Framing a Walk-Out Bow Window

A full-scale drawing reduces the chance of error

by Carl Hagstrom

When the subject of windows came up during the design stage of a house I built recently, the homeowner handed me a page taken from a magazine that showed a walk-out bow window. "That," she said, "is the window I want in my living room."

And why not? Her house was sited on a hillside overlooking a big chunk of farmland, and with a window like this, she'd get a real eyeful of the landscape.

While all of the thick talk of geometry can make a bow window seem daunting, it's really not that difficult to frame and install. The key is to make a full-scale drawing. I used the manufacturer's specs to frame the rough opening, and when the window was actually on site, I set it up on the floor, snapped a few reference lines and made a full-scale drawing of the window and the framing layout. The window fit beautifully (photo right), and I didn't have to fool with a lot of geometry.

Is it a bow or a bay?—The terms bow window and bay window are often mistakenly used interchangeably. But they're two different styles of projecting windows. A bay window has three sides, with the center portion parallel to the wall plane. The other two sides can return to the wall at various angles (90°, 45°, 30° being common). A bow window, on the other hand, can have any number of sides, with each side tangent to an arc of a circle.

Both window styles commonly employ a seat at the bottom of the window to enclose the lower area of projection, but to become a walk-out unit, the floor must extend out to meet the profile of the window projection.

Homework is required—From experience, I knew that a walk-out bow window would present some framing challenges—like where and how to cut the floor joists, how to transfer loads to floor joists and what to do above the window. So after I ordered the window, a 6-ft, high by 10-ft, wide Andersen unit (Andersen Corp., 100 4th Ave., North Bayport, Minn. 55003-1096; 612-439-5150), I read Andersen's literature and firmed up a framing plan.

I decided to frame the rough opening, then leave the rest until the window was on site. Andersen's literature said to make the rough opening 10 ft. 3/16 in. by 6 ft. 1 7/8 in. The rough opening is where the nailing flanges of the end windows hit the wall plane. I treated this opening as I would any rough opening: with a header resting on trimmer studs. In this case I spiked three 2x10s together to span the opening and to support the roof load.

To create the walk-out projection, I cantilevered the wood I-beam floor joists over the foundation wall. According to Andersen, the window projects 14 in. from the exterior wall plane. I cantilevered the joists about 2 ft. beyond the wall plane and cut them to exact size and angle later.

I was installing this bow window in a one-story home that had 20-in. deep eaves, so I could tuck the window projection under the roof overhang. Usually, bow and bay windows have their own roofs, like tiny additions to a house. The house's style governs a bow window's roof design, so if you're considering either a bow or bay window, and there's no overhang to tuck it under, the roof over the window deserves some thought.

Although bow windows are commonly shipped fully assembled, I had the window shipped in pieces because I didn't want to lug around a 400-lb. window unit. This bow window consists of five standard windows. To achieve the bow, Andersen provides wedge-shaped spacers that are screwed between the windows. I assembled the bow window temporarily inside the house, where I could snap some lines and figure out the framing layout.

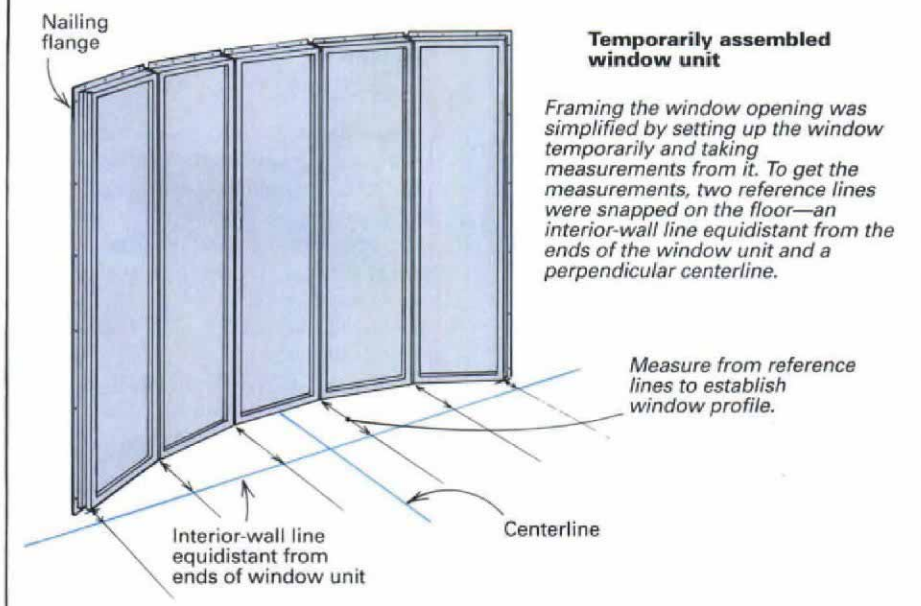
Windows from floor to ceiling. **This 6-ft, high by 10-ft, wide Andersen walk-out bow window comprises five standard casement windows joined with wedge-shaped spacers. The unit projects 14 in. from the wall plane and is supported by cantilevered wood I-beam floor joists.**

