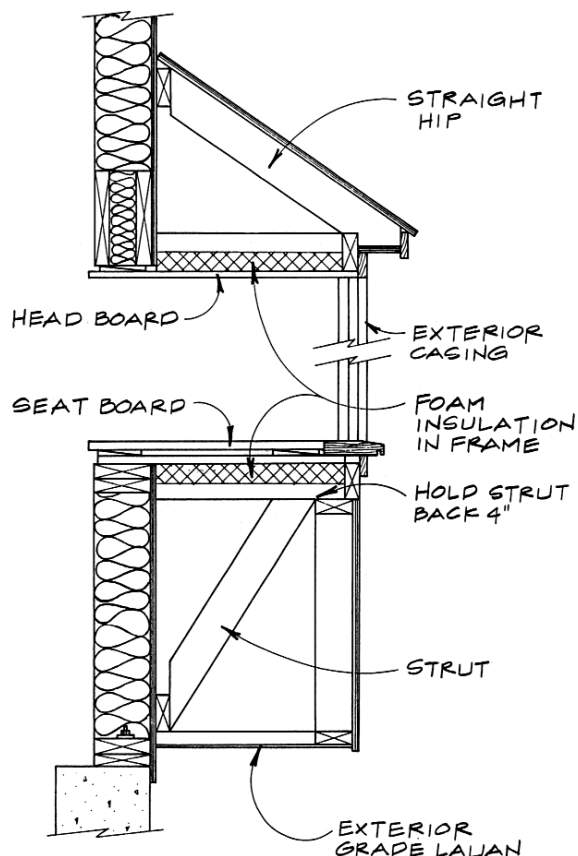


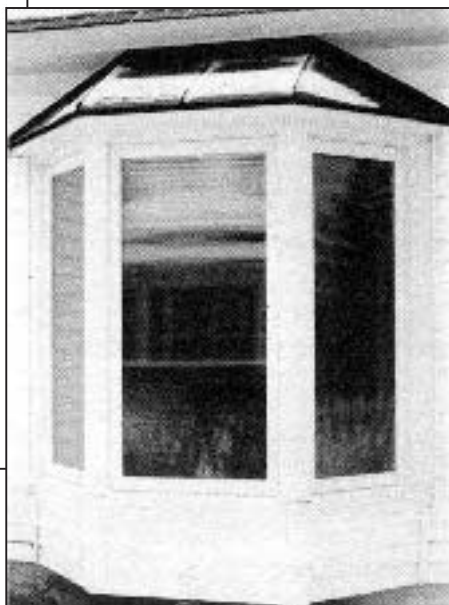
INSTALLING Bay Windows

By Clayton DeKorne

Build attractive, economical bays with fast layout techniques and simple detailing



On a Marvin bay, the author detailed the eaves with a 2½-inch head casing and fascia, and a ½-inch-thick soffit. The birdsmouth cut is 1½ inches deep. Note that the run of the diagonal struts is measured 4 inches back from the front edge of the platform. This allows room for the skirt wall (right), which is clad to match the house exterior.



I blew the estimate on the first angled bay I installed, in part because the unconventional roof layout took me by surprise. The plans and sections in the window catalog offered few clues on the roof and base details. After several installations, however, I figured out the roof cuts, and worked out a few tricks to make these window installations more economical.

Choosing a Style

There's an enormous range of design options in manufactured bay windows. But to keep a bay in line with a tight budget, it helps if you insist on certain design details: First, stick with factory installed head and seat boards (the panels which cap the top and bottom of the windows). These rule out the possibility of a walk-in bay, but save the complications of cantilevered floor joists or angled foundations. Second, stick with 45-degree bays to simplify the roof cuts. Also keep in mind that, while pre-fab metal roofs and decorative brackets simplify the installation, it's often cheaper to frame a hip roof and base yourself.

There are two roof styles I've used. One,

which I call a "straight hip," has hips that run perpendicular to the face of the bay. The other, which I call a "bastard hip," has hips that angle towards the center at 22½ degrees. The straight hip roof is simplest, and is the method I'll describe in this article. It's easy to explain to your lead carpenter because all the rafters are treated as commons. This creates unequal overhangs, but it's fast and the pitch can easily be matched to the main house.

