NCPMA WDI Inspector Examination Procedures

Congratulations on your participation in the NCPMA WDIR program. Now that you've taken the class, here are the steps needed to complete the Inspector Certification Program.

Step One: After the course, take the exam at any LaserGrade facility nationwide. To find testing sites, go to www.lasergrade.com. Click on "Available Tests" and then scroll down to the "North Carolina Pest Management Association" link. Type in your ZIP code to find the nearest testing center and call 800.211.2754 to make an appointment. If you do not have access to a computer, please call 800.211.2754 for assistance in finding the appropriate testing location and to set up an appointment.

Many testing centers are open on weekends. Upon arrival at your appointed test time, you may need a state driver's license for verification. You will fill out the company information onsite.

Step Two: You will then have one hour to take a computerized 50-question test. You will receive your test results upon completion, and the testing center will also forward them to the NCPMA offices, where they will be matched up to your affidavit and course records. All WDIR program applicants must score an 80% or higher (get at least 40 of the 50 questions correct) to pass.

EACH CANDIATE'S FIRST TEST FEE IS INCLUDED IN THE PROGRAM'S REGISTRATION FEES, SO THERE IS NO ADDITIONAL CHARGE. IF A CANDIDATE FAILS, THEY CAN RETAKE THE EXAM AN UNLIMITED NUMBER OF TIMES (EACH EXAM WILL BE UNIQUE). NCPMA WILL BILL THE COMPANY FOR THE FEE OF $35.00 PER TRY.

Step Three: Upon successful completion, NCPMA Will send your company official notification and order a personalized stamp for the newly-accredited inspector. The inspector agrees to abide by the code of ethics, which is provided.

Step Four: Market your company as having the highest level of training in the state, but make sure that only accredited inspectors are sent if a customer asks for an NCPMA Accredited Inspection.

Remember, the designation is with the individual, not the company.

North Carolina Pest Management Association

Wood-Destroying Insect Accredited Inspector
Code of Ethics

To maintain a high level of moral responsibility, character and business integrity; to practice fairness, frankness and honesty in all advertising and in all transactions with the general public.

❖

To hold our industry in high esteem and strive to enhance its prestige.

❖

To perform all WDIR inspections according to the highest standards and methods outlined in the NCPMA Accredited Inspector Manual.

❖

To keep the needs of our client always uppermost.

❖

To perfect our skills and business practices through continuing education and learning.

❖

To respect the reputation and practice of other pest control operators.

❖

To encourage, establish and maintain high standards of competence, knowledge and performance.

❖

Accredited inspectors who receive three (3) or more deviations in a 12-month period are subject to forfeiture of the accreditation.

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The *Wood-Destroying Insects Inspection Manual* is a product of the North Carolina Pest Management Association (NCPMA) with the valuable assistance and cooperation of the Structural Pest Control Division of the North Carolina Department of Agriculture and the North Carolina State University.

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Pinto & Associates, Inc.

Note--Please read the following carefully:

Wood-Destroying Insects Inspection Manual was published 2003 by the North Carolina Pest Management Association (NCPMA). Insofar as the information describes methods or procedures for pest control or business operations, such information should be regarded only as suggestions or guidelines. The information is believed to be accurate as of the date of publication. The accuracy of the information, however, is not warranted by either the authors or NCPMA. Each person using or distributing this publication is responsible for ensuring its accuracy and applicability at the time distributed and under the circumstances used or distributed. Further, the information contained in this manual is not intended to establish standards of care, nor is it intended to promote any single practice or procedure to the exclusion of others. No claim or warranty whatever is made or implied that the information, suggestions, recommendations, methods or procedures in this publication ensure safety, prevent injury, prevent property or environmental damage, or protect a company from legal actions, lawsuits, or regulatory enforcement actions.

Deviation from the procedures described in this manual does not suggest that action has been improper under a given set of circumstances. There may be equally acceptable alternative procedures or methods to follow. Adherence to the suggestions or recommendations in this manual is not a substitute for careful review, legal and professional, and compliance with federal, state and local requirements. It is the responsibility of each business and organization to determine the appropriate methods or procedures to utilize under the particular circumstances, taking into account applicable federal, state and local requirements.

Contents

Introduction to WDI Inspections

On July 1, 1992 the Wood-Destroying Insect Information Report (WDIR 100) was revised and is currently the only form that is acceptable in the state of North Carolina on which to report evidence of wood-destroying insects in structures for sale.

Why is a wood-destroying insect report (WDIR 100) necessary for real estate transactions? Because the potential buyer needs to know, before buying the house or other building, that it is not infested with termites or any other wood-destroying insect (WDI)*. So does the bank or organization lending the money. These insects can cause expensive structural damage, and often go undetected for years by homeowners and property managers.

It takes a trained, dedicated professional to inspect properly for WDIs. It is not an easy job. Inspections can be demanding and dirty work. Termite tubes are often found in the hardest to reach, most uncomfortable corners of a wet crawlspace, or termite galleries are hidden inside a solid-looking sill plate. Powderpost beetles might be found far back in a dark, hot attic.

There is often a devilish little voice inside your head tempting you to rush through, to make your workday a little easier, a bit less uncomfortable. Don't listen. If you miss a sign, if you say there are no termites when, in fact, there are, you have misled someone. The new owner may have spent hundreds of thousands of dollars based on your advice. Now, he must pay thousands more for repairs and treatment. You have failed that buyer. You could also end up in court defending your employer and yourself from a lawsuit.

Your obligation as a WDI inspector for a real estate transaction is to perform a quality inspection and then accurately complete the Official North Carolina Wood-Destroying Insect Information Report (WDIR 100). This chapter discusses WDIR 100 inspections: what to look for, where to inspect, conditions conducive to wood-destroying insect infestations, and provides inspection guidelines for the major wood-destroying insect pests. Later chapters take you step-by-step through WDIR 100 inspections, and discuss how to fill out the WDIR 100 and prepare a graph of the structure .

* *Any reference to termites in this manual refers to subterranean termites unless otherwise specified*

WHAT YOU LOOK FOR DURING A WDI INSPECTION

During your inspection, you are looking for a number of things:

- evidence that wood-destroying insects are infesting the structure
- evidence of an old infestation that appears to be inactive
- evidence of previous treatment
- conditions conducive to (favoring) subterranean termites

There are a wide range of wood-destroying insects that infest and damage structures, and which you must look for during your inspections. Major pests of concern are termites, old house borers, powderpost beetles, carpenter ants and bees, but any insect capable of infesting seasoned wood must be reported.

In some instances, you will find direct evidence of an infestation in the form of the actual insect. Examples include termite workers or swarmers, carpenter bees nesting in window trim, and carpenter ants foraging in a home. Although carpenter ants may be nesting outside rather than inside, carpenter ants found in or on the structure must be reported.

At other times, you will find only indirect evidence that a wood-destroying insect is infesting the structure, or perhaps that it had infested the structure sometime in the past but is now gone. Examples of such evidence include termite-damaged wood (determined either visually or by sounding and probing wood), termite tubes or wings, powderpost beetle emergence holes, and frass composed of wood particles and debris. In some cases you may be able to track down live insects through further investigation. In all cases, you are required to report that you found visible evidence of a wood-destroying insect infestation.

An old infestation of termites cannot be considered inactive unless there is evidence of a previous treatment nearby, so during a wood-destroying insect inspection you also need to check for evidence of any termite treatment in the past.

An important part of any WDI inspection is identifying conditions that favor termite infestations. These are called “conducive conditions.” They include such things as direct wood to soil contact, plumbing leaks, faulty rain gutters, and improper grade that causes rainwater to pool against the foundation. Such conditions favor not only termites but other wood-destroying insects, as well. Conducive conditions are discussed in detail later in this chapter.

WHAT IS INCLUDED AND WHAT ISN'T?

A WDIR 100 inspection consists of a careful examination of all unobstructed and accessible areas of a structure in order to determine the absence or presence of wood-destroying insects. Just what does that entail? Any evidence that is in, on, under, or attached to the structure must be reported, including evidence in debris that may be present under a structure. You must also inspect decks, porches, storage sheds, and other subordinate structures that are permanently attached to the main structure.

Outbuildings, detached garages, sheds, lean-tos, and other detached buildings, structures, and fences are not usually included in the inspection unless specially requested by the client.

A wood-destroying insect inspection determines the absence or presence of visible evidence of wood-destroying insects. It is not a guarantee that wood-destroying insects are not present in the structure, simply that a careful, professional inspection on that date found no visible evidence of infestation.

What Is an Inaccessible Area?

All buildings have structural wood members that are not visible or accessible to an inspector. To check these areas for wood-destroying organisms would require extensive probing and dismantling of sections of the structure. Such activities are not considered part of a normal wood-destroying insect inspection. Furthermore, access to some parts of a structure can be blocked or obstructed. The Official North Carolina Wood-Destroying Insect Information Report (WDIR 100) specifically excludes from the inspection any hidden areas, obstructed areas, or areas otherwise not readily accessible to the inspector. Nor does it imply that there is no hidden damage or damage that was not visible at the time of inspection.

Any area that cannot be inspected without opening the structure or removing objects blocking entry is considered inaccessible for the purposes of a wood-destroying insect inspection. Examples include an attic filled with stored materials or with the entrance blocked by stored materials, a garage filled with stored items, a closet filled with boxes, a crawlspace filled with standing water, or an area under a porch filled with firewood.

You are not expected to enter a crawlspace or section of a crawlspace too narrow to fit (less than 18 inches high), or an attic without stairs or pull-down access, or any area that is unsafe. You are not required to inspect areas which require the breaking apart, dismantling, or removal of moldings, floor coverings, wall coverings, siding, ceilings, insulation, floors, furniture, appliances, personal possessions, and similar objects. An area that requires the

use of a ladder is also considered inaccessible, as is any area where access requires the use of a drill.

Those involved in the real estate transaction must, of course, know which areas you did not inspect because they were inaccessible or obstructed. Details on providing this information on the WDIR 100 are provided in Chapter 4.

Pests Included in the WDIR 100 Inspection

As mentioned earlier, you check primarily for evidence of termites, old house borers, powderpost beetles, carpenter ants, and carpenter bees, but any insect capable of infesting seasoned wood must also be reported. Since this is a wood-destroying insect information report, you need only report insects. Molds are not part of the scope of the inspection. You are not required to report the presence of wood-decay fungus (wood rot) or its damage, except as it may indicate conditions conducive to termite infestation. Nor are you required to inspect for wildlife, or for other pests that do not damage or infest seasoned wood.

Must You Report Damage?

It is not the responsibility of a WDIR 100 inspector to report damage. Where evidence indicates that wood-destroying insects are infesting structural wood, you assume that there is some sort of damage. While the inspector records the type and specific location of evidence, the extent and severity of any damage should be left to a structural engineer or other building expert.

Termites Adjacent to the Structure

What should you report and what action should you take if you find termites in the mulch near a house but you do not find evidence of termites on the structure itself?

Termites are a natural component of the landscape and can be found on almost any piece of property. Soil treatment of a structure has minimal impact on termite activity away from that structure. For WDIR 100 real estate inspections, a structure should be reported as infested only when that structure itself is infested. Of course, a garage, deck, fence, or other structure attached to the house is considered a structure or part of a structure, and you would be required to report termite activity. Areas under an attached deck are considered part of the structure.

Termites found in mulch...even right next to the foundation...would not require treatment under current industry standards and practices, and so you should not report them as infesting the structure, but may note their presence in the remarks section. Mulch should not be moved unless it obstructs access to wood siding. No excavation should be done beneath the mulch.

LEGAL RESPONSIBILITIES, REGULATIONS, AND ENFORCEMENT

Wood-destroying insect inspections of buildings and structures for sale are regulated under the Structural Pest Control Act of North Carolina. Chapter 34 of the NCAC (North Carolina Administrative Code) includes rules for these inspections in *02 NCAC 34.0602: Wood-Destroying Insect and Other Organism Reports*, which requires that you use the specific form WDIR 100, fill it out completely and accurately, and comply with certain other rules (see Box I-1). Standards of inspection of buildings and structures for sale in North Carolina are provide in Appendix D.

BOX I-1
North Carolina Rules for WDIR 100

02 NCAC 34.0602: Wood-Destroying Insect and Other Organism Reports

(a) Any written statement as to the presence or absence of wood-destroying insects or organisms or their damage in buildings or structures for sale shall be on the WDIR 100. An incomplete or inaccurate Wood-Destroying Insect Information Report shall not be acceptable and the issuance of such a report is grounds for disciplinary action by the Committee. No Wood-Destroying Insect Information Report or Wood-Destroying Organism Report shall be issued before an inspection of the building or structure is made. Each Wood-Destroying Insect Information Report issued by a licensee shall be kept in the files of said licensee and made available for inspection upon request of the Division.

(b) If during the inspection of a structure, a licensee or his authorized agent finds live subterranean termites or visible evidence of past or present infestation of subterranean termites (such as tubes, damage, cast wings, infested wood scraps, or other cellulose materials, etc.) in the structure and there is no visible evidence that said structure has been treated for subterranean termites, the licensee shall treat said structure for subterranean termites prior to the issuance of a Wood-Destroying Insect Information Report on the structure which states that the structure is free from subterranean termites or that a previous infestation is inactive.

(c) If a treatment is performed in conjunction with a WDIR, a copy of the written agreement and warranty, if any, shall be included with or attached to and become a part of the WDIR.

(d) A licensee, certified applicator, or registered technician shall not remove or destroy, or cause the removal or destruction of, any wood-destroying organism evidence discovered in, on, under, or in or on debris under a structure inspected pursuant to this Rule except as required by Paragraph (b) of this Rule.

Box I-2

SPCD Enforcement Policy: Wood-Destroying Insect Information Report

The WDIR 100, as revised effective July 1, 1992, is the only form that may be used to report the presence or absence of wood-destroying insects or their damage in a structure that is for sale. Although the form no longer requires the reporting of damage, if damage is to be reported, it must be reported on this form.

The form may not be altered in any way. This includes the addition of an arbitration clause, the use of the form as a proposal etc. Preprinting the licensee's name and license number, company name and address are permitted. In addition, checklists of inaccessible items and/or of conditions conducive to subterranean termites will be permitted provided the use of such lists does not alter the intent of the form. The PCO must check all items that apply for each structure inspected.

Under Rule .0602(c), a copy of the contract MUST be attached to all Wood-Destroying Insect Information Reports on properties on which a treatment was performed in association with the issuance of the WDIR. This requirement applies regardless of the pest for which treatment is performed or the method of treatment.

Rule .0602(d), prohibits the PCO from removing or destroying any evidence of wood-destroying insects discovered during the inspection.

Each section of the form must be properly completed. The following is a section by section discussion of the form.

1. Complete this section fully. Always indicate which structures on the property were inspected. Though not required, it may be best to complete more than one form if two significant structures are to be inspected.

2. PCOs must list areas that were inaccessible during their inspection. However, permanently installed items (e.g. floor coverings, wall coverings, etc.) need not be listed individually as they are covered in item 2 on the reverse of the form. Movable items (e.g. furniture, appliances, equipment, etc.) or items which may vary from structure to structure (e.g. insulation, attic access, etc.) must be listed individually for each structure inspected.

3. The PCO must report all visible evidence of wood-destroying insects observed, past or present. Activity of the infestation observed is not a prerequisite to reporting evidence found. Evidence of a prior treatment alone is not sufficient evidence to report the presence of an infestation of a wood-destroying insect.

If any of blocks A, B, C or D are checked, the appropriate box within that item must also be checked (i.e. box 1, 2 or 3). The location of the evidence of wood-destroying insects must be reported adjacent to the box identifying the insect(s) found. While it is not necessary for the PCO to specify the number of joists affected, the location must be specific enough for all parties to the transaction to understand the location and extent of the infestation and for subsequent inspectors to locate the evidence. "In crawl space" is NOT sufficient. Furthermore, the location must be specific as to whether or not the wood-destroying insect has infested wooden members. Phrases such as "in floor joists behind front porch", "in sill along rear wall" etc. are required.

Block 3.D. "Others" includes but is not necessarily limited to, carpenter ants and wood-boring beetles or other insects capable of infesting seasoned wood.

4. Checking this block indicates that there is absolutely no evidence of wood-destroying insects in the structure or in or on debris under the structure. This item must not be checked if there is any visible evidence of wood-destroying insects present.

5. All conditions conducive to infestation of subterranean termites noted during the inspection must be reported. At a minimum, wood making direct soil contact, cellulose debris under a structure and excessively wet wood, as determined by a moisture meter, in the crawl space must be reported as conditions conducive to subterranean termites. (Other conditions may be present in a specific structure that may be conducive to termites in light of the overall condition of the structure. PCOs must use their own judgment in reporting these items.)

