

## Mortise and Tenon Joinery Made Easy



A pair of sawhorses, made using mortise and tenon joinery, can form a sturdy platform on short notice.

Those who follow James Krenov's work or own a copy of his book *The Fine Art of Cabinetmaking* should be familiar with his unique and stylish sawhorses. After weeks of using the first pair of this style of sawhorse that I built, I decided to make a second set. This time, instead of hand-cut mortise and tenon joints, I used power tools and chose a variation of the original joint: the loose tenon. Just as there are many ways to make a sawhorse, a loose-tenon joint can be cut using many different methods. Here, I'll show the two machine techniques I usually use.

The Krenov-Style Sawhorses



Krenov-style sawhorses the author made.

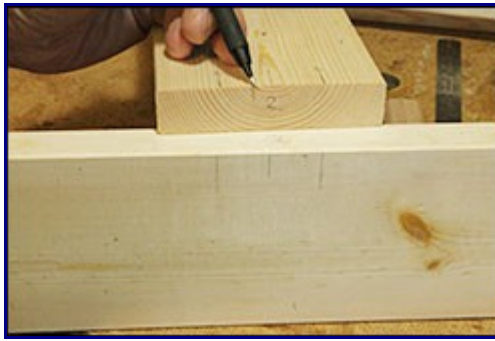
Because of the strong structural design of the sawhorse, I chose spruce, an economical material, as the construction material. I used loose-tenon joints to attach the legs to the bases and then the subassembly to the stretcher. I mounted the top rail on the legs last using a saddle joint. The simplicity of this sawhorse design makes this project great for exploring loose-tenon joinery techniques.

### The Game-Changer: Domino® Joiner

Combined with the use of prefabricated loose tenons (the dominoes), the Domino® Joiner System (the "joiner") is the ticket to fast, accurate loose-tenon joinery. It uses a spinning and oscillating (side to side) bit to cut a mortise in a single plunge.

Although the largest dominoes are only 24mm wide, you can place more than one domino side by side to strengthen the joint. The marking and cutting of the blind mortises on the bases, for example, are straightforward as they are standard plunge cuts with the fence held against the workpiece's

reference edge or end.



Instead of measuring, the author placed the dominoes on the stock to guide the marking of the placement lines.

Marking and labelling are the keys to preventing most mortise blunders.

The through mortises centered on the face of the legs can be cut using the fence against the leg's reference edge or using the intersecting lines technique. The latter method, which involves two marking steps, is described here. First, mark a centerline on the leg (on the reference face). Stand the stretcher on one end and transfer its domino placement lines to the leg. The intersecting point is the center of the mortise.



Transfer the domino placement lines from the stretcher to the face of the leg.

To position the joiner for the cut, line up the joiner's milled flats on both sides with the centerline on the leg. Align the centerline on the baseplate with one of the domino placement lines. Hold the joiner down and plunge to cut the first mortise.

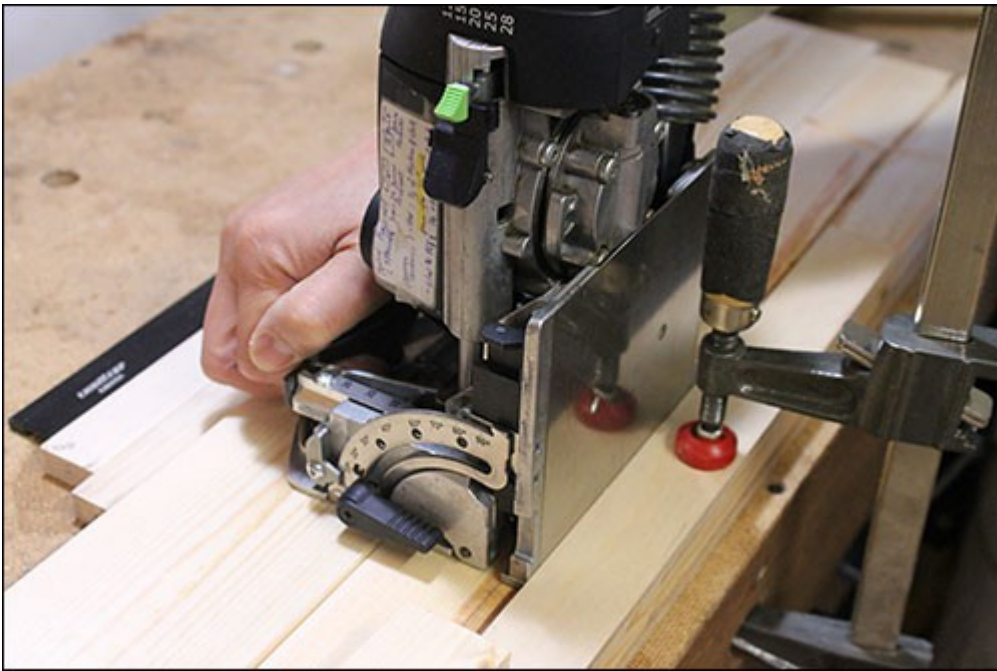
For the second mortise, move the joiner sideways to align with the next domino placement line in the same manner and cut the mortise.



