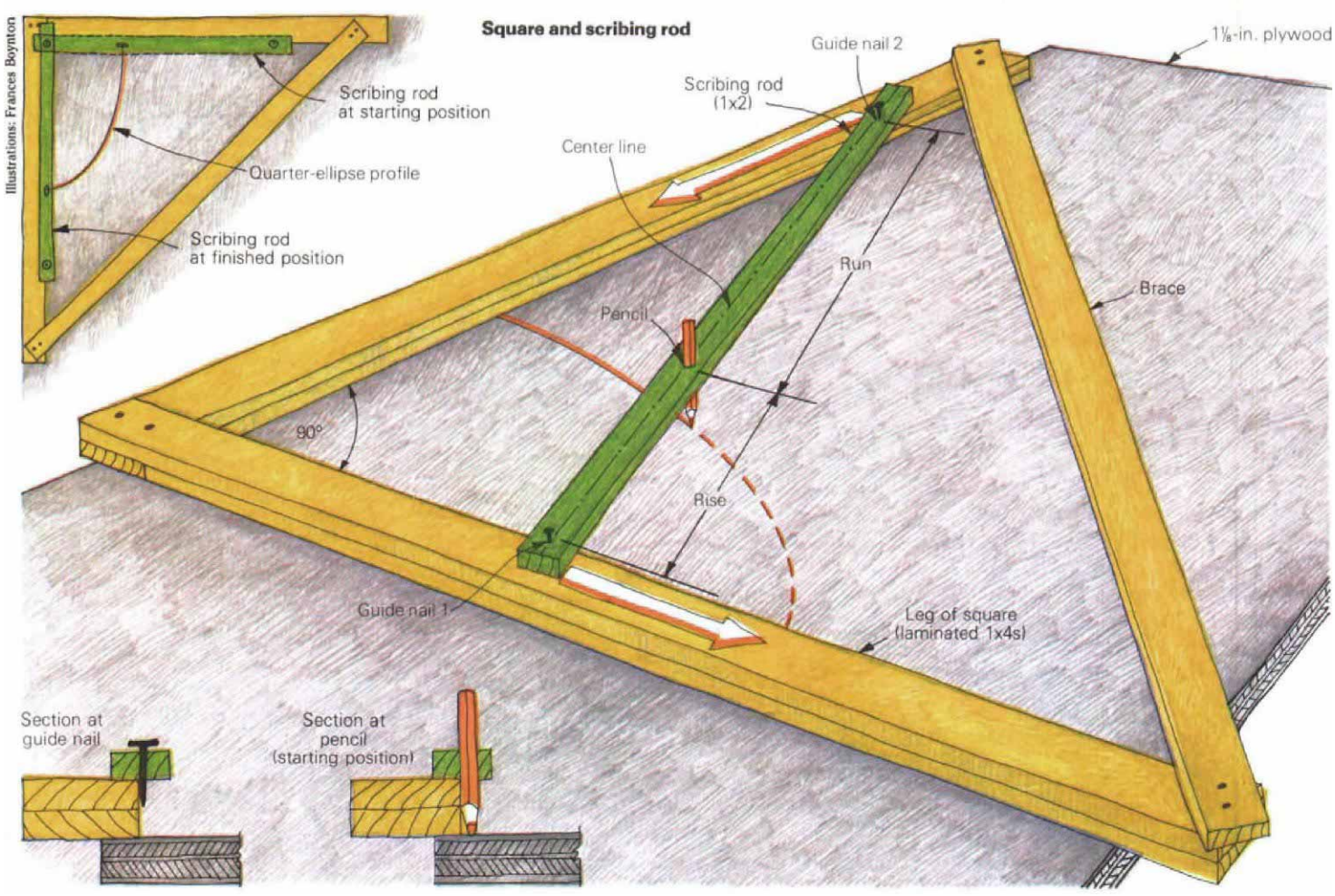


The Scribed Ellipse

An easy way to lay out elliptical coves

by Jud Peake

A building with graceful curves has its own special signature. Soft transitions, impossible in angular structures, can be created with vaulted passageways and rooms with coved ceilings. For curved details, architects and builders usually choose the easily drawn radiused curve, or section of a circle. But sometimes the radius is aesthetically inappropriate, or just won't describe the curve needed at certain junctions. In cases like these, the ellipse may be a better shape. But unlike the radius with its equal rise and run, the ellipse is challenging to draw accurately.

