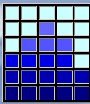


# Advanced Florida Building Code: Site Requirements



*Developed by*  
**BCIC LLC**  
Building Codes in Construction

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# Welcome

- Course title:
  - Course DBPR approval number:
  - # of hours: 2 hours Advanced credit
  - Course Instructor:
- 
- Turn cell phones off or to silent



This course details the requirements of the Florida Building Code as it pertains to site related requirements. The course discusses the Florida Building Code Chapter 11 Accessibility requirements for accessible sites, accessible routes, parking, curb ramps, ramps and detectable warnings and Termite Requirements that are contained in Chapter 1, Chapter 18, Chapter 21 and Chapter 23.



## Learning Objectives

At the end of the course, you will understand

- accessible site requirements
- accessible routes
- accessible parking
- accessible curb ramps
- accessible ramps
- termite protection of soil
- termite protection of wood
- inspection requirements for termites

Upon completion of the course, the participant will understand and be able to apply accessible site requirements, accessible routes, accessible parking, accessible curb ramps and ramps, termite protection of soil, termite protection of wood, and inspection requirements for termites.



## History of the Florida Building Code

- Hurricane Andrew
  - Wake up call
- Florida Building Codes Study Commission
- HB 4181 established
  - A single statewide Building Code
  - The Florida Building Commission

Hurricane Andrew exposed a serious statewide problem of an antiquated system of locally-administered building codes, building code compliance and enforcement. Thousands of buildings and structures that should have resisted the storm did not and the effect of this disaster was felt nationwide. The insurance industry was in crisis and threatened to pull out of the state. Local governments affected by Andrew were helpless attempting to recover and to come to grips with the jolt that Andrew delivered to the construction industry.

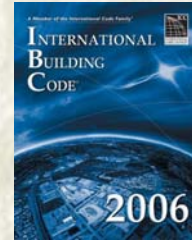
In response to the wake-up call from Andrew, Governor Chiles established in July of 1996 the Florida Building Codes Study Commission to evaluate the existing system and to recommend ways to improve or reform the system. After 16 months of study the Commission found a complex and confusing patchwork system of codes and regulations developed, amended, administered and enforced differently by more than 400 local jurisdictions and state agencies with building code responsibilities. This resulted in an inability to enforce and comply with the confusing system of multiple codes and administrative processes.

The Building Codes Study Commission provided a number of specific recommendations for reforming the building codes system, centered on the concept of a single statewide code. The 1998 Legislature adopted the concept and most of the recommendations as part of House Bill 4181, which amended and expanded greatly Florida Statute Chapter 553.

The law created the Florida Building Code to be the one document containing all of the design parameters for construction, the Florida Building Commission to assume and expand the duties of the Board of Building Codes and Standards and numerous goals and tasks for the Commission including role definition, penalties and education.

## What is the Florida Building Code?

- Based on the International Family of Codes with Florida specific modifications
  - International Building Code (IBC)
  - International Mechanical Code (IMC)
  - International Plumbing Code (IPC)
  - International Fuel Gas Code (IFGC)
  - International Existing Building Code (IEBC)
- 2007 Florida Building Code
  - Effective December 31, 2008



The first edition of the Florida Building Code was the 2001 edition and was based on the 1997 Standard Building Code. The Florida Building Code is now based on the International Family of Codes by the International Code Council. It includes the International Building Code, International Mechanical Code, International Plumbing Code, International Fuel Gas Code, and International Existing Building Code. The 2007 edition of the Florida Building Code will be effective December 31, 2008.



# The Florida Building Commission

- The Florida Building Commission was created to maintain the unified building code system



The Florida Building Commission was created to maintain the unified building code system

Responsibilities:

- code development
- declaratory statements,
- accessibility waiver requests,
- the approval of products and entities,
- the approval of education courses and course accreditors.

The Florida Building Commission has many different representatives from the construction industry such as code officials, architect, engineers, Department of Education, State Fire Marshal, contractors, Building owners and managers association, green building and a representative for persons with disabilities. The chair is appointed by the Governor.



The accessibility requirements for sites and buildings are housed in Chapter 11 of the Florida Building code. These requirements originate from Florida Statutes Chapter 553, Part V. The accessibility requirements can only be modified by the legislature.



# Accessibility Chapter 11

- Accessible site and exterior facilities
- Barrier removal
- Accessible route
- Parking
- Curb ramps and ramps
- Detectable warnings

In this course we will discuss the accessibility requirements of an exterior site. This includes the scoping requirements for accessible sites and exterior facilities, barrier removal, the requirements of an accessible route, parking, curb ramps, ramps and detectable warnings.

## Accessible Sites and Exterior Facilities FBC 11-4.1.2

- Accessible route from public areas of site to building entrance
- Accessible route between buildings
- Protruding objects
- Ground surfaces
- Signage

Excerpt from the Florida Building Code:

### FBC 11-4.1.2

An accessible site shall meet the following minimum requirements:

- (1) At least one accessible route complying with Section 11-4.3 shall be provided within the boundary of the site from public transportation stops, accessible parking spaces, passenger loading zones if provided, and public streets or sidewalks, to an accessible building entrance.
- (2) At least one accessible route complying with Section 11-4.3 shall connect accessible buildings, accessible facilities, accessible elements, and accessible spaces that are on the same site.
- (3) All objects that protrude from surfaces or posts into circulation paths shall comply with Section 11-4.4.
- (4) Ground surfaces along accessible routes and in accessible spaces shall comply with Section 11-4.5.
- (5) Parking spaces
- (6) If toilet facilities are provided on a site, then each such public or common use toilet facility shall comply with Section 11-4.22. If bathing facilities are provided on a site, then each such public or common use bathing facility shall comply with Section 11-4.23.
- (7) Building signage. Signs which designate permanent rooms and spaces shall comply with Sections 11-4.30.1, 11-4.30.4, 11-4.30.5 and 11-4.30.6. Other signs which provide direction to, or information about, functional spaces of the building shall comply with Sections 11-4.30.1, 11-4.30.2, 11-4.30.3, and 11-4.30.5. Elements and spaces of accessible facilities which shall be identified by the International Symbol of Accessibility and which shall comply with Section 11-

## Barrier Removal

### FBC 11-4.1.8(3)

- Requires the removal of architectural barriers from an existing parking facility

Section 11-4.1.8(3) requires the removal of barriers from an existing parking facility.

Excerpt from the Florida Building Code:

11-4.1.8 Accessible buildings, structures and facilities: Architectural barrier removal.

(3) The removal of architectural barriers from a parking facility in accordance with 28 C.F.R. Section 36.304 or with Section 553.508, Florida Statutes, must comply with this section unless compliance would cause the barrier removal not to be readily achievable. If compliance would cause the barrier removal not to be readily achievable, a facility may provide parking spaces at alternative locations for persons who have disabilities and provide appropriate signage directing persons who have disabilities to the alternative parking if readily achievable. The facility may not reduce the required number or dimensions of those spaces, nor may it unreasonably increase the length of the accessible route from a parking space to the facility. The removal of an architectural barrier must not create a significant risk to the health or safety of an individual with disabilities or others.

## Accessible Route - Definition

- A continuous unobstructed path connecting all accessible elements and spaces of a building or facility. Interior accessible routes may include corridors, floors, ramps, elevators, lifts, and clear floor space at fixtures. Exterior accessible routes may include parking access aisles, curb ramps, crosswalks at vehicular ways, walks, ramps and lifts.

When using codes it is always important to understand the terminology.

# Accessible Route

## FBC 11-4.3

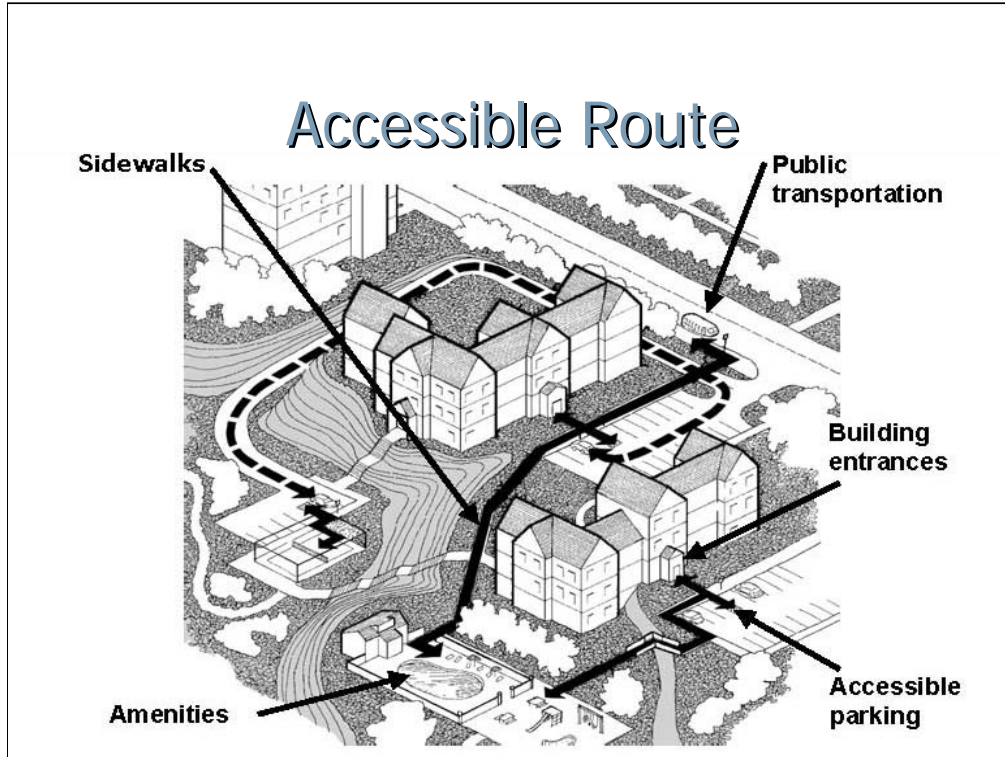
- At least one accessible route within the boundary of the site shall be provided from public transportation stops, accessible parking, and accessible passenger loading zones, public streets or sidewalks.

