

Retrofitting Skylights

A thorough site inspection and standardized techniques make for trouble-free skylights

My company specializes in skylight installation — that's all we do. I've been able to remain profitable

by Derrick Northcross

within this narrow scope because I've developed efficient procedures that guarantee predictable results. In this article I'll describe the strategies I use to do a fast, high-quality job.

Finding the Right Location

Given the small profit margins for a skylight installation, I can only afford to make one trip to a potential customer's home when preparing a quote. During this visit, I listen carefully to the customers' notions of what they want, and look thoroughly for site conditions that may cause problems.

In most cases, the customer has a general idea where they'd like the skylight located. After I've carefully examined the attic area, I point out where the skylight could be located to take advantage of the "path of least resistance," and explain why this location will result in the lowest installation cost. If they are adamant about an



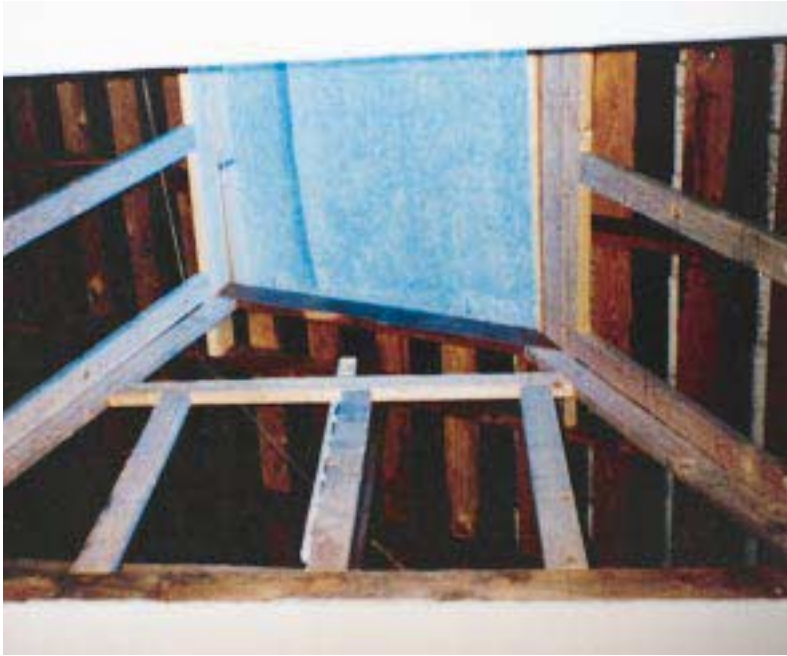


Figure 1. Splaying the upper and lower walls of the skylight is easy, and can more than double the ceiling opening area.

exact location, I explain the extra work and cost that will be involved if I accommodate their request — reframing the roof or moving a heating duct, for example. An option that works sometimes is to leave the ductwork in place, and finish the ceiling with a patterned-glass ceiling panel. By painting the duct and the skylight well white, the obstruction is not visible from below through the light-diffusing panel. (Remember, if you consider using this detail, the overhead glass must be laminated.)

In some cases there is no choice but to pick another location — I won't touch trusses, for instance. The skylight has to go in between or I don't do the job. Sometimes the obstructions are just too big and the cost gets too high. At this point, I might recommend a light tube; the cost is about a third that of a small skylight. They don't provide as much light, but if it's the only option, the customer may be happy with it and the sale may help to cover the cost of my site visit.

Evaluating Existing Conditions

What you can't see *can* hurt you, so attic access is a must. I use a portable halogen spotlight to look for obstructions — heat ducts, valley rafters, electrical wiring, and so forth. If I think there may be wiring in the skylight area, I pull the insulation out of the way and look for wires.

While I'm in the attic, I make note of the size and spacing of roof and ceiling framing, and contem-

plate splaying strategies for the skylight well. Then I go outside and examine the roof area where the skylight will go, noting the roofing type and condition.

If the roofing is in poor condition (old, brittle cedar shakes, for example), I recommend that the roofing above and below the skylight be replaced. It's often impossible to properly tuck the skylight's head flashing under brittle roofing material. By replacing the roofing material to the ridge, I prevent any upstream runoff from finding its way under the head flashing.

This of course leaves a strip of brand new roofing right in the middle of the old roofing material. I'm careful to disclose this to the owner in writing. If the owner is not willing to pay for the roofing, I won't do the job. A few of the early skylights I installed leaked, and in every case, I knew the roof was in questionable condition when I took the job.

In many cases, if the roofing is in bad shape, I'll try to convince the owner that it's wise to have the entire roof replaced. Numbers can help. For instance, a typical skylight installation might cost \$1250, plus another \$450 to replace the roofing to the ridge. If the owner gets the roof replaced at the same time, the roofers handle the skylight flashing, which might knock the skylight installation cost down to \$1000.

I have a few roofing companies I'll refer, and they reciprocate by referring me for skylight work.

