

Staying Safe on the Tablesaw

Part 1: Ripping and crosscutting

BY MARC ADAMS

Most woodworkers, including me, will answer yes to the following two questions, while looking sheepishly at their penny loafers. Did you ignore the “Using Your Saw” section in the owner’s manual when you got your first tablesaw? Have you experienced kickback?

I have had workpieces kick back a few times in my life. Fortunately, I wasn’t hurt. For others, though, that instant on the tablesaw has been tragic and life-altering.

With hundreds of students passing through my school each year, I’ve developed firm guidelines for safe tablesaw use, regardless of skill level. My first rule is to keep all 13 saws properly set up and maintained. But

1. MAINTAIN CONTROL

Never cut stock freehand. The stock must be controlled at all times, using either a fence or a jig. For this to work, miter slots and fences must be aligned properly. Also, a workpiece must be straight and flat on its control surfaces: at least one face and one edge. Be sure to push it all the way past the blade.

THREE CORE PRINCIPLES

Staying safe begins with these three core concepts. No. 2 is specific to the tablesaw, but the others are critical on any piece of machinery.

2. USE A SPLITTER

Kickback is the primary danger on a tablesaw, and a splitter is the cure. Also called a spreader or riving knife, this thin tab of metal or wood sits right behind the blade. The slot (kerf) made by the blade slides onto the splitter, preventing the board from pivoting onto the teeth at the back of the blade. Without having to steer the board to prevent kickback, you can focus on keeping your hands out of harm’s way.

3. LIMIT YOUR EXPOSURE TO THE BLADE

Keep the blade only about $\frac{1}{4}$ in. higher than the workpiece. Whenever possible, keep the cover attached to the splitter, acting as a physical barrier. Keep your fingers 3 in. away from the cover, or 6 in. away from the exposed blade. For many cuts, this means using push sticks or push pads.