Accessible routes should begin at the perimeter of the site where the public would enter the site, whether it be at a public transportation bus stop or a sidewalk that enters the site or from the parking areas. There may be several accessible routes beginning at each of these locations and terminating at the building entrance. The accessible route includes the proper width of this passage, required passing space, headroom, surface textures, slope of the path, and any changes in level that may require a ramp or lift.

Excerpt from the Florida Building Code:

### 11-4.3.2 Location.

- (1) At least one accessible route within the boundary of the site shall be provided from public transportation stops, accessible parking, and accessible passenger loading zones, and public streets or sidewalks to the accessible building entrance they serve. The accessible route shall, to the maximum extent feasible, coincide with the route for the general public.
- (2) At least one accessible route shall connect accessible buildings, facilities, elements, and spaces that are on the same site.
- (3) At least one accessible route shall connect accessible building or facility entrances with all accessible spaces and elements and with all accessible dwelling units within the building or facility.
- (4) An accessible route shall connect at least one accessible entrance of each accessible dwelling unit with those exterior and interior spaces and facilities that serve the accessible dwelling unit.



This diagram depicts the accessible route from the public transportation stops at the site boundary through the site to the accessible entrance. It also shows an accessible route from the parking areas and other features on the site.



# Accessible Route

## FBC 11-4.3

### Components of an Accessible Route

- Width
- Passing Space
- Headroom
- Surface Textures
- Slope
- Changes in Level

Accessible routes should begin at the perimeter of the site where the public would enter the site, whether it be at a public transportation bus stop or a sidewalk that enters the site or from the parking areas. There may be several accessible routes beginning at each of these locations and terminating at the building entrance. The accessible route includes the proper width of this passage, required passing space, headroom, surface textures, slope of the path, and any changes in level that may require a ramp or lift.

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- (2) At least one accessible route shall connect accessible buildings, facilities, elements, and spaces that are on the same site.
- (3) At least one accessible route shall connect accessible building or facility entrances with all accessible spaces and elements and with all accessible dwelling units within the building or facility.
- (4) An accessible route shall connect at least one accessible entrance of each accessible dwelling unit with those exterior and interior spaces and facilities that serve the accessible dwelling unit.

#### 11-4.3.3 Width.

# Accessible Parking

## FBC 11-4.6

- Accessible Parking Spaces
- Access Aisle
- Curb Ramps
- Accessible Route
- Passenger Loading Zones
- Signage

The accessible parking requirements include a minimum number of accessible parking spaces, specific dimensions for the accessible parking space, adjacent access aisles to the accessible parking space and a sign designating the accessible parking space. An accessible route shall be provided from the accessible parking space to the building entrance, and passenger loading zones.

Excerpts from the Florida Building Code:

11-4.6 Parking and passenger loading zones.

11-4.6.1 Minimum number.

Parking spaces required to be accessible by Section 11-4.1 shall comply with Sections 11-4.6.2 through Section 11-4.6.5. Passenger loading zones required to be accessible by Section 11-4.1 shall comply with Section 11-4.6.5 and 11-4.6.6.

Total Parking in Lot	Required Minimum Number of Accessible Spaces
-------------------------	---

1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8

# Accessible Parking Spaces

## FBC 11-4.1.2(5)

### ■ Required minimum number

# of spaces		# req'd accessible spaces
1 to 25	=	1
26 to 50	=	2
51 to 75	=	3
76 to 100	=	4
501 to 1000	=	2% of total
1001 and over	=	20 plus 1 for each 100 over 1000

There are a minimum number of accessible spaces required by the code.

Excerpts from the Florida Building Code:

11-4.6.1 Minimum number.

Parking spaces required to be accessible by Section 11-4.1 shall comply with Sections 11-4.6.2 through Section 11-4.6.5. Passenger loading zones required to be accessible by Section 11-4.1 shall comply with Section 11-4.6.5 and 11-4.6.6.

Total Parking in Lot	Required Minimum Number of Accessible Spaces
-------------------------	---

1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2% of total
1001 and over	20 plus 1 for each 100 over 1000

## Accessible Parking Location

### FBC 11-4.6.2

- Accessible parking spaces serving a particular building shall be located on the **shortest safely** accessible route
- All spaces must be located on an accessible route no less than 44 inches wide.
- Spaces shall be located so that users will not be compelled to walk or wheel behind parked vehicles.

Section 11-4.6.2 provides the requirements for location of accessible parking. One must balance the shortest distance to the accessible entrance with the safest route. Parking should be located so that users do not have to wheel or walk behind parked vehicles. This is a safety issue and is specific to the Florida Code. It is acceptable for someone to wheel or walk behind their own parked vehicle but not others. This has changed the design of parking lots to allow for a center walking aisle in front of vehicles at the accessible parking spaces.

Excerpts from the Florida Building Code:

#### 11-4.6.2 Location.

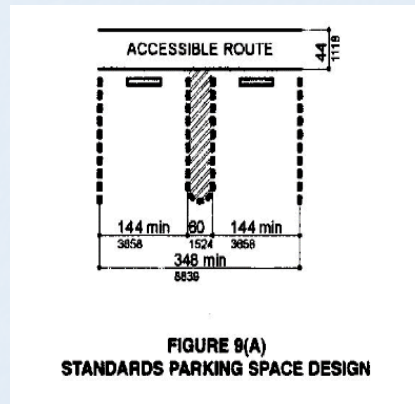
Accessible parking spaces serving a particular building shall be located on the shortest safely accessible route of travel from adjacent parking to an accessible entrance. In parking facilities that do not serve a particular building, accessible parking shall be located on the shortest accessible route of travel to an accessible pedestrian entrance of the parking facility. In buildings with multiple accessible entrances with adjacent parking, accessible parking spaces shall be dispersed and located closest to the accessible entrances.

Each parking space must be no less than 12 feet (3658 mm) wide.

(1) All spaces must be located on an accessible route no less than 44 inches (1118 mm) wide so that users will not be compelled to walk or wheel behind parked vehicles.

(2) If a theme park or entertainment complex [as defined in Section 509.013(9), see definitions] provides parking in several lots or areas from which access to the theme park or entertainment complex is provided, a single lot or area may be designated for parking by persons who have disabilities, if the lot or area is

## Parking Spaces/Access Aisle FBC 11-4.6.3



Each parking space must be no less than 12 feet (3658 mm) wide with an adjacent 5' access aisle. The size of Florida's parking space is a specific modification of the ADA Accessibility Design Guidelines. The parking space shall be level, no more than a 2% slope.

Excerpts from the Florida Building Code:

### 11-4.6.3 Parking spaces.

Parking access aisles must be no less than 5 feet (1524 mm) wide and must be part of an accessible route to the building or facility entrance. Two accessible spaces may share a common access aisle [see Figure 11-9(a)]. The access aisle shall be striped diagonally to designate it as a no-parking zone. Curb ramps must be located outside of the disabled parking spaces and access aisles.

Exception: If a theme park or entertainment complex in which are provided continuous attendant services for directing individuals to marked accessible parking spaces or designated lots for parking by persons who have disabilities, the park or complex may provide parking spaces that comply with the alternatives specified in Section 11-12.

Parked vehicle overhangs shall not reduce the clear width of an accessible route. Parking spaces and access aisles shall be level with surface slopes not exceeding 1:50 (2 percent) in all directions.

Parallel parking spaces must be even with surface slopes, may match the grade of the adjacent travel lane, and must not exceed a cross slope of 1:50, where feasible. Such spaces shall be designed per Sections 11-4.6.2 through 11-4.6.5.

Exception: Access aisles are not required.

