

Dramatic Skylight

BY MIKE GUERTIN

S skylight wells, or shafts, usually are boring. The straight-sided garden-variety shaft isn't much larger than the roof window itself. Plus, the small opening limits the light it lets in. Whenever it's feasible, I splay all four of the shaft walls and flood the whole room with natural light (photo right).

Dealing with the truss dilemma

Building a skylight shaft is tricky in a truss roof. Building codes prohibit modifying the webs and chords of engineered trusses in the field without an engineer's approved design. I prefer to leave the trusses and any bracing intact, with the webs and chords exposed as they run through the opening. When painted, the trusses add character to the opening. And I don't have to modify the roof structure. For this project, I installed a pair of skylights spaced one truss bay apart (24 in.). The sides angle to the adjacent trusses on each side.

Lay out the opening before the skylights go in

I lay out the opening in the ceiling before locating and cutting the skylights in the roof. Keeping in mind which truss bays the skylights are going into, I poke holes through the ceiling to mark the inside edges of the trusses next to those bays. I snap chalklines through the holes to locate the sides of the skylight's splayed opening.

Next, I decide how much of the existing flat ceiling I want to leave beyond the top and bottom walls of the splay. With the corners

established, I snap chalklines to complete the layout for the opening (photos facing page) and drill a hole through the ceiling at each corner to transfer its position to the attic. Now I can determine the location of the skylights.

To contain the mess, I do as much dirty attic work as possible before opening the ceiling. I remove the insulation from the area, install the skylights in the roof, and give the trusses that will be exposed a quick coat of primer. The final bit of prep is covering the floor and walls of the room with sheet plastic to contain the dust and debris from the skylight well. To collect the dust from cutting the drywall, I hold a vacuum hose next to the reciprocating-

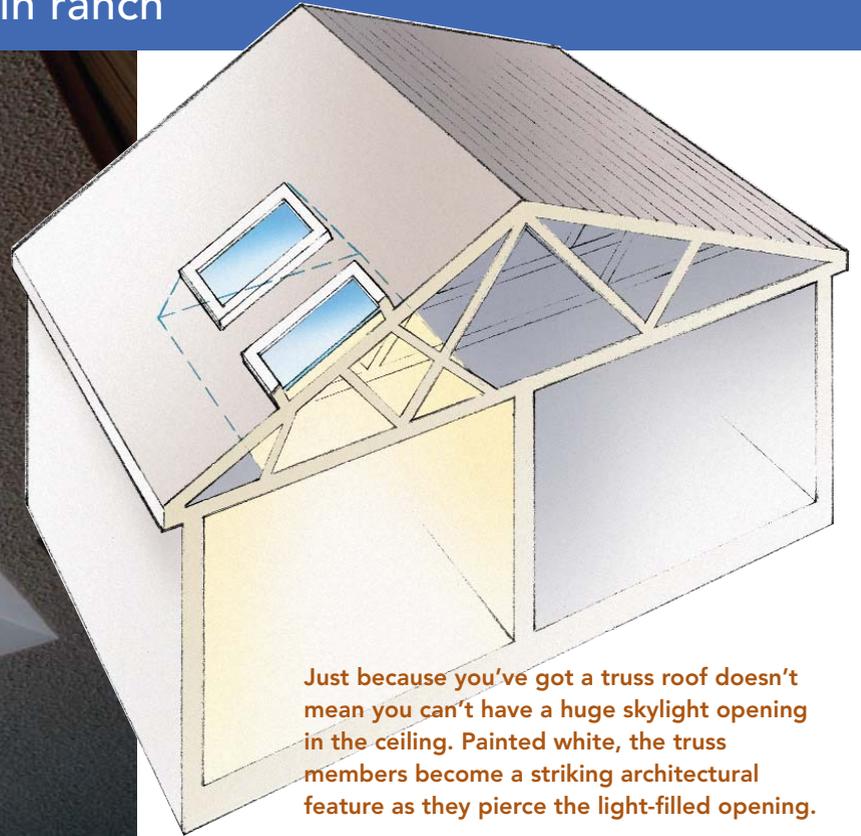
saw blade. I follow the snapped line as closely as possible to make the drywall taping easier. When cutting the lines perpendicular to the trusses, I stop cutting before I hit the edges of the truss chord.

