

A Victorian Cupola

by Len Schmidt

Last summer a customer asked me to design and build a Victorian-style cupola for a renovation project. The features he wanted included round-top shutters, a curved hip roof coming to a peak, and a means of fastening a weathervane at the peak.

The base of the cupola was framed, sheathed, and trimmed in

block are each $1\frac{3}{8}$ inches wide, leaving a $\frac{3}{4}$ -inch hole all the way up through the center of the block. This hole was used for lifting the cupola, and later for mounting a weathervane.

To sheathe the roof, I used $1\frac{1}{2}$ -inch pine strapping that I had on hand. I would recommend using two layers of $\frac{3}{8}$ -inch bending ply-

*Round-top shutters
and a curved hip roof
grace a traditional
roof cap*

conventional fashion, but rather than build custom round-top shutters, we agreed to use stock rectangular shutters and overlay the curved trim. The real challenge lay in framing the roof.

We experimented with full-scale mock-ups to find the appropriate size and bend of the rafters. The common rafters are arcs of a circle with a 7-foot radius. The hip rafters are a bit trickier because they are elliptical. To draw the ellipse, I used the radius of the common rafters to establish the focus points, and used the string method described in the illustration at right. The hip jacks are short sections of a circle with the same radius as the commons.

I built all of the rafters out of 12- or 16-inch strips of $\frac{3}{4}$ -inch CDX plywood, cut out and glued together in pairs to form a $1\frac{1}{2}$ -inch-thick rafter. I cut out the hip rafters first with a jigsaw set at 90 degrees, and then recut them with a bevel to match the roof plane. This bevel varies on a curved hip, increasing as the pitch of the roof does.

Once the rafters were cut, I made an octagonal ridge block by gluing and screwing two 24-inch-long 2x4s together with two $\frac{1}{2}$ -inch plywood strips sandwiched in between. I then ripped the $3\frac{1}{2}$ -inch square block into an octagon with eight $1\frac{1}{2}$ -inch faces for receiving the rafters. The plywood strips in the middle of the ridge

wood glued together with construction adhesive, for a quicker, better job. The sheathing was covered with a standing-seam metal roof.

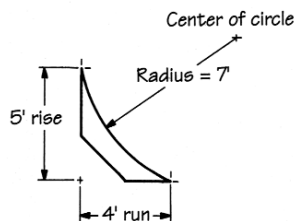
All of the trim — round-tops, cornice blocks, dentils, fascia, and crown molding — was milled out of yellow poplar. Poplar mills better than clear pine, and in New England, is less expensive. But it's also a lot heavier. I would guess this little cupola weighed in at over a half ton, so it had to be well braced before moving it to the site.

The peak had been framed to make the lifting simple. I ran a $\frac{3}{4}$ x36-inch threaded rod through

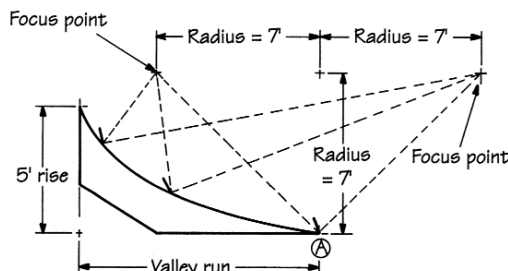


For roof framing, the author cut curved rafters from two layers of $\frac{3}{4}$ -inch CDX plywood. The louvered openings in the base of the cupola are made from stock rectangular shutters overlaid with curved trim (top). Above, a crane picks up the cupola by its peak to set it in place.

Curved Rafter Layout



Circular Commons

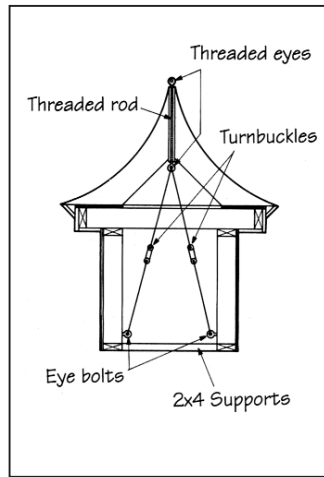


Elliptical Hips

The common rafters (left) are arcs of a circle with a 7-foot radius. The hip rafters are elliptical (right), and the focus points of this ellipse are found using the radius for the commons. Draw a line twice as long as the radius of the common rafters. Tie a string to nails at each end of this line (the focus points), making the string just long enough to pass through point A. Holding the string taut, trace out the hip rafter.



The rafters butt an octagonal ridge block glued up from two 24-inch-long 2x4s with 1/2-inch plywood strips sandwiched in between. A threaded rod, used for lifting the cupola, runs up through the center of the block.



To distribute the load for the crane, the author ran cables from a threaded rod in the peak of the cupola to the four corners of the base.

the ridge block with a nut and washer on each end. On each end of this rod, we bolted on two large threaded eyes which the crane operator provided. The eye on the top was hitched right to the crane, while the eye on the bottom was attached to four cables, which ran to eye bolts in the lower corners of the base, to spread the load. Two-by-four diagonals across the bottom added extra stability.

With this design, the entire cupo-

la could be lifted from the peak without any straps or supports underneath to interfere with setting it on the building pedestal. The installation went safely and quickly, and we kept crane time to a minimum. And while it was going up, I was tickled to hear a passerby remark, "Geez, I wonder where they found that beautiful, old cupola." ■

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