handwork

The hand-cut mortise and tenon

MORTISE GAUGE AND MORTISE CHISEL ARE KEYS TO HELPING MAKE THIS TIME-TESTED JOINT

BY CHRIS GOCHNOUR

This article builds on the skills from my previous Handwork joinery lessons (the half-lap, the bridle joint, and the mitered bridle joint) and adds a mortise gauge and a mortise chisel. I focus on through-mortise and tenons here for two reasons. First, they're stronger because they offer more long-grain glue surface, and the long grain of the tenon going through the stile helps the stile resist splitting. Second, your frames will more likely be flat and without twist because you mortise halfway through from both edges. Plus, through-mortise and tenons take about the same time as stopped ones.

In this example, the through-mortise is ¼ in. wide by 1¾ in. long by 2½ in. deep—a typical size for a frame-and-panel door. The rail gets the tenon and the stile is mortised.

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Photos: Barry NM Dima

Mark the mortise length. *Start by marking the rail width on the stile, then measure in ⅜ in. to locate the mortise ends.*

Set the mortise gauge using the chisel. *Adjust the pins so the ¼-in. chisel drops just inside them. Keep this setting for the whole process. Set the fence to center the mortise on the stock.*

Scribe the mortise walls. *Run the gauge between the end lines of the mortise on each edge of the stock. Make sure to reference off the show face.*

Knife the mortise ends. *With the mortise walls scribed, knife the mortise ends along the pencil lines, starting and stopping at each scribe line. The knifed line will register your chisel when you chop.*

Two helpful tools

A mortise gauge resembles a marking gauge, but instead of one pin, it has two—one fixed and one adjustable. The gauge also has a moveable fence that, once set to the desired position, can be locked in place with a thumbscrew.

Mortise chisels excel at chopping mortises because of their stout construction. They can withstand heavy mallet blows and some levering to remove waste. Plus, the long bevel shears the wood fibers as you drive it downward—a key to mortising.

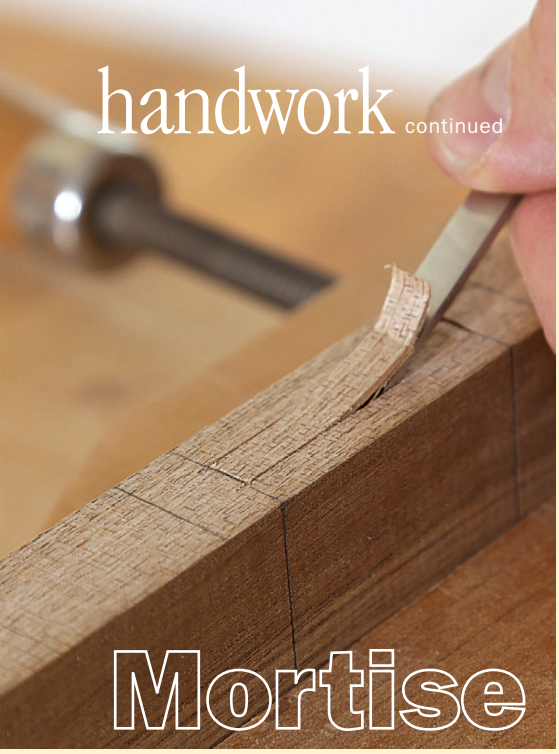
USE THE SAME GAUGE SETTING FOR THE TENON

Lay out the tenon shoulders. *The length of the tenon should equal the width of the stile. Use a knife and square to wrap the shoulder line around the piece.*

