Q A client has a sunroom with an uninsulated concrete slab that is 5 inches below the house floor. What is the best way to insulate and raise the floor to match the hardwood floor in the main house?

A Steven Baczek, a residential architect from Reading, Mass., who specializes in designing durable, low-energy homes, responds: With that 5-inch height difference, I assume that the walls are built on a stem wall, which is not uncommon. You will need to build up the sunroom floor in layers to seal and insulate the floor, while eliminating thermal bridging and creating a nail base for the wood floor.

The first thing to determine is whether the slab is relatively flat and consistent in height. A long level, a straightedge, or a couple of strings can help with this step, but the best tool for checking the floor is a laser level. If the concrete slab is in bad shape, it might be easier to take it out and start from scratch.

If you start with the 5-inch difference between the top of the slab and the finished floor of the house, and you subtract 3/4 inch for the strip floor and another 3/4 inch for the subfloor, you're left with 3 1/2 inches for a supporting frame. Because the slab is uninsulated, it is likely to transmit moisture from the ground below, so first I would cover the slab with 4-mil cross-linked poly (see Insulating a Sunroom Floor, below). Extend the poly up the walls a couple of inches and make sure that it is pressed tightly into the juncture between the slab and the sunroom walls. Tape the poly to the walls with waterproof flashing tape.

To build the supporting structure, start by installing treated 2x4 sleepers on the flat on top of the poly. Place the first sleeper 6 inches in from the edge of the walls and space the rest 24 inches on-center. Fill the spaces between the sleepers and around the perimeter of the room with 1 1/2-inch rigid EPS insulation.

For the next layer, cover the entire floor space with 2-inch-thick rigid insulation. That layer will take the height of the sunroom floor to 3 1/2 inches above the slab.

Next, install the 3/4-inch subfloor on top of the rigid insulation. Drive 3 1/2-inch screws through the 2-inch insulation and into the sleepers below; that screw length should anchor the subfloor without penetrating the poly barrier. With the subfloor installed, you should be able to continue the hardwood strip flooring from the main house directly into the sunroom, uninterrupted. Essentially, this is a floating floor system that is R-15+, sealed, and thermally broken. The insulated floor will make the sunroom warmer, drier, and less likely to cause problems with indoor air quality.

Insulating a Sunroom Floor

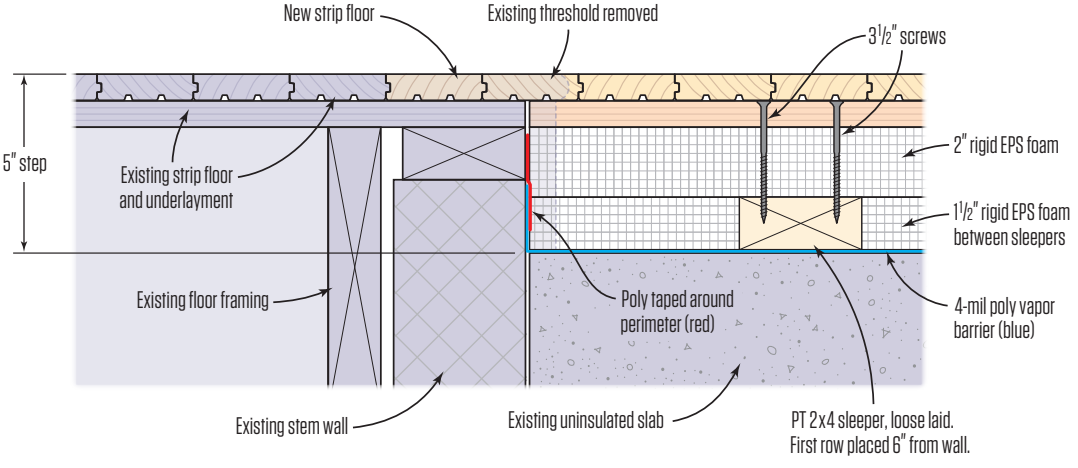

Illustration: Tim Healey

Q Are windows required in all basements?

A Victor Staley, a building official in the town of Brewster, Mass., responds: The IRC's definition of a basement is based on ceiling height, and the code regulates minimum ceiling heights, including those in basements. Section R305 states that the minimum ceiling height in habitable spaces (including habitable basements) shall not be less than 7 feet.

That same section goes on to state that basements that are not habitable shall not be less than 6 feet 8 inches in height. I take this to mean that if the overall below-grade ceiling height is less than 6 feet 8 inches, the space would not be considered a basement but rather a crawlspace. (I'll address crawlspaces later.) The situation can get a little nuanced and complicated when a builder is looking at building out a habitable space in an existing basement, but I'll leave that topic for another discussion.

As to the window requirement, if the house is being built with a basement that meets the ceiling height requirement, the code does require egress that meets IRC Section R310.1, whether the basement will be habitable or not. This section requires that the egress from these areas go directly to the exterior of the building through either a walkout door, a window, or a bulkhead.

The interior stairway between the basement and the first floor does not meet the requirement for egress to the exterior because it does not lead directly to the exterior of the building. So oddly enough, you could build a house with a basement, and the typical interior stairs would not be required, but an egress from the basement directly to the exterior would always be required.

This type of egress in section R310.1 is referred to as an Emergency Escape and Rescue Opening, or EERO. The EERO can be located anywhere along the basement wall, even if the space is mixed-use with part habitable and part uninhabited areas of the basement. The exception to this rule is when a room is designated as a bedroom. In that case, an EERO has to be placed in that bedroom so people trying to flee the bedroom do not have to go through another room to access an EERO. This EERO provision is attached to all bedrooms regardless of the floor on which they are located.

For a below-grade EERO, the code sets forth a minimum net opening area of 5 square feet. If a below-grade window is being used to satisfy the EERO requirement, section R310.2 also requires a window well that projects at least 3 feet from the house. The horizontal area of the window well must be at least 9 square feet.

As mentioned before, a below-grade space with less than 6 feet 8 inches of height would be considered a crawlspace and would not require an EERO. However, the code does require ventilation openings in these spaces.