

## WELCOME TO MODULE 3

Welcome to Module 3 in the four-part course on  
Wood-destroying Organisms



## THE FOCUS

In this third module the focus will be on preventative measures with the following subjects:

- Soil Treatment
- Application Equipment
- Construction – preventative measures in the construction of structures -  
Slab on ground foundation and other techniques – Monolithic slab  
foundation – Floating slab foundation – Crawlspace foundation –  
Basement foundation
- Building sites – using this stage of construction as a preventative measure
- Methods of moisture control – avoiding problems and decay

## AS WE MOVE FORWARD

- In this section of the module the focus will be on preventative techniques.
- This is a broad topic with multiple approaches that can be utilized.
- Given the length of this module and course, we can only provide a basic introduction to the topic and encourage you to read additional materials.
- These are included in the bibliography at the end of this module.



## PREVENTION WORKS

- Chemical treatment of the soil, around or under the foundation of buildings, serves as one of the most important means of isolating a building from termites.
- It provides protection from termite attack for many years.
- Treatment is most effective when done before, and during construction of the foundation, and should be used in conjunction with good construction, not as a substitute for it.
- It is particularly important when using concrete slab-on-ground construction.
- To meet FHA termite-proofing requirements, follow the latest edition of the Housing and Urban Development (HUD) Minimum Property Standards.



# FACTORS AFFECTING TERMITICIDE APPLICATION

- The soil type and its moisture content affect the penetration of pesticides.
- A soil fill accepts treatment best when it is damp, but not excessively wet or dry.
- If the soil is excessively wet, there is a chance of run-off, and the chemical will not penetrate the soil.
- In frozen or excessively dry soil, pesticide emulsions are repelled and puddling occurs, resulting in poor penetration and distribution of the termiticide.
- Check the label, most termiticide labels prohibit applications to be made into saturated or frozen soil.
- Very little disturbance to the treated soil can be tolerated.
- A freshly treated slab-foundation site should be protected with a polyethylene sheet, or other waterproof material, unless the concrete is to be poured the day of treatment.



Soil treatment is one of the most effective of all the preventative measures.



# THE OBJECTIVE

- The objective of applying a termiticide to soil is to provide an unbroken chemical barrier, between the wood in the structure, and termite colonies in the soil.
- Thus, the insecticide must be applied thoroughly and uniformly, to block all routes of termite entry.
- Application procedures will depend on the soil type, grading, water table, presence of drainage tile, and well location.
- The design of the structure, location of the colony, severity of infestations in the area and the termite species, and its behavior must also be considered.



Applying termiticide

## SOIL TREATMENT: METHODS OF APPLICATION

There are 3 methods currently in use

Broadcast  
Spraying

Trenching

Rodding

**SOIL**  
**TREATMENT**



## BROADCAST SPRAYING

- A low-pressure broadcast spray may be used to apply termiticides, as a pre-construction treatment only before slabs are poured.
- There are several other points to remember about broadcast spraying:

A. Use low nozzle pressure of 25 psi or less

B. Do not treat the entire crawl space unless covered with untreated soil or barrier (see termiticide label)

C. Do not treat areas intended for use as plenums





# TRENCHING

- Trenching involves digging a narrow trench, and then flooding it with a measured amount of insecticide.
  - The trench must be right next to the face of the foundation wall, or the masonry-work footing, of any supporting posts or piers.
  - The trench may not extend below the top of the footing of the foundation wall.
  - Trenching varies with soil type and moisture. Some suggest digging a shallow trench and then rodding the soil below to reach the depth of the footings.
  - The trench should be slightly deeper next to the foundation so that the chemical flows against the foundation instead of away from it.
- Apply the prescribed label rate of the termiticide emulsion, for each 10 linear feet of trench, for each foot of depth, from grade to footing, along the entire length of the trench.
  - Be sure to treat the soil thoroughly as it is returned.
  - When the trenching operation is completed, cover the treated soil with approximately 1 inch of untreated soil; this will reduce risk of exposure of residents and pets to the treated soil.
  - Break up lumps and clods of soil, and treat every few inches of depth, as the soil is being replaced.

# THE TECHNIQUE OF RODDING

- Rodding the soil is believed by many to be the simplest method of application.
- The pesticide is applied through hollow steel tubes inserted vertically or horizontally into the soil.
- A rod is usually made of a pipe, 1/2 inch in diameter and about 4 feet long, with a handle and shutoff valve at one end.
- The other end is fitted with a perforated tip to disperse the liquid laterally as well as downwards.



A bottle of termiticide used in soil treatment

## APPLICATION USING THE ROD

Penetration of the ground surface may be aided by wetting down the soil before inserting the rod.

After rod penetration has begun, chemical flow can start and will aid in the passage of the rod to 3, or more feet necessary to soak the soil at the footings.

Always move the rod slowly, allowing the chemical to spread. Never push down, and then bring up the treatment rod.