Box I-2--Continued

SPCD Enforcement Policy: Wood-Destroying Insect Information Report

In determining the accuracy of a WDIR 100, three things must be determined: 1) is there any visible evidence of wood-destroying insects present? 2) If so, was the evidence present during the PCO's inspection? You must take into account the time of year, life cycle of the insect present, treatment status and the presence of active insects; 3) Was the evidence visible at the time of the PCO's inspection and should the PCO have found the evidence during a properly performed inspection? Having answered these three questions, you can then evaluate the accuracy of the WDIR accordingly.

The issuance of an inaccurate WDIR is a secondary deviation and will be written up as such on the inspection report. Inaccuracies should be documented with photographs as necessary.

(Revised March 1, 1997)

ACTIVE VERSUS INACTIVE INFESTATIONS

If you find evidence of an infestation, but no live specimens of wood-destroying insects, the infestation might be active and ongoing, or the infestation could have been eliminated at some time in the past.

Subterranean termites

In the case of subterranean termites, if you do not see live termites in the structure and you find termite tubes, damage, cast wings, previously infested wood scraps and the like, you cannot classify the infestation as inactive unless and until:

(1) you find visible evidence that the house had been previously treated for subterranean termites (drill holes, trenching, bait system, etc.):
   (a) treatment evidence must be adjacent to areas of infestation and in compliance with North Carolina regulations,
   (b) any bait system must be currently maintained,

OR

(2) your company treats the structure for subterranean termites.

Otherwise, such an infestation must be considered active.

Old house borer

In North Carolina, the presence of old house borer or oval exit holes with sawdust-like frass consisting of fine powder with tiny pellets in oval galleries in pine or other softwoods is considered to be evidence of an active infestation of the old house borer. Feeding larvae of the old house borer also can be detected by sound; however, other long-horned borer and flatheaded borer larvae make similar sounds. Therefore, frass and insect characteristics should be used to confirm identity of sound-producing larvae in wood (see discussion of old house borer in the next chapter).

Powderpost beetles

One of the more difficult tasks in WDIR 100 inspections is determining whether a powderpost beetle infestation is active or inactive. The larvae live their lives inside wood and, for many species, the adults only emerge during a relatively brief period between late spring and late summer. Powderpost beetle inspections will be discussed in detail later in this chapter, including how to determine whether an infestation is active or not. North Carolina regulations governing pest control of wood-destroying organisms (02 NCAC 34.0501) state the following related to powderpost beetle activity:

- The presence of frass that is the color of fresh-cut wood will be acceptable as evidence of an active infestation of powderpost beetles.
- The presence of holes alone or holes and dull-colored frass will not be acceptable evidence of an active infestation of powderpost beetles except in such cases where live larvae or pupae are found in wood members. Where holes alone are found in wood members, this should encourage the licensee, certified applicator, or his representative(s) to check the property during the optimum time for adult emergence--May 1 to August 31. It should be pointed out that anobiid beetles usually confine themselves to softwoods such as pine, while lyctid beetles confine themselves to hardwoods like oak or pecan.

Will Wood-Infesting Beetles Reinfest?

Wood boring beetles typically infest wood before it even gets to the lumber yard. Beetles develop slowly inside the wood, sometimes not emerging for

Box I-3
Reinfestation Potential of Wood-Boring Beetles in Homes

Type of Borer	Wood Type	Age of Wood	Reinfest?
Powderpost Beetles:			
Anobiid	hard or softwood	seasoned	yes
Bostrichid	mostly hardwood	newly seasoned	rarely
Lyctid	hardwood	seasoned	yes
Roundheaded borers			
Old house borer	softwood	seasoned	yes
All others	hard or softwood	dying trees, logs, unseasoned	no
Flatheaded borers	hard or softwood	dying trees, logs, unseasoned	no
Bark beetles	inner bark	trees and logs	no
Ambrosia beetles	hard or softwood	trees and logs	no

years. The question is, can the beetles infesting wood in a new home reinfest the structure after they emerge, creating on ongoing problem, or will the population simply die out?

In general, beetles that attack newly cut or unseasoned wood will not reinfest wood in a home. Other beetles prefer wood that is drying out or relatively dry (at least to a beetle). These beetles may reinfest wood in a home. The table in Box I-3 shows the reinfestation potential of common wood-infesting beetles.

CONDITIONS CONDUCIVE TO TERMITES

All conditions "conducive" to infestation by subterranean termites noted during the inspection must be reported on the WDIR 100 in section 5. If there is insufficient space provided on the form, attachments may be used. Conducive conditions simply mean those factors that tend to attract termites or favor their presence. These conditions must be reported not only because they may increase risk of termite attack, but because they need to be corrected before any treatment is undertaken. A checklist of conditions conducive to termite infestation can be found in Box I-4.

BOX I-4
Conditions Conducive to Subterranean Termite Infestation

- ❒ Excessive wood moisture. Moisture levels 20 percent or higher as determined by a moisture meter, fungus and rot, staining, or wet surface.
- ❒ Wet attic. Excessive moisture due to roof leaks, poor ventilation, plumbing leaks.
- ❒ Wet insulation. Excessive moisture from plumbing leaks, roof leaks, improper installation of insulation, etc.
- ❒ Wet stucco/siding. Roof leak, poor runoff, automatic sprinklers, or direct contact with soil causing stucco or other siding to remain wet.
- ❒ Wood debris. Form boards, grade stakes, scraps of lumber, tree stumps and roots, or paper products near or under foundation or in crawlspace or in adjacent planters.
- ❒ Direct wood/soil contact. Untreated structural beams or trim in the soil, untreated wood fence attached to building, firewood piled against foundation wall, wood embedded in and through concrete.
- ❒ Soil piled against brick or siding above the foundation; also raised foundation planters if not protected by flashing or poured concrete.
- ❒ Excessive mulch. Mulch piled up against the foundation wall.
- ❒ Backfilled porch. Raised, dirt filled porch against foundation wall.
- ❒ Damaged concrete or masonry. Cracks in slabs, crumbling blocks and brick at or below the soil surface, holes for utility lines.
- ❒ Foundation insulation. Rigid foamboard, insulation foams, exterior insulation and finish systems (EIFS), or other insulating systems on foundation walls or under slabs below grade.

TOOL BOX

Although in North Carolina a WDIR-100 inspection is made on the basis of "visible evidence" in "accessible areas," this does not mean that an inspection is made with your eyes alone. The North Carolina structural pest control rules define an inspection as:

> *"Inspection for a specific wood-destroying organism" means the careful visual examination of all accessible areas of a building and the sounding of accessible structural members adjacent to slab areas, chimneys, and other areas particularly susceptible to attack by wood-destroying organisms to determine the presence of and the damage by that specific wood-destroying organism.*

You may use a variety of tools to help you locate evidence of wood-destroying insect infestation, including tools for probing and sounding wood. There are also other tools, some very high tech, that can help you in further evaluating a suspect area.

Some tools are discussed below. A checklist of potential WDI inspection tools is presented in BOX I-5.

BOX I-5
List of Possible Tools for WDI-100 Inspections

❒ Flashlights*	❒ Head lamp	❒ Mirrors	❒ Portable microscope
❒ Hand lens*	❒ Vials/containers	❒ Screwdrivers	❒ Oyster knife
❒ Putty knife	❒ Pocket knife	❒ Probe tool*	❒ Ice pick
❒ Hacksaw blade	❒ Spring steel	❒ Pry bar	❒ Metal hammer
❒ Rubber mallet	❒ Moisture meter•	❒ Borescope	❒ Stethescope
❒ Acoustic detector	❒ Drywall saw	❒ Methane detector	❒ Batteries
❒ Ladder	❒ Chalk or markers	❒ Camera	❒ Measuring tape
❒ Measuring wheel	❒ Clipboard/graph paper*		

* minimum requirement

Common Tools

A powerful flashlight can highlight a sign of infestation that would be difficult to see under natural light, and of course is usually essential in crawlspaces and attics. Flashlights with halogen and krypton bulbs tend to be more powerful than those with standard bulbs. Be sure the batteries are charged and

have extra batteries and an extra flashlight available. A hard hat or head-mounted lamp is also useful in crawlspaces and attics.

Mirrors can help you see around corners and behind and under objects. They can also be used to redirect light to expose a darkened area to view. Various types are available and suited to particular circumstances. A mechanic's mirror is adjustable, extendable, and easy to use. A dentist mirror is useful for looking inside small openings. Makeup mirrors, shaving mirrors, and magnifying mirrors all may be useful at times.

A hand lens or portable microscope allows you a close-up look at insects and insect fragments, damaged wood, and frass so that you can identify the pest and help determine if an infestation is active. It helps to have vials, plastic sandwich bags, and other specimen containers in order to take unidentifiable specimens back to the office.

A number of tools can be used to sound and probe wood. Structural wood members such as sill plates and floor joists in crawlspaces, and wooden trim, such as door and window frames, are sounded (a fancy word for banged) with tools such as hammers, mallets, even the butt of a screwdriver. Such sounding allows the inspector to hear or feel hollow areas, soft wood, and other indications that the wood has been damaged by insects or rot.

Probing is using a tool such as a pocket knife, screwdriver, ice pick, oyster knife, putty knife, small pry bar, or a specialized tool such as the Probemaster™, to find damage or open galleries. It is best to carry a set of different probes to meet specific conditions at a job site. A hacksaw blade or slender piece of spring steel is useful for inserting under sills adjacent to possible dirt fills to see whether there is soil in direct contact with wood on the other side. Use chalk or a marker to directly identify areas of damage or other evidence of infestation in attics, crawlspaces, unfinished basements, and other areas where such marks won't be objectionable.

For both probing and sounding, inspectors need to avoid damaging visible wood in living or working areas of the structure.

Tools to Detect Hidden Infestations

Even though WDIR-100 inspections are limited to "visible evidence," WDI inspectors may want to investigate hidden areas, such as wall voids, when they have a strong reason to suspect an infestation there. Screwdrivers, both phillips and flathead, enable inspectors to open access panels into walls and other voids. Borescopes, while not used on every inspection, can be used to further investigate an area of concern. Borescopes are fiber-optic probes that allow visual inspection through a 1/4 to 1/2-inch (7mm-12mm) drill hole (depending on the device). They work best at finding termite tubes and

carpenter ant nests inside wall voids, but are limited by insulation in walls and the fact that many holes are necessary to inspect a structure.

A moisture meter is the best tool to find areas of high moisture in joists, sills, rafters, and other wood. Such moisture is not only considered a conducive condition, but may identify areas of infestation by termites, carpenter ants, and other WDIs. Inspectors take readings every few feet in suspect areas. A moisture reading significantly higher than others pinpoints the moisture problem. In homes without moisture problems, moisture levels in heated living areas usually range between five and ten percent; in unheated areas and crawlspaces from 12-19 percent. Moisture levels above 20 percent signal trouble, and in these locations inspectors should probe, sound, and otherwise investigate further.

Sound equipment can be used to detect feeding and other sounds that wood-destroying insects make. The equipment ranges from inexpensive stethoscopes to high-tech sound amplification systems similar to those used by security firms. Other tools include methane detectors for termite activity and microwave sensing devices. These tools are optional and are not required as standards of inspection.

BOX I-6
List of Safety Equipment for WDI-100 Inspections

❒ Coveralls	❒ Gloves	❒ Hard hat	❒ Boots
❒ Dust mask	❒ Respirator	❒ HEPA filters	❒ Eye protection
❒ Knee pads	❒ First aid kit		

Safety Tools

Personal safety equipment (see Box I-6) should be worn whenever the conditions during the inspection pose risk of injury or illness to the inspector. Examples include coveralls, gloves, hard hat, eye protection, knee pads, dust mask, and respirator. Certain conditions may require the use of respirators with HEPA filters to protect against airborne disease organisms. A good first aid kit is also an essential. Specific safety precautions when inspecting attics and crawlspaces are discussed in the next section.

SAFETY PRECAUTIONS DURING WDI INSPECTIONS

WDI inspections commonly require entry into attics and crawlspaces. Inspectors face numerous safety hazards in both locations. Some of those hazards are obvious, and some are not.

Attics

Ladders leading to attics are frequently broken, weakened, and dangerous. In residential homes, nails often protrude down through the plywood subroofing and can cause painful puncture wounds or lacerations in the head and neck. Furthermore, most home attics are not floored; a misstep can drop you through the ceiling of the room below, or leave you with two legs straddling a ceiling joist. Fiberglass insulation can irritate your skin, eyes, and respiratory tract, or cause more serious health problems, and you face shock hazards from electrical lines.

Attics rarely have good ventilation. They can also be dangerously hot, and you can get cramps, pulled muscles, or a sore back from working and moving hunched over. There may be wasps, bees, and other stinging and biting pests in an attic, as well as bats, birds and their droppings, not to mention the occasional raccoon or opossum. Suggested safety precautions for an inspector working in an attic are shown in Box I-7.

BOX I-7
Safety Precautions When Inspecting Attics

- Wear coveralls, gloves, hard hat, and any other personal protective equipment that you think might be necessary.
- Make sure the attic ladder is safe before using it.
- Disturb insulation as little as possible, particularly blown-in and/or loose insulation in an attic.
- Avoid disturbing bird, rodent, or bat droppings.
- Use a respirator whenever you think that there might be any airborne substances that you do not want to breathe.
- Carry a good flashlight with strong batteries.
- Shine your flashlight on each area of the attic before entering it.
- Move slowly and watch where you step. Don't get yourself into a tight space that you may have trouble getting out of.
- Look out for loose or dangling electrical lines. Don't touch any cables.
- If the attic is hot, do not enter it without someone else to check on you. Be alert to symptoms of heat-related illness.

Crawlspaces

It's dark, it's dirty, it's confined, and it's unfamiliar. Working in a crawlspace can be unpleasant and, to some extent, hazardous. Think about the hazards present in some crawlspaces:

- You can bump your head on pipes, beams, nails, etc.
- You can cut or scrape yourself on broken glass and other debris as you crawl on your belly.
- You can get cramps, pulled muscles, or a sore back from working and moving hunched over.
- In apartment building crawlspaces, in particular, you may be crawling through soil contaminated with old sewage spills from backups or broken pipes.
- You may be crawling through soil contaminated with disease organisms such as those causing hookworm and tetanus.
- You may face shock hazards from electrical lines, particularly in wet crawlspaces.
- There may be fleas, spiders, snakes, and other pests to bite or sting you.
- You could surprise a cornered animal such as a raccoon or skunk.
- You could inhale toxicants of various sorts such as pesticide vapors, asbestos, fungal spores, or allergens.

Suggested safety precautions for an inspector working in a crawlspace are shown in Box I-8.

BOX I-8
Safety Precautions When Inspecting Crawlspaces

Before you enter a particular crawlspace, assess the hazards you might face and take action to protect yourself from them. Use common sense:

- Wear coveralls, gloves, hard hat, and any other personal protective equipment that you think might be necessary.
- Use a respirator if you suspect that the crawl is dusty, or if you think that there might be any airborne substances that you do not want to breathe.
- Carry a good flashlight with strong batteries.
- Shine your flashlight on each area of the crawlspace before entering it.
- Move slowly. Don't get yourself into a tight space that you may have trouble getting out of.
- Make sure someone knows that you are going to enter a crawlspace, particularly a tight one.
- Look out for loose or dangling electrical lines. Don't touch any cables, particularly in a wet crawlspace.
- After you leave the crawl, remove any potential contaminants by taking off and bagging your coveralls and gloves, and washing up.

Inspection Guidelines for WDI Pests

The wood-destroying insects commonly noted on the WDIR 100 include subterranean termites, carpenter ants, powderpost beetles, old house borers, and carpenter bees. Other less common insects such as dry wood termites may also be reported. In this Chapter, we discuss where to look for the major wood-destroying pests, what to look for, and the galleries and nest sites. Appendix A contains information on identification, biology, and habits for each of these pests.

NATIVE SUBTERRANEAN TERMITE

This section concerns the eastern subterranean termite, *Reticulitermes flavipes*, and the related species *R. virginicus* and *R. hageni*. The Formosan subterranean termite, *Coptotermes formosanus*, is discussed in the next section.

Where to Look:

Outdoors, subterranean termites will infest virtually any wood that is in contact with soil: tree stumps, tree roots, logs, firewood, fence posts, utility poles, grade stakes, form boards, etc. Wood that is close to, or in contact with, soil is the usual entry point into buildings. Porches, steps, terraces, fences, or planters are common infestation sites. Check for damp wood near sinks, toilets, or leaking pipes. Wood that is kept moist by runoff water from the roof, gutters, or lawn sprinklers are also susceptible locations. (See Chapter 3 for other inspection sites.)

Damage usually starts with the sill plate (mudsill) or bandjoist in houses built over a crawlspace and with the sole plates of houses built on concrete slabs. Given enough time, subterranean termites will extend the damage into the wooden floor members, the interior trim and furnishings, and into the walls to the roof timbers. Subterranean termites eat mostly the springwood (the softer portion of the rings of trees), leaving the summerwood. Termites can also damage paper, fiberboard, cotton, and certain other fabrics derived from plants.

