BY DAVE HOLBROOK

Shop Saw Basics

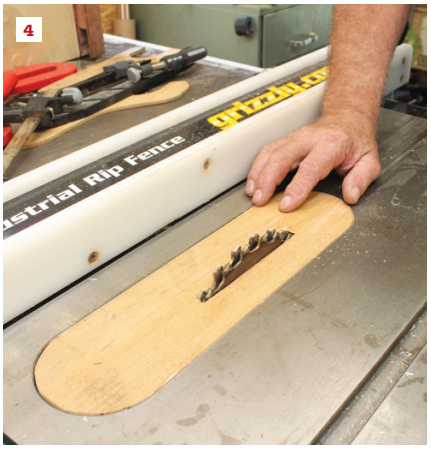
Despite the practicality of a jobsite table saw, there is no related task that I wouldn't rather perform on a cabinet-style table saw. Its solid mass (500-plus pounds is typical), along with a 3- to 5-horsepower, 220-volt motor, helps absorb vibration and deliver the smooth, stable, and precise power and performance for which these machines are prized. While my now-discontinued Grizzly GO690 is several thousand dollars from being a top-of-the-line cabinet saw, it is nonetheless an accurate and reliable machine at the center of my 222-square-foot, home-based shop. Its lack of portability, however, tends to keep it anchored in the shop. So whenever practical, I take the table-saw work home.

Prep. The cast iron saw top measures a typical 27 by 40 inches, and with a 13-inch extension table, it provides a 29 1/2-inch rip capacity to the right of the blade. (Greater rip capacity is always an option where space allows.) My workbench serves as the outfeed table, set on casters and pinned to the saw on its own mobile base. A hefty T-style fence glides almost effortlessly across the surface and locks firmly in place with a cam-style lever. To keep things, including workpieces, sliding smoothly, I periodically apply paste wax to the saw top, fence faces, and various jigs used to make specific cuts. In theory, the wax also helps control rust, though I'm constantly scrubbing little red sweat spots away.

Dust control. Cutting produces prodigious piles of sawdust, which can fill a cabinet saw interior in short order, gumming up the gears and trunnion that raise and tilt your blade. It also means that a lot of that dust is going right down your windpipe, harming you as well. When cutting, I run a dust collector, which is easily automated with a plug-in switch. In addition, I keep an eye on the cabinet interior and periodically blast it clean using pressurized air and a vacuum.

Photos by Tim Healey

An application of ordinary paste wax minimizes surface friction and provides moderate rust protection to the cast iron saw top **(1)**. Here, a hold-down clamped to the fence ensures a consistent depth of cut, with a fence board preventing lateral movement **(2)**. A small steel ruler is more legible than a tape, whose hook partly obscures increments below the 1/2-inch mark **(3)**.



A custom zero-clearance throat plate adds critical full support under small and narrow workpieces, which might otherwise jam dangerously in the gap. Here, a 1/4-inch dado stack is raised through its dedicated plate **(4)**. A switch key locks out unwanted saw activation when the author is setting up or changing blades **(5)**. A digital angle indicator ensures the accuracy of bevel cuts **(6)**.

JIGS AND TECHNIQUES

Let's look at a few jigs and techniques that impose the necessary control for precision cutting—provided that your saw top, blade, and fence are adjusted to factory specification, a basic must. Note that my saw does not have its blade guard or riving knife installed. This is a personal decision and certainly not a recommendation. Caveat aside, all techniques demonstrated in this article show how to securely and safely control a workpiece throughout the cut.

Throat plate. A standard throat plate has a relatively wide gap around the blade to provide clearance for tilting, so I replace it with a custom-made zero-clearance plate to support the workpiece when I'm cutting narrow rips. To make the plate, I use the standard plate as a pattern on 1/2-inch MDO or other smooth-faced plywood. I cut the new plate out on a bandsaw or handheld jigsaw and sand the edges so it fits snugly but not tightly in the throat. Make several while you're at it; you'll use them. Shim the plate (I use small screws driven into the underside) as needed to ensure the new plate lies flush with the tabletop. This is important, as stock can otherwise jam in a minor recess during cutting.

With the blade fully retracted, insert the plate and turn on the saw. Using a block of wood to hold the plate down, raise the blade through the plate to the approximate desired height, and you're good to go. You can use the same approach for beveled cuts as well as dados any time you need full support around the blade. To complete cuts, you may need to push the stock fully beyond the blade with a sacrificial piece rather than a push stick.

Turn the saw off immediately; since both hands are typically engaged up top, I like the ability to shut the saw off with a nudge of my thigh. I've also developed the habit of dropping the blade after the final cut, just to be safe. A lockout key is another feature I use when my hands are in the throat, since it prevents the saw from being turned on accidentally.

