

TERMITE PROTECTION WITHOUT CHLORDANE

by Ward Hitchings

In 1988, the EPA banned Chlordane, the most common and most effective soil termiticide used in the United States. Currently, there are many companies marketing products to replace Chlordane. The most notable post-Chlordane termiticide is chlorpyrifos, commonly known as Dursban.

Chlordane was an extremely effective and long-lasting termiticide, but animal tests indicated that it was possibly toxic to humans. Its primary replacement, Dursban, has been around for awhile, and wood-stake tests conducted by the U.S. Forest Service in Mississippi, Guam, and elsewhere show this termiticide to be effective as well. When accompanied by regular pest-control operator inspections, it will provide more than adequate protection.

Over \$750 million is spent each year replacing wood damaged by decay and termite attack. That figure is remarkable since termite and decay protection is so readily available. Termite controls should be used in areas marked "very heavy" on the termite infestation map (see Figure 1), and termite control is

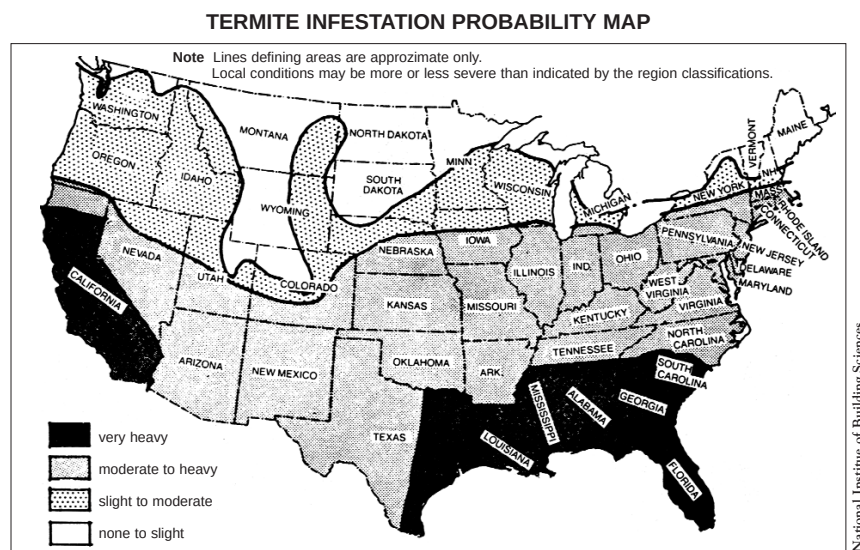


Figure 1. Termite control methods, including soil treatment, are strongly recommended for areas marked "very heavy;" "moderate to heavy" areas also need termite controls.

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The new termiticides require more frequent application
and more attention to building details
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Choosing a Pest Control Sub

by John D. Wagner

Most contractors have tough, well-defined standards when it comes to hiring, scheduling, and supervising various building trades. Pest control application isn't easy to monitor. Yet, it's a job that has to be done effectively and safely or you can inherit some big headaches down the road. An inexperienced applicator can leave you open to liability. Here are some tips on finding a good pest control operator (PCO) and an idea of what to expect from the process.

Choosing a PCO

When choosing a sub to apply termiticide, Phil Gregory, who runs a statewide pest-control service from Greenville, S.C., offers some advice. "First of all," he warns, "make sure the sub you hire to apply termiticide is a state-certified company. They should also be registered with the state and national pest-control associations. These associations keep them up to date on the latest technology of termiticides."

When interviewing a sub, Gregory recommends that you ask at least three types of questions. First, ask for and check out references. Next, ask how many years they have been doing applications. Third, you should check to see if they carry insurance.

The insurance policy of an applicator should warranty termite protection for five to seven years, though Gregory says five years is typical. The insurance policy should also carry a general liability coverage, and a "repair bond," he says, "a repair bond covers any future repair work if the application is improperly done and termites invade."

The contract that you sign should call for a one-percent mixture. Anything under one percent might cost you less, but it will not put up an effective barrier against termites.

