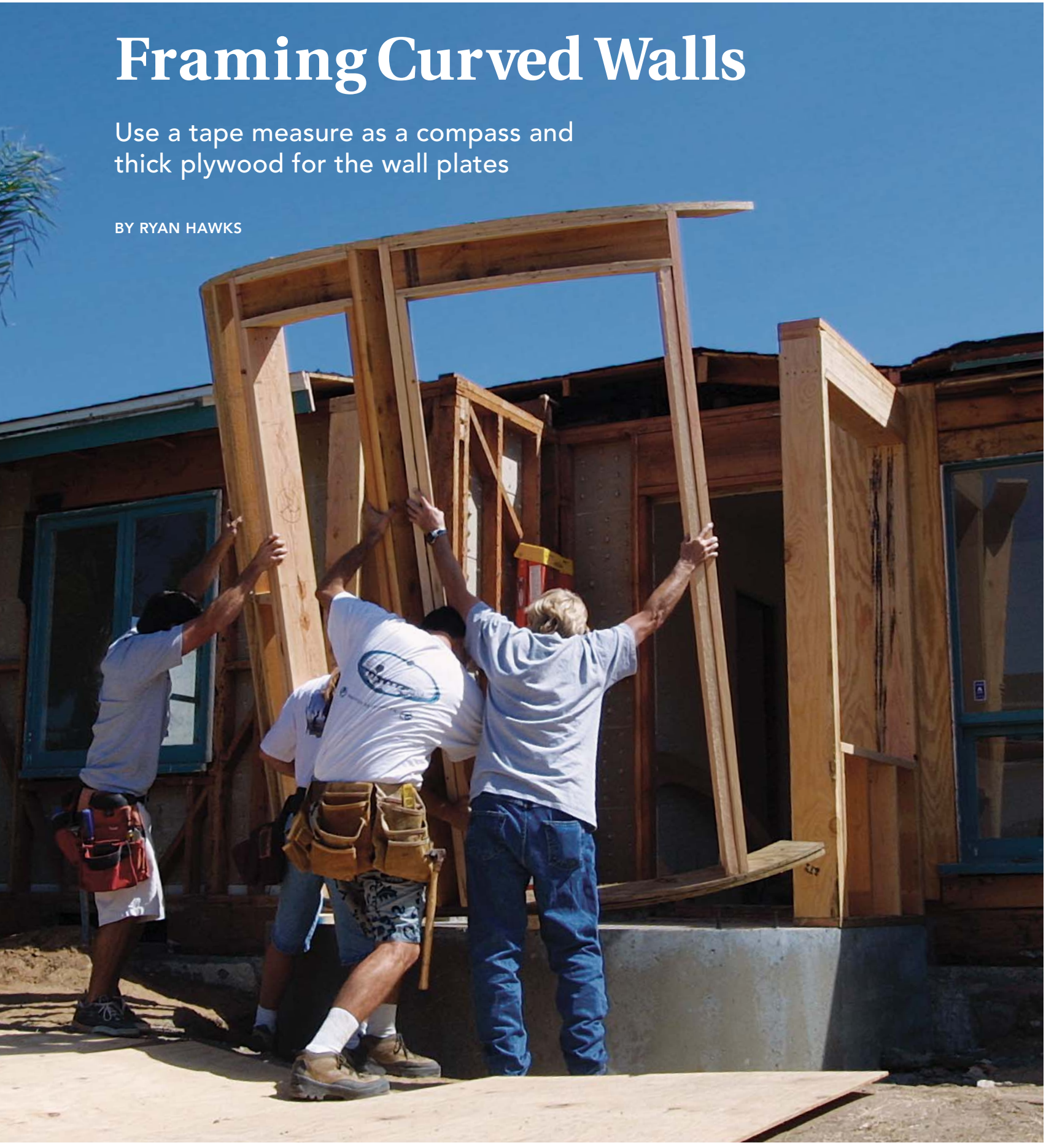
Framing Curved Walls

Use a tape measure as a compass and thick plywood for the wall plates

BY RYAN HAWKS



"Piece of cake," I replied the first time someone asked whether I could build curved walls. But as I looked over the plans, I didn't have a clue how to turn that drawing of a round room into reality. Late in the day, after the generators were silenced and the crews were on their way home or to the bar, I prowled around at a couple of jobs being built by one of the best framing contractors in San Diego.

By looking at his work, copying his notes from the floor, asking questions the next day and applying ingenuity, I built my first radius wall as if I'd done it a hundred times. That was a few years ago; I've since developed a more refined technique that I use now.

A chalkline represents the base of the radius

The job shown here is a 180° radius wall, or a half-circle, that extends from two parallel sidewalls (photo facing page). This radius wall is the simplest type (sidebar p. 67).

