, but it does improve safety. The cover itself acts as a barrier, helping to block any misdirected hand or finger from contacting the spinning blade. That's a big plus. Also, the splitter and pawls minimize the chance of kickback or ejection.

Kickback occurs most often during a ripcut, usually when the workpiece twists away from the rip fence just enough to contact the teeth on the back portion of the blade; those are the teeth just coming up through the insert after traveling under the saw. When that happens, those back teeth can grab the workpiece, lifting it and instantly launching it, usually right back at the operator. But a splitter behind the blade helps prevent the workpiece from contacting the back teeth, so kickback is less likely to happen.

Ejection occurs most often when ripping a relatively narrow piece, just after the sawblade cuts the piece free. At that point, if the piece should tip, twist, or bend, it can become pinched between the blade and the rip fence. And if the piece is not supported by a push block or pawls, the force of the spinning blade can send the piece straight back at warp speed. Indeed, I've seen photos of a 3/4-in.-square by 4-ft.-long piece that shot back 6 ft. and fully penetrated a sheet of 3/4-in.-thick plywood.

Flat, square stock is a must

A warped board or a board with uneven edges can be difficult to control when ripping or crosscutting. Such boards are likely to rock during a cut. When that happens, the wood binds against the side of the blade. At best, you end up with a rough edge that isn't square. At worst, you get kickback or ejection (see the bottom left drawings on p. 58).

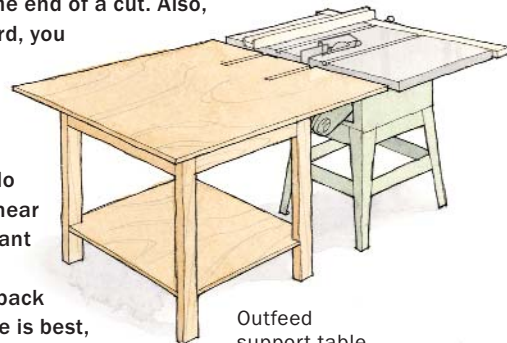
Before you make any tablesaw cuts, check that the face surfaces of the board are flat. Also, any edge that will meet the rip fence or

Essential accessories

Tablesaws come from the factory with everything needed to start making ripcuts and crosscuts. But a few important accessories improve both the safety and accuracy of the saw.

OUTFEED SUPPORT

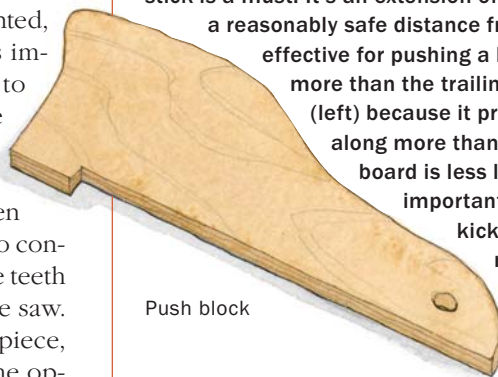
There's not much distance between the back of the blade and the back of the saw table. As a result, boards can end up falling off the back of the saw at the end of a cut. Also, when ripping a long board, you must bear down hard to prevent it from tipping off the back at the end of the cut. That's not something you want to do with your hand passing near the blade. So it's important to have some sort of auxiliary support at the back of the saw. A sturdy table is best, but even a support stand will help.



Outfeed support table

PUSH BLOCKS

When making a ripcut 8 in. wide or less, a push block or push stick is a must. It's an extension of your hand, so your fingers stay a reasonably safe distance from the blade. A push stick is effective for pushing a board, but it holds down little more than the trailing end. I prefer a push block (left) because it provides downward pressure along more than just the end. That way, the board is less likely to flutter and, more important, is less susceptible to kickback. It takes just a few

