

Mortising by Hand

Cutting mortises by hand is easier and more efficient than most woodworkers imagine — once you have the right tools and best technique.

I own a hollow-chisel mortising machine with a sliding table, but there are some jobs that are best accomplished in the home workshop with a mortising chisel and a mallet.

When the mortises must be angled (such as with any chair), or the mortise is positioned in a place where the machine cannot reach (such as piercing a wide stretcher) the hand method is ideal. But here is the radical part: Once you understand how to mortise properly, you'll start using your chisel for more and more one-off jobs.

I'd never use a mortising chisel to cut all the mortises in a Morris chair, for example, but if I have a single door to build for a project, I'll almost always mortise it by hand.

If you've ever tried mortising by hand, I bet you've been frustrated by it. It seems slow, inaccurate and tricky when done with the wrong tools, wrong layout and wrong techniques. But when you choose the right tools, mark your work correctly and mortise properly, you'll find that the tools are efficient and accurate. Yes, you do have to practice a couple times to get comfortable with the routine, but the learning curve is not steep.

About the Tools

Most mortising chisels stink. The steel is warped on many examples I've used, which hurts your chances of making a straight cut. In general, you need a heavy chisel with a straight blade. Unless you work in the metric system, avoid the metric chisels. You want your mortise chisels to



The right mortising chisel and the right technique are key to your success in cutting this joint by hand. Using a bevel-edge chisel for this technique is slow and can even snap the chisel.

match your other tools. This point, called “tool slaving,” is one of the most important things to learn about mortising by hand. The width of your chisel should match exactly the other tools in your kit that you use to lay out your joints and cut your grooves, whether you use a plow plane or a straight bit in a router. When all your tools are sized the same, they guide one another and reduce the skill needed to make them work.

I have used almost every form of mortising chisel available, from sash mortising chisels to Japanese to German mortising chisels. My favorite is the traditional English mortising chisel, shown in the photo above. These chisels are common in the used market, particularly among English tool dealers. Also, Ray Iles makes new ones that actually are nicer than the old tools (contact toolsforworkingwood.com at 800-426-4613, \$58 to \$98 each). Most woodworkers need only a couple chisels. I use either the $\frac{1}{4}$ " or the $\frac{5}{16}$ " the most, and the $\frac{1}{2}$ " less frequently.

You need a marking gauge. While you can use a common single-pin gauge, I recommend you buy a mortising gauge with two pins that will lay out both sides of the mortise simultaneously. I have a couple old gauges I've picked up at flea markets. One of them I keep set to mark a $\frac{1}{4}$ "-wide mortise in $\frac{3}{4}$ " stock. The other one I adjust for custom jobs.

You also need a mallet; the heavier the better. The 18-ounce Veritas Cabinetmaker's Mallet shown is my favorite (Lee Valley Tools, 800-871-

8158, \$28.50). The technique shown in this article also requires a drill bit that is the same width as the chisel (another reason not to use metric chisels in an imperial shop), and some way to drive the bit, such as a brace or electric drill.

About the Technique

With mortising, technique is everything. The way I was first taught to cut a mortise by hand was so woefully inefficient, it's a small miracle I ever stuck with it. There are dozens of ways to chop a mortise, and one long weekend I dug up every single written reference I could find on the topic (from 1875 forward) and compared them all in my basement shop.

I encourage you to compare different techniques for yourself; it actually is good practice and will build your confidence with the tools. The technique shown here is (in our opinion) the easiest, most accurate and least fussy of all the hand techniques.

This technique was published by J. Maynard in *Woodworker* magazine, a British publication, in 1964. British woodworker Jeff Gorman posted the technique on his excellent web site “A Woodworker Notebook” (amgron.clara.net/index.htm).

