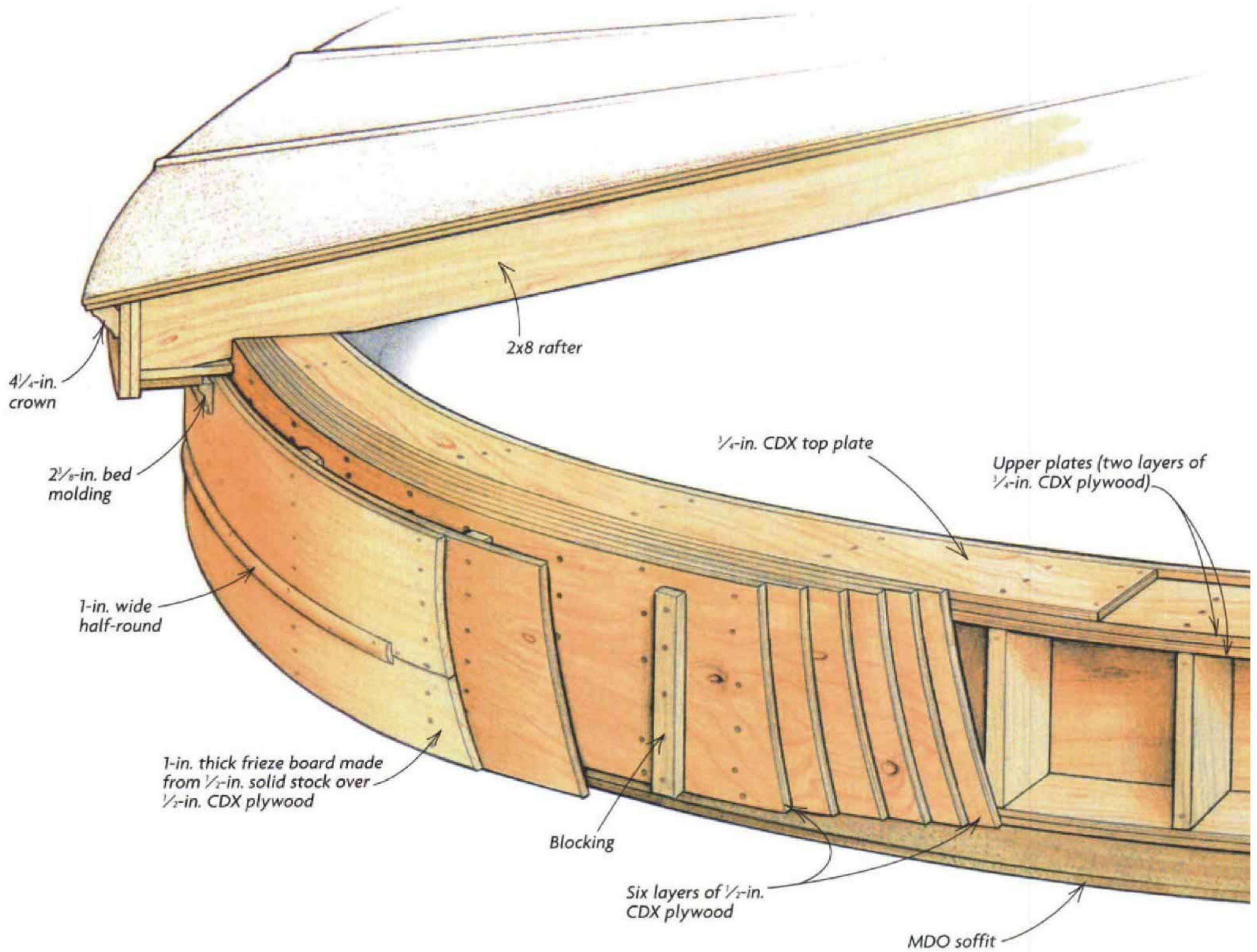
Building a Circular Porch

A curving plywood beam and laminated trim solve some of the problems associated with working in the round

BY LEN SCHMIDT



As carpenters, our day-to-day routines are filled with straight lines and square corners—steady, predictable work. When I began to project-manage a new lakefront home, I knew that our days would be far from routine. The house's design included many of the features associated with a classic shingle style: a turret, steep gambrels and, facing the southern exposure, an open circular porch (photo p. 102). Experience had taught me that the round porch would be one of the more challenging parts of the house. The first trick would be to construct a circular beam with an accurate and fair curve that was strong and easy to build. There was also the matter of the trim: The design called for a substantial crown, which normally won't bend around a curve and maintain its shape.