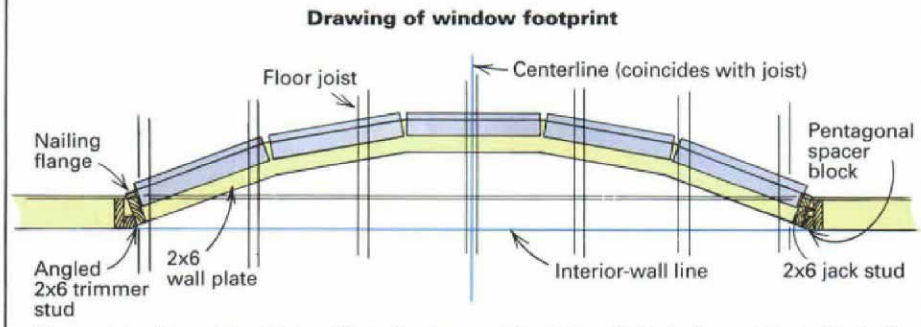
Making the drawing-With the window unit temporarily assembled in the living room, I struck two reference lines on the subfloor: an interior-wall line 6 in. from the nailing flanges on the end windows and a perpendicular centerline (top drawing, facing page). Then I measured the rough opening and checked it against the reference lines to be sure the window unit would fit. It did, which meant the window was in place—theoretically at least.

The next step was to redraw these two reference lines on a sheet of drywall (middle drawing, facing page). Then with a framing square and a T-square, I drew the footprint of the bow window on the drywall by transferring measurements from the windows to the drywall, using the reference lines as guides.

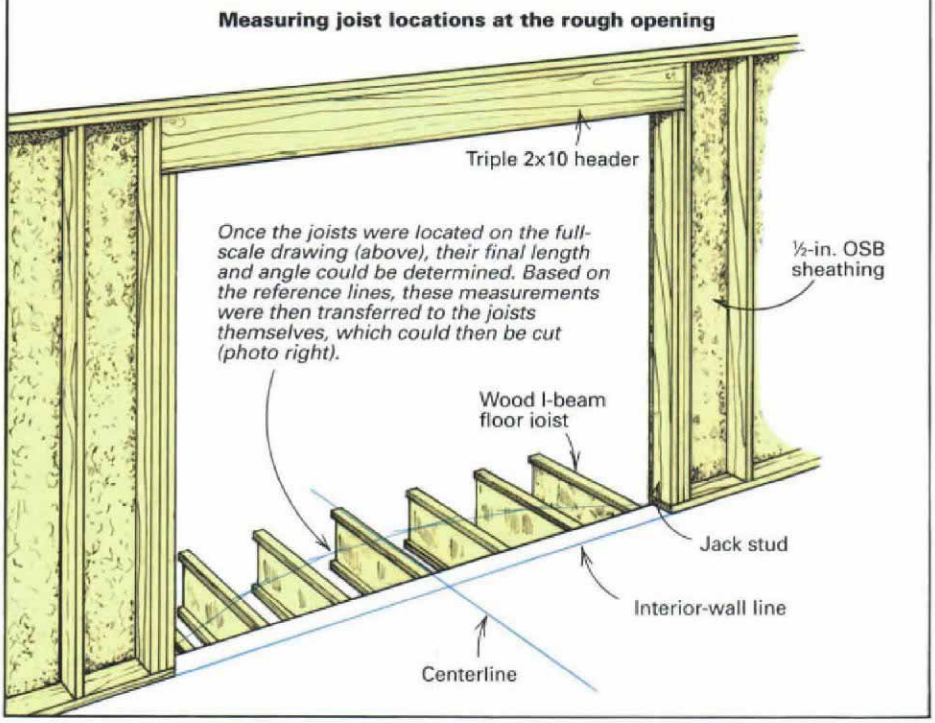
I also traced the wall framing. It was easy enough to measure from the centerline and draw the 2x6 jack studs at both sides of the rough opening. But the window framing

Creating the full-scale drawing





Measurements were transferred from the temporarily assembled window unit to a sheet of drywall with another set of reference lines on it, creating the bow-window footprint. At the rough opening (below), more reference lines were snapped to determine the locations of the floor joists, which were then added to the drawing. This drawing was a full-scale template for cutting the floor joists and the framing members.