Below the windows, I prefer a vertical base which extends from below the window to the skirt board. This gives the impression of a walk-in bay that cantilevers off the top of the foundation (see lead photo). It's faster to build than an angled base that slopes back toward the house. If your client wants the sloping skirt, you can always build an upside-down version of the straight hip roof and cut the rafters without tails.

Building the Base

Before installing the bay into a rough opening, you have to build a platform to support the window. How you detail this deck depends on the kind of window you install. I've used

Marvin (Warroad, MN 56763; 800/346-5044; in Minn., 800/552-1167) windows, and like them because the bottom of the sill is flat. This allows you to place the window on a level platform without blocking beneath the sill to compensate for the angle. A lot of other manufactured bays are built like this, but not all.

If you do use Marvin, and build the deck as I describe, you'll have to increase the height of the window rough opening given in the catalog by ¾ inch.

Use a template. To execute all the framing quickly, I rely on a template of the window footprint. Actually, I build two frames out of 2x4s to the dimensions of the window footprint. One serves as the platform (called the "platform frame"), and the other as the "top plates" for the roof framing. But before this top frame, which I call my "template frame," gets put into the roof, it will serve as an indispensable layout tool.

Since all my work depends on building the template frame accurately, I take time to measure the footprint dimensions carefully. This can be a little tricky because of the angles.

Template Frame Layout

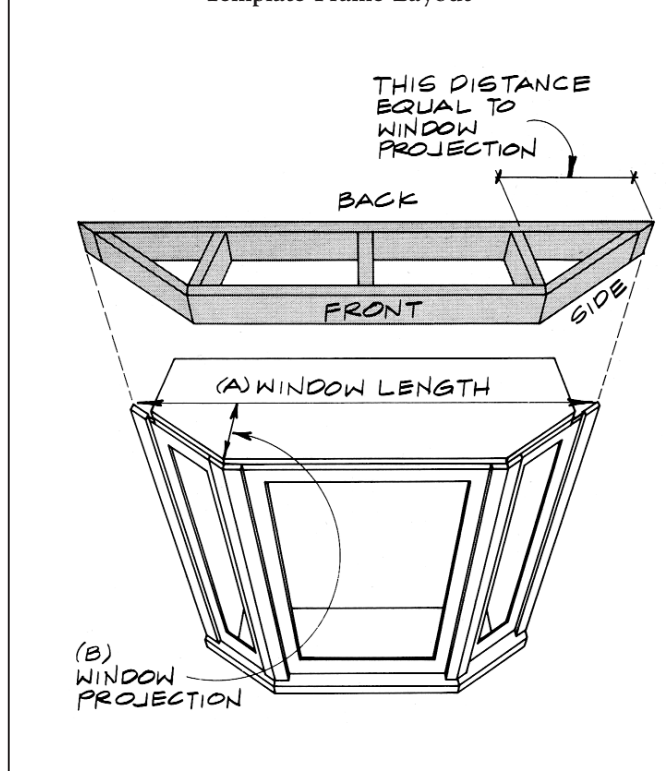


Figure 1. The dimensions for the template frame (shown in gray) are taken off the top of the bay window. The back of the frame is equal to the window length (A), measured from the inside of the exterior casing, minus $\frac{1}{4}$ inch to allow for play when setting the window on the platform. To establish the length of the front, the back is shortened by twice the distance of the window projection (B). The sides are then measured and cut with 45-degree angles at both ends.

But because this is a 45-degree bay, I can establish the angles and dimensions quickly, as shown in Figure 1.

I cut the length of the frames $\frac{1}{4}$ inch short so there's a little play if the window doesn't get centered perfectly in the rough opening. At this time, I also cut two extra 2x4s equal to the length of the front of the frame. One of these I will use as a ledger for diagonal supports in the base, and the other as a "ridge" on the roof.

The platform frame is nailed to the house wall flush with the bottom of the wall opening. The entire surface is then decked with $\frac{3}{4}$ inch plywood. You can save a lot of time by using the template frame for drawing the cut lines for the plywood decking, and adding the width of the framing sill. I cut to the inside of these lines to ensure that the plywood deck won't run past the framing. The ends of this deck are clipped back about 2 inches so the plywood will fit through the window rough opening (see Figure 2).

For now, I nail the deck to the window opening in a single line, leaving it unfastened to the platform frame.

Diagonal support. Under the platform I nail in diagonal struts that carry the load back to the house wall. The length and angles of the struts can be figured just like rafters from the rise and run. The run I use is equal to the width of the platform minus 4 inches to leave enough room for a skirt wall.