Apply the suggested label rate for each 10 linear feet per foot of depth to the top of the footings. Spacing of rodding varies with soil conditions.

Usually, penetration is made every 12 inches, but can sometimes be as close as every 6 inches in clay, and as much as 18 inches in sand.

## TYPICAL TERMITE CONTROL EQUIPMENT

### Sprayer-related Equipment

- 100-gal. Tank
- 10-gpm pump
- 3-hp motor
- Hose reel
- Treating 3/ 8-in. hose (100 to 200 ft.)
- Shutoff valve
- Backflow preventer
- 3/ 4-in. hose to refill tank (25 to 50 ft.)
- Measuring container
- Can of gasoline
- Funnel
- Kit maintenance tools
- Extra hose washers
- Extra sparkplug
- Spare can of oil



Taking proper measurements of key ingredients is of primary importance in pest control

## APPLICATION-RELATED EQUIPMENT

- Electric rotary drill for wall voids
- Electric hammer for concrete floors
- Bits for drill and hammer
- Heat gun for tile; tile cutter
- Extension cord (heavy-duty three-wire type)
- 6-ft. extension rods (for sub-slab treating)
- Sub-slab injector, side injector tip, flanged treating tip
- Termiticide
- Termiticide label

- Package of vents for foundations
- Mortar mix or cement
- Small sledgehammer
- Crowbar
- Shovel
- Trowel
- Heavy-duty flashlight
- Extra batteries for flashlight
- Saw, keyhole
- Saw, crosscut
- Grounding box
- Grounding tester



## PERSONAL PROTECTIVE & SAFETY EQUIPMENT (PPE)\*

- Two pairs of coveralls
- Pair of heavy gloves
- Pair of light plastic gloves
- Safety glasses or goggles
- Bump hat
- Respirator
- First-aid kit
- Poison control center telephone number
- Fire extinguisher

\*This is by no means an exhaustive list, and individual jobs may require highly specific PPE.



# TERMITE CONTROL PROCEDURES

In this next section of the module the focus will be on various termite control procedures used for building construction.

It is important to remember that foundations can be of three general types:

Basement

Slab

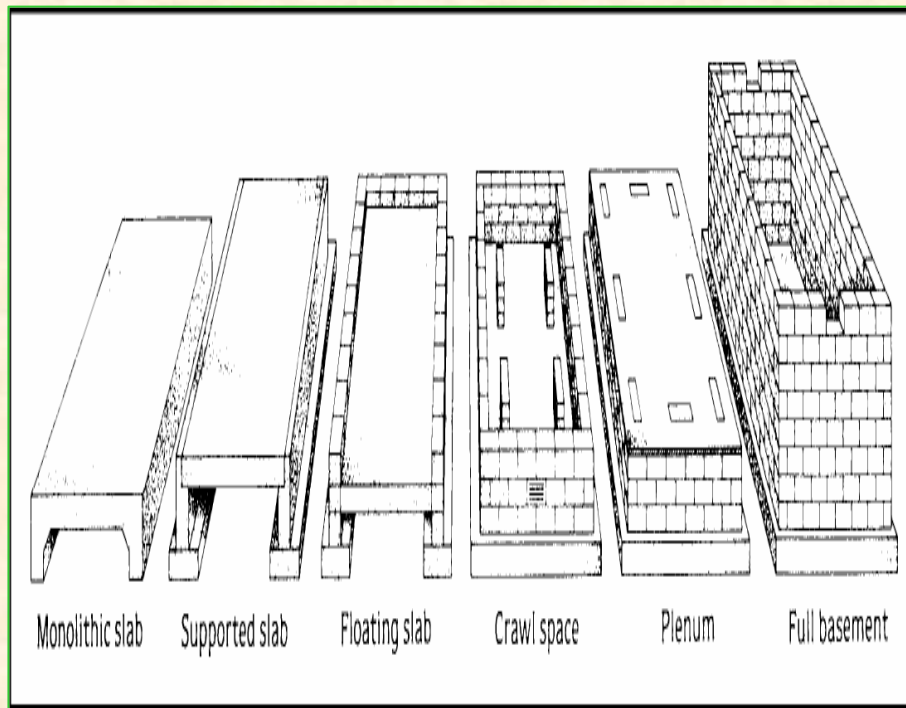
Crawl  
space



These construction techniques can help protect your home.

# IMAGES OF FOUNDATION TYPES

The image in this slide is worth studying in detail to gain a more complete understanding of the types of foundations used in preventative measures. As with preventative measures, this module can only provide a basic introduction to the topic.

