Notes to Instructor:

The PowerPoint notes in this version (Instructor's version) contain more information than the PowerPoint notes in the Participant version so that the instructor can have additional background information as well as answers to questions asked during the presentation. The PowerPoint slides are the same in both the Instructor and Participant versions. The PowerPoint materials for the participants are marked "Florida Building Code Advanced Training: Termites (Participant Version)" on the title slide and included in the "Participant Guide".

To help get the participants on task, ask them to turn in their Participant Guide to the page titled "Objectives". Review the objectives with the class. Then ask the participants to draw a termite swarmer (with wings) in the left square at the bottom of the page and an ant swarmer (with wings) in the right square at the bottom of the page. Remind the participants that termites and ants are often mistaken for one another (especially the swarmers) and this is an activity to get the participants on task and thinking about the topic.

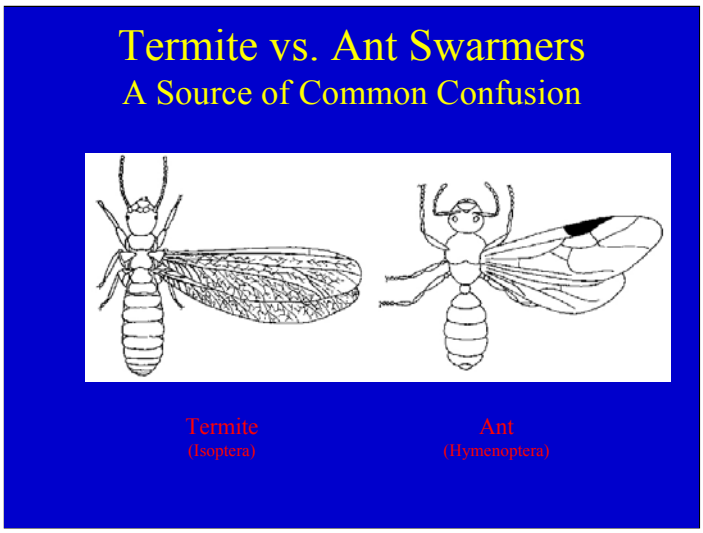
The drawings don't have to be to scale…or drawn perfectly…just their best guess. Give them a few minutes to do this activity---but don't give them so much time that they become frustrated. [The answers are shown in slide #4.]

For information about wood-destroying organisms, and termite treatment, contracts and warranties, contact the Florida Department of Agriculture and Consumer Services, Bureau of Entomology and Pest Control. Information is also available at the Department's Web site http://www.FloridaTermiteHelp.org

You, or the consumer, can check on company violations or file a complaint against a company at the Florida Department of Agriculture and Consumer Services Web site http://doacs.state.fl.us/~aes-ent/pestcntrl/pcpage1.html

This presentation is based, in part, on a slide presentation by faculty and students in the Department of Entomology and Nematology at the University of Florida titled Subterranean Termites: Understanding Your Options and a slide set titled Termites, Pretreatments and the Termite Protection Code, which was written by the Florida Pest Management Association. Code related sections are from the Florida Building Code (2001).

Other contributors (not listed on the slide) include Paula Heinrich (TERMI-MESH), Katherine Allen (Orange County Extension Service – University of Florida), and Karen Westcott (Syngenta).



Note to Instructor:

Ask the participants…How did you do with your drawings? Do they look like these?

Termites and ants (especially the swarmers) are commonly confused for one another. Scientifically, termites are in the order *Isoptera* and ants are in the order *Hymenoptera*. Let's see three ways to help differentiate them one from another.

1. The first way to tell one from another is to look at the antennae. Termite antennae are like a strand of beads and straight, with no bend in the middle, whereas ant antennae are "elbowed" or bent in the middle.
2. Another way to differentiate termites from ants is to look at their waist. The termite waist is not as constricted as that of the ant. Termites are sometimes called "thick-waisted" relative to the ant. The ant, on the other hand, has a very tight constriction between the thorax and the abdomen…thus forming a very small "waist."
3. A third way to help differentiate termites from ants is to examine their wings. Termites, as well as ants, have two pair of wings. Both sets of termite wings are identical in length and width, whereas the forewings (front wings) on ants are larger than their hindwings.

Note: A fourth way to differentiate between termites and ants relates to body hardness. Ants are considered hard-bodied, whereas termites are considered soft-bodied.

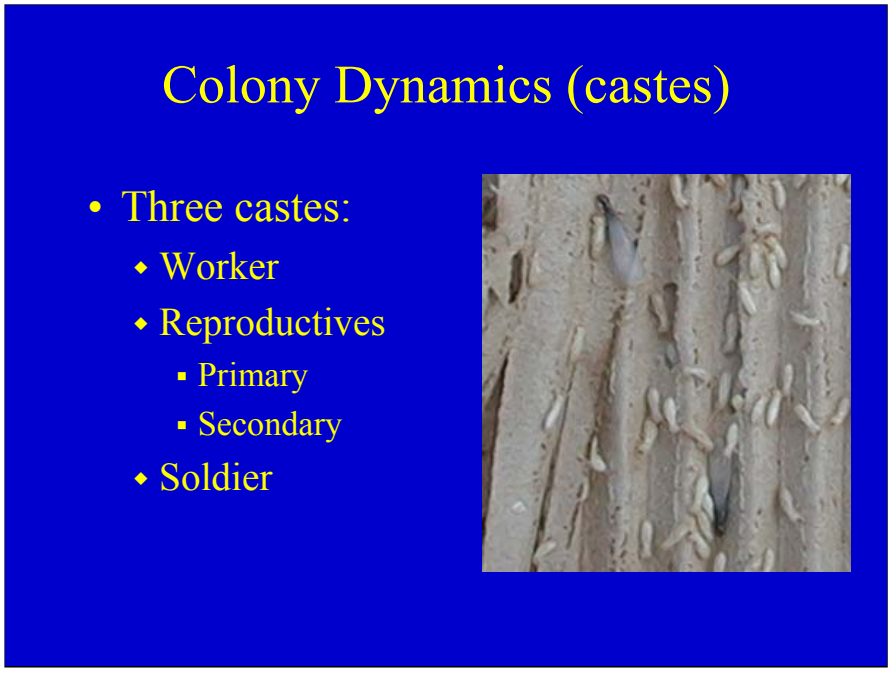
Note to Instructor:

A corny, but useful, way of remembering what a termite looks like in comparison with an ant is to pretend you are Superman or Superwoman…

- **Stand up tall with your arms raised directly over your head (notice you now have straight antennae like a termite)**
- **Alternatively, have someone stand who looks like they lift weights. Have them show everyone their arm muscles (elbowed antennae like ants)…or act out how Popeye the Sailorman shows his muscles after consuming spinach.**

With regard to damage to wood, Superman or Superwoman (termites) will always out do people or Popeye the Sailorman (ants).

[You probably don't want to discuss the "constricted waist" difference ☺]

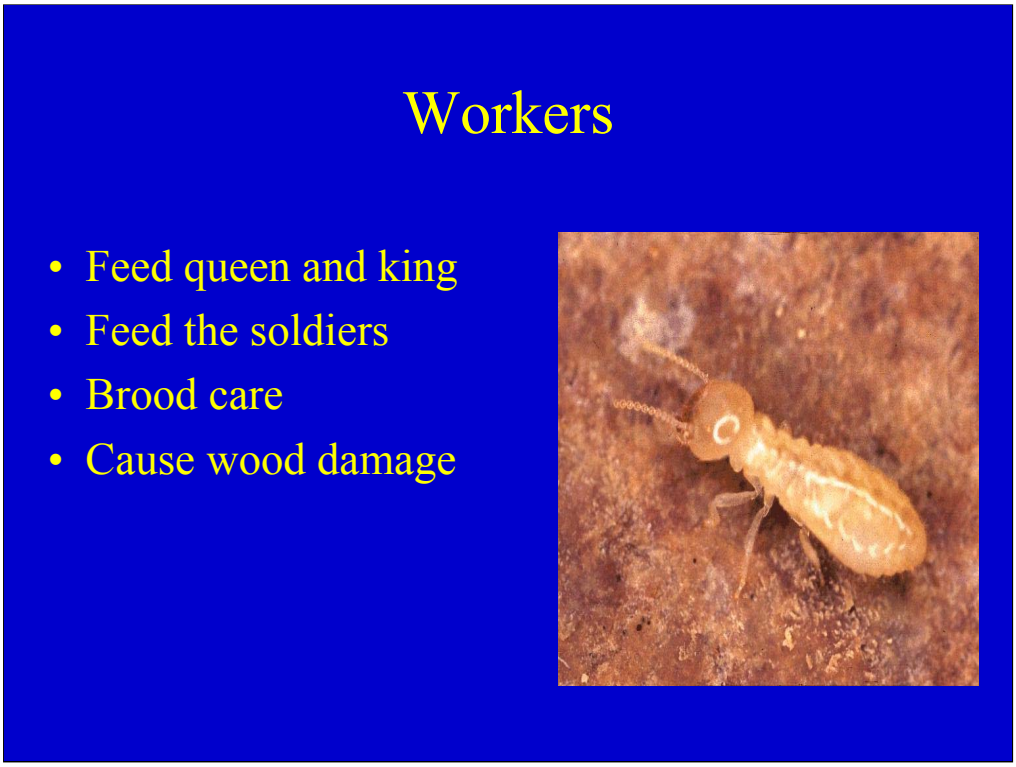


Note to Instructor:

In order to provide you with more information, the notes for this slide are more extensive than those given to the participant.

The dynamics of a termite colony include three castes:

1. Termite workers are milky white and have no wings or eyes. They are responsible for the labor in the colony. They care for the young, repair the nest, build foraging tunnels, locate food, and feed and groom the nonworker castes and each other. In the most common structural pest, the Eastern subterranean termite, workers can make up 97 to 99 percent of the colony.
2. The reproductives:
   - primary (the alates, commonly known as "swarmers," become the king and queen (primary reproductives)) of new colonies and
   - secondary (these replace the function of primary reproductives when the primaries die or the colony is fractionated). Secondary reproductives are light colored, but they are larger than workers and never develop wings. In mature colonies, a secondary reproductive caste can develop even though there is still a producing queen present. Although it is believed that no individual secondary reproductive can produce as many eggs as the queen, several hundred of them may exist in a single colony, producing thousands of eggs. Secondary reproductives may also develop in satellite nests where a group of workers have become separated from the parent colony. This splitting, or budding, of the nest expands the original colony's foraging territory. Due to this ability, partial kill of the colony and death of the primary reproductives will NOT wipe out the colony.
3. The soldiers have cream-colored bodies with darkly sclerotized heads, which support mandibles (jaws) that mainly function to defend the colony against invaders about their size.



Workers

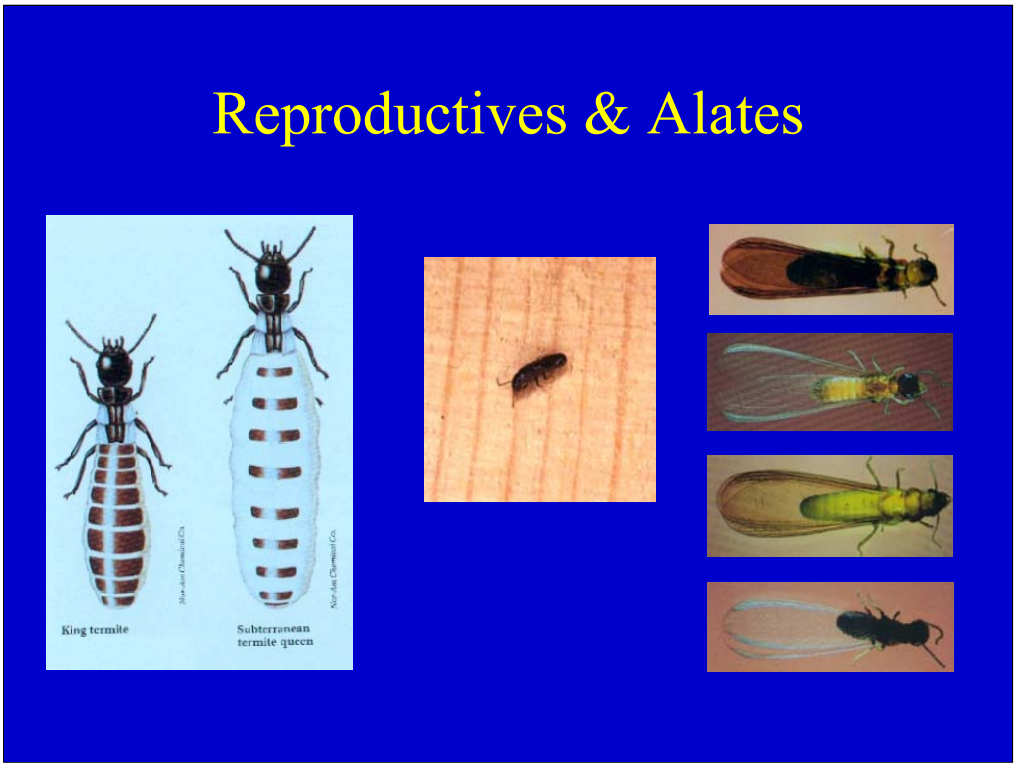
The workers feed the queen, king and soldiers, take care of the brood, AND forage for food (cause the wood damage).

Workers:

- are completely cream colored, soft-bodied and blind.
- are more numerous than any other caste in a colony. (In the most common structural pest, the Eastern subterranean termite, workers can make up 97 to 99 percent of the colony.)
- have chewing mouthparts.
- are able to digest the cellulose in wood into usable sugars with the aid of protozoan symbionts housed in their gut.
- can leave a pheromone trail to a food source for other colony members to follow.

Note to Instructor:

To illustrate this trail-finding method, try the following. Draw a circle on a sheet of paper using a Bic ballpoint pen (the real cheap model) and then place a worker termite in the middle of the circle on the paper. You'll notice that the termite will follow the circle. There appears to be some chemical in the ink that mimics the pheromone.



Reproductives and Alates

Mature subterranean termite colonies, at certain times of the year, produce large numbers of young termites that have elongated wing buds. These mature into the winged alate (pronounced with long a's as a-late) caste, then into the sexually reproductive king and queen termites (primary reproductives).

Swarmers are honey-colored to black, depending on the species. During swarming season, the alates will leave their home colony by flying. They are not good flyers and do not distribute themselves very well on their own.

During the mating flight, the termites eventually land, drop their wings, and pair. They find each other by touch and scent (pheromone). They burrow into the ground (or wherever) in search of moisture and begin a new colony.

Unlike ants, where the male dies soon after mating, the male and female termite pair mate for life, which can be over 20 years, depending on species. The king termite remains virtually unchanged after losing his wings. However, as the queen begins to produce eggs, her abdomen grows – producing thousands to millions of eggs in her lifetime.

Note: The photo on the left is that of a king and queen termite. Notice that the abdomen of the queen seems stretched out. As the queen begins to produce eggs, her abdominal plates stretch out showing the white membranes underneath. At this point, she is termed "physogastric." The photo in the middle is that of a king after losing his wings. The photo on the right is of winged alate stages of several different species of termites.

Soldiers

The soldiers only provide defense. They protect the colony against marauding ants and foreign termites. When foraging tubes or galleries are broken into, the soldiers congregate around the break to stand guard against and repel invaders.

Soldiers are similar to termite workers in that they are blind, soft-bodied, and wingless. However, the soldiers have an enlarged, hard, head, modified for defense. The head has a pair of very large mandibles made to puncture, slice, and kill enemies. The large mandibles prevent the soldiers from chewing wood, so they must rely on the workers to feed them. Soldiers are less numerous than workers, but can comprise up to 30 percent of a Formosan subterranean termite colony.

This slide shows different stages of the soldier as it molts to become a full adult (on far right).

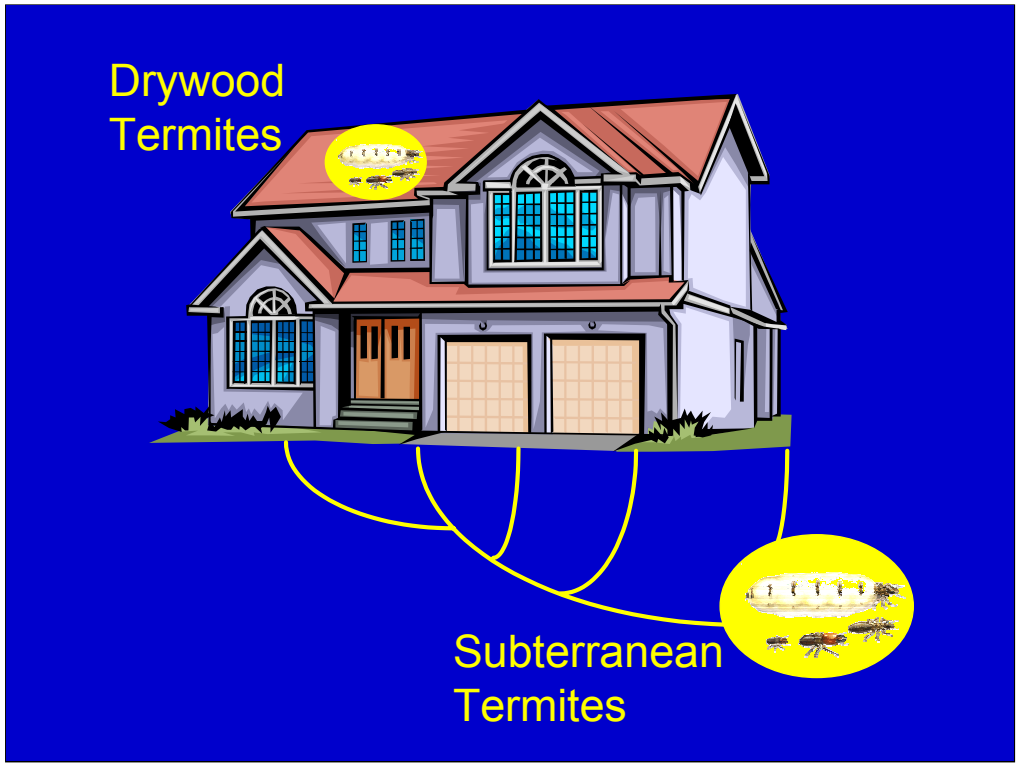
In Florida, economically important termites belong to one of three groups: drywood termites, dampwood termites or subterranean termites. This part of the training, with regard to feeding methods and typical habitat, concentrates on the drywood and subterranean termites since they are prevalent throughout the state.

Here are some photographs of wood damage and fecal pellets from drywood termites.

Drywood termites:

- have no ground contact requirement
- have small colonies (each containing several hundred or a few thousand individuals but nowhere near the size of a large subterranean colony).
- usually pocket within an area, eating across spring and summer wood
- are attracted to light
- usually swarm during the evening during May and August, although this varies with species
- eat both spring and summerwood and, when viewed in cross-section, the galleries extend throughout the wood
- the galleries (damage) in which these termites travel are smooth and without mud because these termites live completely enclosed within the wooden members that they infest
- have fecal pellets (frass) that are six-sided (like a stop sign) and hard. The pellets have a gritty texture when rolled between your fingers.
- can cause significant damage to structures, even though colonies develop slowly, because they can go unnoticed over time
- most commonly infest dry, sound wood and are more commonly associated with older homes

You often see “kick-out” holes (about the size of a pencil tip) where the drywood termites have cast out their fecal pellets. One way to check for a live infestation is to find a “kick-out” hole and put toothpaste over the hole. Return the next day; if they have kicked out the toothpaste, then there is an active infestation.



Keep in mind that drywood termites do not need contact with the ground, whereas subterranean termites usually require ground contact.

Drywood termites are common pests along the coast and can be found in wood flooring, wooden framing members, wooden window sills, and furniture. Structurally, drywood termites are found primarily in attics.

Homeowners usually find out that they have a drywood termite problem when they notice the gritty fecal pellets on the floor or on countertops, windowsills, inside cabinets or drawers of their home.

Common control methods include wood replacement, borate wood treatments, spot treatment with termiticides, fumigation (for extensive infestations), spot treatment with termiticides, and heat.

This is a photograph of eastern subterranean termite wood damage.

Eastern subterranean termites:

- feed in the soft portion of the wood (springwood) going with the grain so that in cross-section the wood has a kind of circular or semi-circular pattern
- create galleries in the wood wherein they bring in soil and moisture
- feed on anything containing cellulose (includes drywall paper facing; Kraft paper facing on insulation, etc.)
- can consume one pound of wood per day (about one and a half twenty-four inch wooden grade stakes) per each active (infestation) colony

Note to Instructor:

A good visual, to illustrate this last point, would be to hold two, 24-inch wooden grade stakes in your hand. You might also have a plastic grade stake as a visual to show the participants that these reusable plastic stakes are now available.

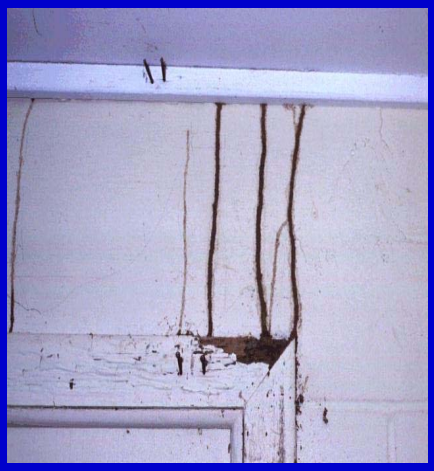
Another good visual would be a piece of eastern subterranean termite damaged wood.

[A little story (true)…A man goes to sleep in his bed one night. As he turns over in his sleep, the bed collapses. What happened?

The builder left a grade stake in the area of the slab under the man's bedroom—right below one of the bed posts. Subterranean termites used the grade stake as a highway; the termites traveled through the carpeting and into his bed post…and eventually the entire bed frame.]

Mud Tubes

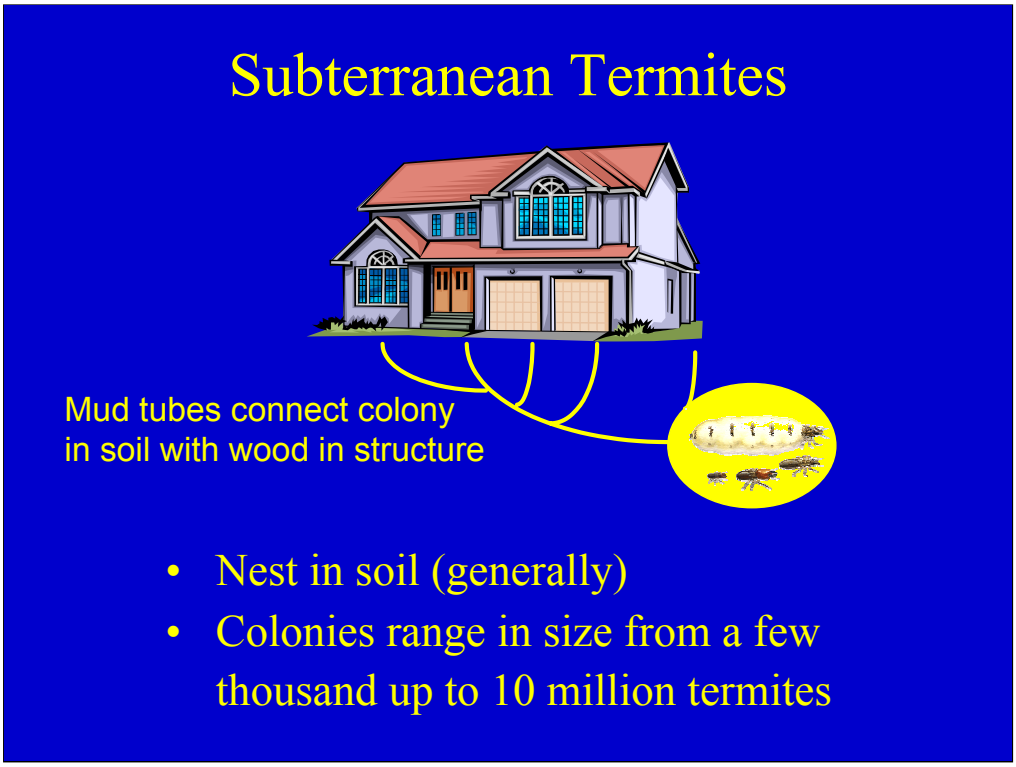
- Entry into buildings
- Protection from
  - Desiccation
  - Predators



Subterranean termites build mud tubes that protect themselves from desiccation and predation, as a common method to travel above ground. These tubes are made out of mud and fecal material.

The presence of mud tubes, generally on an interior wall or on the outside foundation wall, is often the first indication of an infestation by eastern subterranean termites. Building tubes is labor intensive, requiring termites to haul sand a few grains at a time to extend or widen the mud tube.

Mud tubes can range from less than ¼ inch to 6 or 7 inches wide, depending on species and termite activity. Generally, the more the tube is used, the wider it is because it has to accommodate more termites. The length of the tube is highly variable.