"The general contractor should never request a specific termiticide or recommend methods of application," Gregory explains. If these aren't specified on the plans, "let the applicator choose the termiticide. He will know what to use. If you ask for something that doesn't work, you are liable for future litigation. Whatever is applied must be an EPA approved and registered termiticide."

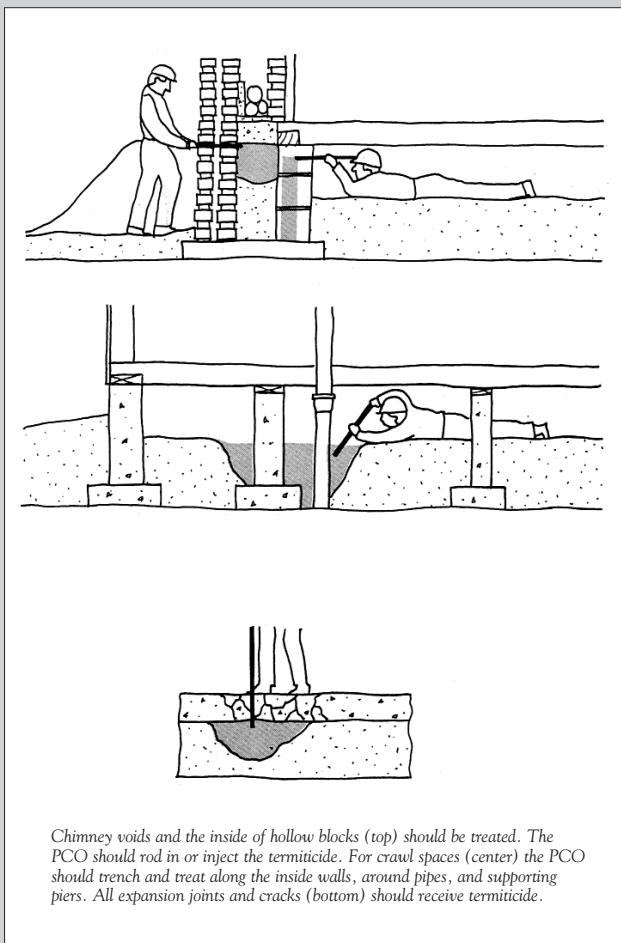
When the owner sells the house, he must pass along to the new owners the Material Safety Data Sheet on the termiticide you had applied, a copy of the label of the

termiticide, and a copy of the contract you signed with the applicator. "If you don't pass this information along," says Gregory, "and the new owners experience health problems, you are liable."

"As for cost, if you get a bid for termite protection and it is \$100 or \$200 dollars, you are paying for a worthless application. A proper termite application costs \$500 to \$700 dollars. And there will be

against termite infestation. Follow-up visual inspections, usually on an annual basis, make sure that no termites have survived and are gaining access to the wooden parts of the structure.

Of the termiticides on the market, Dow Chemical's Dursban TC (not to be confused with Dow's Dursban LO which is for topical, short-term use) is by far the most commonly used.



Chimney voids and the inside of hollow blocks (top) should be treated. The PCO should rod in or inject the termiticide. For crawl spaces (center) the PCO should trench and treat along the inside walls, around pipes, and supporting piers. All expansion joints and cracks (bottom) should receive termiticide.

annual renewal charges for the client. The inspector will come back for \$100 to \$125 a year and inspect the home. If the client doesn't have these renewal inspections, it may void the warranty."

Chemicals and Application Procedures

Termiticides are injected in the soil as a kind of perimeter defense

Dursban TC comes in a liquid concentrated form, and it is mixed either on or off site by the PCO, at the rate of two gallons of concentrate to 98 gallons of water. The PCO pump-applies it through a rod or hose, at the rate of four gallons per 10 linear feet for one-foot-deep coverage. Because of soil absorbency, the number of gallons required increases with the depth of desired coverage, (a 2-foot-deep

horizontal barrier requires four gallons per 8 linear feet; 3 feet, requires six gallons, and so on). Dursban should never be applied to water-saturated or frozen soil.