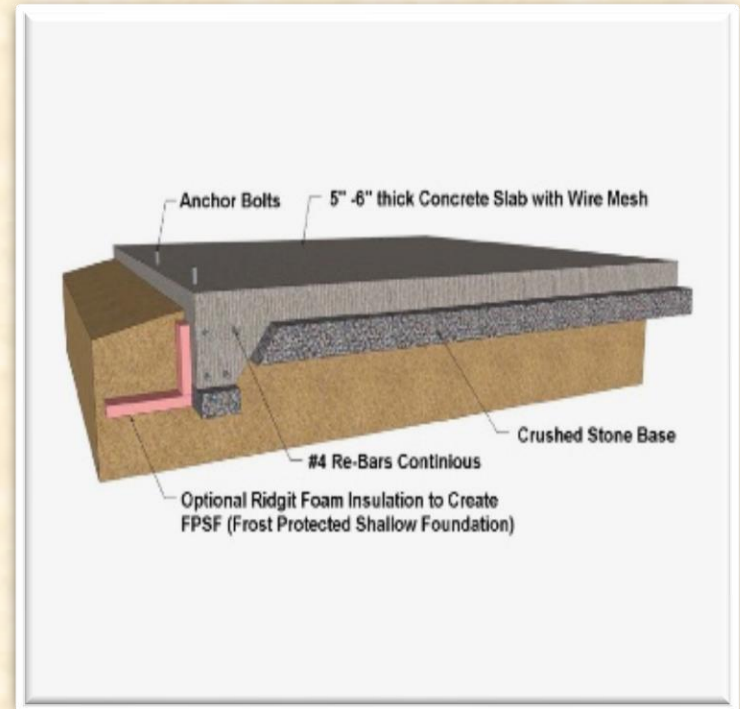


## SLAB-ON-GROUND CONSTRUCTION

This type of construction is used extensively. Because of the hazard of drilling through heat pipes or ducts, electric conduits, and plumbing imbedded in the floor, it may be advisable to treat from the outside by drilling through the foundation walls.

Mechanical alteration is not usually necessary with this type of construction. The three basic types of slab-on-ground construction are:

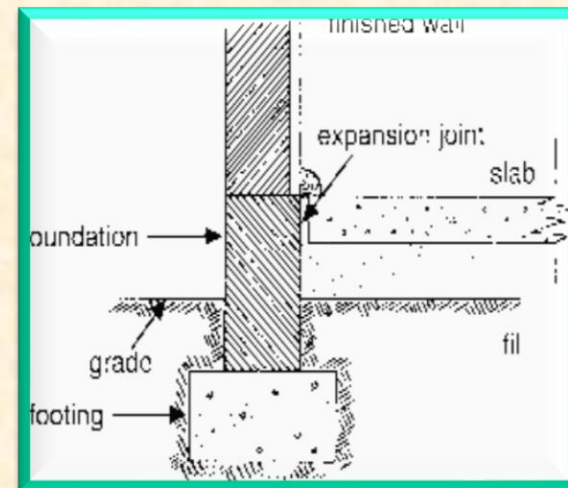
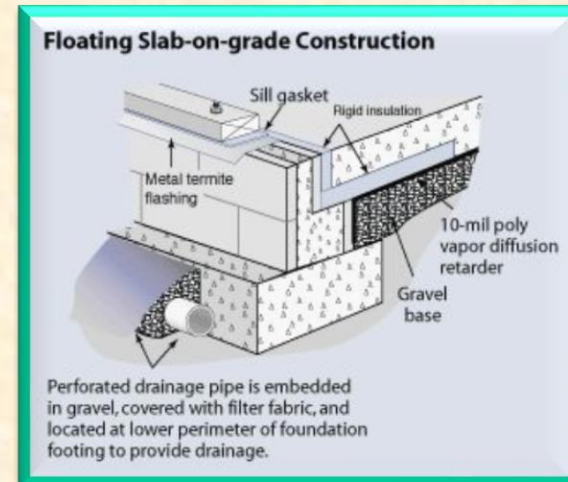
- ***Floating slab***
- ***Monolithic slab***
- ***Suspended slab***