Drawings: Bob Goodfellow

also turned out from the wall framing 20°—the window's starting angle, which I got from Andersen's literature—so spacer blocks and trimmer studs were necessary.

On the drawing, the trimmer studs follow the angle of the end windows—20°—and touch both the nailing flanges and the front edges of the jack studs. Then to complete the interior wall plane, I drew pentagonal spacer blocks that fill the 20° openings between the trimmer and jack studs.

The last step was to add the locations of the cantilevered floor joists to this drawing. I snapped another pair of reference lines at the rough opening itself (bottom drawing, left). Then I transferred the location of the floor joists to the full-scale drawing, once again using the framing square and the T-square.

Cutting the floor joists—Referring to the drawing, I laid out and cut the cantilevered floor joists. I measured from the reference line to the ends of the joists, subtracted the thickness of the sheathing and drew the angle of the cut on the top of the joist. Then I squared a plumb line down the face of the joists and cut each joist.

Unlike framing lumber, the engineered joists that I used have an I-beam profile that makes them difficult to cut with a circular saw. So I padded the web to match the flanges with a temporary 1x3 block screwed next to the cutline. This block provided a flush surface for the saw table to ride on (photo below).

At both ends of the bow, the joists project only a few inches; I used a reciprocating saw to cut these short joists. Cutting with a reciprocating saw requires a steady hand, but it was the best tool to use in such a confined space.

I also used the drawing to cut 2x blocking that spans the bottom flanges of the joists. This blocking does two jobs. First, because the window junctions do not occur directly over the floor joists, the blocking extends the profile of the bow window down to the bottom of the joists. It also provides backing for the sheathing.

Next, I marked and cut the plywood subfloor and glued and nailed it to the floor joists. I also

Cutting the cantilever. **Floor joists (wood I-beams on 19 -in. centers) at the rough opening were left long and then cut to the bow shape. The exact lengths of the joists and angles of the cuts were taken from the drawing.**

Taking shape. **After cutting the joists, 1x4 blocking was nailed along the bottom of the joists to continue the window profile. Then the plywood subfloor was glued and nailed to the joists, and the 2x6 wall plates were measured right from the shape of the subfloor and nailed off.**

Spanning from joist to joist. **The window junctions, which are the weakest points of the unit, don't occur over the floor joists, so doubled 2x8 headers were installed to transfer window loads to the floor joists. These headers are positioned so that they sit within the 2x6 wall plate.**

Installing the sill. **The walk-out bow window rests on a 2x6 sill; each piece of the sill is identical to the wall plate below it. A level held against the plate indicates when the sill is plumb.**

cut and installed a piece of ½-in. OSB on the underside of the cantilevered floor joists.

Because the outside edge of the walk-out represents the exterior surface of the wall framing, I was able to lay out the 2x6 wall plates by taking measurements from the outside edge of the subfloor (top photo, left).

Hidden headers—Because the bow-window junctions don't land on the cantilevered floor joists, I installed doubled 2x8 headers below the window unit (middle photo, left). The headers transfer the window load to the floor joists and support the bow window at its weakest points: the junctions.

By adjusting the position of the headers within the 5½-in. thickness of the wall plane, I was able to maneuver each header so that it would bear on a pair of joists without projecting beyond the bowed wall plane. After the headers were toenailed in place, the windowsill plates followed, mirroring the wall plates below (bottom photo, left).

With the bowed wall plane as my reference, I used a level and a straightedge to transfer the layout of the wall framing to the roof-truss overhang above. Then I framed a 14-in. tall 2x6 wall that matched the profile of the bowed wall framing, lifted this 2x6 wall into place and nailed it off (top photo, facing page). Because the roof load is carried by the header in the rough opening, this wall is non-structural and could be framed with studs. To complete the opening, I cut the pentagonal spacers on the table saw and nailed them in place, followed by trimmer studs that provide nailing on the sides of the window unit.