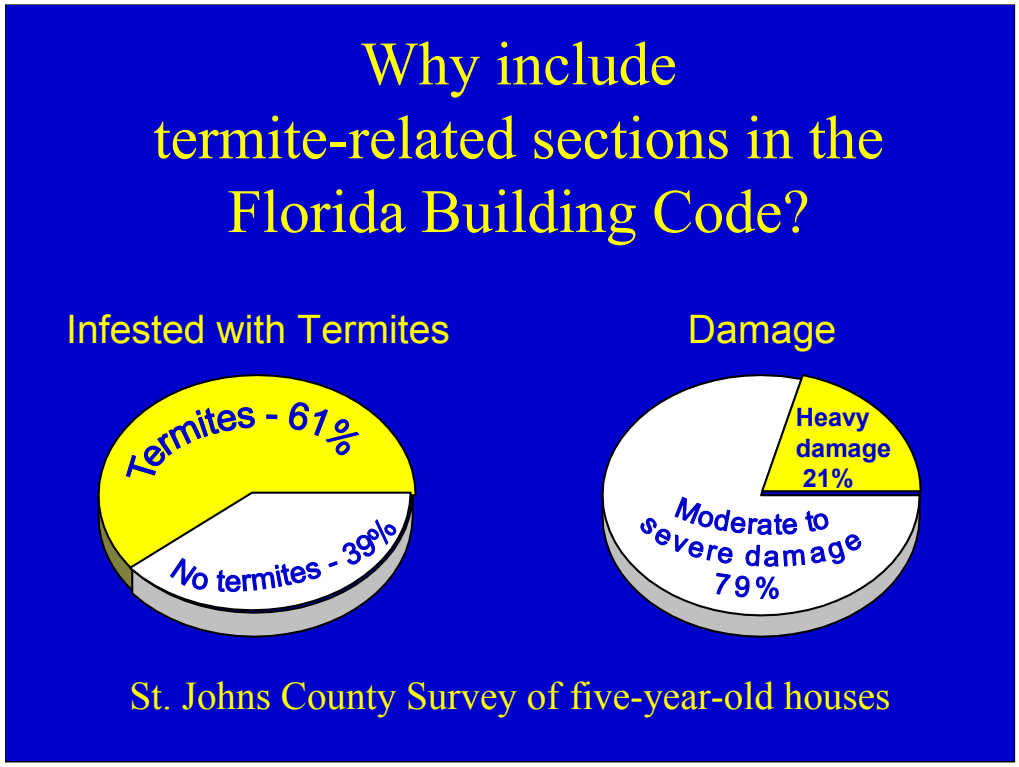
In summary, subterranean termites:

- predominantly construct mud tubes to connect their colony in the soil with wood in the structure.
- usually nest in the soil (Note: All subterranean termites can form aerial colonies under the right conditions. Formosan subterranean termites tend to form them more than other subterranean termites. Aboveground infestations (aerial nests) are almost exclusively found in structures with chronic leaking water or on flat roofs in shaded areas where dead leaves and other debris have allowed moisture to accumulate.)
- have colonies that generally range in size from a few thousand up to 10 million members.
- usually swarm January to May mid-day; however, their swarming season and time of day varies with the species. For example, Formosans swarm around sunset on warm, humid summer evenings (from around April through July) when there is almost no wind.
- pair up after flight. The termites break off their wings shortly after landing, and the new king and queen generally start a new colony together by excavating a small chamber in a crevice or a spot in soft soil.

Cracks in foundation

Take a credit card out of your wallet. Turn it on edge and rub a piece of paper with the edge. Now, look at the impression the card left on the paper. Eastern subterranean termite workers only need a crack about the width of a credit card (1/64 inch) to gain entry into a structure through a cracked slab or hidden space.

Areas especially prone for termites are wherever there are ninety degree angles (this is where cracks are most likely to occur).

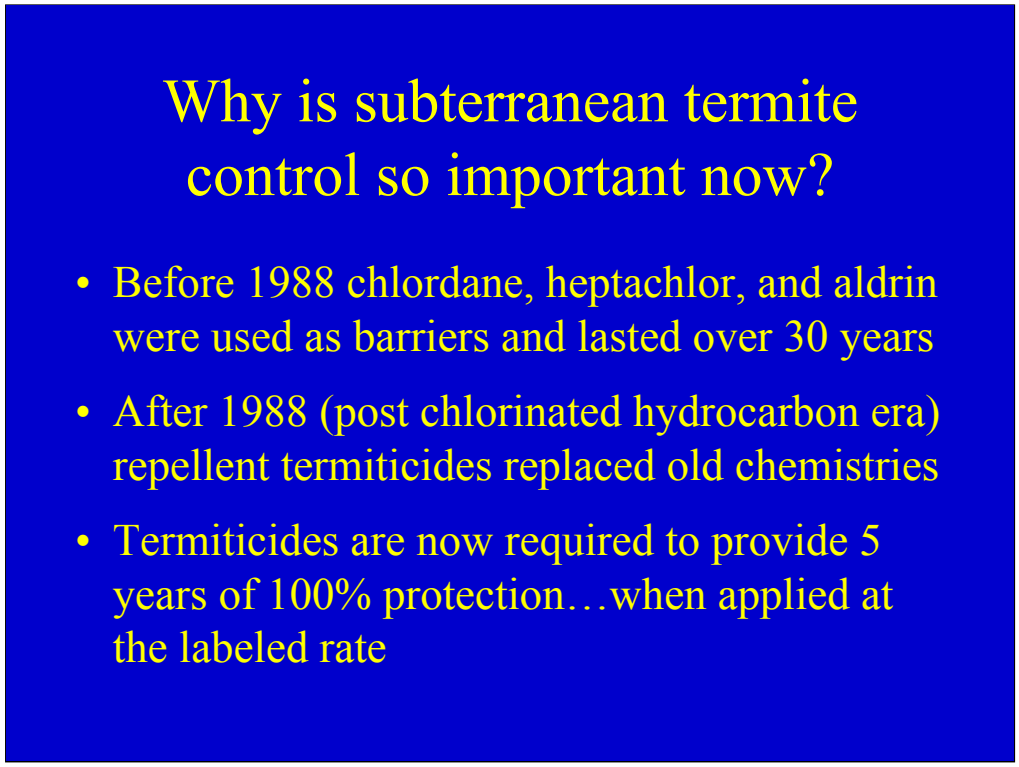


Why are there sections of the Florida Building Code specifically addressing termites?

There are several reasons. Here are a couple:

- The Florida Pest Control (now Management) Association reported that in a survey a few years ago, of Florida pest control companies, most were experiencing pretreatment failures even when the termiticide was properly applied.
- And, a study done in St. Johns County, south of Jacksonville, revealed that sixty-one percent of responses from homeowners of five year old homes reported their homes had a termite infestation – of these, twenty-one percent reported having heavy damage and seventy-nine percent reported moderate to severe damage.

[Note: St. Johns County changed their Building Code to include a stricter section on termites following the report of this research. In a study completed in 2000, the new code resulted in a 50 percent reduction in termite infestation, year four (age of home).]

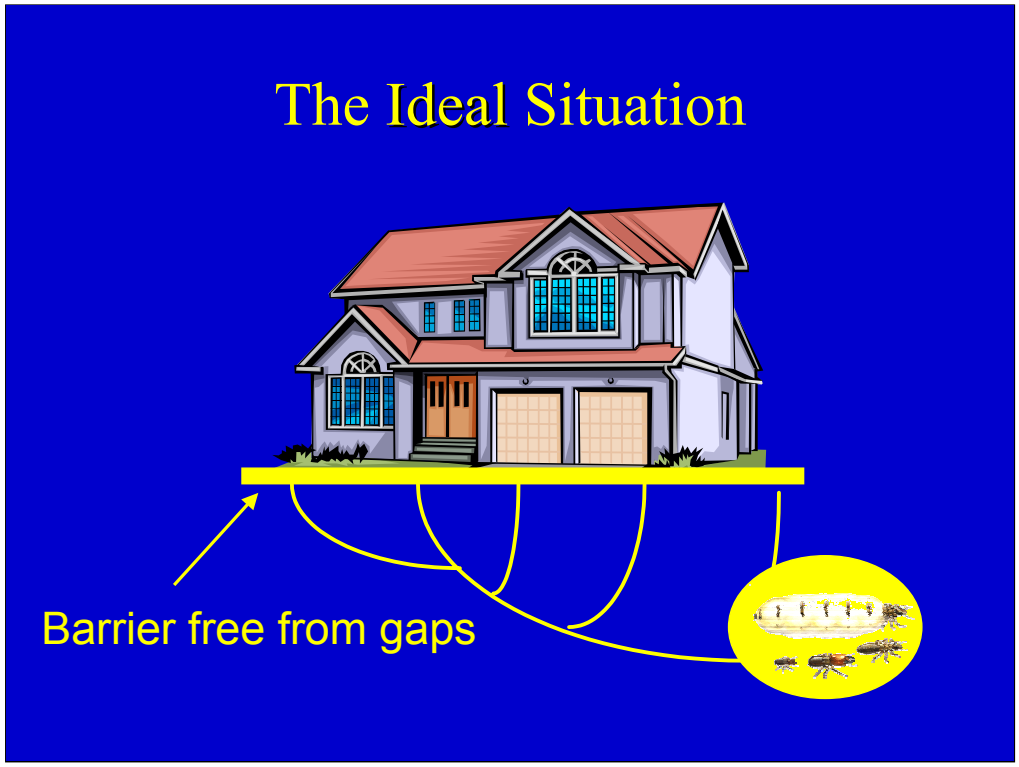


Why is subterranean termite control so important now?

Today, chemical pretreatment of the soil underneath and around the structure is still the primary method used.

- It is important to remember that before 1988 chlordane, heptachlor, and aldrin (chlorinated hydrocarbons) were used and barriers lasted over thirty years.
- These products were replaced after 1988 (post chlorinated hydrocarbon era) with repellent termiticides…considered more environmentally acceptable and less risk for human health.
- Materials registered after chlordane and heptachlor are required to provide 5 years of 100% protection in the USDA/Forest Service Gulfport trials when applied at the labeled rate.

Note: The main concern, of which you should be aware, is that the Gulfport trials are not always indicative of the conditions a pest management professional (PMP) encounters under real-life conditions. Therefore, termiticides may be effective for longer or shorter periods than mentioned here. [In addition, the termiticides appear to be more difficult to apply effectively due to changing construction methods.]

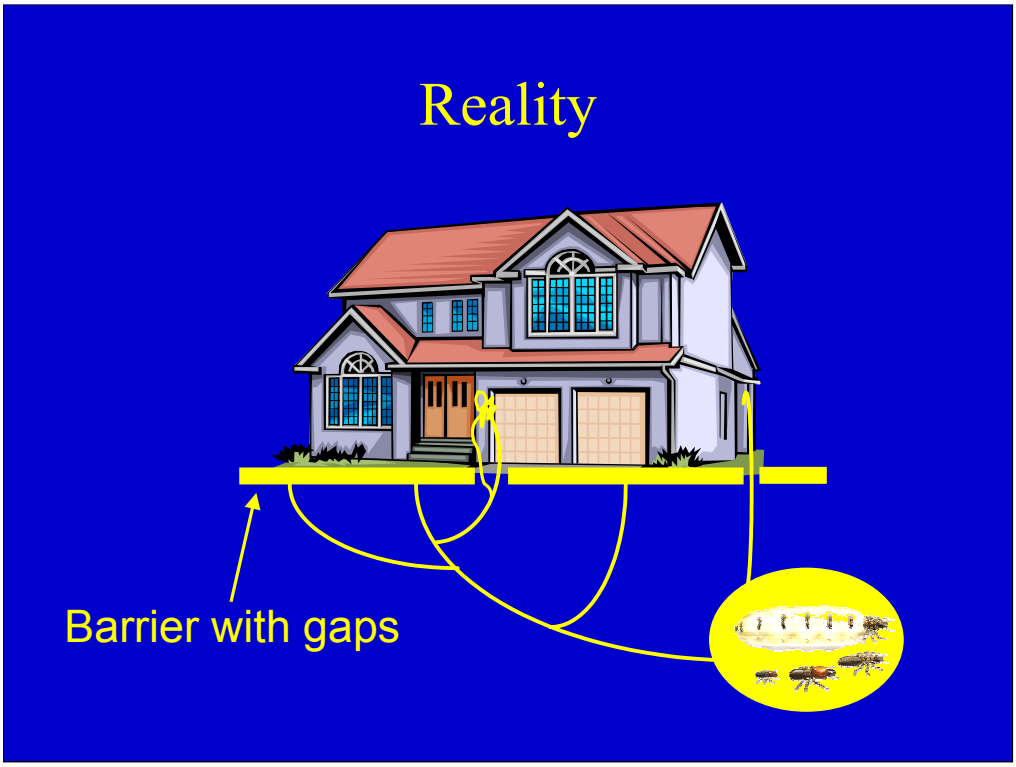


The ***ideal*** situation would be to create a barrier all the way under and around the home free from gaps.

With liquid termiticides this is accomplished through the use of horizontal and vertical treatment methods. Proper application of soil-applied termiticides requires that the material be applied to create a continuous barrier between the structure and termite colonies in the soil. Creation of this barrier requires **at least** two separate applications during construction (pretreatments), and, may require additional applications depending on the construction. These applications are:

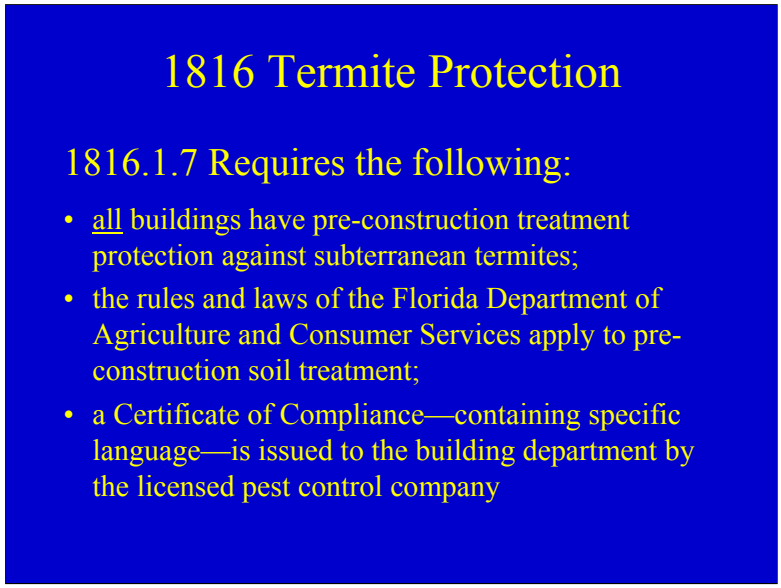
- under the slab (horizontal barrier)
- to the perimeter of the foundation (vertical barrier) outside foundation wall
- band application (minimum 1 foot) under any adjacent slabs such as driveways, patios, walkways, etc.

This will be discussed, in more detail, later in the presentation.



The reality is, however, that you end up with a barrier ***with*** gaps.

It is almost impossible to build a house without gaps in treatment.



Note to Instructor:

Beginning with the next slide, termite-related Florida Building Code (FBC) slides (Florida Building Code Sections) are in order as if you were building a structure (as close as possible) with the exceptions beginning with slide #65 (i.e., "Special Situations"). Termite-related Florida Building Code Sections, in addition to being included in the Participant Version of the PowerPoint presentation, are included in the Participant Guide under the heading of "Building Practices and Standards". However, the termite-related Florida Building Code Sections under the heading of "Building Practices and Standards" appear in the following order: permits and inspections; exterior siding (wall coverings); weather protection (note that irrigation/sprinkler systems are included); foundations and retaining walls; foundation masonry; construction practices; insulated concrete forms; wood; and foam plastic insulation.

"FBC Chapter 18: Foundations and Retaining Walls

FBC 1816 TERMITE PROTECTION

1816.1.7 If a registered termiticide formulated and registered as a bait system is used for subterranean termite prevention, §1816.1.1 through §1816.1.6 do not apply; however, a signed contract assuring the installation, maintenance and monitoring of the baiting system for a minimum of five years from the issue of the Certificate of Occupancy shall be provided to the building official prior to the pouring of the slab, and the system must be installed prior to final building approval. If the baiting system directions for use require a monitoring phase prior

to installation of the pesticide active ingredient, the installation of the monitoring phase components shall be deemed to constitute installation of the system.

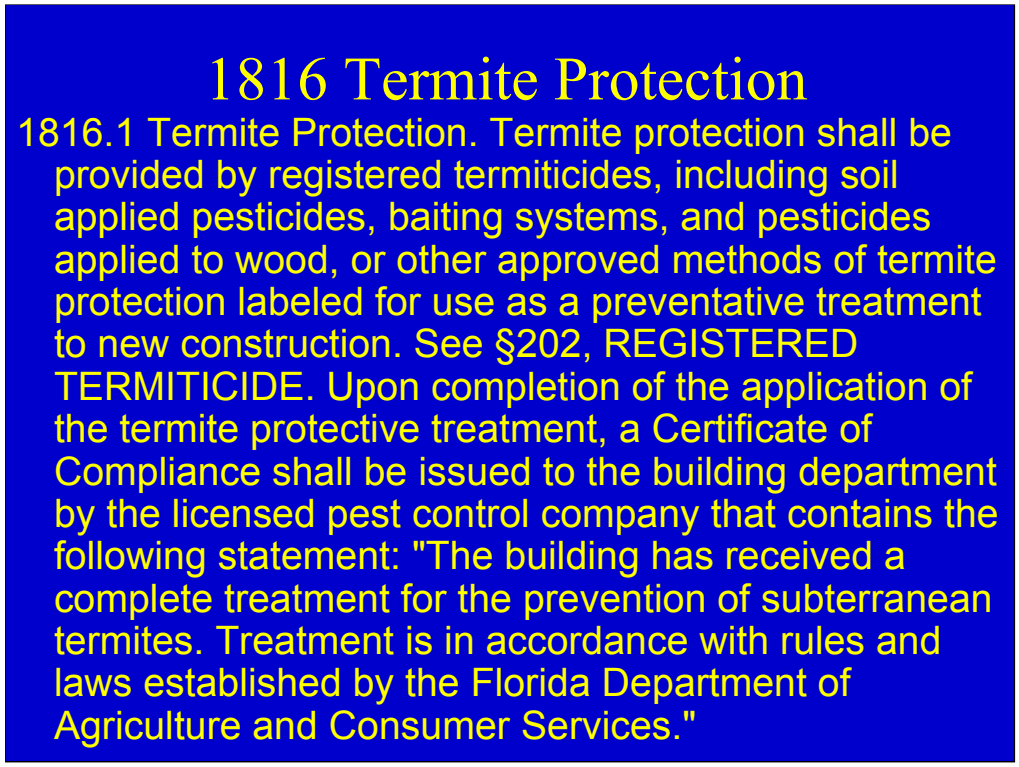
Rules and laws established by the Florida Department of Agriculture and Consumer Services generally refer to Chapters 487 (Pesticides) and 482 (Pest Control) of the Florida

Now, let's go through the Florida Building Code, extracting those sections dealing with termites, in the order of building a home (as close as possible).

"Florida Building Code (FBC) Chapter 1: Administration

FBC 104 PERMITS

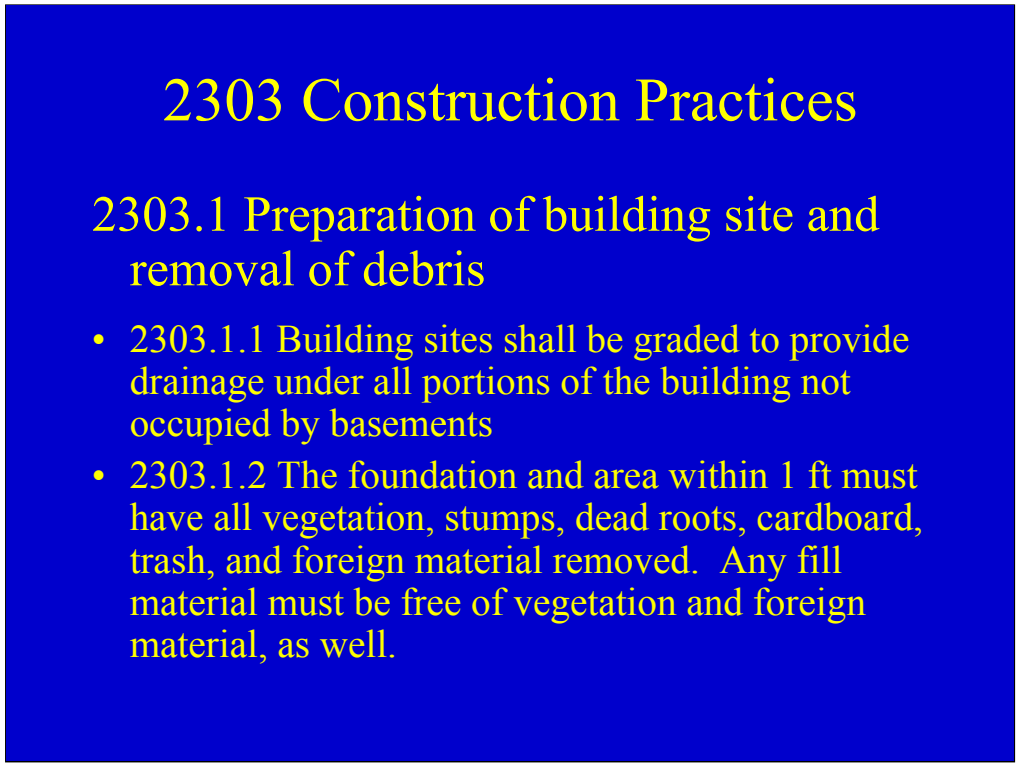
> FBC 104.2.6 Certificate of Protective Treatment for prevention of termites. A weather resistant job site posting board shall be provided to receive duplicate Treatment Certificates as each required protective treatment is completed, providing a copy for the person the permit is issued to and another copy for the building permit files. The Treatment Certificate shall provide the product used, identity of the applicator, time and date of the treatment, site location, area treated, chemical used, percent concentration and number of gallons used, to establish a verifiable record of protective treatment. If the soil chemical barrier method for termite prevention is used, final exterior treatment shall be completed prior to final building approval."
>
> > Requires posting of applications. No "final approval" if all applications not made, including vertical barrier if soil chemical barrier method is used.



"FBC Chapter 18: Foundations and Retaining Walls

FBC 1816 TERMITE PROTECTION

1816.1 Termite Protection. Termite protection shall be provided by registered termiticides, including soil applied pesticides, baiting systems, and pesticides applied to wood, or other approved methods of termite protection labeled for use as a preventative treatment to new construction. See §202, REGISTERED TERMITICIDE. Upon completion of the application of the termite protective treatment, a Certificate of Compliance shall be issued to the building department by the licensed pest control company that contains the following statement: "The building has received a complete treatment for the prevention of subterranean termites. Treatment is in accordance with rules and laws established by the Florida Department of Agriculture and Consumer Services."



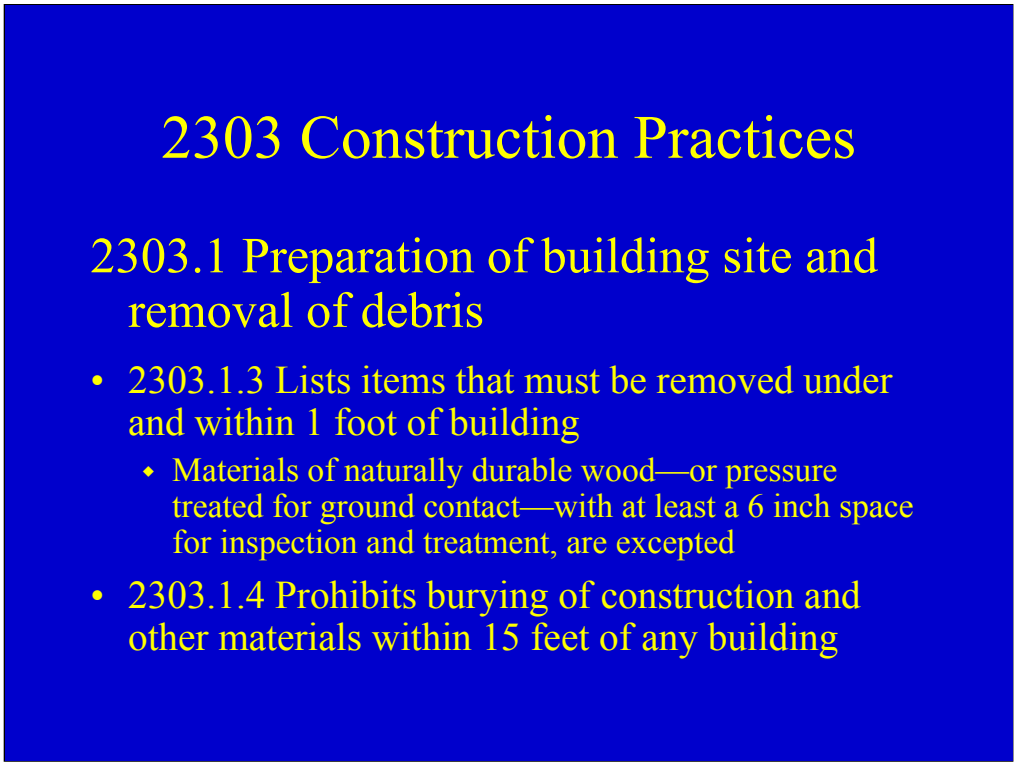
"FBC Chapter 23: Wood

2303 CONSTRUCTION PRACTICES

2303.1 Preparation of building site and removal of debris

2303.1.1 All building sites shall be graded to provide drainage under all portions of the building not occupied by basements.

2303.1.2 The foundation and the area encompassed within 1 foot (305 mm) therein shall have all vegetation, stumps, dead roots, cardboard, trash, and foreign material removed and the fill material shall be free of vegetation and foreign material. The fill shall be compacted to assure adequate support of the foundation."



"FBC Chapter 23: Wood

FBC 2303 CONSTRUCTION PRACTICES

FBC 2303.1.3 After all work is completed, loose wood and debris shall be completely removed from all under the building and within one foot (305 mm) thereof. All wood forms and supports shall be completely removed. This includes, but is not limited to: wooden grade stakes, forms, contraction spacers, tub trap boxes, plumbing supports, bracing, shoring, forms, or other cellulose-containing material placed in any location where such materials are not clearly visible and readily removable prior to completion of the work. Wood shall not be stored in contact with the ground under any building.

Exception:

Materials which are of naturally durable wood or are pressure treated for ground contact, and which are installed with at least 6 inches (152 mm) clear space from the structure to allow for inspection and treatment for termites.

FBC 2303.1.4 In order to reduce chances of termite infestation, no wood, vegetation, stumps, dead roots, cardboard, trash, or other cellulose-containing material shall be buried on the building lot within 15 feet (4.6 m) of any building or the position of any building proposed to be built."

