

Massachusetts Fire Officials Urge Caution With Spray Foam

It's well-known that two-component spray polyurethane foam (SPF) gives off a substantial amount of heat as it cures. That heat — the result of an exothermic chemical reaction — ordinarily dissipates quickly. But if too thick a layer of foam is laid down at once, the internal heat can accumulate, leading in extreme cases to temperatures high enough to cause a fire. While such events are thought to be rare, concerns in Massachusetts about several recent structure fires involving spray foam has brought the issue into the spotlight.

Three fires and a death. On July 1, 2011, Massachusetts state fire marshal Stephen D. Coan issued a memorandum to all state fire-department heads noting that “at least three fires, one being a fatal fire, are believed to have been started during the application of spray foam insulation, and currently remain under investigation.” The memorandum went on to urge local fire officials to work with building departments to “make contractors in your communities aware of this potential fire hazard and encourage that they follow application instructions accurately.” Finally, it requested that department heads inform the fire marshal's office of any future fires involving freshly applied spray foam.

Although the memorandum itself provided no further information on the fires in question, Timothee Rodrique, director of the state's division of fire safety, identified them as follows:

- A May 2008 blaze at a home in North Falmouth that claimed the life of applicator Robert Cowhey, who was spraying an open-celled foam inside an attic with limited access



The May 2010 fire that destroyed this net-zero home in Hudson, Quebec, is thought to have started in a too-thick layer of freshly applied spray polyurethane foam.

■ A recent story in the *New York Times* outlined a Montana man's quixotic effort to build a 2,280-square-foot, three-bedroom house entirely from U.S.-made products and materials. Bozeman builder Anders Lewendal contends that only about 75 percent of the materials used in the average American home are made in the United States, and he estimates that committing to all-American content increases a home's construction cost by 2 to 3 percent. Lewendal admits that in his case he will likely fall short of perfection, since even U.S.-assembled appliances may include foreign-made parts, and the recycled crushed glass beneath the garage slab could contain imported beer bottles.

■ The summer of 2011 drew to a close with a spate of outdoor deck collapses, including one in Alexandria, Minn., that injured 16. “The nails from the side of the house broke apart because they had so much weight on them,” a neighbor told KSAX-TV. A similar accident in DeKalb County, Ga., sent four people to a local trauma center after they “slid down the deck, landing up against the house,” according to a firefighter at the scene. And in the town of Walpole, Mass., three party-goers were hospitalized after a deck failed as those present gathered around a birthday cake. “There were about 15 to 20 people on top of the deck who slid down, toward the foundation,” a witness told WBZ-TV.

- A February 2011 fire at a multimillion-dollar home in the village of Woods Hole (which, by apparent coincidence, is also located in the town of Falmouth) that was undergoing extensive renovations
- A 2011 fire in the town of Sutton, about which no other details were available

Rodrique also cited a Hudson, Quebec, blaze that destroyed the partially completed Alstonvale House, which was one of a dozen participants in a net-zero energy competition sponsored by the Canadian Mortgage Housing Corp.

According to Rodrique, the driving force behind the memo — both its warning and its appeal for information — was alarm about the shortage of reliable information on spray-foam-related fires. (National fire statistics don't provide enough detail to tease out the frequency of such events.) And while Rodrique stresses that investigators have not yet issued final reports on any of the Massachusetts fires, the circumstances in all four cases, he says, strongly point to exothermic heat produced by fresh spray foam as a common cause.

Piling it on. Rick Duncan, executive director of the industry trade group the Spray Polyurethane Foam Alliance (SPFA), agrees that available fire statistics have little to say about exothermic fires. "I'm not aware of any structure fires," he says. "But foam can ignite if an applicator applies too much too quickly. That's why we offer detailed guidance on correct procedures through our applicator accreditation program."

Duncan notes that he's aware of a "half-dozen" instances in which careless or inexperienced applicators have been responsible for small localized fires. "The usual situation is when an applicator is adjusting the spray rig and sprays a test blob of foam on the floor," he says. "If it's big enough and thick enough, it will start to smoke after a while. At that point, someone just picks it up with a shovel and carries it outside."

Spray foam industry consultant Mason Knowles sees the risk of fire as relatively minor. "It's definitely not impossible," he says, "but you'd have to pile on one heck of a lot of foam in one spot." Even under worst-case conditions, such as an already-hot attic, an applicator would have to apply a foot or more of foam before it could begin to burn, Knowles says. Given that foam manufacturers specify the maximum product thickness than can be applied in a single pass — usually no more than an inch or two — he contends that operator error is much more likely to result in defective foam than in smoke or flames. "The usual problem when foam is applied too thick is that you get too many open cells and odor problems after it's supposed to be cured," he says (see "Troubleshooting Spray Foam Insulation," 9/10).

In the interest of both quality and safety, Knowles recommends that all foam applicators perform a simple, low-tech test whenever they begin spraying. "You start to have quality problems when the temperature of the foam reaches 220 degrees, and that happens to be the top of the scale on a standard meat thermometer," he says. "You just stick a meat thermometer in the foam and see how high it goes. If it doesn't go all the way to the top, you shouldn't have any problems."

Field conditions. However, not everybody agrees with that assessment. Quebec-based architect Sevag Pogharian — who designed and oversaw the construction of the ill-fated Alstonvale House — is convinced that applicator training and industry guidelines have failed to provide an adequate margin of safety.