An example of slab-on-ground foundation

## FLOATING SLAB CONSTRUCTION

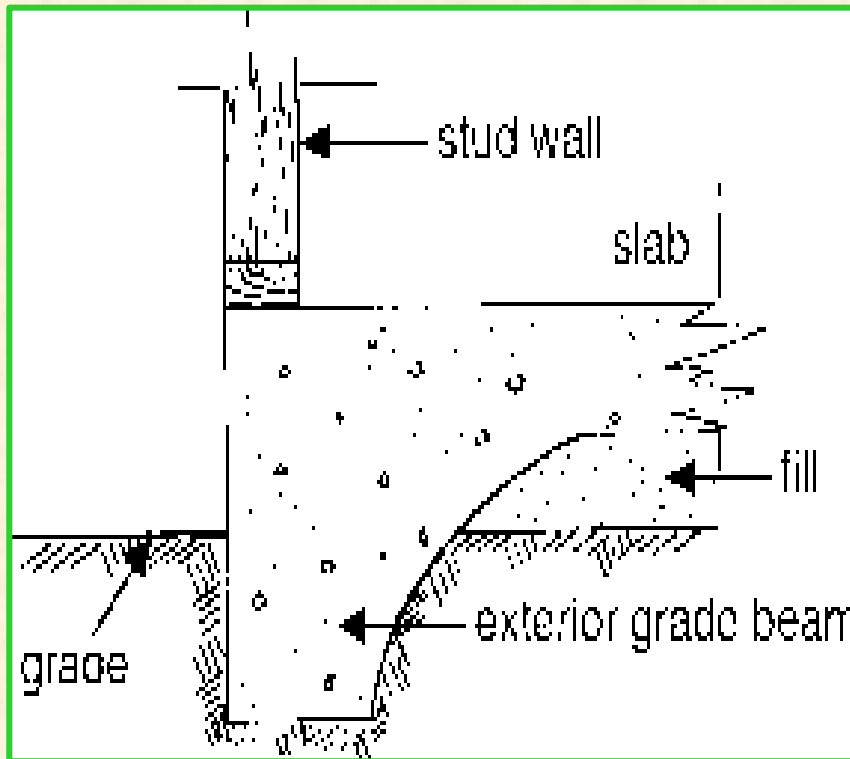
- In floating slab construction, the foundation wall and footing are separated from the slab floor by an expansion joint.
- The slab floor is concrete; the foundation wall can be a variety of materials, such as solid block, hollow block, or concrete.





## MONOLITHIC SLAB CONSTRUCTION

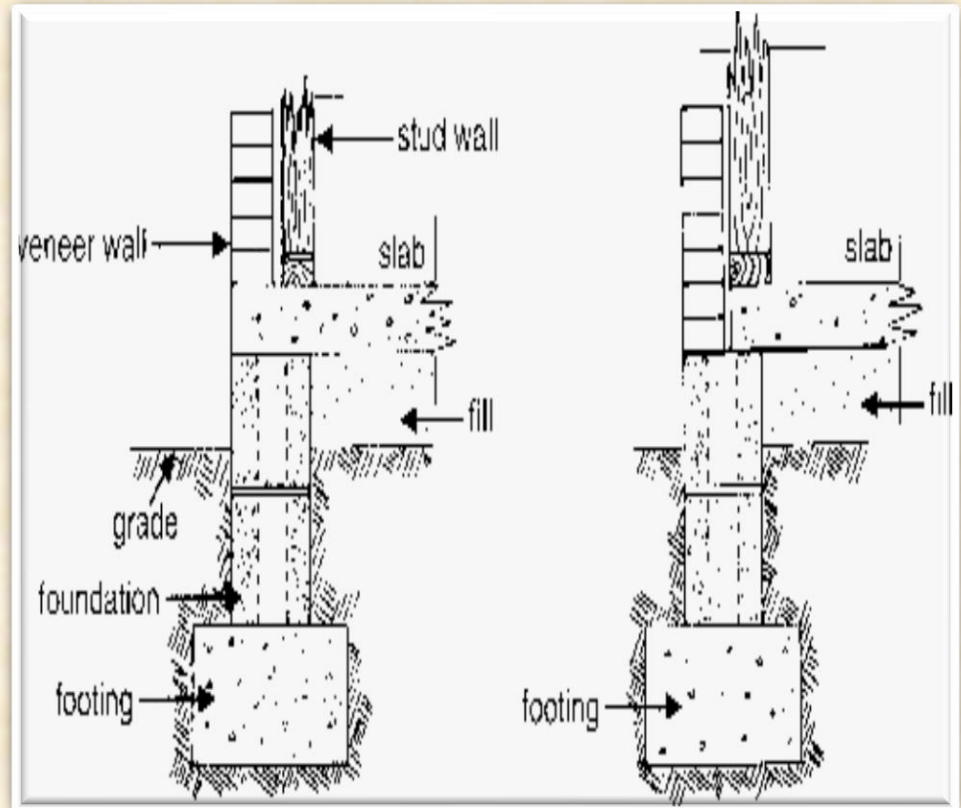
In monolithic slab construction, the foundation footing and the slab floor are formed as one continuous unit. Concrete is the material used in this type of slab foundation.



