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MANY HOME REPAIRS FAIL TO SOLVE MOISTURE PROBLEMS; RESEARCHER PRESENTS "FIVE MYTHS"

Madison, Wis.—First Each year American homeowners spend millions of dollars attempting to fix or prevent moisture-related problems. Too often, their efforts don't fix the problem. In some cases, these efforts actually make matters worse. So says Anton TenWolde [CORRECT], a physicist and researcher who has been studying moisture in buildings for more than 20 years.

According to TenWolde, many generally accepted moisture-control practices in the United States are based on limited or no research but mostly on tradition among home builders and others.

"We spend very little on housing research in the United States. Several countries, including Canada and even smaller nations like Denmark, the Netherlands and Sweden, invest more than the United States in research into home-building technology," he says.

TenWolde, a native of the Netherlands, holds degrees in physics and engineering from the University of Delft in the Netherlands and the University of Wisconsin at Madison.

He has been a physicist at the USDA Forest Service Forest Products Laboratory (FPL) in Madison, Wis., since 1980. He is currently project leader of the Building Moisture and Durability research unit there.

Since 1999, the FPL has been home to the Advanced Housing Research Center, through which much housing-related research is managed and coordinated.

Several ongoing projects at FPL study moisture-related issues. For example, FPL's research-demonstration house, a full-size four-bedroom house built in 2000, is equipped with scores of sensors embedded in the walls and elsewhere to track the movement of moisture and water vapor in the walls and foundation. Other projects look at sealants and wood-preservatives as well as adhesives.

The problem of basing home construction or repairs on unproven building practices is amplified because some of those traditional practices have become part of building codes around the country, TenWolde says.

According to TenWolde, building codes historically deal with safety issues such as fire prevention, electrical safety, or structural standards. Building codes sometimes go beyond safety when they try to deal with moisture.

“And moisture is one area where current building codes get it wrong, especially when they apply standards that might make some sense in northern Maine or Minnesota to Florida or Texas,” TenWolde says.

TenWolde identifies five main ideas about home construction and maintenance that are widely misunderstood or downright incorrect. He calls them “The Five Myths of Moisture.”

Myth One concerns so-called vapor barriers, or vapor retarders.

“A vapor retarder, normally installed only on exterior walls, is intended to slow the diffusion of moisture from an area of higher humidity to one of lower humidity. Such barriers are ineffective if there is any air movement, which is almost always the case in wood-frame construction. An air barrier, to be effective, needs to envelop the entire house—ceiling and floor as well as walls,” TenWolde says. “Problems caused by diffusion are very rare; moisture problems caused by moving air are much more common.”

In warm, humid climates, a vapor barrier can do harm. Nonetheless, practically all building codes require vapor barriers or retarders. (Vapor barriers originated in the 1930s, partly based on research conducted at FPL.) A more effective approach to controlling moisture intrusion would be to make the house as air-tight as possible and provide good drainage around the house, according to TenWolde.

Myth Two is that attics need to have lots of ventilation. Again, venting requirements are not based on rigorous scientific research. TenWolde explains that attic venting originally arose as a moisture-control strategy for cold climates. Other purported benefits, such as longevity of the shingles, arose later. It is widely believed that increased attic venting will prolong the life of roofing shingles by cooling them. But research shows that venting has very little, if any, effect on shingle temperature. The most important issue in shingle temperature appears to be the color of the shingles. Light-colored shingles reflect sunlight and don't get as hot as dark shingles.

One possible real benefit of attic venting in climates with large snowfalls is to reduce snow melt on the roof to avoid the formation of ice dams. But according to TenWolde, a more effective—and energy-efficient—way to control snow melt in almost all climates in the United States would be to use air barriers and insulation to prevent heat from entering the attic.

Myth Three is that new homes are built “too tightly” and that walls have to “breathe.” That is the reason often given for the presence of mold in newly built houses. TenWolde cites recent research in Canada that revealed that houses that leaked air had as much, or in some cases more, mold than tight houses.

“It takes very little air movement to accomplish drying, and even a house with good air barriers usually will permit enough movement to permit moisture to escape, unless there is massive water entry. Uncontrolled air movement may actually cause moisture problems, and certainly can cost money in air conditioning and heating,” he says.

Myth Four: Crawl spaces need to be vented. To TenWolde, venting crawl spaces is just as dubious a practice as venting attics. Venting crawl spaces is marginally effective in dry climates but can be harmful

in wet or warm humid climates. The best way to control moisture in crawl spaces is to use site grading, downspouts and soil covers to prevent water from entering the crawl space.

TenWolde's Myth Five is the belief that building codes actually address residential moisture problems.

"Building codes address only vapor "barriers" and venting attic and crawl spaces. These are only two ways of controlling moisture and not very effective ones at that," TenWolde says. "Most real moisture damage in homes is caused by water entering the home through leaks or poor flashing details. The most effective practices for controlling moisture are related to proper installation of windows, flashing, site grading, foundations, rain absorption, roof overhangs, and whole-house ventilation and humidity control."

TenWolde's "Five Myths" reflect the fact that there is considerable confusion and misunderstanding around moisture problems. In an attempt to resolve some of those differences and publicize the latest research findings, the FPL has joined with industry-related organizations to establish a Residential Moisture-Management Network. The network will evaluate existing research and develop uniform recommendations for dealing with moisture.

The USDA Forest Service Forest Products Laboratory was established in 1910 in Madison, Wis., with the mission to conserve and extend the country's wood resources. Today, FPL's research scientists work with academic and industrial researchers and other government agencies in exploring ways to promote healthy forests and clean water, and improve papermaking and recycling processes. Information is available at FPL's Web site: www.fpl.fs.fed.us. Through FPL's Advanced Housing Research Center, (www.fpl.fs.fed.us/ahrc/), researchers also work to improve homebuilding technologies and materials.

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