Align the edge of the milled flat on both sides with the leg's centerline.



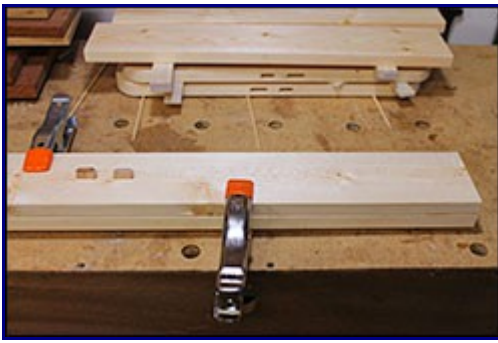
Line up the baseplate's centerline with the domino placement line.



Clamp a batten to the leg for the joiner to butt against.

After cutting the mortises, mark and cut the notches for the saddle joints on the legs held together in pairs for consistency. If desired, shape the rails and bases before gluing up the subassembly. After the glue dries, use the legs to guide the layout of the notches for the rails. Cut the notches and secure the saddle joints with screws.





Dominoes microwaved slightly before use will slip into the mortises with ease.

A scrap clamped on the bottom keeps the legs parallel while notched cauls on the tenons ensure a tight glue-up.

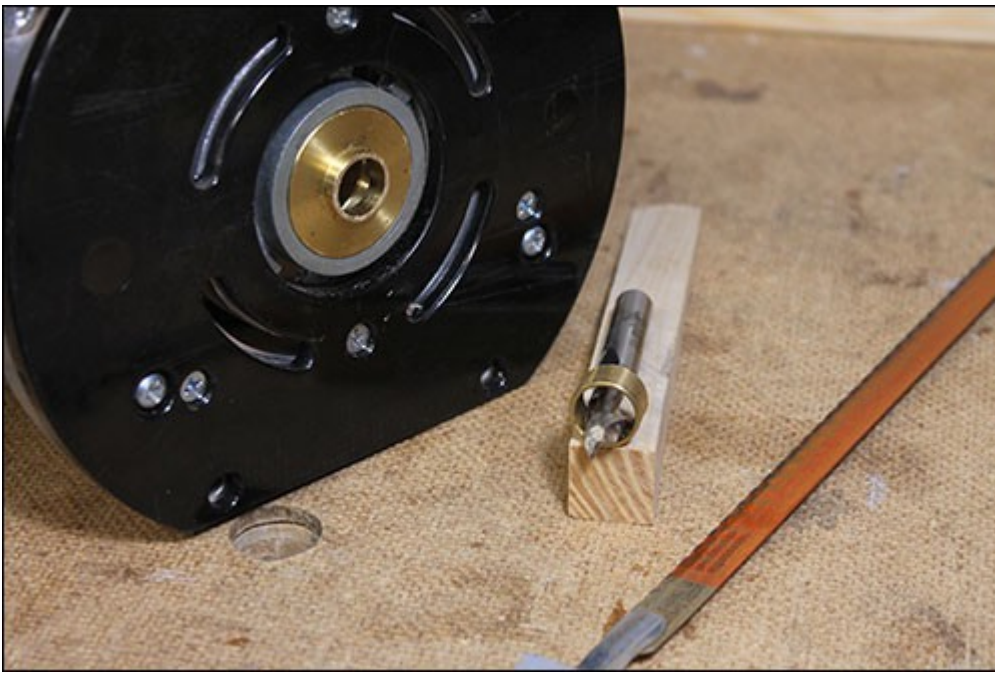
### The Router as a Mortiser

In the second method, I use a router as a hand-held mortising machine. Many woodworkers use a router with an edge guide for mortising in table apron-to-leg or stretcher-to-rail applications, for instance. Another method that gives better control and results is using a router with a guide bushing and a shop-made jig.

The router jig consists of a slotted base and a hardwood fence. The fence registers against either a reference face to mill a through mortise or a reference edge/end to cut a blind mortise. It is a fool-proof set-up, as you will see later.