Monolithic slab construction

## SUSPENDED SLAB CONSTRUCTION

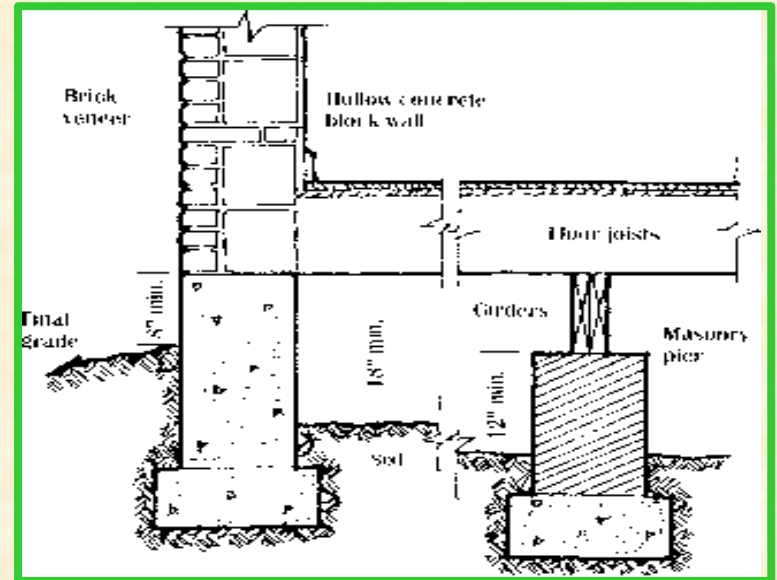
- In suspended slab construction, the slab floor and the foundation wall are separate units, with the slab floor extending over the top of the foundation wall.
- The slab floor is concrete; the material used for the foundation wall may vary.



Suspended slab construction

## CRAWL SPACE CONSTRUCTION

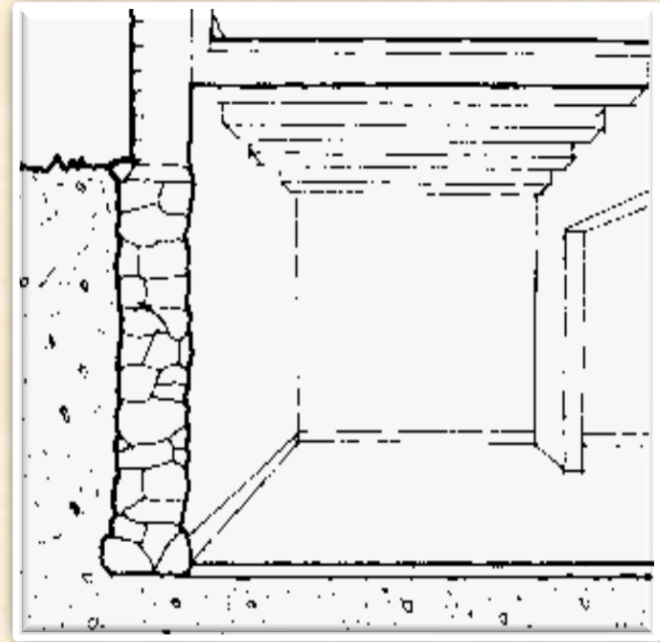
- A crawl space is a shallow space below the living quarters of at least a partially basement less house.
- It is normally enclosed by the foundation wall.
- Crawl spaces are usually less than 3 feet high with exposed soil underneath.
- This type of construction is common in many parts of the country.
- The exposed soil and the short distance to floor joists, and sills make crawl spaces an ideal place for termites to find and infest wood.



Crawl space construction

## BASEMENT CONSTRUCTION

- Though buildings with basements are less susceptible to termite attacks than slab-on-ground construction, basements do have their unique areas vulnerable to termite entry.
- It is important to remember that termites can enter through any crack or crevice as small as  $\frac{1}{32}$  of an inch.



Basement construction

## BUILDING SITES

### Selecting Lumber

In this section, the focus is on using this stage of construction as a preventative measure.

- For new construction, kiln -dried lumber should be used. This lumber should have been dried a minimum of eight hours at 130° F to 140° F and at 80% relative humidity.
- Also, wood preserved using chromated copper arsenate (CCA) salts (described as Wolmanized®) is an excellent choice for wood that will come into contact with soil. The life of CCA-treated wood is 40 years or more.
- This product is not available directly to consumers to apply to wood around their homes because pressure application is essential.
- Treated wood has a slightly green cast and is often sold for use as landscape timbers and for fencing and deck construction.
- Compounds available under the trade name of Cuprinol™ are sold directly to consumers. However, its penetration on wood surfaces is only about 1/8-inch, and its protection is much briefer than that of CCA-treated wood.



# CONSTRUCTION PRACTICES

- Conditions under which termite colonies thrive are rather rigid.
- Certain steps taken during planning and construction can help to avoid these situations.
- Improper design and construction can leave a building open to future infestations.
- The most important rule in avoiding termite problems is to avoid direct contact of soil with untreated wood.
- Whenever possible, all wood, including roots, stumps, and other wood debris should be removed from the building site before construction is even started.



Home inspectors can save new home owners a lot of heartache by advising them on proper construction practices to avoid future infestations.

