

AGRICULTURAL GUIDE

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Insect control

Termite control

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Subterranean termites are the most destructive wood feeding insects in Missouri. They feed on cellulose, which is usually obtained from wood. The wood may be in the form of a dead tree or the wood in a house. They will also feed upon posts, paper, books and fabrics of plant origin.

The damage to buildings is in the reduced structural strength of the wood caused by the removal of part of the tissue.

In addition to wood for food, termites require moisture. Wood in contact with soil, then, is ideal for termite development. Infestations develop in soil, and the termites enter structures through structural wood or foundation walls adjacent to the soil. In cases of structures built partly or completely on concrete slabs, infestation is through expansion joints, cracks and utility and sewer openings.

The basic principle of termite control is to break the connection between wood and soil.

Prevention

Structures can be pretreated at time of construction to protect them from termite attack. Very few people would consider building a new house and then not insure it against damage caused by fire or other calamities. But many more houses are damaged each year by termites than by fire. Pretreatment is relatively inexpensive and highly desirable, especially in buildings constructed on concrete slabs, which are very susceptible to termite attack.

There are three major areas to consider in preventing termites from invading a new building: 1) sanitation of the building site, 2) structural and construction defects and 3) barriers.

Sanitation. Remove all tree roots and stumps from the building site before starting construction. Remove spreader boards and grade stakes before concrete sets. Remove form boards and wood scraps from soil before filling or backfilling. Do not bury wood in the backfill, under porches or steps, as this may attract termites.

Structural and construction defects. Allow sufficient space and ventilation outlets for air movement to aid in keeping soil dry beneath houses with crawl-spaces. The finished grade outside the building should slope away from the foundation so water won't collect under the house. In the final grading, allow at least 6 inches clearance between the top of the soil and the top of the foundation. Porch supports should be separated from the building by at least 2 inches. Wooden steps should rest upon a concrete base that extends 6 inches above grade. Do not place basement partitions, posts and stair stringers until the concrete floor has been poured. They should never extend into or through the concrete.

Barriers. Barriers can be considered in two major categories: 1) mechanical and 2) chemical.

Mechanical barriers

Foundations. A poured, reinforced, crack-free concrete foundation hinders the passage of termites. Termites can go through a crack as small as 1/32nd of an inch.

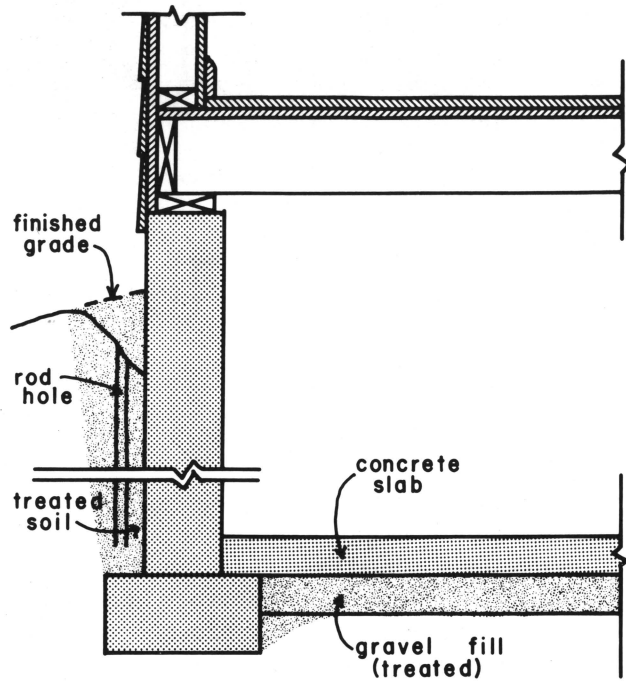
Hollow-block or brick foundations should be capped with a minimum of 4 inches of reinforced concrete.

Slab-on-ground. Of all foundation types, slab-on-ground construction is most susceptible to termite attack. Termites can enter the wood by going over the edge of the slab and through expansion joints, openings around plumbing and cracks. The *monolithic slab* is best. The *suspended slab* is second best, and the *floating types* are easiest for termites to penetrate.