Curbs adjacent to such spaces must be of a height that will not interfere with the

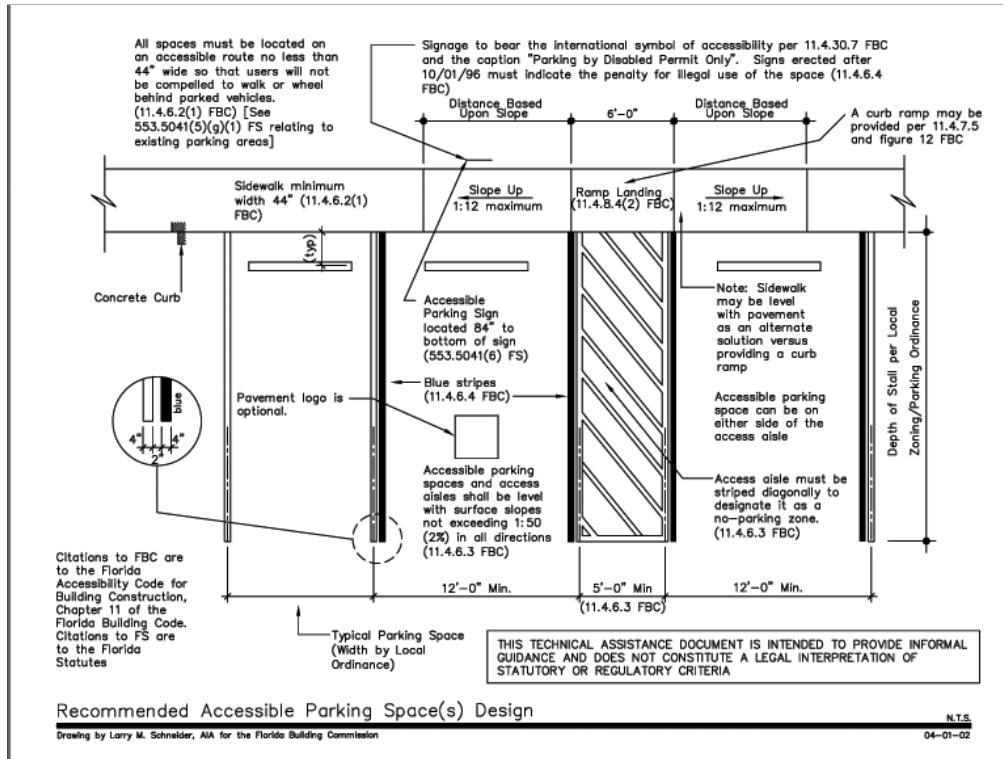


Although the accessible parking spaces are properly designated in this photo, notice where the curb ramp is located. The accessible parking space on the right will have to walk or wheel behind the vehicle parked in the accessible parking space on the left to reach the curb ramp for the accessible route to the building entrance. This would not comply with the requirements in Chapter 11 for the location of the accessible parking spaces. To solve this problem, if the accessible parking spaces were relocated to either side of the curb ramp sharing the 5' access aisle, this would prevent either occupant of the vehicles from walking or wheeling behind another parked vehicle.





This is an example of compliant accessible parking. Two accessible parking spaces share a 5' access aisle. The parking spaces are outlined in blue paint, the access aisle is striped in white. Signage is properly mounted to designate the accessible parking spaces. A curb ramp is provided in front of the accessible parking spaces at the sidewalk to provide an accessible route to the building entrance.



This is a diagram of the requirements of the Accessible Parking Space. It was developed as a guide to designers by the Florida Accessibility TAC. The purpose of this drawing was to depict all of the requirements of the accessible parking space. This is a typical example of how accessible parking spaces are designed in Florida along with an accessible route. Notice how parking spaces are measured.

# Parking Signage

## FBC 11-4.6.4

- Each accessible parking space shall be outlined in blue paint
- An above grade sign designating the accessible parking space is required
- Sign shall be mounted 7'-0" to the bottom of the sign.



Excerpts from the Florida Building Code:

### 11-4.6.4 Signage.

Each accessible parking space must be prominently outlined with blue paint, and must be repainted as necessary, to be clearly distinguishable as a parking space designated for persons who have disabilities and must be posted with a permanent above-grade sign bearing the international symbol of accessibility, meeting the requirements of color and design approved by the Department of Transportation, of Section 11-4.30.7 and the caption "PARKING BY DISABLED PERMIT ONLY." Such sign erected after October 1, 1996, must indicate the penalty for illegal use of the space.

Van accessible parking spaces located within a parking structure shall have an additional sign reading "VAN ACCESSIBLE" mounted below the symbol of accessibility. Such signs shall be located so they cannot be obscured by a vehicle parked in the space.

A theme park or an entertainment complex as defined in Section 509.013(9), Florida Statutes, in which accessible parking is located in designated lots or areas, the signage indicating the lot as reserved for accessible parking may be located at the entrances to the lot in lieu of a sign at each parking space.

Exception: Theme parks or entertainment complexes providing alternative parking spaces pursuant to the exception to Section 11-4.6.3 shall provide the "VAN ACCESSIBLE" sign complying with this section.



This photo shows an example of compliant accessible parking spaces. They include the proper width (12' wide) with the adjacent 5' wide access aisle. The parking and access aisle is properly striped and the spaces are designated with the proper signage. Notice the blue box with the wheelchair logo on the pavement. This is not required by code, but is commonly found at accessible parking spaces.





These parking spaces are non-compliant for the following reasons:

- Access aisle is not provided.
- Accessible Parking Signs are posted too low
- Accessible parking is on a slope, parking areas shall be level.

# Curb Ramps

## FBC 11-4.7

- Curb ramps shall be provided wherever an accessible route crosses a curb.
- Curb ramps must be located outside of disabled parking spaces and access aisles
- Handrails are not required
- EXCEPTION: Curb ramps that are a part of a required means of egress shall be not less than 44 inches wide
- Maximum slope of flared sides shall be 1:12

Curb ramps have to be provided wherever an accessible route crosses a curb. The curb ramps must be located outside of disabled parking spaces and access aisles. Handrails are not required. Curb ramps that are a part of a required means of egress shall be not less than 44 inches wide. The maximum slope of flared sides shall be 1:12.

Excerpts from the Florida Building Code:

11-4.7 Curb ramps.

11-4.7.1 Location.

Curb ramps complying with Section 11-4.7 shall be provided wherever an accessible route crosses a curb.

Curb ramps must be located outside of disabled parking spaces and access aisles.

11-4.7.2 Slope.

Slopes of curb ramps shall comply with Section 11-4.8.2. The slope shall be measured as shown in Figure 11-11. Transitions from ramps to walks, gutters, or streets shall be flush and free of abrupt changes. Maximum slopes of adjoining gutters, road surface immediately adjacent to the curb ramp, or accessible route shall not exceed 1:20.

11-4.7.3 Width.

The minimum width of a curb ramp shall be 36 inches (915 mm), exclusive of flared sides.

Exception: Curb ramps that are a part of a required means of egress shall be not less than 44 inches (1118 mm) wide.

11-4.7.4 Surface.

Surfaces of curb ramps shall comply with Section 11-4.5.

11-4.7.5 Sides of curb ramps.





This parking area is not compliant:

- Access aisle is not the proper width
- Curb ramps are in the parking space and access aisle
- Parking signs are too low
- The parking spaces may be on a slope as well.

# Ramps

## FBC 11-4.8

- The maximum slope of a ramp in new construction shall be 1:12
- Clear width shall be 36" unless part of required means of egress, then 44"
- Landings 5' at top, 6' at bottom in the direction of travel

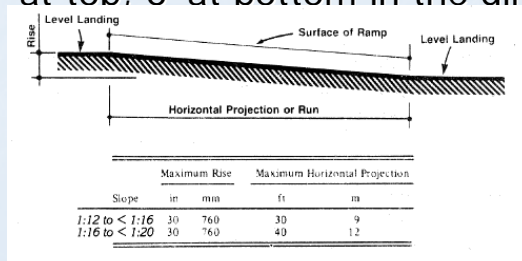


Figure 16

Excerpts from the Florida Building Code:

### 11-4.8 Ramps.

#### 11-4.8.1 General.

Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp and shall comply with Section 11-4.8.

#### 11-4.8.2 Slope and rise.

The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 1 to 12. The maximum rise for any run shall be 30 inches (760 mm) (see Figure 11-16). Curb ramps and ramps to be constructed on existing sites or in existing buildings or facilities may have slopes and rises as shown as allowed in Section 11-4.1.6(3)(a) if space limitations prohibit the use of a 1 to 12 slope or less (see Section 11-4.1.6).

#### 11-4.8.3 Clear Width.

The minimum clear width of a ramp shall be 36 inches (915 mm).

Exception: Ramps that are part of a required means of egress shall be not less than 44 inches wide (1118 mm).

#### 11-4.8.4 Landings.

Ramps shall have level landings at bottom and top of each ramp and each ramp run. Landings shall have the following features:

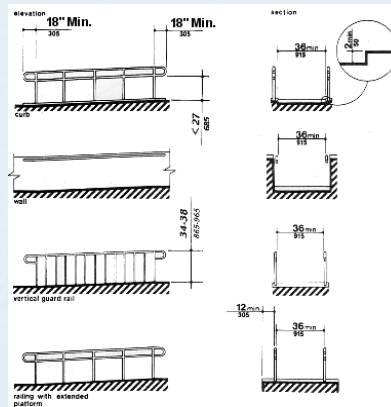
- (1) The landing shall be at least as wide as the ramp run leading to it.
- (2) All landings on ramps shall be not less than 60 inches (1524 mm) clear, and the bottom of each ramp shall have not less than 72 inches (1829 mm) of straight and level clearance

# Ramps – Handrails

## FBC 11-4.8

- Height – 34” to 38” to top
- Shall extend 18 inches at top and bottom
- Shall be continuous
- Ends shall be rounded or returned to floor, wall or post
- Mounted 1 ½” from wall

Figure 17



Excerpts from the Florida Building Code:

### 11-4.8.5 Handrails.

If a ramp run has a rise greater than 6 inches (150 mm) or a horizontal projection greater than 72 inches (1830 mm), then it shall have handrails on both sides. Handrails are not required on curb ramps or adjacent to seating in assembly areas. Handrails shall comply with Section 11-4.26 and shall have the following features:

- (1) Handrails shall be provided along both sides of ramp segments. The inside handrail on switchback or dogleg ramps shall always be continuous.
- (2) Handrails on ramps which are not continuous shall extend not less than 18 inches (457 mm) beyond the sloped segment at both the top and bottom, and shall be parallel to the floor or ground surface.
- (3) The clear space between the handrail and the wall shall be 1½ inches (38 mm).
- (4) Gripping surfaces shall be continuous.
- (5) Top of handrail gripping surfaces shall be mounted between 34 inches and 38 inches (865 mm and 965 mm) above ramp surfaces.
- (6) Ends of handrails shall be either rounded or returned smoothly to floor, wall, or post.
- (7) Handrails shall not rotate within their fittings.

