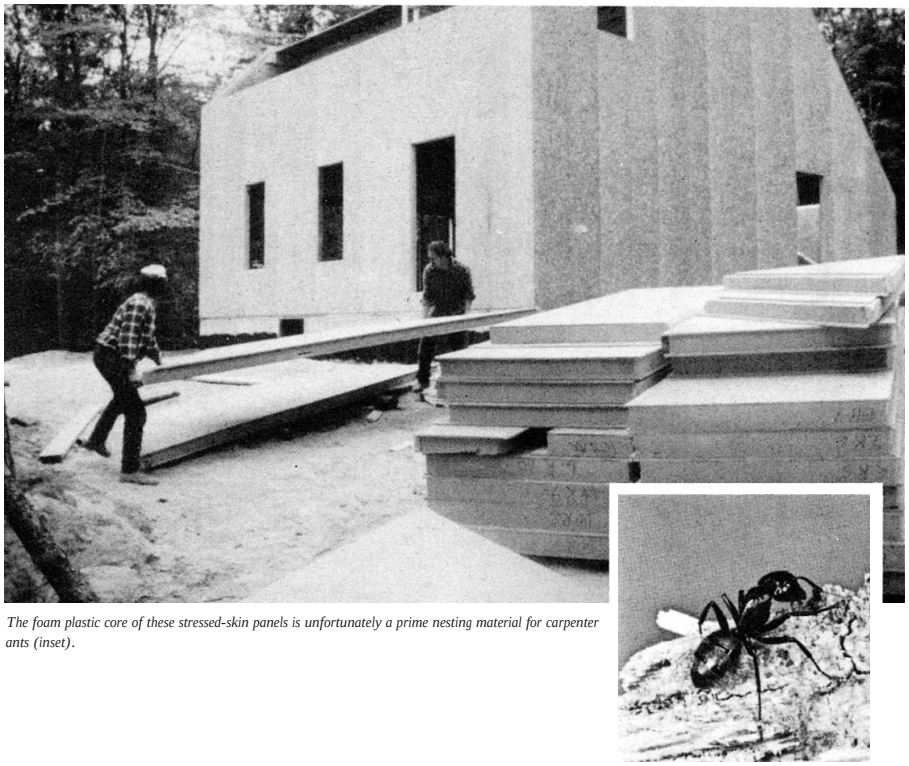


The foam plastic core of these stressed-skin panels is unfortunately a prime nesting material for carpenter ants (inset).

CARPENTER ANTS AND FOAM-CORE PANELS

Stressed-skin panels make cozy homes for more than just humans

by Jeremy Coleman

Carpenter ants have long been recognized as a threat to wooden buildings. Much has been learned and written over the years about why infestations occur in wood-frame buildings and how to stop them. In recent years, however, the use of stressed-skin panels – rigid foam insulation sandwiched between layers of flakeboard, drywall, or other sheet goods – has added a new chapter to the book. Much remains unknown about the scope of this problem. But based on my experience, I think anyone building in infestation-prone areas should think before using rigid insulation products.

Colonial Bugs

"Carpenter ant" refers to species of ants in the sub-family Formicinae, which typically nest in wood – usually, but not necessarily, in wood that has been made punky by decay. Carpenter ants are the big guys, up to _ inch in length, that you may have noticed in rotten wood, or roaming the floors of your house in spring (bad luck). Like all ants Formicans are colonial. Each colony consists of a fertile female, the queen, many sterile wingless females called workers, and winged males. The males appear at the time of swarming, impregnate the female, and then die. During swarming, new fertile females also appear, usually winged at first, and these may go off to form new satellite colonies. Thus a single infestation can spread into new areas where conditions are right. This period of swarming and colonization occurs predominantly in spring, at least in New England. If an infestation is present, this is when one is most likely to see carpenter ants in a house.

Carpenter ants are attracted to damp areas as nesting sites, probably because damp conditions foster the creation of punky wood, their "traditional" nesting area. They don't eat the punky wood, they simply remove it to create a network of nesting tunnels and cells. Presumably, this material is chosen because it is soft and easy to tunnel in.

Foam Will Do

Unfortunately rotten wood is not their exclusive nesting material. Carpenter ants will nest in almost any soft material that approximates the consistency of punky wood. Thus, rigid insulation is a prime nesting material for them. As any exterminator will tell you, they love the stuff.