### The Right Bit and Guide Bushing

The width of a mortise is typically about one-third of the thickness of the mortised stock. I used a 5/16" dia. up-cut bit that allows faster feed rates and comes with less chance of bit wandering. For better chip extraction, pick a collar size that offers a large offset.



The collar was too long, so the author trimmed the excess with a hacksaw.

### Build the Jig

First, cut a 3/16" thick hardboard, large enough to fully support the plunge router base and allow for clamping of the jig to the workpiece. Lay out and cut the two mortise slots on the hardboard using a straight bit on the router table. If the bit is smaller than the slot's width, rout the slot in multiple passes, adjusting the fence after each pass. In the last step, attach the fence to the base.



Use the slot close to the fence to cut blind mortises and the other one to mill through mortises.



To start the cut, place the right end of the hardboard on the router table and lower the board onto the spinning bit, routing from right to left.

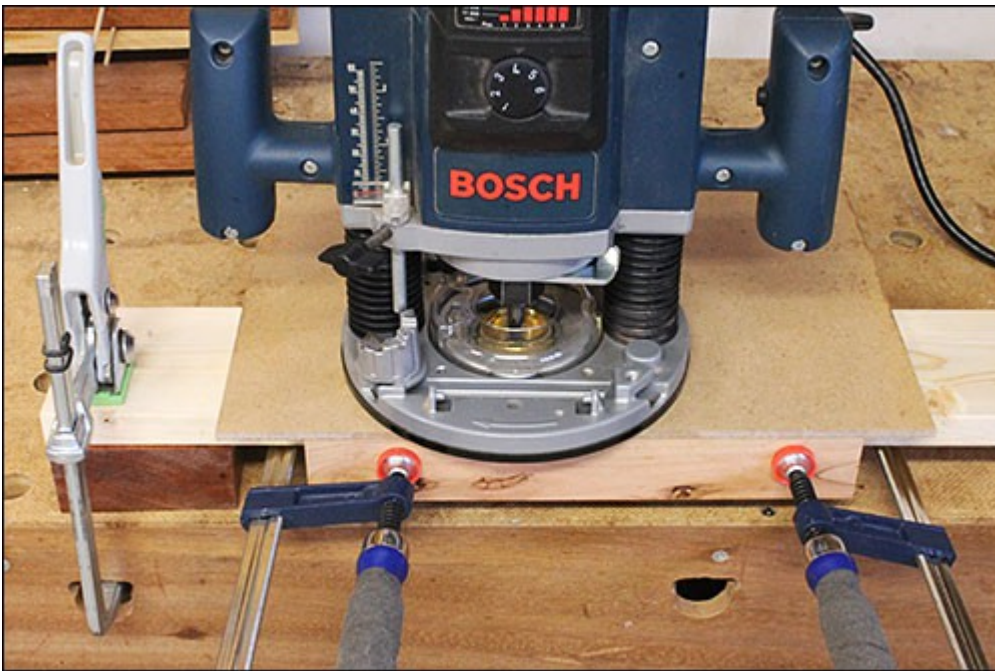


Attach the fence, which determines the positioning of the mortise, after factoring in the offset.

### Rout the Mortises

To use the router jig, clamp it in place on the workpiece, registering the fence against the workpiece's reference edge or face. To cut the through mortises on the legs, use the slot farthest from the fence. Rout the through mortises in multiple passes and keep the router oriented the same way throughout the routing for a consistent cutting path. To cut the rest of the mortises, which are all blind, use the slot closest to the fence. The jig design is fool-proof – there is zero chance of mortising with the wrong slot in this project.





For best results, rout in shallow passes with the aid of good dust extraction.

### Square the Ends

Square loose tenons are not only easier to mill, but also give the look of a traditional mortise and tenon joint. Scribe the ends square and pare them clean, checking to be sure the ends are flat and square.



Pare the ends and check they are square and there are no high spots.

### Mill the Loose Tenons

Cut the tenons 1/16" short to allow for glue escape. Put a



chamfer all around the tenon ends to ease the entry into the mortises. Once the sawhorses are assembled and glued, plane the tenons flush. The last step is as before – attach the rails and secure the saddle joints with screws.



The author made a dust shroud on his cross-cut sled, which trapped almost all of the sawdust.



Sand or plane the joint flush, going with the grain.

As you see, whether or not you own a mortising machine such as the Domino joiner or know how to hand cut a mortise and tenon joint, you can still build long-lasting projects ... with a strong and fool-proof tenon joint.