Preventing Termite Damage

Construction Practices

Conditions under which termite colonies thrive are rather rigid. Because of this, certain steps taken during planning and construction of a building greatly reduce or prevent future termite damage. Improper design and construction of buildings, resulting perhaps from a lack of knowledge of or an indifference to the termite problem, can leave structures vulnerable to infestation. It is important to stress the value of good building practices and chemical treatment of soil during construction. The objective of the preventive procedures is to prevent termite access to wood and moisture.

Building Site

The most important rule in avoiding termite problems is to prevent direct contact between soil and untreated wood. Whenever possible, roots, stumps and other wood debris should be removed from the building site before construction work is started. Spreader sticks and grade stakes should be removed before the concrete sets. Form boards and scraps of lumber should also be removed before filling or backfilling around the completed foundation. Wood should not be buried beneath porches and steps (Figure 10). No scraps of lumber should be left on the soil surface beneath or around the building following construction. Removal of all these materials reduces the likelihood of future termite infestation.

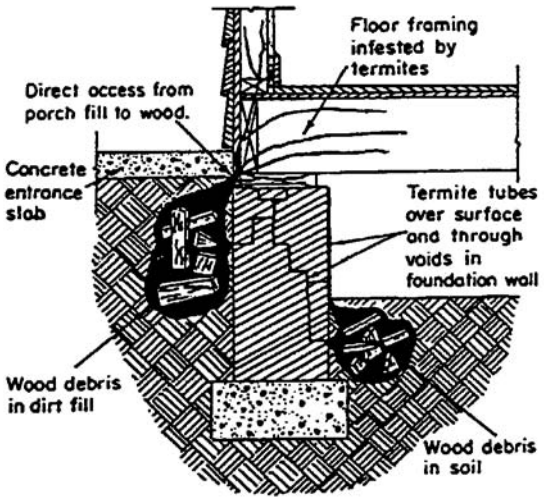

Figure 10. Termite colonies can develop in wood debris or soil and gain entrance into a building, particularly at the concrete entrance slabs of porches.

To prevent unfavorable moisture build-up in the soil beneath a building, the soil surface should be graded so that surface water will drain away from the building. Connection of eaves gutters and downspouts to a storm-sewer system helps. On flat sites or around buildings with basements, the use of drainage tile around the outside of the building is also helpful.

Wall and Pier (Crawl Space) Foundations

All foundations should be made as impenetrable to termites as possible to prevent hidden access to woodwork above. This is one of the most important protective measures that can be taken. Foundations may be rated in decreasing order of resistance to termite penetration as follows:

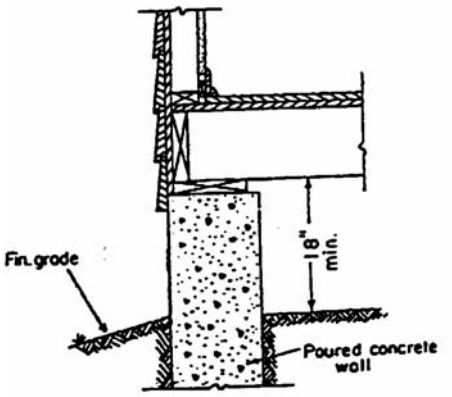

Figure 11. Poured concrete wall and pier foundation.

1. Poured concrete foundations, properly reinforced, prevent large shrinkage or settlement cracks (Figure 11). Termite can enter through cracks as small as 1/64 of an inch in width.

2. Hollow-block or brick foundations and piers:

- Capped with a minimum of 4 inches of reinforced poured concrete (Figure 12).
- Capped with precast solid-concrete blocks, all joints completely filled with cement mortar or poured lean grout.

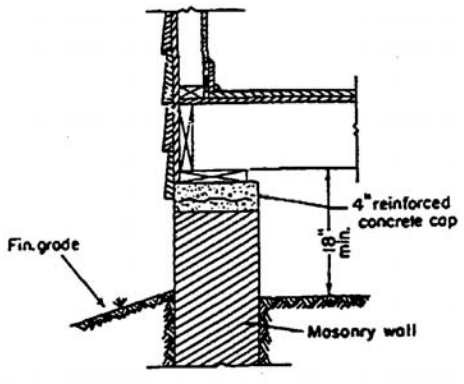

Figure 12. A reinforced poured concrete cap on masonry walls or pier.

- Top course of blocks and all joints completely filled with concrete. Where hollow blocks are left open, no protection is provided, and this type of construction cannot be treated without serious odor problems.