Foreign cellulose materials such as stumps, cardboard, form boards, paper facing on drywall and the like can become food sources for termites and thus bring more termites to the vicinity.

Note to Instructor:

Be certain to review the contents of FBC 2303.1.3 with the participants as this is an important section of the Florida Building Code.

Another termite highway grand opening…form board left below grade.

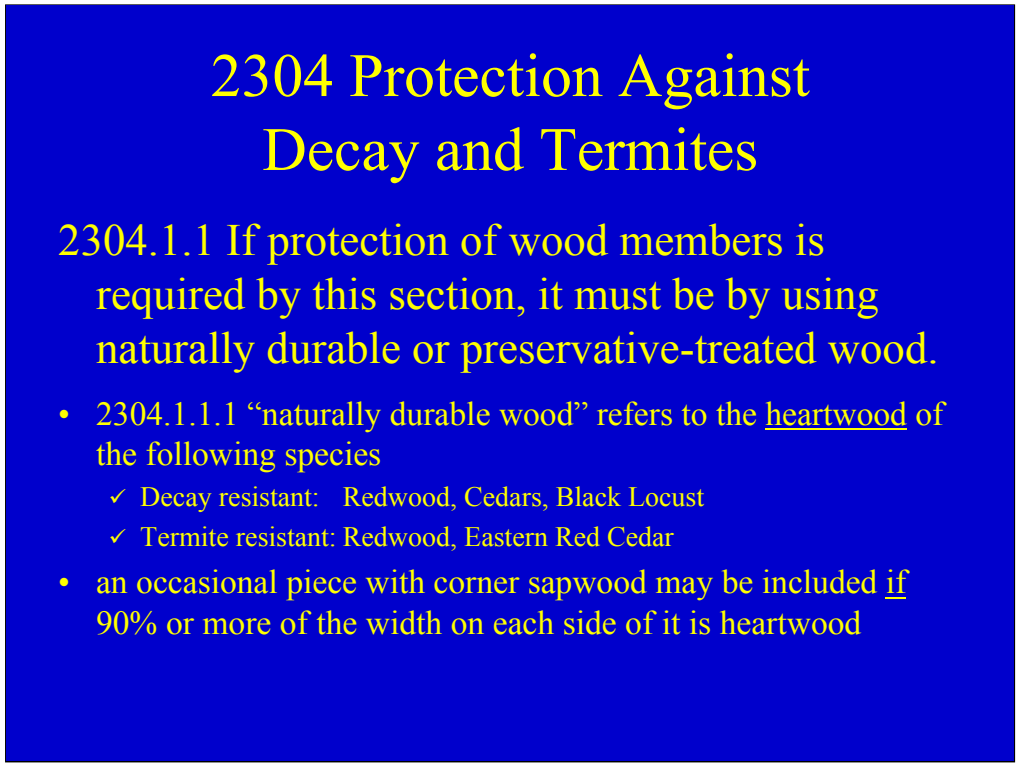
Also, notice all the cellulose containing waste material in the area (that might be later covered by soil).

Both are violations of the Florida Building Code, if left as is or covered.

Here's a piece of untreated wood that was left lying on the ground just outside the structure. Does this violate the Florida Building Code? Yes

Termites swarming at certain times of the year are generally the first clue to the homeowner that they have a problem.

What if the homeowners aren't home to see the swarming … or the wings are blown away by the wind, etc.?



"FBC Chapter 23: Wood

2304 PROTECTION AGAINST DECAY AND TERMITES

2304.1 Protection

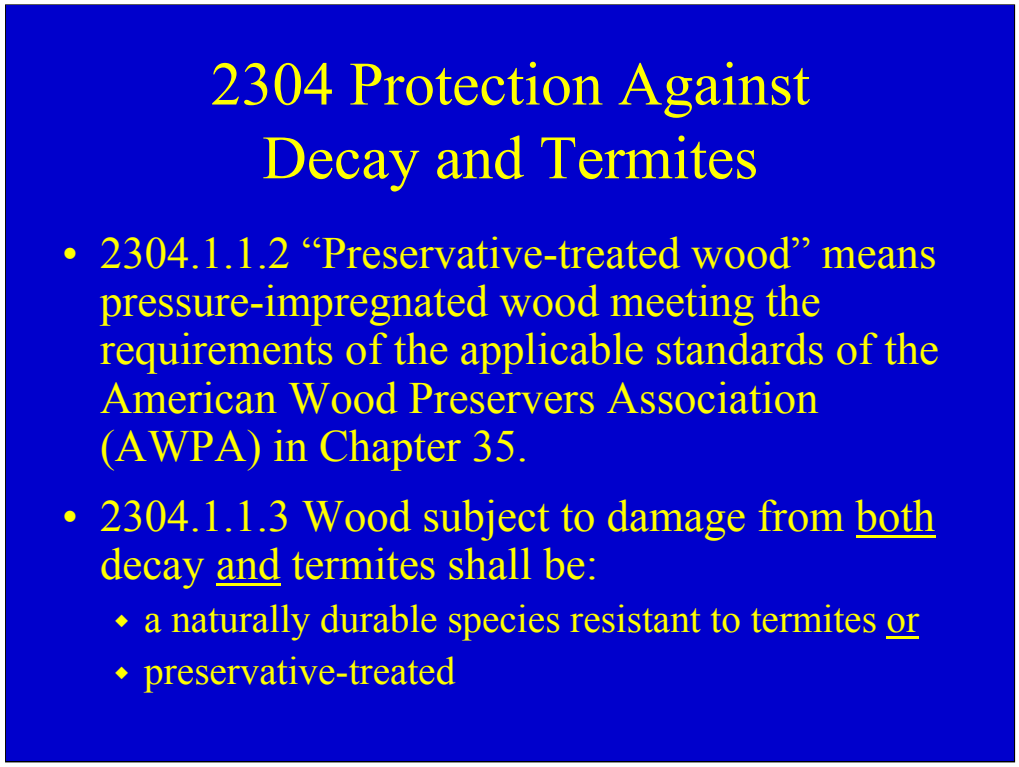
2304.1.1 Where protection of wood members is required by this section, protection shall be provided by using naturally durable or preservative-treated wood.

2304.1.1.1 The expression "naturally durable wood" refers to the heartwood of the following species with the exception that an occasional piece with corner sapwood may be included if 90% or more of the width of each side on which it occurs is heartwood:

Decay resistant – Redwood, Cedars, Black Locust.

Termite resistant – Redwood, Eastern Red Cedar."

Requires preservative or "naturally durable" wood in certain areas ("where protection of wood members is required by this section").

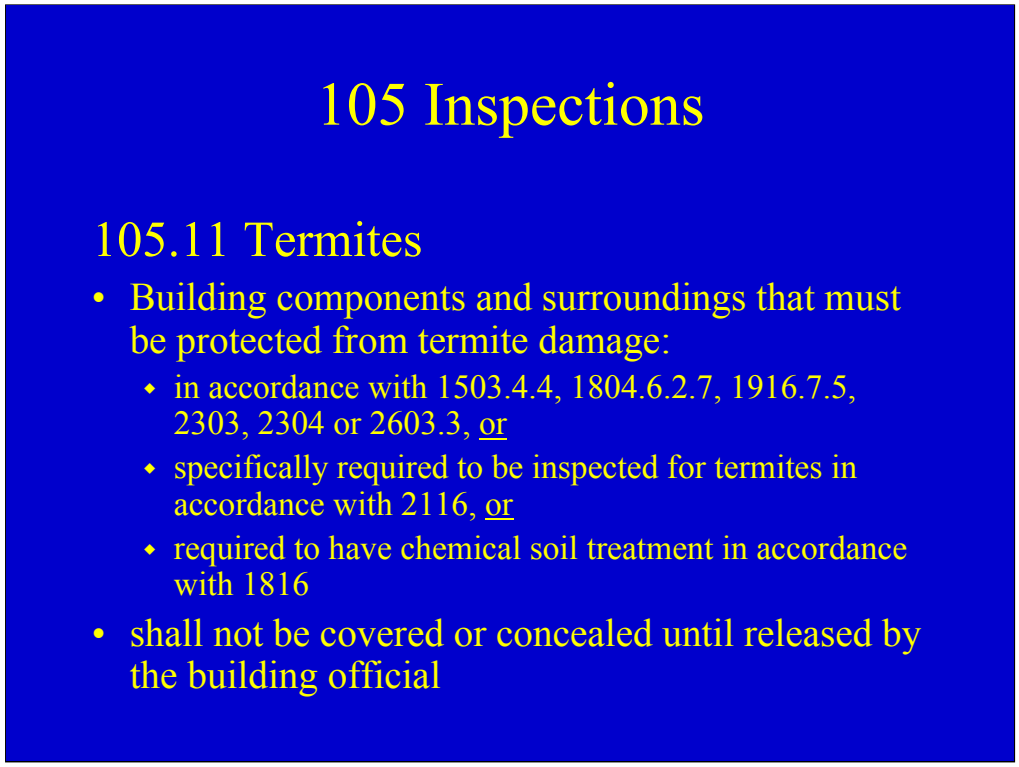


"FBC Chapter 23: Wood

2304 PROTECTION AGAINST DECAY AND TERMITES

2304.1.1.2 The expression "preservative-treated wood" refers to pressure-impregnated wood meeting the retention, penetration and other requirements applicable to the species, products, treatment and conditions of use in the applicable standards of the American Wood Preservers Association (AWPA) in Chapter 35.

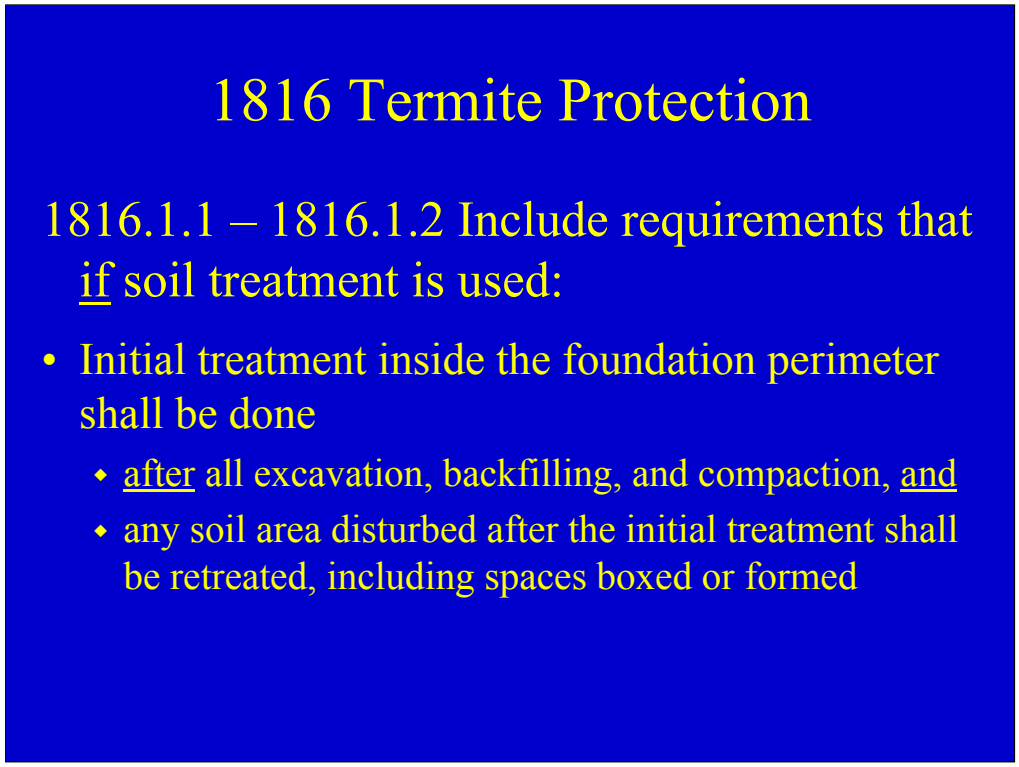
2304.1.1.3 Wood subject to damage from both decay and termites shall be a naturally durable species resistant to termites or preservative-treated."



"FBC Chapter 1: Administration

FBC 105 INSPECTIONS

FBC 105.11 Termites. Building components and building surroundings required to be protected from termite damage in accordance with 1503.4.4, 1804.6.2.7, 1916.7.5, 2303, 2304 or 2603.3, specifically required to be inspected for termites in accordance with 2116, or required to have chemical soil treatment in accordance with 1816 shall not be covered or concealed until the release from the building official has been received."



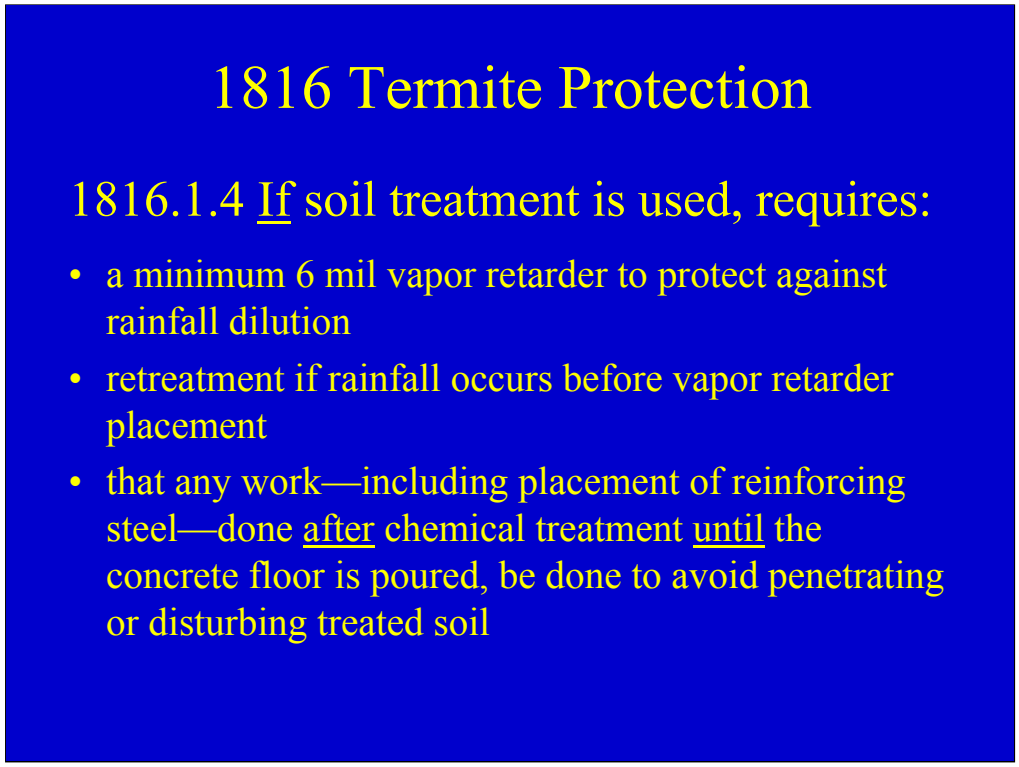
"FBC Chapter 18: Foundations and Retaining Walls

FBC 1816 TERMITE PROTECTION

1816.1.1 If soil treatment is used for subterranean termite prevention, the initial chemical soil treatment inside the foundation perimeter shall be done after all excavation, backfilling, and compaction is complete.

1816.1.2 If soil treatment is used for subterranean termite prevention, soil area disturbed after initial chemical soil treatment shall be retreated with a chemical soil treatment, including spaces boxed or formed."

If soil treatment is used, must be done after compaction and areas disturbed after initial treatment must be retreated.



"FBC Chapter 18: Foundations and Retaining Walls

1816 TERMITE PROTECTION

1816.1.4 If soil treatment is used for subterranean termite prevention, chemically treated soil shall be protected with a minimum 6 mil vapor retarder to protect against rainfall dilution. If rainfall occurs before vapor retarder placement, retreatment is required. Any work, including placement of reinforcing steel, done after chemical treatment until the concrete floor is poured, shall be done in such manner as to avoid penetrating or disturbing treated soil."

The 6-mil vapor retarder aids in avoiding displacement of the chemical termiticide.

Use care not to create any holes in the material…

A minimum 6-mil vapor retarder should be placed over the treated soil, following pretreatment, to reduce the likelihood of soil displacement --- and thus termiticide displacement.

Workers should minimize the amount of walking on treated soil and should try to walk flat-footed without digging their heels and toes into the soil. Even when walking on the vapor retarder, while installing reinforcement wire, the horizontal soil barrier can and is likely disturbed.

Avoid placing holes in the vapor retarder.

Construction crews often move the soil, after it has been pretreated, to relevel the grade or re-install plumbing (if plumbing lines are moved … a *very* common occurrence), and thereby destroy the chemical barrier.

Why is this a problem?

The termiticide pretreatment penetrates the soil very shallowly – only about *one-fourth to one-half inch* ***or less***. Disturbing the soil after pretreatment effectively leaves gaps in the treatment.

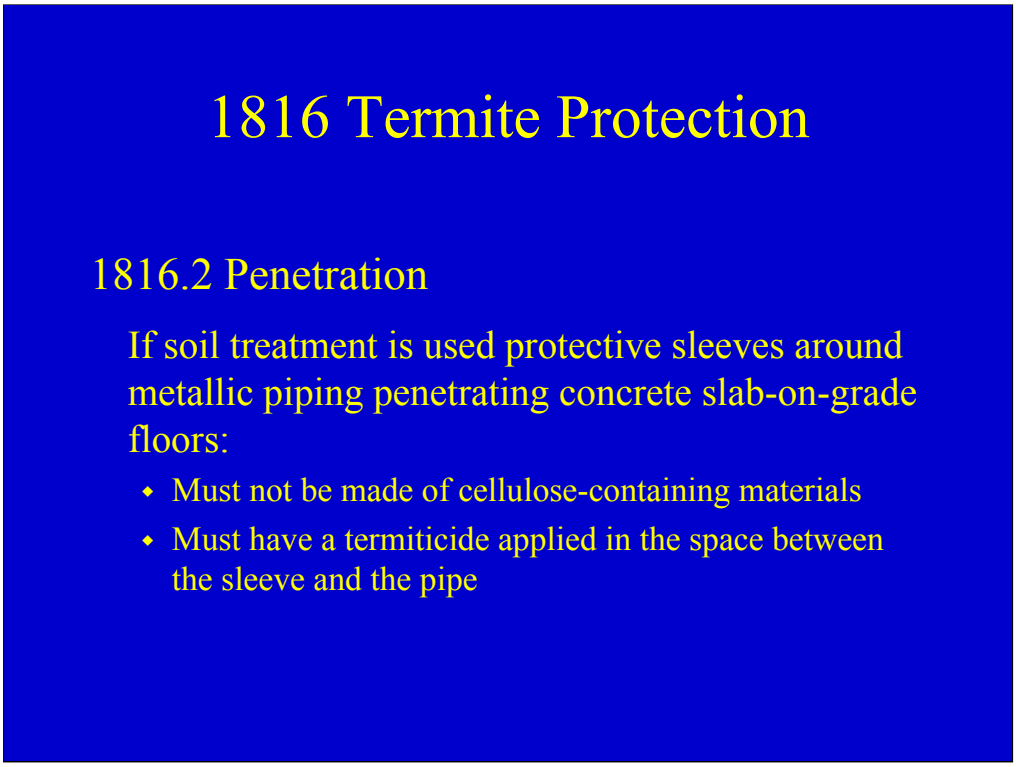
If using soil treatment and you have to relevel the grade, re-install plumbing, etc., the Florida Building Code requires that you call the pest management professional back to retreat the disturbed areas. This is especially important near cold/construction joints, expansion joints, and around slab penetrations (i.e., plumbing) or where cracks in slab will likely occur.

"FBC Chapter 18: Foundations and Retaining Walls

1816 TERMITE PROTECTION

> 1816.1.3 If soil treatment is used for subterranean termite prevention, space in concrete floors boxed out or formed for the subsequent installation of plumbing traps, drains or any other purpose shall be created by using plastic or metal permanently placed forms of sufficient depth to eliminate any planned soil disturbance after initial chemical soil treatment."

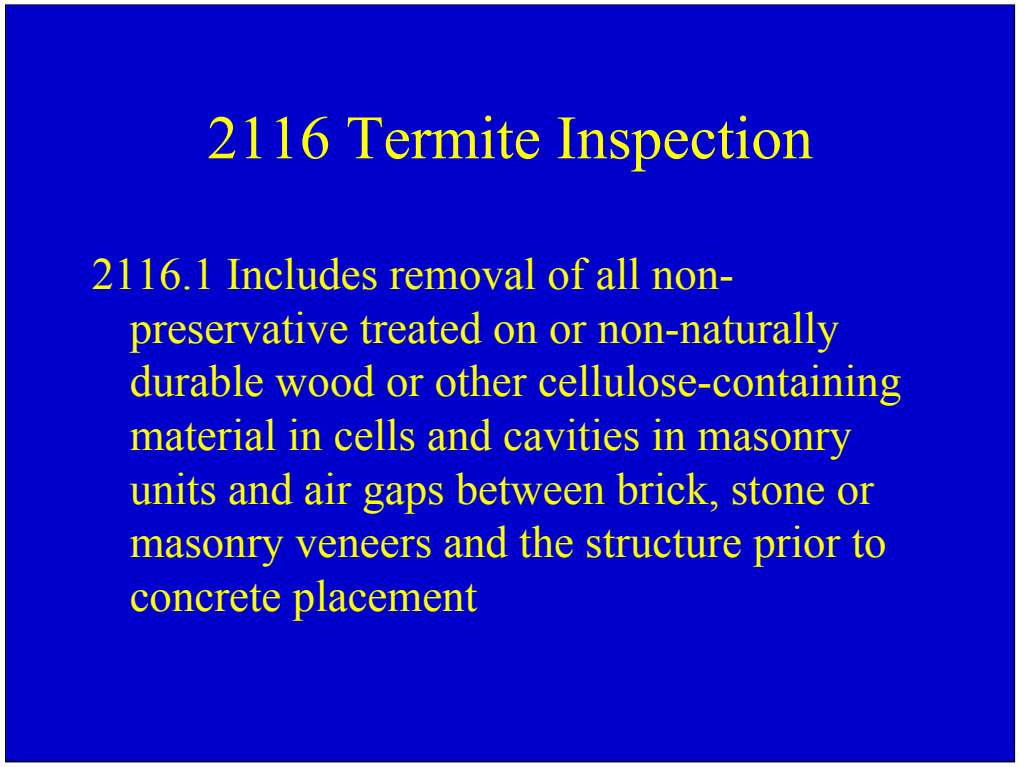
If soil treatment is used, forms and traps must be plastic or metal permanently placed forms.



"FBC Chapter 18: Foundations and Retaining Walls

FBC 1816 TERMITE PROTECTION

1816.2 Penetration. Protective sleeves around metallic piping penetrating concrete slab-on-grade floors shall not be of cellulose-containing materials and, if soil treatment is used for subterranean termite protection, shall receive application of a termiticide in annular space between sleeve and pipe.



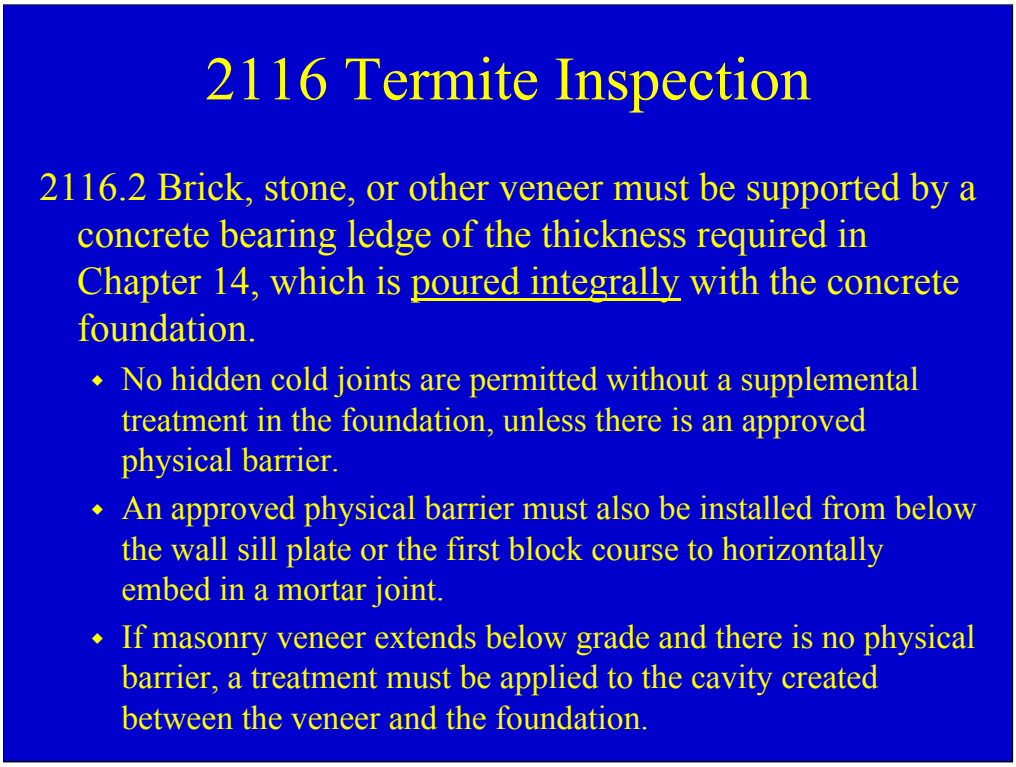
"FBC Chapter 21: Masonry

FBC 2116 TERMITE INSPECTION

2116.1 Cleaning. Cells and cavities in masonry units and air gaps between brick, stone, or masonry veneers and the structure shall be cleaned of all non-preservative treated or non-naturally durable wood, or other cellulose containing material prior to concrete placement.

Exception:

Inorganic material manufactured for closing cells in foundation concrete masonry units construction or clean earth fill placed in concrete masonry unit voids below slab level before termite treatment is performed."