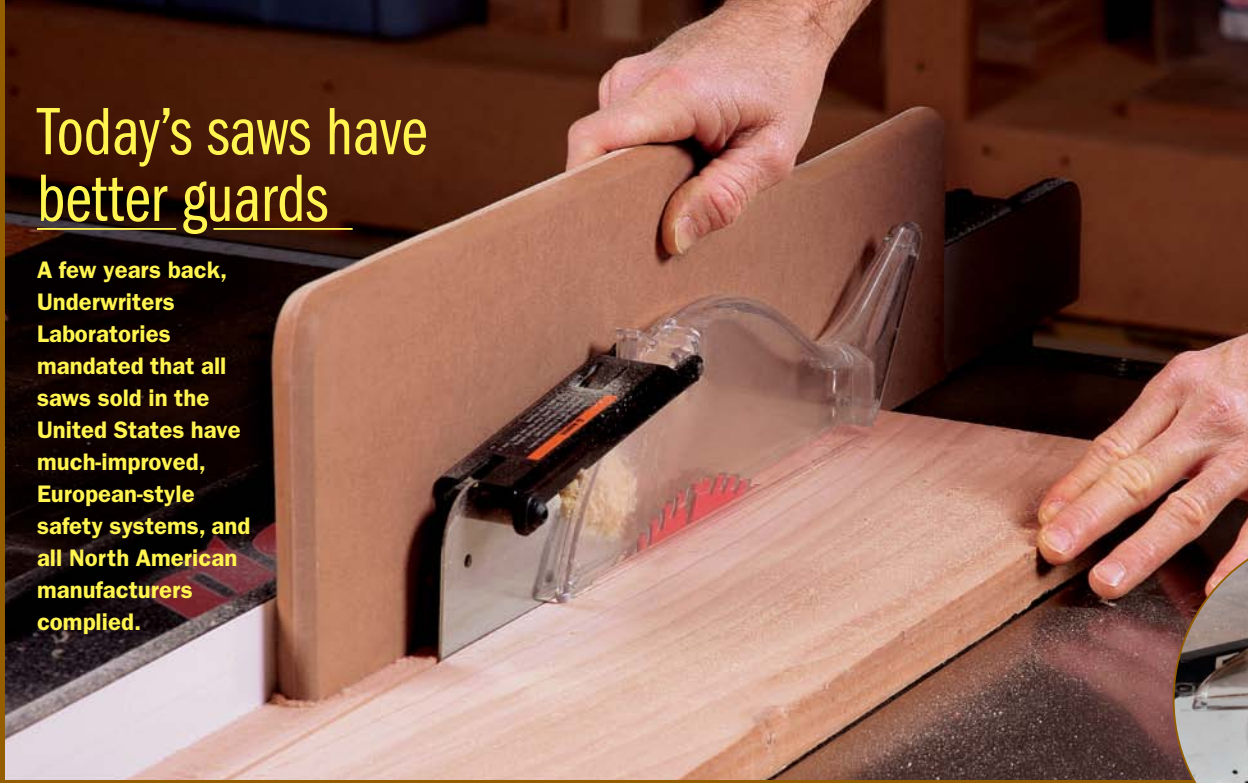


VIDEO WORKSHOP

Watch Adams demonstrate these techniques, plus cut a number of common joints on the tablesaw, in a members-only video at FineWoodworking.com/extras.

Today's saws have better guards

A few years back, Underwriters Laboratories mandated that all saws sold in the United States have much-improved, European-style safety systems, and all North American manufacturers complied.



Better blade covers and splitters. Today's blade covers are narrower, allowing a push stick to pass by more easily. And the riving knife, an improved version of the splitter, moves up and down with the blade, hugging it closely to prevent kickback.



Low-profile option. For very thin rips (far left) and non-through-cuts (near left), the blade cover comes off easily, and you can either adjust the riving knife downward or replace it quickly with a low-profile version (above).

Older saw? You have options

Older splitter systems are inconvenient, and often discarded. But no worries—there are two good ways to replace them.

Buy a better splitter. Available online as an "Anti-Kickback Snap-In Spreader" for about \$150, the Biesemeyer aftermarket splitter was designed for Delta saws but works in many others. You install its holder in the throat of your saw, and then the splitter pops in and out quickly.



Or make a stub splitter. This little tab of wood goes into the saw slot (above left) on a shopmade throat plate (see p. 34 for how to make one), and can be cut short so it works for non-through-cuts too (below left). You'll need to lengthen the saw slot to accommodate it. If it binds in the sawkerf, just sand or plane the sides a bit. Be sure the grain runs vertically for strength.

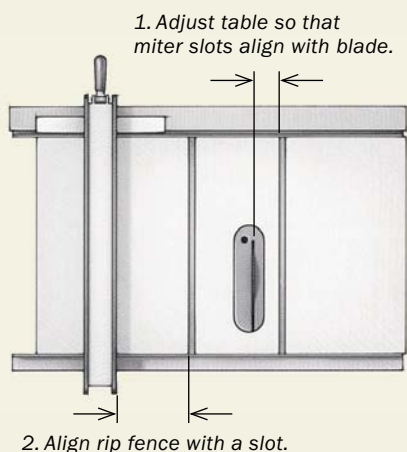
Ripcut basics

Set up for safety

When ripping boards, you need the fence to be parallel to the blade, and you need a few shopmade push sticks on hand.

ALIGN THE SAW IN TWO STEPS

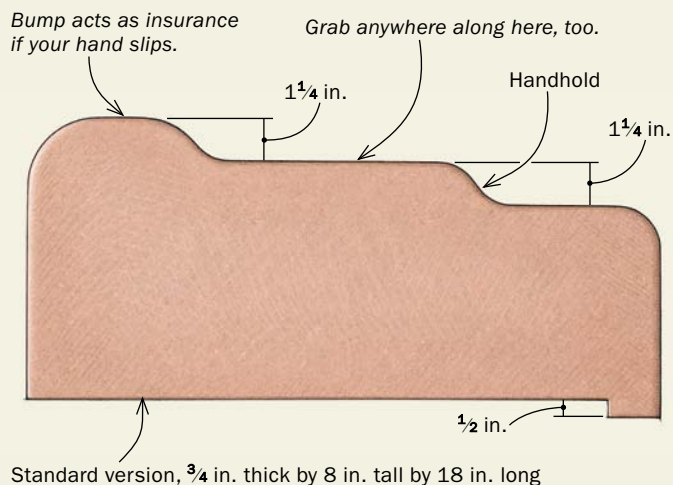
How you adjust the table is different on different saws, but you need the miter slots to be parallel to the blade for safe crosscutting. Then you adjust the rip fence parallel with the slots and you're set for ripping, too.