There is no way to check up on the application percentage, unless a lab examines termiticide samples (and that's an extraordinary thing to do). So, you have to trust the PCO.

The chemicals can be rod-applied, during new construction or to existing buildings, in general areas such as trenches, along foundation perimeters, and inside hollow block. Or it can be pumped through holes drilled in floors or concrete slabs on existing structures where treatment areas aren't easily accessible.

Recommended guidelines are available from termiticide manufacturers, but here are some general guidelines:

For new construction, timing is critical. A product such as Dursban is broadcast sprayed after excavation is completed, but before slab and foundation walls are poured. Exposing Dursban to the air for an extended length of time renders it ineffective.

"For slabs," recommends Dr. Rambo, Director of Research, Education, and Technical Services at the National Pest Control Association, "get the treatment no more than 24 hours before the pour. For soil that will remain open to the air, put down some poly to slow the chemical breakdown. For footings, pretreat the soil as with slabs, but don't be digging around in the treated soil."

For existing structures, things are a bit more complicated. For crawl spaces, the PCO should trench along the inside walls, around pipes, supporting piers, and in chimney voids, and then rod or inject the termiticide. Porches are drilled and termiticide is pumped in or rod-applied. Slabs too are drilled to access soil underneath.

In basements, soil outside the foundation wall should be treated. The inside of hollow block, between double brick, and around utility pipes should be treated. In addition, all cracks, expansion joints, and the soil beneath partition walls should receive termiticide.

For application guidelines for Dursban, Dow distributes *Subterranean Termites: The Unseen Guests*, .55 each. Contact them at 800/258-CHEM; or write Dow Chemical USA, Box 1206, Midland, Michigan 48641-9940.

strongly recommended for "moderate to heavy" areas.

There are three types of termite control: physical barriers, soil treatments, and the use of pressure-treated or naturally durable woods. The use of just one type of control may be effective in areas of lighter termite hazard. For example, the use of pressure-treated or naturally durable floor joists and subfloor would be considered adequate for areas with "slight to moderate" termite hazard. But in "moderate to heavy" termite hazard areas, soil treatment may be required in addition to the treated or durable wood.

Non-Chemical Solutions

With renewed public concern for environmental protection, however, further restrictions on the use of wood preservative and chemical treatments are expected. This puts renewed emphasis on the use of practical, non-chemical solutions to control decay and termites. These control methods will employ proper site preparation and carpentry practices, and leaving adequate clearances between soil and wood. Here are some additional general guidelines:

- Except for millwork, all wood that is subject to termite attack should be either pressure-treated, naturally durable species (redwood or eastern red cedar), or protected by soil treatment before construction begins.
- Both termites and decay fungi thrive in wet areas. The building site should be graded so water drains away from foundation walls. Take precautions to prevent accumulation of moisture in wood. (The moisture content of lumber should be 19 percent or less before insulation is applied.)
- All roots, wooden concrete forms, and scraps of wood should be removed from the immediate vicinity of the house before backfilling or before pouring a floor slab. All scraps of wood should be removed from enclosed crawl spaces.
- All crawl spaces should be ventilated and adequately drained. Except in arid areas, a vapor retarder should be used to cover the ground surface to keep moisture out of the crawl space.
- All structures should be designed to provide adequate and accessible clearance between earth and wood in order to provide for periodic termite inspection.

Physical barriers work by forcing termites into the open, revealing any termite tubes. If tubes are discovered, termiticide treatment of the soil and foundation wall is recommended.

Physical and Chemical Barriers

Physical barriers (termite shields and reinforced-concrete caps), work by forcing termites into the open, revealing any termite tubes around the edge of the shields and over the surface of concrete. Termite shields

and the exterior and interior surfaces of foundations should be inspected for termite tubes at least once a year. If termite tubes are discovered, termiticide treatment of the soil and foundation walls is recommended. In areas designated "moderate to heavy" on the termite-infestation map, soil treatment is recommended as a precautionary measure.