"FBC Chapter 21: Masonry

FBC 2116 TERMITE INSPECTION

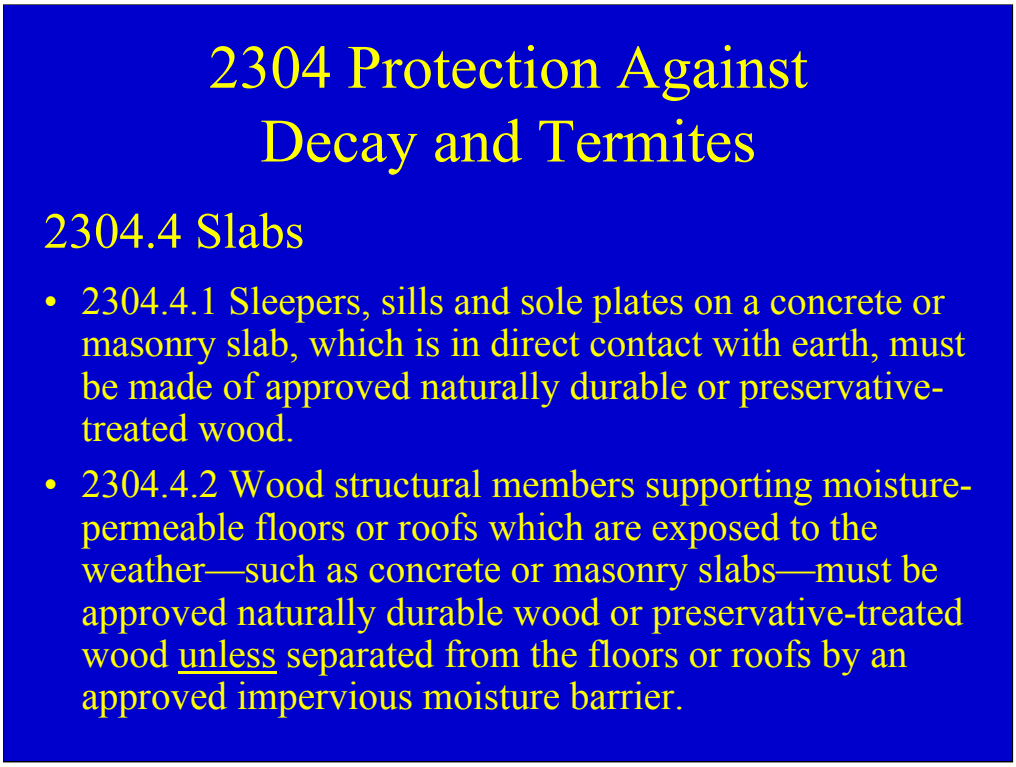
2116.2 Concrete bearing ledge.

Brick, stone, or other veneer shall be supported by a concrete bearing ledge of such thickness as required in Chapter 14, which is poured integrally with the concrete foundation. No supplemental concrete foundation pours which will create a hidden cold joint shall be used without supplemental treatment in the foundation unless there is an approved physical barrier. An approved physical barrier shall also be installed from below the wall sill plate or first block course horizontally to embed in a mortar joint. If masonry veneer extends below grade, a termite protective treatment must be applied to the cavity created between the veneer and the foundation, in lieu of a physical barrier.

Exception:

Veneer supported by a structural member secured to the foundation sidewall as provided in 1403, provided at least a six inch (152 mm) clear inspection space of the foundation sidewall exterior exists between the veneer and the top of any soil, sod, mulch or other organic landscaping component, deck, apron, porch, walk, or any other work immediately adjacent to or adjoining the structure."

[Note that there is an exception.]



"FBC Chapter 23: Wood

2304.4 Slabs

2304.4.1 Sleepers, sills and sole plates on a concrete or masonry slab which is in direct contact with earth shall be approved naturally durable or preservative-treated wood.

2304.4.2 Wood structural members supporting moisture permeable floors or roofs which are exposed to the weather, such as concrete or masonry slabs, shall be of approved naturally durable wood or preservative-treated wood unless separated from such floors or roofs by an approved impervious moisture barrier."

Hidden subterranean termite damage was found on this piece of wood used as siding under the threshold.

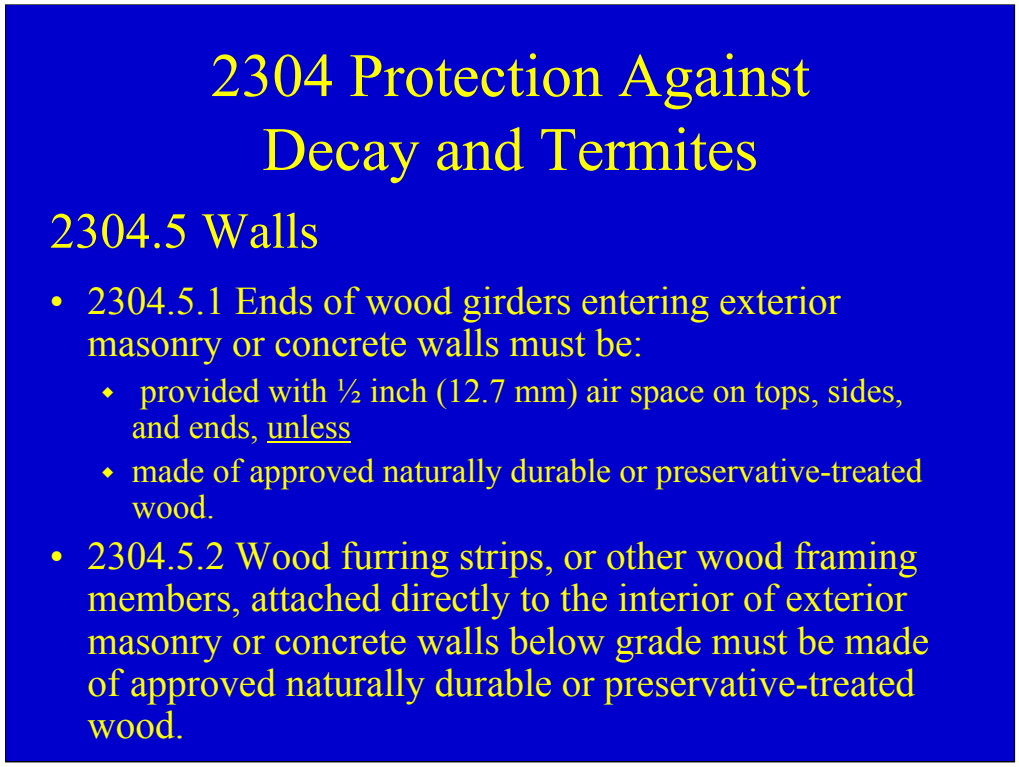
When turned over, the damage was quite apparent.

"FBC Chapter 23: Wood

2304 PROTECTION AGAINST DECAY AND TERMITES

2304.1 Protection

2304.1.2 Termite protection shall be provided by floor framing of naturally durable wood, preservative-treated wood, soil treatment or other approved methods."

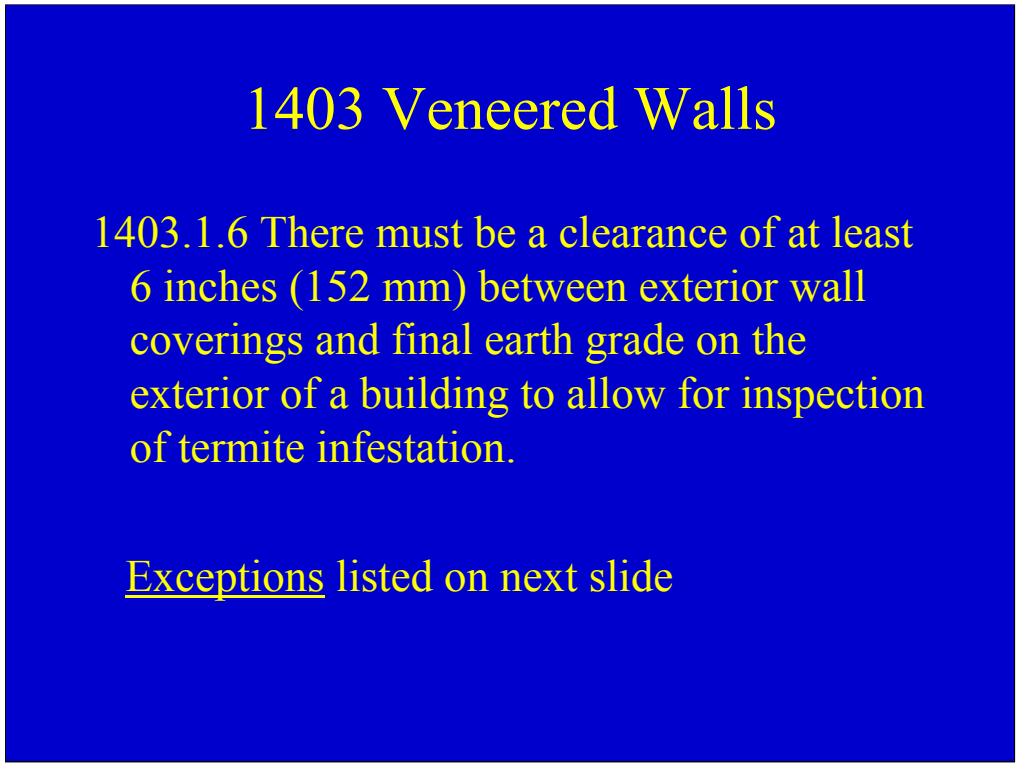


"FBC Chapter 23: Wood

2304.5 Walls

2304.5.1 Ends of wood girders entering exterior masonry or concrete walls shall be provided with ½-inch (12.7 mm) air space on tops, sides, and ends unless approved naturally durable or preservative-treated wood is used.

2304.5.2 Wood furring strips or other wood framing members attached directly to the interior of exterior masonry or concrete walls below grade shall be approved naturally durable or preservative-treated wood."



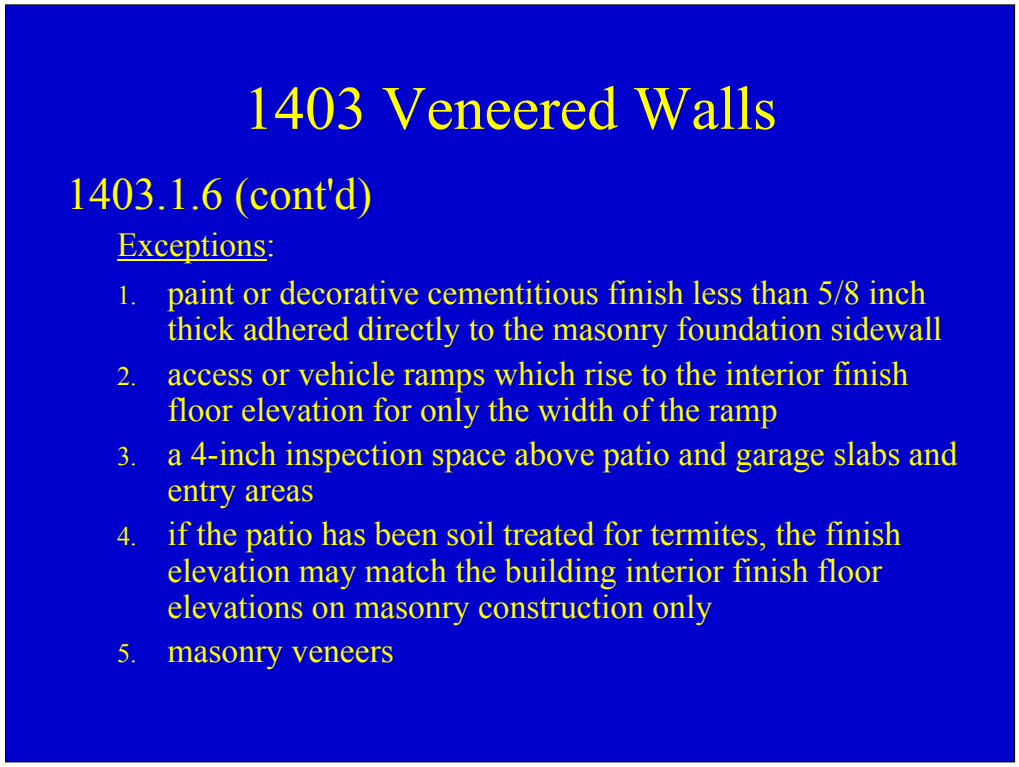
"FBC Chapter 14: Exterior Wall Covering

1403 VENEERED WALLS

1403.1.6 In order to provide for inspection for termite infestation, clearance between exterior wall coverings and final earth grade on the exterior of a building shall not be less than 6 inches (152 mm)."

Exceptions listed on next slide.

Requires space between final grade and siding for termite inspection.



FBC Chapter 14: Exterior Wall Covering

1403 VENEERED WALLS

1403.1.6 (cont.)

"Exceptions:

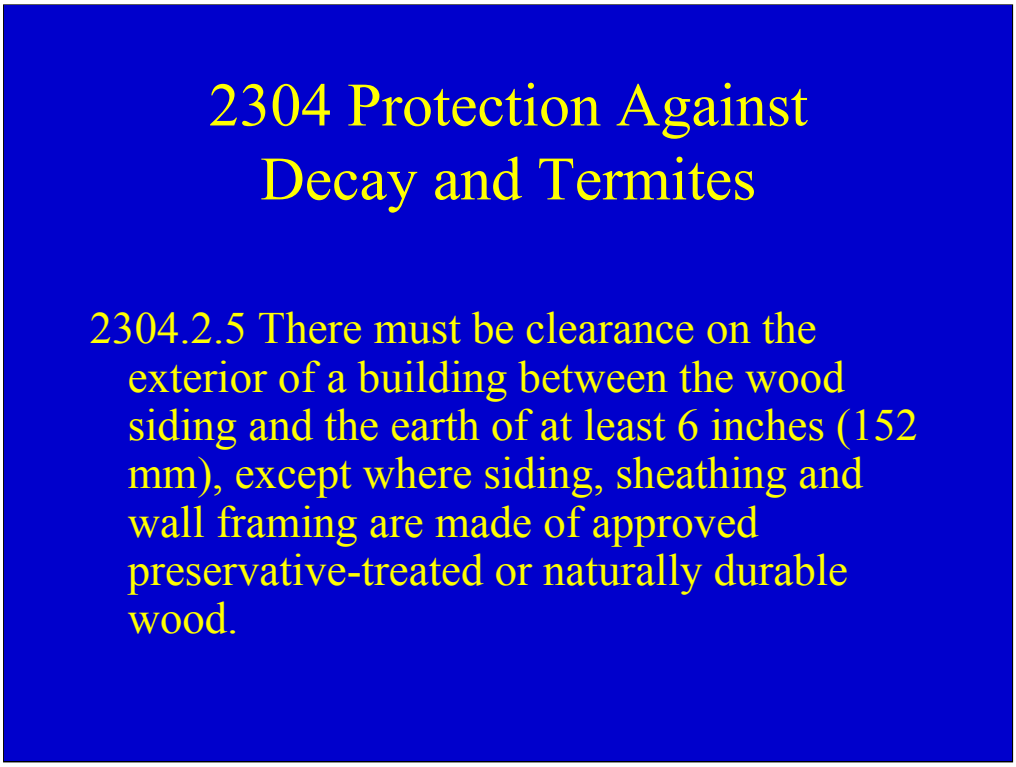
1. Paint or decorative cementitious finish less than 5/8 inch (17.1 mm) thick adhered directly to the masonry foundation sidewall.
2. Access or vehicle ramps which rise to the interior finish floor elevation for the width of such ramps only.
3. A 4-inch (102 mm) inspection space above patio and garage slabs and entry areas.
4. If the patio has been soil treated for termites, the finish elevation may match the building interior finish floor elevations on masonry construction only.
5. Masonry veneers."

Requires space between final grade and siding for termite inspection.

An example of what NOT to do.

In addition to grade problems (i.e., the grade appears to divert water toward the structure, rather than away) there does not appear to be a minimum six-inch clearance between the exterior wall covering and final earth grade.

Perhaps the most serious mistake builders can make is putting “foam” or stucco on wire lathe in direct contact with the soil. This has the double problem of giving the termites access into the home—and then hiding their infestation.



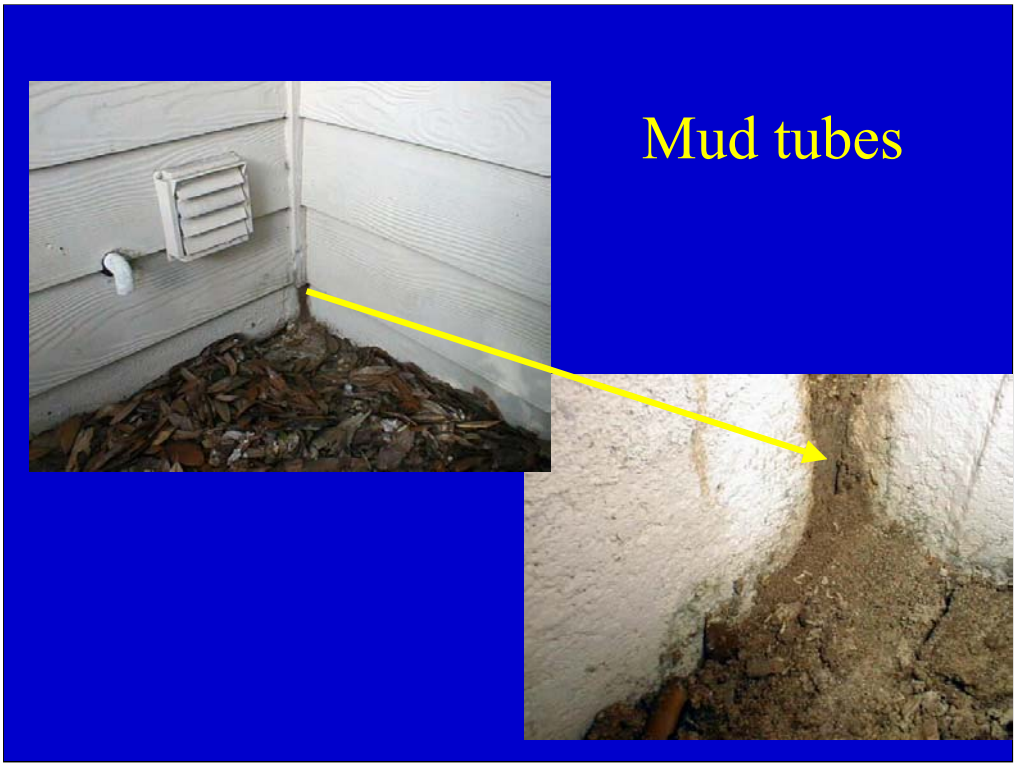
"FBC Chapter 23: Wood

2304.2 Wood in ground contact or exposed to the weather

2304.2.5 Clearance between wood siding and earth on the exterior of a building shall be not less than 6 inches (152 mm) except where siding, sheathing and wall framing are of approved preservative-treated wood or approved naturally durable wood."

Wood and siding (on right) in contact with soil

Siding below grade on right…as well as wood trim in corner also below grade. Would not meet code requirement.



What about non-structural supports extending into the ground?

The evidence of a mud tube is a good indicator of subterranean termite damage.

Although not directly exposed to the weather, the “weather condition” created by the nearby dryer exhaust fan causes high humidity and high temperature…elements conducive to subterranean termites.

Try to locate dryer exhaust vents and condensate lines as far apart as possible from each other.

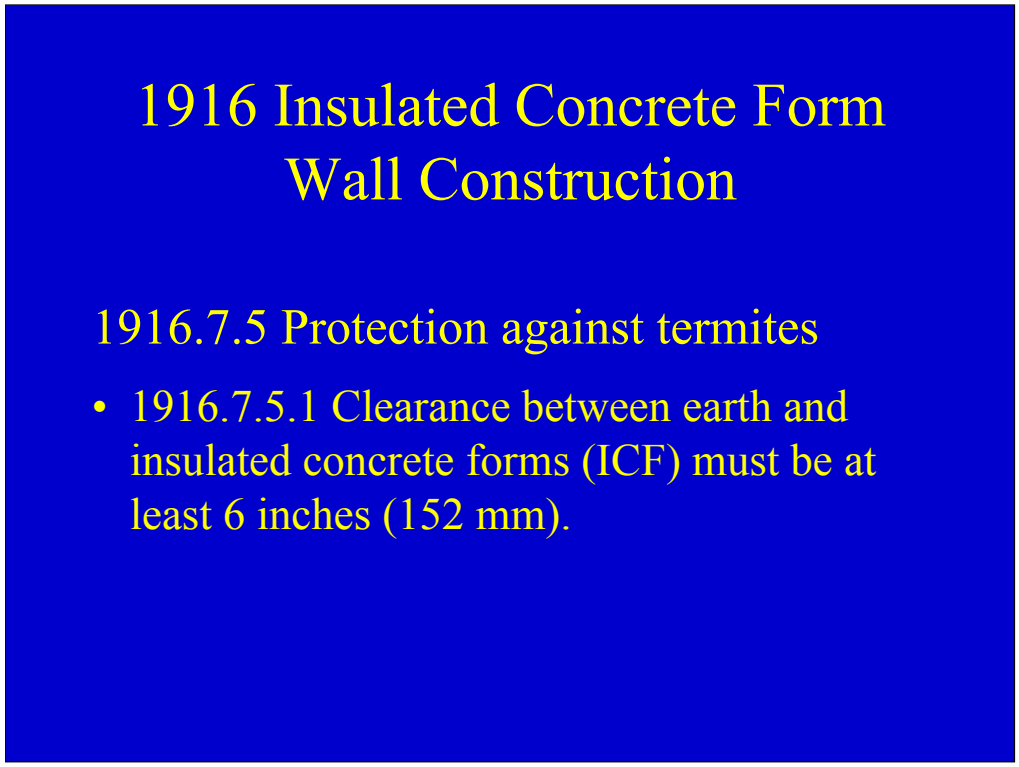
.

Slide illustrates six-inch inspection zone between exterior wall covering and final earth grade. The six-inch clearance is designed to allow for easy visual inspection for termite tunnels.

(Notice that this was originally greater than six inches and that the homeowner has been able to retain the six-inch inspection zone even after applying landscape mulch.)

Here's an example of an inspection zone. Notice the mud tubes?

Yes, they have a problem. But how long do you think it would have been before they found the termites if the wood siding had been extended to grade level or below?



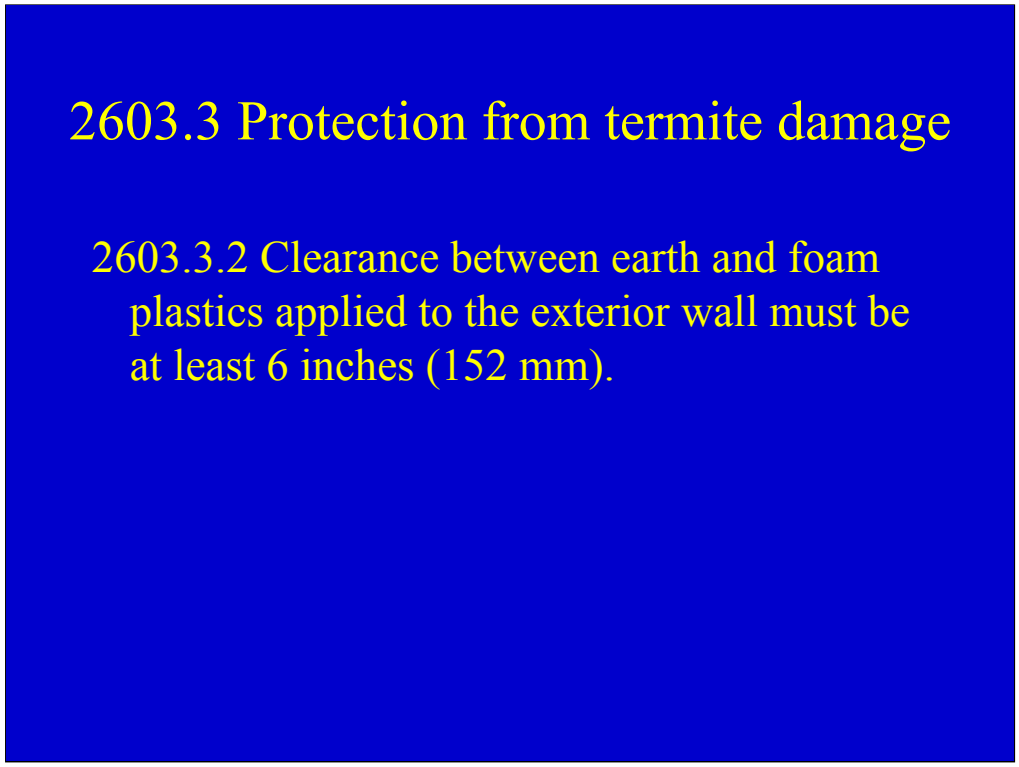
"FBC Chapter 19: Concrete

1916 INSULATED CONCRETE FORM WALL CONSTRUCTION

1916.7.5 Protection against termites

1916.7.5.1 Clearance between earth and insulated concrete forms (ICF) shall be not less than 6 inches (152 mm)."

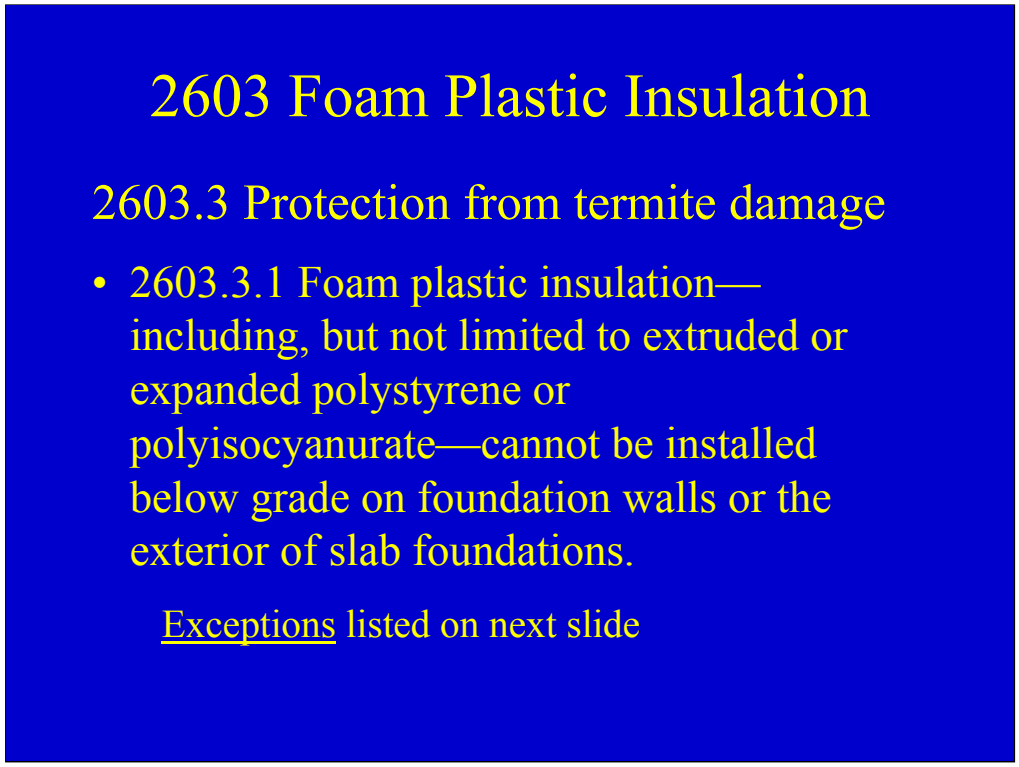
The six-inch clearance is designed to allow for easy visual inspection for termite tunnels.



