

SUPER FMT CHAPTER 7

Special Joints

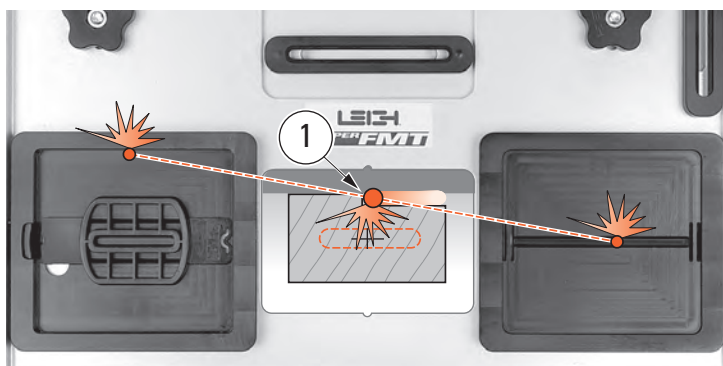
Angled Joints
Through Tenons
Bridle Joints
Asymmetric Tenons
Haunched Joints
Doweling

Before using your Leigh Super FMT you must have completed all of the preparatory steps including reading the router safety recommendations on the previous pages. If you haven't done so, it is essential that you do it now.

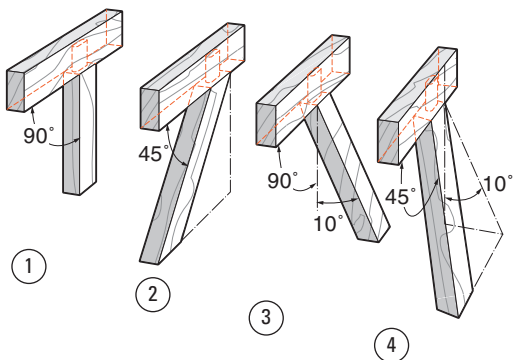
⚠ IMPORTANT SAFETY NOTE

Take great care to not “trap” the bit against the side of tenon rails ①. Do not attempt to rout center tenons in rails thicker than $1\frac{5}{16}$ " [34mm] before referring to 5-39 through 5-44.

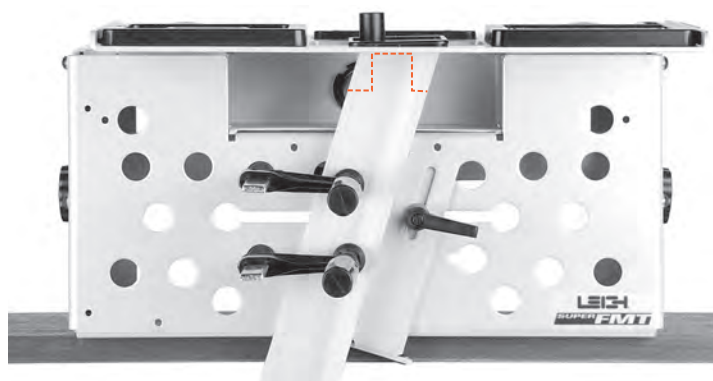
Without using the table movement as prescribed, the bit would have to be plunged into the side of the tenon rail causing the bit to powerfully “drive” the router across the jig. **This could be dangerous and can damage the jig.**



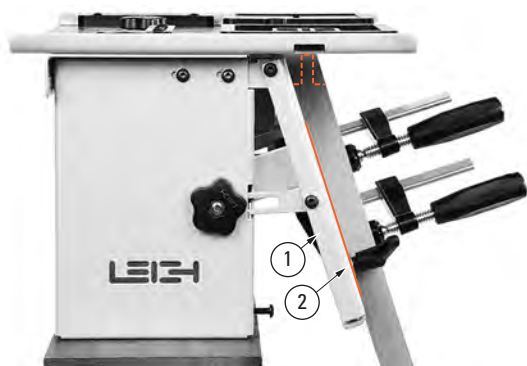
Angled Joints



7-1 The majority of frame joints are at 90° ① but the ability to angle joints is essential in chair construction, for example. Whether these joints are single angles ② and ③ or a compound angle ④ they are easily achieved on the Super FMT.