To lay out the radius, you first must establish the baseline. In this case, the baseline connects the ends of the two sidewalls. I snap a chalkline on the floor to represent the baseline, then mark its center (half the length of the baseline is the outer radius).

A nail partially driven into the floor at this center mark becomes the pivot point for my tape measure, which I use as a compass to mark the inside radius of the wall plate on the floor (top photo). Most tapes have a slot cut in the hook at the end for just this purpose: The edge of the nail head rides in the slot as you hold a pencil to the edge of the tape at the proper point and mark the radius to the floor (bottom photo).

Complications arise when something straight, such as a door or a window, goes into a curved wall. On this job, the architect had called for the wall to be 5½ in. thick and for the door to be 3 ft. wide. If I'd built it as drawn, the center of the door-jamb head would have intruded past the wall surface. After consulting the architect, we thickened the wall to 7½ in. and downsized the door to 2 ft. 8 in. (drawing right)

Thick plywood makes up the radius-wall plates

I usually make radius plates from two top and two bottom layers of 1⅛-in. plywood, which adds up to the same 4½-in. thickness as three 2x plates, avoiding the need to custom-cut studs. When framing on a slab, however, as here, the bottom plate must be treated plywood, which is available in a maximum thickness of only ¾ in. Cutting six ¾-in. plates to achieve a 4½-in. plate thickness would have been a lot of work. Instead, I used two ¾-in. bottom plates and two 1⅛-in. top plates; I custom-cut the few studs that this wall required.

This particular radius was smaller than 48 in., so marking the plate radii on the plywood was straightforward. I simply set a nail in a line bisecting the sheet and used my tape as a compass to lay out the inside and outside radii on the plywood (photo top left, p. 66). (See sidebar p. 67 for walls whose radius is greater than 4 ft.)

If a radius is greater than 10 ft., I can cut the plywood plates with a 7¼-in. circular saw, but I cut these tight-radius plates more conventionally using a jigsaw. After cutting the first plate, I used it as a template to mark the other plates as well as the rough sills and the nailers at the top of window and door openings.

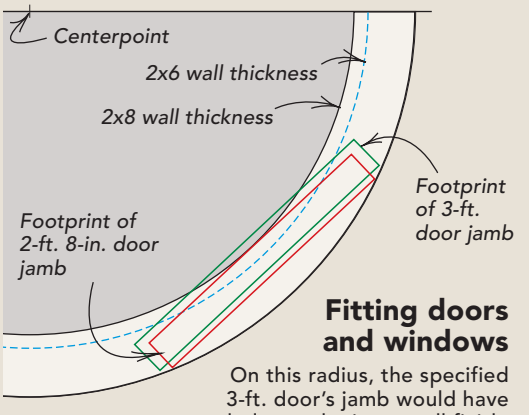
Once the plates are cut, I place the treated bottom plate on top of the anchor bolts, lin-

DRAW THE RADIUS ON THE FLOOR

Layout begins with a baseline and a centered nail (top photo). A chalkline between straight walls from which the curved wall will spring forms the baseline. A nail centered in this line is the centerpoint of the curve. The slot on the hook of the tape fits around the head of the nail, allowing the tape to be used as a compass (bottom photo), in this case to lay out the inside radius of the wall.







Fitting doors and windows

On this radius, the specified 3-ft. door's jamb would have protruded past the inner-wall finish. The fix was to change 2x6 studs to 2x8s and the door to 2 ft. 8 in.

Drawings: Dan Thornton

ing up one end with the intersecting straight wall. I use my square to align the plate with the radius I marked on the concrete and then hammer the plate over the anchor bolts to leave indentations (photo bottom left). These indentations are where I drill for the bolts.

With the bottom plate drilled, I lay it back down on the anchor bolts to check the fit and to mark the ends to be cut where it meets the next section of plate (photo bottom right). One end meets the straight wall, and its cut-line matches the baseline of the radius. If the other end is in the middle of the wall, I want this cut to fall in the center of a stud. I find this point by wrapping my tape around the outside of the plate and then marking the center of the stud that falls closest to the end of the plywood.

With the first plate section cut and in place, I repeat my actions to cut and drill remaining sections. Once the plate is in place, I detail the door and window openings on the plates (drawing facing page).

The first step in laying out the window openings is to find their centers by measuring along the outside of the plate. With the rough-opening centers marked, I snap chalk-lines between them and the centerpoint. Aligning my framing square on the chalkline, I use the square to mark the rough opening on the outside and the inside of the plate, then to connect the marks I've made (top photo, facing page). These layout lines aren't radial; rather, they're parallel to the center-of-opening radius. If they were radial, the rough opening would be narrower on the inside than on the outside.