An ellipse is a curve that has an equal combined distance from two centers (foci) at every point. The length and width of the ellipse are determined by perpendicular major and minor axes that cross at their centers. The foci are always located on the major axis, and are equidistant from its ends.

A common method for drawing the ellipse is to tie a loop of string around three pins, one at each focus and the third at one end of the minor axis (drawing, facing page, center). Once the string is in place, the pin at the minor axis is removed and replaced with a pencil. Exerting even tension on the string, draw the pencil around the foci and back to the starting point. This method, though, is not a very practical way to lay out work on a job site. Fortunately, there is an expedient carpenter's method for drawing the quarter-ellipse. All you need is a large square and a scribing rod.

Make the square out of two layers of 1x4s, lapping them at the right angle to keep the legs flush (drawing, above). Cut the legs about a foot longer than the combined rise and run of your quarter-ellipse. The hypotenuse, actually a brace to ensure an accurate 90° angle, can be lapped over the legs and nailed in place.

The scribing rod is the key to this operation, and carries the measurements and scribing tool (usually a carpenter's pencil) to transfer the quarter-ellipse profile onto the work. The rod should be about the same length as one leg of the square, and cut from a straight 1x2. A few inches from one end, drill a small pilot hole on the center line for an 8d nail, and drive the nail until its point protrudes about 1 in. from the bottom. The nail will act to guide the rod along the inside edge of the square. Measure the distance of the rise from the nail to a point on the center line and drill a hole for a pencil. Make sure you get a snug fit so the pencil won't

wobble. Continuing down the rod, measure the distance of the run from the pencil and set another guide nail on center.

To use the rig, position the triangle over the work (I like 1⅛-in. plywood for cove backing) and register the nails of the scribing rod against the inside edge of one leg of the square. With both nails tight against the leg, move the rod, all the while holding one nail against one leg, the other nail against the adjacent leg. Both pins should eventually come to rest tightly against the adjacent leg. The pencil will describe the curve of your ellipse. For ellipses with different rises and runs, move the guide nails to the appropriate spots.

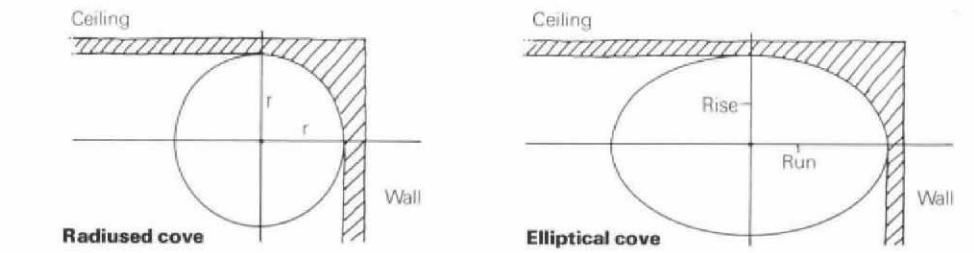
Even if you make radiused (quarter-round) ceiling coves, the elliptical scriber can help you lay out the elliptical corner brace where the two coves are mitered together. For example, let's say we have an 18-in. radiused cove at a square corner in the walls. We know that the rise will remain constant at 18 in., but at the corner, the run will take a diagonal path across the ceiling, making it longer than the radius. You can determine the length of the diagonal by drawing the run of the radiused cove on the floor below the corner to be mitered and then taking a direct measurement. Another way to find the diagonal is to multiply the run by the square root of 2, or 1.415. Set the scribing-rod guide nails for the 18-in. rise and the 25½-in. run, mark the plywood bracing material, and cut out the brace with a jigsaw.

The inside corner brace has to be double beveled to meet the intersecting horizontal lines of the perpendicular coves. This bevel is complicated because it ranges from two 45° bevels at the bottom of the intersection to flat (180°) at the ceiling. To shape this bevel, I tack the brace, curved edge up, to a sawhorse and hollow out the working edge with a freehand circular-saw cut. When I make this cut, I keep both hands on the saw, and I don't stand behind the line of cut. Don't even try this cut if you aren't comfortable with the tool. This is an inexact method, but close enough for a corner that will receive several layers of plaster. The important thing is to hollow out the edge so the plaster won't be too thin at the corner crease.