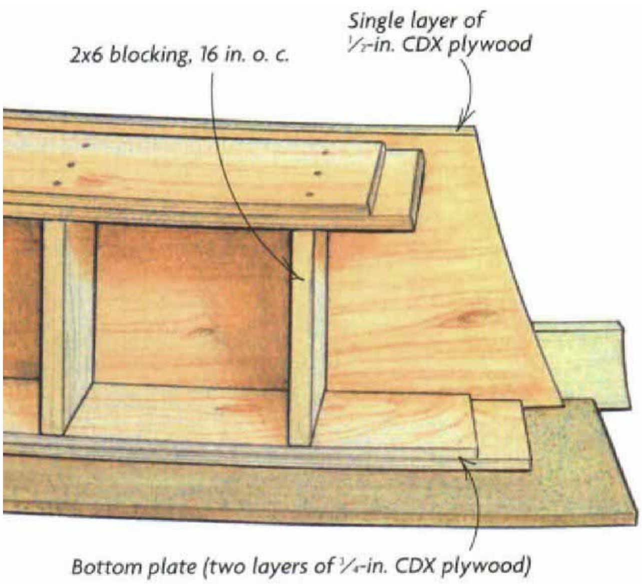
Curved beam sets the stage for roof framing

Once the frost-wall foundation of the porch was complete, we framed the deck and start-

Drawings: Bob La Pointe

Layers of plywood carry the roof

Careful layout of this beam ensures solid and accurate support, which translates to strong framing and less time spent fitting rafters. The entire beam was made in six sections, each consisting of two top and bottom plates, blocking and one layer of plywood on the interior and exterior radii. The sections were then erected on temporary posts; a third top plate and additional outer layers of plywood tied the sections together.



Building in the round relies on the art of framing. The floor frame slopes from a central point to shed water and was configured to support a radial pattern of decking. Consistent spans between the rafters above meant plenty of support for the roof sheathing.

ed preparations for framing the roof. The beam was really the key to the roof framing, both from a structural viewpoint and for ensuring accuracy.

To make the six sections that comprise the beam, we first built a short, curved stud wall (drawing above). The plates were laid out and cut from $\frac{3}{4}$-in. CDX; we used the first plate as a template and cut the rest with a circular saw, trimming edges with a router and a top-bearing bit. After nailing 2x6 blocking (short studs, really) between the plates on 16-in. centers, we doubled the top and bottom plates, then glued and nailed a single layer of $\frac{1}{2}$-in. CDX plywood to both sides of the section. (Nails provide most of the shear strength in this box beam-like construction, but I also used construction adhesive.) The plywood ran $\frac{3}{4}$ in. higher than the top plate, making a channel for a third top plate that would tie the sections together and overlap each intersection by at least 32 in.

We placed two temporary posts at the column locations and set the first beam section

A few strategically placed columns support the roof. Because the weight of the roof was evenly distributed on the rigid laminated beam, columns were required only beneath the section joints. The resulting open spans also give room to enjoy the view.

on these posts. A third temporary post, braced on the outside, kept the beam from tipping over. After bracing a second section, we joined the sections by overlapping a third plate into the channel described above, and then we plumbed and braced the free end going around the circle.

Once the sections were all in place, we nailed five layers of ½-in. plywood around the outside to provide structural support for the roof, staggering the seams as we went. (The ½-in. plywood bent easily around the 12-ft. radius, but I would recommend ⅜-in. plywood for smaller radii.) Keeping the layers flush top and bottom was the key to providing a good bearing surface for the rafters. If the plywood started to run low, we worked it up by nailing off the bottom edge first; if it started to run high, we then nailed the top edge first.

Framing a fair curve for the roof

Framing the conical roof turned out to be a simple day-and-a-half project. We started with two common rafters set opposite each other, then dropped in two more at 90° to the first two. The first two rafters were laid out as any common rafters; the diameter of the circle becomes the total run, and the 3-in-12 pitch determines the rise. The second pair is identical to the first except for the loss of 1½ in. of run. The third and fourth pairs are identical and are cut to fall on 45° intervals between the first four rafters.

The subsequent rafters, all 56 of them, are essentially jack rafters that run from the curved header to short blocks nailed between rafters wherever the space between them exceeded 18 in. (photo p. 101). To maintain the conical shape of the roof and to avoid flat spots, we used a straightedge or chalkline to align each rafter with the peak.

