

Saturday Program Meeting Raised Panel Construction – Jerry Shivers

Jerry Shivers demonstrated raised panel construction to sixteen members. Jerry already had



the footboard made for a walnut bed and decided to make the headboard for our demonstration. The footboard looks like it's two colors because Jerry had

already stained the panels to even out the color. If you are going to stain your project, **always** stain the panels before you install them. Jerry had a dimensioned drawing of the headboard (that's really



is 'bashful Jerry' behind the drawing) and asked the group to calculate the size of the various parts. The **stiles** are the vertical pieces that have the end-grain showing. The

rails the horizontal pieces that fit between stiles and the center pieces between the panels are **muntins**.

Stiles have one edge cut, **rails** have one edge and both ends cut and **muntins** have both edges and both ends cut. Our headboard example was 53" x 31½" overall. The calculations go like this:

- **Stiles:** 31½" (the overall height) x 2½".
- **Rails:** You have to know the length of the tongue for your rail & stile cutters to calculate the length – usually it's 3/8". For our example, 53" (overall length) – 2½" for the right stile and – 2½" left stile + 3/8" for the right tongue and + 3/8" for the left tongue. Final size is 48¾" x 4" for the top rail and 3½" for the bottom rail.
- **Muntins:** For our example, 31½" (overall height of the stiles) – 4" (width of the top rail) – 3½" (width of the bottom rail) + 3/8" (top tongue) + 3/8" (bottom tongue). Final size is 24¾" x 2½".
- **Panel Openings:** To equally space the muntins and panels, find the inside width (53" – 5" (2 stiles) = 48"), then subtract the total width of the muntins (2½" x 3 muntins = 7½") = 40½" and divide by the number of panels (4) = 10 1/8" opening for each panel.
- **Panels:** The maximum panel size is the opening width, 10 1/8" + ¾" (2 tongues) = 10 7/8" x 24¾" (the length of the muntins). Actually, you should plan to make the panels a slightly smaller to allow

for expected wood movement. The amount depends on the species of the wood, how dry wood is and how long it's been acclimated to your shop environment. Jerry advises he usually subtracts 1/8" to 3/16" from the **width** and 0 to 1/16" from the length. Wood moves a lot in width, but very little in length.



Once you get all your measurements, you can layout the pieces on your boards. Jerry always uses chalk for this because it's easy to read, especially on walnut, and

it disappears when you sand and finish the project. The object of the layout step is to get your parts out of the least amount of wood and choose the proper grain patterns. Jerry suggests that you use straight grain for the rails & stiles and cathedral patterns for the panels. If you use the cathedrals, point them to



the top of the project and center them on the panels as much as possible. You may use a little extra wood, but your project will look **much better**. Things to keep in mind when doing

the layouts include:

- Will both sides of the piece show? If not, you may be able to hide defects or sap wood on the backside of the piece.
- Watch snipe or machining defects. You can identify these defects by rubbing your chalk across the board.
- Allow a little extra width and length in your layout measurements so you can perform multiple dimensioning steps to arrive at the finished size.
- Write the name, dimensions and machining edge on the **face side** of each piece with chalk. That will help you keep track of the pieces and faces when you do the other steps.



Cut the pieces to rough length – it's easier to joint a short piece. However, for safety's sake, pieces you intend to joint should be at least 12" long. Jerry usually takes a 1/16" cut

with his jointer. He's found that it produces a good

cut with a minimum number of passes. Remember to start your cut with pressure on the infeed table and shift the pressure to the outfeed table as the board clears the cutter head.



Once the edge of the board is straight and smooth, you use that edge on the table saw when you cut the pieces to width. Jerry likes to set his blade to "½ finger

height" above the board – in case he gets his finger in the way, it will only cut half way through! I guess there is some logic to that. Your pieces should have one jointed edge (usually the one that will be exposed) and one that's 'table saw quality' that will be machined with the stile cutter.



Now it's time to cut the pieces to length. Jerry believes that radial arm saws are only good to rough cut pieces to length. He uses a miter saw with a long support table to make

his cuts. First, he does a cleanup cut. Then he measures and marks the piece, carefully lines up the saw blade with the mark and clamps a stop block in place so similar pieces can be cut the exactly the same length. A clean, square crosscut is required for the rail & stile profiles to fit properly. Save some of the cutoffs to use as test pieces to set the rail & stile and panel cutters.



Now it's time to setup your rail & stile cutters. Jerry usually makes his first test cut with the stile (edge-grain) cutter. Then he manually adjusts the rail (end-grain) cutter so that

it will cut off the tenon and leave no residual. If additional adjustment is needed, simply cut the end of the piece off, adjust the bit and try again. When the rail cutter cuts the tenon off completely, the face side of the pieces will be flush and tight. All of the cuts are made with the piece **face down**, so, if you can read the writing on the pieces, they're upside down. Next, make all of the end-grain cuts on the rails and muntins. By making the end-grain cuts first, most tear-out will be cleaned up by the edge grain cutter. Jerry has a neat sled with a toggle clamp



that holds the pieces tight and square during the cut. You should also use a backing piece to minimize tear-out. Then make the edge-grain (rail) cuts on the rails and muntins. Now, dry fit the frame together to make sure everything fits properly and the spacing for the panels is correct.

Now, you're ready to make the panels. Cut the panels to the proper dimensions and test cut with your panel cutter. If you're using a large, multi-wing, horizontal panel cutter, you must use a slower speed router with a lot of power. If your bit has a 'back-cutter', then you adjust the height so that the top of the panel is flush with the frame. The back-cutter will automatically make the edge of the panel slightly less than ¼" so you get a snug fit in your frame. Without the back-cutter, you have to adjust the cutter so that it leaves the edge of the panel slightly less than ¼". Panels are always cut face down. Sand (and stain, if required) the panels before they are assembled in the frame.

Now, for the fun part. Carefully assemble the frame and panels. Be careful not to get glue on the panels – they have to be free to move, otherwise they will break the frames when they contract and expand with humidity and temperature changes. If you are making doors, you can put some special little balls in the groove of the frame before you assemble the door. The plastic balls will hold the panel in place. Another method is a small brad through the back of the frame and into the panel. Glue the frame together, squaring the frame and using light clamp pressure. When the glue is dry, carefully sand the frame to get all of the faces flush and smooth. If the project requires stain, now's the time to stain the frame. Then apply your choice of finish to the entire assembly.



An example of an arched, raised panel door Jerry made from scraps in about 20 minutes.