"FBC Chapter 26: Plastic

2603.3 Protection from termite damage

2603.3.2 Clearance between earth and foam plastics applied to the exterior wall shall be not less than 6 inches (152 mm)."



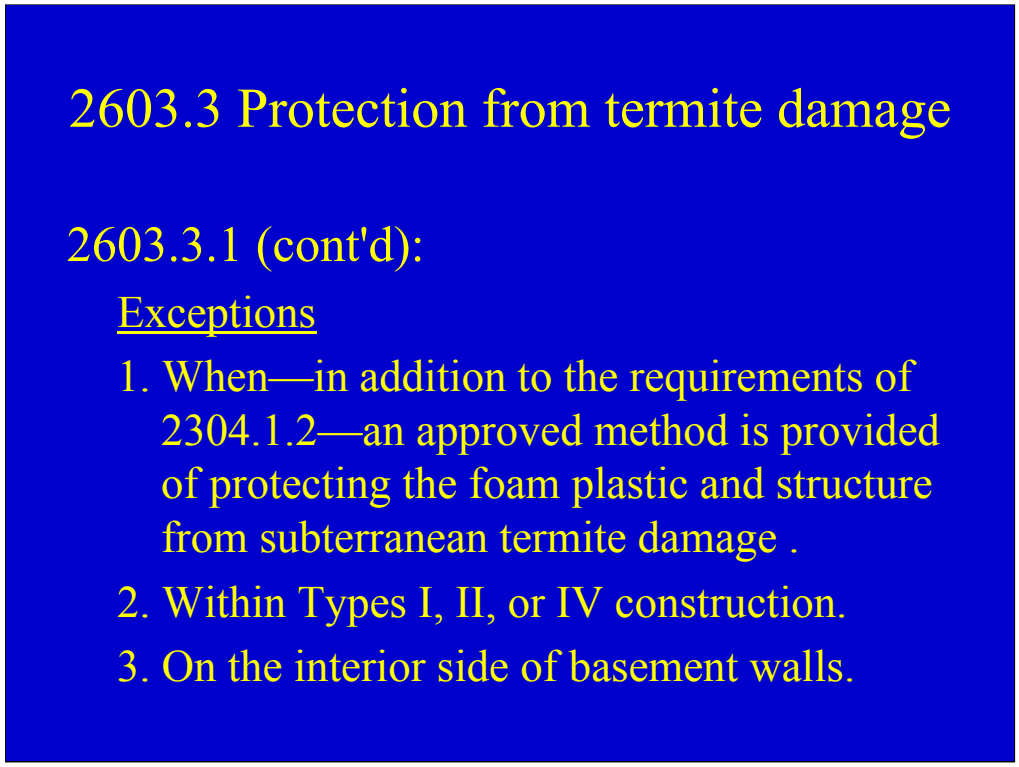
"FBC Chapter 26: Plastic

2603 FOAM PLASTIC INSULATION

2603.3 Protection from termite damage

2603.3.1 Foam plastic insulation including, but not limited to, extruded or expanded polystyrene or polyisocyanurate shall not be installed below grade on foundation walls or below grade on the exterior of slab foundations.

Exceptions: (on next slide)



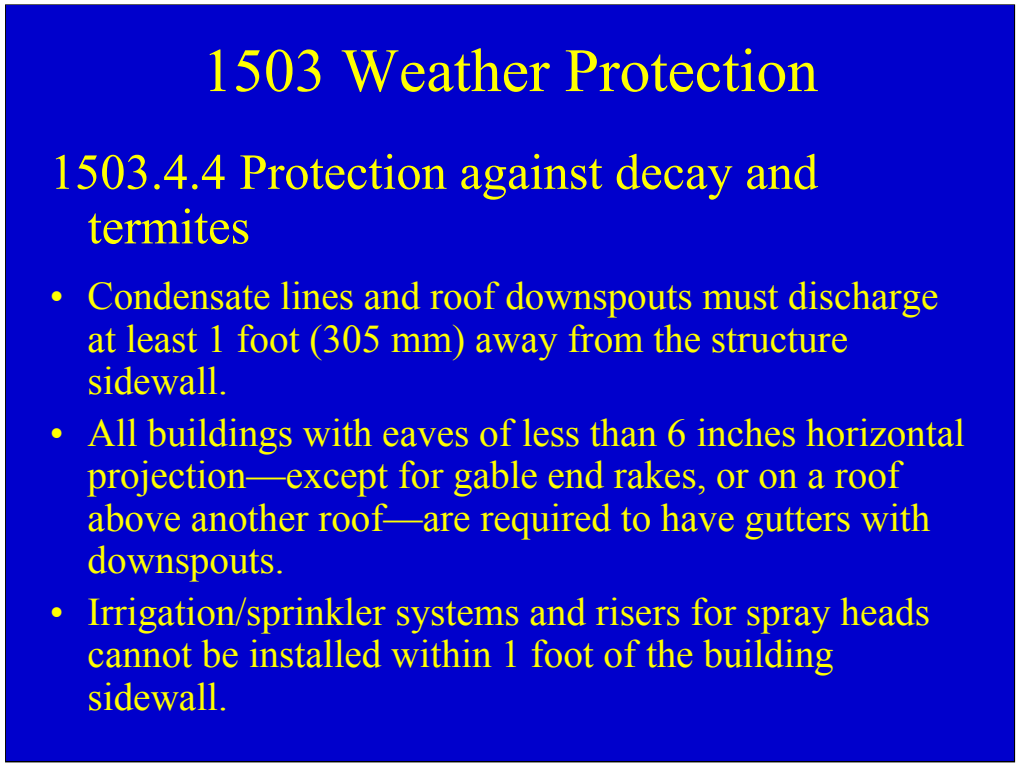
FBC Chapter 26: Plastic

2603.3 Protection from termite damage

2603.3.1 Exceptions (cont. from last slide)

1. When in addition to the requirements of 2304.1.2, an approved method of protecting the foam plastic and structure from subterranean termite damage is provided.
2. Within Types I, II, or IV construction.
3. On the interior side of basement walls."

Chapter 6 of the Florida Building Code contains descriptions of the different construction types (i.e., Types I (Section 603), II (Section 604) and IV (Section 606)).



"FBC Chapter 15: Roof Assemblies and Rooftop Structures

FBC 1503 WEATHER PROTECTION

> FBC 1503.4.4 Protection against decay and termites. Condensate lines and roof downspouts shall discharge at least 1 foot (305 mm) away from the structure sidewall, whether by underground piping, tail extensions, or splash blocks. Gutters with downspouts are required on all buildings with eaves of less than 6 inches (152 mm) horizontal projection except for gable end rakes or on a roof above another roof. Irrigation/sprinkler systems and risers for spray heads shall not be installed within 1 foot (305 mm) of the building sidewall."

The purpose of this section is to limit all possible soil disturbances near building foundations. Liquid soil termiticide applied to these areas during construction can be easily disturbed by subsequent landscape operations and water input rendering a failed termiticide barrier.

This would *not* meet the requirements of the Florida Building Code…air conditioning condensate line *not* discharging at *least* one-foot away from structure (note orange, 12-inch ruler).

Meets code since splash block allows discharge at least one-foot (see wooden ruler) away from the structure sidewall.

Some building officials may disagree since it is conceivable that water could splash against the structure during heavy rainfall.

This photo shows a good indication that the termiticide barrier has been broken.

Notice the different color of paint at the base of the wall indicating soil has eroded away … and therefore termiticide has washed away as well.

By the way…downspout does not meet code requirement since it appears to discharge less than one-foot away from the structure sidewall.

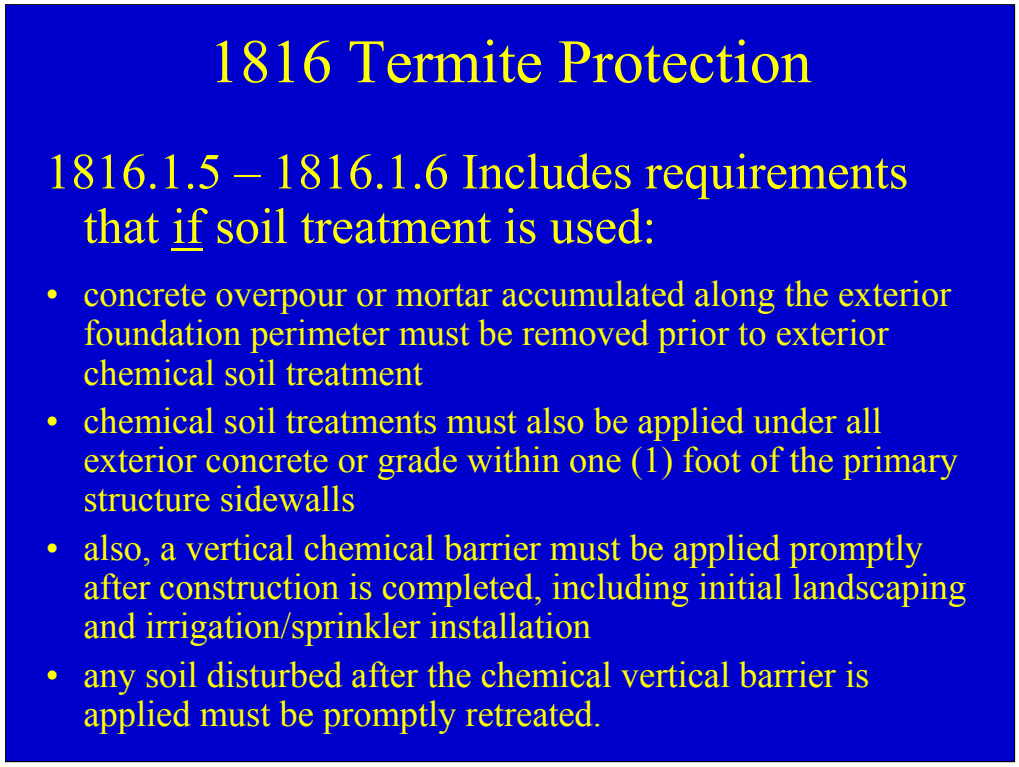
Insufficient eaves, along with a lack of gutters and downspouts to collect rain water and move it away from the structure's foundation, are building components that encourage future termite problems.

Water removes the soil around the base of the structure and therefore the termiticide.

Note: Gutters with downspouts are not required on this part of the structure since this is a gable end (even if the eaves were less than six-inches in horizontal projection).

Sprinkler head location meets code requirement of *not* being installed within one-foot (see wooden ruler) of the building sidewall.

[Note: Ideally, you'd like the sprinkler head to be located even further away from the building with those that "spray" having a 180-degree or less spray pattern (directed away from the structure) instead of 360-degrees.]



"FBC Chapter 18: Foundations and Retaining Walls

1816 TERMITE PROTECTION

1816.1.5 If soil treatment is used for subterranean termite prevention, concrete overpour or mortar accumulated along the exterior foundation perimeter shall be removed prior to exterior chemical soil treatment, to enhance vertical penetration of the chemicals.

1816.1.6 If soil treatment is used for subterranean termite prevention, chemical soil treatments shall also be applied under all exterior concrete or grade within one (1) foot of the primary structure sidewalls. Also, a vertical chemical barrier shall be applied promptly after construction is completed, including initial landscaping and irrigation/sprinkler installation. Any soil disturbed after the chemical vertical barrier is applied shall be promptly retreated."

If soil treatment is used:

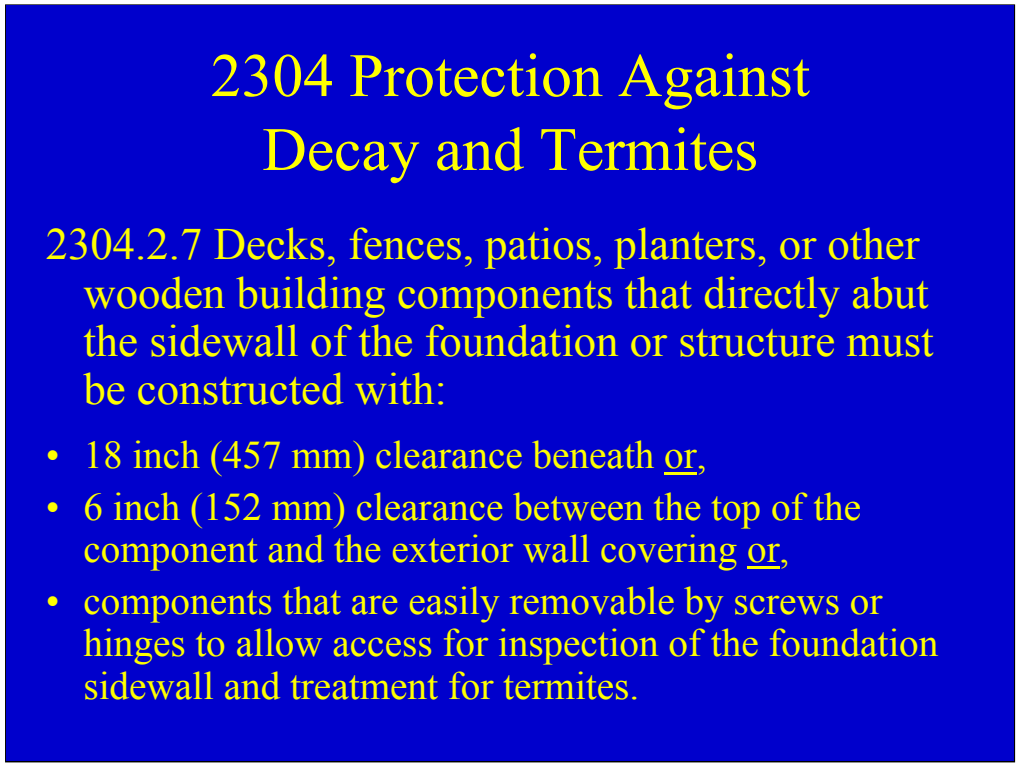
- Concrete overpour along the exterior foundation perimeter shall be removed prior to the exterior vertical soil treatment
- Applications must also be made within one foot of the foundation under adjoining slabs
- A vertical chemical barrier shall be applied after construction is complete…including initial landscaping and irrigation/sprinkler installation
- Any soil disturbed after the chemical vertical barrier is applied shall be promptly retreated

How many trips (if soil treatment is used for pretreatments, also called pre-construction treatments) would the pest management company need to make to the building site of a home on a monolithic slab with a sidewalk, driveway, and AC condensing unit platform added separately?

Note to Instructor:

The answer is five (as follows).

1. **Under the slab – horizontal treatment.**
2. **Band application treatment (typically applied in a 1 foot band) for adjoining sidewalk.**
3. **Band application treatment (typically applied in a 1 foot band) for adjoining driveway.**
4. **Band application treatment (typically applied in a 1 foot band) for adjoining AC condensing unit platform.**
5. **Vertical treatment to perimeter of the foundation.**

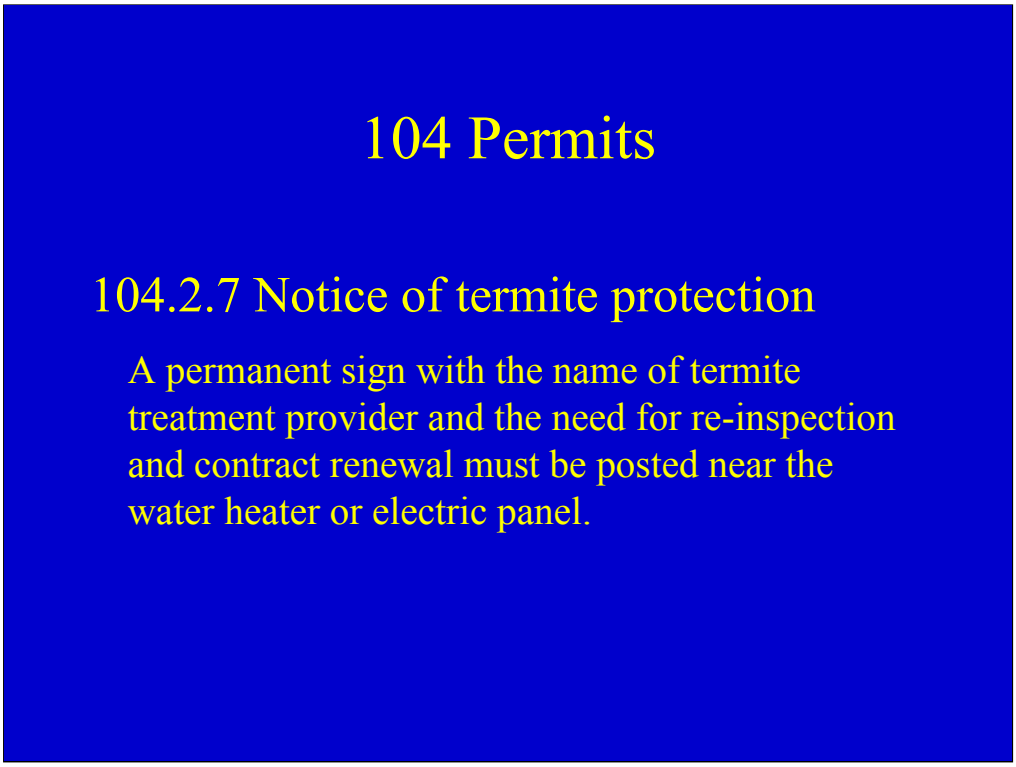


"FBC Chapter 23: Wood

2304.2 Wood in ground contact or exposed to the weather

2304.2.7 Decks, fences, patios, planters, or other wooden building components that directly abut the sidewall of the foundation or structure shall be constructed so as to provide:

- 18 inch (457 mm) clearance beneath or,
- 6 inch (152 mm) clearance between the top of the component and the exterior wall covering or,
- have components that are easily removable by screws or hinges to allow access for inspection of the foundation sidewall and treatment for termites."



"FBC Chapter 1: Administration

FBC 104 PERMITS

> FBC 104.2.7 Notice of termite protection. A permanent sign which identifies the termite treatment provider and need for re-inspection and treatment contract renewal shall be provided. The sign shall be posted near the water heater or electric panel."

Requires posting of consumer notice inside home…will inform owner of need to renew contract and inspect annually.

Based on what you've learned so far…

What construction practices, that destroy soil termiticide barriers, do you see in this picture?

Note to Instructor:

Possible answers include: no inspection zone; bricks directly against building – do you think they called the pest management company back to do a pretreatment before putting in the bricks?; looks like AC condensate line dripping water right against the building; wood debris around foundation base; pipes (conduit?) added after construction was completed?; mulch against building foundation may become a problem (keeps soil moist).

Of these practices, which ones are in violation of the Florida Building Code?

Note to Instructor:

All those listed above, except for the mulch.

The next part of this presentation includes sections of the Florida Building Code relating to termites that are not typical on most residential construction sites (what we're designating as special situations):

- Crawl spaces
- Wood in retaining or crib walls
- One story buildings under 400 square feet
- Wood quality and use issues
- High velocity hurricane zones

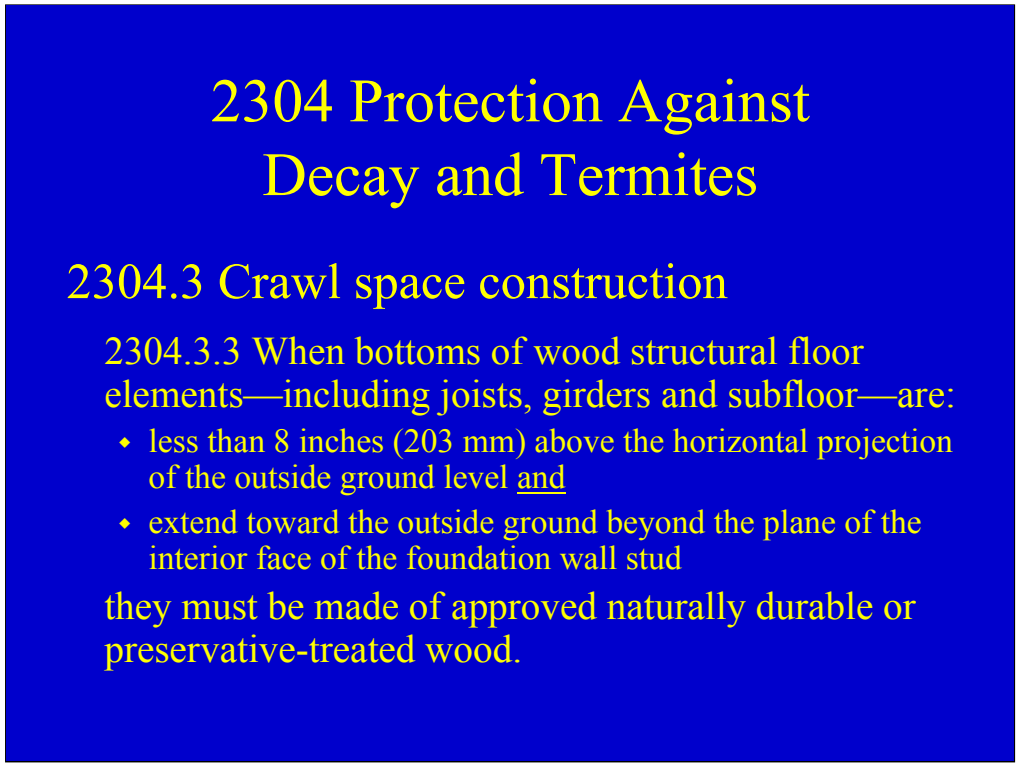
Note to Instructor:

Read through these "special situations" slides (#65 through #79) before presenting as they may not directly apply to your audience. Keep in mind that all termite-related sections of the Florida Building Code are included in the Participant Guide.

"FBC Chapter 23: Wood

2304.3 Crawl space construction

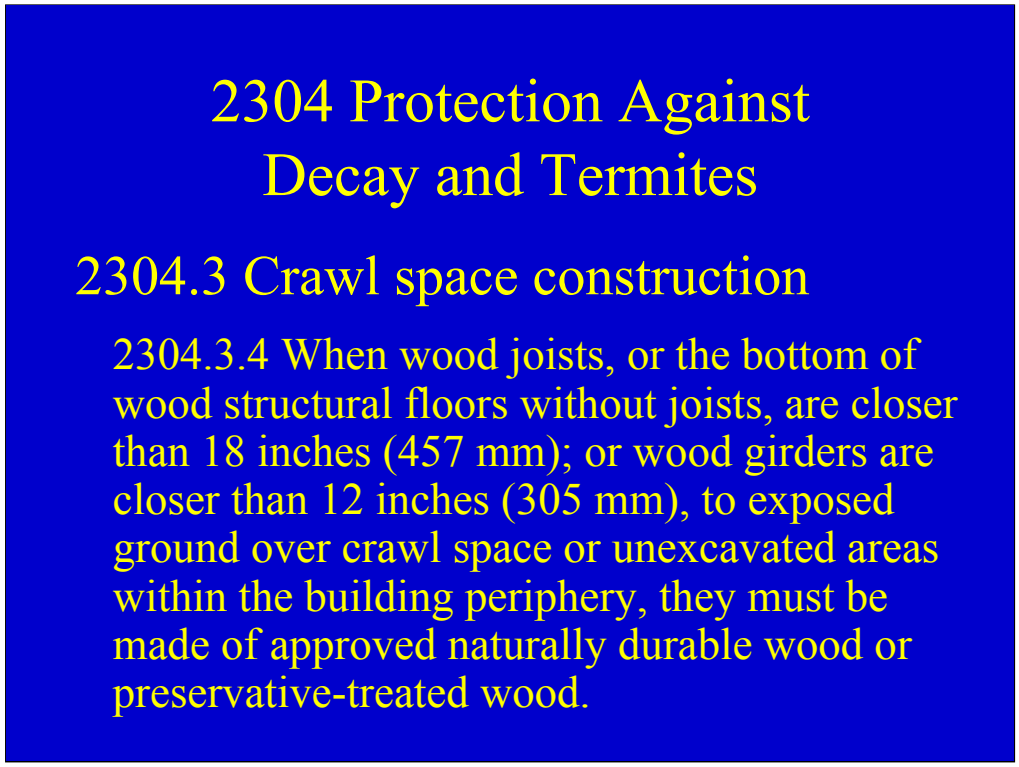
2304.3.2 All wood framing and sheathing less than 8 inches (203 mm) from exposed earth in exterior walls that rest on preservative-treated wood, concrete or masonry foundations shall be approved naturally durable or preservative-treated wood."