3. Wooden piers, or posts used for foundations or piers, pressure treated with an approved preservative by a standard pressure process, properly set on concrete bases with top surface above grade.

Raised Porches and Terraces of Concrete or Masonry

Dirt-filled porches and terraces account for a large proportion of termite infestations in buildings. Therefore, do not fill spaces beneath concrete porches, entrance platforms and similar raised units with soil. If possible, leave such spaces open for inspection and provide access doors for that purpose. If this cannot be done, or if the spaces beneath raised units must be filled, leave 6 inches of clearance between the soil and wood and thoroughly treat the soil with an insecticide (see section on soil treatment).

Clearance Between Wood and Soil

The outside finished grade should always be at or below the level of soil in a crawl space underneath the structure (Figures 11, 12, 13) so that:

- Water is not trapped underneath the house, and
- The foundation wall is exposed and can be inspected. The exterior siding should be at least 6 inches above the outside grade and should not extend down more than 2 inches below the top of the foundation walls, piers and concrete caps. This will force termites into the open where their tunnels can be seen before they reach the wood.

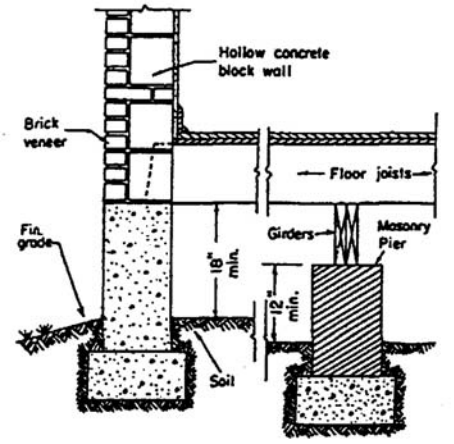

Figure 13. Adequate clearance should be provided between wood and soil both outside and inside the building.

In crawl spaces, the minimum clearance between the ground and the bottoms of floor joists should be 18 inches. Clearances for girders should be at least 12 inches.

Metal Termite Shields

Another method of preventing hidden entry is by means of termite shields (Figure 14), which are sometimes used instead of the concrete cap or other methods of sealing unit masonry foundations. Properly designed, constructed, installed and maintained metal shields will force termites into the open, revealing any tunnels constructed around the edge and over the upper surface of the shields. However, experience has shown that good shield construction and installation is rare. Also, no termite shield has yet been developed that is absolutely effective in preventing the passage of termites.

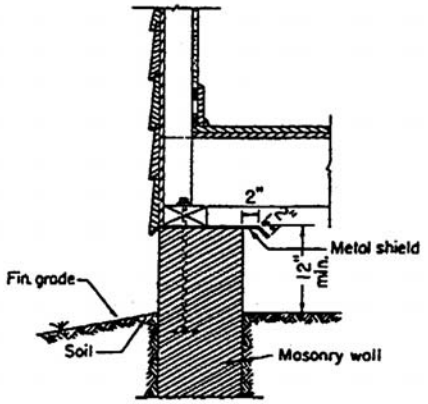

Figure 14. Termite shield over uncapped masonry wall, showing minimum clearance from ground on both inside and outside of foundation.

Termites can construct tubes on the lower surface of a shield. Occasionally one of these tubes will extend around the edge and up over the upper surface. Frequent inspection for the presence of such tubes, therefore, is essential.

Shields are used primarily for protecting portions of buildings above ground. They are suited for unit masonry piers. They are not effective in safeguarding finished rooms in basements. Termites can enter these rooms through expansion joints, crevices in foundation wall, or cracks in the floor. Shields should not be installed in the slab-on-ground type of construction.

Termites tunneling over the shields, the need for frequent inspections and improper construction and installation of shields are common problems. Therefore, termite shields are not presently recommended for detection and prevention of termite infestations.

Ventilation Beneath Buildings

In buildings with crawl spaces, ventilation openings in foundation walls should be large enough and placed properly to prevent dead-air pockets from forming. Such pockets help create humid conditions that favor termite activity and wood decay. Openings placed within three feet of the comers of buildings usually give the best cross-ventilation. The size and number of openings depend on soil moisture, atmospheric humidity and air movement. In general, the total area of ventilation openings should be equivalent to 1/150 of the ground area beneath dwellings. Shrubbery should be kept far enough from the openings to permit free circulation of air and far enough from the foundation to allow inspection of wall surfaces for termite tubes.

Where there is a tendency for moisture to accumulate in crawl spaces or where adequate ventilation is difficult, a vapor barrier over the soil surface is advisable. Polyethylene sheeting, 4 to 6 ml in thickness, is acceptable.

