Curved Table Aprons

Layers of bending plywood faced in veneer are light and strong

by Bruce Peterson

Curved apron is veneered plywood. *The author laminated layers of bending plywood capped by veneer around a circular form (right) to make the apron for this table.*

As a furniture builder, I'm always looking for production methods that save time but don't sacrifice quality. A good example is a series of veneered tables with circular aprons that I build to sell through galleries. The joinery is simple, so I can concentrate on the details: veneer-matching, shaping, inlaying and finishing. I have a vacuum bag, which speeds up the veneer work considerably, and I use jigs to taper the legs and to cut the joinery that connects the legs to the apron. The challenge was figuring out how to make strong and stable round aprons quickly.

Initially, I considered the more traditional methods of forming a curve out of solid wood. But those methods are neither easy nor economical. Steam-bending requires equipment and set-up time. Laminating and bricklaying solid wood involve lots of cutting, fitting and clamping.

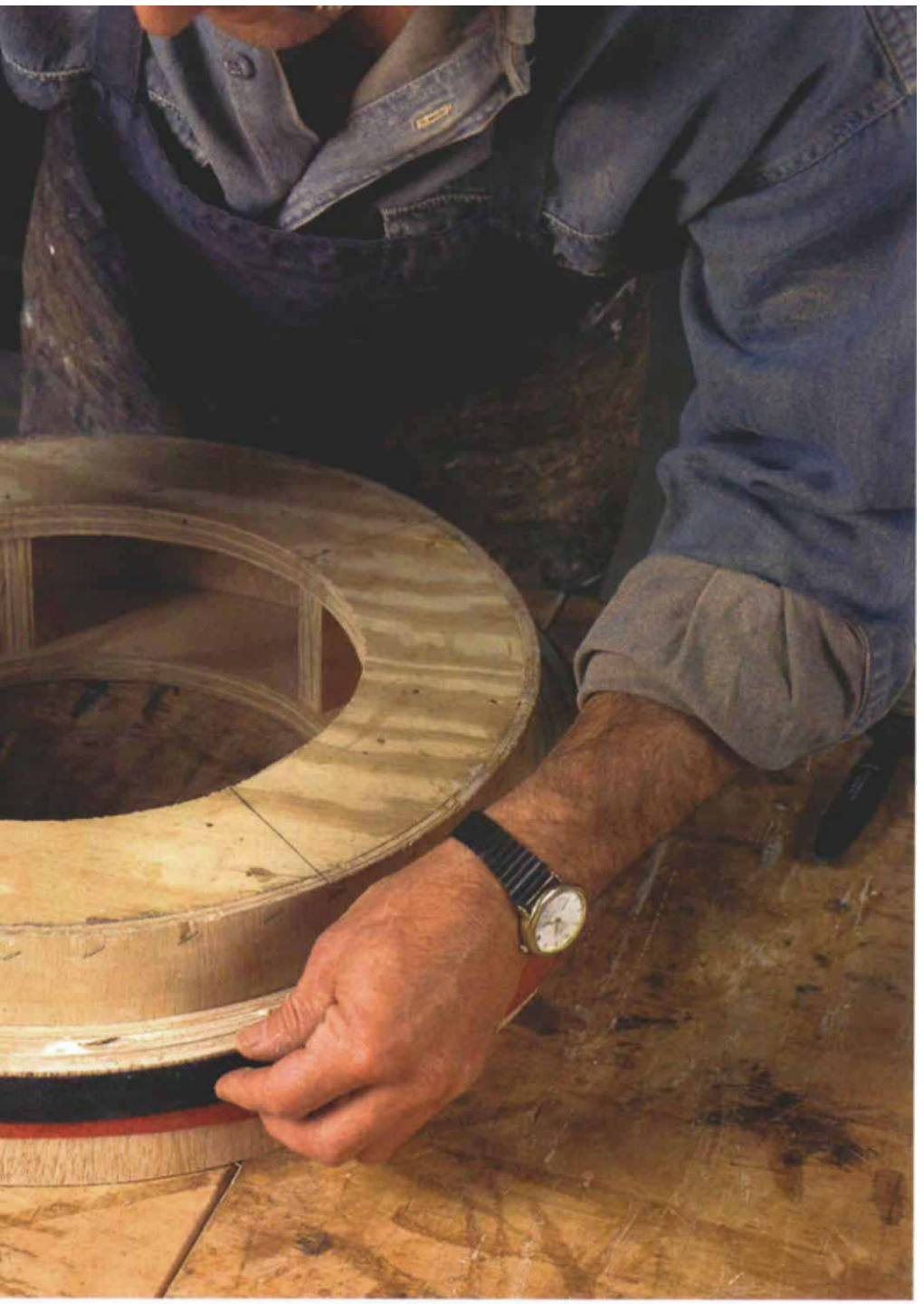
What I needed was a faster, less-expensive way to form a curved apron. I experimented with laminating strips of ⅜-in. bending plywood around a circular mold, or form. With some refinement, I could make a small table apron, ready for veneer, in just a few hours. And this construction is more stable and quite a bit lighter than a solid-wood apron.