### 11-4.8.6 Cross slope and surfaces.

The cross slope of ramp surfaces shall be no greater than 1:50. Ramp surfaces shall comply with Section 11-4.5.



This is an example of a ramp that has compliant continuous handrails and extensions as required.





This ramp does not have proper handrails, the ramp exceeds 6 feet in length and is more than a 1:20 slope, therefore it shall be required to meet the requirements of a ramp.

## Ramp Handrails



The handrails in this photo do not extend 18" past the bottom of the ramp. The ends of the handrail do not return to the post or floor.





The handrails installed in this project do not project out the required 18 inches beyond the ramp.

# Detectable Warnings

## FBC 11-4.29

Where Required:

- Detectable warnings at hazardous vehicular areas
- Detectable warnings at reflecting pools



The photos indicate three examples of detectable warnings. The one at the top and to the right does not comply and was used commonly a number of years ago and are still in place today. The stamped concrete pavers and vinyl or metal mats comply. They do not meet the letter of the Florida Accessibility Code, but do comply with the federal ADA and is approved by Florida Department of Transportation and is used extensively in Florida. These types of detectable warnings can be approved in Florida under equivalent facilitation.

Excerpts from the Florida Building Code:

11-4.29 Detectable warnings.

11-4.29.1 General.

Detectable warnings required by Sections 11-4.1 and 11-4.7 shall comply with 11-4.29.

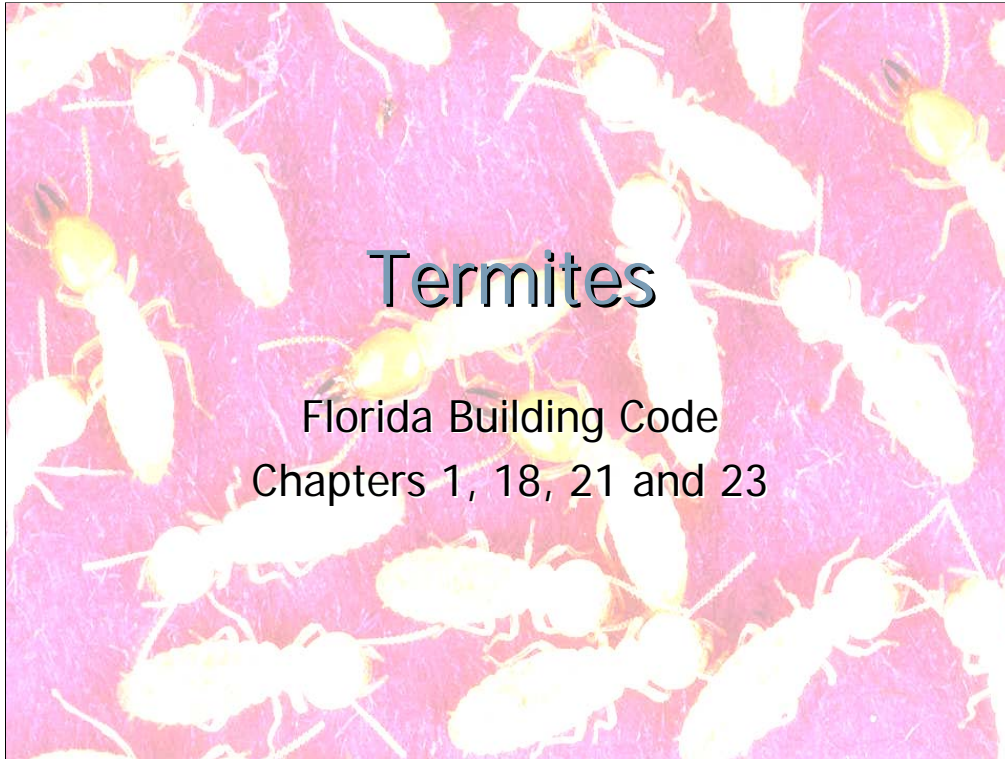
11-4.29.2 Detectable warnings on walking surfaces.

(1) All detectable warning surfaces required by the code shall be governed by the requirements of ANSI A117.1-1986.

(2) Detectable warning textures on walking surfaces shall consist of exposed aggregate concrete, cushioned surfaces made of rubber or plastic, raised strips, or grooves. Textures shall contrast with that of the surrounding surface. Raised strips or grooves shall comply with Figure 11-40(a) and Figure 11-40(b). Grooves may be used indoors only.

11-4.29.3 Detectable warnings on doors to hazardous areas.

Reserved.



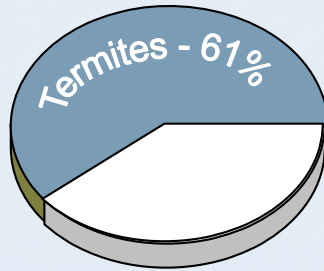
The following course describes basic information about termites and the building code requirements for the control of termites. These are contained in Chapters 1, 18, 21 and 23.

Wood-destroying organisms, such as termites, are a very serious problem in Florida. They attack and damage any building material that contains cellulose, such as wood used in house and building construction, drywall covered with paper, or siding materials containing cellulose. The pests commonly encountered in Florida include subterranean termites, dry-wood termites, and several wood-destroying beetles. One of the most prevalent and dangerous wood destroying organisms is the subterranean termite, which can cause significant wood damage to a house and other structures.

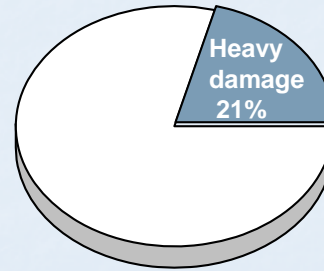
The termite's activity generally goes unnoticed until extensive damage becomes visible, and the economic impact is substantial.

## What do termites have to do with the Florida Building Code?

Infested with Termites



Damage



St. Johns County Survey of five-year-old houses

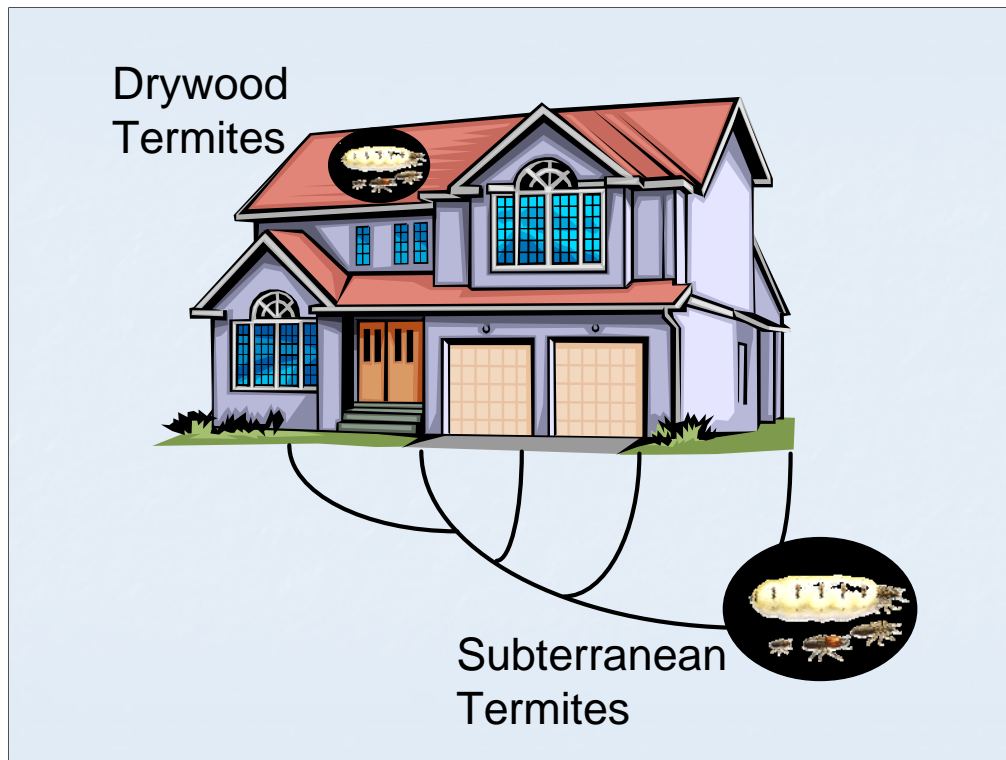
Why are there sections of the Florida Building Code specifically addressing termites?

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).]

It is important to know these concepts because any structure used in design, including garden structures, planters fences and the topography and plantings themselves can contribute to termite problems.



You must understand the differences between drywood and subterranean termites to better control or prevent infestations. Both kinds are found in Florida.

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.

Termite protection contracts are usually only for subterranean termites. A separate contract is usually required for treatment and protection from drywood termites.

The Florida Building Code does not require a preventive treatment for drywood termites for new construction. It does require a treatment for subterranean termites. Coastal and southern areas of the state are more likely to have infestation occur. Colonies are smaller and develop over a longer period of time than do subterranean termites therefore the potential for structural damage over a given period of time is less.

