



AFT Construction: Anti-Formosan Termite

Since the mid 1960's, there have been increasing discoveries of the Formosan Termite in the coastal areas of the continental United States. Their introduction is reported to have come via our naval ships returning from the Pacific Theatre after World War II to the mainland ports such as New Orleans, LA and Charleston, SC. Their activity has been most devastating in New Orleans, with the range of their presence now considered to reach all of our warm, Southern coastal areas, including Southern California.

Dealing with termites is not a new issue to many areas of the country, but the tenacious Formosan termite is renewing attention to anti-termite materials and construction. One of the many species of subterranean termite known to inhabit North America, this amazing creature has proven to be especially devastating. In New Orleans, the damage to the historic city has been at such an alarming rate that the city has created the New Orleans Mosquito and Termite Control Board, the only public agency focused on termite control. The US Department of Agriculture has sponsored ***Operation Full Stop*** under the auspices of its Agricultural Research Service (ARS) in order to study, "expose", and control the Formosan termite. In addition, many universities are supporting research to understand this particular species.

What is so amazing about this insect is that it will carry its own moisture with it, nesting in trees, buildings, or above ground. Their colonies are ten times the size of other subterranean species. Their favorite conditions are warm, dark and wet, preferring wood materials that are already hosting fungi. They are sensitive to dry environments and do not like to be exposed to open air. Similar to their subterranean cousins, the Formosan termite builds underground nests and climbs over obstacles to food sources by carrying mud with them. The mud is formed in tubes against the obstacle. But the Formosan termite will not only carry the mud for protection from dry air, but will bring it with them to a new nest site in a building. Dr. Mike Carroll, PhD, is the Assistant Director of the New Orleans Mosquito & Termite Board. He describes cases where as much as a pint or more of water has dripped from a ceiling area where a termite nest has been discovered and punctured. They will bring to the nest and store their own water in the form of a mudpack.

The difficulty in discovering termite activity is that they will use any concealed spaces to enter a building. Once inside, they will devour lumber and timber from the inside out leaving a thin shell that protects them. The affected wood will not appear to be any different; no signs of entry or exit, no frass, nor any other visual indicator. When the affected piece is probed or touched, it readily collapses. Similar damage to living trees has shown up as the trees fail to resist the winds of coastal storms. In New Orleans, damage to historic live oaks and other species has been estimated to be in the millions of dollars.



Live tree damage and colony extracted... LSU AgCenter Termite web page.

Juan Morales-Ramos is an entomologist at ARS' Southern Regional Research Center in New Orleans who is performing lab experiments to identify wood species that might deter the Formosan termite. Two types of tests are being run. In a preference study, over 30 species of wood have been offered and the amount of wood eaten by the termites is compared to blocks of Southern Yellow Pine that are used as the control. In a deterrent study, the wood samples are examined to see if they inhibit or suppress feeding or prove to be toxic. These studies indicate that the termites do not care for old growth baldcypress (actually toxic), Western and Eastern red cedar, Alaskan yellow cedar, Spanish cedar, mahogany, sassafras, and rosewood (Indian, Honduran, and Bolivian). Morales-Ramos stated that the termites would attack any commercial wood except the cedars (as tested), with juvenile wood being more resistant than the heartwood.

Treated wood products are definitely included in the strategy for building in known termite areas. Dr. Carroll recommends that .4% CCA treated lumber be used throughout, but that the first concern is the first floor framing and beams. Morales-Ramos concurs, stating that borate pressure treated wood is also doing very well in their studies. Both experts warn against surface treatments of any kind. "A layer of borate (1/4" to 1/2") is not enough to deter the attack." The termites will keep eating until workers start dying, and once inside the treated barrier, they will thrive inside the treated layer. Effective treating will penetrate at least 2" into the piece, preferably throughout it. As workers start dying the termites will move to another target.

While many new types of treatments and deterrents are being developed commercially, new chemical compounds and physical barriers still need to be developed for home construction. In Australia, builders have been successful with treated plastic sheets used under concrete slabs. In Hawaii, experience has proven successful with a system that uses uniform size pebbles. Steel mesh barriers and other techniques are being used to isolate structures from ground exposure, hence termites, but tend to be too expensive for homebuilding.



When asked specifically about log homes, Morales-Ramos indicated that the best deterrent to termite infestation would occur at grade level. Dr. Carroll agrees that log homes would be as susceptible to termite damage as other types of wood construction. They both sited stucco and exterior insulation cases where the materials were in contact with the ground and provided the access to the building the termites needed. Morales-Ramos stated "Termites love to nest in insulation materials. Close to the ground is not good!"

Both feel that termite shields are a good idea for new construction. One benefit is that the metal shield creates a barrier that will tend to expose the travel of the termites (mud tubes). While the shield will not stop termites, the tube will become visible during inspection as the termites work to get around it. Similarly, using termite shields to cover the top of hollow block piers will force the termites' activity to again become visible.

Reports of Formosan termites have included attacks on roof overhangs and within roof assemblies. In their alate stage, flying termites can try to establish nests in roof areas, but moisture needs to be present in those cases. Where termites have been found in ceilings, they have often migrated to warmer areas from walls, ultimately traced back to the foundation. The focus, therefore, is to provide protection at all ground contacts and to use construction techniques that minimize any presence of moisture elsewhere.

Both experts recommend that new construction be focused on appropriate material selection, high-quality assembly, and attention to proper design details. Examples include:

- ✓ **Use inorganic materials as ground cover within 12 to 24 inches of the structure. Never use wood mulch, pine straw, or other ground covers.**
- ✓ **Use roof overhangs, gutters and downspouts, proper finish grading, and other conventional techniques to move roof and deck water runoff well away from the structure.**
- ✓ **Keep all exterior wall surfaces dry and free of mold and fungi.**
- ✓ **Raise the foundation at least 6 inches above grade. Do not allow any floor or wall materials to be exposed to the ground.**
- ✓ **Install a concrete slab to cover the ground under the structure, whether used for a pier, crawlspace, or basement foundation. Use chemical treatments around any penetration of that slab and provide 24" to 36" between the top of the slab and treated wood framing.**
- ✓ **Use solid block or concrete construction of all piers and stem walls. A common entry point for termites is through the hollow cells of piers built with blocks.**
- ✓ **Do not rely on over-the-counter termite baits. Only the Dow Sentricon system has proven to be effective stand-alone colony elimination system.**
- ✓ **Contract with a good pest control company. They will apply liquid soil treatments once a year, and if bait systems are used, they will return monthly to quarterly to check them.**
- ✓ **Employ a good inspection system. Keep watch for mud tubes.**

For more information, try the following web sites:

ARS Operation Full Stop web page ... <http://www.ars.usda.gov/is/fullstop/introduction.htm>

Southern Pine Council web page ... <http://www.southernpine.com/termiteinfo2.htm>

Louisiana Pacific's Smart Guard web page ... <http://www.smartguard.lpcorp.com/about.invasion.asp>