The trick to this process is the bending plywood I use to make the circular form and the table apron (see the photo at right on the facing page). The plywood can be bent into fairly tight curves, but it will only bend along one axis. The two most common types are Wiggle Wood (also called Wacky Wood or Bendy Board) and Italian bending poplar. Wiggle Wood is available in ¼ in. and ⅜ in. thicknesses. Italian bending plywood is 3mm thick (just under ⅛ in.). Both come in 4x8 sheets. Large lumberyards carry one or both varieties. I used ⅜-in. Wiggle Wood for my table aprons.

Designing the table and the building forms

I use two wooden forms (see the photo on p. 67) to make my plywood aprons: one is

Photos except where noted: Alec Waters



Bendable plywood—*The author uses Wiggle Wood to make circular table aprons. The wood comes in 4x8 sheets, either ¼ in. or ⅜ in. thick.*

for a three-layer core and the other for a veneered outer layer that's glued to the core. The outer "skin" is made in quadrants that fit the spaces between the four legs. I veneer these arc sections in my vacuum press. The two forms shown in the drawings on p. 66 are the keys to getting tightly glued layers in the apron.

To size the forms, make a full-scale, top-view drawing of your table. From this drawing, you can get the diameters and the arc lengths you'll need. I take scraps of the plywood, bend them in a curve and set them on edge right over the drawing so that I can gauge and mark the thicknesses of the apron layers.

The end table I made is 20½ in. dia. (see the photo at left on the facing page), Its four legs are made from 1⅞-in. cherry. The table's plywood apron is 2¼ in. wide, and the top, made from 1⅛-in. medium-density fiberboard (MDF), is veneered with book-matched Carpathian elrn burl.

A form for the inner core—The form for the apron's three-layer core is a wheel of bending plywood reinforced with ¾-in. plywood (see the photo at left). The form's diameter is just under eight thicknesses of bending plywood less than the outside-to-outside dimension of the table apron. To be exact, figure in the two thicknesses of veneer (usually ⅛ in. each), as well.

To make the top and bottom of the form, cut two circles of ¾-in. plywood. They should be two thicknesses of bending ply less in diameter than the inside of the finished apron (see the bottom drawing on p. 66). Cut out the centers of the top and bottom so they're hollow, like tires.

With the top aligned over the bottom, insert, glue and nail six or eight plywood pieces between them. The pieces, which are higher than the apron width, resemble the spokes in a water wheel. Glue and tack (I used staples) a layer of bending plywood around the wheel.