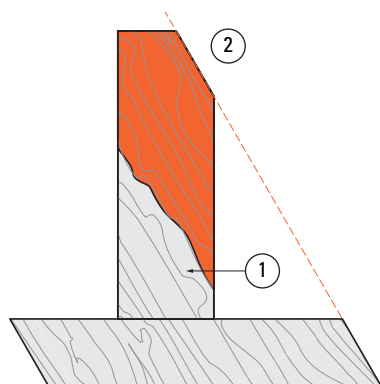
7-2 Angling the sidestop fence gives a single angled joint in the left-right direction.



7-3 Angling the clamp plate ① with the sidestop in a vertical position ② gives a single angled joint in the front-back direction.



7-4 Angling both the sidestop fence and clamp plate gives a double or compound angled joint.

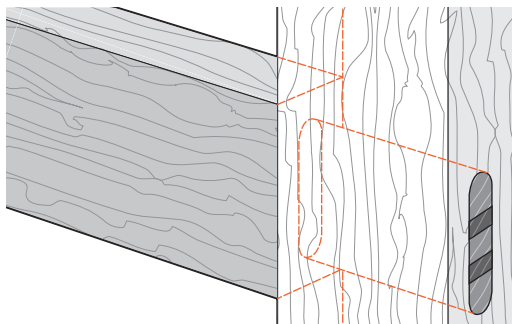


7-5 The Super FMT clamp plate can be angled up to 30° but it is doubtful you will ever need to approach even 10° on a mortise & tenon joint. The strength of a tenon across its grain lessens considerably as the angle increases ①. In addition, the length and position of the tenon is limited in slope by the angled workpiece relative to the vertical bit ② (angle shown in illustration is exaggerated).

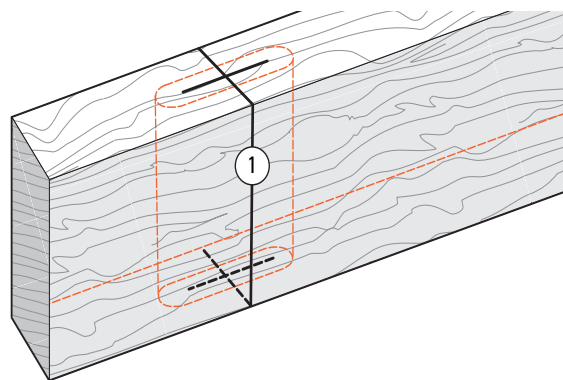


7-6 However, you may for example, want to machine spline mortises or dowel holes in a stave type construction in, say, octagons at 22½°, or hexagons at 30°, so the 30° capacity may prove to be useful. You can then machine precisely fitting splines on the Super FMT and trim them to length. ■

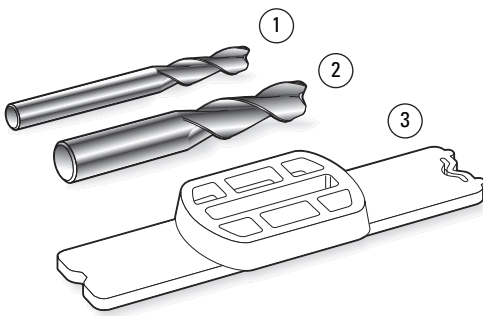
Through Tenons



7-7 Through Tenons Occasionally, a design feature will call for through, exposed tenons, possibly “wedged” for decorative effect. The limited depth of cut of router bits can make this difficult, but the two-sized bit technique described previously, combined with the precision of the Super FMT, makes this procedure perfectly feasible in many instances.



7-8 The problem with through mortises is their great depth relative to the cutting depth and diameter of the bit. However, if the left-right part of the joint center mark ① is carefully squared around the mortise workpiece, it is possible to accurately plunge from **both sides**.



