

Master the Mortiser

Simple tips for sharpening, setup, and cutting sequence

BY ROLAND JOHNSON

A mortiser, also called a hollow-chisel mortiser or mortising machine, cuts mortises remarkably quickly and accurately. Indeed, this machine can cut a typical leg-to-apron mortise in well under a minute. Benchtop models are most common, although larger, freestanding machines also are available.

On the downside, mortisers define the word finicky. If yours isn't set up and used correctly, you'll wonder why you bought one.

Fortunately, mortiser-induced headaches can be treated with relative ease. Simply follow the steps outlined here, and you'll find that quick, clean, and accurate mortises become the norm, not the exception.

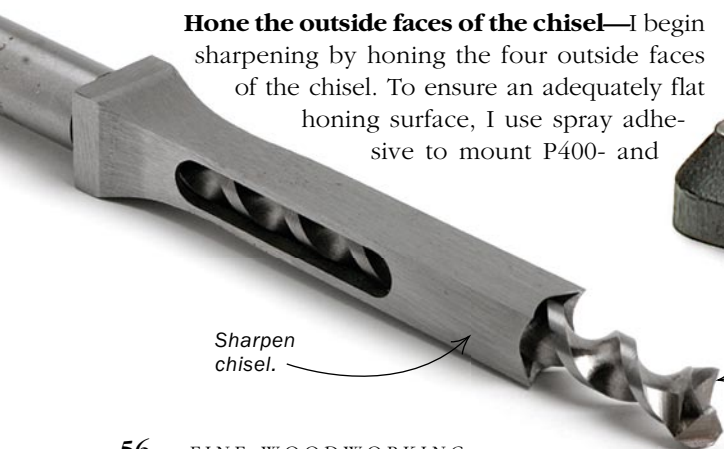
A sharp chisel and bit are a must

A mortiser won't work effectively when the bit and chisel are dull, so keep both parts sharpened (see photos, facing page). No need for a lot of tools, just a chainsaw file, a round and a flat slip stone, a little sandpaper, an abrasive pad, and some honing oil. Don't expect a brand-new bit and chisel to be adequately sharp. Almost all I've seen needed extra attention out of the box.

Hone the outside faces of the chisel—I begin sharpening by honing the four outside faces of the chisel. To ensure an adequately flat honing surface, I use spray adhesive to mount P400- and

KEYS TO SUCCESS

Mortisers require extra attention, but the payoff makes it all worthwhile. Don't ignore any of these steps.



Cutters need sharpening

Like any cutting tool, a mortising chisel and bit must be sharp to work well. A few minutes spent sharpening pays many dividends.



Smooth the outside surfaces of the chisel. A chisel with rough outside faces can't be sharpened and won't be easy to plunge and retract. Use fine sandpaper on a flat surface to smooth all four sides.



OR



Hone the bevels. A little work with a round slip stone (left) or a special, cone-shaped, diamond-coated abrasive (right) produces fresh, sharp edges that ensure a cleaner cut. Use a flat slip stone to remove the burr that results.

P800-grit sandpaper to a granite plate. A piece of plate glass glued to $\frac{3}{4}$ -in.-thick hardwood plywood also makes a good flat surface.

To reduce clogging, I spend time tuning up the bore. The smoother the bore, the easier it is for chips to slide up the auger bit. I use a chainsaw file to remove any internal burrs or machining grooves. A small, round, tapered slip stone works well for cleaning up the ejection slot.

Hone the bevels—A round slip stone is all that's needed to hone the bevels. Keep in mind that not all mortiser chisels have the same bevel angle. Clico, a British manufacturer, and Asian and Japanese sourced chisels use a 60° bevel angle, while Forest City, a U.S. maker, uses a 45° bevel.