Even though I've calculated the

diagonal distance, I still rely on a level when nailing in the struts since a twist in the wall can throw things off.

Once the struts are in, you can nail the deck to the platform frame and install the window. Before lifting the window into place, I mark the centerline of the rough opening on the inside above and below the window. Working off the centerline saves time positioning the window. I also use a 2-inch block to check for an even overhang of the sill on all sides.

Vertical skirt. The skirt can be built out of place as a single, angled wall. I start with top and bottom plates cut at $22\frac{1}{2}$ degrees at the bay angles and 45 degrees at the house wall. To save time, I measure and assemble the plates on my template frame before toenailing the corners together.

I cover the bottom of the skirt with exterior-grade lauan, so I have to add a couple of flat 2x4 nailers for support across the bottom. Again, I use the template frame to lay out the lauan.

Before sheathing the wall, I install rigid foam insulation into the rectangle and triangles of the platform frames. Once again, I use my second frame as a template to mark the foam shapes and get a tight fit.

At this point I cut enough foam to insulate the top of the window as well, but I don't install the top frame until I've cut the rafters. Even though a bay window roof is small enough that you

Platform & Skirt

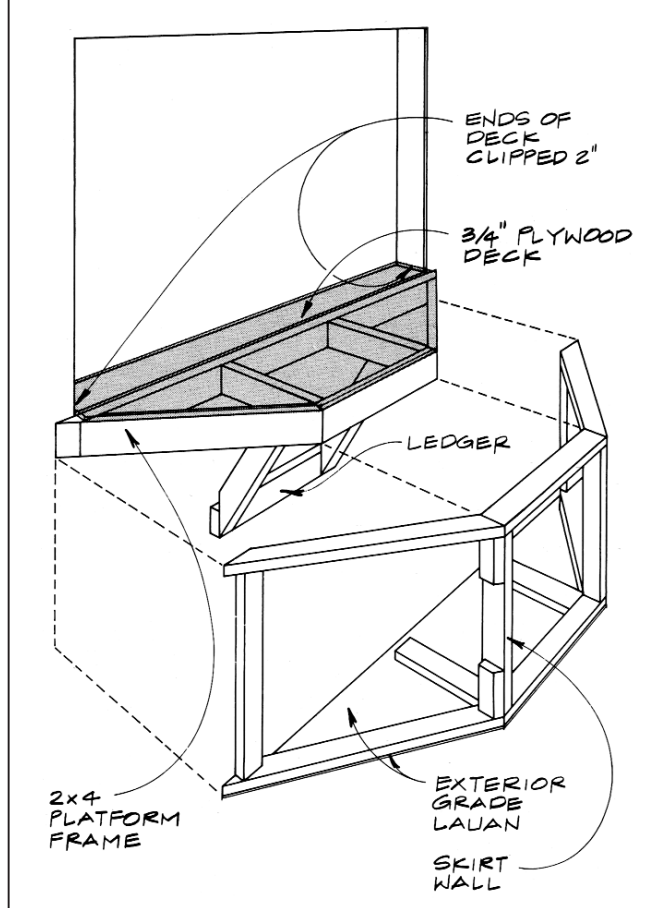


Figure 2. The 45-degree corners of the deck (shown in gray) are clipped so the plywood will fit through the window rough opening.

can tape off the rafter lengths by hand, I do the calculations to save time. By keeping the top frame on the ground for taping off the runs, I can cut the rafters on the ground and just climb up once to set them.

Raising the Roof

I divide a straight hip roof into three sections: First, the "wall rafters" are cut as commons and then ripped at the angle of the roof pitch along the top edge. Second is the mid section, which is essentially a simple shed roof between the two straight hips. In plan the straight hips look like king commons, but they are beveled along their outside edges to carry the sheathing on the sides of the roof. Third, the side rafters get a double cheek cut and look like hips. But they are cut as commons with a shorter run.

Wall rafters and straight hips. If you've built your 2x4 frame carefully, you'll save time laying out the roof. The straight hips will be centered over the outside corners of the bay. So on the template frame the outside of the rectangle will mark the centerline of the straight hip. And the width of the template frame will equal the run of the wall rafters and straight hips, which will be equal to each other because of the 45-degree bay.

I usually match the pitch of the bay to the pitch of the main roof. Since I

know the run, I can find the rise by cross multiplying to find equal proportions. With the rise and run, I can then use the Pythagorean theorem to calculate the rafter lengths.