Here's the technique in brief: Lay out your mortise then bore a hole that matches the width and depth of your mortise that's about $\frac{3}{16}$ " from the end of the mortise. Mark the finished depth on your chisel using tape or a permanent marker. (As you get comfortable with this technique, you

English Mortise Chisels: Details Make a Difference

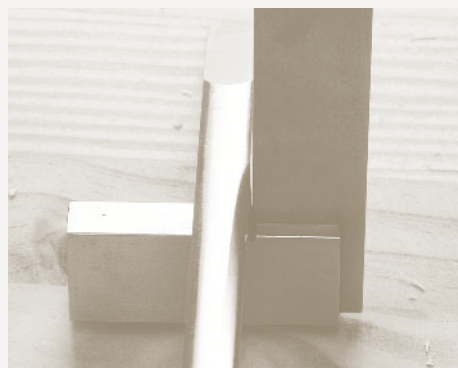
Many tools labeled “mortising chisels” are misnamed, missing features, poorly manufactured and difficult to use. But now Ray Iles, an English toolmaker with family roots in Sheffield, makes mortising chisels using a traditional English pattern that isn’t common in the North America. The tools plunge into hardwoods like an Olympic diver through water, and they lever out waste like an electric crowbar. They work because Iles paid attention to the details on the old English mortising chisels, and he took no shortcuts.

This particular pattern of mortising chisel hasn’t been manufactured for many years. It looks primitive at first. But on close examination, it’s a tool of subtlety.

First, a bit of terminology. Many of the chisels you see in tool catalogs that are called mortising chisels would be called “sash mortising chisels” by a 19th-century woodworker, and they are best for chopping mortises in softwoods. Some other so-called mortise chisels are actually “firmer chisels,” which are tools for all-around woodwork that don’t have beveled edges.

The Ray Iles mortisers are more massive and heavy than any of these chisels. The six tools Iles offers are more than 12" long – about half the tool is the blade; the other half is the beech handle. Both halves are equally important to the function of the whole.

The blades (offered in widths from $\frac{3}{16}$ " to $\frac{1}{2}$ ") are thick at the tool’s bolster (almost $\frac{3}{4}$ ") and this thickness tapers as you approach the shallow 20° primary bevel. The cutting edge of the tool is ground at a stout and appropriate 35° secondary bevel. One nice aspect of all this blade geometry is that you can use the 20° bevel as a depth indicator. When all of



As you can see from the thin line of light between the square and the chisel’s flanks, the sides of the Ray Iles chisels are tapered, allowing the tool to release easily from a deep cut.



The Ray Iles mortising chisels revive a pattern of tool that has been lost for decades. They work remarkably well, outcutting other chisels in our shop.

the bevel is buried in the mortise, your mortise is a shade more than $1\frac{1}{4}$ " deep, which is a typical mortise depth. As you sharpen the primary bevel back, this will change slightly, but I don’t suspect you’ll be sharpening these much.

That’s because Iles used D2 steel for the blade. This exotic steel is tough and as durable as any I’ve worked with. There are advantages and one disadvantage to the D2. First let’s look at D2’s demerit: It’s no fun to sharpen. Setting up these tools took longer than I expected because of the D2’s stout personality. The backs (sometimes called the “faces”) of the chisels were ground at the factory quite well. But even though they were close to perfect from the factory, taking them that last step took a little longer. Sharpening up the secondary bevel also took longer than usual because of the D2’s pigheadedness.

After sharpening, I can report that the D2 seems worth it. Even after a cabinet’s worth of mortises, the edge of the $\frac{1}{4}$ " chisel looked and felt like it was still freshly sharpened. My Sorby sash mortisers (which I have since given away) would not have survived half that much work.



The beech handles come in two sizes. Both sizes are elliptical in shape and tapered in two directions. This complex shape allows you to steer the chisel to make straight cuts.

The final detail worth noting is that the blade is not rectangular in cross-section. The flanks are tapered (I measured the taper as varying between 1° and 2°). This taper is present on quality older tools and missing on later tools and every modern chisel I’ve encountered. The taper helps the chisel release when you pull it out of a deep cut. It also makes it easier to lever the waste. And the taper has no disadvantages that I can discern. The chisel does not twist in the cut at all.

A Better Handle

The handles to these tools are a complex shape that gives the user feedback to keep the tool true in the cut. The handles are elliptical in cross-section and are tapered both front to back and side to side. This elliptical shape tells you instantly whether or not the tool’s bevel is straight on your work. And the tapers allow the tool to fit your hand gracefully.