What to Look For:

(1) Mud shelter tubes on foundation walls, piers, chimneys, plumbing, in crevices between structural members--anywhere that makes contact between soil and wood (Figure 2-1). Live termites are often found inside the tubes when they are broken open. Tubes are usually about 1/4 to 1/2-inch (7 mm to 12 mm) wide. Short swarming tubes may rise from the soil or infested wood. Drop tubes or freestanding tubes may also be seen from foundation joists.

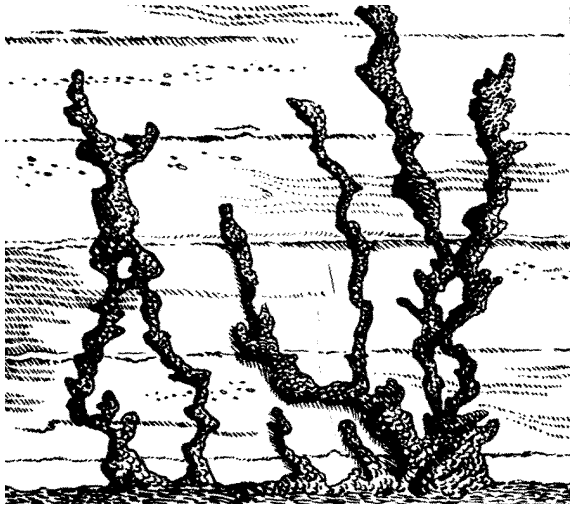


Figure 2-1
Subterranean termite shelter tubes on concrete wall

(2) Swarmers (alates) are seen usually during midday from March to May (see Box II-1). Some colonies will swarm more than one time per year. Look for live or dead swarmers (see Appendix for description) or their shed wings around windows, in light fixtures, or in spider webs. Note, however, that the swarmers may have emerged outside and been attracted to lights inside the structure.

(3) Soil or mud in cracks, crevices, or joints in concrete slab floors.

(4) Dark or blister-like areas on flooring, trim, or framing wood.

(5) Hollow sound when wood is tapped.

(6) Wood moisture content greater than 20%. However, termites can survive in wood with a lower moisture level if there is a supplemental source of moisture such as a plumbing or roof leak.

Galleries:

Damaged wood has a honeycombed or layered appearance because the workers tunnel along the softer grain of the wood, leaving the harder-to-digest summerwood (Figure 2-2). Termites tend to feed in structural wood until only the harder grain and a thin outer shell remain. Galleries often contain

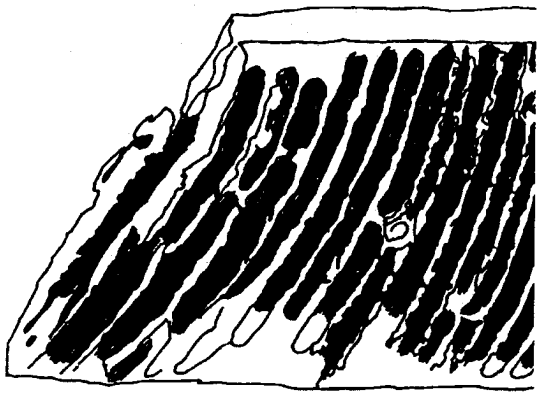


Figure 2-2
Subterranean termites tunnel in the softer grain of the wood

a mixture of solid and digested wood, and soil. Gallery walls have a pale, spotted appearance like dried oatmeal that is produced by the plastering of soft fecal material on surfaces. There is no powdery frass and no fecal pellets in the galleries of subterranean termites, and consequently there are no piles of frass or wood particles on surfaces below the galleries.

Usually only workers and soldiers are found inside galleries when wood is broken open. At certain times of the year, swarmers may be found inside galleries as well.

Damage:

Subterranean termite damage is usually not noticeable on the surface of the wood, but dark, blister-like areas may be seen. The amount of damage that subterranean termites can do to a structure depends on the number and size of the attacking colonies and on the environmental conditions (including the quality of the wood). If the soil moisture is high, if the humidity in the crawlspace and subslab areas is high, and if the wood is in close proximity to the soil, subterranean termites can cause considerable damage in time.

Heavy damage by *Reticulitermes* does not normally occur within the first 3 to 5 years of attack. If treatment is undertaken when the first evidence of infestation occurs, very little serious structural damage is likely to occur.

[For Identification and Habits, see Appendix]

Box II-1
Questions and Answers About Termite Swarms

Swarming is a key event in the life of a termite colony, and often the first indication of an infestation. How much do you really know about termite swarming?

Why do termites swarm? Swarming disperses termites to new locations and allows reproductives, the potential kings and queens of new colonies, to pair with a mate. In flight, termites flutter weakly, and usually land nearby unless helped by the wind. In a short time they land, shed their wings, pair up, and then, as a pair, begin their search for a suitable nest site in soil (most subterranean termites) or wood (drywood termites).

Do termite colonies always swarm? No. A termite colony needs to reach a certain size and degree of development before it produces winged reproductives for a swarming flight. Most subterranean termite species do not swarm until the colony is roughly four years old. Then again, mature colonies that have swarmed strongly for years may suddenly skip a year or more, perhaps because of colony stress of some sort.

Can termite swarmers reinfest buildings? The answer for drywood termites is . . . yes, often. The answer for subterranean termites is . . . not usually. Winged subterranean termites inside a structure dry out and die quickly. Formosan termites (*Coptotermes formosanus*) are a special case. They commonly reinfest buildings, particularly commercial buildings, often when swarmers fly upwards, enter at the roof line, and find wet wood from a roof leak or condensation.

When do termites swarm? The best answer is…it depends. It depends on the type of termite, the area of the country, the weather, who knows what else. Colonies infesting heated buildings often swarm earlier in the season than colonies outside. In North Carolina, the eastern subterranean termite (R*eticulitermes flavipes*) swarms typically peak in April, with probably 80-90 percent of swarms occurring between February 1 and June 1. Formosan termite swarms start in April and peak in late May or early June.

What can a termite swarm tell you? If you have swarmers appearing in widely separated areas in a structure you either have a wide-ranging infestation or two separate termite colonies. A swarm means the colony is at least four years old, although it does not mean the building has been infested for that long. A large, nearby colony could have infested the home this year and sent up swarming “castles” (mud tubes for swarmers). The size of the swarm correlates well with the size of the colony. If you have a large swarm you probably have a large termite colony. One huge swarm of Formosan termites was estimated to contain 2.6 million winged termites.

Does a termite swarm mean that treatment failed? Not necessarily. Swarmers can remain protected above ground in the swarming castles or inside galleries in untreated wood. In fact, treatment often triggers swarms a week or two later. A swarm emerging two months or more after treatment should tell you that something is wrong with the treatment.

FORMOSAN SUBTERRANEAN TERMITE

This section concerns the Formosan subterranean termite, *Coptotermes formosanus*. The eastern subterranean termite, *Reticulitermes flavipes*, and the related species *R. virginicus* and *R. hageni* are discussed in a separate section. Formosan termites are not currently a widespread problem in North Carolina but they are present in certain areas.

Where to Look:

Outdoors, Formosan termites will infest virtually any wood that is in contact with soil: tree stumps, tree roots, logs, firewood, fence posts, utility poles, grade stakes, form boards, etc. Wood that is close to, or in contact with soil is the usual entry point into buildings. Porches, steps, terraces, fences, or planters are common infestation sites. Check for damp wood near sinks, toilets, or leaking pipes, and areas adjacent to slabs. Wood that is kept moist by runoff water from the roof, gutters, or lawn sprinklers are also susceptible locations. [See Chapter 3 for other inspection sites.]

Damage usually starts with the sill plates (mudsill) or bandjoist in houses built over a crawlspace and with the sole plates of houses built on concrete slabs. Given enough time, subterranean termites will extend the damage into the wooden floor members, the interior trim and furnishings, and into the walls to the roof timbers. Formosan termites eat both the softer springwood portion, and the summerwood. They can also damage paper, fiberboard, cotton, and certain other fabrics derived from plants.

Formosan termites commonly produce aerial nests, producing "carton," a combination of saliva, chewed-up wood, and feces that act almost as a sponge to hold moisture. In these cases they can break all contact with the ground. Formosan termites even establish above-ground nests in high-rise buildings.

What to Look For:

(1) Mud shelter tubes on foundation walls, piers, chimneys, plumbing, in crevices between structural members--anywhere that makes contact between soil and wood. Live termites are often found inside the tubes when they are broken open. Tubes are usually about 1/4 to 1/2-inch (7 mm to 12 mm) wide. Short swarming tubes may rise from the soil or infested wood. Drop tubes or freestanding tubes may also be seen.

(2) Swarmers (alates) are seen usually in the evening hours, starting at sundown and ending before midnight, on a warm rainy day in late spring or summer. Formosan swarmers are attracted to lights. Some colonies will produce secondary swarms in addition. Look for live or dead swarmers (see

Appendix for description) or their shed wings around windows, in light fixtures, or in spider webs. Note, however, that the swarmers may have emerged outside and been attracted to lights inside the structure.

(3) Soil or mud in cracks, crevices, or joints in concrete slab floors.

(4) Dark or blister-like areas on flooring, trim, or framing wood.

(5) Hollow sound when wood is tapped.

(6) Carton nest which is a honeycombed mass of chewed wood, saliva, and feces. This spongy-looking nest may be found in wall voids. Active nests are relatively moist, while an abandoned carton nest will harden to a concrete-like consistency.

(7) Wood moisture content greater than 14.8%. However, termites can survive in wood with a lower moisture level if there is a supplemental source of moisture such as a plumbing or roof leak.

Galleries:

Unlike *Reticulitermes* subterranean termites, which tend to feed on only the softer springwood, Formosans can feed on both spring and summerwood, leaving a hollowed area which they fill with "carton" material.

The amount of carton (a combination of chewed wood, saliva, and feces) produced by Formosan subterranean termites is much greater than in other native species. There may be sponge-like masses of pale-colored carton in the larger galleries causing the surface of the wood to bulge. Formosans also commonly place carton outside of the damaged wood in wall cavities, etc.

Termites tend to feed in structural wood until only the harder grain and a thin outer shell remain. Galleries often contain a mixture of solid and digested wood, and soil. Gallery walls have a pale, spotted appearance like dried oatmeal that is produced by the plastering of soft fecal material on surfaces. There is no powdery frass and no fecal pellets in the galleries of subterranean termites, and consequently there are no piles of frass or wood particles on surfaces below the galleries

Damage:

Subterranean termite damage is usually not noticeable on the surface of the wood, but dark, blister-like areas may be seen. The amount of damage that Formosan subterranean termites can do to a structure depends on the number and size of the attacking colonies and on the environmental conditions (including the quality of the wood). If the soil moisture is high, if the humidity in the crawlspace and subslab areas is high, and if the wood is in close

proximity to the soil, subterranean termites can cause considerable damage in time.

The Formosan subterranean termite is more aggressive and has larger colonies than other subterranean species. Given the same amount of time, and with all other things being equal, it will do more damage. An established, mature colony of Formosan termites may cause severe damage to a structure in as little as 3 months.

Formosan termites can also attack and damage live trees and shrubs.

[For Identification and Habits, see Appendix A]

CARPENTER ANTS

Where to Look:

Outdoors, carpenter ants nest in dead portions of standing trees, stumps, and logs. Indoors, they are often found nesting in timbers in basements, porch floors, roofs, and columns, in crawlspaces and attics, in dark closets, or in door or window frames. Check any wood in close proximity to soil. Carpenter ants attack both hardwoods and softwoods. They also sometimes nest in existing cavities and voids (wall voids, hollow doors), in stored furniture, or they excavate foam or fiberglass insulation for nest sites.

Carpenter ants usually start their nests in moist, soft wood that has begun to decay. Nests are commonly located in wood that has been damp because of condensation or a plumbing or roof leak, or in wood that repeatedly gets wet such as windowsills. Once the nest is established, the workers may extend their galleries into sound wood. A colony of carpenter ants may have more than one nest; they may have a parent nest and one or more satellite nests. Satellite nests in structures may be located in dry voids.

What to Look For:

(1) Wood moisture content of 15% or higher.

(2) Large, reddish-brown to black ants (see Appendix for description). You may find winged ants (swarmers) or wings that have been shed, especially around windows. Carpenter ants are most active at night. If carpenter ants are found indoors during winter months, it's a good indication that there is a nest in the structure.

(3) Piles or scattered bits of wood shavings (frass) that are very fibrous and sawdust-like and may be mixed with pieces of dead insects and other pieces of debris.

(4) Slit-like openings in the wood directly above these frass or dump piles. Ants use these openings (called "windows") or cracks and crevices to push the debris out of the nest.

(5) Faint rustling or gnawing sounds coming from the nest site.

(6) Ants foraging outside along the foundation, particularly near water sources or trees (conduct this inspection at night).

Galleries:

There is usually no evidence of infestation on the outside of the wood except for the small slit-like openings made by the ants. Inside the wood, galleries extend along the grain and around the annual rings of the wood. The softer springwood is removed first. The surfaces of the galleries are clean with no mud or sawdust and feel smooth as if they had been sandpapered (Figure 2-3).

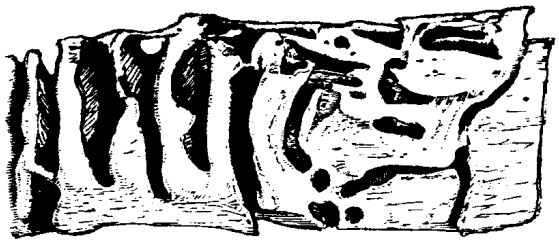


Figure 2-3
Carpenter ant galleries

Damage:

Carpenter ants are generally of relatively little economic importance as destroyers of wood in buildings unless they have been allowed to continue the infestation for some time. In a long-standing infestation that has been ignored, there may be enough damage to require repairs. This most often occurs in outbuildings that are unoccupied and whose construction is conducive to carpenter ant attack. Unless carpenter ants are controlled or conditions change, they will continue to live in and expand their nest area.

[For Identification and Habits, see Appendix A]

CARPENTER BEES

Where to Look:

Carpenter bees prefer to tunnel in weathered, bare wood. They will, however, attack wood that is stained, has only a thin coating of paint, or is lightly pressure-treated. They like to nest in well-lighted but protected locations. Wooden lawn furniture, unfinished siding, decks, porch ceilings and railings, windowsills, and woodwork are common infestation sites. The un-

painted back side of fascia boards, gable ventilators, and shutters may be entry points that are hard to see.

Carpenter bees attack soft and easy-to-work woods such as California redwood, cypress, cedar, Douglas fir, white pine, and southern yellow pine. They may nest in hardwoods if the wood is unprotected and has been softened by exposure to weather.

What to Look For:

(1) Large, robust bees with a fuzzy yellow thorax and shiny black abdomen (see Appendix for description). Bees are present during late spring into early summer, and again in late summer into early fall.

(2) Entry holes into the wood made by the female that are round and 1/2-inch (12 mm) in diameter, about the size of a dime.

(3) Coarse, sawdust-like frass that is the color of freshly-sawed wood on surfaces below the entry hole.

(4) Yellow-brown fecal drips on the wood just below the entry hole.

(5) Additional damage to wood from woodpeckers trying to reach the larvae in the galleries.

(6) Burrowing sounds from the female bee that sound like a vibration on the wood surface.

Galleries:

The female bee tunnels approximately an inch across the grain of the wood, then turns the tunnel at a right angle to follow the grain of the wood in a straight line. The exception is when the entry is through the end of a board (Figure 2-4). The entrance holes and the gallery tunnels are perfectly round and approximately 1/2-inch (12 mm) in diameter. The walls of the tunnels are smooth. A new tunnel usually extends along the grain for 4-6 inches (10 to 15 cm). An old gallery that has been repeatedly used may extend 6-10

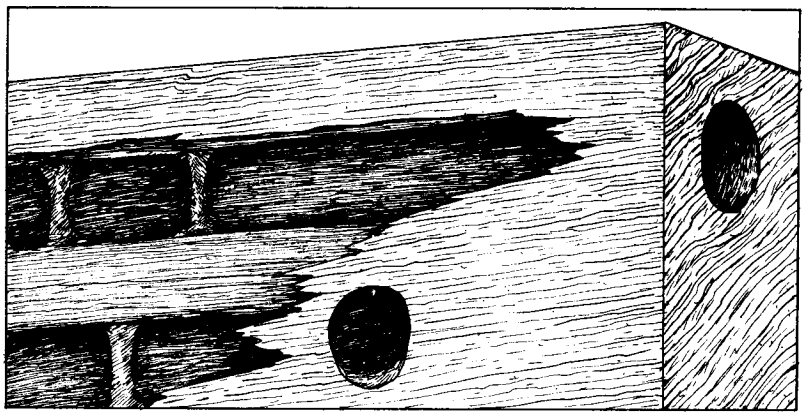


Figure 2-4
Carpenter bee galleries showing larval cells and round entrance hole

feet (2-3 m) along the board. When several generations of bees have shared a common nesting site, the galleries may become quite branched and interconnected.