If soil treatment is required, the application and treatment methods should closely follow the pesticide

label's recommendations. For additional information about applying pesticides, the Southern Forest Experiment Station in Gulf Port, Miss., has a variety of publications available.

General Guidelines for Structures

The National Institute of Building Sciences' Wood Protection Council has published Guidelines for Protection of Wood Against Decay and Termite Attack. This booklet reviews building techniques for termite

protection. Many of the recommendations here are taken from that publication, and you may find that some of the recommendations are already written into applicable codes.

In finished basements, concrete slabs, and crawl spaces, two general rules apply. First, all wood framing and sheathing less than 8 inches from exposed earth in exterior walls should be naturally durable or pressure-treated wood. Second, clearance between wood siding and earth on the

Termiticides and Health: Precautions Necessary

by John D. Wagner

Currently, two types of termiticides are available: synthetic pyrethroids and organophosphates. Synthetic pyrethroids are chemical imitations of naturally occurring pesticides found in chrysanthemums (trade names include Torpedo, Dragnet, and Tribute). How pyrethroids work is not completely understood, and many of the products have not been in use long enough to prove their effectiveness.

The more widely used termiticides are organophosphates. The best known is Dow Chemical's Dursban TC, which has gained a 60- to 70-percent market share. Organophosphates do pose health risks, but they are popular because they offer a less toxic, effective alternative to organochlorines. Organophosphates are safer than organochlorines, such as Chlordane, because they do not accumulate in the body, nor are they carcinogens or skin irritants.

The main drawback with the organophosphate Dursban is its short service life in the soil. Chlordane is active for decades; Dursban may only give five years of protection.

Industrial toxicologist Dr. Daniel Goldstein points out, "even though Dursban is better to work with, it is still a toxin and should be treated with great care. You normally don't find persistent toxic levels in someone who has encountered a properly applied treatment. The problems come when it has been poorly applied and there is unintended contamination. If you drill through a slab and pump in Dursban until it flows out a hole at the other end of a slab, there's a good chance you are contaminating the house."

"Dursban, though dangerous, is much less persistent in the body and in the soil than Chlordane," explains Dr. Anthony Grey of the New York State Bureau of Toxic Substance Assessment. "It is easier to clean up. It is, overall, a much better substance to be working with."

When applied, Dursban has a distinct odor that worries some users. Although this odor lingers after it is applied, Dow Chemical's Greg Sudholt claims, "it is not the smell of anything toxic. Dursban is never an airborne toxin, if applied at recommended levels." Nevertheless, says Sudholt, "some pest control operators (PCOs) choose to wear respirators, especially in enclosed spaces, and PCOs should wear rubber boots; rubber gloves are optional. Once Dursban is dry—which takes a matter of hours, depending on weather conditions—it is safe for crews to work on or nearby the site."

"The post-application odor," explains Dr. George Rambo, Director of Research, Education, and Technical Services at the National Pest Control Association (NPCA), a trade association, "is not the termiticide you are smelling, but the termiticide's solvents. It is often a bothersome smell, but it is not hazardous."

If your PCO spills concentrated Dursban on site, precautions need to be taken. "If as much as a quart (one pound) of the concentrate is spilled," warns Dr. Rambo "you have to notify federal and local authorities. If a smaller amount is spilled in soil that will be covered over, there is no real danger. If you spill it on concrete or somewhere it can't seep in, clean the area with soap, water, and ordinary household bleach."

Dr. Grey agrees, "bleach and soap and water do an adequate clean-up job. You should read the label before application, and follow precisely what the manufacturer recommends for clean up."

How Toxic Is Dursban?

Dursban is toxic to all animals because it blocks a chemical reaction in the nervous system. When humans come in contact with Dursban, it can be fatal if the contact is prolonged and the dose high. If the victim is treated

in time, there are commonly available antidotes that will return the body's nervous system to normal.