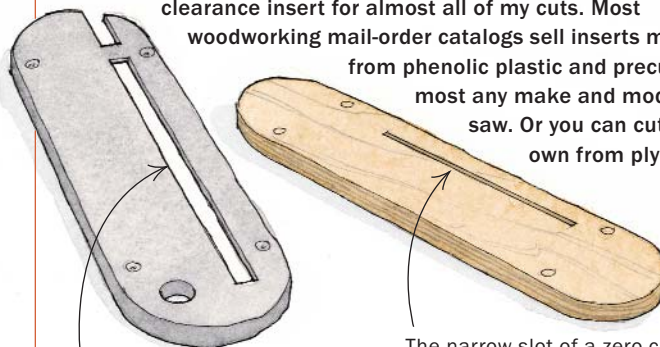


Push block

minutes to make a push block. Use any 3/4-in.- or 1-in.-thick stock and cut it to shape with a bandsaw or sabersaw.

ZERO-CLEARANCE INSERT

When a tablesaw comes from the factory, the blade insert typically has a wide opening. That's fine for bevel cuts or wide ripcuts. But for a narrow ripcut, the trailing end of the piece can drop down through the opening in the insert. As the piece tips, your pushing hand follows it. And you don't want your hand to drop toward a spinning sawblade. If that's not scary enough, you run the risk of kickback, too. To avoid those problems, I use a zero-clearance insert for almost all of my cuts. Most



The wide slot of a factory insert can trap thin stock.

woodworking mail-order catalogs sell inserts made from phenolic plastic and precut to fit most any make and model of saw. Or you can cut your own from plywood.

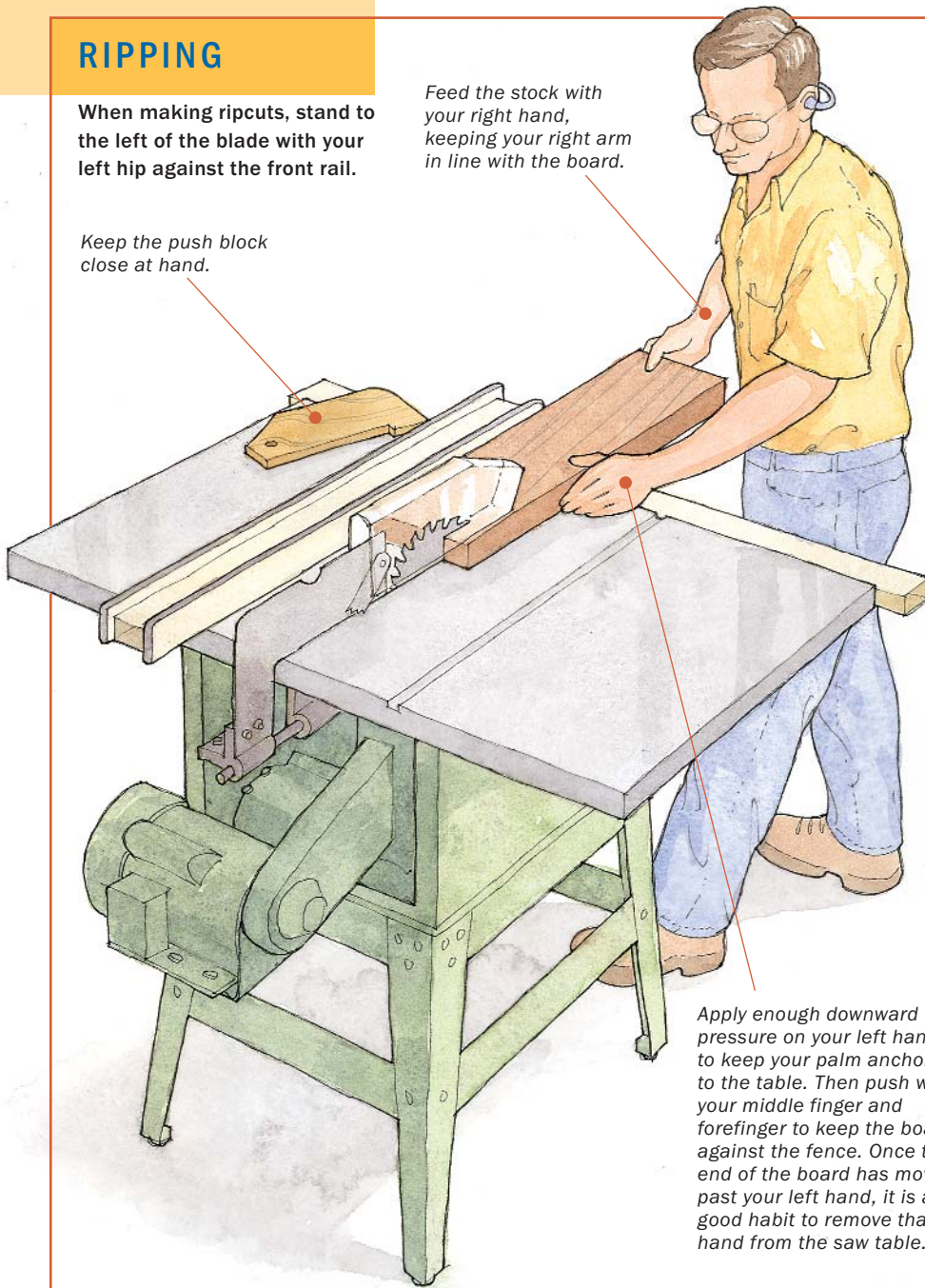
The narrow slot of a zero-clearance insert is created by raising the blade through the insert.