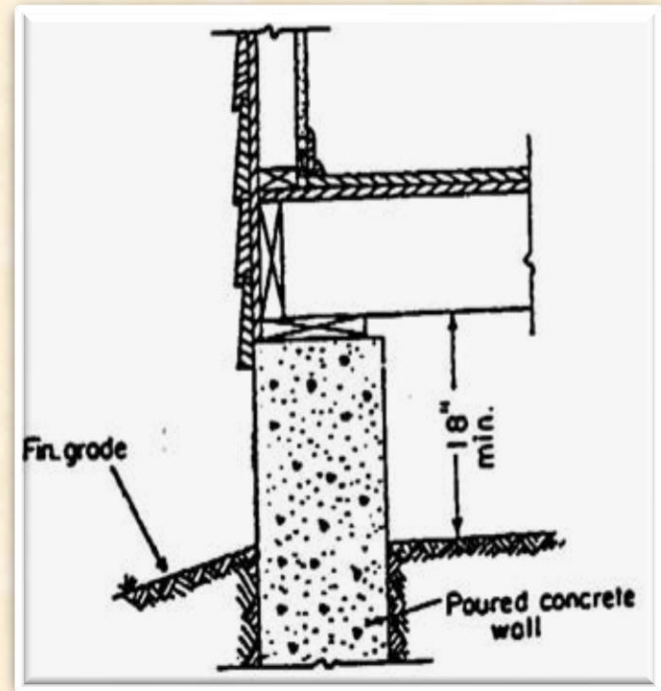
## THE BUILDING SITE

- 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 back-filling around the completed foundation.
- Wood should not be buried beneath porches and steps; 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.
- To prevent unfavorable moisture buildup in the soil beneath a building, the soil surface should be graded so that surface water will drain away from the building.
- Proper connection of eaves, gutters and downspouts to a storm -sewer system helps.
- On flat sites and around buildings with basements, the use of drainage tile around the outside of the building is also helpful.

## WALL & PIER/CRAWLSPACE CONSTRUCTION

All foundations should be made as impenetrable to termites as possible to prevent hidden access to woodwork located higher in the structure.

This is one of the most important protective measures that can be addressed during the construction phase.



Poured concrete wall and pier foundation

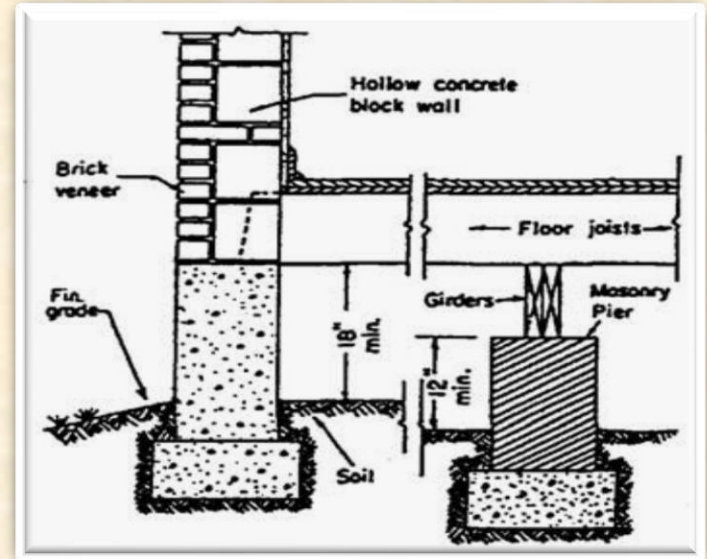
## RATING FOUNDATIONS BY RESISTANCE

These are rated by decreasing rates of resistance:

1. A poured concrete foundation that's properly reinforced helps prevent large shrinkage and settlement cracks. Termites can enter through cracks as small as 1/64-inch wide.
2. For hollow-block and brick foundations and piers, the following measures can be utilized:
  - *Cap with a minimum of 4 inches of reinforced poured concrete*
  - *Cap with precast solid concrete blocks, with all joints completely filled with cement mortar or Poured lean grout*
  - *The top course of blocks and all joints should be 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, should be pressure-treated with an approved preservative by a standard pressure process and properly set on concrete bases with a top surface above grade.

## RAISED PORCHES & TERRACES OF CONCRETE OR MASONRY

- Dirt-filled porches and terraces account for a large proportion of termite infestations in buildings.
- Therefore, spaces beneath concrete porches, entrance platforms and similar raised units with soil should not be filled.
- If possible, such spaces should be left open for inspection and access doors installed for that purpose.
- If this cannot be done, or if the spaces beneath raised units must be filled, a clearance of 6 inches should be left between the soil and wood, and the soil treated with an insecticide.