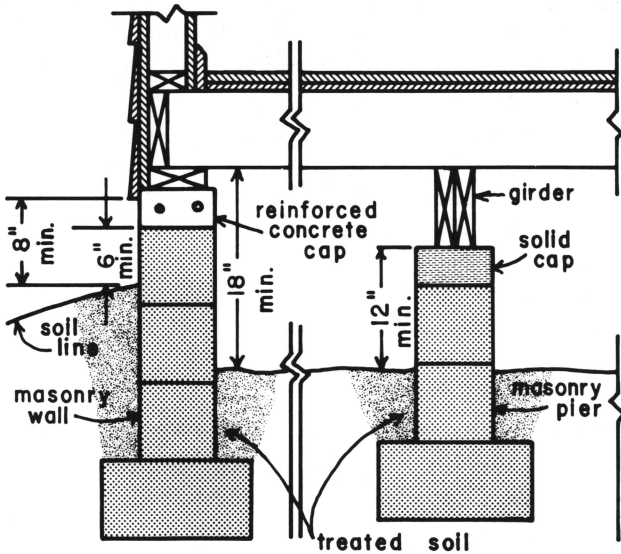
Metal termite shields. Properly designed, constructed, installed and maintained metal termite shields can give protection. However, good shield construction, installation and maintenance are rare. A good metal shield placed on top of foundation and piers will force termites to build tubes out in the open where they can be seen when inspections are made. Even if metal shields are used, a soil insecticide should be used around drain pipes and other unprotected potential termite pathways.

Termite control vs. construction type

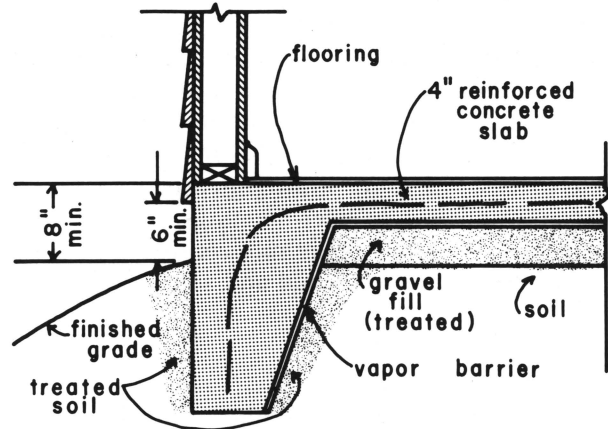
Subterranean termites nest in the soil, which provides the necessary source of moisture. They feed on cellulose, which is usually obtained from wood. The correct application of an appropriate soil insecticide creates a barrier between the termites in the soil and the wood in the house. This is the basic principle of termite control.



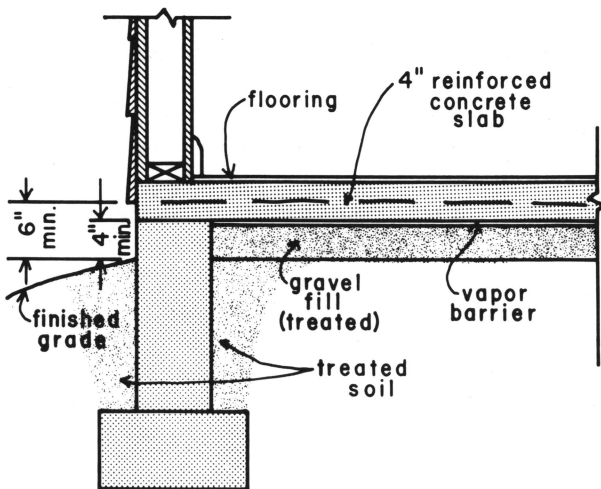
Basement type construction



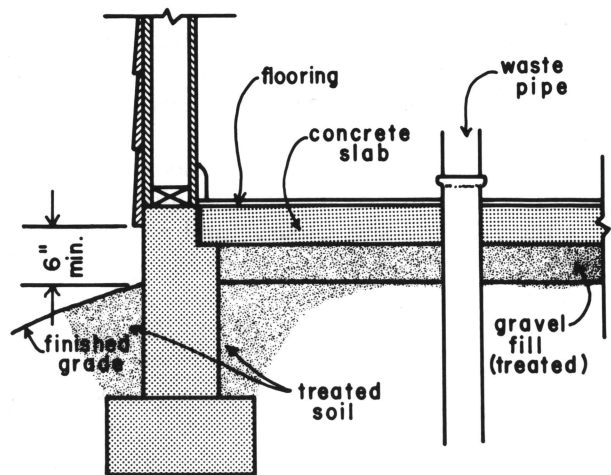
Crawl-space type construction



Monolithic type of slab



Suspended type of slab



Floating type of slab

Table 1. Use *one* of the insecticides below for pretreatment or treatment in existing structures.

Insecticide and formulation	Concentration to use	Dilution		<i>The instructions below apply to all three insecticides listed</i>	
		parts water	parts insecticide	If you are applying to:	Apply this amount
chlordane 72% 8 lb./gal. EC	1%	95	1	Areas to be covered by concrete	1 gal./10 sq. ft. OR 1½ gal. if soil is porous
chlorpyrifos (Dursban) 42.8% 4 lb./gal. EC	1%	98	2	Critical areas under slabs (foundation walls; around sewer or utility openings).	4 gal./10 linear ft.
permethrin* (Dragnet) 38.4% 3.2 lb./gal. EC	0.5%	98.75	1.25	Backfill along outside foundation walls; along inside of walls if there is crawl space.	4 gal./10 linear ft. per foot of depth
(Torpedo) 25.6% 2 lb./gal. EC	0.5%	98	2	Voids in foundation blocks. (Apply before capping.)	2 gal./10 linear ft.