I lay out at least four identical rafters — two wall rafters, which get nailed against the house wall, and two straight hips, plus any commons I need. The depth of the birdsmouth on all these rafters is determined by the height of the head casing on the window.

The straight hips are shortened $1\frac{1}{2}$ inches (measured perpendicular to the plumb cut) to allow for a "ridge" — one of the 2x4s I cut earlier — nailed flat against the house wall.

The wall rafters stay at the full rafter length, and are ripped along the top edge at the same angle as the plumb cut. When these rafters are eventually nailed in place, the long point of this bevel will stick up above the "ridge," as shown in Figure 3. (Alternatively, you can use a 2x6 ridge that is ripped at the pitch angle along the top edge.) The wall rafters also get a 45-degree fascia cut. I don't bother trying to angle the plumb cut on the birdsmouth, though.

The top edges of the straight hips are also beveled, but only to the centerline. The bevel angle is established by the pitch of the side rafters. I usually wait to make this rip until the rest

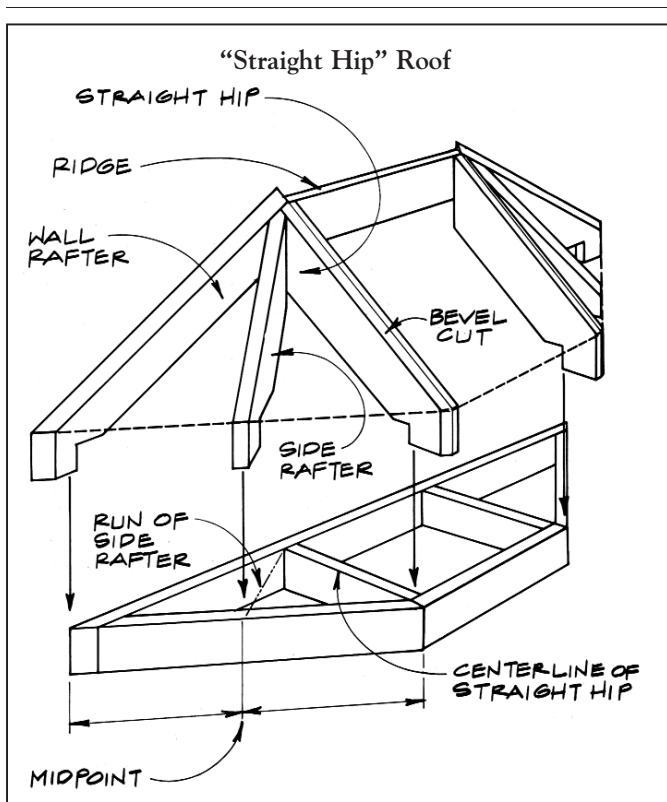


Figure 2. The run of the side rafters can be measured square from the midpoint of the side of the template frame. The wall rafters are beveled, and the long point sticks up above the "ridge." All framing members are 2x4.

of the roof is cut and I have nailed the wall rafters on. Then I can hold the hips in place and mark the point where the bevel on the wall rafter falls on the hip. This point and the centerline of the hip mark the correct angle.

Side rafters. The side rafters are cut like common rafters with a short run. Working off my template frame, I mark the midpoint of one of the angled sides. I then measure the rafter run between this midpoint and the opposite inside corner on the template frame (see Figure 3). If you measure to the inside of the triangle, rather than measuring to the line on the wall sheathing where the true point of intersection should be, you will automatically shorten the rafter.

After the side rafter is laid out, cut the top plumb cut on the side rafters at 45 degrees (like a cheek cut), and then clip $\frac{3}{4}$ inch off the point, cutting 90 degrees to the face of the cheek. When setting the rafters, this "sharp-

ened" point is nailed into the corner where the wall rafter and straight hip intersect.

When laying out the rafter tail, maintain the same height above the plates, and use the same birdsmouth depth and fascia cut as you have on the other commons. The level cut, and consequently the roof overhang, will be shorter because the pitch of this side rafter is steeper.

The difference in the level cuts is only a problem when it comes to running the fascia. If you miter the fascia at $22\frac{1}{2}$ degrees, however, you won't notice a disparity. This offsets the fascia corner slightly from the overhanging roof sheathing, but the inconsistency will be imperceptible from the ground. ■

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