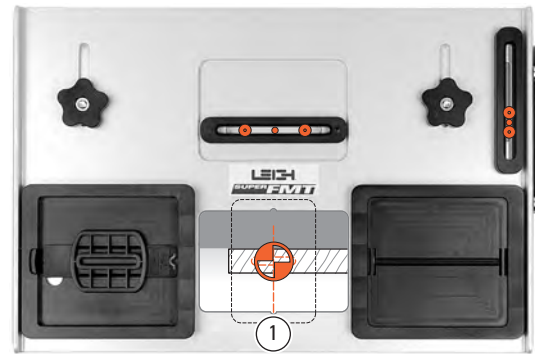
7-9 Here's an example:

$\frac{1}{4}$ " [6mm] joint through $1\frac{1}{2}$ " [35mm] deep mortise.

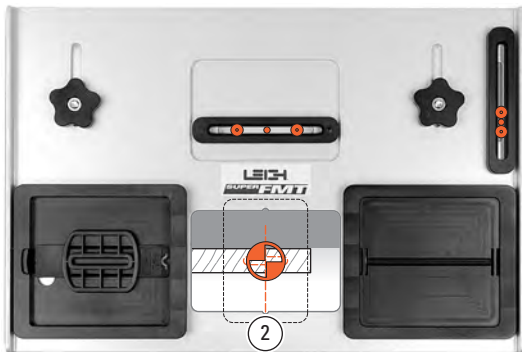
Select $\frac{1}{4}$ " [6mm] bit for mortises ①.

Select $\frac{1}{2}$ " [12mm] bit to rout the $1\frac{1}{2}$ " [35mm] long tenon ②.

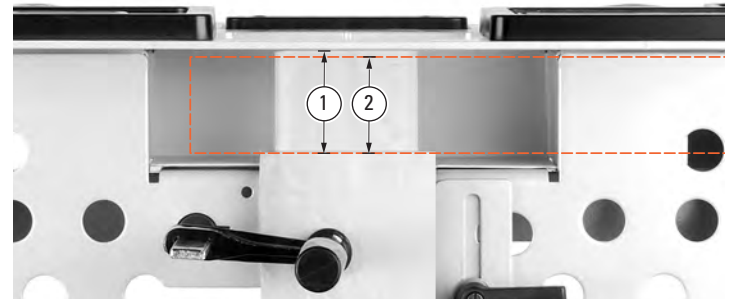
Select $\frac{3}{8}$ " [8mm] guide ③ for length from the guide/bit selection chart in Appendix I.



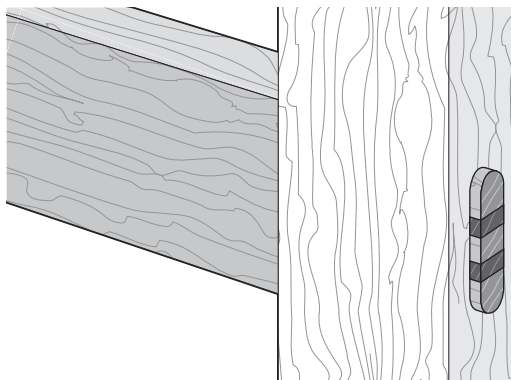
7-10 Carefully sight the mortise taking particular care to center the "vertical" line ① in the sight. Plunge and rout down deeper than half the mortise board depth but no more than the cutting length of the bit.



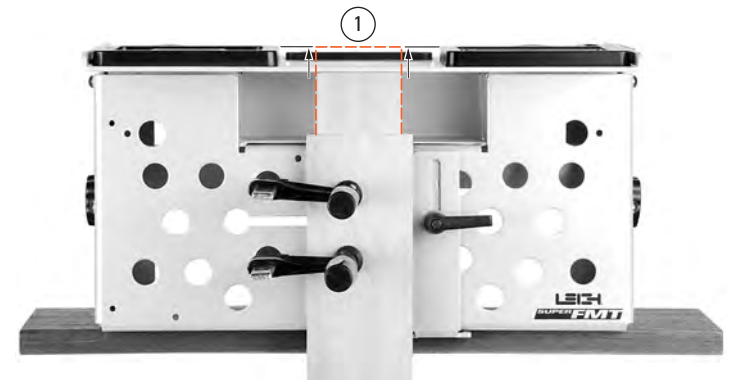
7-11 Turn the mortise piece end for end and, **keeping the same reference side of the mortise board to the clamp face**, carefully sight the "vertical" mortise center mark ② and lock the table. Plunge and rout to clear the through mortise.