Kings and trimmers are custom-cut

Because they are parallel to the centerline of their rough openings (as opposed to being radial), the king studs and trimmer studs are wider than the other studs, and their edges must be beveled to fit neatly on the plates. The bigger the rough opening, the bigger the bevel angle.

I find the rip angle and depth of the king and trimmer studs by laying a block on the plate where the king or trimmer stud sits and scribing. On this job, with its 2x8 studs, I was able to rip the kings and trimmers from 2x10 stock (top photos, p. 68).

After marking the rough openings, I lay out the stud locations on the outside of the plate (photos bottom left, p. 68). Most architects note the stud spacing on the plans. Usually, the tighter the radius, the closer the stud spacing to provide backing for the wall finishes. On this job, the studs were on 8-in. centers.

It's possible to mark the studs exactly radial on the plates by pulling a chalkline from the centerpoint to every layout mark. I usually don't bother with this step, however, finding that I can visually check the stud alignment well enough.

The headers are standard, straight lumber that sandwiches between two pieces of 1⅛-in. plywood, extra pieces I cut along with the plates (photo bottom right, p. 68). I size this

FIT THE BOTTOM PLATE

The plates are marked to be cut using a tape as a compass (photo left). Using a square to ensure that the plate aligns with the layout line, the author taps the plate over the anchor bolts to mark the hole locations (photo below left). With the first section of plate drilled and placed, a square again is used to align a second section, and the author marks it for length (photo below).



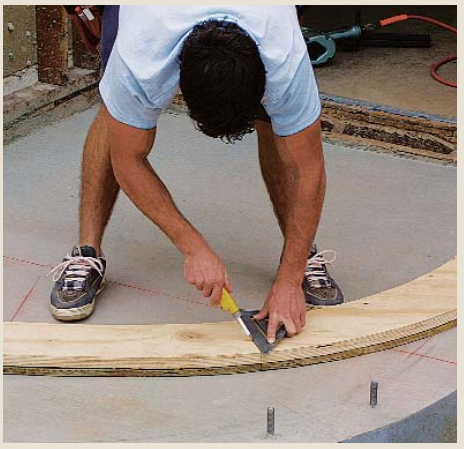




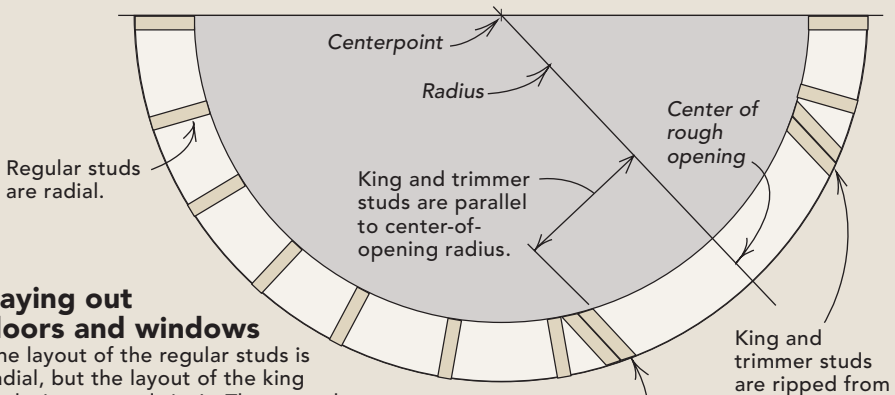
MARK THE ROUGH OPENING

The author snaps a radius line to the center of the rough opening, then transfers that line to the bottom plate (photo below). The centerline is transferred from the bottom plate to the top (photo bottom left), where the locations of the kings and trimmers are marked (photo bottom right).









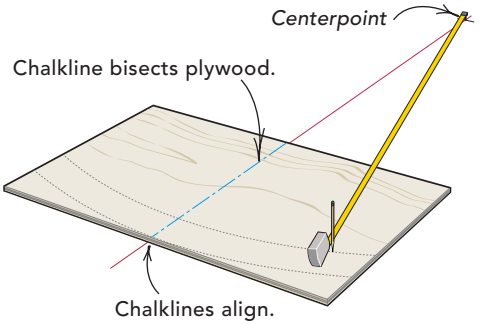
Laying out doors and windows

The layout of the regular studs is radial, but the layout of the king and trimmer studs isn't. They must be parallel to a radius that goes to the center of the rough opening; otherwise, the opening would taper and the window or door wouldn't fit. Kings and trimmers must be cut from wider stock.