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



## METAL SHIELDS, EXTERIOR WOODWORK & DOOR FRAMES

### Metal Termite Shields

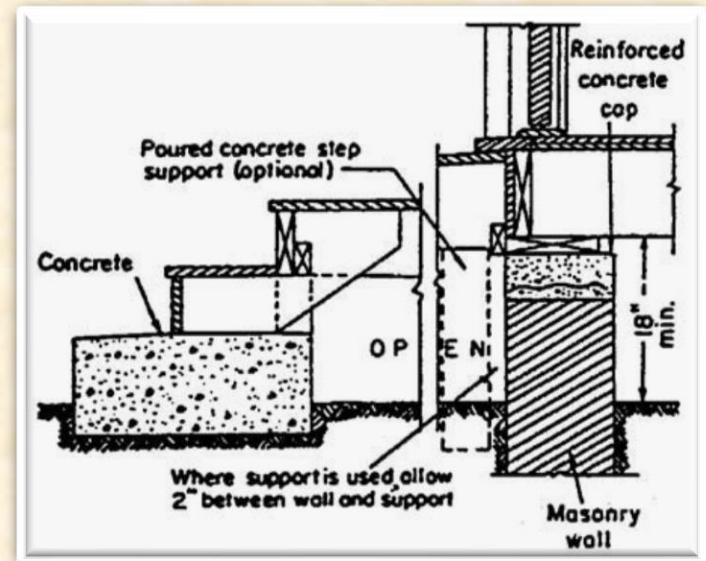
Another method for preventing hidden termite entry is by means of termite shields, which are sometimes used instead of the concrete cap or other methods of sealing masonry unit foundations.

### Exterior Woodwork

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

### Door Frames

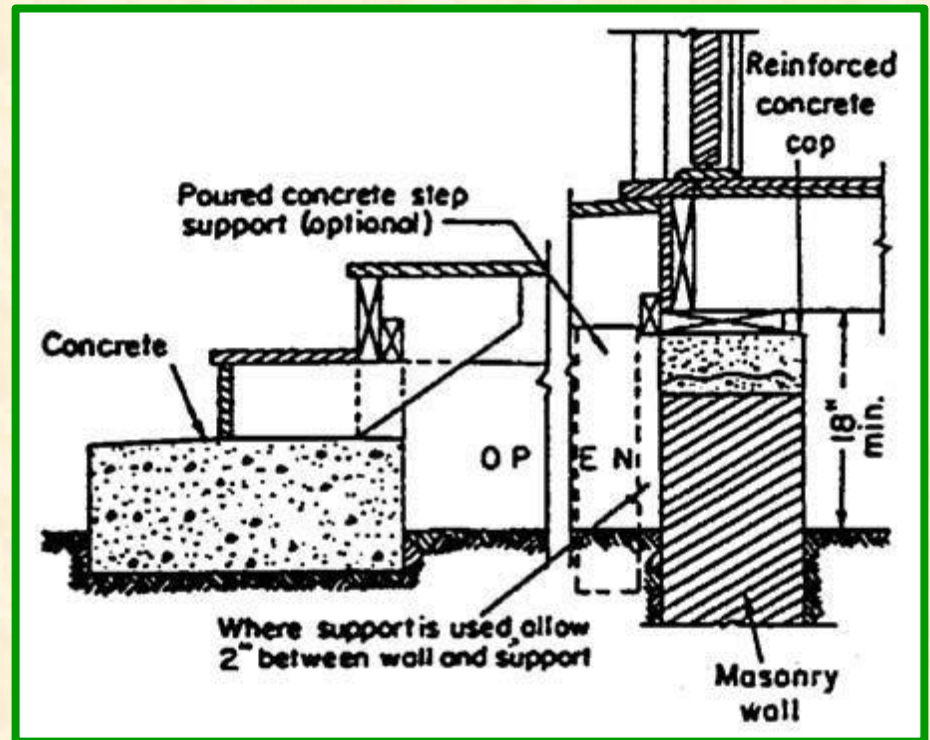
Door frames and jambs should not extend into or through concrete floors, especially exposed exterior doors. Door thresholds should not cover open-block or gaps in the footings.



Proper construction of wooden steps of a porch to prevent hidden termite attack

## WOODEN PORCHES & STEPS

- Porch supports and piers that are adjacent to a building should be separated from the building by 2 inches to prevent hidden access by termites.
- Wooden steps should rest on a concrete base or apron that extends at least 6 inches above grade.



Proper construction of wooden steps of a porch to prevent hidden termite attack

## WINDOWS BELOW GRADE

Where window frames and 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 6 inches below the nearest wood.



Below grade windows under construction

## WATER PIPES AND CONDUITS

- In crawlspaces, all plumbing and electrical conduits should be kept clear of the ground. This can be accomplished by suspending them from girders and joists, where possible.
- They should not be supported by wooden blocks or stakes connected to the ground because termites can tunnel through these supports or construct tubes over them to the sills, floors and joists above.
- The soil around plumbing that extends from the ground to the wood above should be chemically treated.
- Where pipes and steel columns penetrate concrete ground slabs and foundation walls, the spaces around them should be filled 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.