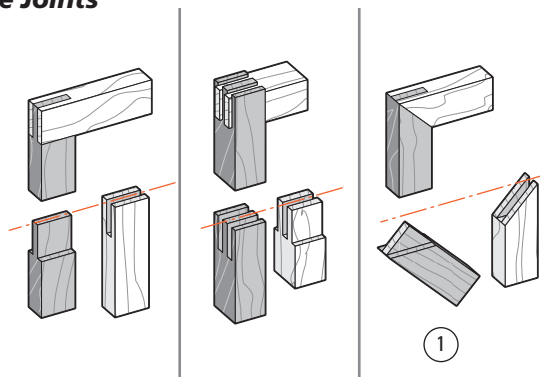
7-12 Rout the tenons with the larger (longer) bit for slightly more tenon depth ① than mortise depth ②.



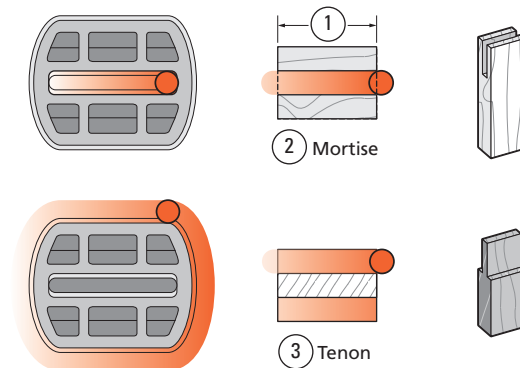
7-13 It may even be possible to make tenons long enough to be raised if this decorative effect is desired. "Wedging" the tenons is a simple hand procedure and adds a nice decorative touch. By design, mortise length is slightly greater than tenon width. Wedging expands the tenon to eliminate the gap.



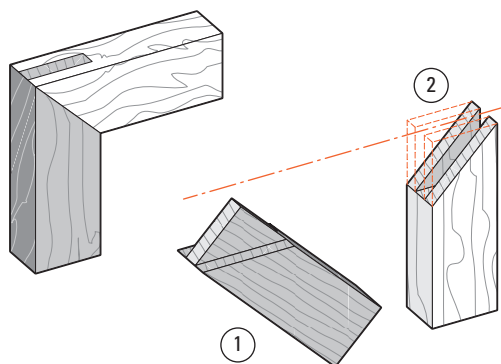
7-14 If the tenon stock is smaller than the table opening it may be possible (after sighting) to slide the tenon workpiece up to gain an extra $\frac{1}{2}$ " [12mm] ① (exaggerated for clarity) of tenon length (assuming of course that the bit has sufficient routing depth) but no higher than the top of the guide moldings ①. ■

Bridle Joints

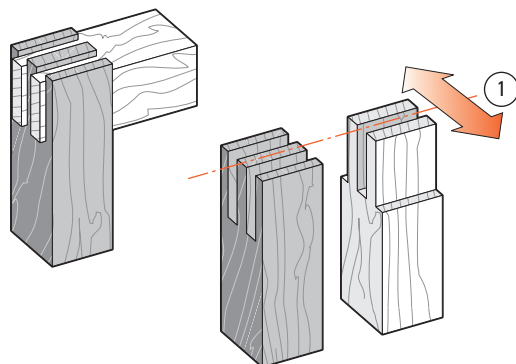
7-15 Routing bridle joints on the Super FMT is simple. All the workpieces (with the exception of the mitered tenon) ① are mounted vertically on the jig. Fit for bridle joints is adjusted with the left guide pin.



