



COMBATTING TERMITES

A Wood-Frame Building Performance Fact Sheet



Termites are small, pale insects that can eat cellulose: their food includes anything made of wood, paper or cotton. These little creatures have been around for millions of years, longer than humanity and certainly longer than humanity's buildings. We don't need to rid the planet of termites: by taking precautions, we can outwit them. What's required is that architects, builders and homeowners take care during design, construction and long-term maintenance of buildings.

This house is protected from termites by borate, a wood-preserving chemical that is harmless to people yet effective against pests. All of the structural wood in this building has been treated with borate. Photo courtesy Timber Specialties Co.



Think about termites before you start construction



Termites are found in many parts of the world with mild climates. If you're building in a termite zone, start by consulting local experts and the regional building code for guidance in termite design strategies.

The traditional approach in battling termites primarily relied on soil treatments — buildings were surrounded by a ring of land permeated with substances with long-term toxicity to termites. Over the last twenty years, however, a changing regulatory environment has moved “chemical insulation” from its place atop anti-termite strategies. Today, buildings can be protected against termites with a combination of other methods.

Clear the site

Before starting construction, find and eliminate existing termite colonies and potential habitats. Remove stumps, roots and other buried and untreated wood. During construction, do not leave untreated wood buried in soil or in contact with concrete. Promptly remove all concrete formwork, wood waste, and other cellulose-based debris. Don't store cellulose materials such as cardboard boxes in crawlspaces.

Use a barrier system

Physical barriers are replacing the chemical barriers of yesterday. Options are twofold: a stainless-steel mesh and a sand barrier. Both techniques have long been used in Hawaii and Australia, areas with active termite populations. A layer of mesh or sand, carefully sized so that termites cannot get past this barrier, is laid under the house foundation and brought up to the surface around the house. Don't rely too heavily on products known as “termite shields” as a barrier. These are thin strips of sheet metal installed at the foundation of the house. They don't keep termites out, however they can help make them easier to spot. Eliminate anything that might give termites a bridge

over the barrier. For example, take care to avoid overhanging branches that touch the house, or even simply leaning a broom handle against the house. An alternative to a barrier system is a baiting system, although this approach is still too new to have a track record. Baits are laid around the house and contain chemicals, which either kill termites on the spot or are carried by termites back to the nest.

Design the building for ease of inspection

Keep the concrete foundation exposed for at least 150mm above soil level to enable inspection for the protective mud tunnels called “shelter tubes” that termites construct to gain access into a building. Crawlspaces should be easily accessible.

Use unappetizing wood

Termites will eat any cellulose-based material, not just wood. But the wood construction components can be protected — either with natural substances that are present in durable wood species like yellow cypress (*Chamaecyparis nootkatensis*), western red cedar (*Thuja plicata*) and eastern white cedar (*Thuja occidentalis*), or with chemicals applied to the wood. Designers can achieve reliable long-term termite resistance by specifying wood treated with chromated copper arsenate (CCA), ammoniacal copper quat (ACQ), copper azole (CA), or borate, all of which also protect against decay. For outdoor applications where water exposure is likely, wood treated with CCA, ACQ, or CA is the best choice. For the structural components of a house in a termite zone, borate-treated wood is usually preferred. Borate is a benign chemical, less toxic to humans than table salt, yet effective against termites. However, borate-treated wood cannot be used outdoors, as the chemical protection may eventually wash away. There are other effective wood preservatives available or in development, although they may not yet have established a long track record of performance against termites.

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Staying termite free



A gram of prevention in building maintenance will save a kilogram of trouble from termites. Here's what to do if you're a building owner in a termite zone:

- Have a professional inspection done periodically, perhaps as often as once per year in a high-risk region. Amateurs seldom spot insects or damage early enough.
- Keep non-treated wood at least 0.5m away from soil.
- Watch for possible termite entry paths and try to seal them. A termite can squeeze through a 1.5mm crack.
- Keep termite habitats away from the immediate area around the building. Clear or relocate buried wood such as tree stumps, firewood, scrap wood, cardboard boxes, and woody plants.
- Keep cellulose materials dry. Quickly fix any roof or plumbing leaks.
- Keep roof gutters in good repair. Ensure they direct water away from the building.
- Maintain the integrity of physical barriers such as sand or mesh. Do not lay soil or mulch over the barrier, or let roots grow through it.

Getting rid of termites

If precautions have failed and termites appear, seek professional advice soon. It's important to hire professionals to locate the nest and kill the termites in it, close off points of access to the building, kill any termites left in the building, and advise on avoiding future infestations.

What about carpenter ants?

Carpenter ants are found all over the world and sometimes confused with termites, because both insects like wood. However, carpenter ants look much different — they are darker and larger than termites. Carpenter ants don't eat wood like termites do, but they may weaken it structurally by tunneling through it. Again, professional opinion and action should be sought. Since carpenter ants generally prefer soft wood, their presence may indicate that the wood is already rotting, which in turn means there may be a moisture problem in the building.



At this University of Hawaii test site, lumber pieces are continuously exposed to the highly aggressive Formosan termite, which can destroy untreated wood in less than a year. The borate-treated sample in the foreground is completely unharmed after one year of testing. Note the dark line traveling from the ground, up the concrete block and reaching the wood: this is a shelter tube built by termites to protect themselves from exposure. Termites have found the borate-treated sample, but left it alone. Borate continues to perform as well as CCA in this test after six years.

For more information

For specific guidance on termite risk in your area and design and construction tips for termite resistance, consult your local building authorities. If you are in an area with a severe termite problem, your regional government may have a great deal of information available. Your local government may additionally be engaged in a regional termite-suppression program, attempting to rid the area of termites at a large scale.

For data on durable wood construction, termite biology, design guidelines for protection from termites, preservative-treated wood and many links for more information, go to: www.durable-wood.com

Another good source is Standards Australia. Go to www.standards.com.au and search under the keyword *termite*.

For general information on termites and special conditions in the US, visit the National Pest Management Association website at www.pestworld.org



Forintek is Canada's wood products research institute. Established as a private, not-for profit corporation in 1979, Forintek is an amalgamation of two former public laboratories whose history dates back to 1913. To this day, Forintek continues to provide leading-edge technical support to the solid wood products industry. As part of its broad program, Forintek is Canada's primary wood industry-based participant in worldwide termite research and a major North American supplier of information on wood preservative treatment technologies. Visit www.forintek.ca.



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