Damage:

Structural damage from carpenter bees is usually of little consequence. It takes several years of neglect for serious structural failure of the wood to occur. Most damage is cosmetic. The large nest holes and the yellow fecal staining beneath the holes can be very unsightly, even more so if woodpeckers have been pecking at the galleries. Carpenter bees will often reuse and enlarge existing nest sites and will reinfest wood in the same area. The amount of damage that can occur is proportional to the amount of suitable wood available for attack. When thin wood, such as siding, is attacked it can be completely penetrated.

[For Identification and Habits, see Appendix A]

POWDERPOST BEETLES

The term "powderpost" refers to a type of damage in which the inner portion of wood is eventually converted to a mass of powdery or pelleted frass held together by a thin outer shell of surface wood which is itself penetrated by numerous exit holes.

Most experts consider three different families of beetles to be powderpost beetles: lyctids, anobiids, and bostrichids. There are a number of different pest species within each of these three powderpost beetle families. All three groups have similar habits and cause similar damage, but infest different woods. Lyctid powderpost beetles are sometimes referred to as "true powderpost beetles," while bostrichid powderpost beetles are sometimes called "false powderpost beetles."

There are differences in the frass produced by each group of powderpost beetles that help to tell them apart. In general, if the powder is bright and light-colored like freshly sawed wood, it's an indication that the infestation is active. Frass that is yellowed and partially caked on the surface suggests an inactive infestation.

Anobiid Powderpost Beetle

Where to Look:

Anobiid attacks often start in poorly heated or ventilated crawlspace and spread to other parts of the house. Crawlspace and outbuildings are especially suitable due to the dampness and moderate temperatures. Houses

that are closed up, unoccupied, and unheated for long periods, such as log vacation homes, are most susceptible to infestation. Anobiids rarely infest houses on slab foundations.

Anobiids infest both freshly seasoned and older wood, some species will attack unseasoned wood as well. Most anobiids attack the sapwood of hardwoods and softwoods. Sometimes heartwood next to the sapwood may be damaged. The most common North Carolina species, *Euvrilletta peltatus*, does serious damage to southern yellow pine framing. Plywood may be damaged, especially if made with blood or casein glues.

What to Look For:

(1) Wood moisture content higher than 20%.

(2) Accumulations of powdery frass, usually combined with tiny pellets, underneath infested wood or streaming from exit holes. The pellets, which are partially digested wood, are either bun-shaped or taper at each end and give the frass a gritty feel if a softwood is infested. The frass feels less gritty if a hardwood is under attack.

(3) Exit holes in the wood that are round and vary from 1/16 to 1/8-inch (1.6 mm to 3 mm) in diameter (Figure 2-5).

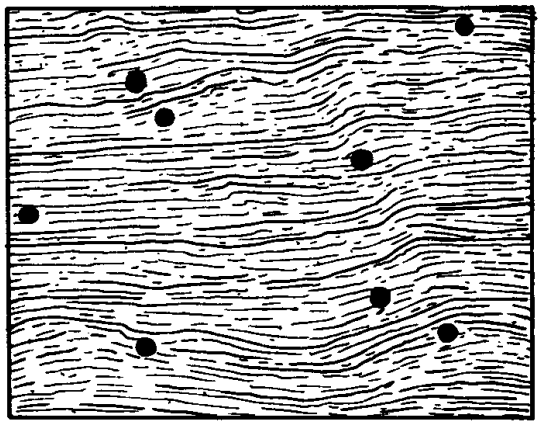


Figure 2-5
Round exit holes of an Anobiid powderpost beetle

(4) Very tiny, round exit holes (1/32-inch or 0.6 mm in diameter) from parasitic wasps that feed on the beetle larvae. Most common in old, heavy anobiid infestations.

(5) Adult beetles (see Appendix for description) are active from spring through summer but are rarely seen. Anobiids are active only at night and some are attracted to lights. Look for live or dead beetles around light sources such as windowsills, in light fixtures, or in spider webs in crawlspace (especially around foundation vents).

Galleries:

Tunneling is most extensive in the sapwood. In timber, the outer sapwood nearest the bark is the most damaged. Anobiid galleries are tightly packed with frass and pellets that are left behind by the larvae as they tunnel. The frass remains in the tunnels unless the wood has dried out considerably (Figure 2-6).

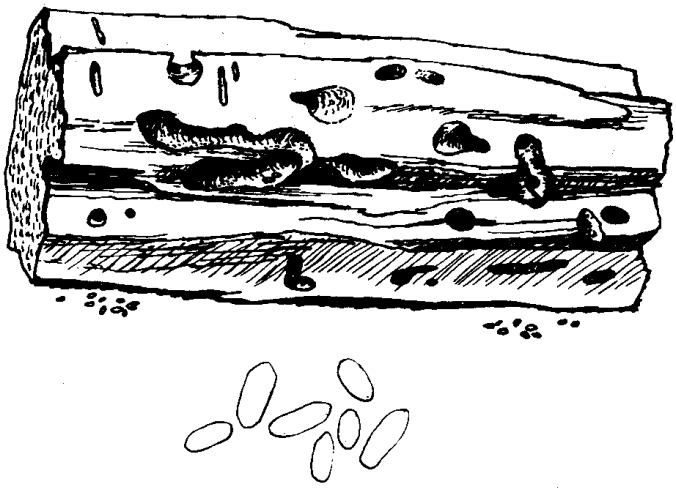


Figure 2-6
Anobiid powderpost beetle galleries

Newly hatched larvae bore into the wood a short distance, then turn at a right angle to tunnel in the direction of the wood grain. The tunnels of many larvae may intersect. Repeated infestations can reduce the wood to a mass of powdery frass.

Damage:

Anobiid powderpost beetles are rather minor pests in heated, occupied buildings in other parts of the country, but in the southeastern U.S., they are common pests. This is mainly because of the higher relative humidity and the high percentage of houses with crawlspaces that provide ideal conditions for anobiid infestation of wood framing.

Because infestations increase slowly over years, a house is usually at least 10 years old before damage is obvious. Damage is usually greatest in the damper parts of houses, and the amount of damage to wood from anobiids is directly related to the moisture level of the wood. A high moisture level and the presence of decay speeds the development of the larvae. Central heating and cooling systems dry out framing and trim wood in a house, reducing the amount of damage.

Widespread damage from anobiids is usually limited to crawlspaces with moisture problems or unheated buildings. The amount of structural damage to wood also depends on the ratio of sapwood to heartwood. Structural weakness can result when anobiids infest wood from fast-growing trees, which have more sapwood. Anobiids can reinfest seasoned wood if wood moisture remains high. Wood that is varnished, waxed, or painted is not attacked.

[For Identification and Habits, see Appendix A]

Lyctid Powderpost Beetle

Where to Look:

Lyctids attack both lumber and manufactured products. Infestation is normally limited to hardwood paneling, trim, furniture, and flooring. Lyctids infest only the sapwood of partially seasoned or fully-seasoned hardwoods. The prefer woods with a high starch content and with large pores for egg laying: for example, oak, hickory, ash, walnut, pecan, poplar, sweetgum, wild cherry, and many tropical hardwoods. Some species also infest bamboo. Softwoods are not attacked because they do not have pores and usually have a low starch content. Structural timbers are infested only if made of hardwood.

What to Look For:

(1) The greatest lyctid activity occurs in wood with 10 to 20% moisture.

(2) Small piles of very fine, flour-like frass on or under the wood. A slight jarring of the wood will cause the frass to sift out of exit holes. The frass contains no pellets (as with anobiid powderpost beetles) and feels like talcum powder.

(3) Exit holes in the wood that are round and vary from 1/32 to 1/16-inch (0.6 mm to 1.2 mm) in diameter (Figure 2-7).

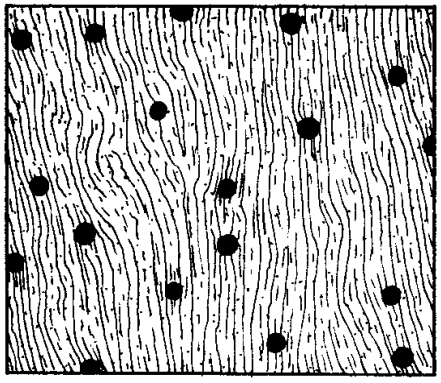


Figure 2-7
Round exit holes of Lyctid powderpost beetle

(4) Very tiny, round exit holes (1/32-inch or 0.6 mm in diameter) from parasitic wasps that feed on the beetle larvae. Most common in old, heavy lyctid infestations.

(5) Adult beetles (see Appendix for description) are most active from late winter to early spring but are rarely seen. The beetles fly and may be attracted to lights. They hide during the day but may be seen crawling on windowsills, floors, furniture, and other surfaces at night. Dead beetles may be found on windowsills or in spider webs.

Galleries:

Larvae bore tunnels in the wood that are straight and follow the grain at first, but later become more irregular and often intersect other tunnels. Tunnels are about 1/16-inch (1.2 mm) in diameter and loosely packed with fine frass (Figure 2-8). The frass is not tightly packed into the tunnels as with the anobiid or bostrichid powderpost beetles, and so is easily jarred loose.

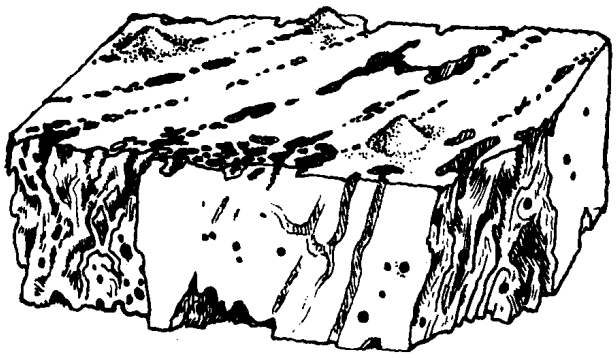


Figure 2-8
Lyctid powderpost beetle galleries

Damage:

Lyctid powderpost beetles are more of a problem in the southern U.S. than in other regions. The amount of wood damage done by lyctids depends on the starch content in the wood. The width of the sapwood portion of the piece of wood (assuming an adequate starch content) helps determine how much of the wood might be damaged. In severe cases, the sapwood may be completely converted within a few years to frass held in by a very thin veneer of surface wood. As long as the starch content in seasoned wood remains high enough, lyctids can reinfest the wood until it disintegrates. Eggs are usually laid in or near the same wood from which the adult female emerged. Wood that is varnished, waxed, or painted is not attacked.

[For Identification and Habits, see Appendix A]

Bostrichid Powderpost Beetle

Where to Look:

Bostrichid attack is usually limited to individual pieces of hardwood flooring, woodwork, or trim. They infest new hardwood lumber and manufactured products that are less than 10 years old.

Most bostrichids infest the sapwood of hardwoods, but a few attack softwoods. Some species attack bamboo and tropical woods. Some bostrichids attack freshly cut and partially seasoned woods with the bark on; others attack relatively dry wood. Outdoors in their natural habitat, bostrichids infest dead or dying branches of trees, especially hardwoods, and are sometimes referred to as "branch and twig borers."

What to Look For:

(1) Wood moisture content that is 6-30%. Species that attack partially seasoned wood require an even higher moisture content.

(2) Frass that is tightly packed in the galleries and does not sift out easily. The frass contains no pellets (as with anobiid powderpost beetles). The frass feels mealy, tends to stick together and is less likely to fall from exit holes than the frass of anobiid or lyctid powderpost beetles.

(3) Circular entry holes (3/32 to 9/32-inch or 2.4 to 7 mm) in the wood made by the female beetle. She enters the wood to construct egg laying tunnels. These holes rarely contain frass.

(4) Exit holes in the wood that are round and vary from 3/32 to 9/32-inch (2.4 mm to 7 mm) in diameter, and that are made by emerging adults (Figure 2-9). These holes may contain frass.

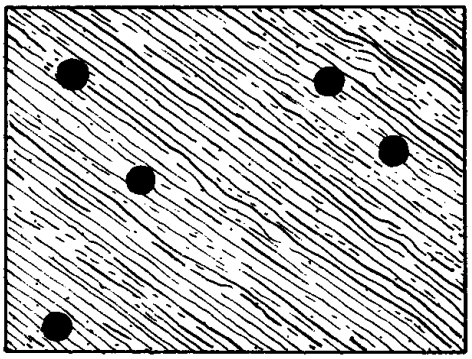


Figure 2-9
Round exit holes of Bostrichid powderpost beetle

(5) Adult beetles (see Appendix for description) are active during the day but are rarely seen. In a heavy infestation, they may be seen crawling over infested wood. Check windowsills, light fixtures, and spider webs for dead beetles.

Galleries:

Larval tunnels are round and range from 1/16 to 3/8-inch (1.6 mm to 10 mm) in diameter, depending on the species. The larva tightly packs the frass into the tunnel as it feeds. The mealy frass does not easily sift out of the wood (Figure 2-11). Tunnels can be 20-24 inches (50-60 cm) by the time the larvae complete development.

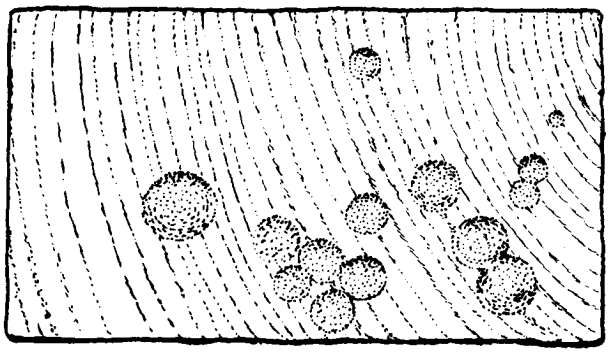


Figure 2-10
Bostrichid powderpost beetle galleries

Damage:

Bostrichids are of less importance in houses than the anobiid or lyctid powderpost beetles. They rarely cause significant damage to framing lumber. Since they are restricted to feeding in the outer sapwood, damage usually does not extend more than an inch or two into the board. Bostrichid-infested wood will have more holes on the surface since there are both entry and exit holes present.

Since most bostrichids do not reinfest the wood from which they emerged, the damage is limited to that caused by a single generation. However, because of the shorter life cycle of bostrichids, they can cause damage more quickly than an equivalent number of anobiids. In a heavy initial infestation, the sapwood may be completely consumed. In rare instances, certain species of Bostrichids will reinfest wood in a structure, particularly if there is a serious moisture problem.

[For Identification and Habits, see Appendix A]

OLD HOUSE BORER

Where to Look:

Old house borers are strictly pests of structures and have not been found outdoors in logs or stumps. They have been found, however, in barns, fence posts, and rustic buildings. Old house borers attack both structural timbers

and lumber. They are common pests in new construction since they are often built into the structure. In the southern east coast, damage is most often found in wood framing in crawlspaces, basements, and storage areas, and in log homes. In more northern areas, damage is more commonly found in attic framing.

Old house borers attack only the sapwood of softwoods. They attack spruce and fir, but prefer pine since it has a higher protein content. They will also attack relatively unseasoned pine and other coniferous construction material. They do not attack hardwoods but exit holes may be found in hardwood, plywood, wood siding, trim, sheetrock, plaster, paneling, or flooring after the adults chew through these materials to escape from infested wood beneath. Old house borers usually attack wood less than 10 years old but can attack older wood as well.

What to Look For:

(1) Larvae develop best at wood moisture levels of 15 to 25%.

(2) Rhythmic ticking or rasping sound made by 2-3 year-old larvae as they tunnel in the wood. It's similar to the sound made by a mouse gnawing. These chewing sounds can be heard most of the year except in winter months.

(3) Bulges or blistered areas on the surface of the wood caused by frass packed in tunnels beneath. Shine a light parallel to the wood surface to see the blisters.

(4) Small piles of frass beneath or on top of infested wood. The frass is loosely packed in the tunnels and is composed of very fine powder and tiny blunt-ended pellets. If the wood was machined after the emergence of the beetles, there may be no frass present in the tunnels.

(5) Exit holes in the wood that are oval and 1/4 to 3/8-inch (7 mm to 10 mm) in diameter, with the edges often ragged (Figure 2-11).

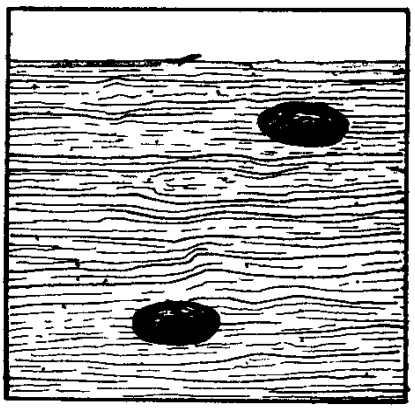


Figure 2-11
Oval exit holes of old house borer

(6) Adult beetles (see Appendix A for description) are strong fliers and are most active in June and July, but are rarely seen. Look for them in spider webs and on surfaces near light sources, or at ventilation openings in crawlspace.