The handles are made from air-dried beech with a traditional linseed oil finish. And they take a heck of a beating. After a year of use (and a little abuse thrown in for good measure), I feel no trepidation about whaling on these. They and their tough nature have earned a permanent place in my shop. — CS

Supplies

The Ray Iles mortising chisels are available from:

- **Tools for Working Wood**
800-426-4613
or toolsforworkingwood.com

actually will skip that part – the tape gets damaged anyway during the levering).

Place the chisel on the mortise, about 1/4" from the hole. You want the bevel of the tool to face the hole and the handle to be tipped back toward you. Drive the chisel into the work until it stops at the bottom of the hole. Gently lever the tool back downward. This will pull up a satisfying wad of chips.

Pull the chisel out and move it back toward

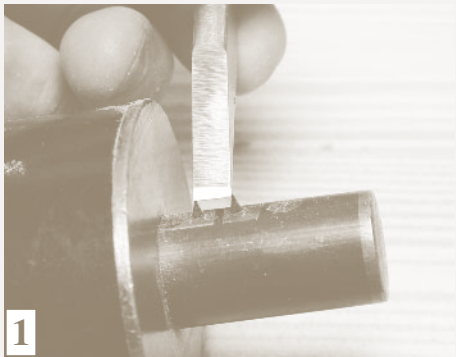
you. A 1/4" or more is good for starters (you'll get more aggressive as you get practice). Drive it again. Lever the waste out again. Continue doing this until you get near the end of the mortise nearest you. Now hold the chisel perfectly upright and drive it straight down to the bottom of the mortise. Lever it forward to break up the chips, and then lever it carefully back to remove the waste without seriously bruising the rim of the mortise (a little deformation is fine and expected;

it will be covered by the tenon's shoulder).

Turn the chisel around and do the same on the far end of the mortise to clear that end.

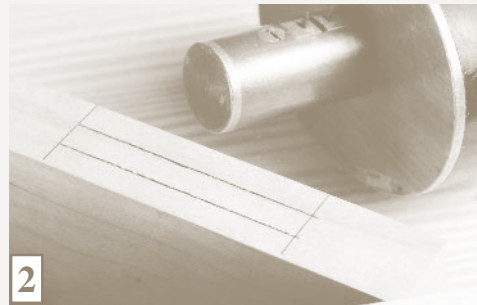
Here are the virtues of the technique: The hole allows you to drive the chisel easily without it sticking too much in the work. Plus, the hole serves as a depth stop for the chisel. Once you do this technique a few times, you'll find that when you reach the proper depth with your chisel, it will stop.

The Maynard Technique



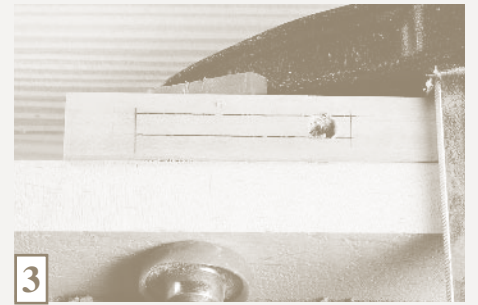
1

If your mortise is not going to occur in a groove, you need to mark it out with a gauge. If you use a proper mortise gauge, set the pins to exactly the width of your chisel.



2

With a pencil, mark all your stiles and rails on their outside faces. When you mark your mortises, press the head of the marking gauge against the face of your pieces (both when mortising and when tenoning). Then use a square to mark the length of the mortise in pencil.



3

Clamp the stile to a piece of wood that is secured in your face vise. Clamp across the mortise location to reduce the chance of splitting. Now clamp the stile to the benchtop and bore a hole at the far end of the mortise as shown.



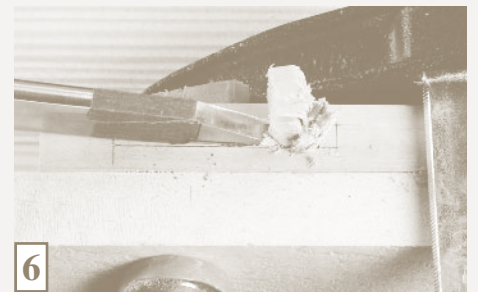
4

With the bevel of the chisel facing the hole, drive the tool in at an angle as shown. When the chisel hits the bottom of the hole, it will stop cutting easily. Pop this waste out by levering the chisel backward.