Exterior Woodwork

Certain exterior woodwork is susceptible to decay, and so pressure-treated wood should be used.

Door Frames

Doorframes or jambs should not extend into or through concrete floors. This is particularly true for exposed outside doors. Door thresholds should not cover open block or gaps in the footings.

Wooden Porches and Steps

Porch supports, such as piers, adjacent to a building should be separated from the building proper by two inches to prevent hidden access by termites (Figure 15). Wooden steps should rest upon a concrete base or apron that extends at least 6 inches above grade.

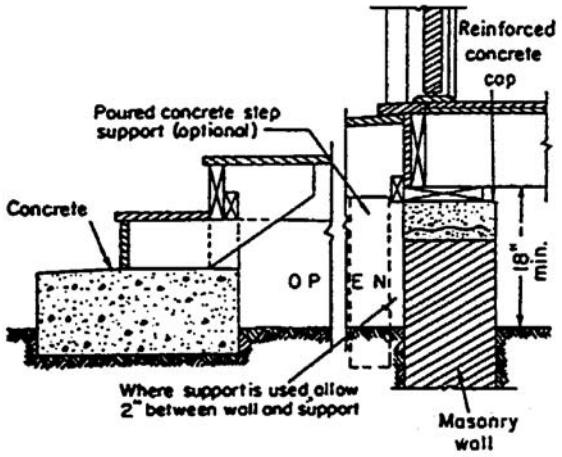

Figure 15. Construction of wooden steps of porch to prevent hidden termite attack.

Windows Below Grade

Where window frames or other openings near or below grade are made of wood, the foundation wall surrounding the wood should be made impervious to termites, and the level of the window well should be at least six inches below the nearest wood.

Skirting Between Foundation Piers

Where pier foundations are used, it is sometimes desirable to close the spaces between the piers with lattice or wooden skirting. If this is done, the woodwork should be separated from the piers and soil by at least two inches, to allow for visual inspection.

Wood Used in Basements

Partitions and Posts

Wooden basement partitions, posts and stair carriages should be placed after the concrete floor is poured. They should never extend into or through the concrete; otherwise, they are more prone to attack and damage by termites. Use reinforced concrete under them, so that the concrete does not crack and allow termites access from the soil beneath. Concrete footings that extend about three inches above the floor level can be used under wood posts, stair carriages, heating units and other load-bearing points.

Basement Rooms

Termite infestations in basement rooms are very difficult to detect and control. Such situations commonly exist in recreation rooms and finished basements where untreated wood floors and furring strips are used. The best way to prevent these infestations is to treat the soil below the basement floor, along the outside of the foundation, and in any voids that may exist in the wall. Because of the danger of decay, wood screens, subflooring and furring strips should be made from wood that has been pressure treated with a wood preservative.

Girders, Sills and Joists

A building practice that causes concern is the placement of wooden girders, sills and joists in or on foundation walls in basements below the outside grade level. Termites may find hidden access to this wood; furthermore, the wood may be more subject to decay. Floor joists and girders, boxed in masonry concrete walls, should have an air space of at least one inch around the sides and ends. It is a good practice to use lumber impregnated with a preservative because it is difficult to remove these timbers once they are structurally damaged by termites.

Water Pipes and Conduits

Keep all plumbing and electrical conduits clear of the ground in crawl spaces. Suspend them from girders and joists where possible. Do not support them by wooden blocks or stakes connecting the ground, for termites can tunnel through these supports or construct tubes over them to the sills, floors and joists above. Chemically treat the soil around plumbing that extends from the ground to the wood above.

Where pipes or steel columns penetrate concrete ground slabs or foundation walls, fill the spaces around them with dense cement mortar, roofing grade coal-tar pitch or rubberoid bituminous sealers after the soil around the pipe or column has been treated chemically.

Concrete Slab-on-Ground Construction

One of the most susceptible types of construction, and one that often gives a false sense of security, is the concrete slab-on-ground. Termites can gain access to the building over the edge of the slab or through expansion joints, openings around plumbing and cracks in the slab. Infestations in buildings with this type of construction are most difficult to control.

Because slab-on-ground construction is so susceptible to termite attack and infestations are very difficult to control in areas of termite activity, pretreat the soil with termiticides before pouring the concrete. Such a treatment, properly applied, will protect a building for many years and is much less expensive than remedial treatments at a later date. Foundations with subslab ductwork should be treated with extra care by an experienced technician.

