Fastening Tabletops

How to cope with wood movement

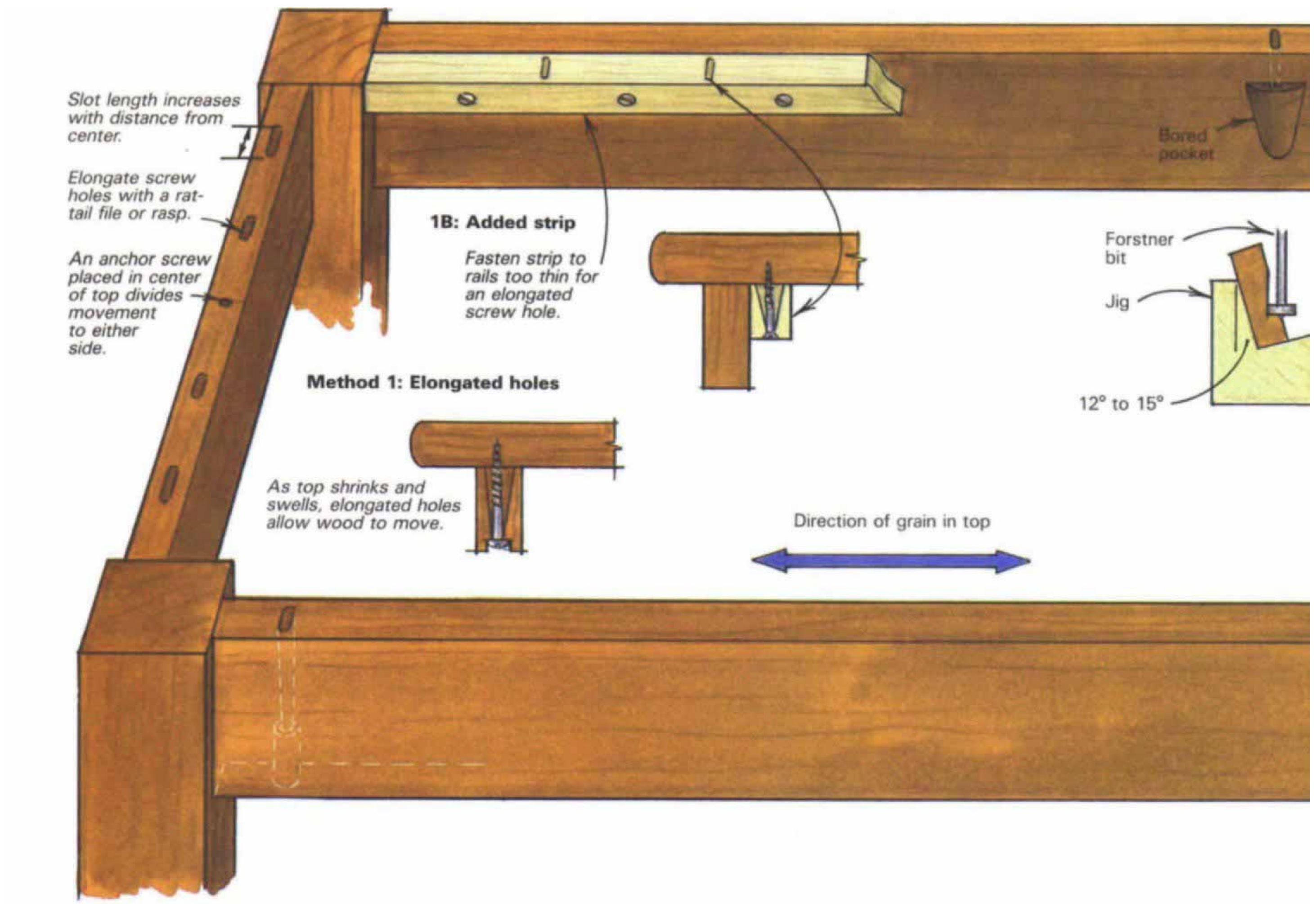
by Christian Becksvoort

I remember the first table I built in the junior high school wood shop: Philippine mahogany, carefully mortised and tenoned. When it came time to attach the top, I went whole hog; glue all around and black, round-head screws. I took the table home, put some plants on it and parked it directly over a hot-air outlet. Needless to say, the top did not survive the winter. It bowed and cracked. Thus ended round one in a continuing battle of wits between wood movement and my efforts to cope with it.