Radius-wall variations

Large-radius wall plates

When the radius is larger than 4 ft., the centerpoint can't be on the plywood. To find the centerpoint, snap a chalkline that's at least the length of the radius on the floor. Next, bisect the plywood with a chalkline, then align the plywood's chalkline with that on the floor. Locate the centerpoint of the radius along the chalkline, and use a tape measure to swing the radius.



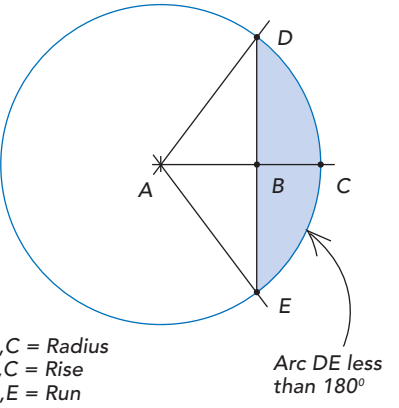
When the arc is less than 180°

Jack radius walls, where the arc of the wall is less than 180°, are common, but finding the radius of these walls so that you can lay them out is not so obvious. Jack radius walls are usually specified with two factors: rise and run. As an example, say the run is 8 and the rise 2. Plug these two numbers into a simple algebraic equation to get the radius (drawing below).

Radius = $(Run^2 + 4Rise^2) \div 8Rise$

Radius = $(8^2 + 4 \times 2^2) \div (8 \times 2)$

Radius = 5

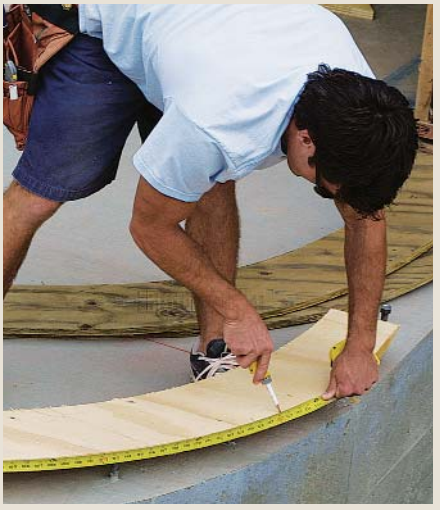


GETTING THE KINGS AND TRIMMERS RIGHT

The simplest way to find the width and bevel of kings and trimmers is to scribe a scrap block in place (photo below) and use it to set up a table saw to rip the kings and trimmers from wider stock (photo right).









PUTTING STUDS AND NAILERS IN THEIR PLACES

Studs on curved walls are often spaced closer than 16 in. o. c., in this case 8 in. Laying out the outside edge of the plate ensures that the sheathing joints, though not the drywall, land on studs (photo left). Snapping radial chalklines for each stud would ensure perfect alignment, but lining up the studs by eye works fine and is a lot faster (photo below left). The headers are standard. Only the nailers for the wall finish (extra plate stock) are curved. Assembling the headers with a square as a guide ensures their fit (photo below).







STUDDING OUT

Curved walls want to roll, so filling in the studs takes two carpenters. The author starts with the kings and trimmers (photo above). Next come the regular studs (photo below) and the midwall blocking, which he scribes from the laid-out plates (photo left).





Lack of plate overlap *means metal straps must tie curved wall to straight. And yes, it would be safer to perform this operation on a ladder.*

plywood by laying it on the detailed plates and marking it to fit between the king studs.

Nail the wall together where there's room to maneuver

I like to frame these walls on a nice flat floor, but I framed this one outside because the job was a remodel with no room inside for me to frame a curved wall. Working with curved components is cumbersome, and it helps to have one person holding the wood and another one nailing.

I begin by nailing the headers to the king studs and trimmers, and then to the plates (photo to top left). Next come the studs, and after nailing in more than half of them, I chock the wall with a couple of scrap blocks to prevent it from rolling. The rest of the wall is filled in one stud at a time by two carpenters, one who is holding the studs and another who is doing the nailing (bottom photo).

Round walls are usually heavier than straight walls, and they like to roll. I always take extra precautions when standing a round wall; having too many carpenters raise a wall is better than not having enough. When possible, I raise radius walls from the position of having the ends of the plates, as opposed to their centers, on the floor. This approach prevents the wall from rolling as it's being raised.

Because of the existing house, that approach wasn't possible on this job. There's really no trick here: Just have more muscle than wall on hand. Because the plates differ in thickness from straight wall plates, they don't lap to tie the walls together. They're simply butted, plumbed and tied together with metal straps wrapped around both intersecting plates (photo above right).

Sheathing the wall is simple. I use ⅜-in. CDX plywood because it's flexible, and I sheathe as I would any other wall. □

Ryan Hawks is a carpenter in Pacific Beach, CA. Photos by Tom O'Brien.