Framing a Dramatic Dormer

If doghouse dormers or shed dormers aren't dressy enough, A-dormers can add an exciting design note, and they're easier to seal against the elements

BY JOHN SPIER

A lot of houses built on New England's coast use dormers to tuck light, airy living spaces under their roofs. Steep-roofed A-dormers are an attractive approach to this style. A house my crew and I recently built on Block Island, Rhode Island, incorporated three A-dormers on the front of a conventional colonial-style roof.



What is an A-dormer?

An A-dormer differs from most other dormers in that its gable wall is built in the same plane as the exterior wall of the house below it (photo below). It's just about the only dormer that looks good when not recessed into the roof. With steeply pitched roofs (these were 24-in-12), A-dormers provide minimal floor area, but they can accommodate tall windows and interesting cathedral-ceiling details (photo left). The exterior trim is usually simple with a uniform soffit width and long rakes connected by minimal lengths of horizontal fascia.

Because the entire A-dormer roof extends down to form a valley with the main roof of the house, none of the usual dormer details, such as cheeks, corner boards or siding-to-roof flashings, is an issue. Absence of these details makes A-dormers easy to finish and weatherproof.

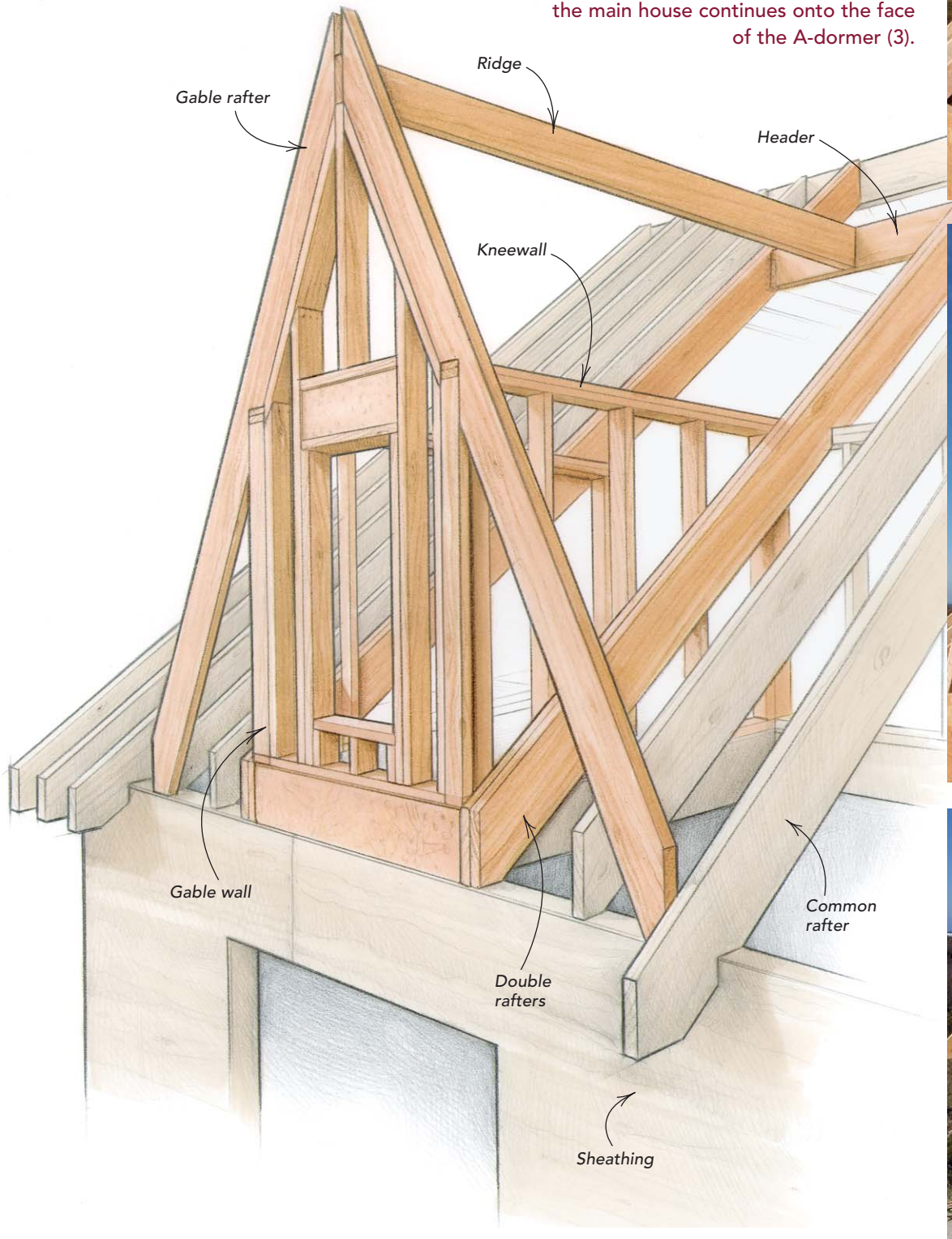
First building steps are the same as for a doghouse dormer