To Splay or Not to Splay

With a clear picture of the existing conditions, I suggest the optimum skylight size and location, and explain the splaying options.

In southern California, skylights introduce unwanted heat gain, so I try to use the smallest skylight practical. Splaying the light shaft, however, increases the amount of light entering the room. Typically, I choose a skylight that is equal to 5% of the floor area below, and splay the top and bottom of the light shaft. Since rafters are generally aligned parallel with the ceiling joists, splaying the upper and lower sides of the light shaft (what would typically be the head and sill of a window) seldom requires any difficult framing (see Figure 1). This produces a ceiling opening one-and-a-half to two times the size of the skylight area.

For example, I often install 2x4-foot skylights. Rather than install them with the long side parallel to the rafters, I'll turn the skylight with the long side parallel to the ridge. (This means I have to order a unit hinged on the long side.) I'll typically splay the upper side of the well 90 degrees to the roof and the lower side 90 degrees to the ceiling. Depending on how far up the roof the skylight is

positioned, the bottom of the shaft may be 4x4 feet. This doubles the effect of the light without doubling the heat gain.

Cuts and Codes

Whenever possible, I try to avoid cutting more than one rafter. In my area, the inspector requires double headers if I interrupt one rafter. If I cut out two rafters, I have to use double headers and double the rafters at each side as well. Removing three or more rafters requires an engineer's design.

The code in my area also requires plumbing vents to be at least four feet from an operable skylight. This is to prevent sewer gases from finding their way into the house through an open skylight. Keep in mind that arbitrarily relocating an attic plumbing vent can cause house drains to become sluggish if maximum venting distances are exceeded.

Laying Out the Openings

Up in the attic, I mark the four corners of the roof opening, transfer these marks down to the ceiling (incorporating the splayed shaft), and drive nails through the ceiling at these layout marks.

I bring the homeowner into the room and point out the nails, explaining that they represent the ceiling opening. This provides me with an "I told you so" should the customer later complain that they don't like the location of the ceiling opening.

Top Down

I always start on the roof, and work down. I cut the roof hole first to create standing room in shallow attics, a good source of light within the attic, and an exhaust vent for hot attic air. Working from the top down also puts me on the winning side of the dust and debris that fall downward as the holes are cut.

I drive four nails through the roof sheathing at the skylight opening layout marks, and chop a "breather hole" through the roof within these marks (Figure 2).

I prefer to frame the opening before cutting the hole in the roof sheathing to final size. This provides a little wiggle room when positioning the framing members, and guarantees that I won't over-cut the skylight hole.

Through the Ceiling

Before cutting the ceiling hole, I curtain off a large area around the skylight area below by taping polyethylene sheeting to the ceiling (see photo, first page). This protects the household from the ensuing mess, and I leave it in place during the entire job.

I frame the ceiling opening before I cut through the ceiling drywall. The framing provides solid



Figure 2. The skylight opening is transferred to the roof by driving nails up through the sheathing (top). The carpenter first cuts a small "breather hole" to provide light and ventilation in the attic. After framing the opening, he cuts the full-size hole (above).

backing as I cut out the ceiling opening with a reciprocating saw, and prevents tearouts in the drywall.

Then I build the four shaft walls (including any blocking needed for the drywall), and run feed wires if lighting will be incorporated within the skylight shaft (more on this below).

Installing the Skylight

I mainly install two brands of skylights: Solar Industries, a southwestern regional manufacturer



Figure 3. Prebent flashing supplied by the manufacturer tucks under a flexible rubber counterflashing gasket on this Velux unit.



Figure 4. Before installing drywall in the skylight shaft, the author uses a garden hose to perform a leak test. The sealants he uses to repair any leaks can be applied while the roof is still wet.

(P.O. Box 27337, Tucson, AZ 85726; 520/790-8989) and Velux (450 Old Brickyard Rd., Greenwood, SC 29648-5001; 800/888-3589). The majority of my installations involve a Solar Industries unit mounted on a site-built 2x4 curb. I always use the company's flashing kit, which has presoldered corners on the head and sill flashings. I learned this the hard way: Early on, 90% of my callbacks were for leaks at the corners, where we or the roofers had attempted to bend our own flashings. It's definitely worth the extra money for soldered corners.

Solar Industries' flashing comes in a mill finish, so we have to clean it with thinner and prime and paint it to match the roofing. The Velux flashings come with a dark finish that blends well with the roofing. I typically use Velux for high-end jobs, where customers want bells and whistles like automatic shades and motorized openers. The nice thing about Velux is that they'll provide the warranty service. As long as I do a good job with the installation, I can walk away and never have to worry about a callback.

Velux also provides flashing kits for a variety of roof pitches and types of roofing, including shingle, barrel tile, metal, and flat-roof membranes. The Velux units I install also come with a flexible rubber gasket at the top edges that serves as counterflashing. The preformed metal flashing tucks under this rubber membrane (Figure 3). If you don't install a lot of skylights, I recommend Velux units because they take away the guesswork. With the right flashing kit, installation is straightforward.