RIPPING

When making ripcuts, stand to the left of the blade with your left hip against the front rail.

Keep the push block close at hand.

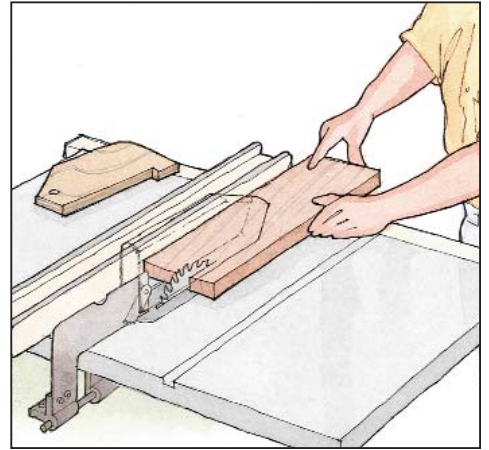
Feed the stock with your right hand, keeping your right arm in line with the board.



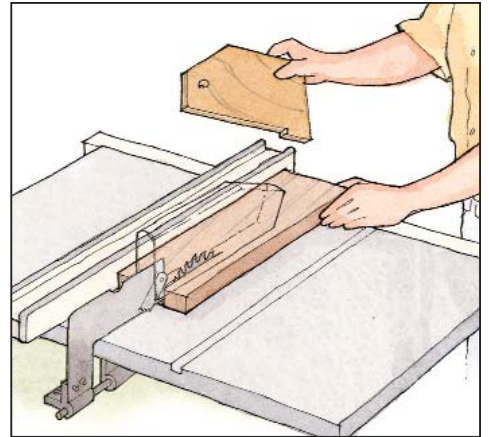
Apply enough downward pressure on your left hand to keep your palm anchored to the table. Then push with your middle finger and forefinger to keep the board against the fence. Once the end of the board has moved past your left hand, it is a good habit to remove that hand from the saw table.

A SIMPLE RIP CUT

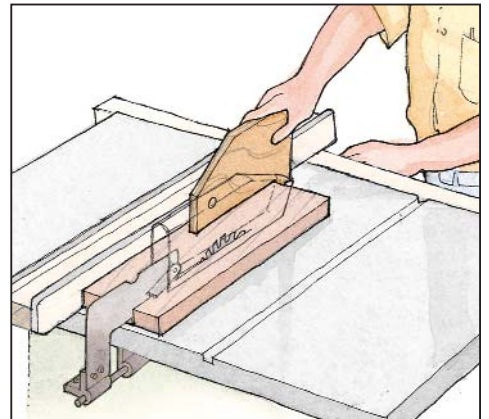
Most tablesaw accidents occur during ripping. By following a few basic techniques, you'll not only get good-quality cuts, but you'll also get them with a better degree of safety.



