



Low-tech mortising

GET CLEAN, CONSISTENT MORTISES WITH A DRILL PRESS AND CHISELS

BY TOM BEGNAL

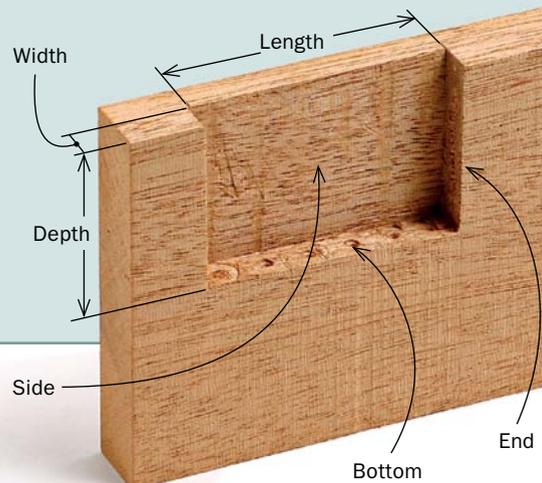
Over the years, woodworkers have devised all sorts of ways to cut a mortise. Some use a mortising machine to get the job done quickly, but you'd have to reach pretty deep into your wallet to ride in that fast lane. Some use a router and a straight bit, although that process usually requires a somewhat fussy setup. A mallet and bench chisel will get you a mortise on the cheap, but it's a relatively slow and labor-intensive procedure.

For most beginning woodworkers, the most approachable option is the drill-and-chisel method. That's the one I used when I started woodworking some 35 years ago. It's nearly foolproof and doesn't require fancy machinery. You simply drill a series of holes to remove most of the stock from the mortise, then finish the job with chisels. Simple and precise, just the way I like it. For this exercise, we'll assume the mortise is centered in the stock's thickness.

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A PEEK INSIDE A MORTISE

When describing a mortise, it helps to use words that everyone understands. Some common terms are shown in this cutaway view of a typical mortise.



Lay out the mortise



1

Mark the length. Use a rule and a pencil to establish the ends of the mortise (above). Then scribe the ends with a marking knife (right), with the knife tip flush against the combination square blade.

One of the first questions a beginner has is what size tenon to use. The rule of thumb is to use as big a tenon as you can fit. Here's an easy method to get you started. Divide the thickness of the board by three, then round off that number to the nearest common drill-bit diameter. That means a 1 $\frac{1}{4}$ -in.-thick board would have a $\frac{7}{16}$ -in.-thick tenon, a 1-in.-thick board would have a $\frac{5}{16}$ -in.-thick tenon, and so forth. This rule of thirds provides an adequate tenon while ensuring a thick enough wall between the sides of the mortise and the face of the board.

To lay out the mortises, you'll need a pencil, a rule, a marking knife, and a square. I use the pencil to mark the mortise length on each workpiece. Then I use a marking knife for the rest of the layout. The sharp point of the knife can be placed flush against the blade of a combination square to give you very accurate scribe lines. You can also use the incised lines later as a guide when you are chiseling (see p. 24).

The square and marking knife also establish the width. Place the fence of the square against the outside face of the workpiece and adjust the blade to locate one side of the mortise wall. With the tip of the knife against the end of the square's blade, slide the square and the knife in unison along the workpiece. Then, because the mortise in this example is centered, you can flip the square to reference off the inside face of the workpiece and repeat the process.



2



3

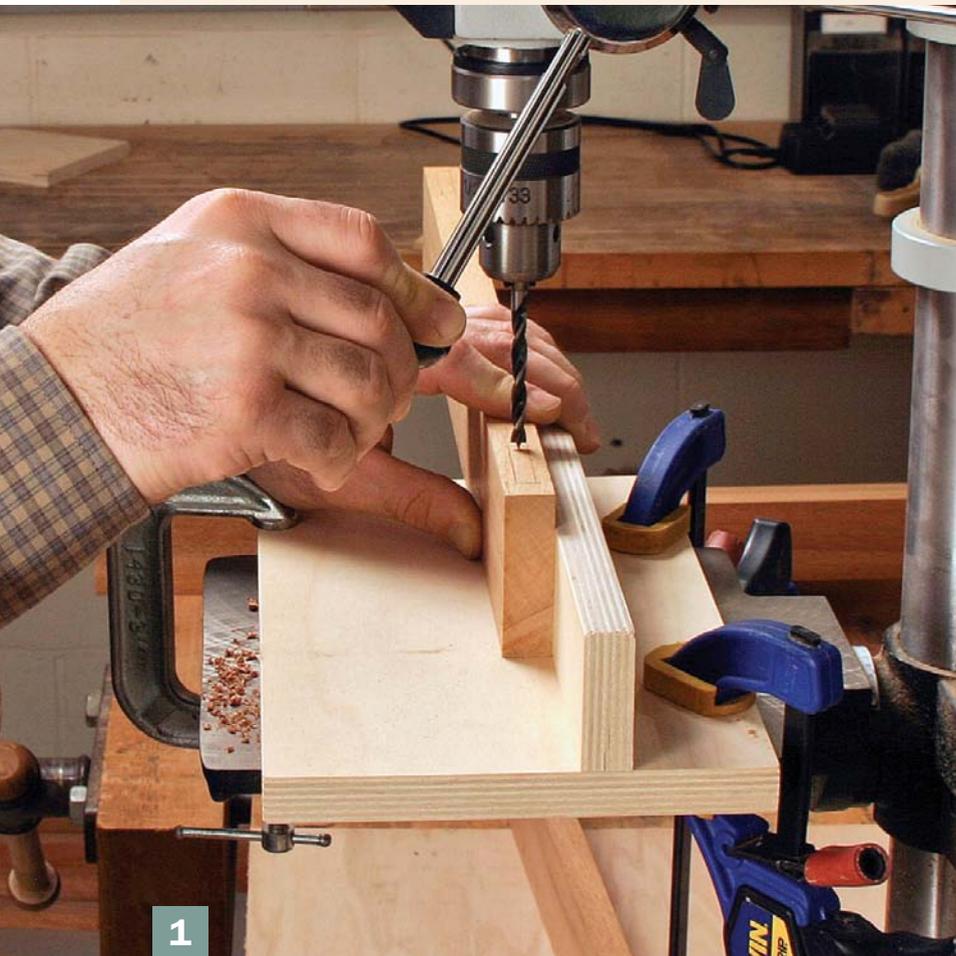
Scribe the width. Butt the marking knife against the end of the combo-square blade and slide both down the edge of the workpiece to make a mark. To make the second line, flip the square 180° and repeat.

