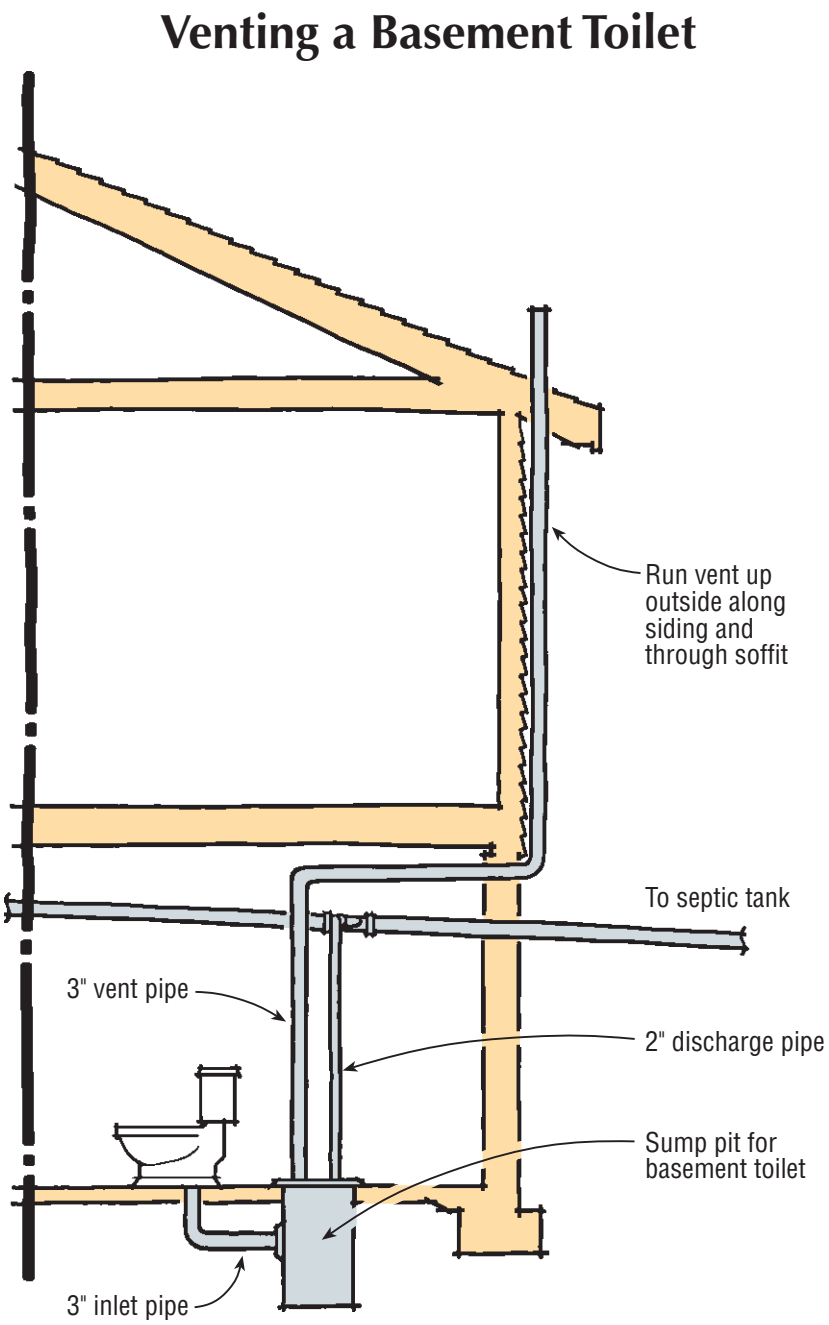
Venting a Basement Toilet

Q. *I am installing an in-floor ejector pump for a basement toilet. Obviously, a wet vent is not possible, since I don't want any upstairs fixtures discharging into the sump pit. How do I vent the toilet?*

A. *Master plumber Rex Cauldwell responds:* You will have two pipes at the top of the sump pit: a high pressure discharge pipe, usually 2 inches in diameter, and a dry vent pipe, usually 2 to 3 inches in diameter. To connect the vent, first try to find a dry vent in the house plumbing and tap into that. If you have none, you take the vent outside and up along the siding. Some people terminate the pipe below the soffit, while others take it through the soffit and go above the roof. I've also been known to take it through the floor to an upstairs closet, and then outside and up.