Even though colonies are slow to develop if left unchecked for extended periods of time substantial damage can occur. If you suspect an infestation of drywood termites make sure a positive identification is done by an experienced pest control operator. Drywood termites will also infest pieces of furniture (particularly antique



# Subterranean Termites



Mud tubes connect colony  
in soil with wood in structure



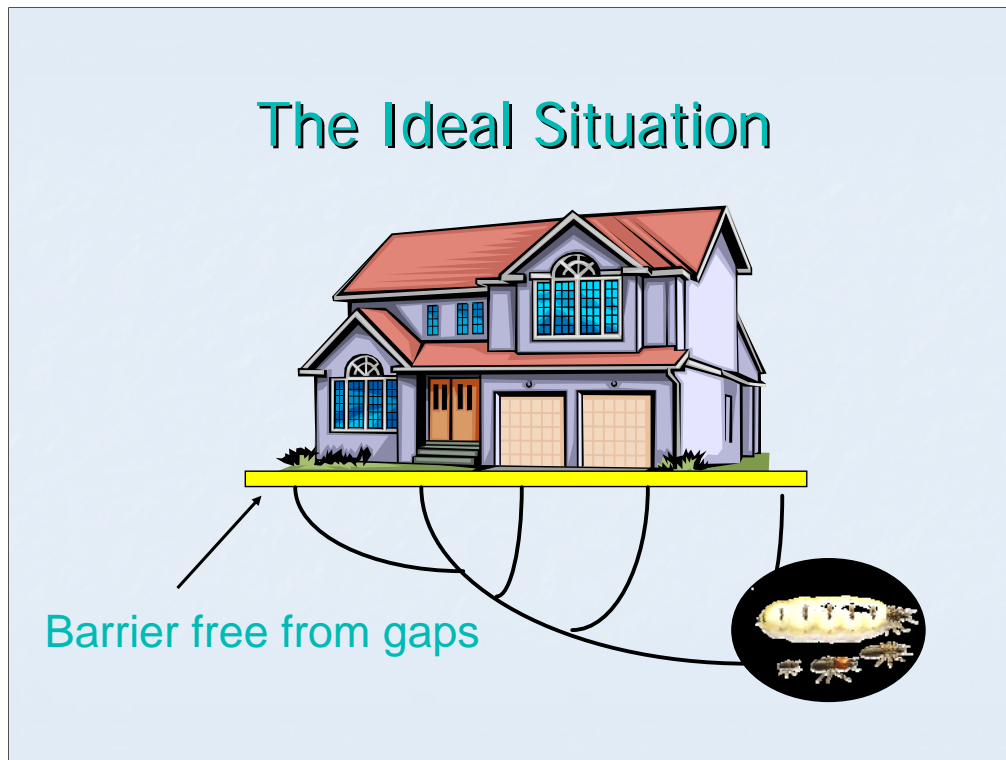
- Nest in soil (generally)
- Colonies range in size from a few thousand up to 10 million termites

To better understand subterranean termites you should know that they:

- 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.



## The Ideal Situation

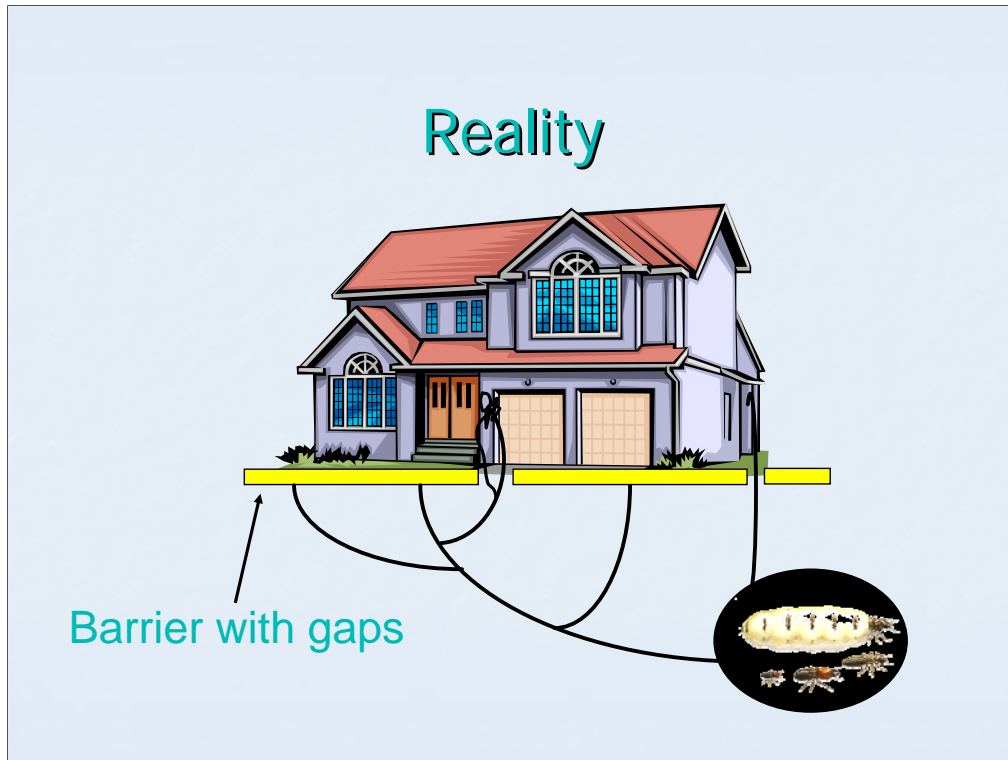


The *ideal* situation to prevent subterranean termites would be to create a barrier all the way under and around the home free or structure from gaps.

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 or structure without gaps in treatment. Many of the techniques described in the Florida Building Code will address methods of controlling the gaps, or reducing moisture and food. Like all creatures termites need a place to live, food and moisture.

Houses and other wood structures can be protected from termites only if they are constructed and maintained properly, and a protective treatment is applied correctly.

# Eastern Subterranean Termites



- Feed in the soft portion of the wood
- Create galleries
- Feed on anything containing cellulose
- An active colony can consume one pound of wood per day

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

## 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. The Florida Building Code will require and it is good practice to provide clear space around the building to allow ant such tubes to be seen.

Mud tubes can range from less than  $\frac{1}{4}$  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.



## 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 is subterranean termite control so important now?

- Before 1988 chlordane, heptachlor, and aldrin were used as barriers and lasted over 30 years
- After 1988 (post chlorinated hydrocarbon era) repellent termiticides replaced old chemistries
- Termiticides are now required to provide 5 years of 100% protection...when applied at the labeled rate

Why is the subject of 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.



# Termite requirements in the FBC

- Ch 1
- Ch 18
- Ch 21
- Ch 23



Termite control and techniques are described and required in several sections of the Florida Building Code- Building Edition. They are also described in the Florida Building Code- Residential Edition which is not detailed in this course.

Excerpts from the Florida Building Code:

104.2.6-Certificate of Protective Treatment for Prevention of Termites- Requires posting of applications - no "final approval" if all applications not made, including vertical barrier

104.2.7-Notice of Termite Protection- Requires posting of consumer notice inside house - will inform owner of need to renew contract and inspect annually

1403.1.6-Section 1403-Veneered Walls- Requires 6 inch space between grade and siding for termite inspection

1503.4.4-Protection Against Decay and Termites- Requires discharge lines and gutter downspouts to terminate at least one foot from foundation

1816.1-Foundations and Retaining Walls - Termite Protection- Requires foundations to have some form of protection from termites ("labeled for use as a preventative treatment to new construction")

1816.1.1-If soil treatment is used, must be done after compaction

1816.1.2-If soil treatment is used, disturbed areas must be re-treated

1816.1.3-If soil treatment is used, forms and traps must be plastic or metal

1816.1.4-If soil treatment is used, vapor barrier must be installed

1816.1.5-If soil treatment is used, concrete overpour must be removed

## Certificate of Treatment 105.10

- Weather-resistant job-site posting board for duplicate treatment certificates as each required protective treatment is completed.
- Provide a copy for the person the permit is issued to
- Provide a 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.

In order to inform both the building department, other contractors and the owner of a building under construction, Section 105.10 requires specific notification be provided to show how the soil was treated. What is required is a weather-resistant job-site posting board. Duplicate treatment certificates, at least two, are required when each protective treatment is completed. A copy of all of the certificates must be provided for the person the permit is issued to, and copies 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. The specifics are covered in greater detail further on in the course.

Excerpt from the Florida Building Code:

105.10 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

## Subterranean Termite Treatment Methods and Practices

- 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

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

# Termite Protection

## FBC 1816.1

- all buildings have pre-construction treatment protection against subterranean termites;
- the rules and laws of the Florida Department of Agriculture and Consumer Services apply to pre-construction soil treatment;
- a Certificate of Compliance—containing specific language—is issued to the building department by the licensed pest control company

Section 1816 contains specific requirements for Termite Protection. These include the requirement that all buildings have pre-construction treatment protection against subterranean termites; that the rules and laws of the Florida Department of Agriculture and Consumer Services will apply to pre-construction soil treatment; and that a Certificate of Compliance—containing specific language—is issued to the building department by the licensed pest control company.

Excerpt from the Florida Building Code:

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 Section 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.”