Galleries:

Feeding larvae seldom break through the surface of the wood even though the interior may be heavily damaged. In severe infestations the heavy amount of frass that is loosely packed in the tunnels may swell and cause the thin surface layer of the wood to bulge out, giving it a blistered look. When the surface of the wood is pried away, frass will fall from the galleries. On the interior, surfaces of the tunnels have a characteristic rippled or wavy pattern like sand over which water has washed. The galleries are oval in cross-section and may be up to 3/8-inch (9 mm) at the broadest point. Most of the larval feeding is parallel to the grain of the wood (Figure 2-12).

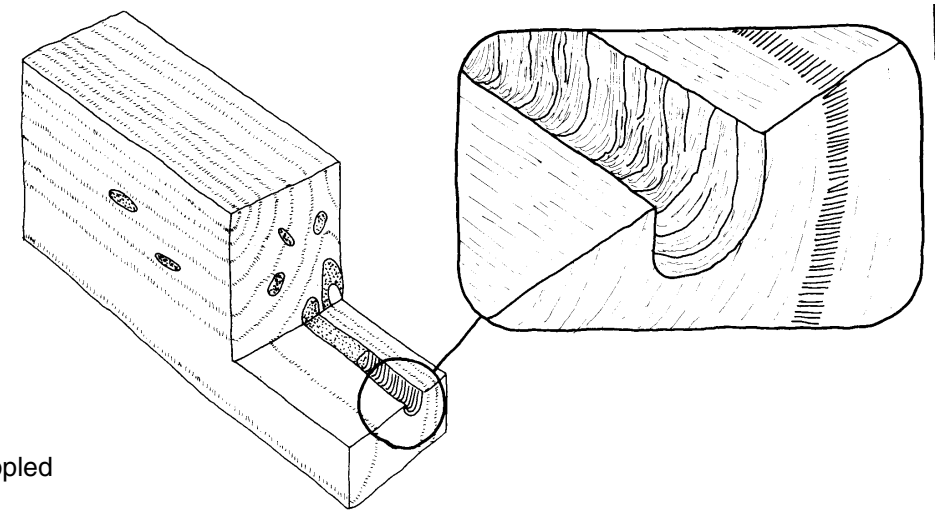


Figure 2-12
Old house borer gallery showing rippled pattern of tunnels

Damage:

The old house borer ranks only behind termites in the frequency with which it is found in structures in the coastal, eastern United States. Infested wood is often accidentally used in construction since the early stages of infestation are very difficult to detect.

Although a common pest, the amount of actual damage done by the old house borer is often limited to only a few boards in the entire house. Old house borers will reinfest seasoned wood, unless it is very dry. But evidence suggests that in heated, well-ventilated, occupied buildings, they may rarely reinfest after the first generation is completed.

In portions of houses that may have a high enough humidity to allow reinfestation of old house borers, serious damage can result. The extent of the structural damage depends on the proportion of sapwood to heartwood since virtually all sapwood of infested boards may be disintegrated. In cases of extreme damage, the sapwood may be reduced to powdery frass with a very thin layer of surface wood. Serious structural damage is most likely to occur in unheated storage areas, in buildings that are occupied intermittently and rarely heated, or in occupied buildings where structural timbers have a high moisture content. When conditions allow reinfestation, the beetles usually reinfest wood in the same site from which they emerged.

[For Identification and Habits, see Appendix A]

WOOD-DESTROYING FUNGI

Where to Look:

Conditions that are conducive to invasion by fungi are largely the same kinds of conditions that are conducive to subterranean termite infestation.

White rot fungi primarily attacks hardwoods. Brown rot is more common in softwoods like pine, spruce, and fir. The unusual brown rot, *Poria incrassata* (see Appendix for description), can attack and destroy almost any type of wood, but coniferous softwoods are most often infected because they make up most of the rough frame lumber in a structure. *Poria* usually attacks structural timbers in buildings, or stored lumber. *Poria* infections usually occur in houses only a few years old or those that have had recent structural changes. It's a particular problem in homes with wet, poorly ventilated crawlspaces, or in homes with basements and slab foundations.

Surface molds and sapstain fungi can grow on wood before it is seasoned, when it is in the supplier's yard or on the building site, or in a finished house. Although these fungi discolor wood, they do not break down wood fibers and do not damage or weaken the wood. They do, however, provide an early warning that damp conditions exist which may lead to attack by fungi that do damage wood.

What to Look For:

(1) Fungal fruiting bodies and other fungal structures which include threadlike strands (hyphae) on the wood, or fan-shaped mats of hyphae (mycelia), cottony growths, or fungal bodies that may look like tiny mushrooms or shelflike brackets. These may have a soft slimy texture and a distinct mushroom smell.

(2) Water-conducting tubes, or rhizomorphs, of the *Poria* fungus which can extend for 30 feet or more along the surface of concrete, brick, or other materials or within hollow unit walls.

(3) Wood that has either a darker or lighter color than normal wood.

(4) Wood that breaks into cubes, is spongy or stringy, or breaks into short slivers when picked.

(5) Floor boards that have shrunk exposing white mycelia between the boards, or separation of the baseboard from the floor due to shrinkage of the wood.

(6) Swelling and crumbling of plaster or sheet rock, usually vertically where it is fastened to a wall stud.

(7) Wood moisture content higher than 20%. At a moisture content below 20%, the fungus becomes inactive, but is not dead.

(8) Soft, dead, dull sound when wood is tapped.

Damage:

Wood-destroying fungi, especially brown rot, cause as much and maybe more damage to structures than do termites. Heavily-decayed wood usually appears solid, but is almost weightless when lifted. When wood damaged by fungi is jabbed with an ice pick or screwdriver across the grain, it lifts out as short slivers or will break across the grain without splintering.

Wood that is infected with white rot is spongy to the touch and stringy when broken. There may be some cracking across the grain, although the wood surface does not collapse or shrink dramatically until decay is advanced (Figure 2-13).

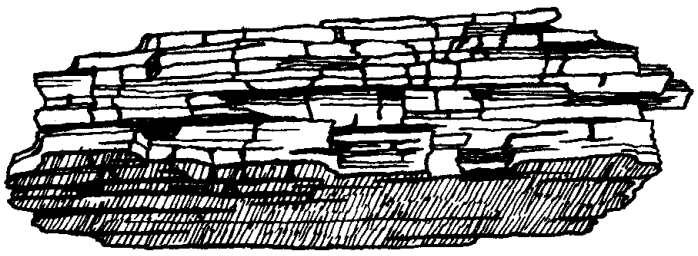


Figure 2-13
Brown rot showing cracking across the grain

Brown rot is the most damaging of all the fungi found in structures. It can cause rapid weakening of wood. In advanced stages, the wood cracks across the grain into "cubes" and the wood surface shrinks and collapses. Wood that is heavily damaged by brown rot is brittle and can be crushed into a dark powder. *Poria incrassata* (see Appendix for description) is a relatively rare brown rot that has water-transporting tubes. The surface of

damaged wood sometimes appears wavy, but apparently sound, even though the interior may be heavily decayed. *Poria* is extremely damaging and can destroy a house in little more than a year.

Remember, fungi is only to be listed as a condition conducive to infestation. Molds are not to be listed.

[For Identification and Habits, see the Appendix A]

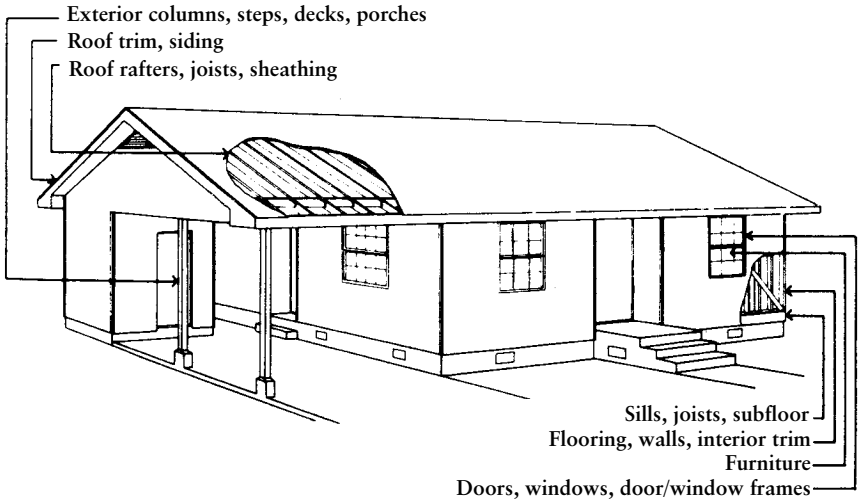
Step-By-Step Inspection Procedures

Generally, the inspector works on behalf of the buyer/lender. Your obligation as a WDI inspector for a real estate transaction is to do a quality inspection and accurately complete the *Official North Carolina Wood-destroying Insect Information Report (WDIR 100)*. During your inspection, you attempt to (1) discover whether wood-destroying insects are infesting the structure, (2) find evidence of an old infestation that appears to be inactive, (3) determine if there were any previous treatments, and (4) identify conditions conducive to subterranean termites. Major pests of concern are termites, old house borers, powderpost beetles, carpenter ants and bees, but any insect capable of infesting seasoned wood must be reported (Figure III-1).

Your inspection should include a thorough examination of the exterior of the structure, the foundation, any basements or crawlspaces, the interior living areas, the attic, if accessible, and any attached structures or elements. You will check all visible areas, but typically concentrate on those areas and elements of construction known to be common sites of infestations. (Note: This chapter uses many construction terms such as sill plate, footers, joists, and so forth that might be new to some readers. Appendix B contains definitions of these frequently used terms with diagrams that help identify structural elements.)

Be systematic and organized. Be sure to do the following:

- Initial walk-around, analysis, & graph
- Identify type of construction and potential problems
- Inspect the exterior
- Inspect the lowest floors and crawlspace
- Inspect living areas
- Inspect the attic, if accessible
- Check for previous treatments



	Sills, joists, subfloor	Flooring, walls, interior trim	Roof rafters, joists	Roof trim, siding	Outside doors, windows, frames	Outside columns, steps, porches
Subterranean termites	C	C	O	O	C	C
Formosan termites	C	C	C	O	C	C
Drywood termites	C	C	C	C	C	C
Carpenter ants	C	O	O	O	C	C
Carpenter bees	R	R	R	C	O	O
Old house borers	C	O	C	O	O	O
Lyctid beetles	R	C	R	R	C	R
Anobiid beetles	C	O	O	O	O	O
Bostrichid beetles	O	C	O	O	C	O
Surface mold/sapstain	C	O	O	C	O	O
Brown & white rot	O	R	O	O	C	C
Water-conducting fungi	C	C	R	O	C	O
White-pocket rot	C	R	C	R	R	R

Figure 3-1

Where to find wood-destroying insects, fungus, and rot infesting a structure

C = Common, O = Occasional, R =Rare

(1) DO AN INITIAL WALK-AROUND

Your first step should be to stand back about twenty or thirty feet and, while slowly walking around the structure, examine it for gross structural problems, evidence of moisture, or special areas of potential concern. Look for a damaged or sagging roof, walls that are out of alignment, deteriorating chimneys, cracks in brick or block walls, and other indications that part of the structure is settling.

Termites, carpenter ants, powderpost beetles, and other wood-destroying insects are more likely to infest and reinfest leaky, water-damaged structures. Still standing back from the structure, look for evidence of moisture problems. If it was raining, where would the rainwater go? Are the gutters and downspouts in good shape, and does the drainage system take the water away from the structure? Does the ground slope away from or towards the foundation? Do walkway, porch, and patio slabs slope away from the structure? (To tell, simply pour some water on them.) Is the paint in good shape or is it discolored and peeling? Are icicles providing a steady drip, drip, drip of water onto siding or window frames? Are the soffits rotting? Does the ventilation appear adequate for the attic and crawlspace? Whenever you find a potential water problem, you will need to investigate further inside and determine its effect on the structure and whether WDI's are associated with the water problem.

Identify other sites of special concern such as dirt-filled raised porches, decks and fences attached to the structure, planter boxes, wooden porch supports, open soffits, nearby tree stumps, branches touching the roof or siding, heavy and thick foundation plantings, trellises against the house, and similar sites that require further investigation.

(2) GRAPH THE STRUCTURE

While not strictly required as part of the WDIR 100 inspection, measuring and sketching the structure on graph paper can help you identify hidden and inaccessible areas that might be overlooked when you inspect the interior. You can measure distances with a steel tape, measuring wheel, or folding rule. Your graph does not need to show great detail. Simply outline the structure, showing breaks and setbacks at the perimeter, any garages, patios, porches, carports, attached fences, chimneys and other structural elements, and entrypoints for utility lines. Then use the graph to record evidence of infestation, conducive conditions, and other notes of importance to your report.

(3) IDENTIFY THE TYPE OF FOUNDATION

Houses and other buildings come in all shapes and sizes. Some have basements, some don't. Some have crawlspaces, some don't. Some have slabs sitting at grade level, some have no slabs at all. Foundations may be made of concrete, block, brick, hollow tile, stone and rubble, or even wood. New construction systems are being regularly introduced.

WDI inspectors need to be familiar with the common types of construction because each has unique characteristics which may affect its susceptibility to WDI attack and your ability to inspect. As you begin your inspection, identify the types of foundation present in the structure (there can be different types within a single structure). Here are the most common:

Slab-on-Grade

Many builders and much of the general public believe that a slab foundation protects against attack by termites. While it is true that termites cannot penetrate solid concrete, they can enter through openings and cracks as small as 1/64-inch. (0.3 mm). They can gain access over the edge of a slab, through expansion joints, openings around plumbing, electrical, and other slab penetrations, cracks that appear in the slab as it settles, and through grade stakes improperly left in place as the slab was poured. Slab-on-grade construction comes in different forms.

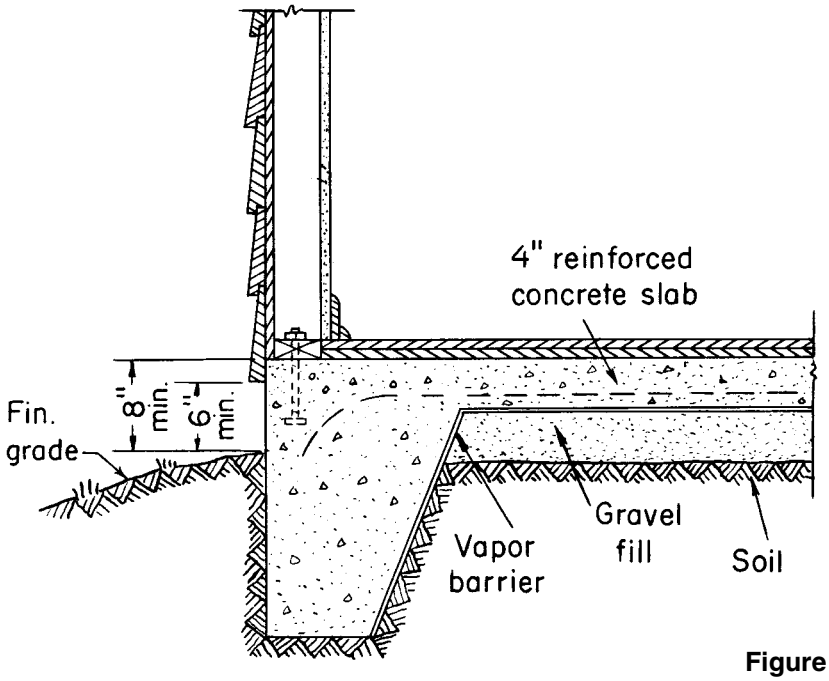


Figure 3-2
Monolithic concrete slab-on-grade construction

Monolithic slabs

Monolithic slabs provide the best protection since they are poured as a single piece combining the footers, foundation wall, and slab (Figure 3-2). If they aren't cracked or damaged, termites can only enter the structure by going around them or through utility penetrations.

Supported slabs

Supported slabs rest on foundation walls and concrete beams or posts (Figure 3.3). The slab and the foundation are constructed separately. If you look at an exposed foundation wall you may see a horizontal seam. This type of construction provides fairly good protection since termites must tunnel over the visible edge of an undamaged slab in order to enter the structure. The tunnels should be visible to the inspector unless the slab edge is covered by siding, mulch, soil, or thick shrubbery.