According to Pogharian, the May 25, 2010, fire coincided with a spell of unseasonably hot weather. The crew's goal for the day was to spray a 2-inch layer of closed-cell foam on the underside of the roof deck. Running the length of the ridge was an interior duct, which drew hot air from a plenum beneath a roof-mounted photovoltaic array for space heating. "The

■ A federal district court has dismissed a lawsuit charging the U.S. Green Building Council with false advertising in connection with its LEED certification program. The suit had been filed late last year by New York energy consultant Henry Gifford, who argued that his business had been injured by the USGBC's claim that LEED-certified buildings save energy. In dismissing the case, the judge ruled that the plaintiff had failed to demonstrate any legal interest that the suit would protect. The case was dismissed "with prejudice," meaning that the claim cannot be brought again, though Gifford may still choose to appeal the decision.

■ Two recent stories in the news illustrate the kind of problems that can result from poorly placed solar electric panels. According to the website Cincinnati.com, Newport, Ky., homeowners Becky and Perry Bush are threatening to sue a neighbor over a 10-foot-by-16-foot ground-mounted PV assembly that they claim blocks the view from their \$900,000 home. And in Hermosa Beach, Calif., a much-praised net-zero home has angered neighbors who charge that its 27 view-obstructing PV modules are costing them big money. "They've knocked hundreds of thousands of dollars off my property value," one disgruntled resident told the website Dailybreeze.com.

space, in among the truss members.” Despite the difficult working conditions, the insulation crew finished spraying the south side of the roof by midafternoon, and had packed up and left the site by 4 p.m. A few hours later, the structure was in flames.

“The reality of life on a job site is that you can’t count on everything going right,” Pogharian says. “The drawing called for two inches of foam, but it would have been easy to put down much more in some areas, given the conditions under the roof.” Another factor, Pogharian believes, may have been the contractor’s eagerness to complete the job that day, since he’d been unable to work the week before.

“That may have clouded the contractor’s judgement,” Pogharian says. “The temperature dipped the week after the fire, and it might have been safe to spray the foam then. The reality is that there wasn’t one single cause, but a whole cocktail of things.”

Plumbers and heaters. Because the heat-producing chemical reaction characteristic of spray foam runs its course within a few hours of application, exothermic fire seems to present little risk to homeowners. And unless foam-related fires are much more common than anyone now suspects, they’re responsible for far less property damage than familiar job-site hazards like portable space heat-

ers and careless plumbers with propane torches.

Still, the issue is potentially troublesome for the spray foam industry. Despite the sharp overall decline in construction in the past few years, spray foam has boomed. According to the SPFA’s Rick Duncan, volume more than doubled in the period from 2006 to 2008, raising concerns about quality control.

“We have a very comprehensive training and accreditation program,” he says. “But an out-of-work carpenter can buy spray equipment and drums of foam on eBay. The challenge for us as an industry association is to reach the low-bid guys.” — *Jon Vara*

Passivhaus Institut and Passive House Institute U.S. Sever Ties

In the middle of August, the U.S. passive house community was nonplussed to learn of a decision by the Passivhaus Institut (PHI) of Darmstadt, Germany, to terminate its relationship with its U.S. subsidiary, the Urbana, Illinois-based Passive House Institute U.S. (PHIUS). The split was made public in an open letter from PHI founder Wolfgang Feist, which cited several “breaches of contract and good faith” on the part of the U.S. organization, including unauthorized changes to PHI’s proprietary energy modeling software and improper certification of passive house buildings. PHIUS executive director Katrin Klinkenborg responded swiftly with an open letter of her own, asserting that the charges amounted to “public defamation and character assault,” and that any violations of existing contracts were the fault of the German organization, not PHIUS.

Charges and countercharges have continued to fly back and forth since, primarily in the form of letters from the aggrieved

heads of the two groups. Left in limbo for the time being are PHIUS-certified passive house consultants and builders with projects pending or already under construction, who must now decide whether to remain loyal to PHIUS — even though its project certifications will apparently no longer be recognized internationally — or seek new working relationships with PHI-approved organizations outside the U.S. As for energy-efficiency advocates as a whole, they’re mostly scratching their heads in confusion. However the controversy is resolved, it seems likely to slow the momentum that passive house has gained in the U.S. over the past several years — an outcome both PHI and PHIUS would presumably have preferred to avoid (see “Passive House Seeks Broader Appeal,” *JLC Report*, 2/11).

Blake Bilyeu, a Salem, Ore., builder and passive house consultant, completed a PHIUS-certified house last year. “We’ll find out whether it will shake some of the consumer confidence in certification,” he

says of the organizational rift. “It’s a huge disservice to the movement. But the system and the method are still valuable to us.”

Advocates who have been supportive of the passive house movement’s goals but critical of its inflexible standards speculate that, in the long run, the PHI-PHIUS split may not be such a bad thing if it prompts a reassessment of priorities. “There are very smart people involved with passive house who are doing good work,” says energy consultant Michael Blasnik, who has been active in building-science research for more than 20 years. “They’re right to emphasize the importance of thermal bridging, and they have some excellent energy construction details. But the precision they’re after doesn’t exist in the real world. Why spend thousands of dollars doing energy modeling for super-tight buildings with phenomenal R-values? You know before you start that you’ll have an incredibly efficient home. Too much mystique and dogma diverts people into minor issues that don’t matter much.” — *J.V.*