It's Best to Test

After the skylight is installed, I take a hose up on the roof and test for leaks. I try to simulate a strong rain, and I always test the skylight *before* installing the drywall below (Figure 4).

On the few occasions when I discover a leak (typically in an area of reworked roofing), I use Henry's Wet Seal (Henry's Wet Seal, 5731 Bickett St., Huntington Park, CA 90255) to make repairs. This product can be used while the surface is still wet. If I need to seal metal to metal, I use Vulkem 921 polyurethane sealant (Mameco International, 4475 E. 175th St., Cleveland, OH 44128; 800/321-6412).

Interior Finish

Once I'm sure I'm tight to the weather, I move inside. To save time when I drywall the shaft, I avoid seams on the shaft walls whenever possible. This may mean using additional sheets of drywall, but the labor I save during taping more than offsets the extra cost of the material.

To speed drywall finishing, I use U.S. Gypsum's

Standardizing Costs

I developed a list of “standardized” costs that cover many of the options I offer my customers. This list also includes typical costs for dealing with obstructions (an air-conditioning duct, for example).

Every skylight installation is unique, so I use these costs as a point of departure when working up a price quote. Site conditions, customer profile, and the sixth sense I’ve developed after 20 years in the business, will all be taken into account when adjusting these standardized costs to fit the job at hand.

—D.N.

Relocate electrical, phone, or speaker wire: \$35 to \$55 each

Install recessed lighting (fixture cost not included): \$55 per fixture

Relocate flex-type cooling duct: \$75 each

Relocate rigid cooling duct: \$150 each

Relocate copper plumbing line: \$75 per line

Relocate plumbing vent: \$75

Relocate natural gas line: \$200

Install indirect lighting: \$400

Some Finished Installations



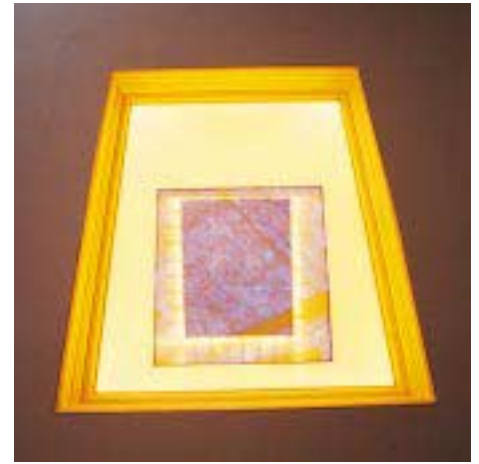


Figure 5. Concealing low-voltage strip lighting behind a crown molding provides a source of indirect light within the shaft. The author warns customers who choose this option that the lights will be reflected off the glass at night (top right photo).

Durabond, a fast-setting compound available with setting times from 20 to 90 minutes.

To further reduce finishing costs, I typically use wood casings at the intersection of the shaft walls and ceiling. This eliminates the need to repaint the whole ceiling, as is the case when corner bead and compound are used.

When all the finish work is complete, I wrap the outside of the skylight shaft with R-19 fiberglass insulation to reduce cooling losses in the summer.

Lighting the Skylight: Turning Problems Into Profits

It's very common for a homeowner to want a skylight right in the middle of the living room ceiling — in the exact location of the overhead light fixture. In this situation, I'll offer the option of installing indirect lighting in the skylight shaft. The wall switches are already in place, so this requires no fancy wiring maneuvers. I install a crown molding valance around the bottom edge of the shaft, then conceal a strip of low-voltage lights behind the crown (Figure 5). I use low-voltage strip lighting called Invisilite, made by a local company (CSL Lighting & Mfg. Inc., 27615 Avenue Hopkins, Valencia, CA 91355; 800/642-2286). I locate the transformer as close as possible to the attic access hatch.


The indirect lighting produces a soft light and

extends the skylight's usefulness into the evening hours. Rather than a black hole in the middle of the ceiling, there's now a soft glow coming from the shaft.

One word of caution: At night, the lighting can be seen in the reflection of the skylight. I've had customers who found this very objectionable, so be sure your customer is aware of this issue before installing indirect lighting.

Low-voltage lighting is not cheap, so I've tried a couple of alternatives with some success. One is to use a line-voltage rope light, which is available from my local lighting supplier for around \$75 for 25 feet. This doesn't give as much light as the Invisilite, but still provides a nice effect. The least expensive option is to install a couple of 4-inch can lights in the sides of the skylight shaft and direct the trim baffles to wash the walls of the shaft.

Estimating Costs

Even though each skylight installation is unique, I have developed some generalized pricing over the years that helps me to quote a job during the first visit (see "Standardizing Costs," previous page). There is no substitute for experience, however, and after reviewing the site conditions, I often revise these figures accordingly. 

Derrick Northcross, of Los Angeles, has owned and operated Trouble Free Skylights and Repair since 1978.