1. Place the front end of the board on the saw. Then, with the edge of the board against the rip fence, feed the board into the blade at a steady rate. If the motor slows down, slow the feed rate.



2. Once the trailing end of the board reaches the front of the table, use the push block to feed the board.

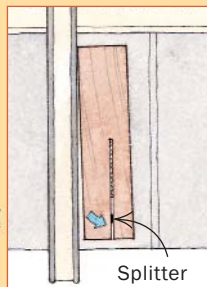
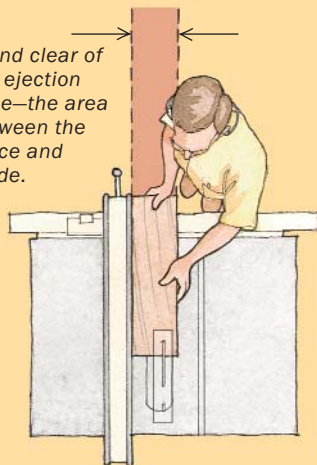


3. Continue pushing the trailing end of the board with the push block until the board is an inch or two past the sawblade.

AVOIDING EJECTION AND KICKBACK

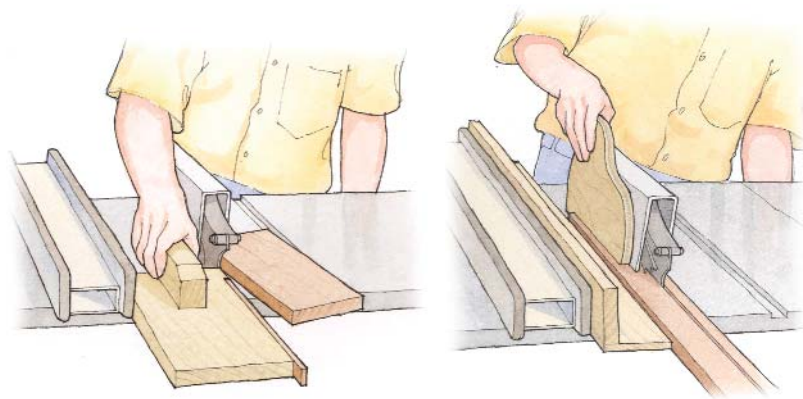
Ejection occurs when a cutoff piece gets pinched between the blade and the rip fence. If the piece isn't supported by a push block or pawls, it can shoot straight back. Kickback occurs when a workpiece twists into the upward-spinning blade teeth. The teeth can launch the piece at your nose in an instant.

Stand clear of the ejection zone—the area between the fence and blade.



With a splitter behind the blade, kickback is less likely to occur because the workpiece can't easily contact the back teeth of the blade.

RIPPING NARROW BOARDS



When ripping parts less than about 1¼ in. wide, use a notched sled, guided by the rip fence, to push the stock through the blade. A handle makes for easier pushing.

A shopmade L-shaped fence mounted to the rip fence creates extra space between the blade cover and the rip fence, making it easier to feed the stock, especially when a tall push block is used.

the miter gauge must be straight. If the flat surface or straight edge is missing, the stock needs to be handplaned or jointed.

How to avoid kickback or ejection while ripping

Smooth ripcuts can become routine if you follow a few basic cutting techniques. Not only will you get smooth ripcuts, but you'll also be able to get them with a better degree of safety. That's important, especially when you consider that most table-saw accidents occur during ripcuts. A safety point: Don't rip a board that is wider than it is long. With the shortest edge of the board bearing against the rip fence, the board easily can twist away from the fence and into the side of the blade, an invitation to kickback.

When you're faced with making a narrow ripcut, typically one that's between 1¼ in. wide and 3 in. wide, the blade cover usually ends up interfering with your right hand as you use the push block to feed the board through the blade. To avoid that problem, use a tall push block, which puts your hand well above the cover as the stock is pushed along.