## Soil Treatment

FBC 1816.1.1 & 1816.1.2

Includes requirements that if soil treatment is used:

- Initial treatment inside the foundation perimeter shall be done
  - after all excavation, backfilling, and compaction, and
  - any soil area disturbed after the initial treatment shall be retreated, including spaces boxed or formed

It is important as was shown by the studies related to the industry that was described in prior slides, that soil treatment be applied after the slab and footings has been completed and are ready to accept vapor barriers, reinforcement and concrete. With pre-treatment, the goal is to create a chemical barrier in the soil that will stop termites from surfacing and attacking the wood in the home. **ANY** disturbance to the chemical barrier will create a gap that termites will exploit.

Excerpt from the Florida Building Code:

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





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. You will also need to supply a new or amended certificate. 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.



## Box-Outs

### FBC 1816.1.3

If soil treatment is used, requires:

- In concrete floors, spaces boxed out/formed for installation of plumbing traps, drains or any other purpose, must:
  - Be of plastic or metal permanently-placed forms
  - Be placed deep enough to eliminate any soil disturbance after the initial chemical soil treatment

The code requires that when an area is left out of the pour (boxed out), or depressed in the pour, the use of a plastic or metal permanent form must be used to eliminate any soil disturbance. As described in any of the sections related to soil treatment the goal is to provide an un-broken chemical barrier. Boxed out spaces in concrete floor areas for subsequent plumbing traps or any other purpose must be created with permanently placed inorganic forms of adequate depth to eliminate any planned soil disturbance after chemical soil treatment, and any accidental disturbance inside or around such forms.

Excerpt from the Florida Building Code:

#### 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.

## Vapor Barrier

### FBC 1816.1.4

If soil treatment is used,

- a minimum 6 mil vapor retarder to protect against rainfall dilution
- retreatment if rainfall occurs before vapor retarder placement
- that any work—including placement of reinforcing steel—done after chemical treatment until the concrete floor is poured, be done to avoid penetrating or disturbing treated soil

In order to protect the chemical soil treatment, the code requires that a 6 mil vapor barrier be placed over the treatment (also used to control moisture migration up from the ground thru the concrete). If the treatment has been disturbed by rain prior to the installation of the vapor barrier, then the soil must be retreated. An additional benefit of the use of vapor barriers is the removal of any source of chronic moisture since termites are attracted to damp wood for their food source. Moist soil is necessary for termites to survive.

Termites travel back and forth between soil and food sources because they must obtain moisture from the soil. In addition, capillary action and water vapor buildup can result in excessive dampness which can actually wick through a concrete slab or masonry foundation to the wood framing above it, thus attracting termites. A vapor barrier in addition to protecting the chemical barrier from rain also helps to control moisture under the slab and in the concrete.

Excerpt from the Florida Building Code:

#### 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.

## Overpour

### FBC 1816.1.5

- If there is concrete overpour or mortar accumulation, it must be removed *before* treatment

On some types of buildings or structures, such as those that utilize a stem wall, there may be overpours of concrete or mortar that are left over from the construction of the stem wall. The code requires that all of the waste concrete and mortar be removed. All concrete overpour or mortar excess accumulated along the exterior (as well as interior) foundation perimeter must be broken away and removed prior to exterior chemical soil treatments to enhance vertical penetration of the chemicals.

Excerpt from the Florida Building Code:

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

## Perimeter Treatment

### FBC 1816.16.1.6

- Requires chemical soil treatments to be applied an additional one foot from the exterior and vertically after;
  - Construction is complete
  - Landscaping is installed

Studies have shown that additional treatment when using chemicals must take place outside of the footprint of the building in areas such as patios and walks. Also when the structure is complete a treatment must be done when the final grade and landscaping is complete. This is very important for landscape designers to know, that treatments must take place after grading and landscaping is done. Often the building is built correctly, and treated and the grading and landscaping will defeat the treatment.

This section requires additional protection to the building exterior if chemical treatment is used.

Excerpt from the Florida Building Code:

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 1 foot (305 mm)

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.



## Registered Bait System

### FBC 1816.16.1.7

- States that the treatment steps do not apply to a registered bait system when:
  - There is a signed contract for a minimum of 5 years from CO
  - And the system must be installed prior to final building approval.

None of the above steps apply that are required for “chemical” treatment are required if you use a registered bait system. If a bait system is used there has to be a signed contract assuring the installation, maintenance and monitoring of the baiting system for a minimum of 5 years from the issue of the certificate of occupancy. This information has to be provided to the building official prior to the pouring of the slab, and the system must be installed prior to final building approval.

Excerpt from the Florida Building Code:

1816.1.7 If a registered termiticide formulated and registered as a bait system is used for subterranean termite prevention, Sections 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 5 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..

## Registered Wood System

### FBC 1816.16.1.8

- States that the treatment steps do not apply to a registered wood system when:
  - Application of the wood-treatment is as required by label directions for use
  - Must be completed prior to final building approval and any changes

None of the above steps apply if you use a registered wood system. The wood system has to be applied according to the label, it must be complete before the building final, and applied when there are any changes. This can be difficult to monitor when walls change or parts in the walls change.

Excerpt from the Florida Building Code:

1816.1.8 If a registered termiticide formulated and registered as a wood treatment is used for subterranean termite prevention, Sections 1816.1.1 through 1816.1.6 do not apply. Application of the wood-treatment termiticide shall be as required by label directions for use, and must be completed prior to final building approval. Changes in framing or additions to framing in areas of the structure requiring treatment that occur after the initial wood treatment must be treated prior to final building approval.

# Sleeves

## FBC 1816.2

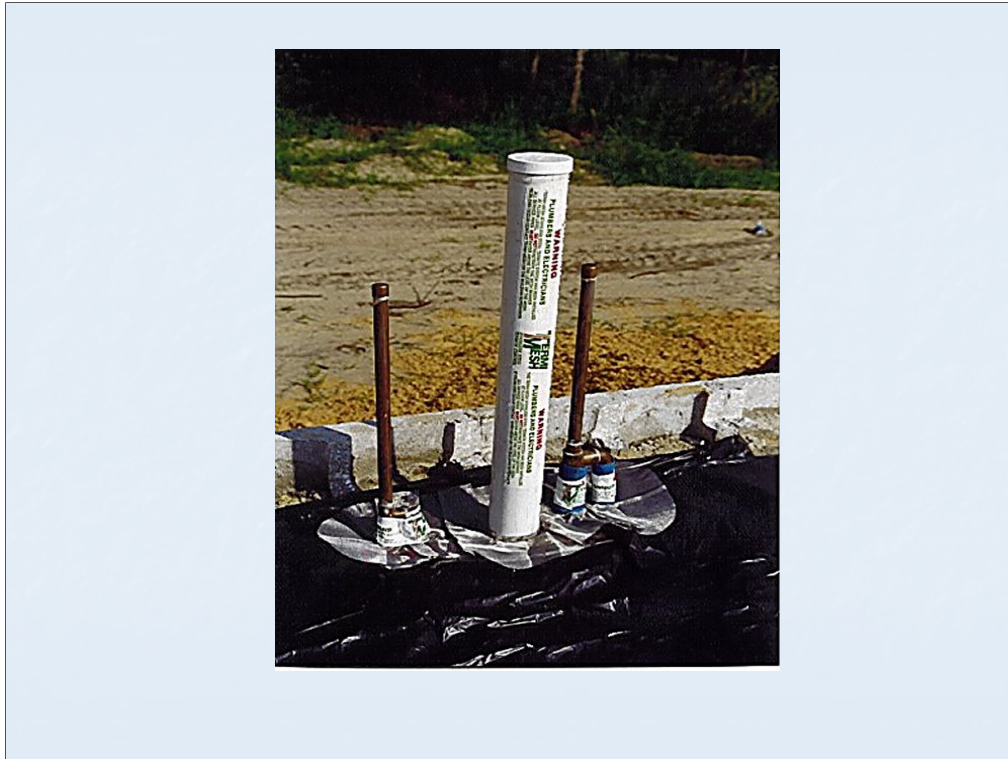
Penetration- If soil treatment is used protective sleeves around metallic piping penetrating concrete slab-on-grade floors:

- Must not be made of cellulose-containing materials
- The sleeve shall have a nominal thickness of 0.010 inch and sized for the pipe
- The sleeve is sealed within the slab using a noncorrosive clamping device to eliminate the annular space between the pipe and pipe sleeve.

When ever you poke a hole in the slab, you create an avenue for termites to enter the building from the soil. The code requires that the sleeves around pipes not be made of cellulose. Which as we know is termite food, and that the penetration be protected using a sleeve material. The main entry points for termites are pipe penetrations, construction joints and, bath traps. Flashings may not fit snugly enough around pipe penetrations to ward off determined populations. Common pipe wraps provide termites access into the house and protect them from soil termiticides as they enter through slab penetrations. The use of a physical barrier around pipes, solves the problem completely. This section was changed in the glitch amendment cycle and does not read the same as in the first printing of the FBC.

Excerpt from the Florida Building Code:

1816.2 Penetration. Protective sleeves around piping penetrating concrete slab-on-grade floors shall not be of cellulose-containing materials. If soil treatment is used for subterranean termite protection, the sleeve shall have a maximum wall thickness of 0.010 inch, and be sealed within the slab using a non-corrosive clamping device to eliminate the annular space between the pipe and the sleeve. No termiticides shall be applied inside the sleeve.



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

## Sites

### FBC 2304.13

#### Preparation of building site and removal of debris

- 2304.13.1 Building sites shall be graded to provide drainage under all portions of the building not occupied by basements
- 2304.13.2 The foundation and area within 1 ft must have all vegetation, stumps, dead roots, cardboard, trash, and foreign material removed. Any fill material must be free of vegetation and foreign material, as well.