Here's an idea that is not code approved: Install an automatic mechanical vent (2 or 3 inches in diameter) in place of a fixed vent right at the unit itself. This works in some cases, but not all. Every time the pump kicks on, the vacuum will open the vent and allow air to come in, and no air will escape to the house. Officially, you are not supposed to do this because allegedly the mechanical vent does not respond fast enough to the pump.

Incidentally, basement ejector pumps do not have to be installed in the concrete floor. Kits are available which allow an above-floor installation.



Which Side of OSB Goes Up?

Q. *When OSB is installed on roofs, which side should face up — the slick side or the rough side?*

A. *Corresponding Editor Paul Fisette responds:* The rough side is installed facing up, in order to provide a safer walking surface for workers during construction.

Attic Ventilation Details

Q. *I am improving the attic ventilation in a 30-year-old two-story house in Virginia. My plan is to install soffit vents and insulation baffles. The attic has gable vents with thermostatically controlled fans. Do I have to install a ridge vent, or are the gable vents adequate? What advice shall I give the owners about the fans?*

A. *Bill Rose, architect and building researcher at the University of Illinois Urbana-Champaign, responds:* There are four purported reasons to vent an attic space. The first is moisture control. Moisture control matters in the northern states, but in the humid South, only

carpetbaggers would say that venting is necessary for moisture control.

The second reason for venting attics is to reduce ice dams, which are not a problem in Virginia. The third reason is to enhance the service life of asphalt shingles. How much effort and expense are you ready to put out so that the roof lasts 22 years instead of 20 years? (Use your own estimates of how long shingle roofs last — these are my personal guesses based on my own roof.)

The fourth reason is for comfort and savings during the summer cooling period. In your case, judging from the presence of a thermostatically controlled fan, I would guess that this is the main reason — to keep the attic air temperature as cool as possible. If it's comfort and savings you want, ceiling insulation comes first. The gable fans might actually be counterproductive, since they might be sucking good air-conditioned air out of the house and into the attic. If there is ductwork in the attic, try to relocate it into the conditioned space, or at least correct any leaks or poor duct insulation.

Once you've sealed all of the openings that lead from below into the attic, corrected the ductwork, and installed a nice thick blanket of insulation in the attic, then one venting strategy is about as good as any other. Gable venting and ridge venting are both fine. Soffit venting with baffles is fine. Combinations are fine. If parts of the roof have a lot of venting and other parts have little or none, most would agree that that's fine too. Power venting, however, is noisy and expensive.

Backpriming Siding

Q. *I have often read that wood siding should be backprimed before installation. But I believe that a primer without a finish coat is of no value, because I don't think a primer can slow down moisture movement. Has there been any research or testing on this question?*

A. *Wood finishes expert Bill Feist responds:* Some architects and wood trade associations advise priming the back side of solid wood siding with paint or a water repellent. Research performed at the U.S. Forest Products Laboratory (FPL) in Madison, Wisc., during the 1950s conclusively indicated that backpriming the siding with a paintable water-repellent preservative (like DAP's Woodlife) improved the paint retention and overall performance of horizontal wood lap siding. However, the benefits of backpriming solid wood siding with *paint* have not been experimentally verified, and I am not aware of any published information on studies on this subject.

Recent FPL publications describing studies on backpriming hardboard siding conclude that "backpriming did not improve the performance of this particular hardboard siding nor did it lower in-service moisture content." The studies indicated that there was a possibility that backpriming the lower half of the hardboard siding was beneficial.

Keep in mind that if only the lower portion of the back of wood siding is primed, it is likely that the siding will absorb less moisture, and this would be beneficial. However, it is also possible that if the entire back face of the siding is primed with paint, water that has been absorbed by the siding will be retarded from evaporating. Backpriming with paint retards water vapor from leaving the wood, and the FPL hardboard research suggests that backpriming the entire back with paint may have more negative effects than positive. Unlike paint, a water-repellent preservative will permit drying (loss of water vapor) and also reduce wetting (liquid water).