EC = Emulsifiable concentrate.

* = Restricted use pesticide by certified applicators only.

Chemical barriers

Treated lumber. Chemically treated lumber should be used for the foundation plate, mudsill and all lumber used as partition framing and furring strips below ground. For maximum protection, the wood should be pressure impregnated with pentachlorophenol, copper-arsenic salt or a similar preservative, but not creosote. Brushing, spraying or soaking the lumber with the chemical gives only limited protection.

Soil insecticides. Treatment of the soil around and under the foundation with one of the recommended soil insecticides is a good method of preventing termite attack. *Soil treatment should be used as a supplement to good construction, not as a substitute for it.* Treatment is needed in four areas during construction:

1. Treatment of the entire soil surface under any area to be covered with concrete, including garage floors, entrance platforms and filled porches.

2. Treatment with additional amounts of chemical to the soil beneath those areas that lie adjacent to foundation walls, beneath interior walls, around sewer and utility openings and at other possible points of entry.

3. Treatment of footings and backfill *outside* foundation walls and *inside* walled areas where there is a crawl space. Accessible areas like these could be treated later, but it's easier to do it at construction time.

4. Treatment of empty spaces or voids in concrete blocks.

Insecticides to use and how to use them. The three insecticides recommended are water emulsions. Unlike oil solutions, they will not injure plants when used along exterior foundation walls. Neither will they creep up walls and damage floors, as oil may

when applied along the interior of foundations. They are available in concentrated formulations and must be diluted with water before using. See Table 1 for details. The chart shows how to obtain the desired dilutions. Read and follow specific instructions on the container label of the concentrate that you purchase.

Application methods.

Slab-on-ground houses—After the gravel or dirt fill has been made and tamped, treat the soil with one of the recommended soil insecticides, just before covering with vapor barrier and concrete. First, apply the chemical with sprayer or sprinkling can in the critical areas; along the inside of the foundation walls; around plumbing; and in wall voids. After this is done, give an overall treatment to the remaining fill surface. The treated soil must not be disturbed between the time of application and laying of vapor barrier and concrete.

When all grading is completed, dig a trench 6-8 inches wide and 12 inches deep along the outside of the foundation. If the top of the footing is more than 12 inches below the surface, make crowbar holes in the bottom of the trench as described for basement homes. When the soil is replaced in the trench, it must also be treated.

Crawl-space and basement houses—To treat the soil along the exterior and interior walls of foundations with shallow footings, use the method described for treating the exterior or slab-on-ground houses.

Where the footings are more than 12 inches deep and where large volumes of the chemical must be applied, make holes about 1 foot apart in the bottom of the trench with a crowbar, pipe or metal rod. Punch these holes down to the top of the footing.

Pour or sprinkle some of the chemical at the bottom of the trench. Cover with a layer of soil about 6 inches thick. Pour or sprinkle more the chemical on top of this soil layer. Mix the chemical thoroughly with this layer. Tamp well. Continue to add more layers of soil, mix with chemicals as before, and tamp until the trench is filled. Do not apply chemicals to watersoaked or frozen soils because the chemicals will not be distributed, and the desired control may not be obtained.

For the treatment of soil beneath concrete floors in basements, follow the same procedures as recommended for slab-on-ground construction.

Control in existing structures

It is not difficult to identify termites and termite damage. However, people often mistake winged ants for termites and become unnecessarily alarmed. Actually, the difference is quite pronounced. A swarmer termite is generally black. It has a rather straight body and four cloudy-white, equal-length wings that are twice as long as the body. The winged ant, on the other hand, may be similar in color but has a wasp-like waist and four clear wings, unequal in length, and much shorter.

The white, soft-bodied, wingless worker termites, although seldom seen, are the ones that do the damage. They eat the soft grain of wood, leaving a thin shell outside and a splinter effect inside.