I have personally experienced a severe carpenter ant infestation in my own stressed-skin home and have heard accounts of many other cases. In one infested ceiling I inspected, if you pounded on the underside (pine boards), chewed-up EPS came down like rain. A sample chunk from this ceiling, 12x12x6 inches, was more than 50 percent hollow. Ants will infest extruded polystyrene, isocyanurate, and urethane as well. To carpenter ants these materials make an ideal, easily-excavated home.

The ants are definitely attracted to moist conditions, and very probably excavate into moist, softer woods even if they are not punky. Areas around dishwashers, leaky toilet flange gaskets, poorly flashed roofs or siding, and other chronically moist areas are prone to infestation.

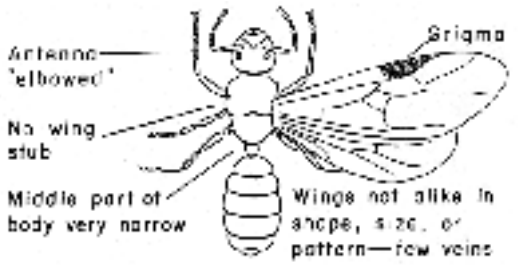
Many experts suggest that curing the moisture problem will get rid of the carpenter ant problem, and this may be true in many instances. Unfortunately, however, the ants can get around this. Once a colony has been established in a relatively vapor-tight area, moisture produced as a byproduct of the ants' own metabolism is enough to sustain the colony, even in the absence of any other source of moisture. This is the principle whereby some small, moisture-efficient desert mammals can survive without any source of drinking water. Metabolism consists largely of the oxidation of carbohydrate fuels, and a byproduct of the oxidation process is water.

Given this ability, carpenter ants can find sandwich-type building panels a prime nesting material. Whether or not the ants were first attracted to the panels by moisture, once a colony is established the ants can supply all the moisture they need. I have reports of infestations in both rigid insulation fit between framing members and in stressed-skin panels. The former situation appears temporary – after a year or two the ants may disappear. With stressed-skin panels, however, the infestations require extermination. I believe this is because the transpired moisture sandwiched in the panels cannot escape.

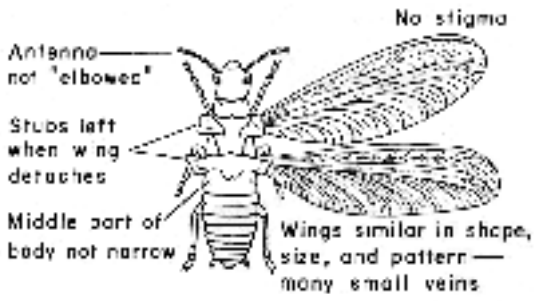
Problems of Technique

Certain techniques of stressed-skin panel construction have a tendency to create wet areas at the panel joints, especially in the first winter after construction. This is especially true when 2x4 splines are used to connect adjoining panels. Many gallons of water vapor are released the first year, coming from the drying of concrete slabs, joint compound, and especially the wood framing, which is often practically green.

This moisture works its way into areas of least vapor resistance – in this case the joints with the 2x4 splines. If the weather is cold, these joints can become so wet that joint compound over the joints will re-hydrate, and the



ANT



TERMITE

The carpenter ant (above) has an hourglass-shaped body, while the termite (below) is elongated. Carpenter ants burrow in wood or foam to nest, while termites eat wood as a food source.

tape and screws virtually bubble into the room – a problem that's most severe in the cool, northern portions of a house (particularly one heated by a wood stove). Sunshine beating on south-facing walls seems to prevent this problem on southern exposure.

While the splined joints are wet they may become prime avenues for the movement of carpenter ants into the panels. In subsequent years moisture may no longer collect in these joints but the ants may have already made a successful beachhead and can sustain themselves indefinitely. The sheet goods on the outside of the stressed-skin panels tend to keep the water vapor in.