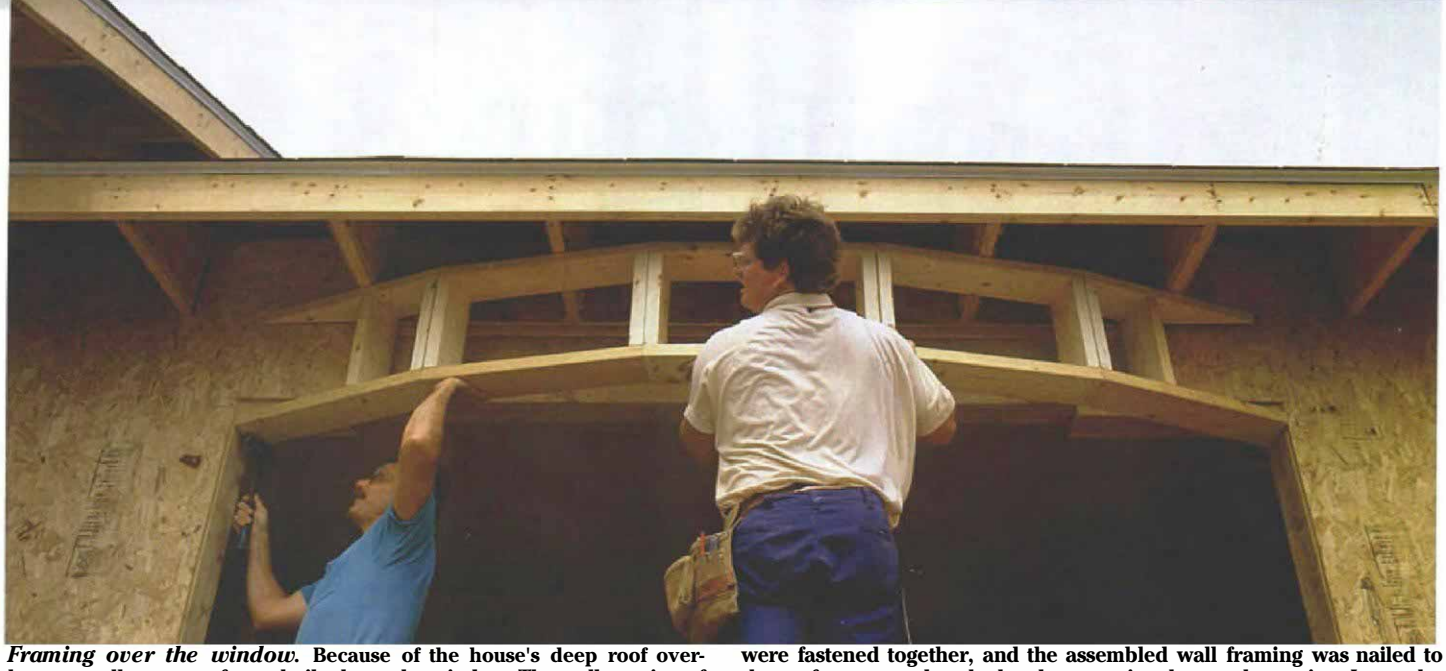
Installing the windows—After sheathing the upper and lower portions of the bowed wall, I installed the five windows. My coworker and I broke down the assembled unit and numbered each window and its accompanying wedge-shaped spacer so that all the screw holes would line up when we reassembled the window in place. By using the same screw holes, the window went back together the same way that I drew it on the drywall.

From that point on, installing the bow window was straightforward. The first unit was tacked in place, the wedge-shaped spacer screwed to the window frame (bottom photos, facing page), and the second unit was then screwed to the first unit. Following this sequence, all the units were fastened together but only tacked in place.

Then we pried and shimmed the bow window into position. When it was level, plumb and centered in the opening, we nailed off the window through the exterior flanges, spacing our 2-in, galvanized roofing nails 8 in. o. c.