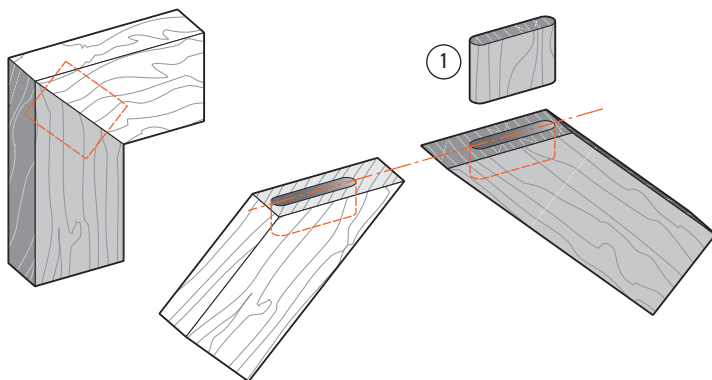
7-16 Select a guide that is greater in length than the workpiece width ① by at least two bit diameters. Rout right through the “vertical mortise” ② and across the tenon sides ③. The bit will clear the edge of the workpiece before the guide pin reaches the rounded part of the guide. Adjustment for fit is made with the left hand guide pin.



7-17 The mitered “tenon” is mounted at 45° on the clamp plate ①. The “mortise” end miter ② is cut on the table saw after routing the mortise.

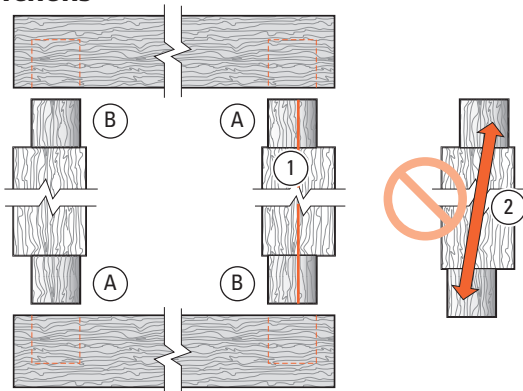


7-18 Twin bridle joints use the technique shown above combined with the table movement ①. See Twin Joints, 5-12.

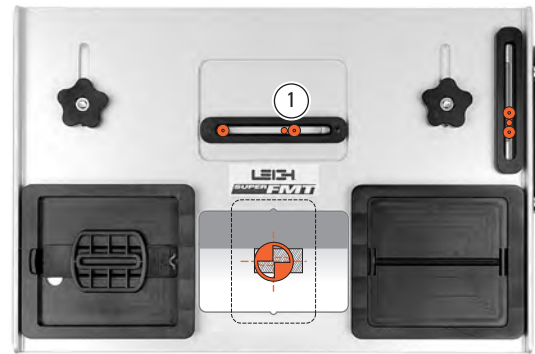


7-19 Floating Tenons A “floating” tenon in a mitered corner allows for a greater joint glue area at the inside of the corner. On this mitered corner, the workpieces are mounted in the jig at 45° and the mortises routed. The floating tenon ① is routed on the end of a vertically mounted scrap piece using the same guide and then sawn off. ■

Asymmetric Tenons

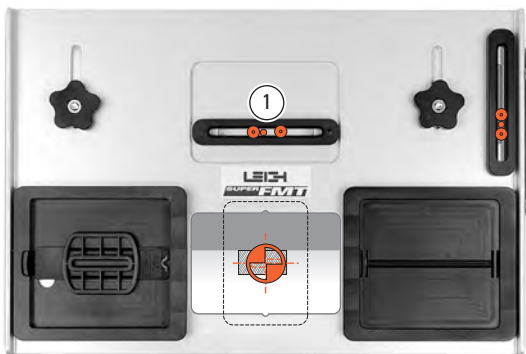


7-20 Asymmetric Tenons Not all tenons are centered on the long axis of the workpiece end ①. This means that tenons “A” are routed at one table sighting and tenons “B” at a second table sighting. If they aren’t routed in this manner, the two tenons will be diagonally opposed to each other ②.