Rip fence is easy to correct. Use the adjustment screws to align the fence with a miter slot, and it should stay parallel in any position.

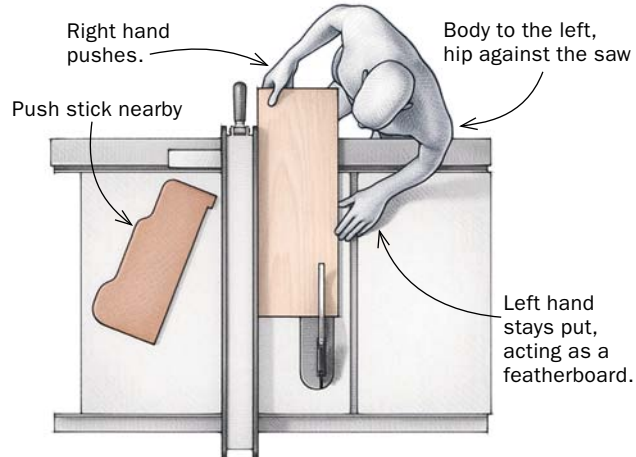
SMART PUSH STICK DESIGN

Adams's push sticks hook over the back of a board, of course, but also extend over the top of it for full control. He makes them in MDF in a number of sizes and thicknesses.



Safe ripping is a 3-step process

GOOD BODY POSITION



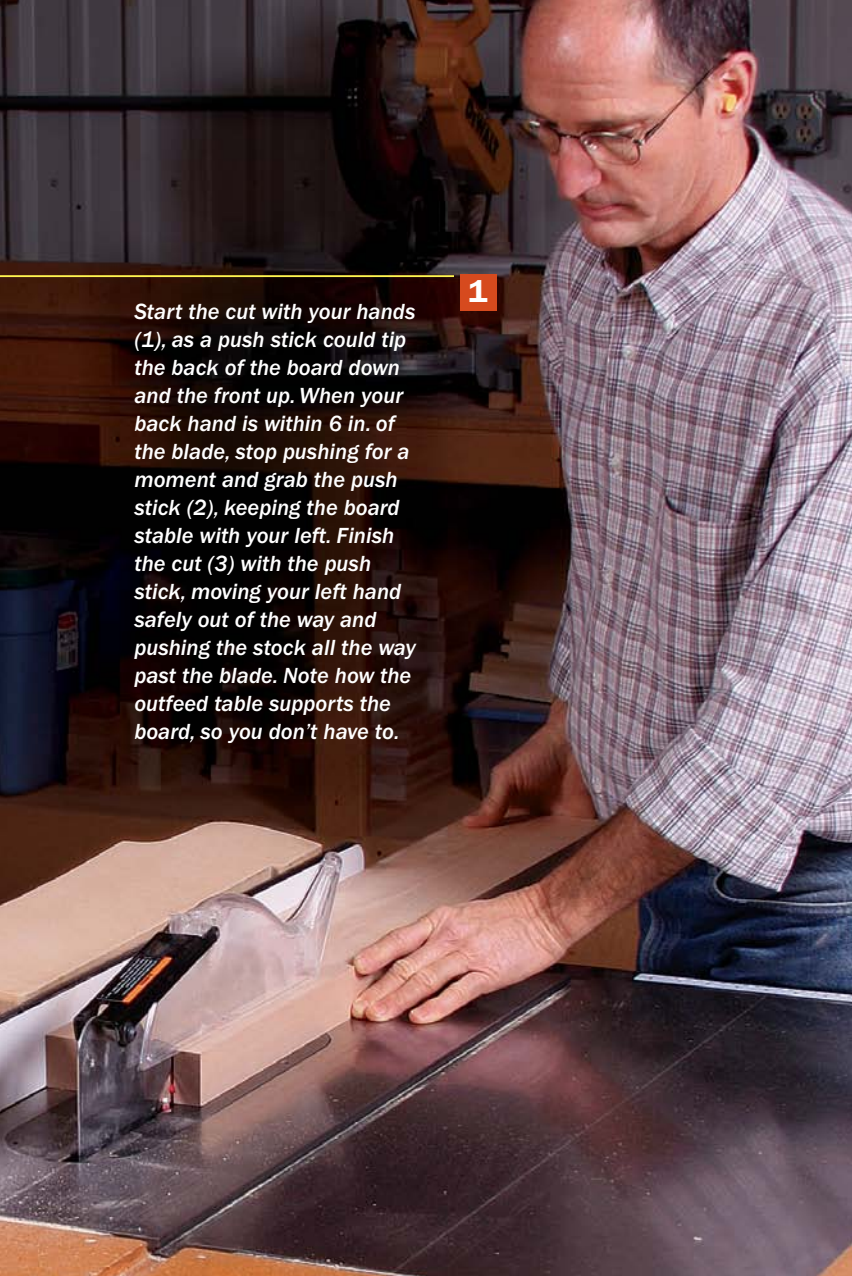
this article focuses on the second part of the equation: a knowledgeable operator. If you understand how the saw works and know the best practices for its use, the chance for a bad accident can be virtually eliminated. Machines don't think, but you can.