As is the case with most other dormers, the main roof of the house is framed first: The gables are raised, the ridge beam is set, and the common rafters are installed with double or triple rafters framing the openings left for the dormers ("Cutting and Setting Common Rafters," *FHB* #142, pp. 56-61). The dormers



NOT YOUR BASIC DOGHOUSE

Although dramatically different when finished, an A-dormer's initial framing looks much the same as a doghouse dormer (1) with kneewalls and a small gable wall. But then the gable rafters extend down to meet the main roof of the house (2), and the unique A-dormer character begins to emerge. The wall sheathing of the main house continues onto the face of the A-dormer (3).









Drawings: Bob La Pointe



GATHERING VALLEY-RAFTER INFORMATION

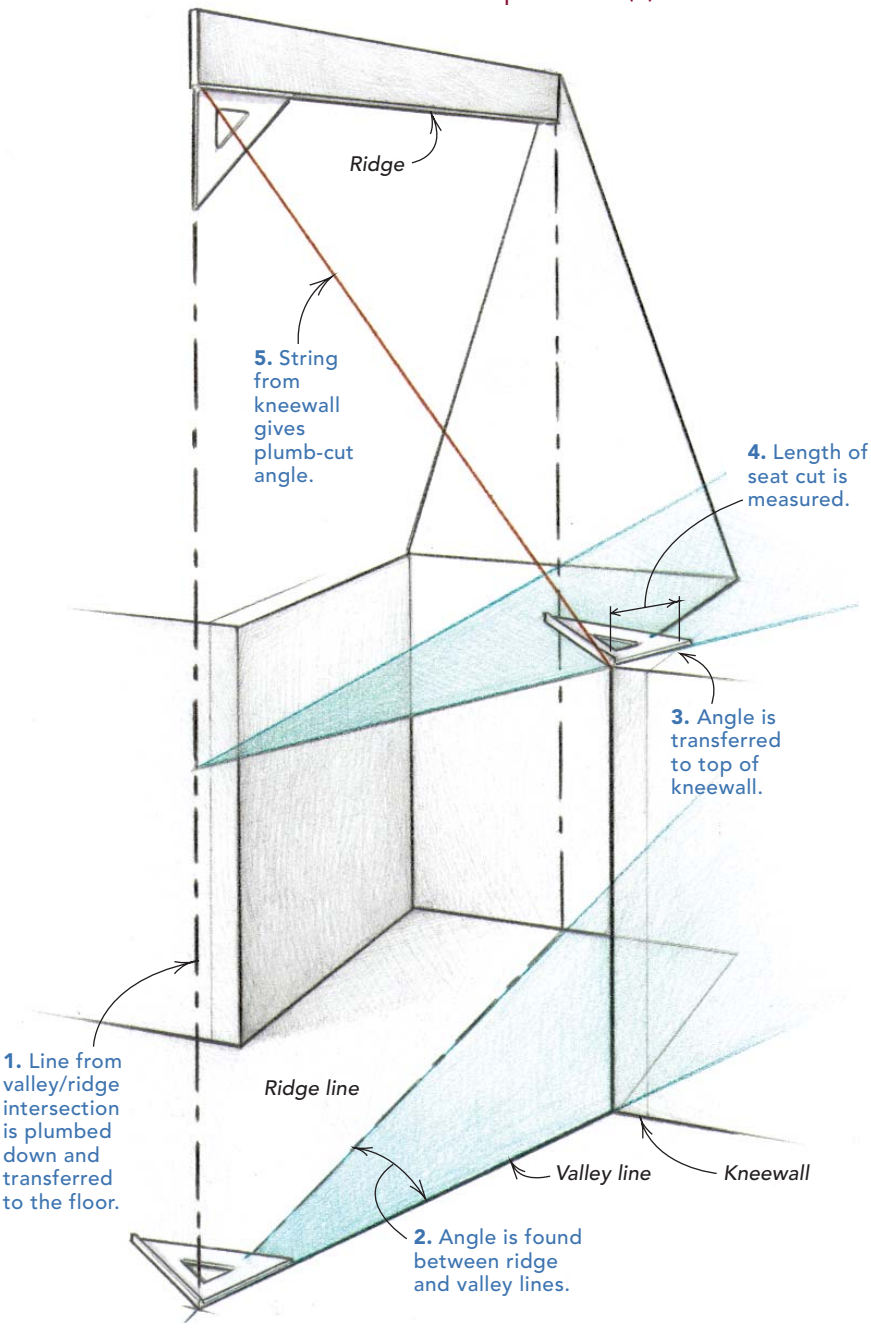
To find the bevel angle for the valley rafters, the author plumbs down from the ridge (1). Lines drawn from the corner of the kneewall represent the valley, and a rafter square finds the angle (2). That angle then is transferred to the top of the kneewall (3), and the length of the seat cut is measured for the valley-rafter layout (4). A string from the kneewall to the ridge is used to find the plumb cut (5).