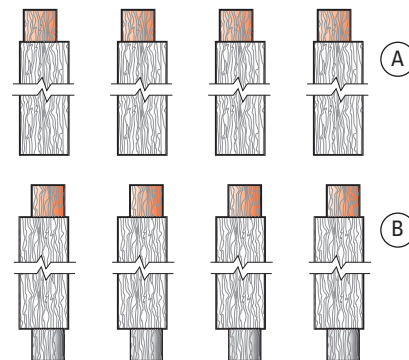


7-21 Use the LR limit stops for rapid changeover from tenons “A” to tenons “B”.

For example, with the workpiece centered on the jig, sight tenon “A” and set the right hand limit stop to the right of the post ①, then...

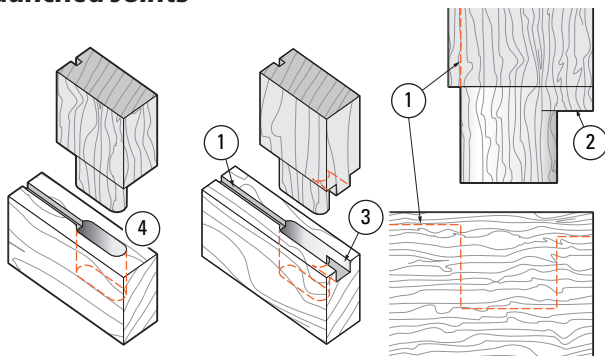


7-22 ...sight tenon “B” and set the left hand limit stop to the left of the post ①. Now alternately route tenons “A” and “B”, moving the table left and right each time, or...

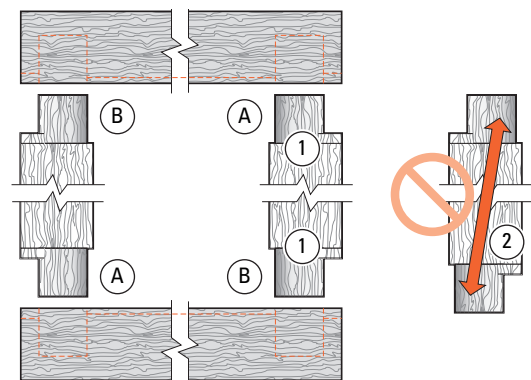


7-23 ...if you don’t trust yourself to get the sequence correct, you could route all the “A” tenons first, then change the table one time to route all the “B” tenons. This latter procedure would be the simplest way to route haunched tenons (covered in the next section). ■

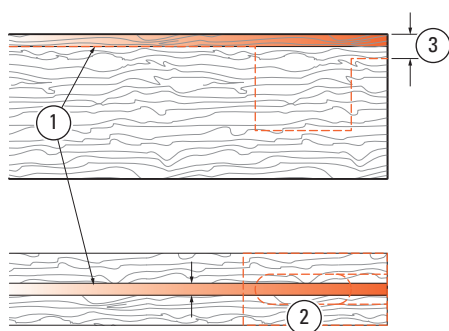
Haunched Joints



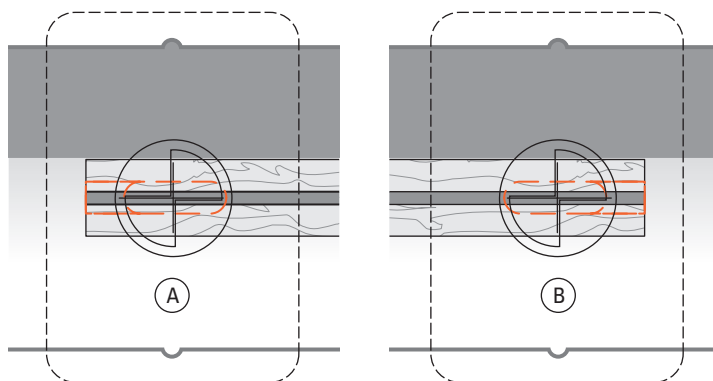
7-24 Frame and panel door construction can call for rails and stiles to be grooved for the panel ①, and the tenons haunched ②, both for joint stability and to fill the end of the stile groove which is sometimes run right through ③. This is not as common as it once was. Routers and router tables now make it simple to have a stopped groove ④, avoiding the need for the haunch.