The level of danger Dursban poses to a worker depends on the percent concentration of the solution he comes in contact with. In the majority of cases, workers contact one-percent solutions of Dursban, and there are no long-term health effects. Though reactions differ, the effects of low-dosage, short-term contacts are not life threatening. NPCA's Rambo reiterates that your crew is not at risk, even if they are in and around the soil where Dursban has been applied. "Dursban breaks down in the air and light. It is more stable in the soil, and gives you about five years of termite protection. But exposed to sunlight and humidity, it only lasts about 15 days. Any air exposure is well below toxic levels. Digging in treated soil doesn't present a problem with toxicity, but it does break the chemical barrier Dursban is designed to put down, and it becomes practically worthless."

Dr. Grey doesn't buy the industry line. He is a bit more cautious. "It is hard to say exactly how someone will react to contact with Dursban, in the ground or in the air, even at low-level exposures. It might aggravate an existing condition, or it might affect someone who is very young. There is an antidote, and, no, you wouldn't expect toxicity symptoms with low-level exposure, but there is still need for care. In any event, you should not go on site if the substance is wet."

PCO Phil Gregory agrees with this last point. "Make sure your people are not on the site when the application takes place. Don't return to the site until the termiticide is dry," he adds. If there is a spill, he recommends using "Spill Control," a trade name for a chemical that neutralizes the termiticide.

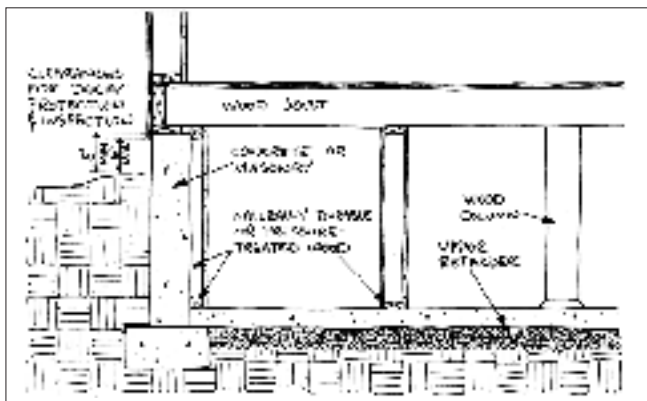


Figure 2. All wood posts, poles, and columns resting on concrete that is in direct contact with the ground should be pressure-treated wood rated for ground contact.

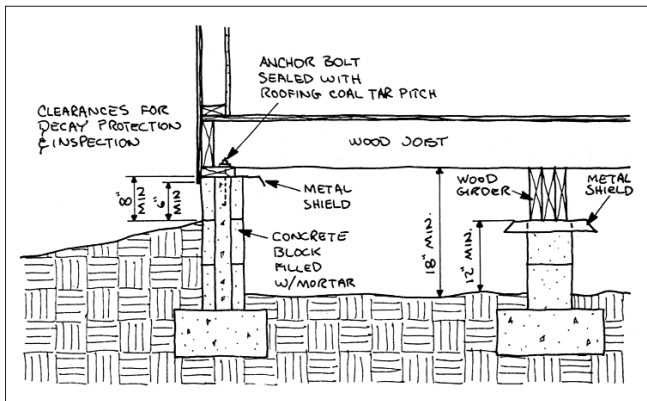


Figure 3. In crawl spaces, if wood joists are closer than 18 inches to exposed ground, the floor assembly, posts, girders, joists, and subfloor should be naturally durable or pressure-treated wood.