for this project were supported by 5-ft. high kneewalls that extend inward from the outside wall; in turn, beams in the ceiling below carry the kneewalls. We framed these kneewalls first and set all the common rafters for the main roof outside of them.

Because A-dormer gable walls are flush with the wall below, the adjacent common rafters must have their tails cut off flush with the exterior-wall plate (photos p. 93). A triangulation using the dormer pitch and the kneewall height showed which common rafters needed to be cut flush and which needed full tails to carry the fascia between the dormers.

Next, we framed the gable faces of the dormers. Lines snapped on the subfloor represent the top and bottom plates and the king studs, and the walls are framed to the snapped lines and lifted into place ("Raising Gables," *FHB* #122, pp. 88-93) in a miniature version of raising the main gable.

The 24-in-12 pitch of these dormers required bevel cuts of 64° for the tops of the studs, which is beyond the reach of any saw I own. Because each of these narrow dormers had about only eight of these cuts, I mass-produced the cuts by stacking the studs on edge and gang-cutting them. An 8¼-in. circular saw helped, but a regular saw with a reciprocating saw to finish the cuts also would work.

Next, we took the height of the dormer ridges from the plans and installed headers between the doubled common rafters on each side of the dormers. We nailed in hangers to support the ends of the headers. After the gables were made plumb, the ridge boards were cut, laid out and nailed in place. Next, we made and tested a pattern rafter (without a tail), and we set a pair of rafters on each dormer gable. We cut and installed short studs under these gable rafters outside the kneewalls as nailers for the sheathing and as a way to tie the common-rafter ends to the gable rafter of the dormer. After the rafters were in place, we extended the sheathing from the main house onto the dormer gable.

Two types of valleys in each dormer

Roof valleys can be framed two ways, and each dormer valley in this project is a hybrid of both. The first method uses a valley rafter, which carries jack rafters on each side. This approach was used for the valleys above and inside the plane of the kneewalls where the interior was to be finished as cathedral space.

The second approach, sometimes known as a California valley, was used for the valleys

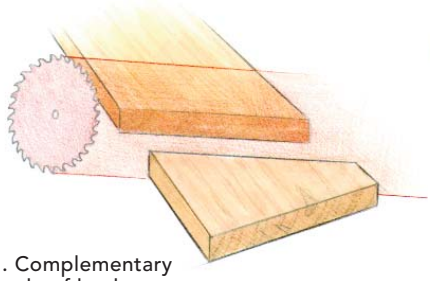
CUTTING THE VALLEY RAFTER

After the ends of the valley rafters are laid out, the first step to cutting the steep bevel angle is making the heel cut or plumb cut at the complementary angle, in this case 18° (1). With the board on edge, a saw set at 90° rides on the first cut to create the bevel angle of 72° (2). A reciprocating saw finishes the cut (3).

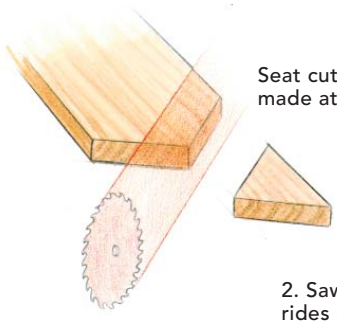








1. Complementary angle of heel cut (18°) is made.

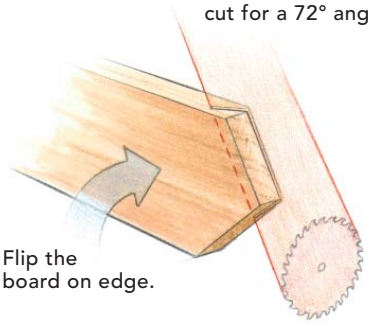


Seat cut is made at 90°.

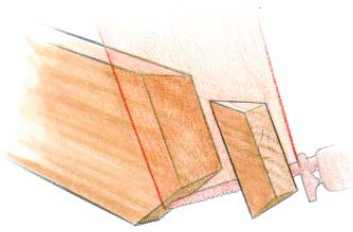
2. Saw set at 90° rides on first heel cut for a 72° angle.