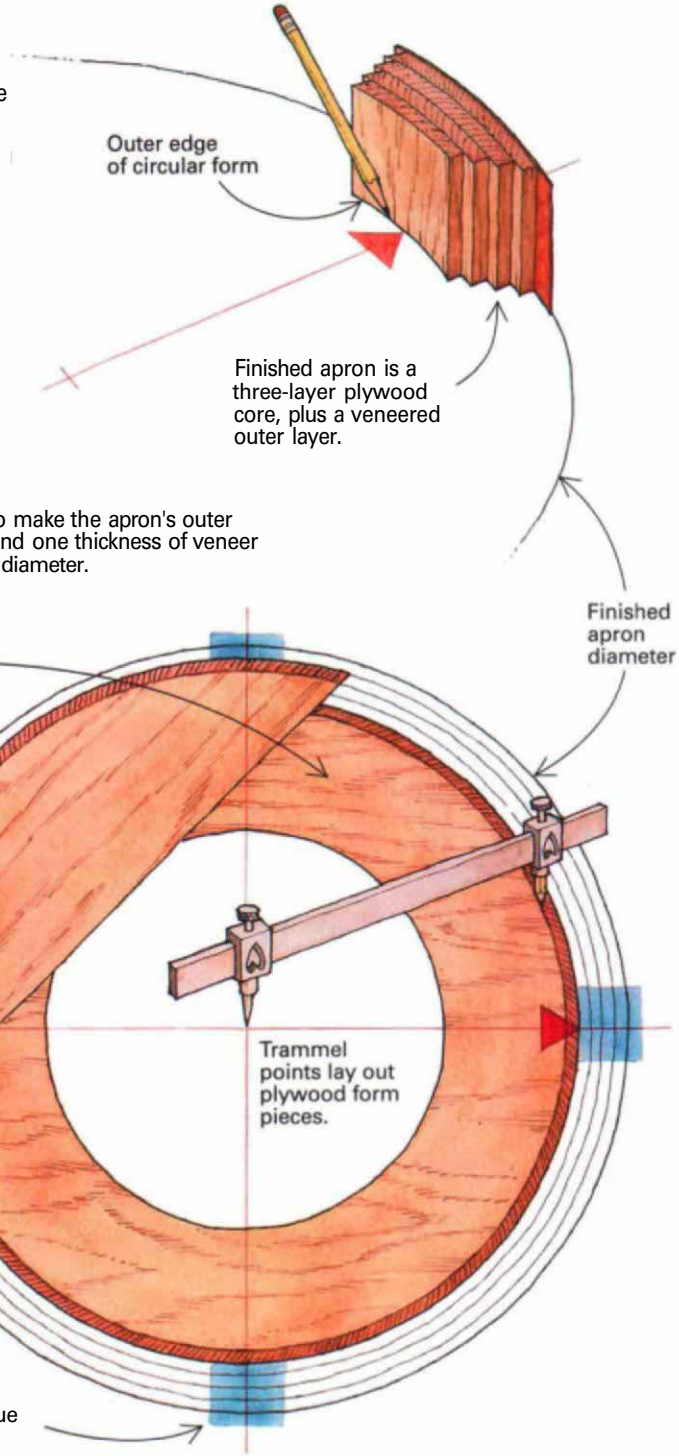
A form for the outer, veneered skin—The form for the outer, veneered layer of the apron is an arc that's slightly longer than a quarter of the table-apron core. The radius of the form is the outside radius of the apron less one layer of bending plywood and the thickness of the veneer.