"FBC Chapter 23: Wood

2304.3 Crawl space construction

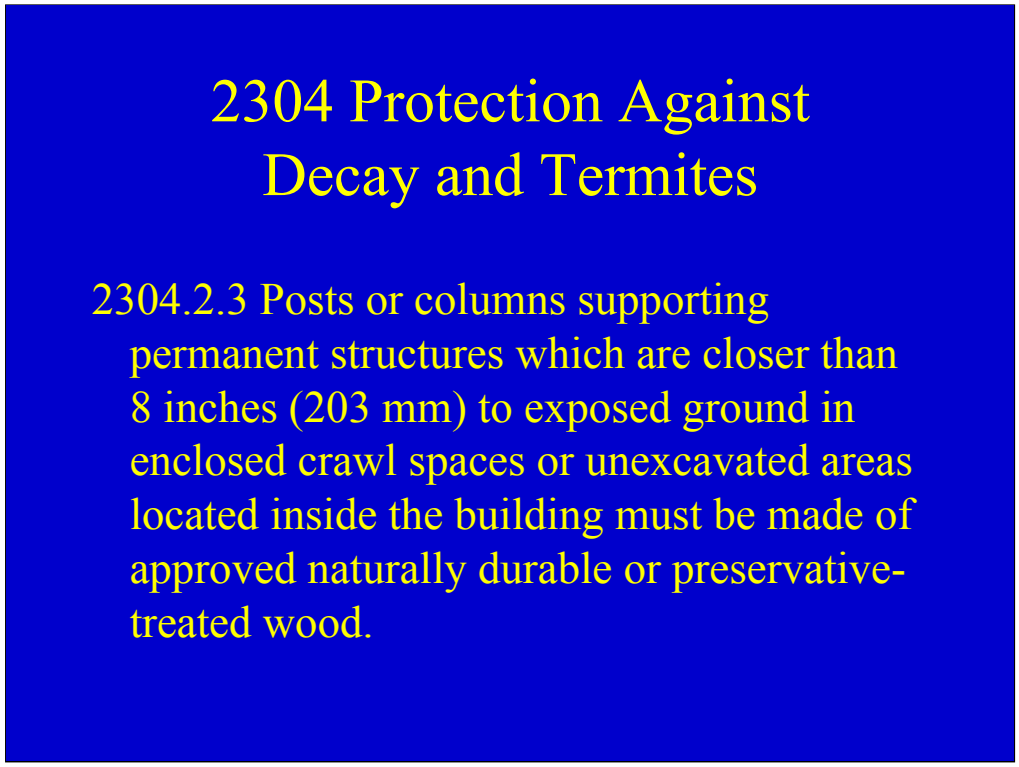
2304.3.3 When the bottoms of wood structural floor elements, including joists, girders and subfloor, are less than 8 inches (203 mm) above the horizontal projection of the outside ground level and extend toward the outside ground beyond the plane represented by the interior face of the foundation wall stud, such elements shall be approved naturally durable or preservative-treated wood."



"FBC Chapter 23: Wood

2304.3 Crawl space construction

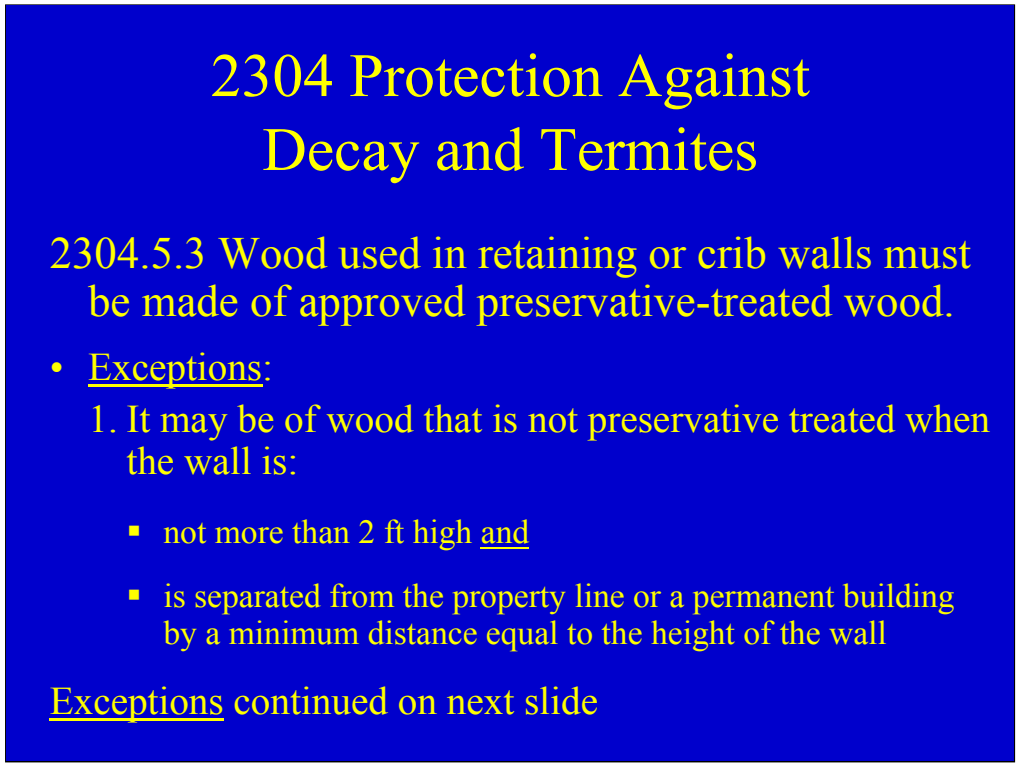
2304.3.4 When wood joists or the bottom of wood structural floors without joists are closer than 18 inches (457 mm) or wood girders are closer than 12 inches (305 mm) to exposed ground located within the periphery of the building over crawl space or unexcavated areas, they shall be of approved naturally durable wood or preservative-treated wood."



"FBC Chapter 23: Wood

2304.2 Wood in ground contact or exposed to the weather

2304.2.3 Posts or columns supporting permanent structures which are closer than 8 inches (203 mm) to exposed ground in enclosed crawl spaces or unexcavated areas located within the periphery of the building shall be approved naturally durable or preservative-treated wood."



"FBC Chapter 23: Wood

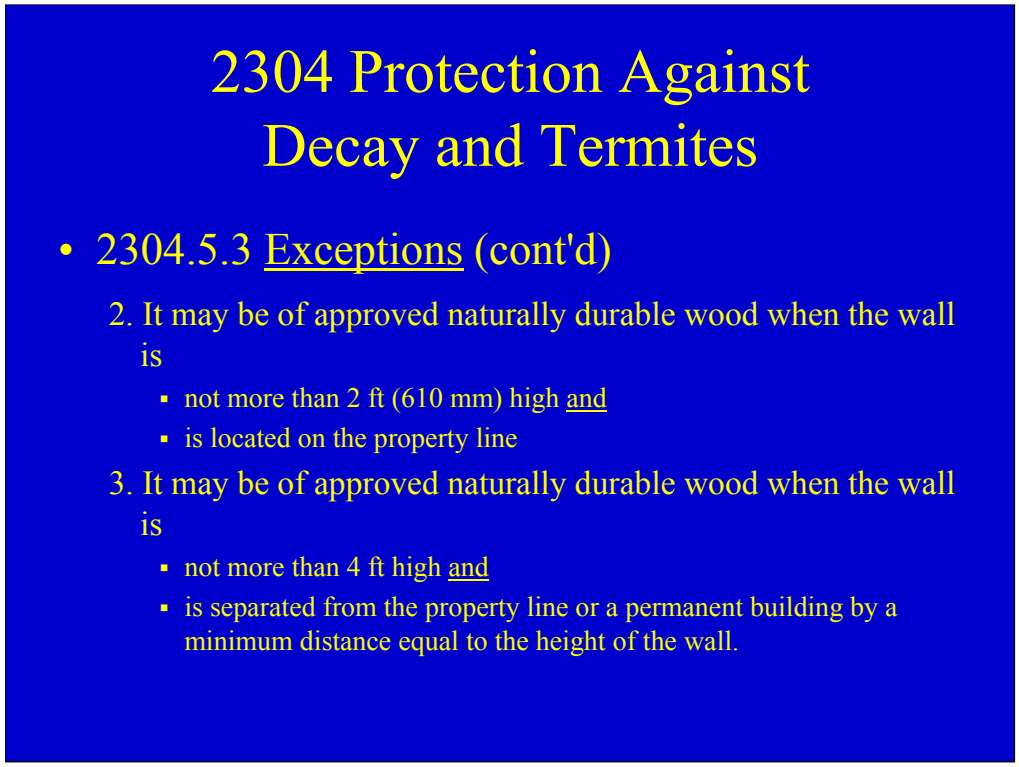
2304.5 Walls

2304.5.3 Wood used in retaining or crib walls shall be approved preservative-treated wood.

Exceptions:

1. It may be of wood that is not preservative treated when the wall is not more than 2 ft high and is separated from the property line or a permanent building by a minimum distance equal to the height of the wall.

(Exceptions cont'd on next slide)



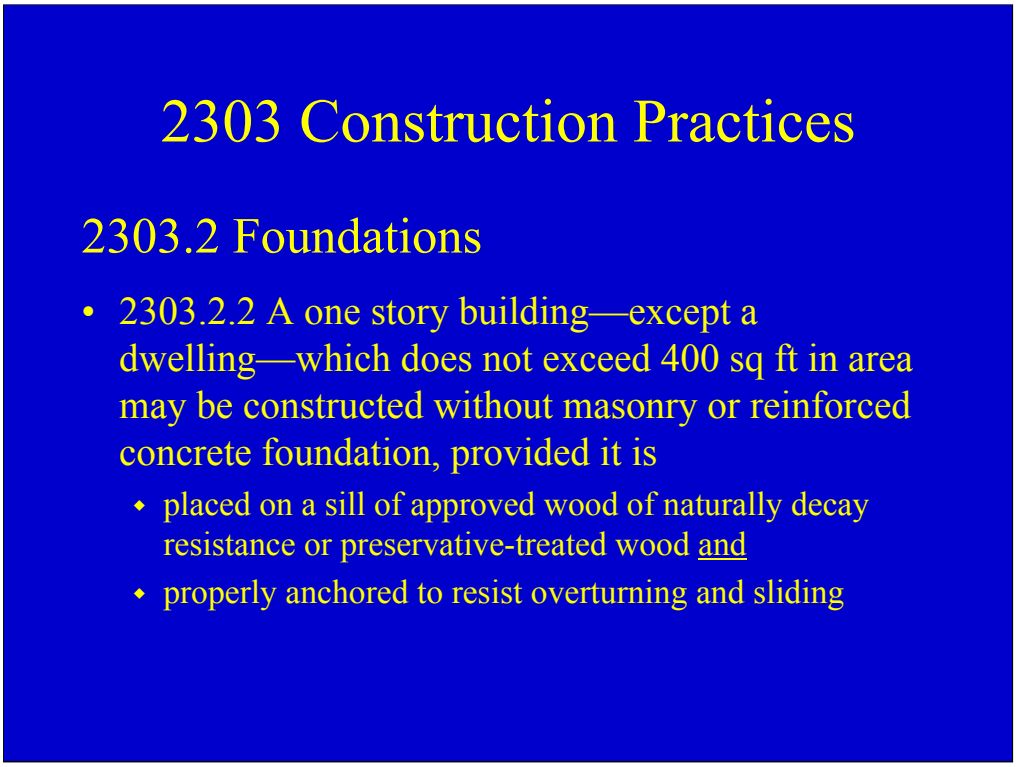
FBC Chapter 23: Wood

2304.5 Walls

2304.5.3 Exceptions (cont'd from last slide):

2. It may be of approved naturally durable wood when the wall is not more than 2 ft (610 mm) high and is located on the property line.

3. It may be of approved naturally durable wood when the wall is not more than 4 ft (1219 mm) high and is separated from the property line or a permanent building by a minimum distance equal to the height of the wall."

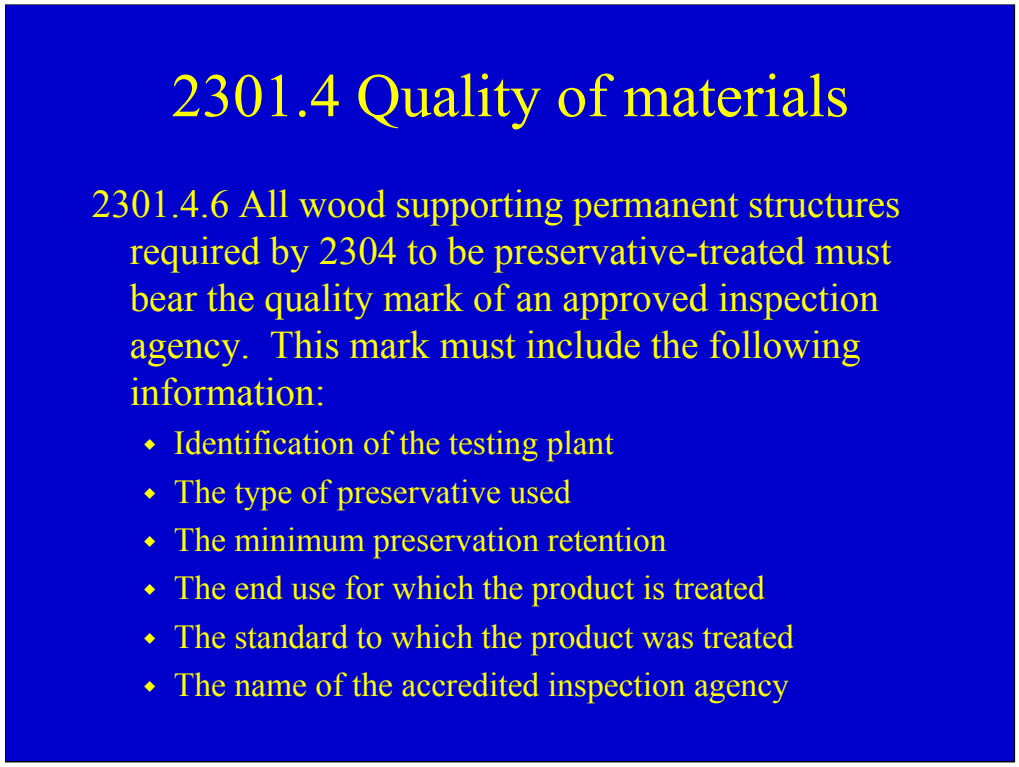


"FBC Chapter 23: Wood

FBC 2303 CONSTRUCTION PRACTICES

FBC 2303.2 Foundations

2303.2.2 A one story building, except a dwelling, which does not exceed 400 sq ft (37 m^2) in area may be constructed without masonry or reinforced concrete foundation, provided such building is placed on a sill of approved wood of natural decay resistance or preservative-treated wood and provided the structure is properly anchored to resist overturning and sliding as required in 1606.1.3. Mud sills shall be not less than a 2×6 or 3×4."



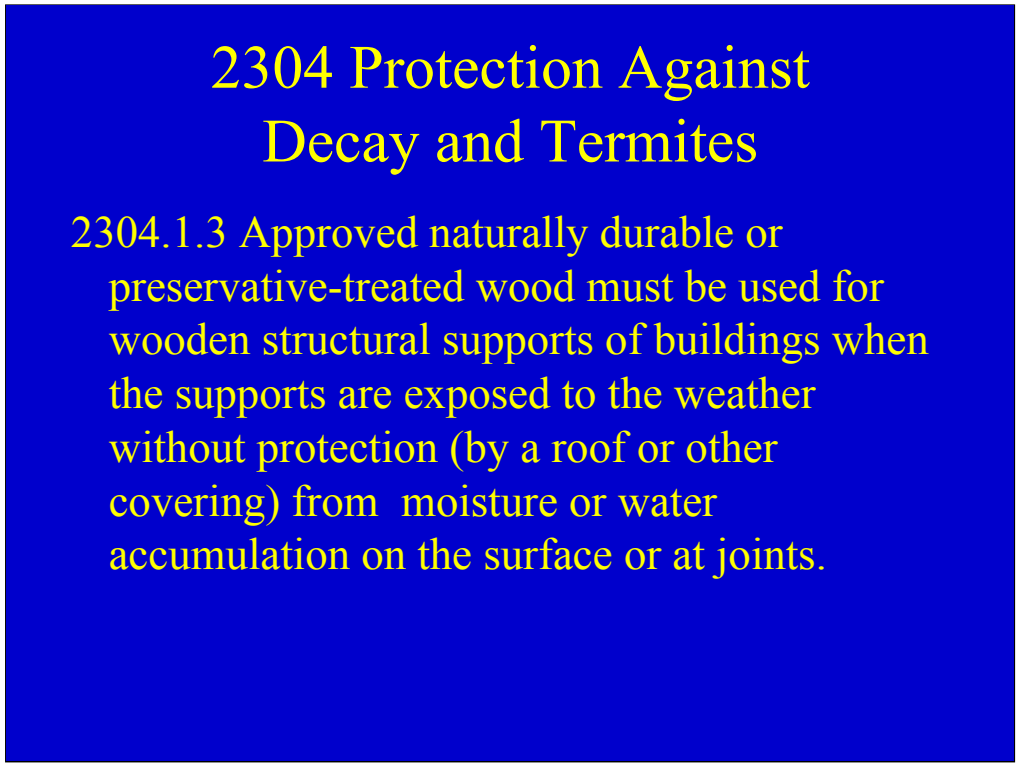
"FBC Chapter 23: Wood

2301.4 Quality of materials

2301.4.6 All lumber, sawn timber, plywood, piles and poles supporting permanent structures required by 2304 to be preservative-treated shall bear the quality mark of an approved inspection agency which maintains continued supervision, testing and inspection over the quality of the product and which has been approved by an accreditation body which complies with the requirements of the American Lumber Standard Committee treated wood program or the equivalent, as described in the applicable AWPA standards listed in Chapter 35. The quality mark shall include the following information:

- Identification of the testing plant.
- Type of preservative used.
- Minimum preservative retention.
- End use for which the product is treated.
- Standard to which the product was treated.
- Identity of the accredited inspection agency."

Preservative-treated wood must meet a standard.

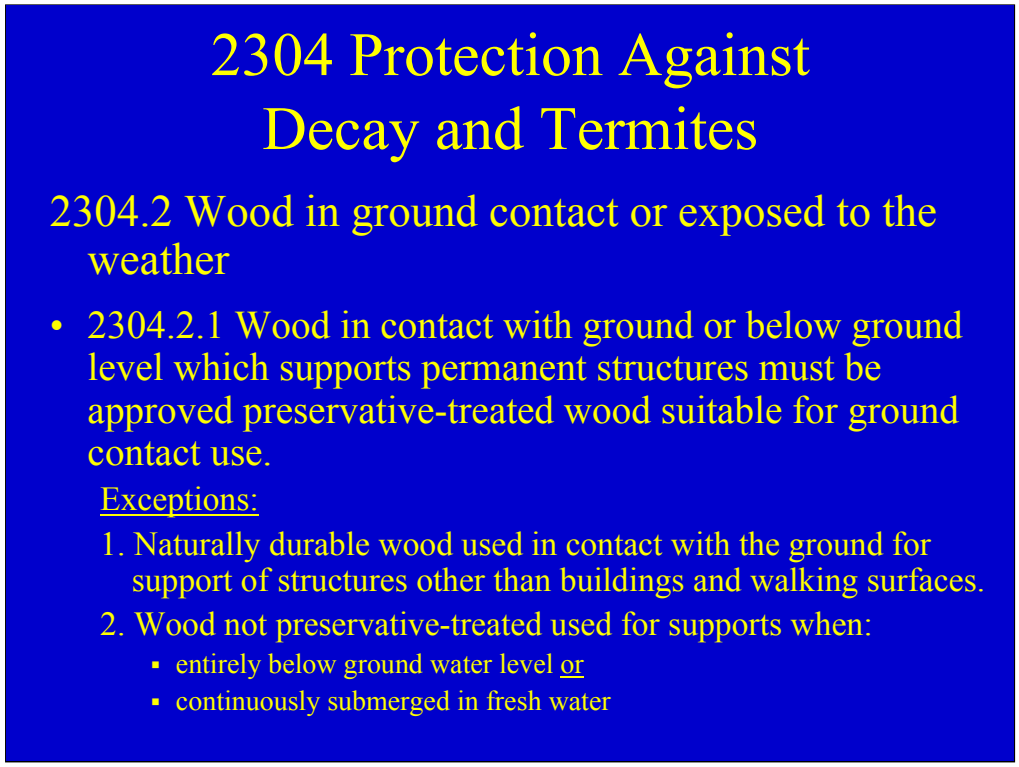


"FBC Chapter 23: Wood

2304 PROTECTION AGAINST DECAY AND TERMITES

2304.1 Protection

2304.1.3 In geographical areas where experience has demonstrated a specific need, approved naturally durable or preservative-treated wood shall be used for those portions of wood members which form the structural supports of buildings, balconies, porches or similar permanent building appurtenances when such members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering to prevent moisture or water accumulation on the surface or at joints between members. Depending on local experience, such members may include horizontal members such as girders, joists, and decking and vertical members such as posts, poles and columns."



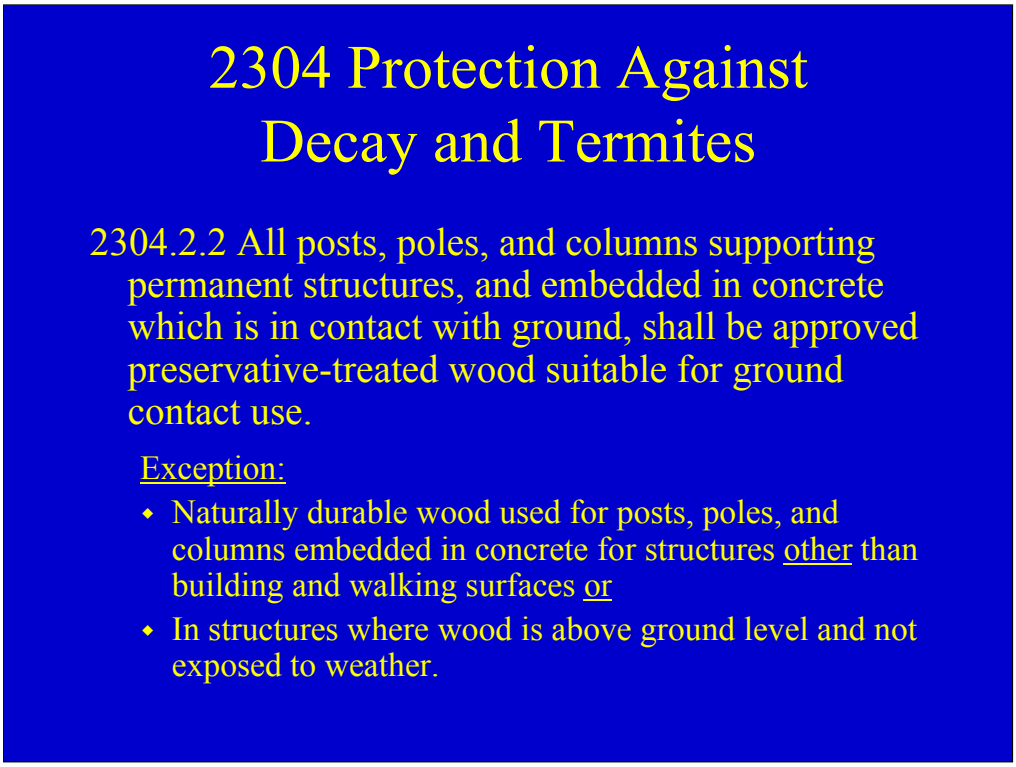
"FBC Chapter 23: Wood

2304.2 Wood in ground contact or exposed to the weather

2304.2.1 Wood in contact with ground or below ground level which supports permanent structures shall be approved preservative-treated wood suitable for ground contact use.

Exceptions:

1. Naturally durable wood used in contact with the ground for support of structures other than buildings and walking surfaces.
2. Wood not preservative-treated used for supports where entirely below ground water level or continuously submerged in fresh water."



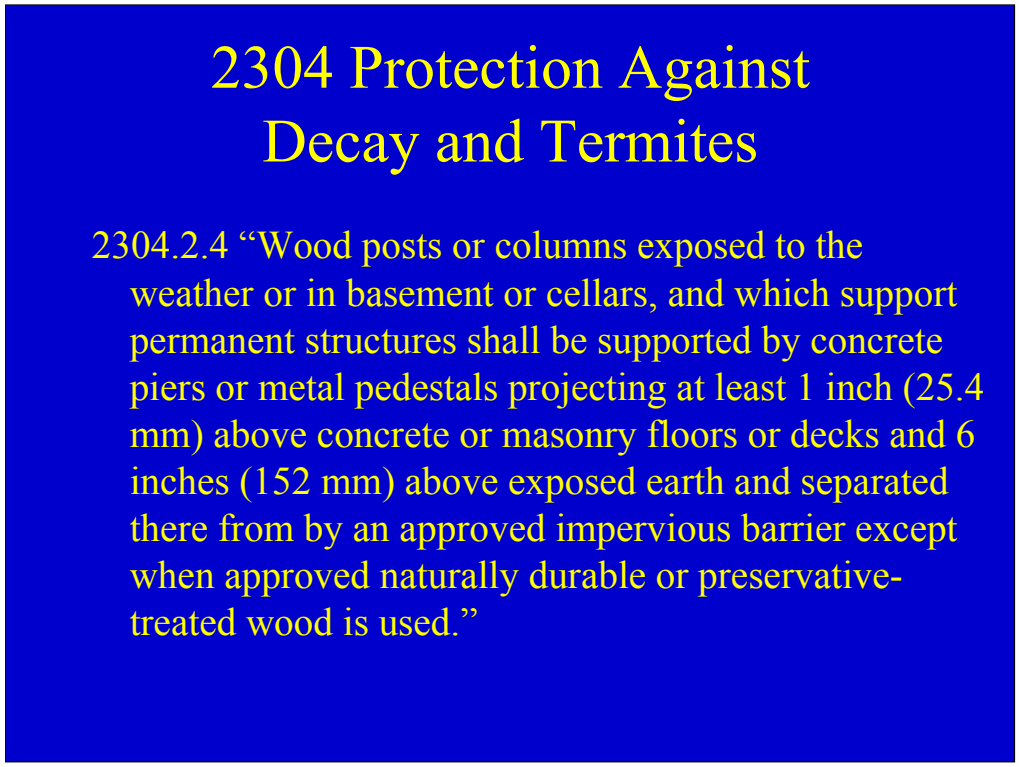
"FBC Chapter 23: Wood

2304.2 Wood in ground contact or exposed to the weather

2304.2.2 All posts, poles, and columns supporting permanent structures and embedded in concrete which is in contact with ground shall be approved preservative-treated wood suitable for ground contact use.