MORTISE GAUGE OPTION

A mortise gauge is a handy tool for laying out and marking the width of mortises. First set the two pins on the gauge to establish the mortise width. Then use the gauge's fence to align the pins with your layout marks. Lock the fence in that position, and then scribe the mortise width as shown. To ensure proper alignment of the parts, be sure to use the same reference faces from board to board.



Drill a series of straight holes



1 **Fence guides the work.** Position the fence so that the drill bit is centered in the mortise. If your drill press doesn't have a fence, make an auxiliary table and fence and clamp it to the drill-press table as shown. Be sure the fence is square.

With the mortise locations marked, you can start creating the cavity by drilling a series of holes equal to the depth of the mortise. It's easiest to drill the holes with a drill press, which excels at keeping the drill bit square to the surface of the workpiece. To keep your workpiece square to the table, use a fence. If your drill press doesn't have one, make an auxiliary table and fence out of $\frac{3}{4}$ -in. plywood or MDF. Just make sure the fence is square to the table.

Use a drill bit with a diameter equal to, or slightly less than, the thickness of the mortise. For example, use a $\frac{5}{16}$ -in.- or $\frac{3}{8}$ -in.-dia. bit for a $\frac{3}{8}$ -in.-thick mortise. If possible, avoid twist bits (the kind made for cutting either wood or metal) as they tend to wander during deep cuts. Brad-point bits or Forstner bits are better at staying straight and true.



2 **Start at the ends.** With the drill press adjusted to the desired mortise depth, drill a hole at each end of the mortise. The rims of each hole should just touch the inside of your scribe lines.



3 **Hog out the middle.** Drill out the waste in the middle of the mortise. Don't overlap the holes; instead, leave a thin web of material between them.

Position the fence so that the bit is centered in the mortise and set the stop on the drill press so that you are drilling to a consistent depth from workpiece to workpiece. Drill holes at both ends of the mortise first, then remove the waste between them. As you position the bit, don't overlap any of the holes. When holes overlap, the bit is more likely to deflect and wander away from a square cut. Such wandering is much less of a problem with Forstner or brad-point bits.

Here's a rule of thumb that's important to remember. When making a mortise-and-tenon joint, be sure to leave space (about $\frac{1}{16}$ in. is usually enough) between the bottom of the mortise and the end of the tenon. If you don't, and enough glue gets squeezed into the space when the tenon is assembled, you won't be able to close the joint fully.

Chisel away the waste

The wood that remains after you've drilled the holes is best cleaned up with sharp bench chisels. Clamp the workpiece in a vise or to a bench, mortise side up. Starting with the ends of the mortise, position the tip of a chisel in the knife line you marked earlier, making sure to hold the chisel vertically with the bevel toward the center of the mortise.

Begin tapping the end of the chisel handle with a mallet. Typically, I'll drive the chisel only $\frac{1}{4}$ in. to $\frac{3}{8}$ in. at a time, but that can vary depending upon the hardness of the wood and the amount I need to remove. To break away the wood fibers, give the handle a gentle twist in both directions. Work in this manner until both ends of the mortise are reasonably flat from top to bottom.

To clean up the sides, I typically use a wider chisel, anywhere from $\frac{1}{2}$ in. to 1 in. wide, depending on the length of the mortise. A wide chisel cuts faster and makes it easier to produce flat sides. Work from the center back toward the sides, holding the chisel vertically. Use a mallet for the first series of cuts, but pare to the walls with just hand pressure. Use the knife lines to align the tip of the chisel for those cuts.

The final step is to flatten the bottom of the mortise. That can be a challenge. The trick is to angle a narrow chisel in the mortise and use it to smooth as much of the bottom as you can. Then, reverse the direction and work from the other end. As you work on the bottom, be sure to clean out the waste material in each of the four corners.

Don't fuss too much over the smoothness of the bottom. Mostly, you want to ensure that the bottom won't interfere with the end of the tenon when it's time to close the joint.



Chisel the mortise ends. Slip the tip of the chisel into the knife-cut line at the end of the mortise (above), then hold the chisel vertically and tap it with a mallet to begin squaring the ends of the mortise (right).



Clean up the sides. Chop out most the waste using a mallet, working from the middle toward the side. Then, using the knife line to register the tip of the chisel, pare the mortise sides flat and straight.