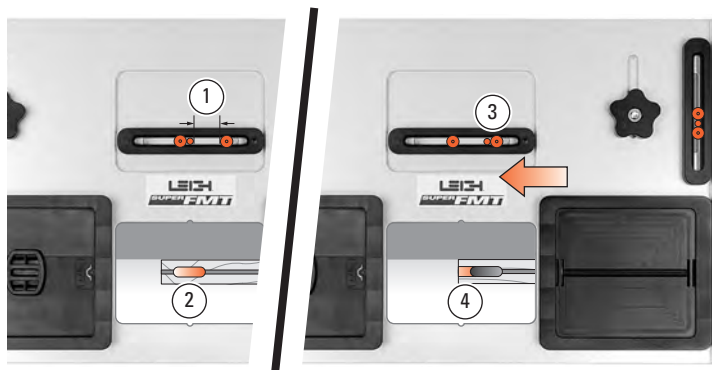
7-25 Haunched mortises and tenons are “handed”, and require separate setups for each. e.g. if these two tenons ① were routed with the same jig setup, the result would be offset tenons ②. So mark out the two types of corners as “A” and “B” mortises and tenons.



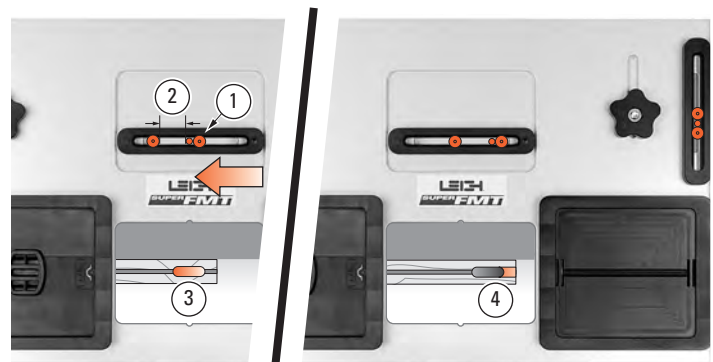
7-26 First, groove all the workpieces ①. The groove should be less than the mortise width ② and shallower than the haunch recess ③.



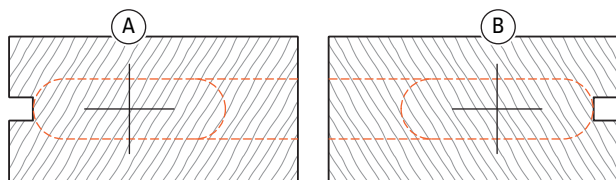
7-27 Sight both the “A” and “B” mortises. Set stops or mark the outrigger for repeatable successive workpieces. Position and lock the $\square$ FB Limit Stops against the post.



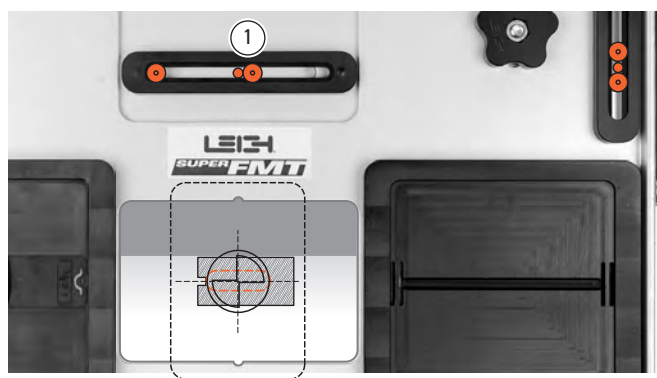
7-28 “A” Mortises and Haunch Recesses Set right hand $\square$ LR Limit Stop away from the post, $\frac{3}{4}$ of the guide length ①. e.g. 1" guide, move $\frac{3}{4}$ ". Table still in “mortise center” position, rout mortise full depth ②. Raise the plunge. Move table left to the stop ③. Lower the bit to haunch depth; set router depth turret. The router is now set for both depths of cut. Rout haunch recess ④. Repeat for all “A” mortises.



