

6.1 Constructing The Rim Form

Forms for construction of banjo rims can be made by many different methods dependent upon the tools that are available to use, but this method is quick, inexpensive, and fairly robust to withstand the clamping forces necessary to produce a rim that features solid construction and has no voids that would effect structural integrity or sound production.

Rim forms for laminated rims are normally used to retain a number of plies as they are assembled into a complete rim, each layer being consecutively fitted and glued to the previous layer until the desired thickness is obtained. The exact methodology varies by how any particular builder prefers to work, but the desired result will be to produce a rim that is consistent in dimension and has no internal voids that would result in a loss of rigidity and strength.

Some forms are made to produce a slightly larger diameter rim blank to be machined or lathe turned to finished dimension, but my preference is to utilize a form in a manner that produces a rim that will be close to the correct outer diameter after being removed from the form. Ideally the need for sanding of the exterior surface will be minimal to minimize excessive amounts of labor.

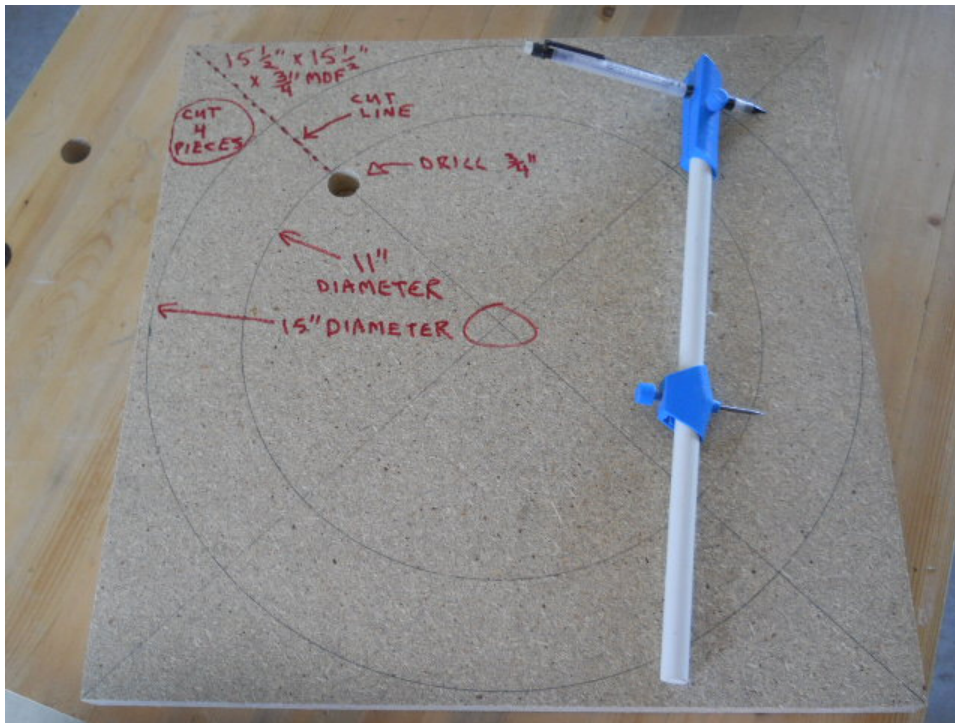
Many rims for resonator banjos are made from three thick plies, but open back banjos are seen with rims of various configuration with a thin laminated rim being popular for use with many of today's makers.

I prefer this type of rim for open back banjos and also prefer to work with plies that are made to approximately .010" in thickness. Plies of this thickness can be steam formed quickly, bent to the desired shape with much less fear of fracturing in the bending process, and the layers easily joined with simple lapped end joints. These mid-thickness plies also easily conform to each previous layer to produce tight and gap-free laminated rims, an important consideration. The mid-thickness plies are also easily machined without excessive risk of grain tear-out that can be a problem with other methods of construction. More on that later.

Here is an overview of my preferred method of rim form construction, but I'll offer a few options to the basic process; those based on alternative tools that may be available to use.

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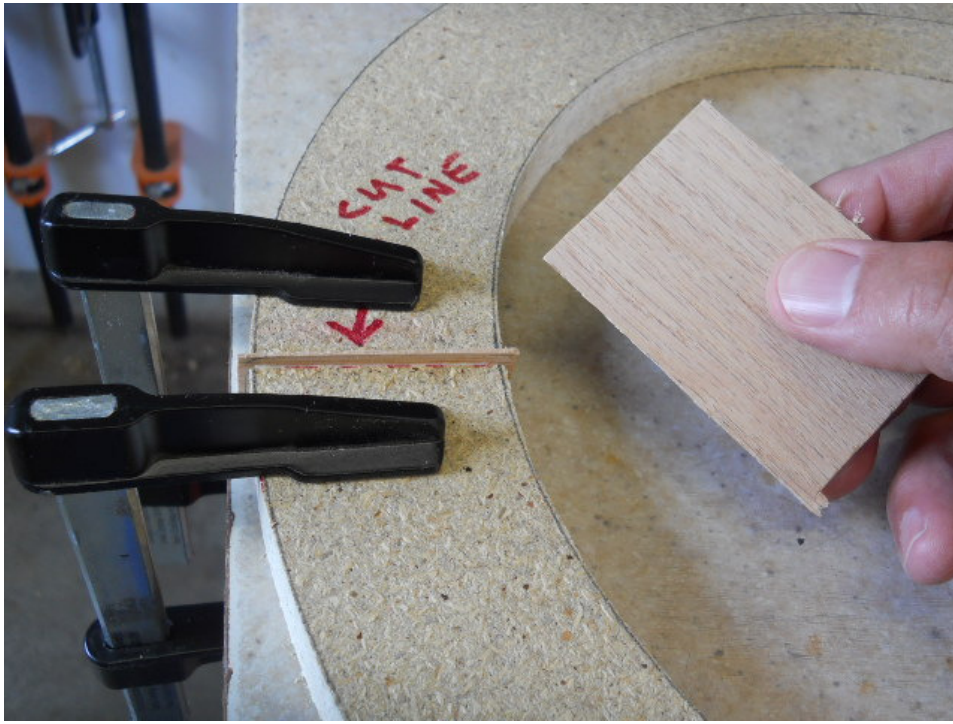
1. Lay out the pattern ring for the form. In this case it is drawn on a 15-1/2" by 15-1/2" by 3/4" piece of MDF (medium density fiberboard). The general idea is to use a band saw to remove the outer waste, cut directly into the 3/4" blade clearance hole, and cut out the inner waste portion. Save the inner portion, as it will be used to make the lamination forming jig, to be covered later.