Do not leave untreated wood such as forms, scraps, grade stakes or wood plugs in or beneath the slab. Reinforce the slab at all points where it is likely to crack.

Slabs vary in their susceptibility to penetration by termites. In order of degree of protection against termites, they are:

1. **Monolithic Slab**. A monolithic slab (Figure 16) provides the best protection against termites. The floor and footing are poured in one continuous operation, so that there are no joints or other structural features that might permit hidden termites entry. The top of the slab should be at least 8 inches above grade. This type of slab is commonly used under sheds and garages.

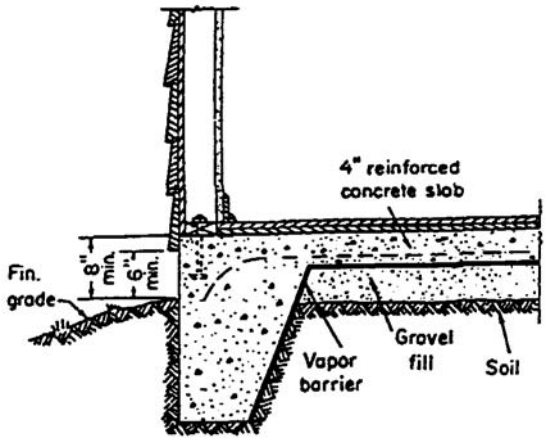

Figure 16. Monolithic concrete slab-on-ground construction.

2. **Supported Slab**. With a supported slab (Figure 17) the floor slab extends completely or partly across the top of the foundation. The slab and the foundation are constructed as independent units. A fully extended slab prevents hidden termite attack, even though a vertical crack may develop in the wall. Termites still must tunnel over an exposed part of the concrete slab. The top of the slab should be at least 8 inches above grade and its lower edge open to view.

3. **Floating Slab**. The floating slab (Figure 18) is in contact with the ground and is independent of the foundation. This is the most hazardous of the three types of slabs. It comes in contact with the foundation walls where there are expansion joints, through which termites may gain access to the woodwork above.

To reduce penetration through expansion joints and openings made for plumbing and conduits, fill them with roofing grade coal-tar pitch or rubberoid bituminous sealers. This is not foolproof. The soil should be treated with a long-lasting termiticide before the concrete is poured.

Chemically Treated Woods

Chemically treated wood resists attack by both termites and decay. The degree of protection depends on the kind of preservative, the penetration achieved and the retention of the chemical in the wood. Termites are usually able to build shelter tubes over any small barrier. This is often the case when they encounter naturally resistant wood or chemically treated wood. The termites construct tubes over the undesirable wood to attack the desirable. Only where drywood termites and decay are major concerns should chemically treated wood be used throughout a structure.

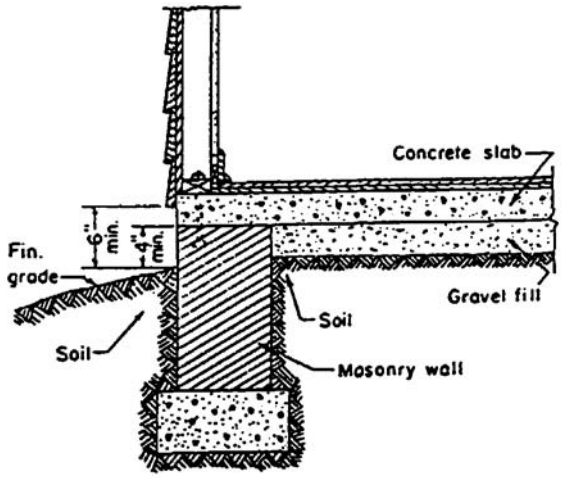

Figure 17. Supported concrete slab-on-ground construction.

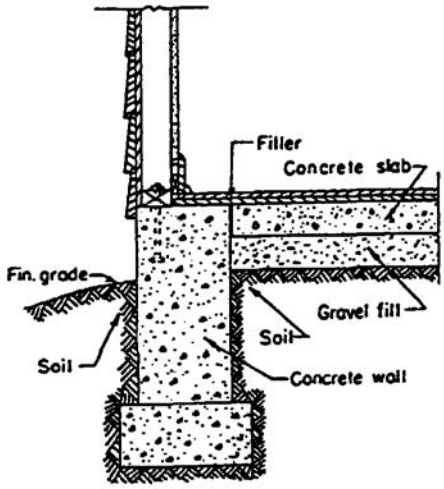

Figure 18. Floating concrete slab-on-ground construction.