There are two concepts here that you need to take into consideration for prevention of termites. One is the removal of food that could be under the building as debris such as wood stumps, logs, branches and construction debris such as cuttings from framing or forms. The other concept is the removing of water from under the building by the use of correct drainage. Remember termites need a place to live, water and food.

Excerpt from the Florida Building Code:

#### 2304 CONSTRUCTION Requirements

##### 2304.13 Preparation of building site and removal of debris

2304.13.1 All building sites shall be graded to provide drainage under all portions of the building not occupied by basements.

2304.13.2 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.”



# Debris

## FBC 2304.13

### Preparation of building site and removal of debris

- 2304.13.3 Lists items that must be removed under and within 1 foot of building
  - Wood forms, supports, wooden stakes, contraction spacers, tub trap boxes, plumbing supports, bracing, shoring, forms or other cellulose containing material shall be removed.

This section is meant to remove identified areas where construction techniques or post-construction techniques contribute to the termite problem. It will be difficult to “removed from all under the building” after the building is complete. It has long been a code requirement to remove such debris from under the building. The code require the removal of forms that used to be left in place which did create problems. When the studies were done in St. Johns County, one area that clearly created a problem was where forms used to create pans for showers, or changes in elevation, or grade stakes created both a food source and highway for termites.

Excerpt from the Florida Building Code:

#### FBC 2304 CONSTRUCTION Requirements

2304.13.3 After all work is completed, loose wood and debris shall be completely removed from under the building and within 1 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.



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.



Wood left on  
the ground

Termite swarmers  
at certain times  
of the year



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.?

# Decay and Termites

## FBC 2304.11.1

If protection of wood members is required by this section, it must be by using naturally durable or preservative-treated wood.

- 2302.1.1.1 Definitions: “naturally durable wood” refers to the heartwood of the following species
  - ✓ Decay resistant: Redwood, Cedars, Black Locust and Black Walnut
  - ✓ Termite resistant: Redwood, Eastern Red Cedar
- an occasional piece with corner sapwood may be included if 90% or more of the width on each side of it is heartwood

This section states that if protection of wood members is required by this section, it must be by using naturally durable or preservative-treated wood. There is a definition of what naturally durable is. Certain wood species are naturally resistant to termite attack and offer an alternative to preservative-treated wood. It is important to note, however, that it is only the heartwood (and sometimes the bark) that exhibits termite resistant properties. The heartwood of some wood species contains chemical extractives that prevent attack by decay and insects. The extent of natural durability depends on the wood species and also varies within the same species and even the same tree.

Excerpt from the Florida Building Code:

### 2304 PROTECTION AGAINST DECAY AND TERMITES

#### 2304.1 Protection

2304.11.1 Where protection of wood members is required by this section, protection shall be provided by using naturally durable or preservative-treated wood.

2302.1. The definition: “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”).

## Treated Wood

### FBC 2302.11

- PRESERVATIVE-TREATED WOOD. Wood (including plywood) pressure treated with preservatives in accordance with Section 2303.1.8.
- 2304.11.1 through 2304.11.6 Wood subject to damage from both decay and termites shall be: a naturally durable species resistant to termites or preservative-treated

The code also requires the use of preservative treated wood. This is the definition of what preservative-treated wood is. Naturally durable or preservative treated wood is required in sections 2304.11.1 thru 2304.11.6. To ensure that the wood is properly treated, look for a quality mark or stamp of an American Lumber Standards Committee (ALSC) accredited agency on the wood. If such a mark or end tag for the preservative treatment (not the lumber grade stamp) is present, it is an indication that the producer of the treated wood product subscribes to an independent inspection agency. These "third party" agencies verify for customers that their wood was properly treated in accordance with standards of the American Wood-Preservers' Association (AWPA).

In addition to identifying information on the producer, the stamp indicates the type of preservative, the retention level of the preservatives, and the intended exposure conditions. Retention levels are provided in pounds of preservatives per cubic foot of wood. Retention levels are specific to the type of preservative, wood species, and intended exposure conditions. The appropriate treated wood will depend on whether the intended applications are above ground, ground contact, fresh water, marine (salt water), or in a permanent wood foundation. Detailed specifications on the different treatments can be found in the applicable standards of AWPA and ASTM International. The ASTM standard on specification for pressure treatment of timber products is ASTM D 1760.

Excerpt from the Florida Building Code:

#### 2304.11 PROTECTION AGAINST DECAY AND TERMITES

2302.1 PRESERVATIVE-TREATED WOOD. Wood (including plywood) pressure treated with preservatives in accordance with Section 2303.1.8.



## Posts and Timbers

### FBC 2304.11.2.7

- Require posts and laminated timbers to be a naturally durable species resistant to termites or preservative-treated unless the posts:
  - Supported by concrete piers or metal pedestals projected at least 1 inch above the slab or deck and 6 inches above exposed earth, and are separated by an impervious moisture barrier
  - In enclosed crawl spaces or unexcavated areas located within the periphery of the building, and supported by a concrete pier or metal pedestal at a height greater than 8 inches from exposed ground, and are separated there from by an impervious moisture barrier

Whenever you have posts or columns placed so that they are proximate to the soil, they must be a naturally durable species resistant to termites or preservative-treated . The exception are when the columns are

supported by concrete piers or metal pedestals projected at least 1 inch above the slab or deck and 6 inches above exposed earth, and are separated by an impervious moisture barrier or are in enclosed crawl spaces or unexcavated areas located within the periphery of the building, and supported by a concrete pier or metal pedestal at a height greater than 8 inches from exposed ground, and are separated there from by an impervious moisture barrier.

Excerpt from the Florida Building Code:

2304.11.2.7 Posts or columns. Posts or columns supporting permanent structures and supported by a concrete or masonry slab or footing that is in direct contact with the earth shall be of naturally durable or preservative-treated wood

## Ground Contact

### FBC 2304.11.4

- Wood in contact with ground or freshwater shall be naturally durable or preservative-treated using water-borne preservatives except when the wood is continuously below the water

Section 2304.11.4 contains the requirements when wood is completely below water or subject to fresh or ground water.

Excerpt from the Florida Building Code:

2304.11.4 Wood in contact with the ground or freshwater. Wood used in contact with the ground (exposed earth) in the locations specified in Sections 2304.11.4.1 and 2304.11.4.2 shall be naturally durable (species for both decay and termite resistance) or preservative treated using water-borne preservatives in accordance with AWPA U1 (Commodity Specifications A or F) for soil or fresh water use.

Exception: Untreated wood is permitted where such wood is continuously and entirely below the ground-water level or submerged in fresh water.

## Embedded Posts

### FBC 2304.11.4.1

- Posts or columns that are embedded in concrete and which support permanent structures that are embedded in concrete that is exposed to the weather or in direct contact with the earth has to be of preservative-treated wood

When a post is in contact with the earth, or embedded in concrete that is exposed to the earth it must be preservative- treated.

Excerpt from the Florida Building Code:

2304.11.4.1 Posts or columns. Posts and columns supporting permanent structures that are embedded in concrete that is in direct contact with the earth, embedded in concrete that is exposed to the weather or in direct contact with the earth shall be of preservative-treated wood.

## Floors and Roofs

### FBC 2304.11.4.2

- Requires naturally durable or preservative-treated wood to be used when floors or roofs are supported by wood, moisture permeable and not separated by an impervious barrier naturally durable or preservative-treated wood

When a roof or floor subject to weather exposure, that is moisture permeable is supported by wood frame and not separated by a moisture barrier must be naturally durable or preservative-treated wood.

Excerpt from the Florida Building Code:

2304.11.4.2 Wood structural members. Wood structural members that support moisture-permeable floors or

roofs that are exposed to the weather, such as concrete or masonry slabs, shall be of naturally durable or preservative-treated wood unless separated from such floors or roofs by an impervious moisture barrier.

## Decks and Fences

### FBC 2304.11.4.3

- Requires that decks, fences, patios, planters and other wooden building components must be constructed to have:
  - Eighteen-inch (457 mm) clearance beneath, or
  - Six-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

When the designer or property owner building fences, decks, patios, planters etc, that abut a foundation wall or the building structure, the building fences, decks, patios, planters etc. have to have 18" clearance from the ground, or 6" clearance from the top of the component to the wall, or be easily removable...the intent is for inspection.

Excerpt from the Florida Building Code:

2304.11.4.3 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:

1. Eighteen-inch (457 mm) clearance beneath, or
2. Six-inch (152 mm) clearance between the top of the component and the exterior wall covering or
3. Have components that are easily removable by screws or hinges to allow access for inspection of the foundation sidewall and treatment for termites.



## Balconies and Porches

### FBC 2304.11.5

- Wood members that support of balconies, porches or similar permanent building appurtenances that are exposed to the weather and not covered with a roof, eave, overhang must be naturally durable or preservative-treated wood

All wooden appurtenances including structural supports of buildings, balconies, and porches that are subject to the weather must be naturally durable or preservative-treated wood.

Excerpt from the Florida Building Code:

2304.11.5 Supporting member for permanent appurtenances. Naturally durable or preservative-treated wood

shall be utilized for those portions of wood members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances where 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.

Exception: When a building is located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use durable materials where the structure is exposed to the weather.

## Foam FBC 2304.11.10

- 2304.11.10 requires that when foam insulation is close to the ground that it have to meet Section 2603.8 unless there is six inches clear space
- Section 2603.8 does not permit foam insulation to be below ground in termite prone areas

It is important to know that foam insulation is not permitted below ground in termite prone areas. When foam is used in such areas there has to be at least 6 inches clearance to finished earth work. Foam is a great highway for termites to enter the building or structure and hide the pathways and problem.

