by Doug Seiter

NOW THAT SUMMER'S HERE, LET'S TALK FROST

With mountain streams flowing and wildflowers blooming, it just seems like we could talk about something other than winter cold for a bit. Sorry – builders in Colorado don't get much of a summer. They spend a fair amount of effort getting as much as they can done before the next cold blast, so no breaks here either.

Frost-protected shallow foundations (FPSFs) have gained some ground over the last few years. More than one building department has turned a suspicious eye their way. But a quick survey of Colorado building officials around the state revealed that to the extent that FPSFs are designed according to industry standards, the resistance to this application ranges from minimal to non-existent.

The science – not to mention savings – is there to support this sensible alternative to traditional foundations. Supporters of FPSFs include the National Association of Home Builders, the U.S. Department of Housing and Urban Development, Partnership for Advancing Technology in Housing (PATH) and the U.S. Department of Energy Building America Program (www.buildingamerica.gov). There are numerous good reference materials on the subject.

As a quick review, FPSFs combine rigid polystyrene foam insulation (EPS or XPS) and ground heat to raise the frost line, reduce the depth of the footing and still avoid heaving caused by frost. The technique is appropriate for slab-on-grade, stem wall and unventilated crawlspace foundations for homes, but can also be applied to malls, schools and offices. The benefits of FPSFs are:

↗ CONSTRUCTION COST SAVINGS FROM REDUCED EXCAVATION.
A trencher can be used instead of a backhoe for FPSFs that don't require horizontal insulation.

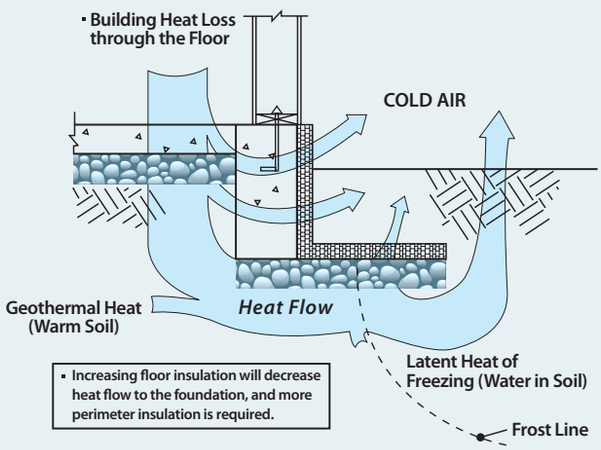
↗ MATERIAL REDUCTION.
Because the depth of the footing can be reduced by as much as two-thirds, the amount of concrete needed is reduced. (Denver's Oakwood Homes documented a 13 percent to 17 percent cost savings in 1,300- to 1,500-square-foot homes.)

↗ BETTER PERFORMANCE.
Insulated foundations will result in better comfort and lower heating requirements for the home.

THERE ARE A FEW ISSUES THAT REQUIRE SOME DILIGENCE, OF COURSE:

- Termites, while not a huge problem in much of Colorado, need to be thwarted from building a highway behind the foundation insulation.

AN FPSF HEAT FLOW DIAGRAM FOR A HEATED BUILDING



SOURCE: REVISED BUILDER'S GUIDE TO FROST PROTECTED SHALLOW FOUNDATIONS

- Some jurisdictions in Colorado will be less inclined to go down the FPSF road simply because the savings start to diminish, according to PATH and ToolBase Services, if the frost depth is less than 30 inches.

- It's also important, as with any system, to make sure the components are applied properly.

- Proper drainage away from the foundation and avoidance of "cold bridges" (points with breaks in the insulation) are fundamental to good performance.

- Landscaping should be avoided above horizontal insulation, but leaving a non-irrigated buffer adjacent to the foundation is just good building science for moisture management.

- Finally, a tough and durable coating is necessary to protect the foundation insulation from damage during construction and beyond. (See the *Revised Builder's Guide to Frost Protected Shallow Foundations* for information about coatings.)

An FPSF will gain five points on the *Built Green® Checklist.* Switching to FPSFs turns out to be a fairly easy decision and saves construction costs in the bargain. If you aren't already on board, it's worth a look.

FOR MORE INFORMATION

Frost-protected shallow foundations are detailed in the 2006 International Residential Code *(page 74, Figure 403.3 [1]), and just about all you ever wanted to know about FPSFs can be found in the* Revised Builder's Guide to Frost Protected Shallow Foundations *found at the ToolBase Services Web site:* ***http://www.toolbase.org/PDF/DesignGuides/revisedFPSFguide.pdf***.