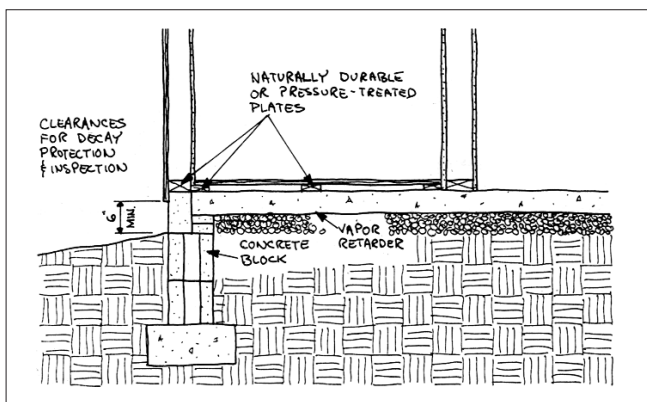


Figure 4. With concrete slabs, clearance between wood siding and earth should be at least 6 inches, except if the siding is pressure-treated or naturally durable wood.

exterior of the building should not be less than 6 inches, except where the siding is pressure-treated or naturally durable wood.

Finished Basement

Figure 2 shows finished basement construction. If you use wood posts and columns, set them on piers or metal pedestals. The pedestals should project at least 1 inch above the concrete or masonry floor, and 6 inches above exposed earth. All posts, poles, and columns embedded in concrete that is in direct contact with the ground should be pressure-treated wood suitable for ground-contact use. (Cut ends should be field-treated in accordance with American Wood Preservers Association Standard M4.) A vapor retarder should separate wood members from piers or pedestals. Sleepers, sills, and plates on concrete or masonry slabs that are in direct contact with earth should be naturally durable or pressure-treated wood. Wood furring strips or other wood framing members attached below grade on the inside of exterior masonry or concrete walls should be pressure-treated or naturally durable wood.

Crawl Spaces

Figure 3 shows crawl space construction. When wood joists are closer than 18 inches to exposed ground in crawl spaces or unexcavated areas, the

floor assembly, posts, girders, joists, and subfloor should be naturally durable or pressure-treated wood. Wood girders may be as close as 12 inches to exposed ground. If the soil is treated, the girders may not need to be; if the girders are treated, the soil can often go without.

Concrete-Slab Construction

Figure 4 shows concrete-slab construction. For structures built on concrete slabs, clearance between wood siding and earth on the exterior of the building should be at least 6 inches, unless the siding is pressure-treated or naturally durable wood.

Sleepers, sills, and plates on a concrete or masonry slab that is in direct contact with earth should be naturally durable or pressure-treated wood.

Effective Alternatives

With the banning of chlordane, builders, designers, and architects will have to employ design alternatives and practical, non-chemical solutions to control decay and termites. These methods, combined with the new termiticides, will provide more than adequate protection when combined with regular inspections by pest-control operators. ■

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For more information...

Guidelines for Protection of Wood Against Decay and Termite Attack is available for \$25 from The National Institute of Building Sciences, 1015 15th St. N.W., Suite 200, Washington, DC 20005; 202/347-5710.

For a list of publications on how to apply various termiticides, contact the Southern Forest Experiment Station, 2008GMF, Gulf Port, MS 39505; 601/864-3991.

Wood Construction Data No. 6—Design for Wood Structures for Permanence is available for \$6.50 from The National Forest Products Association, 1250 Connecticut Ave. N.W., Washington, DC 20036; 202/463-2700.

The American Wood Preservers Association's *Book of Standards*, a comprehensive guide to AWPA standards on wood products and chemical treatments, is available for

\$18 from the American Wood Preservers Association, Box 849, Stevensville, MD 21666; 301/643-4163.

The Building Officials and Code Administrators National Code is available for \$40 from BOCA International, 4051 Flossmoor Rd., Country Club Hills, IL 60478; 312/799-2300.

The Southern Building Code Congress International Standard Code 1988 (with the 1989 update) is available for \$64 from the Southern Building Code Congress, 900 Montclair Rd., Birmingham, AL 35213; 205/591-1853.

The International Conference of Building Officials Uniform Building Code is available to members for \$40, and to nonmembers for \$53.30 (plus local sales tax) from the International Conference of Building Officials, 5369 South Workmenmill Rd., Whittier, CA 90601; 213/699-0541.