2. The band saw is being used here to cut out the inner waste area. This cut needs to be made accurately, as this ring will serve as a pattern for the remaining sections. Saw close to the line and finish the work by using the 3" 80 grit drum on a vertical oscillating spindle sander. Accuracy is important, as this will determine the finished size of the rim.



3. Since a small amount of material was removed by the band saw blade its good to add a small piece of veneer or other filler material so the inside diameter profile will be kept to its originally drawn dimensions. The filler material is sanded flush to the top and bottom surfaces before the inside and outside diameter profiles are sanded to the drawn reference lines.



4. The form is carefully sanded to the inside diameter reference line with the 3" 80 grit sanding drum of the vertical oscillating spindle sander.



5. Once the “master pattern” has been established it is used to draw the remaining layers on the blank material with a large tip black Sharpie. When these are cut out on the band saw it will be assured that there is enough overhang to pattern route the edges if the band saw cuts are made slightly outside the black lines.



6. If it is preferred to leave the layers intact without a cut to the inner portion a jig saw can be used. It's best to allow a bit more tolerance for the cut so any chip out will remain outside the pattern routed edges. Not shown, one of the mating sections is drilled with 5/32" holes about 4" apart so the rim form layers can be held together with #6 by 1-5/8" drywall screws.



7. Glue can be spread on both sides to be joined if there's any worry about glue joint integrity of the form.



8. The drywall screws are added to draw the layers together. Do not apply excessive force or the screws will strip out of the MDF. Use pieces of slightly dampened paper towel to remove all of the glue squeeze out from the glued layers.



9. A 1/2" bearing guided carbide edged router bit makes quick (but messy!) work of flush cutting the wider layer to the inside diameter of the pattern layer. Note the cutting direction; it's always best to go against the direction of cutter rotation to prevent any tendency to grab the work. This is done in a couple of passes to make the routing easier.



10. The same operation trims the outer surface flush with the pattern layer; note that the feed direction is reversed so the cutting is performed against the direction of cutter rotation. Again, taking a few lighter cuts is preferable to reduce the chance of chip out and to produce the smoothest finish.



11. The final two layers are cut using the band saw in this example. It is much quicker to cut out the layers with the band saw and the cut can be glued and closed with light hand pressure as the layer is glued in position. If you choose not to use painter's masking tape when adding the additional layers make sure to mark the sides so the hole locations can be drilled between the existing holes. The next photo shows the bonded layers covered with green tape and the screw locations marked on the outer side.



12. Here green painter's tape has been added on both inner and outer walls of the rim form to demonstrate how to make it easier to clean up excess glue. The next layers are glued by applying glue to only one of each mating face. This is sufficient, and is much easier to clean up the glue squeeze out. Choose between adding glue to both mating surfaces or a single surface based on comfort with your ability to provide good transfer of glue to both surfaces for a solid bond.

The screw locations for the first two layers are drawn on the outside green tape so it is easy to arrange the screw pattern for the next layer to avoid hitting any of the existing screw holes. Note that the drill bit has been marked with a bit of tape so 5/32" holes can be drilled just shy of going through the layer. This makes it less messy to insert the screws as the glue won't feed up through the holes as the layer is positioned.



13. Here the last layer is being joined to the opposite side. The screws will be removed from both sides once the glue has dried. The excess squeeze out has already been wiped away on the layer now positioned at the bottom of the rim form build up.



14. Both layers are being flush trimmed with the bearing guided router bit. Since both sides were added this makes flush trimming both the inside and outside edges of both layers quick and easy. The tape was left on because the layers are going to receive a final flush cut operation by using the vertical oscillating spindle sander. The tape can be removed before flush cutting, too.



15. The green tape is removed and a pencil is used to draw lines across the four inside layers. The marks are used so it's easy to LIGHTLY sand the inner surface with the 80 grit drum of the vertical oscillating drum sander and gauge when the entire surface is uniform and smooth. The important thing is that the surface is sanded to be at 90 degrees to the horizontal plane of the form and the inner diameter is kept to your chosen 11" dimension.



16. The finished rim form is shown here. It's pedestrian in nature, but the screw holes can be drilled and plugged with flush cut dowel pieces if you're going for a work of art. (Smile...)
The important thing with a rim form is that it is made accurately; uniform in diameter and sides that are 90 degrees to the horizontal plane of the form. The square shows this relationship in the photo. That's important so the lamination strips can be assembled gap-free without spiraling up or downward from where they should be when the strips are clamped in position.



Note:

The previous information is an excerpt from “Crafting The Bluestem Legacy Open Back Banjo, a complete illustrated guide to banjo design and construction based on following the path of least resistance”