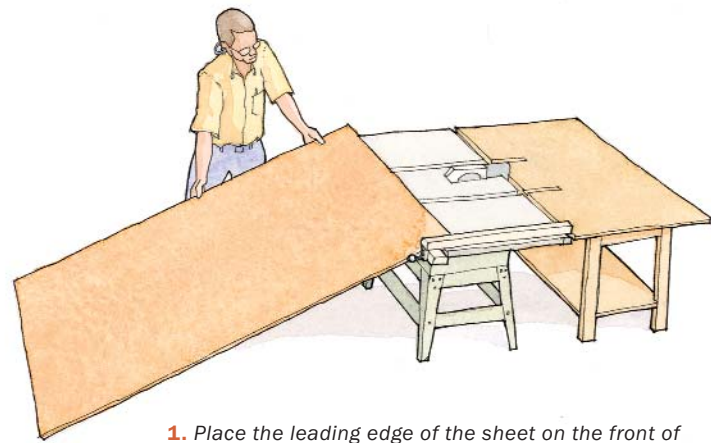
For the narrowest ripcuts, between ½ in. wide and 1¼ in. wide, use a notched sled when the stock is less than about 24 in. long (see the left drawing above). A handle on top helps you push the sled while making sure the edge of the sled stays against the rip fence. To set the width of the cut, simply measure the distance from the sled's inside edge to the sawblade's inside edge. For longer parts that require a narrow ripcut, clamp a short auxiliary fence to the rip fence (see the right drawing above). The short fence allows the stock to slide under the blade cover. However, when the front of the push block reaches the cover, you'll have to stop pushing and go to the back of the saw. The pawls will keep the stock in place. Once at the back, you can complete the final few inches of the cut by pulling the narrow piece through the blade.

Use a firm grip while crosscutting

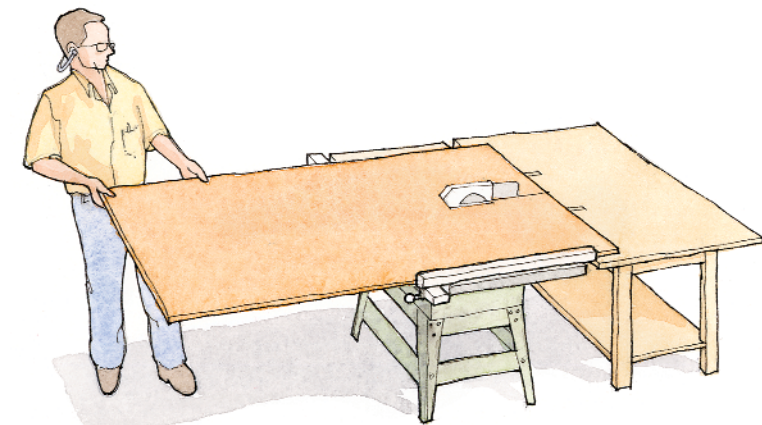
The most common crosscut is made with the miter gauge set at 90° to the miter-gauge slot, resulting in a square cut. However, consis-

RIPPING LARGE PANELS

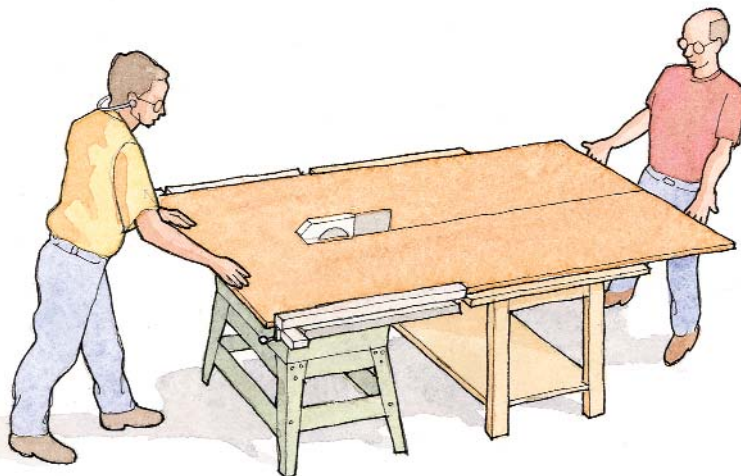
Full-size (4 ft. by 8 ft.) sheets of plywood and other sheet goods are heavy and awkward to handle, which make them a chore to cut. But with a little forethought and practice, the procedure can be reasonably straightforward.