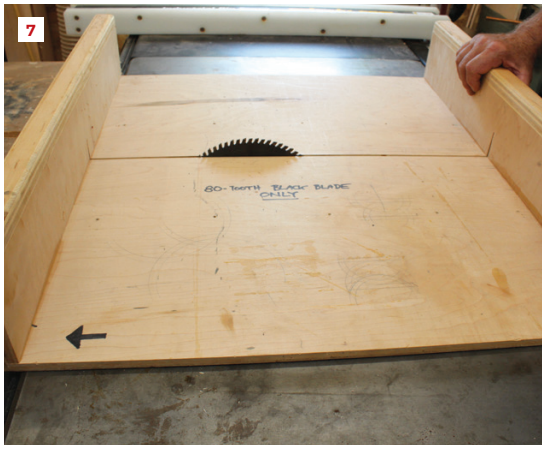
Hold-downs. Many joints, including rabbets and dado ploughs, call for controlling the depth of cut. Simply pressing the stock down and against the fence by hand is no guarantee against minor lifting over the blade's attack, or drifting from the fence, resulting in an inaccurate kerf. To limit this action, I employ hold-downs and feather boards.

Here's how I set up the cut: First, I set the cut distance between the blade and the fence, then drop the blade below the surface. Next, I place the workpiece against the fence and lay the narrow edge of a straight piece of lumber on top of it. I use a hold-down that isn't much taller than the fence so that I can clamp the two firmly together to prevent the piece from lifting off the table during cutting. I turn on the saw, raise the blade gradually, and establish my depth of cut on a test piece. To prevent possible movement, I tighten the knob in the center of the handwheel used to raise the blade. To prevent lateral drift, I use a feather board against my workpiece.

Thin slices. A hold-down is also useful when I'm cutting very thin wood strips. If thin strips are not secured, the blade can shatter rather than cut them. To prevent that, I raise the blade fully into the underside of the fence-mounted hold-down. Thus, the workpiece is fully captured against unwanted movement.

Perfect 90 degrees. On most saws, the angle indicator is not to be trusted for accuracy. Obviously, for true square cuts, the blade must be perfectly perpendicular to the table. There's a positive stop in the tilt mechanism that must be adjusted if the stop doesn't deliver a true 90 degrees. Sometimes a little sawdust buildup interferes and must be removed. I periodically check the alignment with a trusted manual square. Set its vertical edge directly against the blade body, between the teeth that, being wider, would otherwise hold it off.

Bevel cuts. For trustworthy angle settings, I use a $30 Wixey digital angle gauge that attaches magnetically to the blade. After



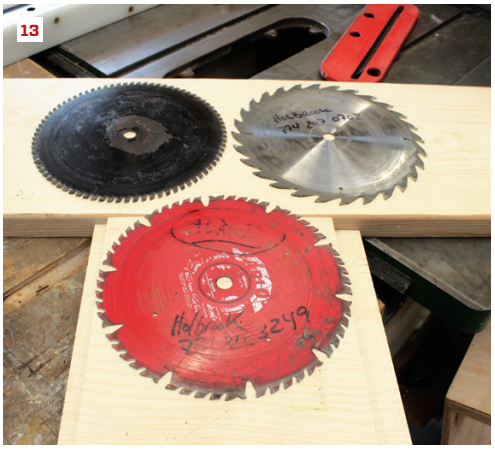
This crosscut sled uses both miter slots, left and right of the blade. To avoid distorting the kerf, the sled is best always used with the same saw blade **(7)**. Accurate cuts are as simple as lining up the tick mark with the sled's kerf **(8)**. The saw's miter slots are extended onto the outfeed table a fixed distance to prevent excess travel **(9)**.

With an angle aligned to the sled's kerf, the author affixes a temporary fence for identical repeat cutting **(10)**. In this repeat-cut setup, a fall-off block clamped to the fence greatly reduces the chance of post-cut jams between the fence and blade. The desired cut is measured between the sled kerf and block **(11)**. Otherwise dicey cuts are performed safely and finger-free on the sled **(12)**.

first ensuring the blade is truly square to the table, you then press the calibrate button to zero the gauge. Now tilt the blade to the desired readout.

Crosscutting by sled. Table saws come equipped with a miter gauge, some better than others, including sophisticated after-market units that really exploit its usefulness. Equipped with an auxiliary scrap-wood fence, you can use the standard gauge to make repeat cuts against a fixed stop, box-joint cuts, variable angle cuts, and a raft of other cuts. I use mine, but not as often as I turn to my sled for crosscuts. I won't waste space here on sled design; you can find a slew of design choices online. They all do pretty much the same thing, which is provide excellent control over otherwise slippery cuts. A sled can straddle the blade, as shown in the photos above, using both miter slots as runners, or work from one side of the blade only, as in bevel and dado cutting. Either way, by riding the workpiece on the sled, friction between it and the tabletop is eliminated and the cut follows the precise track of the miter slot.

The sled shown here is wide enough to accommodate crosscutting standard 24-inch-wide cabinet panels, ensuring truly square corners. To allow the sled's back rail to travel fully to mid-blade and no further, I've extended the miter grooves a limited distance out onto my worktable. The blade can thus project through the back rail at the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Use the right blade for the job: Dedicated crosscut (black), ripping (silver), and combination (red) blades are each designed for optimal perfomance in specific applications **(13)**. Here, ripping a scrap of spruce with a sharp combination blade produces scorch marks on the lumber. A dedicated ripping blade's tooth configuration eliminates the friction responsible for the burn **(14)**.