5

Move the chisel back toward you and make another similar chop. Again, the chisel will stop cutting easily when you hit bottom.



6

This method excels at waste removal. By pulling the tool back toward you, you'll excavate large wads of chips. Continue along the mortise until you reach the end closest to you.



7

To complete the mortise end, stand the chisel upright and knock off the last 1/8" of waste. Push the chisel forward and then lever it (gently) back.



8

Do the same at the other end of the mortise, finishing up the end where you made the hole.



9

Total elapsed time: about two minutes. (I was taking my time.) The mortise is also fairly clear of chips.

This technique also is excellent because the chisel work is simple. You only have to reverse the direction the chisel faces once during a mortise. Other techniques require you to turn the chisel back and forth after each plunge.

Here is the downside to the technique: You have to bore an accurate hole. This requires one more tool and one more set of skills. However, most woodworkers own a drill and can use it quite well, so I think this demerit is minor.

The photos in “The Maynard Technique” story (previous page) show how to make a Maynard Mortise in what would be a door stile. So that

you can see everything that is going on during the cut, I made the mortise in a stile without a panel groove. When you try this, I recommend you try it in a piece of stock with a groove. The 1/4"-wide groove guides both your 1/4"-diameter drill bit and your 1/4"-wide mortising chisel. The photos below show this process on a stile with a groove.

No matter which technique you use, there are some other tips I can recommend. Work on the end of your bench as shown in the photographs and position your body in line with the chisel and the length of the mortise – don’t mortise while standing at the side of the chisel.

Also, clamp your work two ways. I recommend you clamp directly across the joint as shown. I clamp my work to a board that is secured in my face vise. This is a traditional English approach (not my idea) and it works well at preventing the work from splitting if you make a mistake.

Also, you need to clamp your work against the benchtop to keep everything from lifting up when you lever the waste out.

And most of all, don’t give up after one mortise. If you have the right tools and techniques, the skills will quickly follow suit. **WM**

— Christopher Schwarz

Mortising in a Groove

Cutting a mortise in a groove is far easier than mortising a flat surface. The walls of the groove guide all your tools. This is exactly why you want your tools to all be the same dimension. Here I’m using a 1/4" iron in a plow plane, a 1/4" auger bit in a brace and a 1/4" mortising chisel.

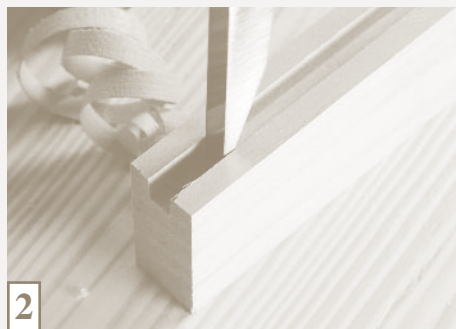
This is, hands down, the easiest way to cut a mortise by hand. Also, note where I am standing during these photographs. By standing

at the end of the bench I can make sure all of my tools are straight up and down in the most important axis – which is keeping the walls of the mortise parallel with the faces of my stiles.

If my tool is tipped forward or back, the mortise will still be true (in fact, I purposely tip the tool to assist in excavating. But if my drill bit or chisel is tipped left or right, I will spoil the accuracy and perhaps blow out the walls of the mortise. — CS



1 I cut the grooves for this drawer with a little plow plane. Its 1/4" iron is exactly the same width as my mortising chisel. My chisel also matches the groove made by our shop’s 1/4" straight bit.



2 Here you can see the advantage of tool slaving. My chisel drops into the groove. The walls will guide the chisel.



3 Note the stance here. I’m watching the bit in the most important axis. If I tip left or right, my mortise chisel will follow the hole.



4 Generally, I mark only the auger bit with tape. The hole limits the depth of cut made with my chisel. Attempts to mark the depth of cut on the chisel are always a struggle.



5 Again, note the stance and the two clamps involved in mortising. This clamping setup keeps the work from shifting to the side or pulling up off the bench.



6 Mortises cut by hand are on par with those cut by a hollow-chisel mortiser. They are fairly clean and the walls are smooth enough.