

QUESTIONS & ANSWERS

Slab Insulation

Q: Is it necessary to insulate under a slab in a superinsulated house? I assume an uninsulated slab would help cool the house in summer.—*William Lee, Cave Creek, Ariz.*

A: Experts don't agree as to whether or how much to insulate below a slab. It's most important to insulate the perimeter of a slab down to the bottom of the footing. Second most important is to insulate under the first few feet around the edge of the slab, and third, under the remainder of the slab. In climates where cooling as well as heating is an issue, it may be best to insulate only the perimeter and leave the underslab uninsulated, as you suggest, for cooling.

Full insulation under the slab is recommended in some situations. These include slabs used in radiant heat delivery or passive solar storage. Also, if wood flooring or carpeting isn't planned, underslab insulations will make the floor feel warmer to bare feet.

Best Roof Color

Q: What is the best color for a roof? In Iowa a well-insulated roof has snow on it most of the winter, so using dark shingles to absorb solar energy won't work. In the summer a light-colored roof will stay cooler. So in our hot Iowa summers, when we have to air-condition, is it not better to use light-colored roofs, despite the trend toward dark roofs?—*Victor Gibson, Waterloo, Iowa*

A: In the absence of specific research on the subject, we polled several experts. They agree that roof color alone has a minor effect on the overall energy balance of a well-insulated house in your area, winter or summer. The attic insulation level and ventilation rate are the most important factors. So choose whatever color strikes your fancy.

In very hot climates, however, roof color definitely affects the cooling load of a house. For instance, an attic under a black roof can be 30°F hotter than a white-roof attic in Florida, according to the Florida Solar Energy Center's Phil Faurey. Light colors would be in order there.

Blockbed Design

Q: In designing a concrete-block radiant floor with heat supplied by warm air from a sunspace, how do I determine the correct pressure drop? Is there an optimum length for an air passage using blocks?—*Herman Blumel, Eden, Utah*

A: Solar designer Mike Nicklas of Innovative Design Inc., in Raleigh, N.C., finds the following rules of thumb work well for block storage. First, size the airflow to exhaust 2 to 5 cfm per square foot of sunspace glazing. Then size the blockbed to take 25 to 50 cfm of air through each block core. For best heat transfer a maximum core length of 16 feet has been set.

This seems to hold true regardless of sunspace size. The optimum run length is 12 to 14 feet. For this length of block duct, the pressure drop is 0.1 inches of water, assuming standard 8"x8"x16" blocks, which have a core diameter of about 5". Smaller blocks have greater pressure drop because the smaller core size presents greater resistance to airflow. For more on radiant slab floors, see "Radiant Floors," *Solar Age*, 5/82.

Water Heater Timer

Q: Does it make sense to put a timer on a hot water tank to turn it off for most of the day if no one will be home? How about an electric tankless water heater if gas is not available?—*Bill Geary, Belfair, Wash.*

A: According to Princeton energy engineer Gautam Dutt, the timer idea will work fairly well if your daily water consumption is less than one tankload, or if the tank is shut off for several days at a time, such as over a long weekend. For shorter periods of time or higher consumption rates, he thinks it would be more practical to insulate the tank.

A typical 1980 stock electric water heater is 73-percent efficient, including tank losses. If you include pipe losses, the efficiency drops to about 60 percent. This may help you decide whether to use a timer or insulation, or both.

Dutt says tankless systems work best if hot water demands are low and points of use are clustered in one part of the house. Obviously this is easier to achieve in a new construction than in retrofit. Drawbacks of tankless systems are that they draw high amperage and supply low flow rates. This means you can't shower and wash dishes at the same time, and low-demand appliances are in order.

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