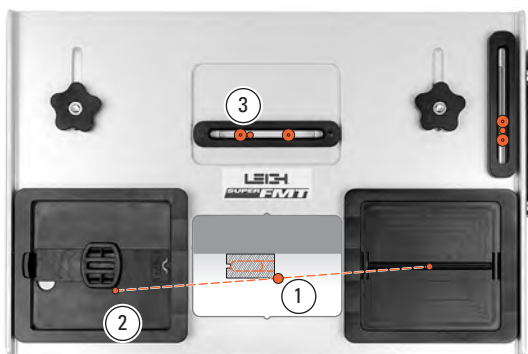
7-29 “B” Mortises and Haunch Recesses Move the table left to touch the right hand $\square$ LR Limit Stop against the post ① and lock the table. Move the left hand $\square$ LR Limit Stop (by $\frac{3}{4}$ of the guide length) to the left ②. Rout the “B” mortises ③ and haunch recesses ④ using the table movement and the same router depth settings.



7-30 Routing the Tenons Mark the tenon centers “A” and “B”. Remember, the tenons are “off center” and each end of the tenon pieces are marked off center in opposite directions. **Prepare and make a couple of extra (scrap) tenon pieces to use in setting haunch bit depth later (see 7-35).**



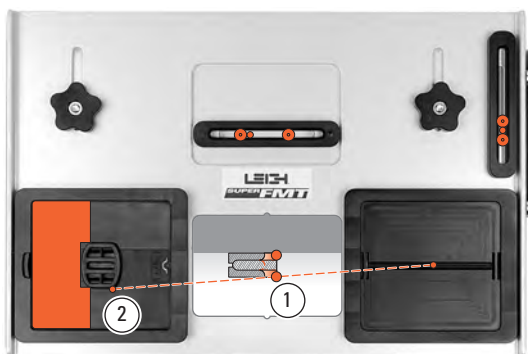
7-31 “A” Tenons With the workpiece centered on the jig, sight the tenon center and set the right hand $\square$ LR limit stop to the post ①.



7-32 Move the table right to a position where the bit will clear the end of the haunch ① while the guide pin is still on the straight part of the guide ②. Set the left hand **LR** limit stop to its post ③.



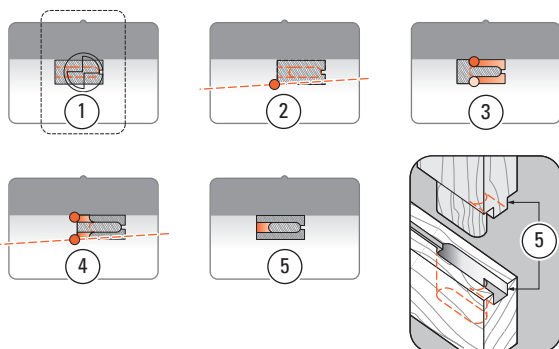
7-33 Move the table to the left again and if necessary, set a “guard” piece in the guide recess ① to prevent routing around the right end of the tenon ②. Rout the left end of the tenon (shaded area) at full shoulder depth.



7-34 Move the guard to the left end of the recess. Move the table right and rout the rest of the “A” tenon at full depth; the bit prevented from rounding the haunch off at ① by the guide pin against the guide side at ②.



7-35 Move the table left, remove the guard from the bit recess. **Depth:** You will have to preset the plunge router depth-of-cut rod and turret so that the routed haunch exactly equals the depth of the haunch recess ①. Use the scrap test tenons to achieve this setting by measurement and a little trial and error. Now rout completely around the actual tenon.



7-36 “B” Tenons on the other end are routed with the procedure reversed. ■

Doweling



7-37 Sometimes where the strength of a mortise and tenon is not required, doweling may be a suitable alternative. A bonus use of the Super FMT is its ability to provide very precise dowel hole boring. Turn the left hand guide pin down to “zero free play” in the mortise guide slot. Simply use one or both ends of a mortise guide slot for positioning while plunging the dowel holes. ■