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For this test-piece tenon, the author first adjusts for depth of cut against the layout line **(15)**. To safely cut a tenon while preventing unwanted movement, clamp the workpiece to a simple tenoning jig **(16)**. After readjusting the blade height, complete secondary shoulder cuts directly against the fence. To guard against violent waste-piece ejection, use a push stick to drive it past the blade **(17)**.

end of a cut, a potentially dangerous condition that smart designs address with a small box enclosure (which I should add to mine).

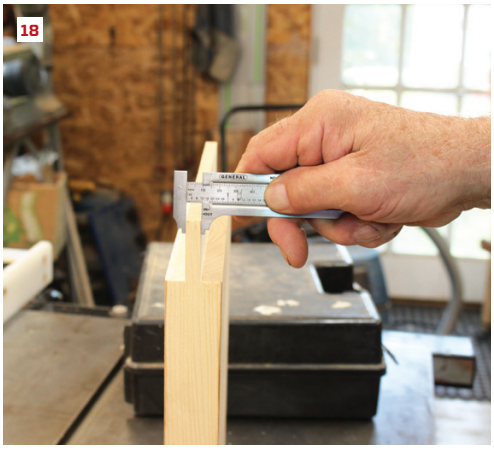
Once you add a sled to your saw, its potential reveals itself with every use. The saw kerf provides flawless alignment between your tick mark and actual cut, if you use the original saw blade every time you use the sled. Different blades make different kerfs, distorting the original track. Despite writing a note-to-self on the sled in the photos, I've been lazy and used it without switching to the design blade. Although nothing's lost in function, the penalty is a little slowdown to alignment.

You can tack or clamp a stop to the bed or back rail of the sled to cut repeat lengths and angles. The fence can also be used with the sled for repeat cutoffs, provided you first clamp a fall-off block to it to eliminate the possibility of a seize-up between the blade and the fence beyond the cut.

Controlling a small piece is a snap, too, with the sled fully supporting it throughout the cut.

Rip blade. I've seen other carpenters smile at my rip blade, because its relatively few, rough-looking teeth appear cartoonish to the uninitiated. But if you feel undue resistance and see smoke pouring from the cut and attendant burn marks on your piece, either your blade is dull, or you're ripping with a dedicated crosscut or combo blade. This is generally true for solid lumber, less so for plywood. When I'm ripping solid lumber, I install a rip blade. The ease with which it passes through the lumber and the cleanness of the cut are all the persuasion I need.

Tenoning. There's more than one way to accurately cut a tenon in the end grain of a board. Handheld on a tablesaw is likely the most dangerous method. Don't do it. Instead, either buy a dedicated tenoning jig or make your own. Again, slick online designs abound. Given their simplicity, I'm inclined to make essentially disposable jigs. In the photos, a box that fits over my fence supports an upright



A caliper provides a quick and accurate check on tenon thickness **(18)**. Using the caliper, the author adjusts dado thickness to match the tenon, adding washer-like proprietary thin metal shims between blades and chippers as needed **(19)**.

To avoid interference and inaccuracy, adjust the throat plate to be flush with the surrounding saw table **(20)**. Set to depth, the dado blade cuts a wide kerf, sized to snugly fit the tenon **(21)**. As a hedge against miscalculation, the tenon can first be run long, then trimmed to the precise depth of the slot. This joint is ready for glue **(22)**.

panel against which the demo workpiece is clamped, rigidly supported through the cut. The box and fence are treated with paste wax for smooth operation. After defining and cutting both sides of the tenon, I lower the blade as needed and make the secondary shoulder cuts directly against the fence.

Stack dado. A dado blade is an adjusting thickness blade that is useful for making grooves and interlocking joints. There are at least two basic dado blade designs, stack and wobble. I bought a Freud stack set long ago, and it's what I am most familiar with. Matching the stack to the desired cut often involves trial and error, though a caliper is helpful.

Plywood thickness is notoriously nominal; 3/4-inch ply is typically about 1/32 inch thinner than that. My stack provides buildup in 1/8-inch increments, with one 1/16-inch chipper in the kit. This leaves those 32nds and 64ths up for grabs, which is where proprietary thin metal shims come into play, interspersed between the blades and chipper until a perfect fit is reached. A full stack typically provides a maximum 13/16-inch dado width. Standard dado throat plates allow for this width, making them a little scary—that is, less supportive—under narrower ploughs. I like to use a zero-clearance throat plate with a dado set to provide full support. Wide and deep dado cuts can put a heavy load on the dado blade and motor, so make successive passes. It's a good idea to make a test piece, ensuring a perfect fit, before attacking the actual workpiece.

Maintenance. The best advice I can give is to make a habit of periodically checking the saw's various settings for consistent accuracy, and cleaning and adjusting its mechanisms when it isn't dead-nuts precise. In return, you'll get ease of use and the satisfaction of accurate work.

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