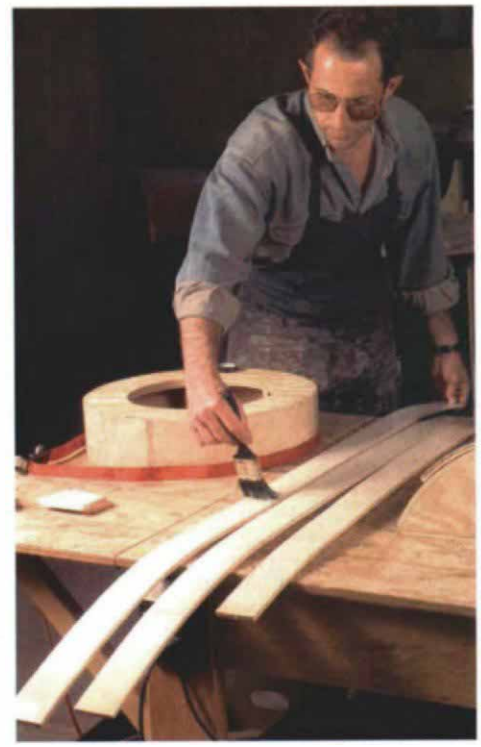
This form must be strong to withstand the pressure of the vacuum press. It should be about 18 in. from end to end so you will have enough room to glue four to six quarter sections at a time. Having one or two extra quarters is a good idea in case you ruin one of them during glue-up. And the

Photo at right: Vincent Laurence

Bending forms

To determine the exact shape of the two forms used to make circular aprons, the author starts with a line representing the diameter of the finished apron (right). The outside edge of the circular form for the apron's core is found by subtracting four layers of plywood plus the veneer.





Three layers of plywood *are painted with thinned glue and then wrapped and clamped on the form at left.*

extras can speed things up if you are doing a production run. To make the form, wrap and fasten a layer of bending ply over ribs of ¾-in. plywood that are attached to a plywood baseplate, as shown in the photo on the facing page.

If you plan to use hide glue and a veneer hammer or yellow glue and an iron to attach the veneer to the apron, you do not need to build this second form. You would laminate four layers of plywood (instead of three) over the first form. I like using a second form; in the vacuum press, it produces veneered quadrants that are bent in rigid arcs, ready to be attached to the core. I use epoxy for veneering because it makes a good bond and gives good working time. Also, epoxy reduces the cracking, lifting and chipping that can occur on the edges of delicate veneers.

Cutting and gluing up the apron

Cut the plywood for the apron layers in strips that are ⅛ in. over-width to allow for trimming. You'll need three strips for the inner core and a fourth for the veneered, outer layer. Wrap the innermost strip around the core form, and mark the strip where the two ends butt. Cut the strip ¼ in. short of this length so that it can be drawn together tightly on the form. Tape the strip temporarily in place on the form.

In a similar manner, wrap the second layer around the first strip, and then tape it. Do the same thing with the third and fourth layers. If you measure these lengths now, you can cut strips for subsequent tables. Dry-assemble to make sure that all the layers compress nicely. Remove the layers from the form, and then cut the fourth strip in quarters.

I use yellow glue that's been thinned with water to about the consistency of light cream. Thinning the glue will allow the layers to slide past one another as they are clamped. I use an old paint brush to apply the glue to one side of the three core strips (see the photo above).

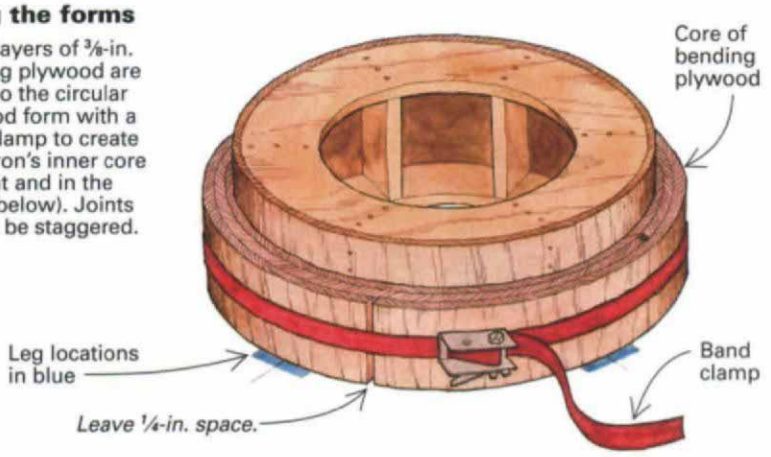
I clamp the layers together with two band clamps, making sure that the joints of the strips are staggered. After a few hours, I remove the clamps and trim and clean up the apron's edges. A jointer or stationary belt sander works well for this.

