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Sunday, November 23, 2008

Weatherize to save \$\$\$

By Val Van Meter  
 The Winchester Star

**Gainesboro** — Do you want to save big bucks on home heating costs this winter?

If so, cellulose is the silver bullet. That's the word from William W. Hill, a professor in the Building Futures Institute of the College of Architecture and Planning at Ball State University, Muncie, Ind.

On a recent sunny fall afternoon, Hill was watching Scott Darnell and his crew from Community Housing Partners in Berryville snake large hoses across the lawn at Hogue Creek Farm, near Gainesboro, as they got ready to blow treated, shredded newspaper into the attic floors and walls of his mother-in-law's home.

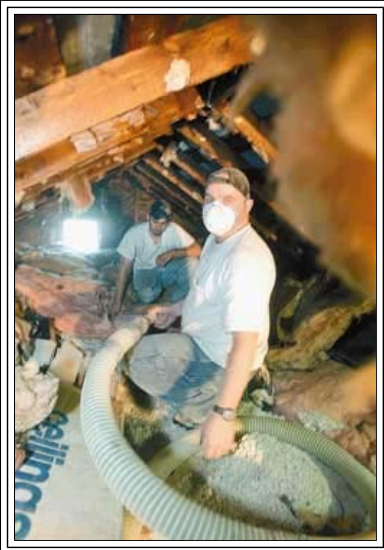
When they finished, the old farmhouse and its several additions should be much more air tight. That's where the savings come in, Hill said.

Everybody recommends caulking and weatherstripping around doors and windows, but that's not where houses leak, Hill said.

"It's not rocket science," Hill wrote in a paper on heating and cooling costs, "But it is science."

The science can be traced to 1978, when researchers from Princeton University published a study on how buildings lose heat.


Basically, it showed that most heat in homes is lost through the ceilings into the attics and



Mike Belcher (right) and Travis Merrix



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through walls.

install cellulose insulation in the attic to save energy.  
*(Photo by Scott Mason)*

The driving force to push heated or cooled air out is a stack effect, Hill explained. Differences in temperature and pressure inside and outside the house create the effect.

Hill helped conduct a study of weatherization in Virginia that proved the point to him.

He worked with colleagues at Virginia Tech in 1988-89, to see how much money could be saved with winterization based on caulking and weatherstripping.

"We thought we were going to see a 50 percent savings," Hill said. "Like every assumption, it didn't work."

Twenty years ago, he said, 75 tubes of caulk brought a four percent savings in energy costs.

At that point, Hill said, they took four crews and trained them in dense pack, the process Darnell's crew was using on the farmhouse.

"It's not a do-it-yourself" project, Hill admitted.

You have to have the right equipment, and a little scientific instrumentation helps too.

Hill set up a "blower door," a plastic sheet with a blower fan in the center, that installs in a doorway.

Monitoring equipment on the fan can tell how long it takes to exhaust all the air in a building, and if fresh air is being pulled in through leaks in the house itself.

A test of the house showed air was entering at the same rate it would if there was a 541 square-inch hole in the building.

"That's 8,000-cubic-feet per minute. That's hugely leaky," Hill said.

Last year, he said, it cost about \$2,500 for fuel oil to heat the house. "And they burn a lot of wood."

Darnell's crew blew the cellulose into holes cut into the floor of the attic between each joist.

"It's not light and fluffy," Hill said. "It's blown in under pressure, hence the term 'dense pack.' It gets packed in there really, really tight."

The cellulose is treated to deter bugs and is fireproof, Darnell explained.

After all the ceiling areas were done, the crew drilled quarter-inch holes in the siding of the house at ground level and proceeded to pack the walls.

"It does a really good job," Darnell said. "It stops every hole, cracks and all."

The R-value, a rating of how much heat-retention insulation provides, will be about 50 for the attic and 13 or better in the walls, Darnell added.

Fiberglass insulation, which most modern homes have, doesn't do the same job, he said, because it basically filters the air through.

For most houses, Darnell said, the major source of heat loss is through the attic.

So, although he got his start in architecture and planning in solar technology, Hill said he's come to believe that the best way to conserve energy is to make houses less wasteful of the energy it takes to heat and cool them.

"This is not news in the field I'm in," Hill said. But he's concerned that the word hasn't gotten out to "Main Street."



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A second blower door test, completed after the walls were filled, showed an exchange rate of 5,909-cubic-feet per minute, about a 32 percent reduction from the first test, Hill said.

"I had hoped for an even better reduction of the air leakage, but the 'newer' parts of the house," those added to the old house over time, had fiberglass in the walls and cathedral ceilings, Hill said. That "made it impossible to 'pack' the walls with cellulose. The air leakage in the old part of the house, which had essentially nothing in the walls or ceilings, was reduced tremendously."

By plugging the leaks in houses, homeowners could save 25 percent of their energy costs, Hill stated.

On an anecdotal level, Hill said he could attest that the increase in thermal comfort in the guest bedroom where he was sleeping was "dramatic. I noticed it the first night after they had only 'blown' the attic above."

And, he added, "the savings go on year after year. These are dollars that don't leave the community."

— Contact Val Van Meter at  
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