Each side rafter is a different angle

After the drywall is removed from the opening, it's time to start the framing that supports the insulation and drywall. The skylight well sort of resembles a large ceiling coffer, except the angle of the roof turns the sides into irregular four-sided shapes. For the sake of simplicity, I'll refer to the framing supports as rafters. The rafters for the splayed sides are



A skylight well with splayed sides lets in lots of light to transform a plain ranch



Just because you've got a truss roof doesn't mean you can't have a huge skylight opening in the ceiling. Painted white, the truss members become a striking architectural feature as they pierce the light-filled opening.



each a different length, and each rafter sits at a different angle. So the angle of the end cuts changes as well.

I use two strings to locate the first rafter position and to establish its cut angle. The first string is plumb from a lower outside corner of the framed skylight opening to the bottom truss chord. From that point, I square over to the truss chord at the side of the opening where the rafter lands. I then run a second string from that point back to the corner of the skylight. To secure the string at the lower point, I slip a dull putty knife between the drywall and the bottom truss chord. I now can measure the length along the diagonal



OPEN UP THE CEILING



Snapped lines mark the shaft opening on the ceiling (photo left). As the opening is cut, a vacuum hose held near the sawblade keeps dust to a minimum (center photo), and the old ceiling should come down in large pieces that leave less mess (photo right).

SKYLIGHT-WELL FRAMING

To frame the skylight shaft, 2x4 rafters connect the top and bottom chords of adjacent trusses (drawing facing page). Because the roof plane slopes up and away from the ceiling plane, each side rafter has a different length and angle. As the rafter lengths increase, the cut angles increase as well, creating a twist in the sidewall. Hip rafters form the corners, and jacks complete the sidewall framing.