Just as if it grew here. *When the valley is in place, the 72° heel cut lies flat against the doubled common rafters. The rafter bottoms are kept flush, and the dormer roof sheathing hides the height difference in the rafters.*



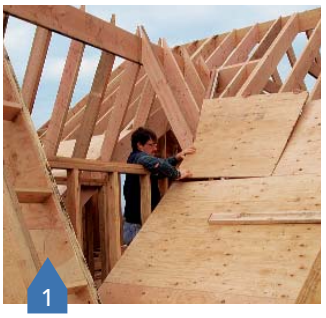
Flip the board on edge.



3. Finish the heel cut with a reciprocating saw.

BUILDING A CALIFORNIA VALLEY

With a standard valley above and the main roof sheathed (1), the crew snaps a chalkline for the edge of the California valley (2) and measures the length. A 2x plate with a beveled edge forms the base of the valley (3), and the rafters cut to length land on the plate (4). Sheathing is installed from the top down (5).


1


2


3

below and outside the plane of the kneewalls where the interior space was unimportant. A California valley is made by framing (and in this case, sheathing) the roof on one side of the valley, then building the roof for the other side of the valley on top of it.

Valley rafters for tops of dormers

Any regular valley between roofs of equal pitch is fairly straightforward; the compound cuts are all beveled at 45°, and standard tool settings and references are used to calculate the valley-rafter angles. An irregular valley, which joins roofs of different pitch, introduces several complications. These A-dormers with their 24-in-12 pitch intersected a roof with a 10-in-12 pitch, creating an extremely irregular valley.

The first step is finding the angles and location for the valley rafter (photos and drawing, p. 94), which is possible through advanced mathematics. But every carpenter I know does it by snapping lines and taking measurements. I start by transferring the location of the valley/ridge intersection to the floor with a plumb bob or a tall level. With a straightedge, I draw a line from that point to the corner of the kneewall, which supports the lower end of the valley rafter. Using a rafter square, I then measure the bevel angle directly from the floor.

Next, I stretch a string from the corner of the kneewall to the ridge and record the angle of the plumb cut with a rafter square. The length of the valley rafter then is measured between those points (along the bottom edge of the rafter). I transfer the bevel angle of the valley to the top of the kneewall, and then I can measure the length of the seat cut to complete the valley-rafter layout.

Another complication when dealing with irregular valleys is the different depths of the rafters for the different roof pitches. In some cases, the width of the stock can be adjusted. In this more extreme case, I framed everything to the planes of the interior ceiling, then allowed the plane of the deeper dormer roof to land beyond the valley rafter on the roof sheathing of the main house.

One of the greatest challenges to framing these dormers is cutting the extreme compound bevels on the ends of the valley and jack rafters (photos p. 95), in this case at 72°. After laying out the cutlines, I cut the complementary angle (90° minus 72°, or 18°) along the heel of the rafter. Then I stood the rafter on edge and made a 90° cut, letting the saw ride along the bevel cut I just made, and I finished the cut with a reciprocating saw.

California valleys simplify framing the lower dormer roof

After the valley rafters and jack rafters are installed, we lay out and finish the rest of the roof. First, we make a set of fly rafters with blocks to establish the overhang. These rafters are installed with the lower ends left long, and they then are cut in place to the level of the common-rafter tails from the main roof. Next, we install short sections of subfascia to join the fly rafters of adjacent dormers.

As I mentioned, we sheathe the common roof with plywood before installing the plate for the California valley (photos above). For strength and simplicity, the sheathing runs to the sides of the dormer kneewalls.

We locate the plate for each California valley by snapping a chalkline from the valley rafter to the outside edge of the gable rafter. After measuring the length, we cut a 2x10 plate (wide enough to catch the tails of the rafters) that forms the base for the California valley. We bevel one edge of the plate to the angle of the dormer roof and cut the angles for the ends, which we figure using a rafter



square along our snapped line. We nail the plate to the snapped line. The rafters for the California valley are identical from the bird's mouth at the kneewall up, so it's just a matter of cutting the tails to length.

Top-down sheathing removes the guesswork

The last step is sheathing the dormer roof. As with most dormers, and especially with roofs this steep, I find it easiest to work from the top to the bottom. Not only do I usually have safer, more comfortable footing with this method, but measuring the remaining angled pieces is also easier.

After snapping the course lines, I start with a full sheet of plywood at the upper and outermost corner of the dormer roof. The trapezoidal shape of succeeding pieces of plywood then can be given to the person doing the cutting simply by measuring the short and long points or by using overall lengths and the common difference. □

John Spier and his wife, Kerri, own Spier Construction, a custom-home building company on Block Island, Rhode Island. Photos by Roe A. Osborn.





Challenging but dramatic. *The steep pitches and sharp angles of A-dormers are an extra challenge for the roofing, plastering and painting subcontractors, but the dramatic results are worth the extra effort.*