What it comes down to is this: When relative humidity goes up or down, so does the moisture content of wood, and it expands and contracts in width, across the grain. It doesn't change in length (actually it does, but so little that it can safely be ignored). The problem is how to attach a solid-wood tabletop that shrinks and expands across the grain to rails that don't change in length.

When designing a table, there are ways to minimize wood movement. In general, let the grain of the top run in the longest dimension. For example, a 3-ft. by 7-ft. tabletop should be glued up from 7-ft. boards, so there's only the movement of the 3-ft. width to contend with. On a round or square top, glue up the top from quartersawn stock, if possible, because it's likely to move about half as much as plainsawn stock.

Even using quartersawn stock won't eliminate wood movement problems, so I use one of the four methods shown in the drawing to accommodate movement. All of these require screws in some form or another. No matter which method I use, I anchor the tabletop at each end with a screw through each rail, skirt, brace, or support where it intersects the centerline of the



top. This screw divides potential wood movement into halves,. 50% to the left of center and 50% to the right.

Method 1, the one I use most often, is simply screws through the table rails into the top. Except for the anchor-screw hole at each end, the holes are slotted or "ovalized" in the direction of potential movement with a rat-tail file or rasp. In the end rails that run across the grain of the top, the farther these holes are from the center, the longer the slots. In the side rails that parallel the grain of the top, the slots are all the same length. Use an awl to mark the actual location of the screw in the slot. To ease the actual movement I sometimes use round head screws and washers.

On a table with relatively thin rails, the slots would break through the side rails. In this case, I glue or screw strips to the inside edges of the side rails, as shown in drawing 1B.

Drawing 1C shows a variation of the slotted hole technique which allows screw access through pocket holes on the inside surfaces of the rails. On antique tables these pockets were three-sided holes chiseled into the rail. A faster alternative is to use a Forstner bit in a drill press. Make a jig, as shown, with a 90° rabbet tilted about 12° to 15°. Rails can be set into the jig, drilled with the Forstner bit, then re-drilled with a ¼-in. bit for the screw shank.

Method 2 involves grooves and fingers (sometimes called buttons). Before assembling the table base, run grooves along the inside upper face of the rails, then cut wooden fingers to fit the grooves. These are best cut in quantity from wide endgrain cutoffs, such as the trimmed end of the tabletop. An alternative is to use metal fingers (available from Craftsman Wood Service Co., 1735 West Cortland Ct., Addison, Ill. 60101).

Method 3 uses the "figure 8" or desk-top fastener (the best are Knape and Vogt #1547, but less expensive ones are available from The Woodworkers' Store, 21801 Industrial Blvd., Rogers, Minn. 55374). The fasteners are installed in shallow, blind holes flush with the tops of the rails. This method is ideal for fastening rails or cleats running across the top grain because the fastener pivots as the wood moves. If set in slightly oversize holes and positioned at a 45° angle to the rails that parallel the grain, a desk-top fastener will allow a bit of movement, though not as much as a finger will.

I use the sliding dovetail shown in method 4 as a last resort for extreme amounts of movement or for a testle tabletop, where there are no long-grain rails. For example, I recently completed a 4 ft. by 24-ft. conference table made in three 8-ft. sections. The architect specified that the grain run in the 4-ft. direction, so each section had 8 ft. of moving wood to contend with. In this case, I routed a dovetail groove along the length of each 2-in.-thick rail running across the top grain (stopping just short of one end). I fastened 20 2-in.-long dovetail blocks along each long side of the top with a dab of glue and two screws. I waxed the dovetail grooves and slid a rail over each line of dovetail blocks. I put a heavy screw through the rail at the centerline of the top to anchor the two firmly and divide potential movement in two. □

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