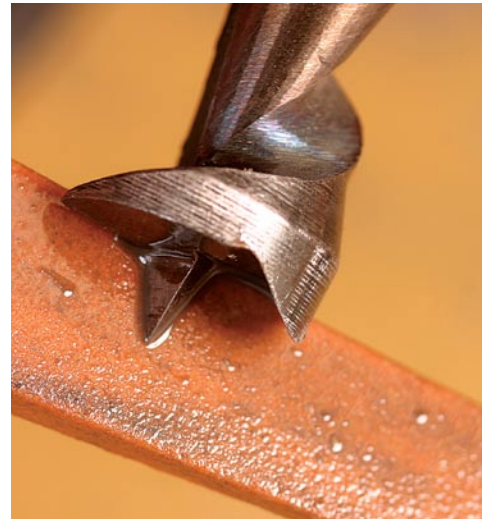
With the shank of the chisel secured in a vise, place the stone flat against a bevel and work it back and forth with a light touch. Be sure to wet the stone first with a few drops of honing oil. To avoid creating a groove, keep the stone moving from side to side along the bevel and don't stay in one spot for more than a few strokes. Try to remove about the same amount of material from each bevel.

If you prefer a process that's somewhat less fussy, there is a special cone-shaped tool (available from Rockler; www.rockler.com) that allows you to sharpen all four 60° bevels at once. If the chisel has a 45° bevel, tilt the cone and sharpen only a portion of the bevel at a time.

Honing the bevels will produce a burr along the outside edge of the chisel. To remove it, hold a flat slip stone flat against the outside face of the chisel and drag the stone lightly toward you.

Sharpen the bit—Depending on the manufacturer, the auger-style drill bits for mortiser chisels are either a single spur/flute brad point or a double spur/flute without a centering point. I find that the single spur/flute with its higher-helix flute evacuates chips faster than the double-flute bits. But any type you use must be sharp and burr-free.

In an auger-style drill bit, all the cutting gets done in just two places: at the spurs and at the flutes. So that's where



Sharpen the bit. Use a flat slip stone to hone the bit in two places: the spur and the cutting edge. If your bit has a centerpoint (not all do), hone each of the three facets of the point, too.

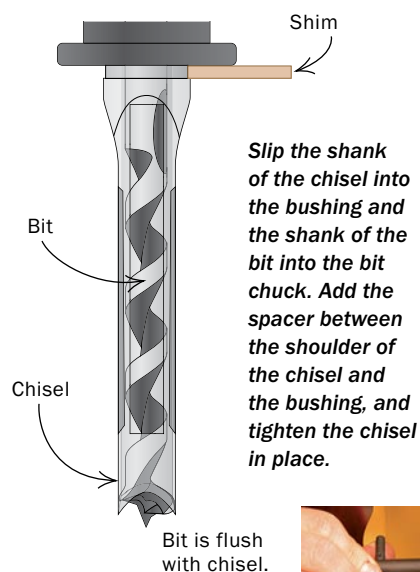


Add some lubricant. To help reduce friction during cuts, spray both the chisel and bit with dry lubricant after sharpening. Later on, when cutting mortises, an occasional squirt of lubricant on the chisel and bit will fight friction.

Set the right gap

A sharp chisel and bit are not the end of the story. The two parts must be installed correctly to minimize friction and maximize chip removal.

1 TIGHTEN THE CHISEL IN THE BUSHING

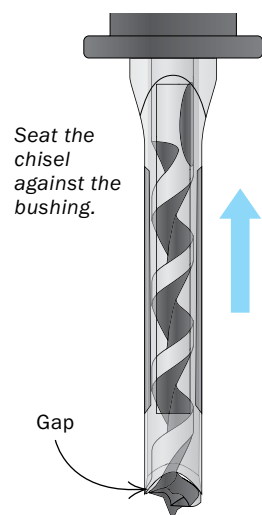


2 TIGHTEN THE BIT IN THE CHUCK

While holding the spur of the bit about flush with the points of the chisel, tighten the shank of the bit in the drill chuck.



3 NOW READJUST THE CHISEL



Remove the spacer and raise the chisel until it butts against the bushing. A squaring board ensures that the chisel is square to the fence. Tighten the locking knob.



you need to sharpen. If the bit has a brad point, I usually sharpen the point, too. The machining process at the factory sometimes leaves ridges or burrs at the transition area between the spurs and flutes. Use a slip stone to smooth any you find. After that, polish the flutes with a medium-grit abrasive pad to create a slick route for the chips to follow.

Install the chisel and bit correctly

The installation of the chisel/bit in the mortiser should follow a precise sequence. If you do it properly, the chips will eject easily and the hole will be square to the workpiece.

