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## RESEARCH NEEDED ON WOOD DURABILITY FOR RESIDENTIAL STRUCTURES

The southern and southeastern U.S. environments might be considered a natural disaster for wood. This is primarily due to a hot and humid climate. However, unless protected, wood is naturally degraded by combinations of heat, moisture, insects, decay, mold, and other forces such as hurricanes and floods in all regions of the globe.

It may be surprising to many that wood-destroying insects are becoming more common in the United States. In an increasing number of southern states, a relatively new destructive organism is the Formosan subterranean termite (*Coptotermes formosanus* Shiraki). This insect is thought to have been introduced at the end of WWII by ships returning from the Pacific Rim. From their docking positions in major ports and waterways, they discarded wood crating and dunnage infested with this termite. *C. formosanus* were therefore established in structures in the port cities and surrounding areas, including swamps and forests. They continuously gained strength and increased numbers by remaining unnoticed until 1966. Now recognized as the most destructive insect in Louisiana, this pest costs homeowners in the United States an estimated \$1 billion per year in structure damage, repair, and treatment. About \$350 million of that is in New Orleans alone. Other wood-destroying insects include the southern pine beetle, pine nematode, borers, carpenter bees, carpenter ants, and new termite species. These are also affecting international trade; for example, the pine nematode found in softwood pallets caused a ban on untreated pallets going to the European Union and other ports of the world. Most importantly,

the devastation of these insects is especially felt when they get into our homes.

This, of course, is not the only major problem facing homeowners in the United States. High humidity and heat in the South and poor building practices in other regions also provide a fertile atmosphere for growth of decay and mold inside walls and attics. This has become more common because of the tighter structures being constructed, which do not allow moisture to escape after it collects unseen within walls. Common sources of moisture are poor construction, damp crawl spaces, faulty plumbing, leaky roofs, shower or bath steam, improperly vented stoves and clothes dryers, backed-up drains and flooding.

Decay is probably the most destructive biological pathogen in wood structures in the United States. As one example, within the last five years, huge losses have been caused by improper installation of exterior insulation finishing systems (EIFS). An estimated 215,000 homes have been built in this country using this technique. The exact amount lost to this process is unknown, but is in the billions of dollars—and this is only one system.

The growth of mold, almost unnoticed less than 15 years ago, has entered the limelight. Even though mold has not been linked directly to widespread health effects scientifically, it is thought to cause illnesses in people sensitive to toxic gases produced by mold's mycotoxins. Those that can be affected include infants, children, the elderly, people with low immune systems, pregnant women, and those with respiratory conditions such as allergies, asthma, and

hay fever. Costs and lawsuits resulting from mold growth increase daily, with homes having to be decontaminated and torn down.

Increasing the severity of wood degradation problems is the removal from residential construction the most common wood preservative used in the United States and throughout the world. CCA (chromated copper arsenate) has an almost 70-year track record of effective use against termites and decay. After discussions with the Environmental Protection Agency, CCA manufacturers have volunteered to remove this product from the residential market because of public concern over the use of arsenic. Other preservatives are available; however, most either cost more or do not have the same resistance to leaching as CCA when in soil contact.

U.S. homeowners therefore are left vulnerable to conditions that can lead to degradation of wood structural components whether caused by shoddy construction, long-term negligence of proper maintenance, or flooding. Regardless of the reason, homeowners and builders are concerned and are beginning to increase their demand for, and use of, wood substitutes. Some substitutes are reasonable, but the increased use of wood substitutes is a double blow to primarily rural economies and the environment when using energy-intensive materials such as concrete and steel.

The need, therefore, is to increase the fundamental and applied knowledge for increased du-

rability of wood and wood-based products in residential housing. Increased performance in service and decreased maintenance of all wood products also need to be enhanced. Fortunately, we have a number of excellent research laboratories and industry suppliers that have long histories of work in this area. And the silver lining in the CCA cloud is that its removal has opened up exploration for newer, environmentally friendly wood-based treatments. In addition, many of these treatments are also addressing mold and dimensional stability issues. Having said this, however, we need increased research in treatment of engineered wood products, in situ treatments for existing homes, and better detection devices for locating decay, insects, and mold.

If wood can be made more durable through product development, environmentally safe treatments and better building design, this tremendous resource can be used more wisely. Benefits include enhanced economic conditions for rural areas, the forest products industry in general, and providing homeowners the comfort of knowing their largest monetary investment is more secure without having to use substitutes for the real thing—wood.

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