1. Place the leading edge of the sheet on the front of the saw with the back end resting on the floor.



2. Stand at the left corner of the sheet with your body more alongside the left edge than the end. From that position it's easier to hold the edge of the sheet against the rip fence. When making the cut, both arms should be comfortably outstretched with your left arm along the left edge and your right arm on the end.



3. As you feed the sheet and begin to approach the front of the saw, shift your body more to the front of the sheet. Once at the front of the table, assume your normal starting stance to complete the cut. Have a helper support the end of the sheet.

CROSSCUTTING

The starting position for a square crosscut is about the same as the one used for ripping. Stand in front of the miter gauge with your left hip against the front rail.

Use your right hand to push the gauge toward the back of the saw.

Hold the board against the miter-gauge fence with your left hand. For safety, keep fingers at least 6 in. from the blade cover.

The miter gauge works just as well in either of the two miter slots. But because most people are right-handed, the majority of tablesaw users push the miter gauge with their right hand, so the gauge has to go into the left slot.

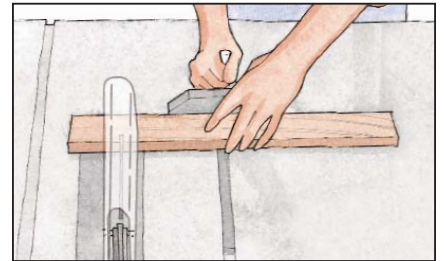
USE AN AUXILIARY FENCE TO CROSSCUT LONG BOARDS

Kerf in fence can assist in aligning cuts.

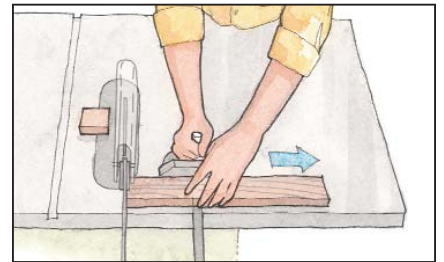
Auxiliary fence

A typical miter-gauge fence is relatively short, so it doesn't offer a lot of support to long boards. An easy solution is to screw a long auxiliary wood fence to the miter-gauge fence. You can make the wood fence to any length, but just be sure it's flat and straight.

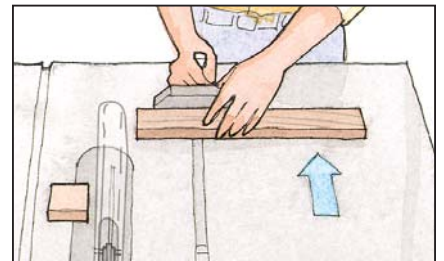
A SIMPLE CROSSCUT



1. Keep the board away from the blade (an inch or two) before starting the saw. Push the miter gauge with your right hand, feeding the board at a steady speed. Stop pushing after the cut, but continue to hold the board against the fence.



2. To avoid having the spinning blade touch the cut edge of the board when the miter gauge is pulled back to the starting position, possibly causing a little extra splintering, it's best to shift the board away from the blade slightly.



3. While holding the board against the fence, pull both the board and the gauge back to the starting position. Then shut off the saw.