Exception:

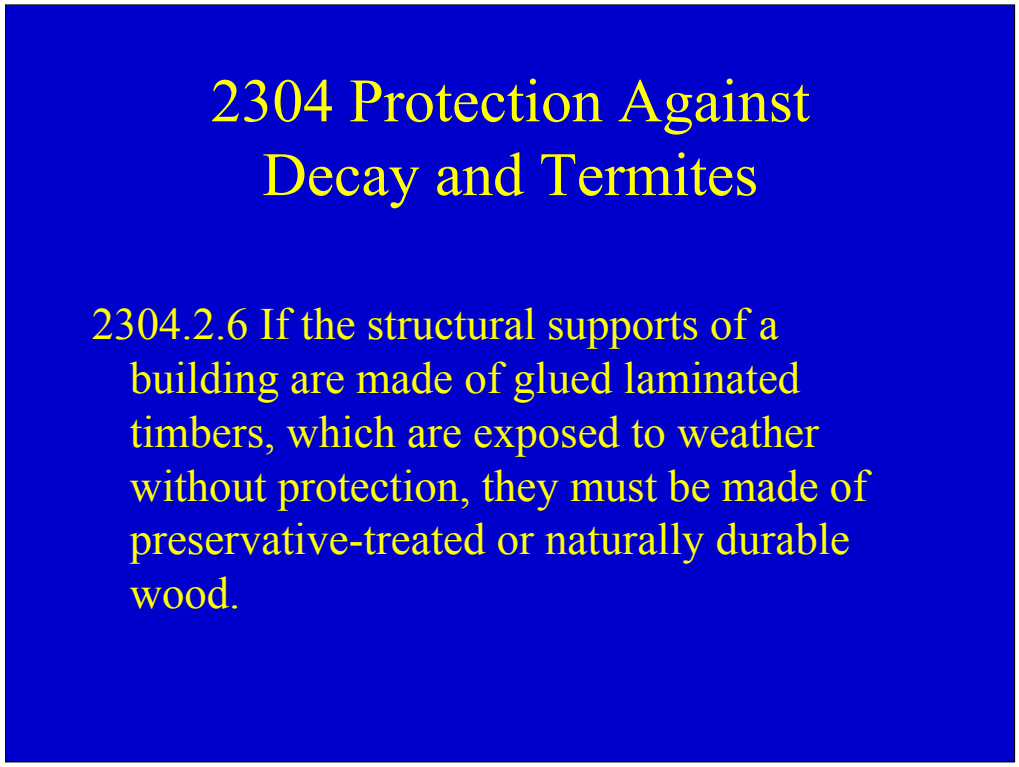
Naturally durable wood used for posts, poles, and columns embedded in concrete for structures other than building and walking surfaces or in structures where wood is above ground level and not exposed to weather."



"FBC Chapter 23: Wood

2304.2 Wood in ground contact or exposed to the weather

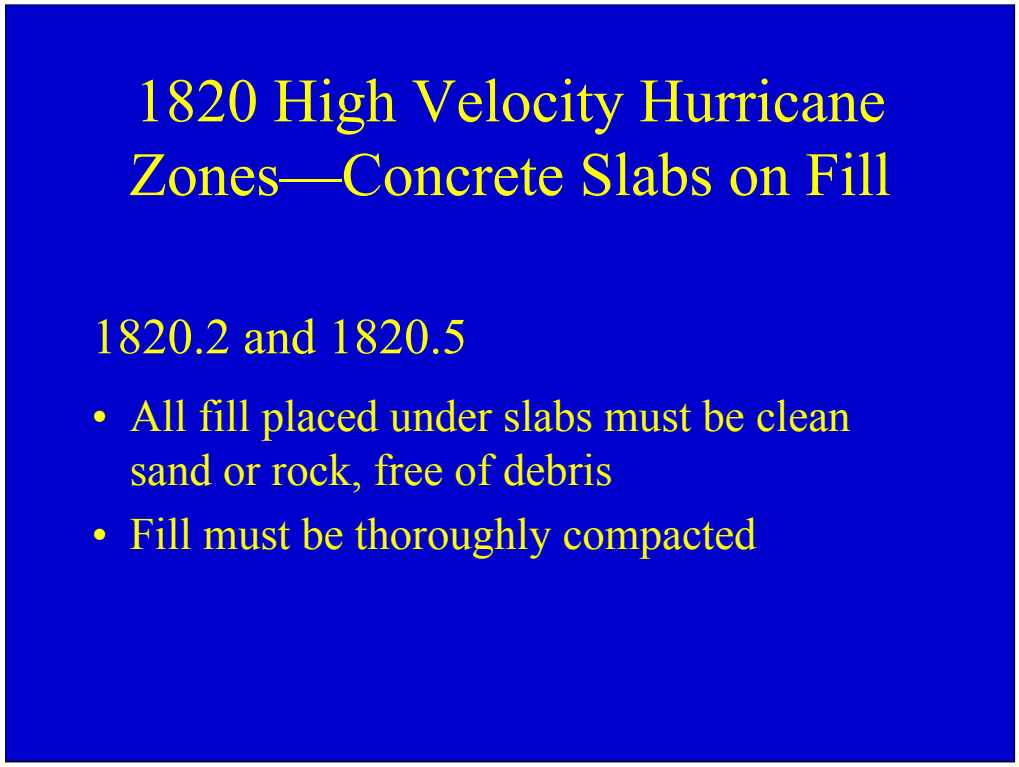
2304.2.4 Wood posts or columns exposed to the weather or in basement or cellars, and which support permanent structures shall be supported by concrete piers or metal pedestals projecting at least 1 inch (25.4 mm) above concrete or masonry floors or decks and 6 inches (152 mm) above exposed earth and separated there from by an approved impervious barrier except when approved naturally durable or preservative-treated wood is used."



"FBC Chapter 23: Wood

2304.2 Wood in ground contact or exposed to the weather

2304.2.6 Those portions of glued laminated timbers which form the structural supports of a building or other structure and are exposed to weather and not properly protected by a roof, eave or similar covering shall be preservative-treated or be manufactured from naturally durable wood."

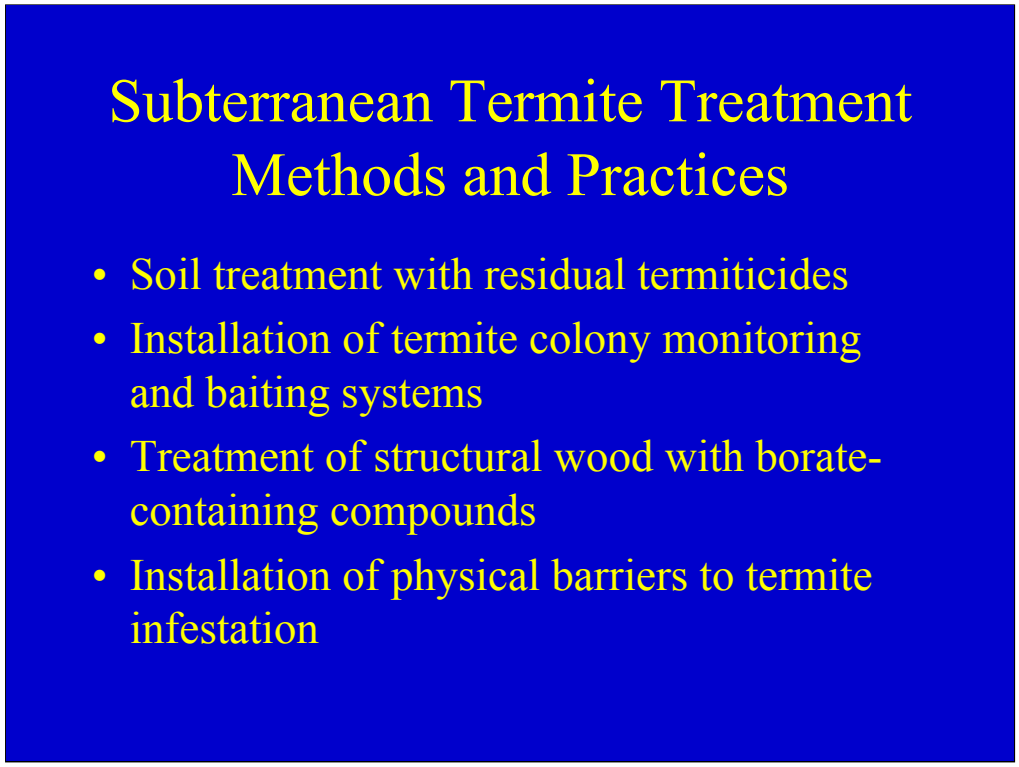


"FBC Chapter 18: Foundations and Retaining Walls

FBC 1820 HIGH VELOCITY HURRICANE ZONES CONCRETE SLABS ON FILL

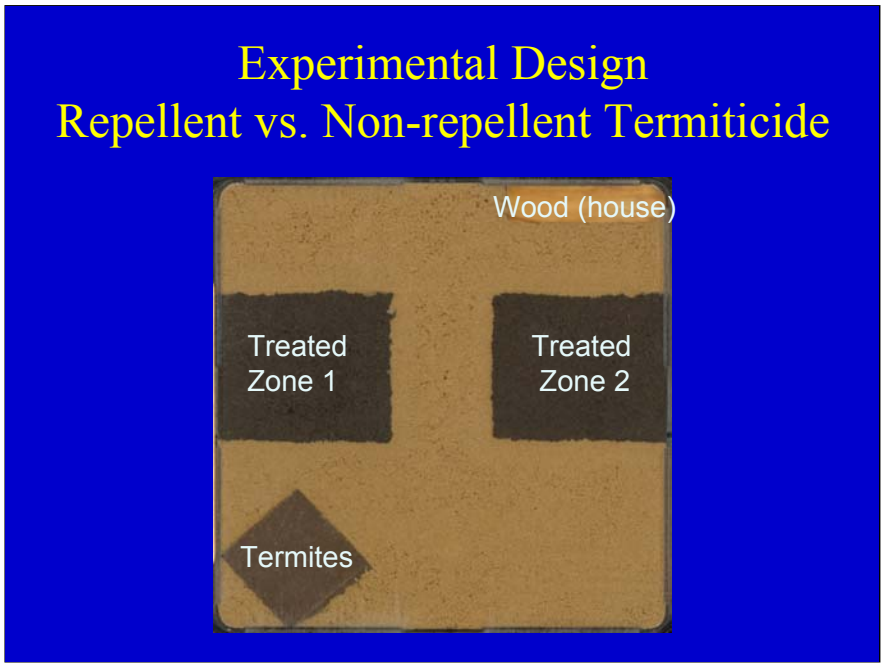
1820.2 Where it is proposed to place concrete slabs directly on the supporting soil, a subgrade shall be thoroughly compacted by approved methods. All fill placed under slabs shall be clean sand or rock, free of debris and other deleterious materials. The maximum size of rock within 12 inches below the floor slab in compacted fill shall be 3 inches in diameter. Where fill material includes rock, large rocks shall not be allowed to nest and all voids shall be carefully filled with small stones or sand, and properly compacted.

1820.5 Concrete slabs outside of buildings, other than patios and pool slabs, where placed directly on the supporting soil, for minor accessory uses such as, but not limited to, walkways, driveways, minor equipment pads, etc., shall be not less than 4 inches thick. Such slabs shall be placed on clean, thoroughly compacted sand or crushed rock free from organics, debris or other deleterious materials."



Now, let's examine some of the different subterranean termite treatment methods and practices that are available:

- Soil treatment with residual termiticides
- Installation of termite colony monitoring and baiting systems
- Treatment of structural wood with borate-containing compounds
- Installation of physical barriers to termite infestation



With regard to soil treatment with residual termiticides…

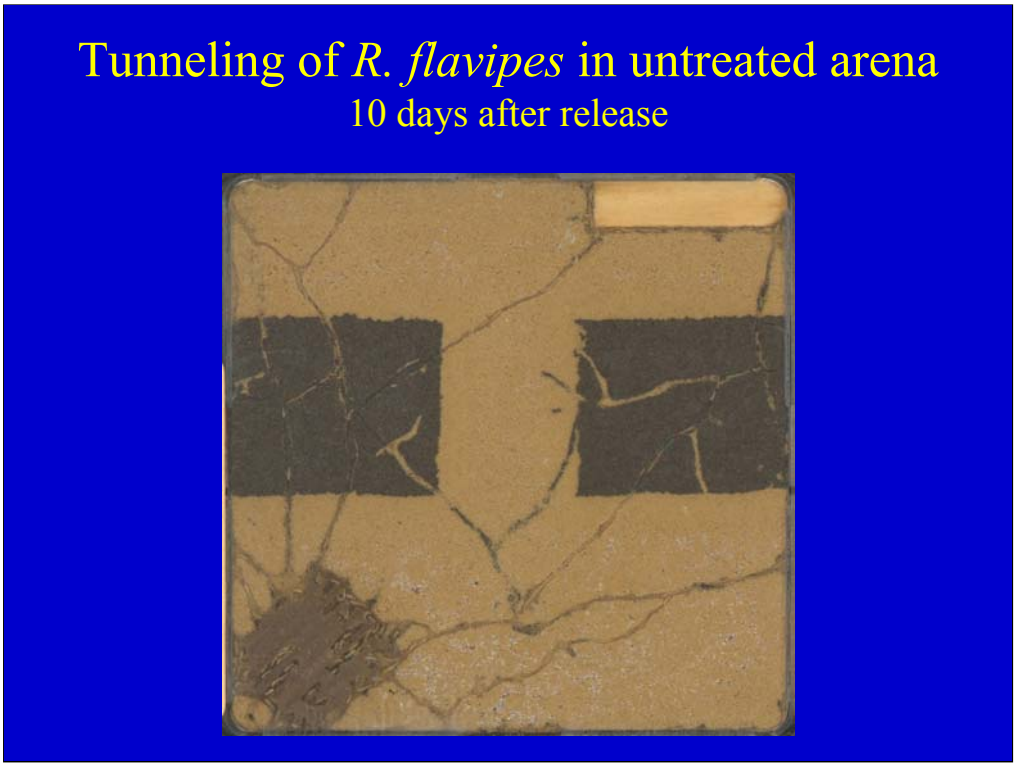
What kinds of termiticides are available?

Generally, termiticides are classified as repellent or non-repellent. A termiticide barrier composed of a repellent termiticide repels termites. A properly applied repellent termiticide will provide protection for the structure unless the barrier is disturbed. A termiticide barrier composed of a non-repellent termiticide kills termites. A properly applied non-repellent termiticide can provide protection for the structure even if the barrier is disturbed.

This is a Xerox copy of an actual glass tray that was used by a graduate student studying repellent and non-repellent termiticides.

Each experiment was set up the same way:

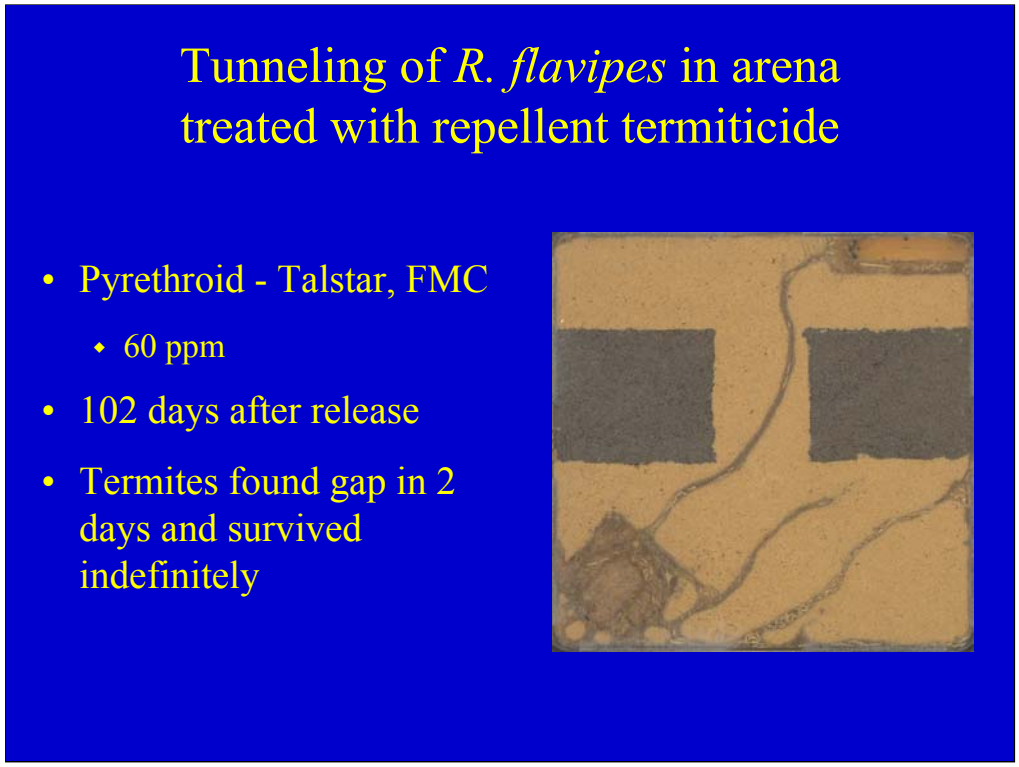
- Sand was used as the soil.
- In each experiment two treatment areas (zones) were treated with the same termiticide (i.e., Treated Zone 1 and Treated Zone 2).
- A piece of untreated wood was placed in the upper right-hand corner (to serve as the "house") and approximately 100 eastern subterranean worker termites were placed in the lower left-hand corner.



In this experiment, one hundred eastern subterranean worker termites (*Reticulitermes flavipes*) were placed in an *untreated* arena (in the lower left-hand corner).

Ten days after release, this is what happened.

The termites found their way to the untreated wood ("house") – in the upper right-hand corner.



In this experiment, one hundred eastern subterranean worker termites (*Reticulitermes flavipes*) were placed in the arena and a *repellent* termiticide (Talstar, in this case) was placed in the treatment zone.

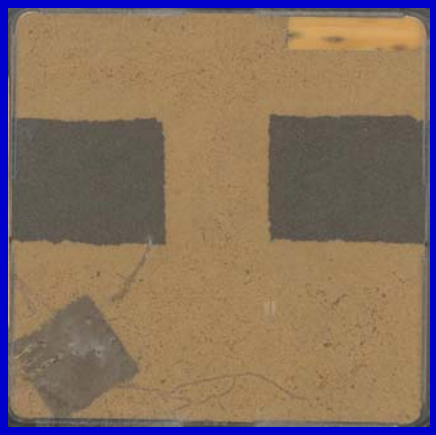
This is what the glass tray looked like 102 days after the termites were released.

By the way, the termites found the gap between the treated areas in two days and survived indefinitely.

See disclaimer on inside front cover of this booklet.

Tunneling of *R. flavipes* in arena treated with non-repellent termiticide

- Imidacloprid - Premise 75, Bayer
  - 100 ppm
- 12 days after release (100% mortality at 16 days)
- Termites can't detect treated from untreated soil



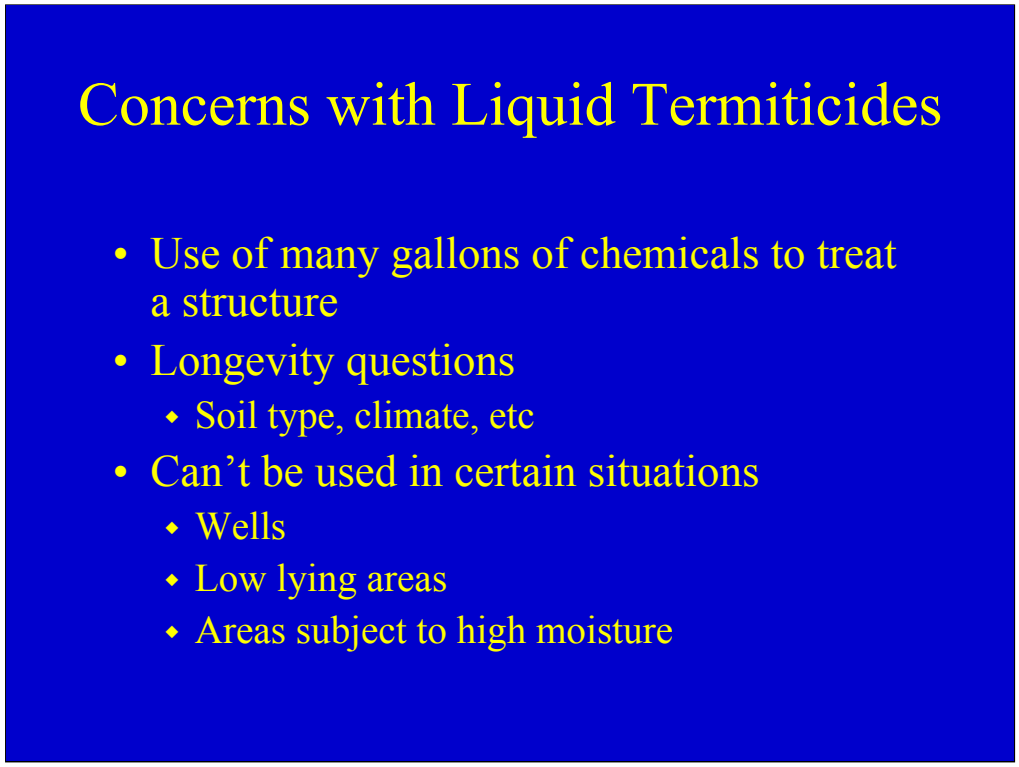
In this experiment, one hundred eastern subterranean worker termites (*Reticulitermes flavipes*) were placed in the arena and a *non-repellent* termiticide (Premise 75, in this case) was placed in the treatment zone.

This photo shows the experiment twelve days after release of the termites. After sixteen days there was one hundred percent mortality. You can see that the termites could not distinguish the treated from the untreated soil.

Keep in mind that with non-repellents the termites tunnel into it and die; whereas repellent termiticides repel (however, they will be killed if they happen to fall into the material, etc).

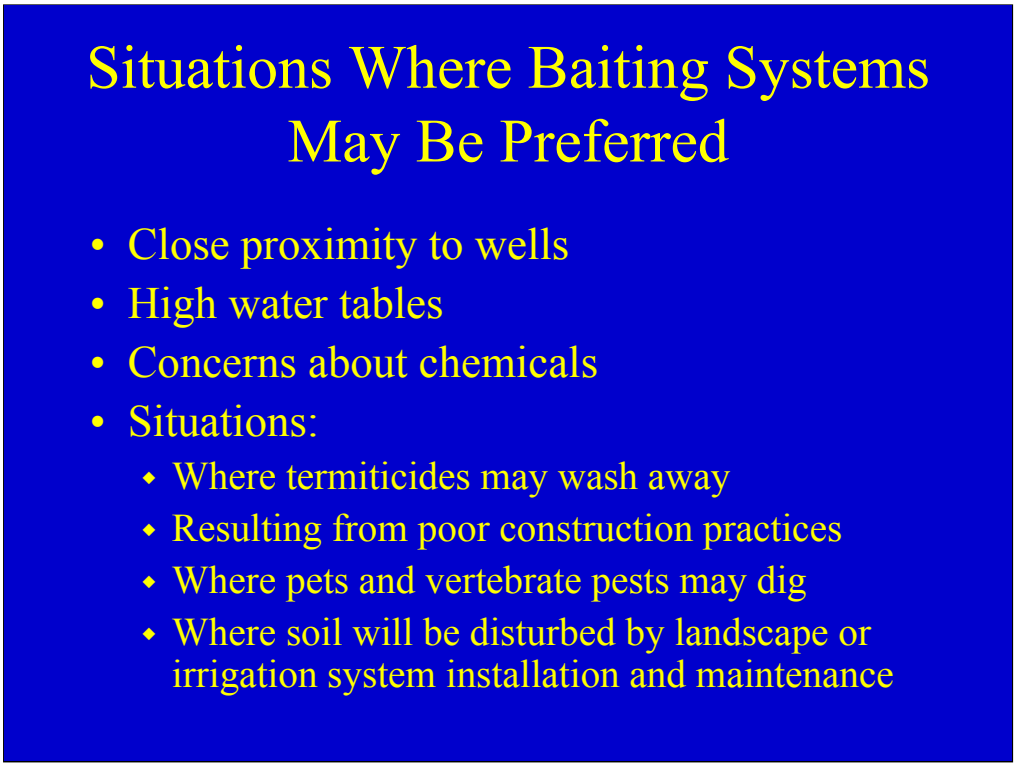
[Note: It is important to understand that sometimes, as in the case of Dursban (non-repellent), the termites die quickly within the treated area. However, as numerous termites die, they decompose and produce acidic chemicals that are repellent. In-coming termites may be repelled by the dead bodies and won't contact the treated soil. Therefore, in reality, a non-repellent termiticide may cause a repellent barrier underneath and around the building as termites die and decompose.]

See disclaimer on inside front cover of this booklet.



There are concerns with liquid termiticides:

- Some people object to the use of many gallons of chemicals to treat a structure.
- The question of longevity … how long do they last based on soil type, climate, etc.
- The liquid termiticides can't be used in certain situations (ex. close to a well, low lying areas, areas subject to high moisture, etc.)