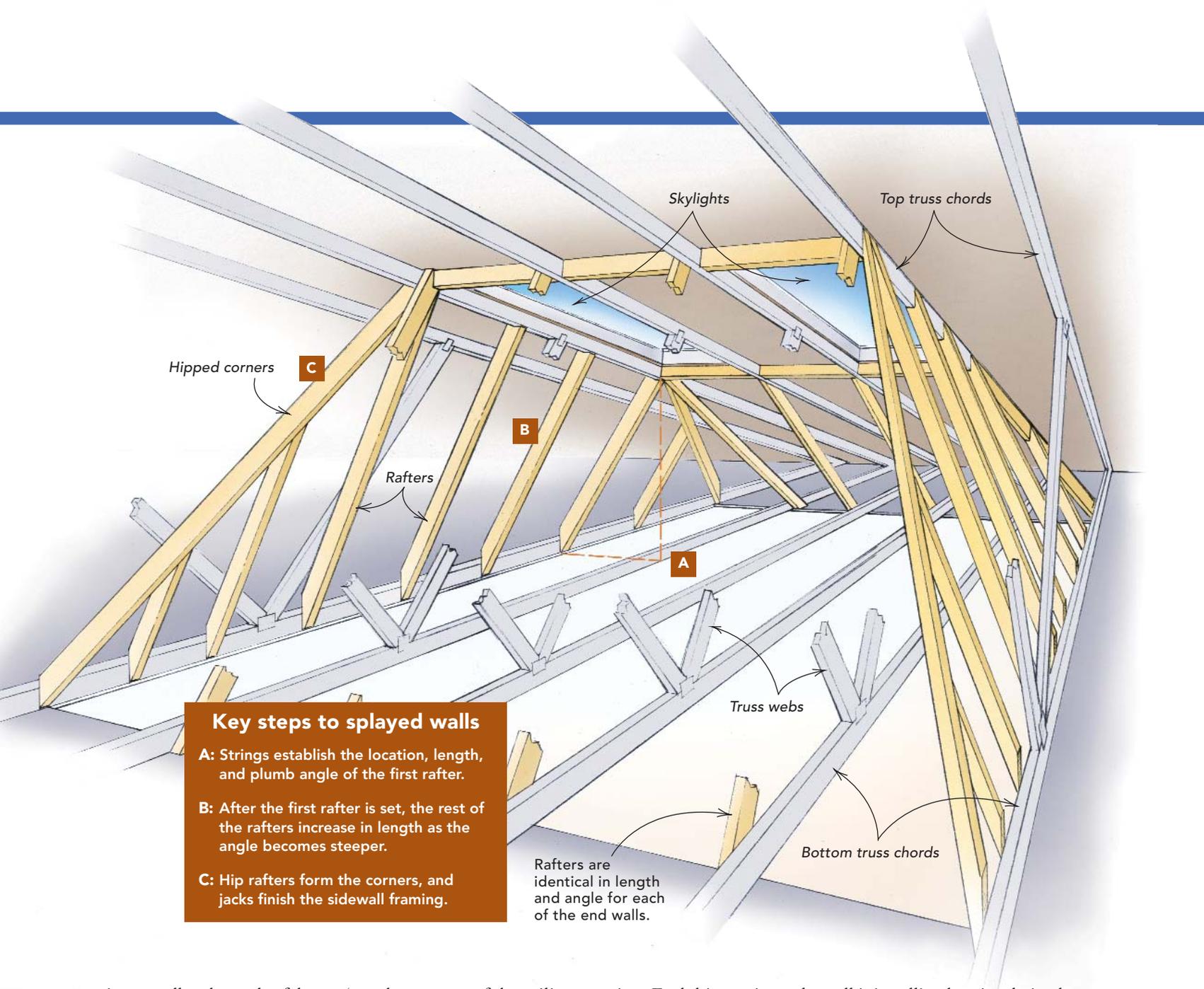
Strings find the length and angle. A plumb line squared over to the side of the opening locates the first rafter (photo left, point A on drawing). A string back to the skylight provides the length and the proper angles, and the rafter then is screwed into place (photo right).



No two rafters the same. Measuring off the first rafter locates each additional rafter whose length increases as the angle to the skylight becomes steeper (point B on drawing).



Hip corners. With all the rafters in place, the twist in the sidewalls is unmistakable. Hip rafters form the corners of the shaft, and jacks complete the framing (point C on drawing).



Key steps to splayed walls

- A:** Strings establish the location, length, and plumb angle of the first rafter.
- B:** After the first rafter is set, the rest of the rafters increase in length as the angle becomes steeper.
- C:** Hip rafters form the corners, and jacks finish the sidewall framing.

Rafters are identical in length and angle for each of the end walls.

string as well as the angle of the cut (top photos, facing page).

The rafter's bottom cut is a straight plumb cut, but the top cut is a bird's mouth with the seat cut angled to the roof pitch. I cut the rafter for one side and test it. If I'm satisfied, I cut its mirror image for the other side and screw them both into place. Having established a starting point, I reposition the strings for the next set of rafters either 12 in. or 16 in. away, depending on the size of the skylight. The process is repeated for each pair of rafters until I reach the upper corner of the skylight (center photo, facing page).

Corner rafters are really hips

The corner rafters are like hips that reach from the corner of the skylight to the cor-

ner of the ceiling opening. Each hip cut is compound with both a bevel angle and a miter angle. I stretch a string from the skylight corner to the corner of the opening to determine the miter angle. To figure out the bevel angle, I plumb down from the skylight corner to the bottom truss chord. A string that I run from that point to the corner of the opening gives me the bevel angle. Before fastening the hip rafter in place, I center it on the string.

Just as with a hip roof, I measure, cut, and install any jack rafters, maintaining the same rafter spacing as I work (bottom photo, facing page). The end rafters along the bottom and top of the skylights are equal in length and position; I attach one to the side of each truss. The last step I take before hanging the

drywall is installing batt insulation between the rafters.