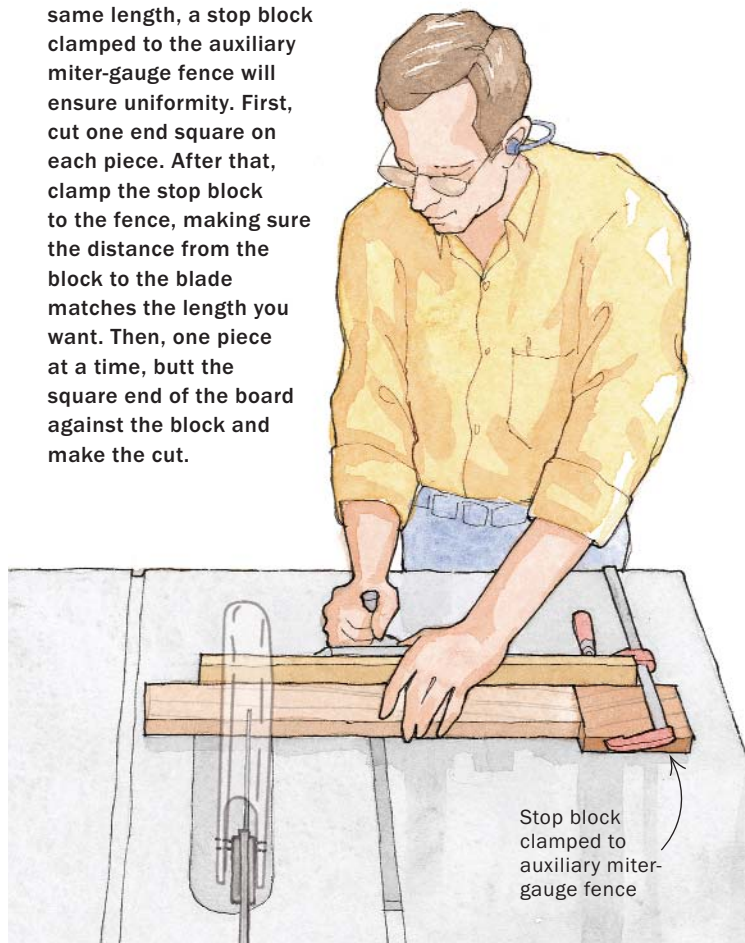
tently smooth, square crosscuts don't happen automatically. You need to follow a few basic procedures.

Position the board on the miter gauge—Place the board on the saw table. Use your left hand to hold the board against the miter-gauge fence and slide the gauge forward with your right hand until the leading edge of the board almost touches the blade. At this point, use one or two hands as needed to align the sawblade with the cut line on the board.

Push the board through the blade—When everything is aligned, use your left hand to hold the board firmly against the miter-gauge fence until the cut is completed. The holding force you apply should be straight back, and your fingers should be at least 6 in. from the blade cover. Slide the board an inch or two away

REPEAT CUTS FOR LONG PARTS

When you're cutting several boards to the same length, a stop block clamped to the auxiliary miter-gauge fence will ensure uniformity. First, cut one end square on each piece. After that, clamp the stop block to the fence, making sure the distance from the block to the blade matches the length you want. Then, one piece at a time, butt the square end of the board against the block and make the cut.



from the blade before starting the saw. Use your right hand to push the gauge toward the back of the saw, and feed the board at a steady speed. Stop pushing once the cut is finished, but continue to hold the board firmly against the miter-gauge fence.