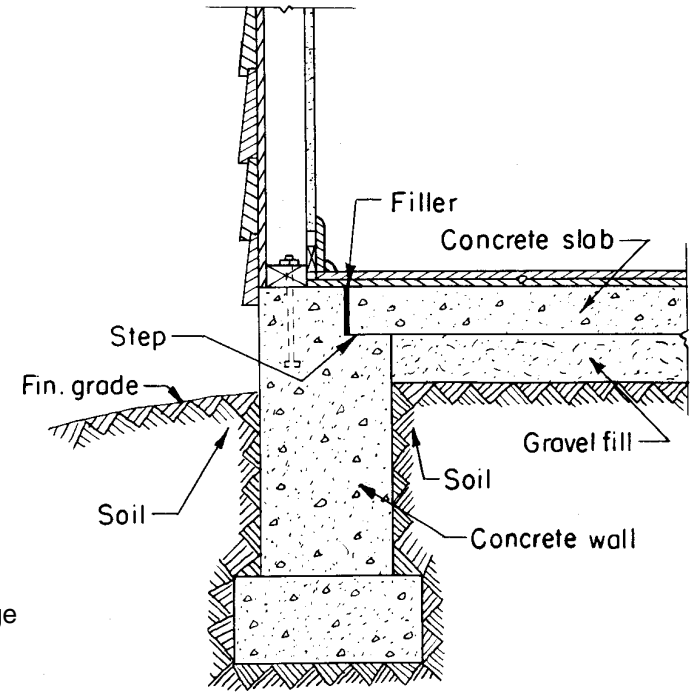


Figure 3-3
Supported slab-on-grade construction: edge of slab rests on ledge in foundation wall.

Floating slabs

Floating slabs are the most susceptible to termite entry. The slab rests entirely on the fill material (Figure 3-4). In either case, there is an expansion joint between the foundation wall and the slab. Termites can enter the structure unseen, directly through this joint. If the inside floor is unfinished, you

may be able to see the seam between the foundation and the slab. If you are in doubt and you feel it is necessary to verify that the slab is floating, you can sometimes remove a doorsill and find the expansion joint. Floating slabs are used extensively in commercial buildings and in other large structures. Most basements have a floating slab floor (see later discussion of basement construction).

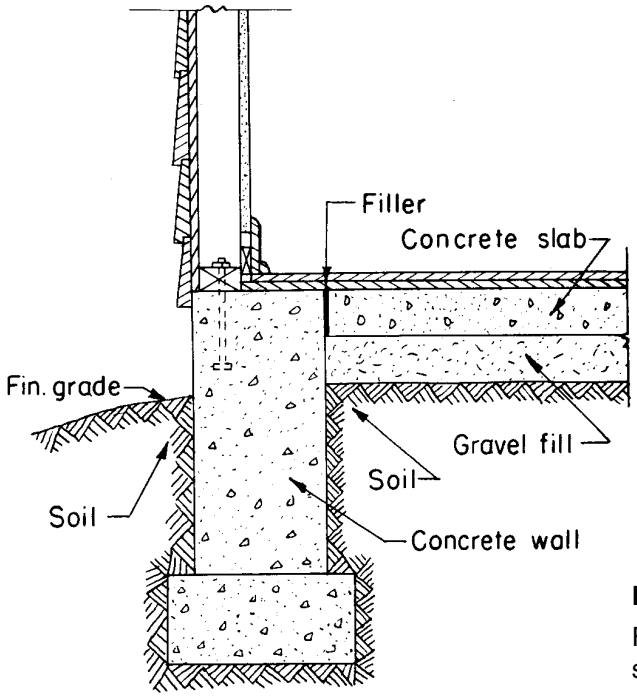


Figure 3-4
Floating concrete slab-on-grade construction: slab rests entirely on the ground

Wherever sections of slabs come together, there will be joints to allow for expansion and contraction of the concrete due to changes in temperature. These expansion joints are common entry points for termites. They are unfortunately often hidden under the base of interior walls and impossible to inspect without pulling molding, carpeting, or opening walls.

Basement

A habitable story of a building that is built significantly below grade level is called a basement (Figure 3-5). In some homes and other structures, the entire lower floor is below ground. In many homes, only part of the footprint is a basement, the rest being slab-on-grade or crawlspace construction. The floor of the basement is most often a floating slab, but may be one of the other slab construction types. Some older buildings have brick floors, dirt floors, or wood over dirt floors. Because they are below grade, base-

ments often experience problems with ground water, and many have French drain systems and sumps installed under the slab perimeter to help reduce hydrostatic pressure and water intrusion.

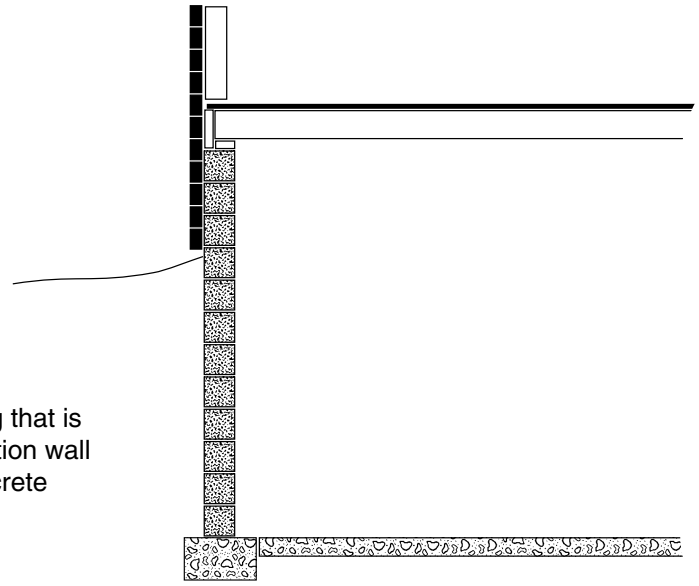


Figure 3-5

A basement is a habitable story of a building that is built significantly below grade level. Foundation wall may be block, stone, concrete, or even concrete inside formboard

Unfinished basements allow inspection of many structural areas attacked by termites and other wood-destroying insects. These areas are commonly inaccessible in finished basements, as is the case in most areas of slab-on-grade homes.

Crawlspace Construction

When a ground floor is suspended over the soil below, the area underneath is called a crawlspace (Figure 3-6). They come in many forms, with dirt floors or slab floors, and sometimes a little of both. They may be insulated and uninsulated. They are typically characterized by not being high enough to stand in, and they often are so low that they require the inspector to crawl to get from one section to another. Some are entered from the outside, some from the inside. Some have no access at all. If the crawlspace is accessible, structural beams, sill plates, and other WDI susceptible sites are often fairly easy to inspect.

In a special type of crawlspace construction, the crawlspace becomes a giant heating and cooling duct called a “plenum.” Air flows through the plenum and through vents into the rest of the house. There is no access to the plenum space.

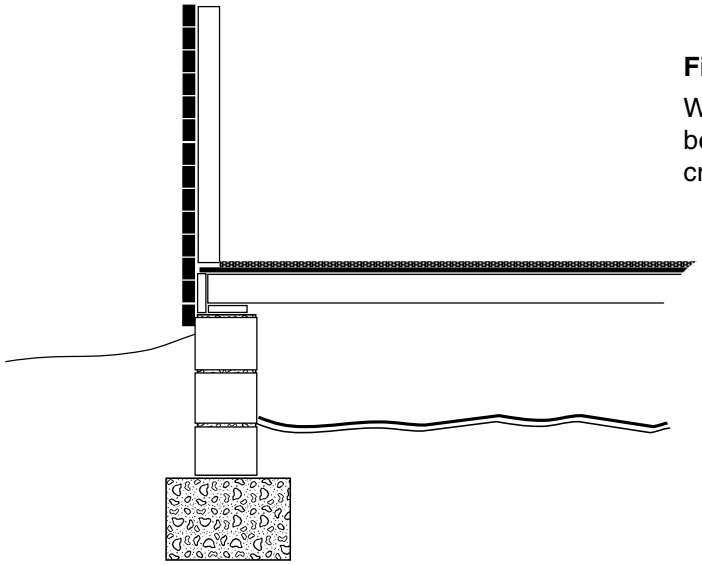


Figure 3-6
When a ground floor is suspended over the soil below, the area underneath is called a crawlspace.

Unusual Foundations and Other Special Problems

Certain types of construction pose special problems for wood-destroying insect inspectors. Some prevent inspectors from checking critical areas, some make buildings especially susceptible to WDI attack. Here are a few unusual foundations and other special problems that may occur in North Carolina:

Crushed stone foundations

A new construction technique uses crushed or compacted stone footings (Figure 3-7). For slab-on-grade construction, the builder applies crushed stone in a two-foot wide trench to below frost line in place of traditional poured concrete footers. For basement construction, the builder underlays the slab with a minimum of six inches of crushed stone. From a termite control standpoint, the question is: Can termites travel through the crushed stone to reach the structure? If so, or if the crushed stone formed cracks or breaks over time and after ground movement, termites would be able to enter the structure at any location where there was not an effective chemical barrier. Both seem likely.

North Carolina recently turned down a request to amend their building code to allow this type of foundation. The reason? State structural pest control regulators questioned whether such structures could be treated effectively for subterranean termites. Even so, officials have warned that such houses can be built without code approval by getting the approval of local authorities. Be alert to this type of construction.

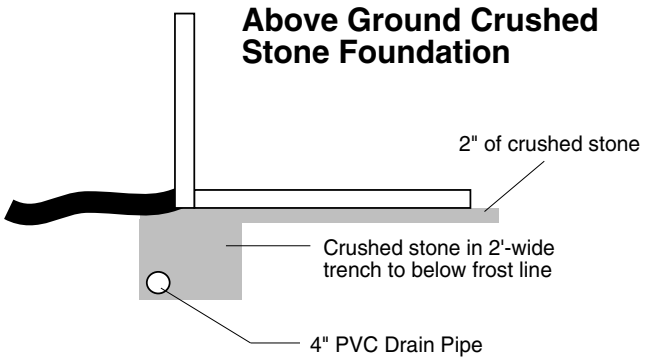
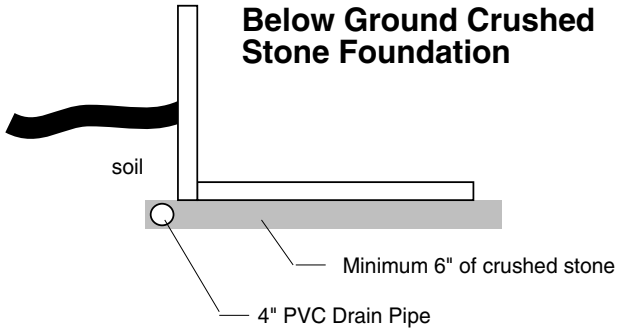


Figure 3-7
A new construction technique using crushed or compacted stone footings.



Stone and rubble foundations

Older homes sometimes sit on stone and rubble (field stone) foundations (Figure 3-8). These foundations consist either of tightly-fitted stones cemented only on the sides and top, or stones and rubble tied together with mortar throughout the entire wall. The foundations are often wider at the base and taper towards the top. Termites can enter a stone and rubble foundation and tunnel through the interior to reach wood sills and beams resting on the top or notched into the wall. Treatment of such foundations can be very difficult.

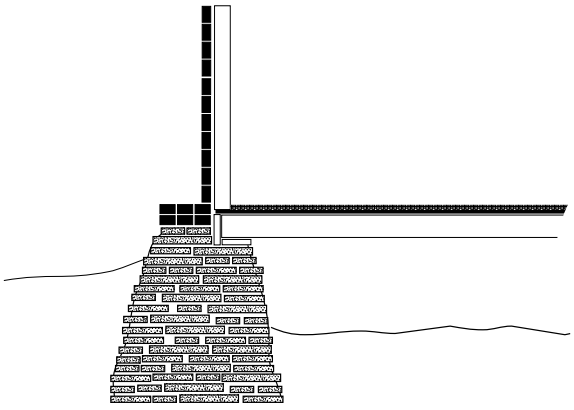


Figure 3-8
Stone and rubble (field stone) foundation.

Permanent wood foundations (PWF)

Figure 3-9 shows a permanent wood foundation (PWF), which is constructed of preservative treated plywood, wooden plates, and other lumber overlaid with polyethylene sheeting or asphalt felt building paper. The foundation rests on gravel or crushed stone fill. Although the wood has been treated, termites may tube over the treated wood and attack the sill plate and other untreated lumber resting on the foundation. Inspectors of PWF buildings need to especially check perimeter joists, sill plates, and the end of joists for termite activity. PWF can be found in both basement homes, in crawlspace homes, and slab homes.

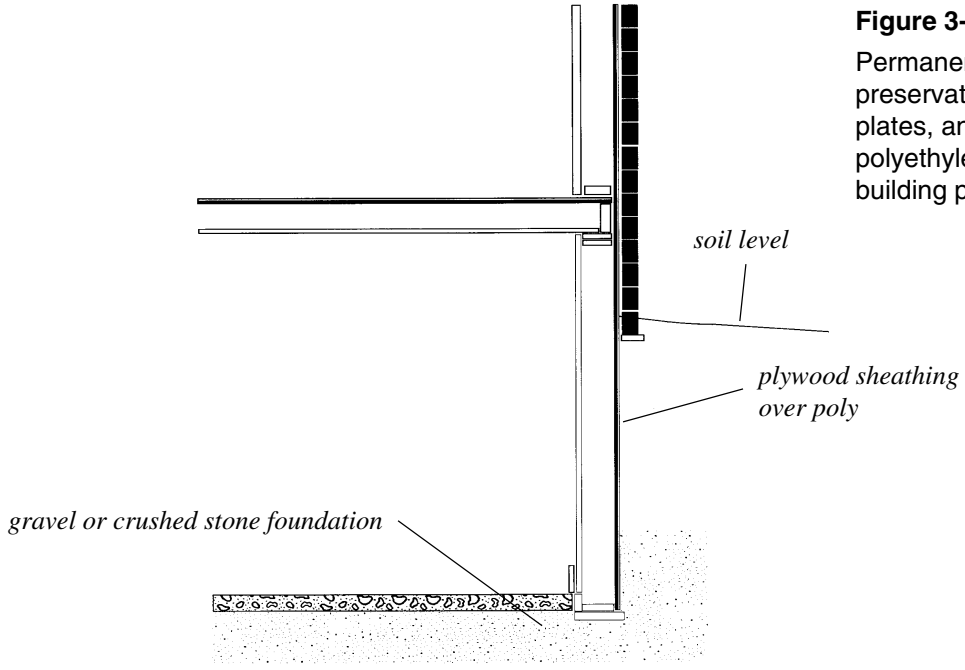


Figure 3-9
Permanent wood foundation (PWF) of preservative treated plywood, wooden plates, and other lumber overlaid with polyethylene sheeting or asphalt felt building paper.

Stucco

Stucco is an exterior finish for homes and other buildings. It is made by mixing cement, sand, and lime. Stucco is applied wet to a coated, expanded-metal lath, usually but not always over some type of sheathing. Over time, stucco can develop cracks and leaks and moisture can accumulate against the building, attracting termites and carpenter ants. Permanently wet stucco can support an above-ground colony of subterranean termites.

A common problem with older stucco homes occurs when the sill is below grade and the stucco extends below the soil surface. Not only is moisture wicked up into the stucco, but the sill plate is protected from termite attack only by a thin layer of stucco. This should be reported as a condition conducive to termite infestation.

Rigid foamboard insulation

More and more builders have been using rigid foamboard insulation on the inside or outside of foundation walls above and below grade, or under slabs (Figure 3-12). Some local codes even require it. The problem is with below-grade installations, where termites are able to bypass any chemical barrier in the soil and enter structures undetected though the foamboard. Also, when such a structure is treated, the water resistance of the foamboard prevents the termiticide from reaching critical areas. Many newer houses have been built with rigid foamboard, by some estimates up to 50 percent of homes built in the past five years. It should be considered a condition conducive to termite infestation.

Rigid foamboard insulation is easy to see when it is on the inside foundation wall of an accessible crawlspace or inside an unfinished basement, or when it extends above the soil surface on the foundation wall. Below-grade foamboard insulation is far more difficult, and it may be found on any structure built after 1985. An inspection gap is required by the North Carolina Building Code.

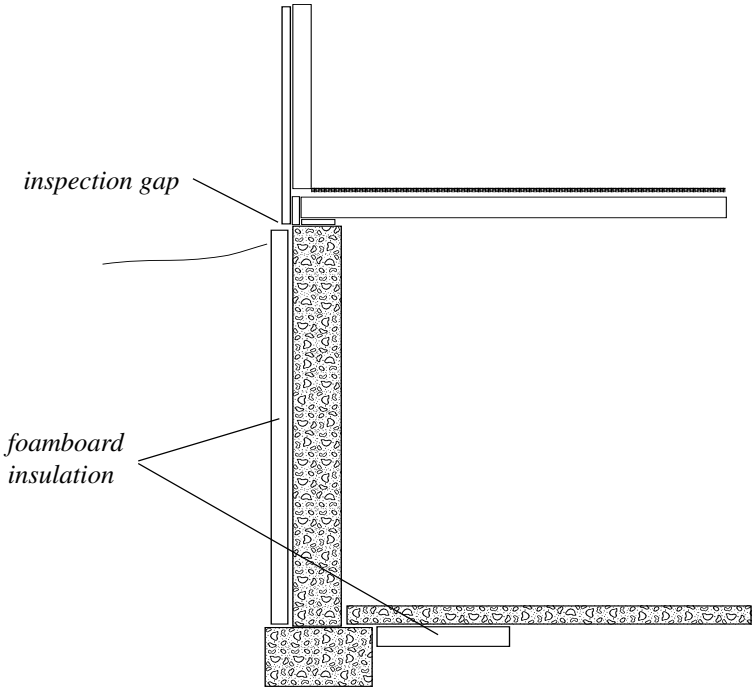


Figure 3-10
Rigid foamboard insulation can be on the inside or outside of foundation walls, above or below grade, or under slabs.