Determine the gap—

When installing the chisel and bit, it's important to have

the proper gap between the chisel bevels and the end of the bit. I vary the gap based on the size of the chisel and the material. Softwood typically produces large chips that can clog the chisel quickly. Large mortise chisels and bits also make large chips, even in hardwood. I like to leave a $\frac{1}{16}$ -in. to $\frac{3}{32}$ -in. gap when using small ($\frac{1}{4}$ in. and $\frac{5}{16}$ in.) and medium ($\frac{3}{8}$ in.) bits in hardwood. A little more clearance, about $\frac{3}{32}$ in. to $\frac{1}{8}$ in., is adequate for small and medium bits in softwood. For large bits ($\frac{1}{2}$ in. and larger) in hardwood and softwood, a full $\frac{1}{8}$ -in. gap works best. These clearances aren't carved in stone, so if you find the going tough or your chisel plugging frequently, try increasing the gap between the chisel and bit.

Set the gap—Knowing the gap that's needed, you can go ahead and install the bit and chisel. Be aware that the points on the chisel are very sharp, so use care. I usually wear a leather glove on the hand supporting the chisel and bit.

First, rip a piece of scrap stock to the thickness of the intended gap to use as a spacer. Then place a short length of board on the mortiser table to forestall any damage to the points of the chisel or the cutting flutes on the bit should either be dropped.

Insert the bit into the chisel. Then slip the shank of the bit into the bit chuck and the shank of the chisel into the mounting bushing. (Some machines require a sleeve sized to fit the chisel shank.) At the same time, place the spacer between the shank of the chisel and the bushing. Then tighten the chisel. After aligning the spur of the bit with the chisel points, tighten the bit.

To complete the gap-setting procedure, remove the spacer and raise the chisel until the shoulder is seated tight to the bushing. Tighten the chisel, and the offset will be correct.

The chisel must be parallel to the fence—Slip a flat piece of wood—I call it a squaring board—between the fence and the chisel. Next, loosen the fence and chisel and, keeping its shoulder

Start cutting mortises

With the chisel/bit sharpened and installed, the general setup procedure is over. Now make the final machine adjustments for the mortise you want and follow a specific cutting sequence.

1 SET THE MORTISE DEPTH

After marking the mortise depth on the end of the workpiece, lower the chisel and bit to the marked line and set the depth stop on the machine.

tight to the mortise-head, rotate the chisel and pull the fence forward until the chisel sits flat against the board. Then tighten the chisel.

Square the chisel to the table—Make sure the centerline of the chisel is square to the table in two directions; front to back and side to side. Use a square to do the checking. Don't panic if all's not well. Most mortisers have the mortising head and support column mounted to the table with bolts. It's a simple matter to loosen those bolts and shim (I use automotive alignment shims) the appropriate side of the column base to get the chisel square to the table.

Square the fence to the table—When the fence isn't square to the table, the mortise won't be square either. Check it with a square. If it's off more than say, 0.005 in. over 3 in., you'll need to shim the fence bracket where it attaches to the base or add a wooden fence that can be shimmed or beveled to square.

Hold-downs keep the workpiece on the table—Position the hold-down so that there is just enough clearance to allow the workpiece to slide under the hold-down without binding. I keep a 1/64-in-thick strip of stock handy as a spacer.

Avoid overlapping cuts

In the first cut by a bit and chisel, all four faces of the chisel will get equal support, so the bit is sure to stay square to the table throughout the cut. But if the next cut overlaps the first so that one side is unsupported, the chisel will tend to bend slightly toward that unsupported side. That causes the outside of the bit to rub against the inside of the chisel, which leads to friction, heat, and noise.

To avoid the overlap problem, make a pair of cuts, one on each end of the mortise. Then make a series of unconnected cuts to begin to remove the waste stock in between the ends. Leave a little less than a bit's width between these cuts. That way, the chisel is always fully supported. After that, go back and make cuts as needed to clean up the mortise. □

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2 ADJUST THE HOLD-DOWN

A thin, wood spacer creates a slight clearance between the top of the workpiece and the hold-down, making it easy to slide the workpiece sideways.



3 CUT EACH END OF THE MORTISE FIRST



Make two cuts, one at each end of the mortise (left). Then make a series of cuts, leaving a web of wood in between each cut. Last, make cuts (above) to clean out the webs.