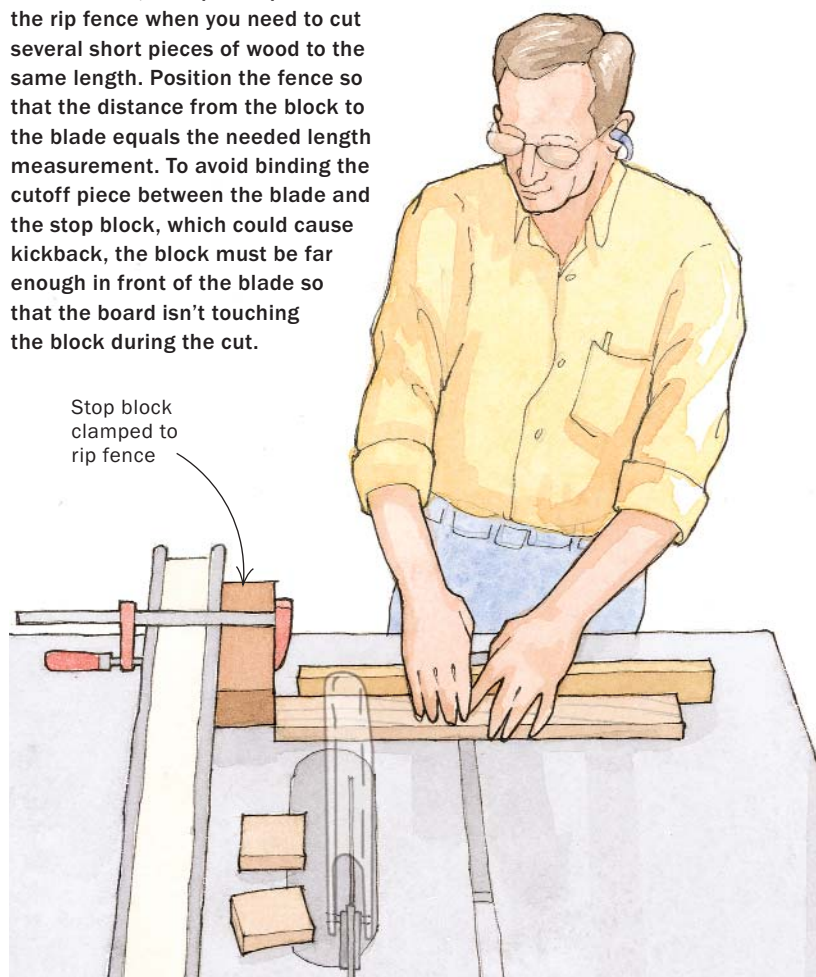
Pull back the board—Once the board has been cut, continue to hold the board firmly against the fence, and pull both the board and the gauge back to the starting position. Once back to the starting point, you can relax your hold on the board and shut off the saw.

Oftentimes, as the board and miter gauge are pulled back, the spinning blade will slightly touch the cut edge of the board and cause a little extra splintering. To avoid the problem—and if the board is small and light enough—I'll use my left hand to shift the board $\frac{1}{8}$ in. to $\frac{1}{4}$ in. away from the blade before pulling it back. Bigger and heavier boards, however, won't move as easily. So if I'm cutting a big board while in splinter-phobic mode, I simply shut off the saw before removing the board and pulling back the gauge.

Add a stop block to the rip fence when cutting several short pieces to the same length—It's not uncommon to need several short pieces of wood, each

REPEAT CUTS FOR SHORT PARTS

To save time, clamp a stop block to the rip fence when you need to cut several short pieces of wood to the same length. Position the fence so that the distance from the block to the blade equals the needed length measurement. To avoid binding the cutoff piece between the blade and the stop block, which could cause kickback, the block must be far enough in front of the blade so that the board isn't touching the block during the cut.



one the same length. When that's the case, I clamp a stop block to the rip fence. Then the fence is positioned so that the distance from the block to the blade equals the length measurement you need. To avoid kickback, the block must be far enough from the blade so that the board isn't touching the block when it starts being cut by the blade.

Add a stop block to the auxiliary miter-gauge fence when cutting longer boards to the same length—Make sure the distance from the block to the blade matches the length you want. First, though, using only the auxiliary fence, cut one end of each board square. Then butt the square end of each board against the block and cut one piece at a time.

Another versatile jig that gets a lot of use in my shop is the crosscut sled (to see the sled in use, go to www.finewoodworking.com/toolsandshops). The sled makes crosscutting even more accurate and safe.

Once you've mastered the basic techniques of ripping and crosscutting, you'll be ready to tackle the other various tasks suitable for the table saw, such as cutting miters, tenons, and tapers. □

Watch it on the Web

To see a video on using a tablesaw crosscut sled, go to www.finewoodworking.com/toolsandshops.

Kelly Mehler is the author of The Table Saw Book (The Taunton Press, 2002).