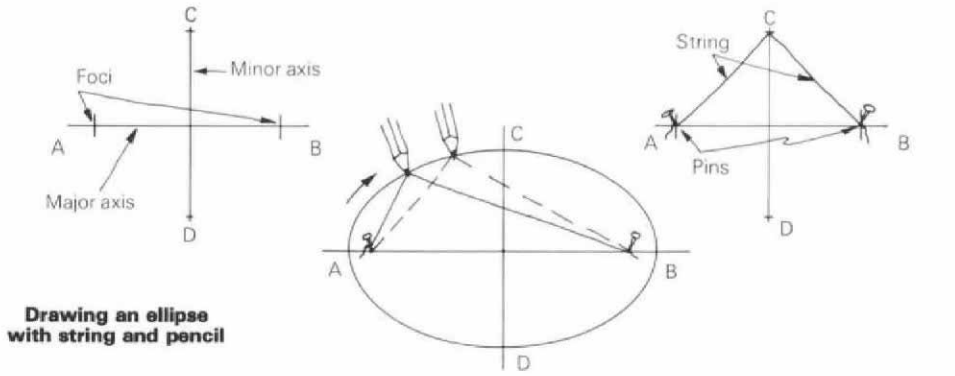
An outside corner brace (photo right) is the same elliptical shape as its inside counterpart, but the double bevel comes to a point rather than a hollow. I cut them out with a jigsaw, and taper the angles on both sides, from 45° at the bottom to flat at the top.

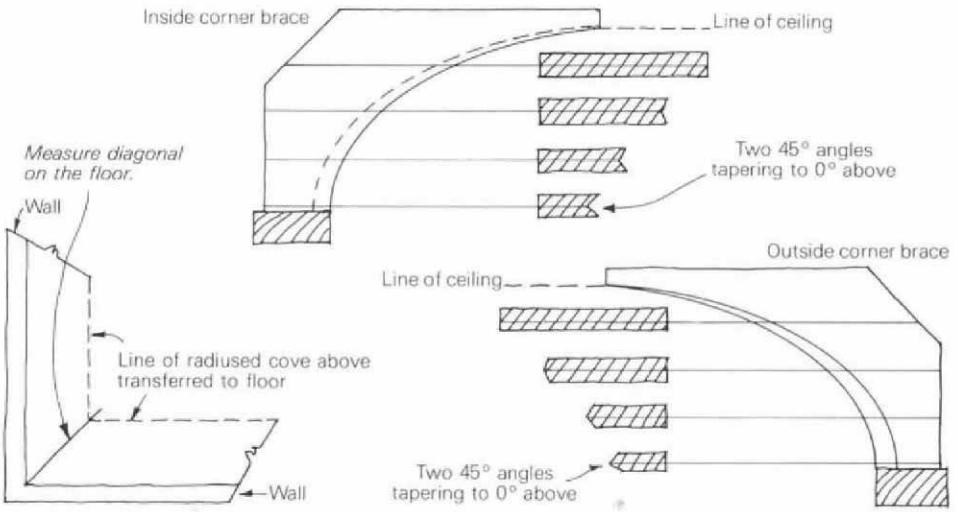
The elliptical cove section has further applications. I recently worked on a Victorian building that featured a large oblong skylight with radiused ends. The skylight was to perch atop a room of the same shape and be connected to the walls by radiused cove sections. Because of a mistake on the drawing board, the skylight didn't end up exactly concentric with the radiused wall below. Instead of repositioning the wall or replacing the skylight, we decided to use elliptical sections instead of arcs, each one slightly different in dimension. □

Jud Peake is a carpenter and a contractor. He lives in Oakland, Calif.



In section, the most common coved ceiling is a quarter circle, with equal rise and run. When the rise and run differ, the section is elliptical.





Elliptical corner braces *(below) for a radiused cove ceiling can be drawn with a square and scribing rod. Both inside and outside braces are double-beveled (above) to hold intersecting pieces of lath.*