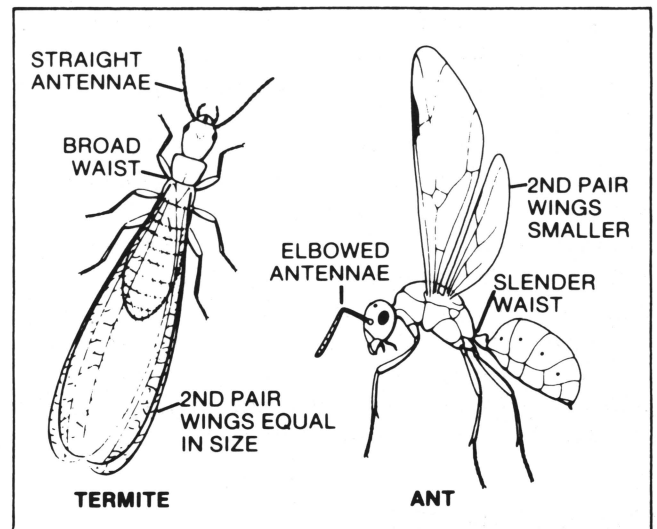
To check for termites, probe any wood near the foundation or soil with an ice pick or screw driver, especially the plates, header joists, ends of floor joists and any hardwood flooring. Presence of earthen "shelter tubes" on foundation walls and wood is also evidence of infestation. Termites build the tubes from bits of soil, which they use to close up breaks in the surface of infested wood.

If you find damage, there is no great hurry to apply control measures. Termites work slowly, and a few weeks' or even months' delay is of little consequence.

Slab-on-ground houses

The control of infestations occurring beneath concrete floor slabs on the ground is difficult and sometimes hazardous. For this reason, it should not be done by the average home owner. This is especially true where radiant heat is concerned, because pipes are apt to be buried in the concrete and may be damaged when drilling holes in the floor through which an insecticide is poured to treat the soil below.

Where pipes are not present in the slab, holes usually are made $\frac{1}{2}$ inch in diameter, about 1 foot apart and 6 inches from the wall. The insecticide is applied with a pump and under considerable pressure through a hose and $\frac{1}{4}$ inch pipe. After the



Termite vs. ant

treatment is finished, the holes are filled with a dense mortar mixture. An alternative method consists of drilling the holes through the foundation walls so the chemical can be introduced into the soil just below the slab. The holes are made about 3 feet apart, and the chemical is distributed best by using a high pressure pump.

Along the exterior foundation wall, make a trench 6 to 8 inches wide and about a foot deep, but do not go below the top of the footing. Where the footing is deeper than the trench, make holes along the bottom of the trench, 1 inch in diameter and about a foot apart, as described under crawl-space houses.

Crawl-space houses

To control infestations occurring along interior walls or around supporting piers of houses with crawl spaces, dig a trench 6 to 8 inches wide and a few inches deep next to the walls or piers, taking care not to go below the top of the footing. If the land slopes or if the footing is more than 12 inches deep, make crowbar, pipe or rod holes about 1 inch in diameter and a foot apart in the bottom of the trench. The holes should go to the footing. This will help distribute the chemical evenly along the wall.

The trench along the exterior foundation wall is also made 6 to 8 inches wide, but about a foot deep. If needed, holes are also made in the trench bottom, as described for the trench along the interior wall.

Basement houses

Where the termites are coming from beneath the concrete floor in the basement, remove any wood that may extend into the ground, treat the soil, and then seal cracks or holes with a dense cement mortar. Where the infestation is located between the floor and wall (expansion joint) or around a furnace, make

a series of ½ inch holes, spaced about 1 foot apart, through which a chemical can be poured or injected. Holes along a wall should be made about 6 to 8 inches from it, so as to clear the footing and reach the soil beneath.

Where the infestation occurs along the exterior foundation wall in houses having full basements, it is necessary to treat the soil to a greater depth than is required for other types of houses. The trench is prepared in the same way, but the pipe or rod holes should extend down to the top of the footing to aid in proper distribution of the chemical to all parts of the wall. This is especially important in masonry foundations where numerous mortar joints are below grade and which may be susceptible to termite attack.

Pest control operators

Sprayers, safety equipment, other specialized equipment and special knowledge are usually required for the proper application of termite insecticides. A qualified pest control operator has this equipment and knowledge. Securing the services of a reliable pest control operator is advisable in most cases. Obtain bids, a description of the work to be done and

details of any guarantees from two or more firms. Study this information and then make your decision.

Cautions

The insecticides mentioned in this guide are potentially toxic to people and other warm-blooded animals and must be handled with care. Do not permit them to come in contact with your skin. Wear rubberized gloves for protection. Where the insecticide is being applied with pressure through holes in walls and piers, use a cellulose acetate face guard so the chemical cannot splash back onto your face. If contact with the insecticide occurs, wash the skin immediately with warm, soapy water. When the insecticide is being applied in an enclosed area, provide a free circulation of air.

Do not apply these insecticides to the soil beneath a plenum air space. Do not treat soil beneath structures that contain cisterns or wells. Do not treat soil that is water-saturated or frozen. Do not apply in any situation that might result in contamination of any water supply. Keep children and pets away from areas where these insecticides are being prepared and used.

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