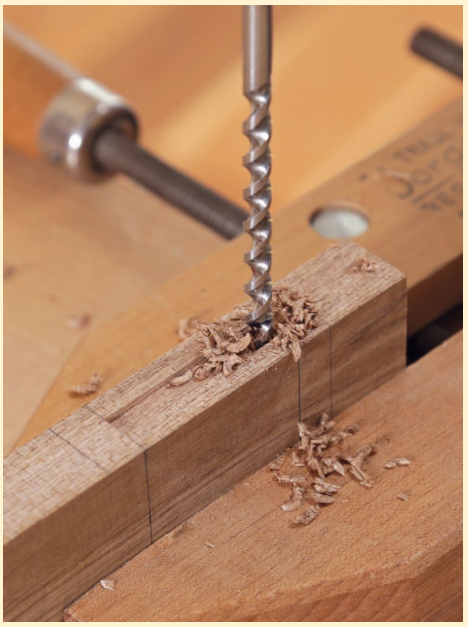
Mark the cheeks. *With the mortise gauge at the same setting, and again referencing off the show face, scribe the edges and end of the rail.*

Scribe the tenon's width. *Mark ⅜ in. from both edges. Scribe the ends only. After you cut the cheeks, bring these marks down the tenon.*

Mortise



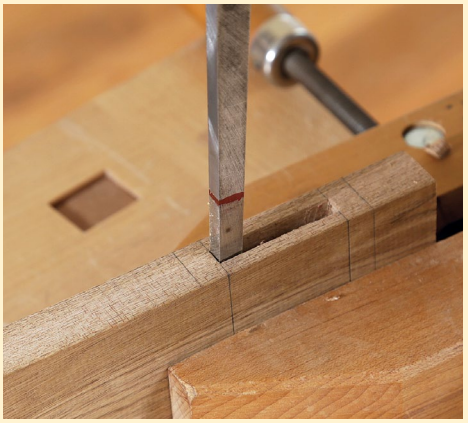
Make a space for your chisel. *Starting on the inside edge, make stop cuts with a chisel at the ends of the mortise. With the chisel bevel down, lift out a shaving between the cuts. This groove helps precisely register your chisel.*



Drill a starter hole. *Bore a ¼-in.-dia. hole halfway through the stile near the mortise end closer to you. This hole enables the chisel to plunge deeply right off the bat.*

Draw your depth gauge. *To monitor the depth of cut, draw a mark around the chisel representing slightly more than half the width of the stile.*

Chop. *The key to effective mortising is to let the long bevel of the chisel make shearing cuts. Start ⅛ in. in front of the hole, with the chisel bevel facing away from you. Angle the handle toward you when chopping so the bevel is plumb. Drive the chisel ½ in. or so deep.*



Lever and repeat. *Lever the waste, and move the chisel ⅛ in. farther. Chop and lever again. When you lever, make sure the fibers are free to move. At the ends of the mortise, rotate the chisel so the bevel is facing inward.*

Mortise the other edge and check the ends. *Repeat the mortising steps on the other edge. Once you're through on both sides, scrape away any remaining debris until the chisel can extend to the interior pencil lines.*

Tenon

Cut the cheeks. *On the waste side of the layout lines, cut as close as possible but never take the lines. With the handle lowered, follow the mark down the edge facing you. Flip the board 180° and cut from this edge as before. Finish by raising the handle and sawing the middle all the way to the shoulder. The two angled kerfs will guide the saw.*

Define the shoulder. *Use a 1-in. paring chisel to cut a bevel on the waste side of the knifed shoulder lines.*

Cut the shoulder. *Place a saw into the bevel and butt the saw teeth against the tenon shoulder. Next, with a steady hand, cut the shoulder down to the cheek. Repeat on the other side.*

Bring the tenon to width. *Use the marking gauge set at 3/8 in. to extend the mark down the tenon's face from its end. Next, make a sawcut at the shoulder from the outside edge of the tenon to the scribe mark. Do this on both sides of the tenon. Then remove the waste with a ripcut down to the shoulder.*

Fit the joint. *Spread pencil lead on the mortise walls and then assemble the joint as far as you can. Remove the tenon; graphite will be on the tight spots. High spots inside the mortise may also be burnished. Remove these with a chisel or plane until the fit is right. If the pieces are out of square, relieve the areas pushing the joint out of alignment.*