# VENTILATION BENEATH BUILDINGS

- In buildings with crawlspaces, ventilation openings in foundation walls should be large enough and placed properly to prevent pockets of dead air from forming. These pockets help create humid conditions that favor termite activity and wood decay.
- Openings placed within 3 feet of the corners of a building usually give the best cross-ventilation. The size and number of openings depend on the soil's moisture level, the atmospheric humidity, and air movement.
- In general, the total area of ventilation openings should be equivalent to 1/150 of the ground area beneath the dwelling.
- Shrubby should be kept far enough away from the openings to permit free circulation of air, as well as far enough away from the foundation to allow inspection of wall surfaces for termite tubes.
- Where there is a tendency for moisture to accumulate in crawlspaces or where adequate ventilation is difficult to achieve, it is advisable to place a vapor barrier over the soil's surface. Polyethylene sheeting that is 4-to 6 mil thick is acceptable.

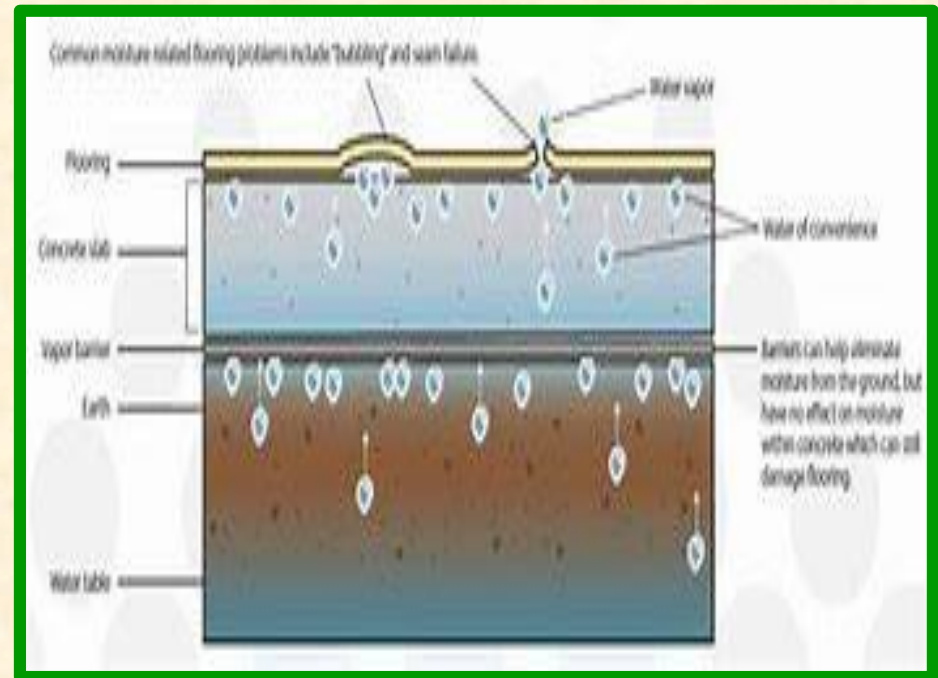


## METHODS OF MOISTURE CONTROL

In our final topic for this module, the focus is on preventing decay by controlling moisture.

Methods of moisture control include:

1. Isolating wood from soil;
2. Installing moisture barriers;
3. Providing adequate ventilation;
4. Improving drainage; and
5. Applying chemical wood preservatives.



## CHECKLIST FOR MOISTURE CONTROL PART 1

The following checklist can be used as a guide in helping avoid problems with decay fungi and/or termites.

1. Soil from flowerbeds next to a house should not be in contact with any wood siding.
2. Soil should be properly graded. Wood should be at least 3 inches above the adjacent finish grade for framing members, and 6 inches above finish grade for siding.
3. Lawn sprinklers should be monitored. Persistent wetting of exterior wood creates a high decay hazard.
4. Wood junctions should be checked. Decay lurks especially where boards and beams are jointed together end to end. Also, the ends of boards and beams absorb water more readily than do the sides. Metal caps help prevent moisture entry and subsequent decay.
5. Ends of exposed beams can be problem areas. Cracks that open as the wood dries out permit the entry of rainwater. Exposed beams should be treated with a wood preservative. When thoroughly dry, the ends should be capped with a metal shield.
6. The roof overhang should be adequate to drain rainwater runoff away from the exterior walls.
7. Roof flashing between dormers and the chimney should be adequate for proper draining.

## CHECKLIST FOR MOISTURE CONTROL PART 2

8. Roof lines should allow water to flow away from the house.
9. Shingles must extend beyond the fascia boards to prevent water from draining over the wood trim.
10. Rain gutters with downspouts should be installed to direct roof drainage away from the house.
11. Surface areas of the porch must slope away from the house to avoid the formation of standing water and puddles.
12. Wooden posts should not touch the porch surface. Water should be directed away from the posts.
13. Repair all plumbing leaks.
14. Do not allow condensation to form underneath the house. Some homes will need a vapor barrier.
15. Water should drain away from the house, not under the house.

## END OF MODULE 3

This concludes Module 3. Please proceed to the quiz, and then Module 4.



The use of proper techniques and procedures in home construction outlined in this module can prevent future infestations from termites and other predators.