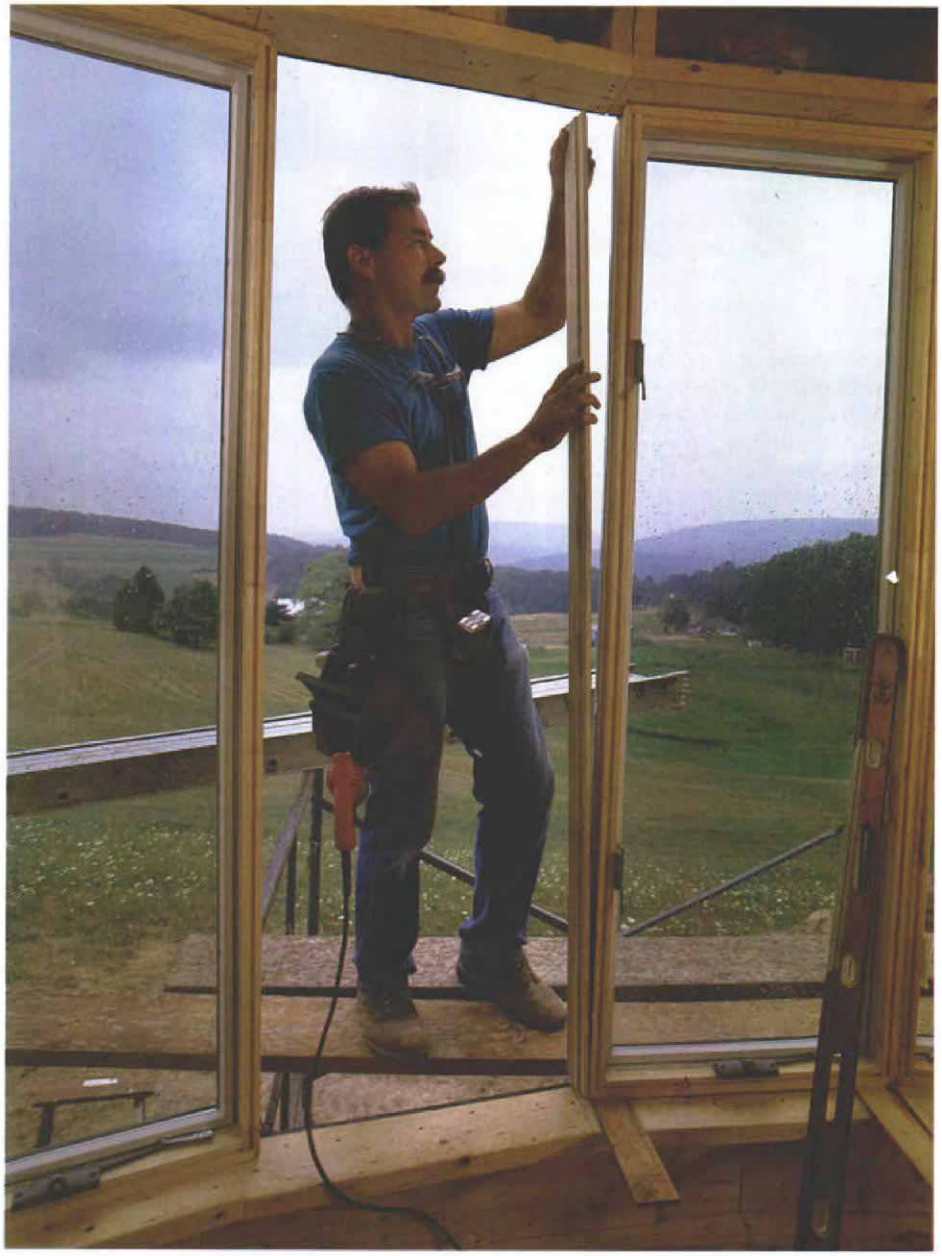
The window unit came with vinyl weather caps that I snapped in place to provide a weather seal at each window junction. The caps got their first test right away because it started pouring as I was putting the last cap in place. □

Carl Hagstrom manages Hagstrom Contracting, a design/build company in Montrose, Pa. and is a frequent contributor to Fine Homebuilding. *Photos by Rich Ziegner.*



Framing over the window. **Because of the house's deep roof overhang, a wall, not a roof, was built above the window. The wall consists of five separate 2x6 frames built to match the window profile. The frames were fastened together, and the assembled wall framing was nailed to the roof trusses and to the header spanning the rough opening. Later, the header will be padded down to the bottom of the 2x6 wall frame.**

Fastening a spacer. **A wedge-shaped pine spacer screwed to the window frame angles the windows to give the unit its bowed shape.**



Nice view, eh? **Against a backdrop of Pennsylvania farmland, the author checks a spacer for its number: When the bow window was first assembled, each wedge-shaped spacer was numbered so that everything would go back together according to the full-scale drawing.**