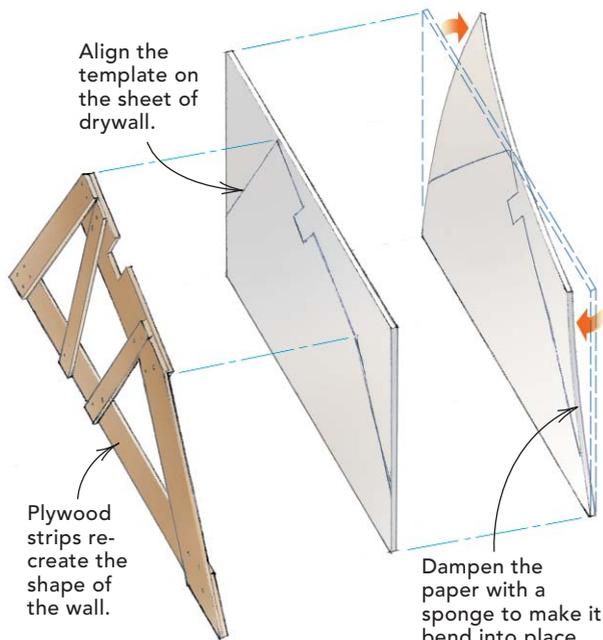
Templates for twisted walls

Because the sides of the skylight well are odd four-sided shapes and have a curving plane, there's really no way to measure, mark, and cut the drywall without a template. So I make the template out of strips of 1/4-in. plywood that bends easily.

I first cut the strips into rough lengths for the edges of each side and screw them to the framing temporarily. Next, I screw together the corners of the template strips (sidebar p. 96). I rough-cut openings around any obstructions, such as the truss webs, and locate the precise dimensions of the cutout onto the template with a scribe block. Later, I use the

FIT DRYWALL IN THE SKYLIGHT WELL

Because the sidewalls of the skylight are not flat planes, the most accurate way to copy the exact shape of the wall is with a plywood-strip template. The template transfers the shape to a sheet of drywall, and the drywall is dampened slightly so that it bends into the twisted plane of the sidewalls.



Screws and a little water bend the drywall. To bend the dampened drywall to the shape of the sidewall, fasten the bottom edge to the framing first, then drive many closely spaced screws at each rafter location to shape the drywall a little bit at a time.

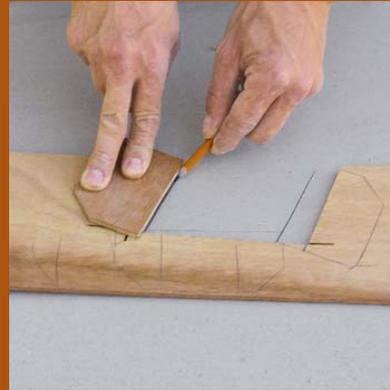
Patterns for odd shapes



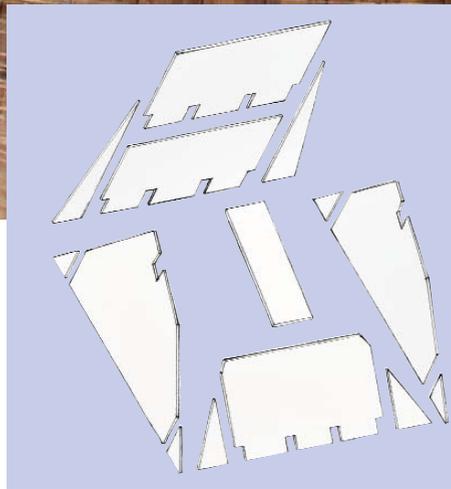
A plywood-strip pattern or template can re-create any oddly shaped area, whether it's a crooked wall inside a closet or the wall of a splayed skylight well. The strips follow the edges of an area and can be scribed to fit edges that aren't straight. For obstructions such as a truss web, the loose shape is cut into the strip, and a scribe block marks the exact location. For this template, rafter locations marked on the template help to orient it properly on the sheet of drywall.