Another option is the use of termite colony monitoring and baiting systems.

Situations where baiting systems may be preferred include:

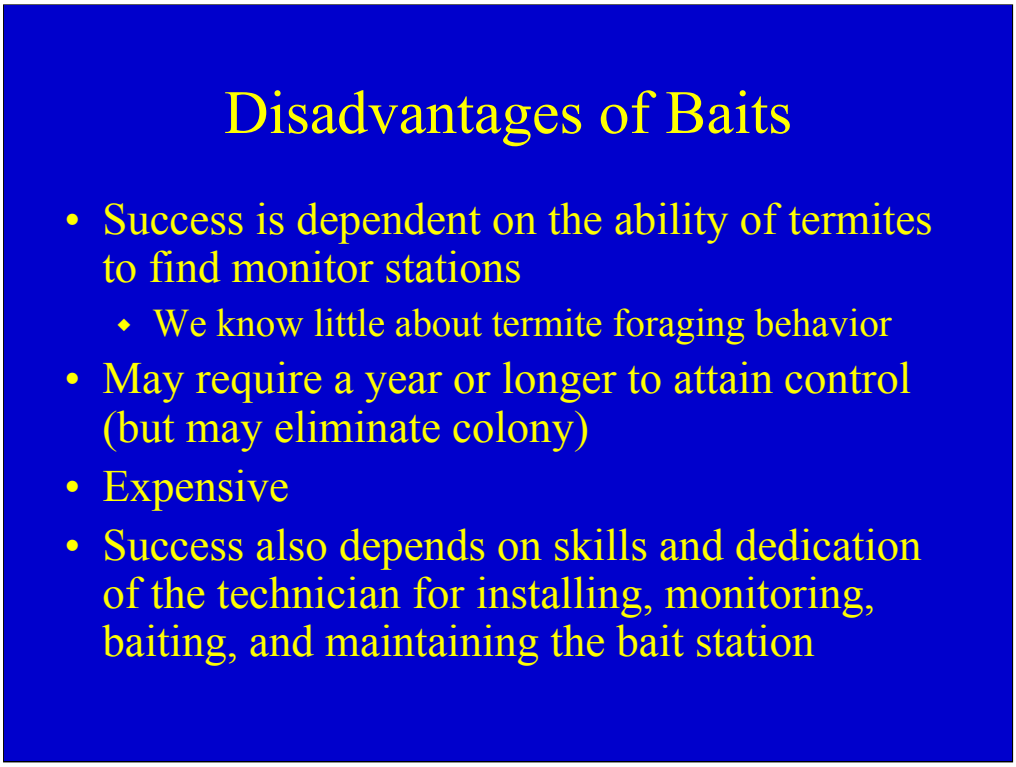
- Those areas in close proximity to wells.
- Areas with a high water table.
- Where people are concerned about the use of chemicals.
- For areas where termiticides may wash away (some bait stations can be mounted on the wall of the structure)
- In situations resulting from poor construction practices such as
    - Buried cellulose debris
    - Stucco below grade
- For use in areas where pets and vertebrate pests (like armadillos) may dig
- For use in areas where soil will be disturbed by landscape or irrigation system installation and maintenance.

Some products using baits include Exterra, Sentricon, FirstLine and Terminate.

Some of these products use wood or cardboard (cellulose containing material) that is then monitored for damage. After damage is detected (i.e. feeding activity), then a pesticide bait is placed in the station.

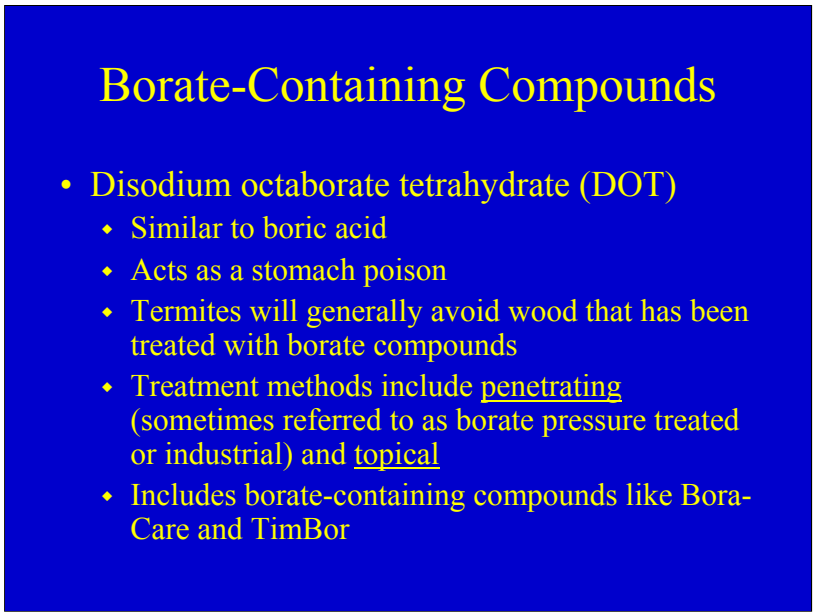
In general, the termites are affected by the chitin synthesis inhibitor in the bait that basically prevents them from molting…they therefore die.

See disclaimer on inside front cover of this booklet.



Disadvantages of baits include:

- Success is dependent on the ability of termites to find monitor stations.
- We really know very little about termite foraging behavior.
- Baits may require a year or longer to attain control (-- however, baits may eliminate the entire colony).
- They are expensive.
- The success of the baiting system depends on the skills and dedication of the technician for installation, monitoring, baiting, and maintenance.



Another termiticide treatment involves the use of borate-containing compounds such as disodium octaborate tetrahydrate (DOT). DOT is similar to boric acid, and acts as a stomach poison. Also often mentioned is that borates interfere with the metabolic process. Termites will generally avoid wood that has been treated with borate compounds. Treatment methods include:

- *Penetrating (sometimes referred to as borate pressure treated or industrial).* Wood can be industrially pre-treated before it arrives at the construction site. Because wood is relatively impermeable, industrially pre-treated products often have optimal preservative penetration applied under strict quality control requirements. Commercially borate pre-treated wood is typically kiln dried after treatment (KDAT) to reduce the moisture content to below the 19% required by many building codes throughout the country.
- *Topical.* Wood can be field-treated by brush or spray during or after the structure is built. These field treatments are often used for remedial applications and for treating the end-cuts of industrially pre-treated wood. Sometimes field treatments are also used in wood components that are difficult to purchase pre-treated, such as heavy timbers and logs. The treatments come in liquids, pastes, powders, and soluble borate rods. Application of the liquids can be by brushing, spraying, or dipping. Some liquid formulations contain glycols that help carry the borates into dry wood, since borates on their own will usually only diffuse through wood on their own if the wood is fairly wet.

Common borate-containing compounds include Bora-Care and TimBor.

See disclaimer on inside front cover of this booklet.

Here's an example of borate (disodium octaborate tetrahydrate – DOT) pressure treated (industrial) lumber used as interior framing.

How can you tell this is borate pressure treated lumber?

See disclaimer on inside front cover of this booklet.

Note to Instructor:

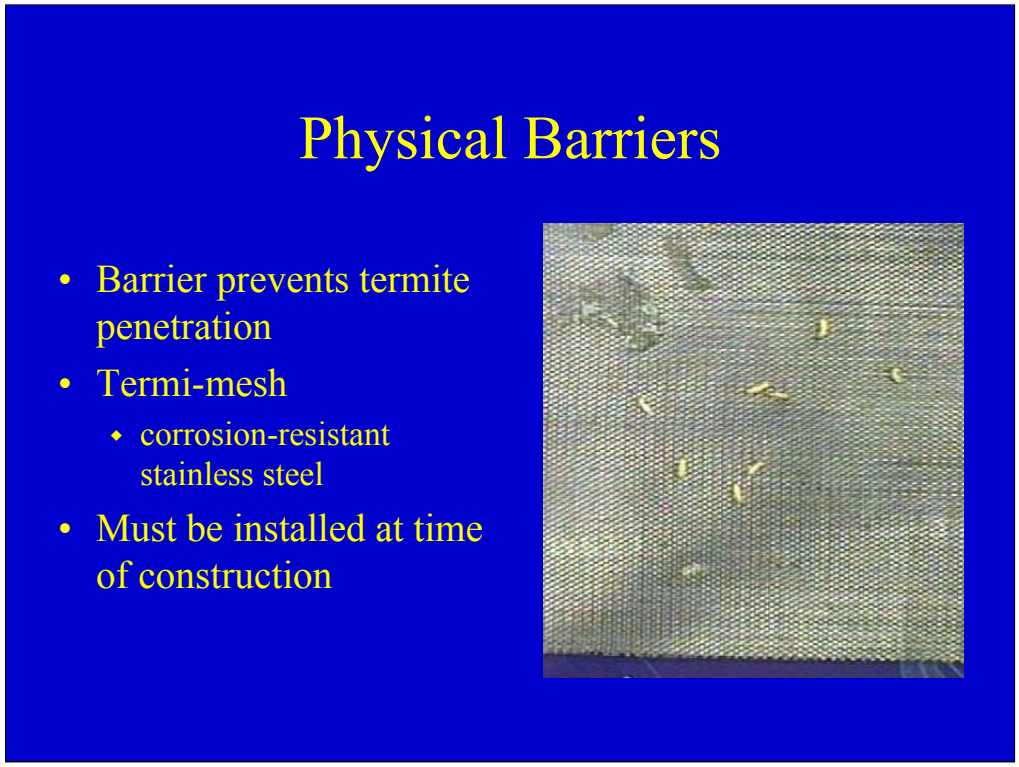
See next slide for answer.

Look for the grade stamp (permanent ink stamp).

The stamp generally contains the following information:

- name of the company that treated the product
- name or number of the treating plant
- year of treatment
- brand name of the product
- the symbol “SBX” that stands for sodium borate
- the retention rate…in this case .42 DOT – disodium octaborate tetrahydrate
- the treating standard…in this case AWPA (American Wood Preservers Association) C31, C9
- the inspection agency…in this case TP (Timber Products Inspection Agency)
- the wood species…in this case SYP (southern yellow pine) lumber and plywood
- the protected application…in this case “above ground and continuously protected from liquid water”

See disclaimer on inside front cover of this booklet.



Physical barriers, intended to prevent termite penetration, are another option.

Termi-mesh is a company that makes such a material out of corrosive resistant stainless steel.

The mesh is so small that the termite can't go through the openings.

The company has their own crew that installs the material during construction at places, such as around all penetrations (plumbing lines, gas lines, etc.), cold/construction joints, etc.

They can do retrofits to existing homes but it is very expensive.

See disclaimer on inside front cover of this booklet.

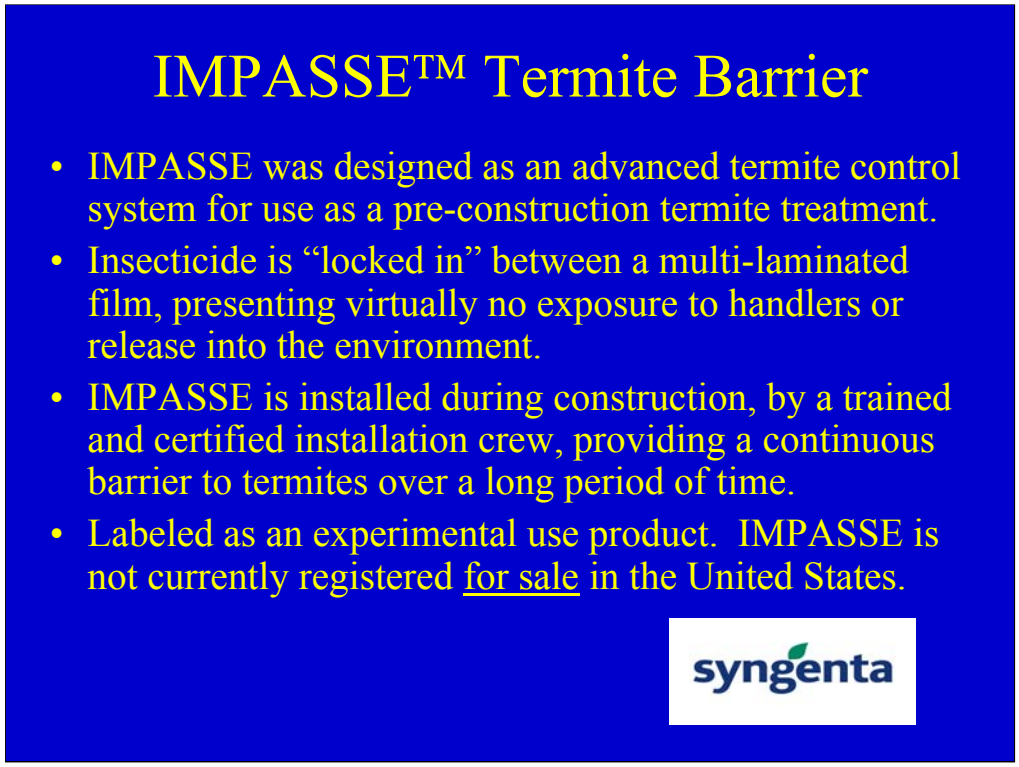
This is how the stainless steel product looks once installed around piping – prior to pouring the slab.

See disclaimer on inside front cover of this booklet.

This photo shows an installer "parging" Termi-Mesh over the cold joint created in preparation for a stem wall.

The "Parge" is a proprietary cement (SBR latex modified portland cement with a silica aggregate where half of the aggregate will pass through the MESH and half will not).

See disclaimer on inside front cover of this booklet.

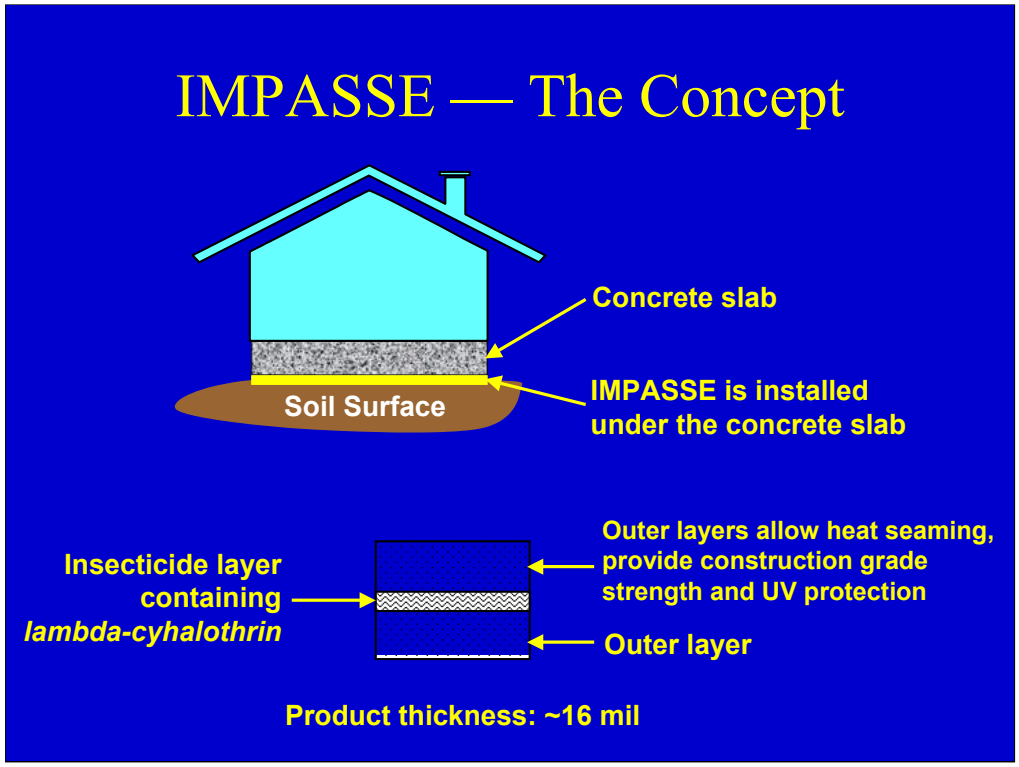


Impasse Termite Barrier is another type of physical barrier.

- IMPASSE was designed as an advanced termite control system for use as a pre-construction termite treatment.
- An insecticide is "locked in" between a multi-laminated film, presenting virtually no exposure to handlers or release into the environment.
- IMPASSE is installed during construction, by a trained and certified installation crew, providing a continuous barrier to termites over a long period of time.
- Labeled as an experimental use product. IMPASSE is not currently registered *for sale* in the United States.

[Note: Registration for commercial sale is currently planned for June 2002. Syngenta is the company that makes the product.]

See disclaimer on inside front cover of this booklet.



Note that this termite barrier also contains a pesticide.

May want to point out:

- product thickness (approximately 16 mil)
- the product is installed by a separate construction crew before the slab is poured
- the pesticide (lambda-cyhalothrin) is in a layer within the material
- outer layers allow heat seaming and provide construction grade strength and UV protection

See disclaimer on inside front cover of this booklet.

This slide shows actual application of the material.

Possible advantages and attributes include:

- correct rates always applied - no dilutions
- uniform, accurate product placement
- visible protection
- UV protected
- can reduce liability risk of misapplications
- soil leaching – not a concern
- less use of insecticide

See disclaimer on inside front cover of this booklet.

Protections and Warranties:

- Homeowner's insurance excludes termites
- Less than fifty percent of Florida homeowners have termite damage replacement warranties [Note: Old terminology was "bond".]
- Termite damage replacement warranties are only available from pest management companies

Pest management contracts are either "limited" or "full" warranties:

- Limited warranties require the pest management company to come back and retreat the infestation
- Full warranties require re-treatment and payment for damages caused by termites

Termite warranty renewal on new construction:

- Owner/occupant receives a one year warranty (hopefully you've ensured that it is a damage replacement warranty that will protect the homebuyer financially -- requires re-treatment and payment for damages caused by termites – should the termite treatment fail).
- The owner can renew this contract yearly for up to four additional years for a sum total of five years.
- Most pest management companies will require a new contract after the fifth year
- In order to continue the warranty for the home, re-treatment by the pest management company is usually required during the sixth year.

Notes:

- Reminder … Approximately fifty percent of homeowners let their termite protection contracts lapse, leaving them with no protection.
- Normally, the annual renewal fee will remain the same during the term of the contract.
- The homebuyer should make sure everything is spelled out and you should provide the pest management professional the name and address of the homebuyer so that they can be contacted for the annual renewals.

A building professional's home ☺

Actually, this slide is to show you that homeowners can play a large role in termite problems as well – although usually not to this extreme.

Usually, homeowners place plants too close to their home or they add a patio or sidewalk, etc. without calling the pest management professional, thereby disrupting the termiticide barrier. Storing items that encourage moisture in close proximity to your home can also increase termite activity. All of these practices can greatly increase the likelihood of a termite infestation.

[Note: This slide is intended to be both truthful and humorous…as well as to show that it takes many people to help prevent termite infestations: construction professionals, pest management professionals and homeowners. Simply put, adequate termite protection in today's environment requires four things: appropriate home design, proper construction techniques, proper termite protection application, and appropriate landscaping and maintenance.]

- Monolithic slabs
  - 1 gallon per 10 square feet
  - + 4 gallons per 10 linear feet per foot of depth around perimeter
- Supported or floating slabs
  - 1 gallon per 10 square feet
  - + 4 gallons per 10 linear feet per foot of depth inside perimeter of stem wall (concrete block walls)
  - + 2 gallons per 10 linear feet for block voids
  - + 4 gallons per 10 linear feet per foot of depth around outside perimeter

Let's spend a little more time on the most common form of termiticide pretreatment – the application of liquid termiticide to the soil.

Applying termiticides during construction requires application of a large volume of termiticide. This slide contains the generally used rates of finished mix.

Note to Instructor:

Be sure the participants understand this slide.

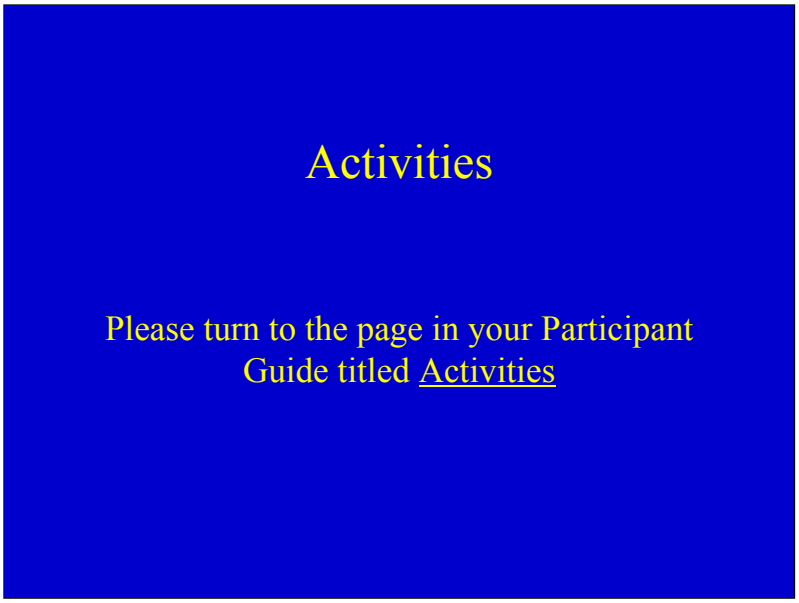
Any disturbance to the treated soil can displace the termiticide. Even the simple act of laying out and moving the hose for treatment has to be thought out.

Even the **application** of a termiticide pretreatment has to be thoroughly thought out as any disturbance to the treated soil can displace the termiticide.

What's the **minimum** amount of total time a pest control operator should be on your site to do a pretreatment on a fifty by forty foot monolithic slab?

Note to Instructor:

This is part of the activities the participants will be doing. Take a few "guesses" here and then go on to the next slide.



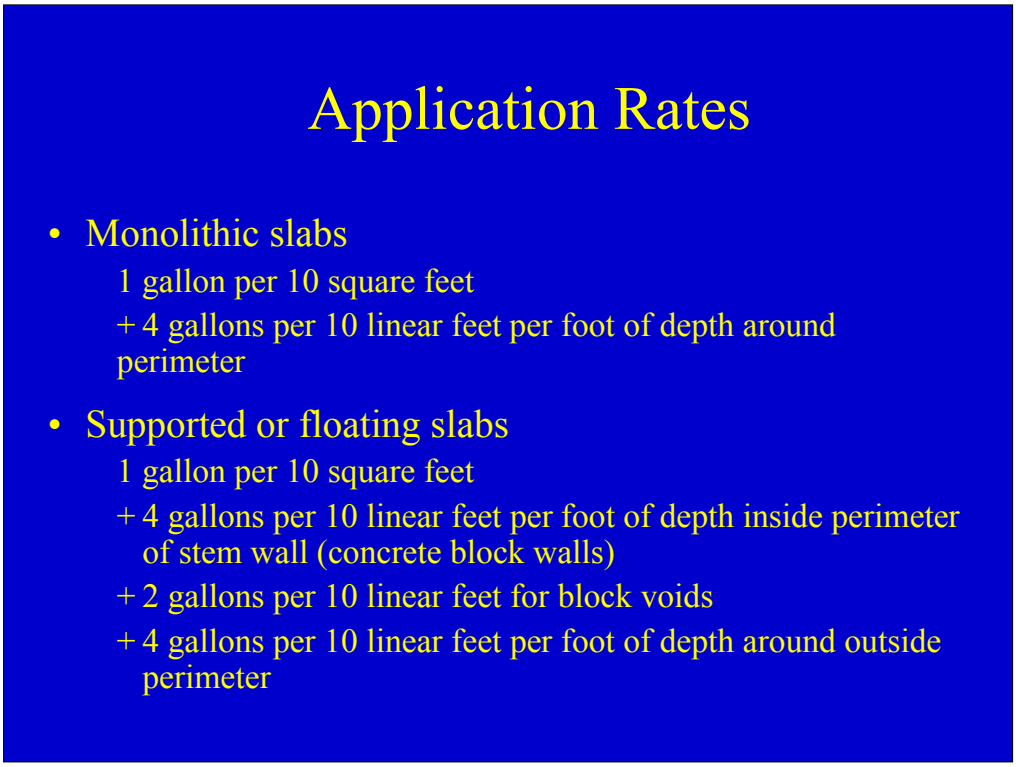
We're going to determine the answer to the question posed in the last slide, namely…

What's the **minimum** amount of total time a pest control operator should be on your site to do a pretreatment on a fifty by forty foot monolithic slab?

First we have some steps to do before we can get to the answer. We're also going to determine the **minimum** amount of total time a pest control operator should be on your site to do a pretreatment on a fifty by forty foot floating slab.

Note to Instructor:

Ask the participants to turn to the page in their Participant Guide titled "Activities". To introduce the activities you can say that although builders often subcontract out termiticide applications, the activities are designed to inform them of the process. Break the group into smaller groups (4 or 5 people in each group); give each group a calculator; ask the groups to answer the questions in Activity 1, Parts A, B, and C; after a few minutes, go through the answers and then repeat for Activity 2, Parts A, B, and C (did anyone "guess" the correct answer – from the previous slide?). For large groups you may have to just "walk" the participants through the steps in the process. The next slide in this presentation contains the generally used rates of finished mix (required formulas to complete the activities). Turn to the next slide before beginning the activities. Also, the answers are on the last two pages of the Instructor Guide.



As you do the activities, use this as your guide to the generally used application rates.

Monolithic slabs

1 gal per 10 sq ft

+ 4 gal per 10 linear ft per foot of depth around perimeter

Supported or floating slabs

1 gal per 10 sq ft

+ 4 gal per 10 linear ft per foot of depth inside perimeter of stem wall (concrete block walls)

+ 2 gal per 10 linear ft for block voids

+ 4 gal per 10 linear ft per foot of depth around outside perimeter

Note to Instructor:

Remember that the answers to the activities are on the last two pages of your Instructor Guide.