Excerpt from the Florida Building Code:

2304.11.10 Foam-plastic insulation.

2304.11.10.1 The provisions of Section 2603.8 shall apply to the installation of foam plastic insulation in close proximity to the ground.

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.

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.

2603.8 Protection from termite damage.

2603.8.1 Foam-plastic insulation including, but not limited to, extruded or expanded polystyrene or polyisocyanurate shall not be installed below grade on

## Inspections required

- The Florida Building Code, Building
- and the Florida Building Code, Residential
- have the same requirements for inspections.



The Florida Building Code, Building and the Florida Building Code, Residential have the same requirements for inspections.

## Permits FBC 105.10

### Certificate of Protective Treatment for Prevention of Termites

- Requires a weather-resistant board on the jobsite for posting of Termite Treatment Certificates
- Certificate must include:
  - Product used
  - Area treated
  - Applicator
  - Chemical used
  - Treatment time and date
  - Concentration
  - Site location
  - Gallons used
- The final exterior treatment applies only to cases where a soil chemical barrier method is used

As describe previously, a certificate of protective treatment is required. The certificate must have the product used, the identity of the applicator, time and date of the treatment, the site location, the area

treated, the chemical used, the percent concentration and number of gallons used. If the soil chemical barrier

method for termite prevention is used, final exterior treatment has to be completed prior to final building approval.

Excerpt from the Florida Building Code:

#### FBC 105 PERMITS

105.10 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

# Inspections

## FBC 109.3.4

### Termites

- Building components and surroundings that must be protected from termite damage:
  - in accordance with 1503.6, Section 2304.13, Section 2304.11.6 or
  - specifically required to be inspected for termites in accordance with 2114, or
  - required to have chemical soil treatment in accordance with 1816
- shall not be covered or concealed until released by the building official

As stated in the text, both building components and *their surroundings*, must be inspected as stated by the code, prior to covering up. The sections that require inspection can include: Section 1503.6, Section 2304.13 or Section 2304.11.6, specifically required to be inspected for termites in accordance with 2114, or required to have chemical soil treatment in accordance with 1816.

Excerpt from the Florida Building Code:

FBC 109 INSPECTIONS FBC 109.3.4 Termites

Building components and building surroundings required to be protected from termite damage in accordance with Section 1503.6, Section 2304.13 or Section 2304.11.6, specifically required to be inspected for termites in accordance with 2114, 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.”

109.3.4 Termites. Building components and building surroundings required to be protected from termite damage in accordance with Section 1503.6, Section 2304.13 or Section 2304.11.6, specifically required to be inspected for termites in accordance with Section 2114, or required to have chemical soil treatment in accordance with Section 1816 shall not be covered or concealed until the release from the building official has been received.

# Termite Inspection

## FBC 2114

Includes removal of all non-preservative treated on or non-naturally durable wood or other cellulose-containing material in cells and cavities in masonry units and air gaps between brick, stone or masonry veneers and the structure prior to concrete placement

It is important to remove all wood that is not treated to remove the food source for termites include any wood debris in cells or cavity's.

Excerpt from the Florida Building Code:

### SECTION 2114

#### TERMITE INSPECTION

2114.1 Cleaning. Cells and cavities in masonry units and air gaps between brick, stone or masonry veneers and the structure shall be cleaned of all nonpreservative-treated or nonnaturally durable wood, or other cellulose-containing material prior to concrete placement.

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



# Termite Inspection

## FBC 2114.2

Brick, stone, or other veneer must be supported by a concrete bearing ledge at least equal to the total thickness of the brick, stone or other veneer, which is poured integrally with the concrete foundation.

- No hidden cold joints are permitted
- An approved physical barrier must also be installed from below the wall sill plate
- If masonry veneer extends below grade and there is no physical barrier, a treatment must be applied to the cavity

It is important to reduce all voids. Section 2114.2 requires that angles or ledges that support brick, stone or other veneer must be made integrally to reduce voids.

Excerpt from the Florida Building Code:

2114.2 Concrete bearing ledge. Brick, stone or other veneer shall be supported by a concrete-bearing ledge at least equal to the total thickness of the brick, stone or other veneer, 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 shelf, angle or lintel secured to the foundation sidewall in accordance with ACI 530/ASCE 5/TMS 402, provided at least a 6-inch (152 mm) clear inspection space of the foundation sidewall exterior exist 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.

## High Velocity Hurricane Zones— Concrete Slabs on Fill

FBC 1820.2 & 1820.5

- All fill placed under slabs must be clean sand or rock, free of debris. Max size of rock within 12" below slab is 3"
- Fill must be thoroughly compacted

There are specific requirements for termites, as there are for many code issues in the High Velocity Hurricane Zone. The High Velocity Hurricane Zone is primarily Dade and Broward County.

Excerpt from the Florida Building Code:

### 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.”



There are a number of systems that can be used to treat and/or prevent termites.

There are three major methods to treat and/or prevent termites. We have spent most of the time in the course, and the building code spend most of the time as well with the Traditional Barrier System.

**Traditional repelling barrier system.** This system places a chemical barrier between the ground and every potential entry point into the house. Chlordane, a very effective and long-lasting chemical repellent, was commonly used in this process until the EPA removed it from the market in the 1980s. The barrier chemicals used today are less durable than chlordane and must be reapplied after a few years.

**Bait system.** A worker using this technique strategically places a series of baits around the house. The intention is for termite colonies to encounter one or more of the baits before approaching the house. Once termite activity in the bait is observed, the bait wood is replaced with an active ingredient. The termites bring the active ingredient back to the colony, and the colony is either eliminated or substantially reduced. This system is relatively new to the market. Its success depends on the termite staking the bait before finding and damaging the house.

**Nonrepelling barrier system.** This procedure is similar to a traditional barrier system, except that the active ingredient used is not a repellent. The termites cannot detect the active ingredient and thus bring it back to the colony, where it can either eliminate or substantially reduce the colony. This system is also relatively

## Concerns with Liquid Termiticides

- Use of many gallons of chemicals to treat a structure
- Longevity questions
  - Soil type, climate, etc
- Can't be used in certain situations
  - Wells
  - Low lying areas
  - Areas subject to high moisture

One of the issues with the traditional repelling system is with the use of a pesticide.

There are concerns with the use of 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.)

## Situations Where Baiting Systems May Be Preferred

- Close proximity to wells
- High water tables
- Concerns about chemicals
- Situations:
  - Where termiticides may wash away
  - Resulting from poor construction practices
  - Where pets and vertebrate pests may dig
  - Where soil will be disturbed by landscape or irrigation system installation and maintenance

Another option is the use of termite colony monitoring and baiting systems as opposed to chemical treatment.

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.



## Disadvantages of Baits

- Success is dependent on the ability of termites to find monitor stations
  - We know little about termite foraging behavior
- May require a year or longer to attain control (but may eliminate colony)
- Expensive
- Success also depends on skills and dedication of the technician for installing, monitoring, baiting, and maintaining the bait station

There are disadvantages to the use of baits and they 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.

## Borate-Containing Compounds

- Disodium octaborate tetrahydrate (DOT)
  - Similar to boric acid
  - Acts as a stomach poison
  - 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) and topical
  - Includes borate-containing compounds like Bora-Care and TimBor

Wood treatment systems use a chemical or substance coating the wood to kill or discourage insects. Wood treatment is a form of chemical barrier. There are three primary methods of wood treatment currently prevail: creosote pressure-treated wood, pentachlorophenol pressure-treated wood, and inorganic arsenical pressure-treated wood.

The pressure-treating process is done by commercial facilities and made available to users in the final wood product. Copper naphthenate, zinc naphthenate, and tributyltin oxide are other wood treatment options that can be site applied. All of these treatment processes involve dangerous chemicals . Chromated copper arsenate (CCA) is the most popular wood treatment product available today. The chemicals are inert within the material and offer protection from moisture and decay fungi. The chemicals do not penetrate into the heartwood effectively so a sealer is advisable on cut ends of CCA treated wood. Although CCA treated wood is sawn on jobsites, hardly anyone seals the cuts. All pressure treated products require adherence to safety precautions approved by the EPA.

The toxicity of the chemicals used in wood treatment has led to research into less toxic methods such as the use of borates derived from the natural element boron (borax). Borates (from boron) are used in wood in New Zealand and Australia and offer insect protection and fire retarding benefits to wood. Full-scale commercial introduction of borates in the U.S. awaits resolution of the leaching problem of borates. Since borates are water soluble, water dilutes them and leaves the wood unprotected from decay after a period of time. In a location unexposed to water, they are effective in preserving wood; site applied borate products are available.

Termiticide treatment with borate-containing compounds such as disodium octaborate tetrahydrate (DOT) is the usual method seen in Florida, as opposed to chemical treatment or baits. DOT is similar to boric acid, and acts as a stomach poison. Also often mentioned is that borates interfere with the metabolic process.



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 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 AWP (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”

# Physical Barriers

- Barrier prevents termite penetration
- Termi-mesh
  - corrosion-resistant stainless steel
- Must be installed at time of construction



Physical barriers, intended to prevent termite penetration, are another option. There are no direct references in the building code, so their use would have to be approved by the building official. These are used in Hawaii.

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.



This photo shows an installer "paring" 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).



# The End

- Questions or comments
- Fill out evaluations