Plywood bends to the wall. First, 1/4-in. plywood strips are screwed into the framing. Next, the corners are joined (photo left). Diagonal strips reinforce the template, and then the complete template can be removed from the framing (photo right).



Scribe block. To copy an exact shape onto a larger template, a scribe block is fast and accurate. Butt the block against the shape (in this case, a truss web), and trace the edge of the block (photo left). Then transfer the shape to the finished material (photo right). A cut corner on the block aligns it exactly on the template.



Small pieces for a less fussy fit. Where the drywall has to fit around the truss webs, smaller pieces are easier to fit. The upper end wall is done in two pieces (photo above), and the lower end wall can be made in one piece. Triangular pieces complete the board installation at the corners.

ing templates. Where truss webs intersect the upper end wall, I install two sheets horizontally for one long seam rather than cut separate pieces to fit between the trusses (photo above). The lower end wall can go in as one piece.

Mud, body filler, and a little paint

The flat ceiling panel between the skylights is filled with rigid-foam insulation and then drywalled over. I also drywall the inside edges of the skylight curbs. To finish around the truss framing where it intersects the top and bottom of the well, I apply tape and joint compound. I tape and compound over any splits in the paper on the curved sidewalls as well. It takes several coats to fair over the joints and any splits. With all the picky little spots and the curved surface, it might be wise to leave the mudding to a pro.

To give the trusses a more finished look, I cover the truss plates with auto-body filler, feathering the edges back to the 2x4 truss webs and chords. After they're painted, the trusses have a nice, smooth look. □

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scribe block to transfer the cutout location to the drywall. To reinforce the template, I attach diagonal braces in a trusslike fashion. Once the template is done, I mark the rafter positions along the perimeter, back out the temporary screws, and then carefully remove the template from the wall.

Water makes drywall flexible

If the template is longer than 8 ft. (as this one is), I place it on a sheet of drywall with a rafter position lined up on the end of the sheet. I trace the template on the drywall and mark the cutouts precisely with the scribe block.

The sides of the skylight well curve, so the drywall needs to bend to the plane. The easiest way to bend drywall is by doubling up ¼-in. sheets, but ¼-in. drywall isn't always available. If ½-in. stock is all I can get, I cut the pieces and wet the paper on both sides of each piece with a damp sponge. I let the sheets sit for about

15 minutes and repeat the sponging. Damp drywall is fragile and heavy, so an extra set of hands is helpful for positioning the sheets.

Lots of screws bend the drywall

To attach the first sheets, I drive screws along the bottom edge at each rafter. Then I work up each rafter, spacing the screws about 8 in. apart where the sheet is nearly flat and 4 in. apart or less at the most severe curves.

When ½-in. drywall is bent, the paper face almost always splits slightly during the process, but any damage can be fixed later with compound. Smaller drywall pieces fill in the ends of the sidewalls. With the drywall installed, the curve of the wall becomes pronounced.

Drywalling the top and bottom walls of the skylight well is simpler than drywalling the sidewalls. Because the planes are flat and the edges regular, I can measure and cut notches around the chords and webs instead of mak-

continued

Reader Response

Roof-truss caution

I found Mike Guertin's article about fitting new skylights around roof trusses very interesting (*FHB* #164, pp. 92-97). I work for a roof-truss manufacturer in Michigan and will pass the information on to customers. I did, however, find something missing.

When the rigid drywall was removed from the bottom chord of the truss, the lateral restraint also was removed from that critical portion of the trusses. If proper bracing is not in place, the bottom chord of the trusses may bow out of plane and cause some cosmetic, or even structural, problems. Whenever the rigid bracing material is removed, the manufacturer should be consulted for replacement solutions. A simple 2x4 brace attached to the bottom chord may be the only thing required to do the job (along with some X-bracing at either end of the lateral brace).

—KEVIN HASKIN
via email