Kickback is the main danger

Kickback accounts for the majority of tablesaw accidents. Unfortunately, I encounter many woodworkers who don't understand the cause of kickback, or the cure.

Here's how it happens. The teeth at the front of the blade do the cutting, and they move downward, helping to keep the board safely on the table. But the teeth at the back of the blade are not your friend; they spin in your direction at over 100 mph. During a safe cut, the slot made by the blade brushes past the back teeth without incident. But if the back of the board pivots as you push it, or one of the halves is pinched into the blade somehow, only one of those back teeth needs to grab the workpiece to set kickback in motion. And it happens in milliseconds, as the lifting action converts almost instantly to horizontal force aimed right at you. The

1 Start the cut with your hands (1), as a push stick could tip the back of the board down and the front up. When your back hand is within 6 in. of the blade, stop pushing for a moment and grab the push stick (2), keeping the board stable with your left. Finish the cut (3) with the push stick, moving your left hand safely out of the way and pushing the stock all the way past the blade. Note how the outfeed table supports the board, so you don't have to.



projectile can hurt you, obviously, but it can also pull your hand into the blade. The good news is that kickback is easy to prevent.

Use a splitter whenever possible—Also called a spreader or riving knife, a splitter keeps a board from making contact with the teeth at the back of the blade. Problem solved? Not exactly. The splitter has to be there to do its job, and until recently, most splitters were downright inconvenient and were therefore discarded. North American saws that are more than a few years old will have a crude splitter that extends high above the blade and too far behind it. The main problem is that these splitters have to come off the saw for all non-through-cuts, such as grooves. The big blade covers are just as inconvenient.

This outdated safety equipment is difficult to detach and reinstall, so most of these splitter/blade cover assemblies find a permanent home in a shop cabinet. If you have one of these saws, you still owe it to yourself to use a splitter (see “Older saw? You have options,” p. 31).

A riving knife is a blessing—Fortunately, a few years ago Underwriters Laboratories (UL) proposed that all new

HOW TO HANDLE PLYWOOD

Safe and accurate. Focus on the area where the panel rides the rip fence, but remain aware of your hands, too, keeping them clear of the blade. Again, outfeed support is critical.