If I were installing new solid wood siding, I would treat the entire board (front, back, ends, and edges) with a paintable water-repellent preservative and allow two days for proper drying. Best of all, dip the siding before installation (redipping any cut ends), then dry, prime, and topcoat. If that is not possible, I would treat the back, the ends, and the bottom edge of the siding with water-repellent preservative.

Finally, if a paintable water-repellent preservative is not available, I would backprime the lower half, ends, and bottom edge of the board with a single coat of alkyd primer paint.

Reroofing with Heavy Shingles

Q. *I intend to reroof over the original asphalt shingles on a 30-year-old house. I would like to install heavy 40-year architectural-weight asphalt shingles, without stripping the existing shingles. I am a little worried that the new shingles may add too much weight to the roof. The 4:12 roof has 2x8 rafters, 16 inches on-center, that are 16 feet long from the ridge to the eaves. Will a second layer of shingles pose any problems?*

A. *Christopher DeBlois, a structural engineer with Palmer Engineering Co. in Tucker, Ga., responds:* The simple answer is that if the roof is fine now, it will almost certainly be fine when you add the new roofing.

Most residential roofs are sized or designed for basic loads of 10 pounds per square foot (psf) for dead load (self weight), and 20 psf for live load (primarily snow, ice, and rain). The old roofing — standard asphalt shingles — probably weighs about 2.5 psf. The 2x8s themselves weigh about 2.3 psf depending on the species of wood, and 3/4-inch plywood or 1-by roof decking weighs about 2.5 psf. Add a pinch for 30# felt, and you get an existing load of about 8 psf. This assumes that you don't have insulation or a finished ceiling on the rafters, but I am guessing that a 30-year-old house probably has a roof over an unfinished attic.

The fancier and heavier architectural shingles will weigh in at about 4.0 psf. Adding all this up, I get a total load of 32 psf (20 live load plus 8 existing dead load plus 4 new dead load). That's less than a 7% increase over the standard design capacity of 30 psf, so you'll probably be fine.

A more detailed analysis of your question depends on the answers to at least five questions:

- What is the species and grade of the rafters?
- Is the framing in good condition?
- Did you measure the 16-foot rafter span following the slope, or did you measure horizontally?
- Is there a finished ceiling under any or all of the roof?

- What is the ground snow load where you live?

In order to give a more precise answer, I'll make some assumptions. I'll assume the rafters are #2 Southern Yellow Pine (SYP) or of equivalent quality, and I'll assume the material is still in good condition. Since you said "16 feet long" instead of "16 foot span," I'll assume you measured the 16-foot rafter length up the slope. At a 4:12 pitch, this gives a design span of 15 feet 2 inches. To give myself a little wiggle room, I will add another 2.5 psf to the existing dead load for a drywall ceiling with insulation.

Now I have enough data to actually calculate the capacity of the roof. For #2 SYP rafters at 16 inches on-center and spanning 15 feet 2 inches, I calculate an allowable load of 45.2 psf. Note that I have taken advantage of two upgrades permitted by the wood design code: a 15% strength increase available for multiple member use (typical for rafters and floor joists), and a second 15% load duration increase that applies for snow loads that are only present part of the year. Subtracting 10.5 psf for the existing framing and roofing, and 4.0 psf more for the new roof, and rounding down, I am left with an allowable roof live load of 30 psf.

A roof load this high can only be caused by snow. In this case, I conclude that you can add the new roofing if you live in a locale with ground snow loads of 30 psf or less. For the curious, the dividing line would fall approximately as follows: south of Pennsylvania, south of Michigan and Wisconsin, south of the middle of Iowa, south of South Dakota, and west of the Dakotas at an elevation below 5,000 feet above sea level.

If the framing details for the house you're refroofing match my assumptions, then you should be able to add the new layer of shingles. If you're in doubt, either consult a local engineer or tear off the original shingles.

GOT A QUESTION? Send it to On the House, *JLC*, 186 Allen Brook Ln., Williston, VT 05495; or e-mail to *jlc@bginet.com*.