To determine if rigid foamboard insulation is present, ask the owner, check any blueprints available, or dig down six to twelve inches at the foundation wall. You can also find it from the inside by probing and prying into expansion joints, around sill plates, and behind paneling.

Exterior Insulation and Finish Systems (EIFS)

A relatively new and popular construction type for upscale homes and commercial buildings is the Exterior Insulation and Finish System (EIFS). Insulation is applied on the outside of the building rather than inside, and it looks a lot like stucco. It consists of layers of insulation board, mesh, a base coat, and an acrylic copolymer finish coat.

EIFS creates serious wood-destroying insect problems because the structures are very susceptible to moisture problems and WDIs, particularly termites and carpenter ants. EIFS homes are very difficult to treat once they are infested. Once an EIFS structure gets wet, it is very difficult to dry out. Furthermore, the systems often extend below grade and wick moisture up into the upper floors, while at the same time allowing direct access to the structure by termites. EIFS should be considered a conducive condition for termites.

If you suspect EIFS, ask the owner or occupant. Tap on the exterior wall. It should sound hollow, but so does stucco. An ice pick will penetrate EIFS far more easily than stucco.

(4) CONDUCT AN EXTERIOR PERIMETER INSPECTION

Check the perimeter of the structure in a systematic way. For example, start at the front door and proceed counterclockwise around the structure until you return to your starting point. Look from ground level up to the roof line (Figure 3-11). You are looking for pests, evidence of pests, and conducive conditions, and you need to investigate those elements of construction that history has shown favor WDI pests.

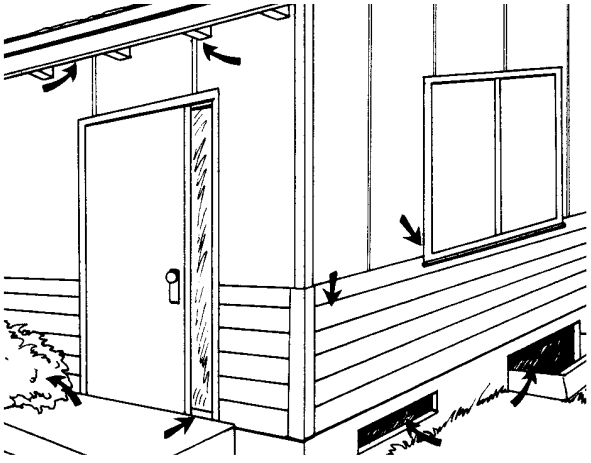


Figure 3-11

Look from ground level up to the roof for evidence of WDIs, moisture problems, and other conditions conducive to termites (adapted from University of Florida).

Termite Tubes

Check the surface of foundation walls for termite tubes. Look inside cracks or crevices in the wall, and in siding, wood trim, and the like. Also check the intersection of elements of construction such as between the foundation wall and a patio slab, deck, or attached fence, and in expansion joints between slabs. Termite tubes can be difficult to see when they are located inside cracks, and so you may need to use a tool to gently dig into the crack to expose the tubes. Termite tubes also can be difficult to see if soil has splashed on them.

Be sure to look above your head as well as below. Termites, and particularly Formosan termites, often build shelter tubes on the sides of structures well above the ground when they are infesting inside the walls. Also be sure to check carefully wherever firewood or wood debris have been stored against the foundation. Check the wall behind shrubs and other plantings that are against the foundation.

Carpenter Ants

Look for carpenter ant workers trailing on the foundation wall or entering openings into the structure. Other common trailing sites are on the surface of tree roots and branches (especially important are those touching the house), along the edges of patio blocks, planters, or sidewalks. Carpenter ants, by their continuous foraging to and from their nests, can actually cut trails into lawns so that the trail looks like a deep, 1/4-inch (7mm) wide groove. While carpenter ants nesting outside are not reported on the WDIR 100, such activity may signal an infestation inside the structure, and you should investigate to see if the ants are nesting inside.

If carpenter ants are nesting behind the outside wall, you may find a carpenter ant dump on the ground below the nest area. The dump will consist of piles of scattered wood fibers and sawdust-like frass from the wood that the ants excavated for their nest (Figure 3-12). The dump will also include fragments of ants and other insects. The dump is ejected through

Figure 3-12
Carpenter ant dump with piles of scattered wood fibers, frass, and insect parts.

"windows" or slit-like opening made for that purpose, which can be considered a positive sign of at least an old infestation if not an active one. You may also hear the rustling and faint gnawing sounds of carpenter ants inside their nest, especially if you place your ear directly on the wood, or use a stethoscope or other amplification device.

Carpenter Bees

The most obvious sign of a carpenter bee infestation is the bees themselves flying close to the house, and sometimes aggressively at people in the area. Highest activity occurs in late spring and early summer, and then again in later summer and early fall. You can sometimes hear the vibrating sound of the carpenter bee excavating the nest.

Look for the 1/2-inch (12 mm) diameter, round entry holes of the nests (see Figure 2-4). While they at times will nest in almost any type of unfinished wood, they much prefer California redwood, cypress, cedar, white pine, and southern yellow pine. Look both above your head at natural wood siding and trim, and below on decking and railings. Inspectors commonly overlook evidence of carpenter bees nesting on the underside of wood decks and the back side of fascia boards.

Wood/soil Contact

When untreated wood is in direct contact with the soil, it provides hidden access for termites and sometimes a way for moisture to wick into the structure (figure 3-13). Examples include form boards and stakes left around porch and patio slabs, wood trim extending below the soil, planter boxes against siding, planters installed around carport supports (see *Planters* below), wood lattices or walls under porches (curtain walls) in direct contact with the soil, wood stairs, firewood or wood debris against the foundation and on the ground, and siding below grade (see *Siding Below Grade* below).

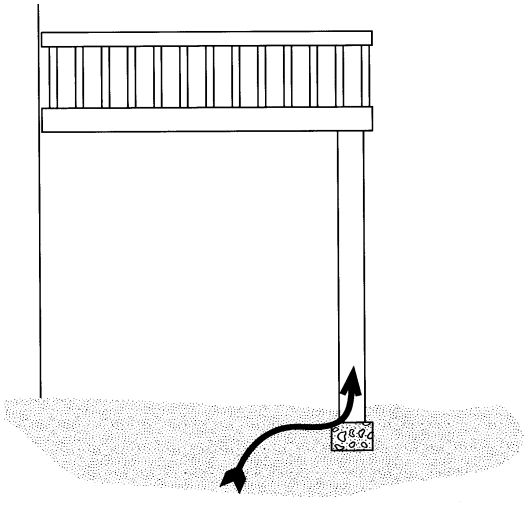


Figure 3-13
Untreated wood in direct contact with the soil provides hidden access for termites.

Such wood/soil contact must be reported as a conducive condition for termites.

Even treated wood increases the risk of WDI infestation both as a moisture conduit and because wood treatment does not last forever, particularly if the wood has been cut or drilled to expose interior sections. Wherever you find direct wood/soil contact, you need to investigate further to see if the condition indicates a WDI pest problem.

A closely related problem, and sometimes creating even more risk of undetected termite attack, is where untreated wood support posts or wood sleepers extend into concrete slabs. Sometimes they extend to the bottom of the slab and into the soil. Even when only partially embedded, settlement of the slab often causes cracks at the base of the post, allowing termite entry into the untreated wood.

Siding Below Grade

There are two problems when siding is below the level of the soil. Moisture tends to be wicked up into the structure, which can attract and support wood-destroying insects, particularly termites and carpenter ants. And subterranean termites can invade the structure unseen directly from the soil by going behind the siding and up into the sill plate and other structural members (Figure 3-14).

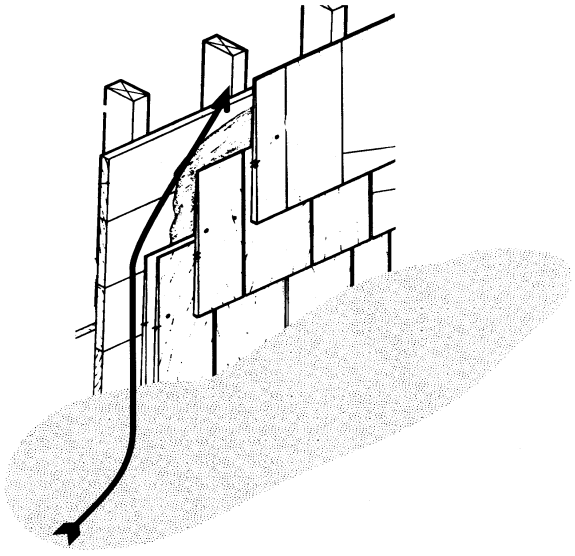


Figure 3-14
When siding is below grade, subterranean termites can invade the structure unseen.

Planter Boxes

Termites are often found in planter boxes because the conditions are ideal for them: plenty of wood, moisture, and shade. Planters are often built right up against the structure, and can contain a number of conditions conducive to termite infestation. In the worst case, they are simply built as three-sided boxes with no bottom and using the structure as the fourth side. They can

be built of brick or block, landscape timbers or railroad ties, poured concrete, and other materials, even covered in stucco. Termites can move into the planter box from the ground below and then find their way into the structure undetected through direct wood/soil contact, through weep holes in brick, up under the siding, etc. Inspect the planter boxes, and be sure to pull back the mulch and soil from the foundation wall and check for termite tubes and activity.

Wood Mulch

Wood mulch creates ideal conditions for subterranean termites, keeping the soil below shaded and moist. It promotes fungus, breaks down to form a rich humus and, of course, it's made of wood. As mentioned in Chapter 1, however, termites in mulch...even right next to the foundation...are not reportable as evidence of infestation, because they are not directly infesting the structure, but may be reported in remarks on the back side of the WDIR 100.

If you find termites in mulch, you need to carefully check the adjacent structure to be certain they haven't moved inside. The real problem with mulch occurs when it is piles up against the foundation wall until it contacts brick veneer, siding, or wood trim. Then it becomes a condition conducive to termites. That layer of mulch allows the termites to bypass any termiticide barrier in the soil, and travel unseen directly into weep holes in brick, damaged mortar, directly into wood, or under siding to invade the structure (Figure 3-15).

Mulch should not be moved unless it obstructs access to wood siding. No excavation should be done beneath the mulch.

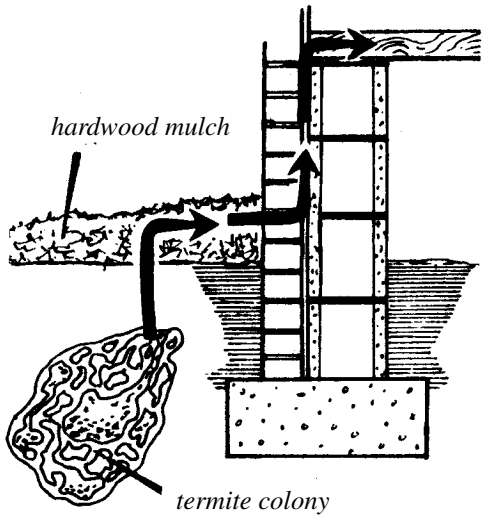


Figure 3-15

Mulch allows the termites to bypass any termiticide barrier in the soil, and travel unseen directly into the structure.

Fences, Gates, Trellises

These items are not officially part of a WDIR 100 inspection unless they are attached to the house at some point. In such cases, examine them carefully for termite activity and for shelter tubes. Sound and probe them as needed. If one end of the fence is attached to the house, the rest of the fence must be considered part of the inspection until there is a break, a gate or other discontinuity. Vegetation covered trellises can attract carpenter ants and provide an access point to the house.

Window and Door Frames

Inspect all window and door frames within reach for termite tubes and other evidence of WDI infestation. Moisture problems are common in frames because of deteriorating finishes and poor caulking and sealing. Use a moisture meter if you have one to detect problem areas. Look for wood rot. Sound and probe the wood as necessary. Check for insect exit holes, and sawdust or pellets caught in spider webs or on window ledges. Bay windows are a common problem area and potential nesting site for carpenter ants. Door frames often exhibit moisture problems at their base (Figure 16).

Sliding glass patio doors in slab-on-grade homes or walkouts are often mounted directly over an expansion joint between the door step and the interior slab. This is a common entry point for termites. Check the tracks for termite swarmer wings and dead carpenter ants. Older farm houses and

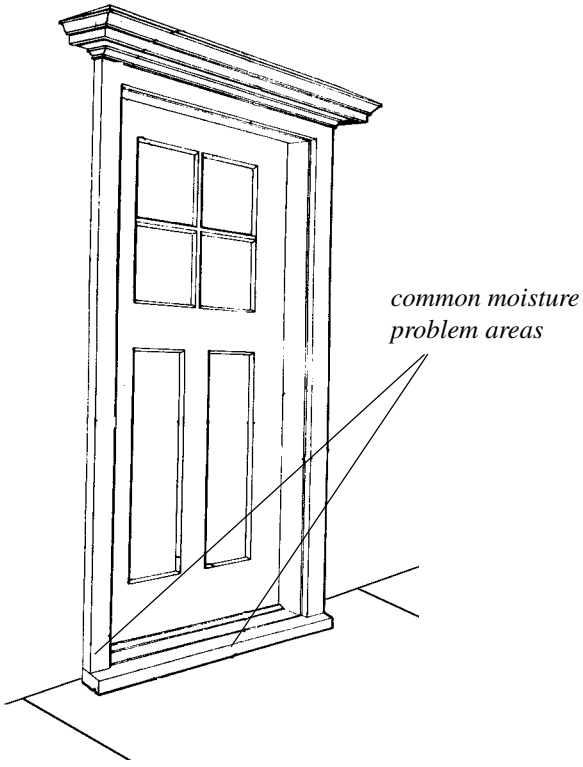


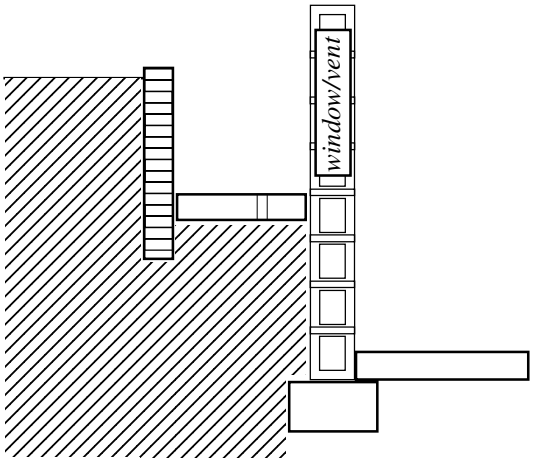
Figure 3-16
Door frames often exhibit moisture problems at their base.

historical homes may have once had dirt floors that have been retrofitted with a concrete slab. Sometimes the concrete was simply poured over or around the bases of the wood door frames, retaining direct access for termites, another conducive condition.

Window Wells and Vent Wells

Window wells and vent wells are a common entry point for termites, particularly when the frames are wood or when moisture builds up under the well floor. There are many types of window or vent wells. They can have gravel, concrete, or brick floors, and they can be made of metal, concrete, block, resin, or other composite material. The critical inspection area is under the well just where it meets the foundation wall (Figure 3-17).

Brick or block well, concrete floor



Metal half-moon well, gravel floor

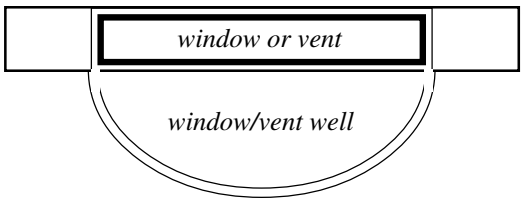


Figure 3-17

The critical inspection area is under the window or vent well just where it meets the foundation wall.

Decks

Check any attached wood deck for termite tubes and evidence of carpenter bee nest entrance holes. Check the joint between the deck and the structure for tubes and evidence of moisture problems. Poor installation can cause moisture to accumulate there and enter the structure. Check deck posts for direct wood/soil contact. Wooden deck posts develop cracks along the grain of the wood which can provide termites with an easy entry to the often untreated core.

Chimneys

Many moisture problems in homes can be traced to the chimney, as can many termite infestations. As the chimney deteriorates and shifts through time, there is more likelihood that rain can find its way into the structure at the intersection of the chimney and the roof, siding, or foundation. Termites

often enter the structure from the ground where the chimney meets the foundation wall. Look for termite tubes in any cracks or junctions.