Crosscut basics

Set up for safety



MAKE A ZERO-CLEARANCE THROAT INSERT

Crosscuts produce the most tearout at the bottom edge, and a zero-clearance insert will prevent it. It will also keep small offcuts from diving into the throat of the saw.

Simple job. Trace your stock insert plate onto a piece of MDF (above) of the right thickness to fit your saw, and then bandsaw it close, using a sander to work up to the line. On most saws, a 10-in.-dia. blade won't go low enough to let you insert the blank plate, so make a ripcut along the bottom to create clearance (above right). Then install the blank insert, place the rip fence on top of it, and bring the spinning blade up through it (right). Last, extend the slot with a jigsaw (below) or scrollsaw to accommodate your splitter or riving knife. You might also need to use tape or screws underneath to shim the plate level with the table.



MAKE A MITER-GAUGE FENCE

A standard miter gauge needs some help. A long fence will improve control and accuracy, tame tearout on the back edge, and push the offcut safely past the blade.

Smart, safe design. Screw a long piece of MDF to your miter gauge, cut a slot through it, and then attach a wood block (as shown) on the back edge where the blade emerges.



Stick trick. The slots in your outfeed table, designed to accommodate miter gauges and sled runners, are the perfect spot for a simple stick that limits their travel, making sure the blade doesn't pass through the safety block (or box) at the back of the fence.



tablesaws have a riving knife, a more versatile type of splitter borrowed from European tablesaws, and all of the North American tablesaw manufacturers complied.

If you can afford to buy a new saw, you'll find safety much more convenient. The riving knife can stay on for almost every type of cut, and the new blade covers are narrower and come off the saw more easily when they get in the way. Unfortunately, today's riving knives still include "anti-kickback fingers," which are basically useless and often in the way, so I remove them.

One gray area is getting your riving knife or splitter to fit through a shopmade throat plate. On my saw, I just extend the blade slot (using my scrollsaw) to allow the low-profile riving knife to

Accurate crosscutting

Zero clearance is your friend. After cutting one end of the stock square, mark the length at the other end, and use the slot in your miter-gauge fence to set up the final cut.

fit through. But the taller knife won't work because it is longer, and I'd have to make the slot so long it would weaken the insert plate. So I use my zero-clearance throat plate for crosscutting only, where tearout is the biggest problem and where I need to use my low-profile knife anyway to fit through the fence on my miter gauge and crosscut sled. For ripping, I use the standard throat plate. That lets me use the full-height riving knife and blade cover.

A few more tips

Even if a board is already jointed straight and flat, it might not stay that way as internal tensions are released during a cut. If a board jams during the cut, use one hand to turn off the saw, wait for the blade to stop, and finish the cut on the bandsaw. Also, be aware that a short board is more likely to pivot onto the back of the blade. If you are not sure about a workpiece, rip it on the bandsaw. And on some smaller, portable saws, the rip fence won't stay parallel to the blade when you move it, which can cause binding, so you'll need to check it each time.

One no-no when crosscutting is using the rip fence as a stop. This traps the offcut, and the friction against the fence can cause it to pivot and bind, causing kickback. For the rest of my safety rules, see the photos and illustrations throughout this article.

Follow these basic safety guidelines and you'll turn the most dangerous machine in the shop into a trusted friend. In Part 2, I'll show you how to get even more value from this versatile tool, demonstrating a variety of fast, accurate joinery cuts. □

Marc Adams runs one of the largest woodworking schools in North America. Go to MarcAdams.com for more information.

www.finewoodworking.com



Set the stop. The long MDF auxiliary fence lets you set up a stop at the far end for cutting a series of workpieces to the same length.



CROSSCUT SLED IS BEST

For the most accurate crosscuts of all, even on large panels, nothing beats a crosscut sled. To learn how to build one, check out FineWoodworking.com/extras for a free plan.

Perfect support. With a big, stable bed, and two runners in the miter slots, a crosscut sled cuts big workpieces with unmatched accuracy. Again, you can clamp stops to the fence. For longer workpieces, clamp a hook-type stop above the workpiece (see above).