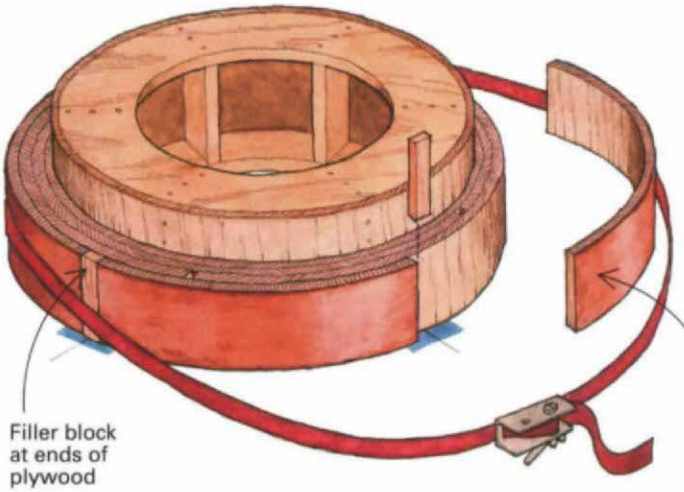
While the aprons are drying, I veneer the

Drawings: Jim Richey

Using the forms

Three layers of ⅜-in. bending plywood are glued to the circular plywood form with a band clamp to create the apron's inner core (at right and in the photo below). Joints should be staggered.





Veneer is applied to the last layer of plywood on a second form and then glued to the core (photo below). Filler blocks inserted in gaps between pieces help keep the core rigid during glue-up.

Forming the leg sockets—*The author starts on a tablesaw, using a miter-gauge jig to cut the ends of a half-lap joint for each leg (above). A bandsaw removes the rest of the waste (right).*

quarter-section pieces that make up the fourth layer of the apron in a vacuum press. (For more about this process, see *FWW* #110, pp. 82-85.) Once the veneered sections are removed from the press, I glue and clamp them to the core with band clamps. I like to fill in the voids between sections by gluing in apron and veneer scraps. The fillers don't have to look pretty because they'll be cut out for the leg sockets. But having a rigid, continuous circumference helps ensure accurate cuts.

I also plug any voids in the three inner layers. This gives the apron a cleaner look when viewed from below.

Joining the legs and the top to the apron

To join the legs to the apron, I use simple, but strong, half-lap joints reinforced with screws. This joinery allows the attachment of many different leg styles, and it is easy to do. Shape the legs after the joinery is cut, so you're working with stock that has straight sides and square corners. To determine where to lay out the leg sockets on the apron, return to your drawing. I like to place the apron directly on the diagram and transfer the leg locations to both the top and bottom of the apron.

Use a tablesaw to cut the limits of the dadoes for the half-lap joints in the apron. The depth of the dadoes is one-half the thickness of the apron. A scrap of MDF cut in the arc of the apron and clamped to the miter gauge makes a handy jig that helps steady the cut (see the top left photo).

Take a practice cut somewhere inside your marks to make sure that the blade cuts square to the apron surface. Then carefully line up the apron marks, and make your cuts. Although the cut is not too deep, it's a good idea to clamp the work securely to the jig in case the piece should kick back.

Next use a bandsaw to remove the waste between the sawcuts (see the bottom left photo). Test-fit the legs into each dado. Now rabbet the upper backs of the legs so that they will slip into the apron.

The depth of these recesses determines how much the leg protrudes from the outside of the apron. I like the leg to be about ¼ in. proud. Shape the legs to their final form, and then glue them into place. Drive two screws in from the back of the apron to reinforce the joint.

Bruce Peterson works in a one-man shop in Pilar, N.M.