Detection and Prevention

Detection of formican ants is not difficult. In late winter and spring, winged males and later females will be found in the house. These ants are looking to form satellite colonies. As pointed out previously, the ants do not eat the rigid insulation, they mine it, and they have to do something with the tailings. Piles of excavated insulation (or sawdust, if they are nesting in wood) can be found, usually around the perimeter of the house at the foundation, sometimes clinging to spider webs, sometimes falling from the ceiling. At night, one can actually hear the ants excavating in stress-skin panels. The panels amplify the sound an in the quiet of the night one can hear a sound like paper rustling, a steady crunching, emanating from the walls!

Keeping carpenter ants out of stressed-skin panels is a real problem. Whether an infestation occurs or not appears to depend more on chance than plan. Some timber framers have noted that the ants appear mostly in homes with red oak frames and speculate that this wood, for some unknown reason, attracts them. Regardless, it is important to realize that carpenter ants are widespread in wooded areas where they thrive in ground litter and rotting tree trunks, and that densities can run into hundreds of thousands per acre. Therefore if one is building with stressed-skin panels in a wooded area, chances for ant problems are greatly increased.

> While splined joints are wet, they may become prime avenues for the movement of carpenter ants into the panel. In subsequent years...the ants may have already mad a successful beachhead and can sustain themselves indefinitely.

The only truly effective preventative technique may be a thoroughly application of a residual-acting insecticide around the building. While this method certainly works, it will pose a problem for persons concerned with toxins in the home and workplace. And short of poison, it may be impossible to keep ants out of the panels entirely.

Some things help, however. Setting the base panels on a bed of plastic roofing cement helps seal off the most likely entry route into the panels by carpenter ants. Keeping the building site clear of woody debris and keeping stressed-skin panels dry on the job site can also help reduce the problem. (But ironically, storing goods under plastic that drapes down to the ground creates a humid hothouse that actually attracts carpenter ants.) Keeping a completed house clean and free of sweet or greasy foods may help minimize ant attraction. But ants can fit through minuscule cracks, and the skin of a wood building is virtually made of cracks.

Once Infested

Once stressed-skin panels have become infested, extermination may be difficult. Calls placed to local exterminators revealed they had only moderate experience with the problem and had experienced mixed results with eradication. The problem is one of delivery of an effective toxin to what may be a very widespread nesting area. Also, point-specific application must be combined with a broad use of residual insecticides in and around the structure. Unless the queen is killed, efforts at extermination may merely cause the ants to relocate within the panel.

I suspect that carpenter ant infestation in rigid insulation products may well be a more serious problem than is generally acknowledged. Stressed-skin manufacturers are certainly aware of the issue. In a trade newsletter, one prominent manufacturer had recommended the following when building with their stressed-skin product: (1) Treat the foundation with a residual-acting insecticide before backfilling. (2) Treat the ground around the house before backfilling. (3) Set the panels on a bed of asphalt roofing to discourage ant penetration from below. (4) In wooded locations, have the stud cavities and exterior sheathing treated with a long-acting residual insecticide. (5) Avoid excess humidity in the house in winter. (6) Maintain a regular treatment schedule with a licensed exterminator for the ground around the house – every one or two years.

To my mind, such a set of installation guidelines is quite extraordinary. I mean, would any homeowner seriously consider using stressed-skin panels if he knew the manufacturer recommended such a procedure? Does the manufacturer notify the potential homeowner about these guidelines before, or for that matter, after, he has purchased the sheathing?

So far as I know no systematic research is being done on the problem by an objective third party. One manufacturer is looking into materials that can be injected into the foam during manufacture that will make his panels ant-proof. The leading candidate is boric acid, which apparently causes carpenter ants to literally “explode” if they eat it.

Research Needed

The industry response to this problem has been that carpenter ants are a potential risk with any wood construction method, stressed-skin panels included. The evidence suggests, however, that rigid insulation in general, and stressed-skin panels in particular, may pose a significantly greater liability than conventional wood construction. Clearly, some objective third-party research is in order. But until some of these problems are resolved, or until an ant-proof rigid insulation is developed, I have definite reservations about using stressed-skin panels to enclose a building. The burden of proof is upon the manufacturers to tell us whether the panels can provide a safe and durable building shell. ■

Jeremy Coleman is an associate with the firm of Pietz & Michal Architects, Keene, N.H. He was previously a builder and has had wide experience in energy conservation, solar design, and construction. If you would like to share your experiences or thoughts about the problems of carpenter ants and rigid insulation, you may write to him c/o The Journal.