After the roof was sheathed with two layers of ⅜-in. CDX plywood, I hooked a tape measure on a nail tacked to the peak of the roof and struck a trim line all around the cone. This curve was gentle enough to trim with a circular saw.

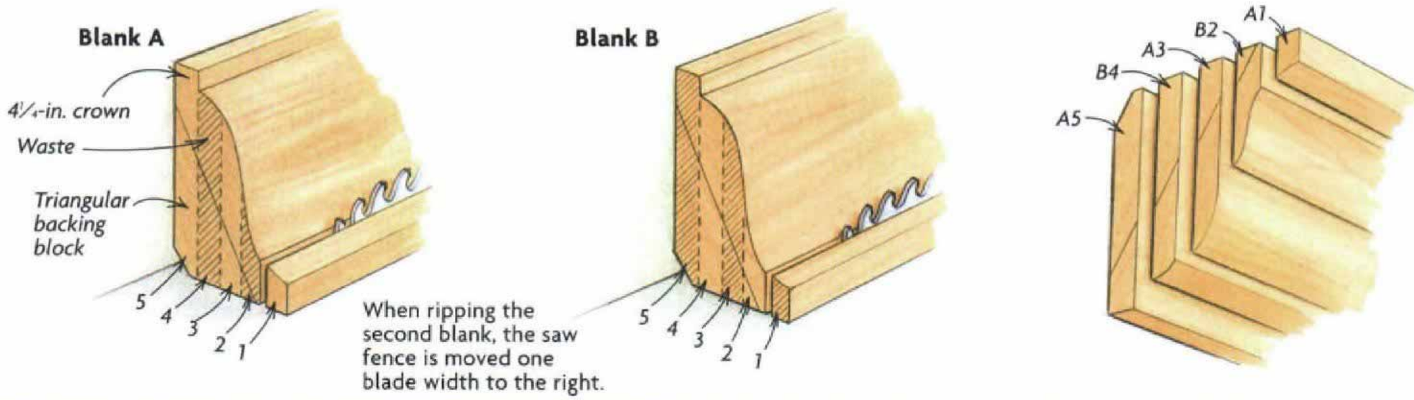
Trim must be laminated or sawn to make the curve

The curved trim in this porch project fell into two basic categories: bent laminations (trim elements made from several layers bent

Photo this page: Charles Bickford

LAMINATING CURVED MOLDINGS

To make a 4¼-in. crown molding bend around a 12-ft. radius, the author first glued up two blanks consisting of the crown and a triangular backing block. He then ripped each blank into five strips thin enough to bend around the radius. By alternating strips from each of the blanks, he could make up for material lost to the saw kerfs.



Layers of trim are built up under the drip edge. To bend the trim around the radius, the crown molding was ripped into pliable strips, then applied in sequence to the outside frieze board. Tight nailing patterns and staggered end joints kept the curves fair.

around the curve) and sawn curves (cutting the shape out of wide material and then shaping it if necessary). I used the bent-lamination method for the frieze boards and the fascia boards. For the soffits, I used the latter method and cut the radius out of sheets of medium-density overlay (MDO). But what about the crown molding and the bed moldings? These types of trim are impossible to bend because their thin dimension is not square to the direction of the bend. A bed mold that is ⅝ in. thick but projects 1⅜ in. off the wall bends like a piece of wood that's 1⅜ in. thick. I decided to employ both methods; I used the sawn-curve method to produce bed molding and the bent-lamination method to produce crown (drawing above).

I divided the bed mold into two elements: a quarter-round on top and a cove underneath. The quarter-round portion was the thickest part of the molding and would never bend, so I began by cutting the outside radius from 5/4-in. by 12-in. stock. For safety's sake, I first routed the profile on the wide stock with a 1-in. roundover bit and then cut the second inner radius. For the cove underneath, we found that we could quickly bend an off-the-shelf cove molding.

Producing the curved crown was a bit more of a challenge. Because of the width of the crown (4¼ in., with a horizontal projection of 2¼ in.), there was no way to cut the shape on curved stock without buying huge custom shaper-cutters, and even then it would have required huge glue ups to produce the necessary stock. The bent-lamination technique worked nicely but required some extra attention to the process.

The first step was to glue the crown molding to triangular backer blocks (drawing above); these blanks were then resawn on a table saw into 7/16-in. strips. Each strip was wrapped around the curved fascia, glued with exterior-grade PVA glue and nailed to the layer below (photos above). After we sanded the glue joints and primed the molding, the laminations blended into a seamless detail under the drip edge. □

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