Garage Door Jambs

Garage door jambs or posts often extend into or through garage slabs, providing direct wood/soil access for termites. Furthermore, the slabs of attached garages are often thinner and of lesser quality than the slabs in the main structure, and may or may not include adequate footings. For both these reasons, cracks may appear in the area of the garage doors, also allowing termite access even where the door jambs are properly installed. Be sure to check these door jambs for termite tubes and moisture, and sound and probe them as necessary.

Porches

All wooden porches pose increased risk of attack by wood-destroying insects. They should be checked visually and by sounding and probing as necessary. Pay particular attention to the supports below, and the interface between the porch and the main structure. A porch whose base or crawl is enclosed may generate moisture problems that attract wood-destroying insects. Check for wood-boring beetle exit holes if the area is accessible.

Raised, dirt-filled porches

Raised, dirt-filled porches and stoops are at high risk for subterranean termite attack, and account for a large percentage of all termite infestations in buildings (Figure 3-18). They are often inaccessible, damp, and filled with wood debris left during construction. The soil inside is often right against the foundation wall, sometimes even above the siding or in direct contact with structural wood, allowing direct and hidden access for termites. The termites can also build shelter tubes out of the ground and up to the underside of the porch, and then along the underside of the slab and into the structure.

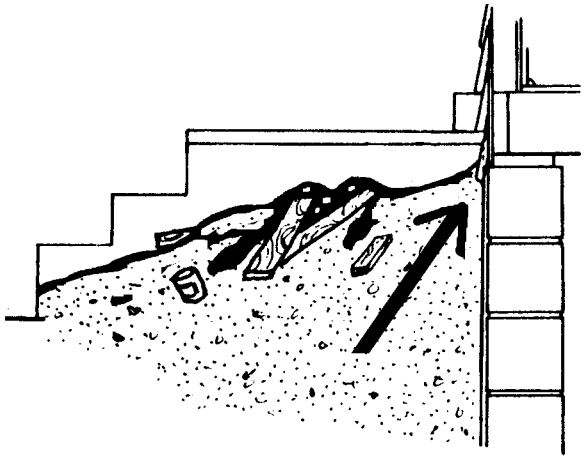


Figure 3-18
Raised, dirt-filled porches and stoops are at high risk for subterranean termite attack.

Sometimes these porches have access underneath in the crawl or basement, and so you are able to inspect them. Carefully inspect the intersections of the porch with the building for termite tubes. You can sometimes stick a hacksaw blade or piece of spring steel into the joints to see how high the soil extends at the foundation. When you move your inspection inside, be sure to very thoroughly inspect the indoor areas adjacent to any dirt-filled porches for evidence of termites and moisture problems.

Porch columns

The roof of a porch is sometimes supported by hollow columns. They may be made of wood or brick. The inside is usually inaccessible. Most often, you find such column supporting the outermost overhang of the roof, and the columns usually rests on the slab. Be sure to inspect porch columns for moisture problems, termite tubes, and evidence of nesting carpenter ants. The columns provide direct access to the building through the porch roof (Figure 3-19).

Sometimes, hollow columns of brick are installed for ornamental purposes right against the building wall. They may extend down to a footer and can provide access for termites from the soil under the porch slab directly into the sill or floor joists or up to the roof. Inspect the area carefully both outside and inside.

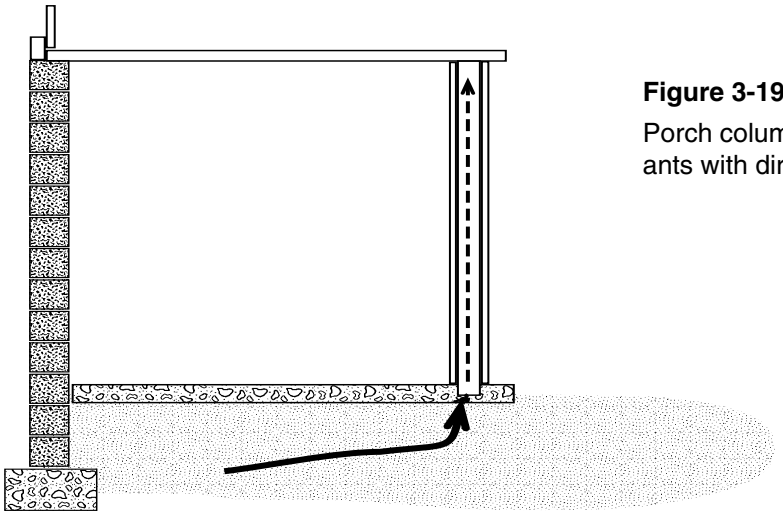


Figure 3-19
Porch columns can provide termites and carpenter ants with direct access into a structure

Traditional Stucco Siding

The problems with stucco were discussed earlier. Tap and sound the stucco along the foundation and around window and door frames. If it sounds hollow, it indicates separation and a possible moisture problem or even in-

festation. Loose stucco near the soil line allows hidden access for termites (figure 3-20).

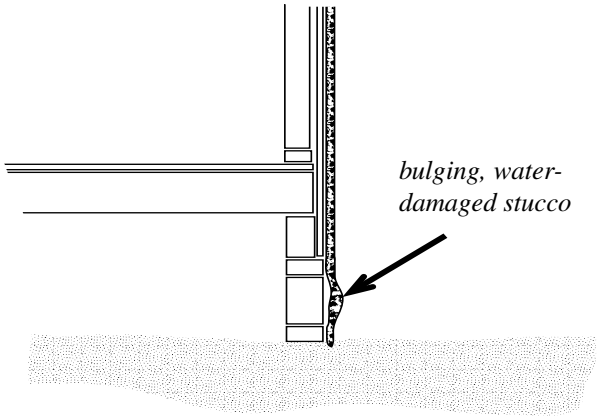


Figure 3-20
Loose or bulging stucco in or near the soil suggests moisture problems and possible termite infestation.

Plants

Are any tree branches or shrubs touching the structure? They can provide direct entry for carpenter ants. Heavy vegetation against the structure can trap moisture, causing conducive conditions for termites and other WDIs in the structure itself. Termites sometimes tube up shrubs and other plants to gain entry into the building, so check for tubing on the foundation plants themselves. A rotted tree stump can be the site of a termite infestation. While not reportable as infesting the structure, it may indicate an increased risk that termites have, in fact, entered the structure, and you should diligently investigate further.

Utility Entries

Electric and telephone lines may enter the structure above ground through holes in the foundation wall near or at grade, or even higher through the veneer or siding. The holes are often poorly sealed, allowing entry of termites and carpenter ants. Carefully inspect these types of wall penetrations for termite tubes and other evidence of WDIs. Also check electric meters, gas meters, and fuse boxes set into walls.

Cable TV is a special case because, at least in older homes, it usually was installed well after the home was built, and in many cases after the last termite treatment. Some cable companies excavate at the foundation wall and run their lines at or below the soil surface, sometimes well below, especially in basement construction. In commercial buildings, the cable box may be installed at the foundation, as well. This area needs to be checked care-

fully for termites because any chemical barrier in the soil would have been broken during installation (Figure 3-21).

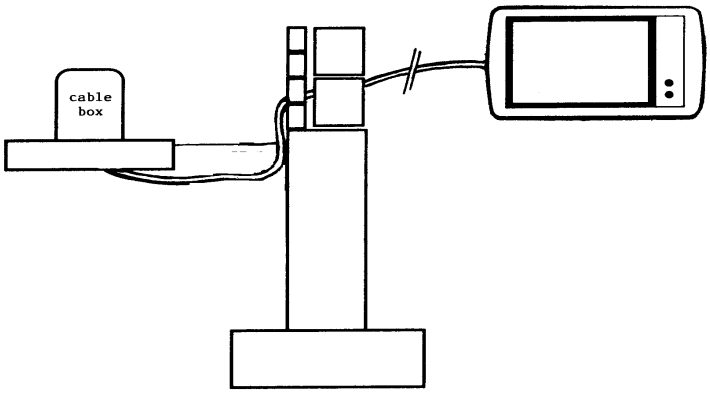


Figure 3-21
Excavation for the installation of cable tv lines often destroys the termiticide barrier in the soil.

Decorative Wood-Framed Attachments

Some houses have decorative, wood-framed attachments such as arches, pilasters, and buttresses. They may be covered with wood, stucco or other materials. Be sure to inspect them for evidence of WDIs and conditions conducive to termites. These attachments are common infestation sites for termites and carpenter ants. Make sure there is adequate clearance between the covering and the soil. Tap the covering to determine if the structure is hollow. If it is, and there is no access door, be sure to note it as inaccessible.

(5) INSPECT THE LOWEST FLOORS AND CRAWLSPACE

The lowest floors in a building are where you are most likely to find termites. Other pests may be present as well. While the overall inspection strategy is the same regardless of the type of construction, there are differences between inspection in a crawlspace, an unfinished basement, a finished basement, and a slab-on-grade living area.

Inspecting the Crawlspace

Crawlspaces provide an excellent opportunity for inspectors to find wood-destroying insect infestations (Figure 3-22). Structural wood is accessible in the most critical areas. You can probe and sound wood without risking cosmetic damage. Yet crawlspace inspections are often superficial and sloppy. The reason? It can be uncomfortable work. Some crawlspaces are particularly nasty: low clearance, uneven surface, spider webs, broken bricks and bottles, and other debris to make life miserable.

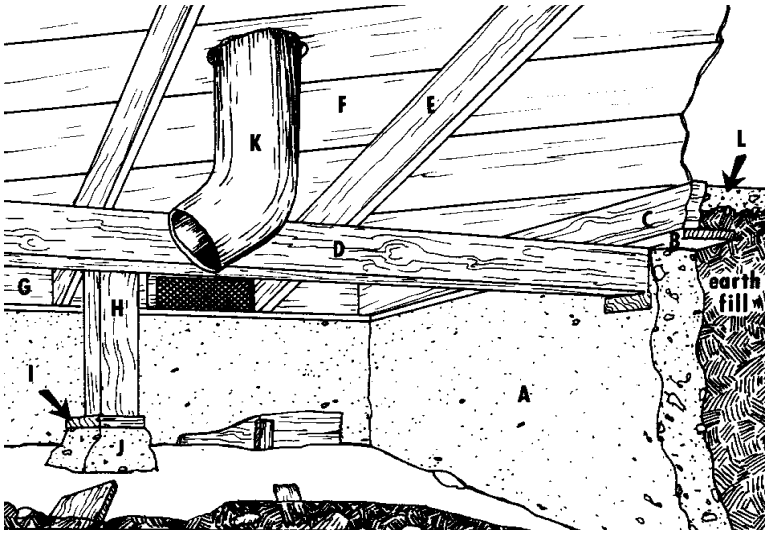


Figure 3-22
Some critical areas to inspect in a crawlspace (University of Florida).

A. Foundation
B. Sillplate (mudsill)
C. Header
D. Girder
E. Floor Joist
F. Subflooring
G. Header spacer
H. Pier post
I. Pier block
J. Pier
K. Waste pipe
L. Back of porch slab

It's tempting to resort to the "remote flashlight inspection," shining a flashlight into the crawlspace from the entrance. Don't do it. It's not fair to the customer, nor is it ethical or legal. Termite tubes can be found in the hardest-to-reach corners, damage in the most solid looking sill plate. It's also not unusual for just one or two joists in the farthest corner to be infested with powderpost beetles. A superficial inspection can cost someone tens of thousands of dollars.

When you enter the crawlspace, start by checking the wood trim at the entrance and then proceed systematically along the foundation walls, around piers, underneath bathrooms, etc. In large crawlspaces, you may have to make several trips back and forth in order to check all perimeter walls, piers and pillars, chimney bases and hearths, interior load-bearing walls, floor joists, and all pipes making contact with the soil. You need to check everywhere that is accessible, and everywhere that isn't needs to be noted on the WDIR 100.

When inspecting the crawlspace, check behind all the potential problem areas you identified in your exterior inspection, such as dirt-filled porches, poor grade, planter boxes, chimneys, and patio and porch slabs. Remember, North Carolina rules require the physical sounding of certain wood members (see 2 NCAC 34.0102(33).

Moisture problems

How much moisture is too much moisture in a crawlspace? Sometimes it is an easy call, sometimes not. Clearly, you have a serious problem if water is an inch deep on the crawlspace floor. Such a crawlspace should be noted as inaccessible. Likewise, if fungus is growing on the floor joists (fruiting bodies or cottony fungal growth), or if you see beads of water hanging on the bottom side of the floor, or if a moisture meter shows wood moisture levels of 20 percent or higher, these must be noted as conditions conducive to infestation.

Other indicators are not as absolute. Surface staining of wood or mildew may indicate a seasonal problem or simply an old moisture problem that has been corrected. Wood moisture levels of 16 to 19 percent are usually acceptable in the spring or other periods of very high humidity but could indicate a serious moisture problem during a dry period.

Many crawlspace moisture problems can be traced to poor ventilation or a lack of vapor barrier over the soil (Figure 3-23). Other moisture contributors include poor dryer venting and improperly installed insulation. Humid air accumulates in the crawlspace and water condenses on walls, joists, ductwork, etc. Federal standards require a minimum of 1 square foot of vent for every 150 square feet of crawlspace. If the soil surface is covered with a vapor barrier, that figure can be reduced to 1 per 1500.

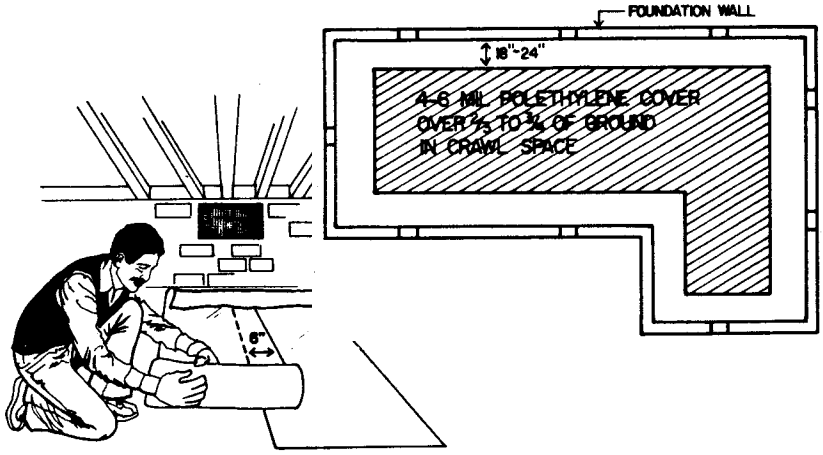


Figure 3-23

Many crawlspace moisture problems can be traced to poor ventilation or a lack of vapor barrier.

Foundation walls and other masonry elements

Look for tubes on foundation walls, pillars, interior walls, chimney bases and hearths. Inspect carefully for damage to mortar, moisture problems, and termite tubes hidden in crevices. Check the base of the chimney for termite activity. Check for vertical cracks in foundation walls. They can act as a direct route from the soil up into the structure. Look for termite tubes inside the cracks. Be sure that nonpressure-treated wood support piers (posts) are resting on concrete footers and not directly on the soil surface, as is sometimes the case in older homes (Figure 3-24).

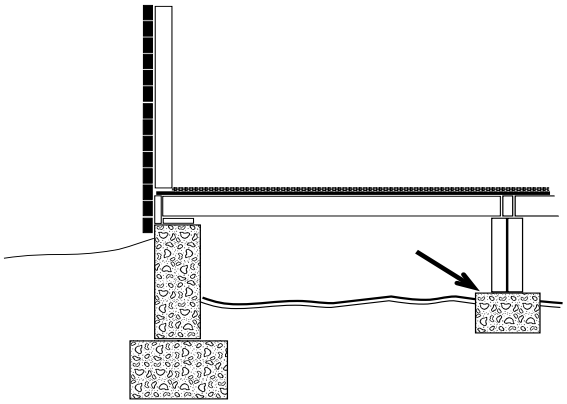


Figure 3-24
Nonpressure-treated wood support piers (posts) should be resting on concrete footers and not directly on the soil surface.

Structural wood

Joists, headers, girders, box sills, piers and really any wood located in the crawlspace needs to be inspected. Check double or triple girders and joists for tubes at the joints. Take your time and be thorough. Even wood that has been heavily damaged by termites sometimes appear normal to the eye. Use a hammer or other tool to sound the wood. Termite-damaged wood is partially hollow and contains a mixture of soil and digested wood. It thuds rather than rings. Probe wood that you suspect is damaged or that can't be sounded using a probe such as an ice pick, Probemaster™, screwdriver, or other tool. Look for drop tubes from joists and flooring.

Look for powderpost beetle emergence holes, particularly in the floor joists. Spot check joists and other structural wood with a moisture meter looking for wet wood over 19 percent moisture level. Mold, fungus, or sap stains indicate moisture problems. Look in spider webs for powderpost beetle frass/sawdust and even dead adult beetles that have fallen from their emergence holes in the beams above.

Sill plate area

The sill or sill plate is the lowest member of the frame of a structure that rests, usually horizontally, on top of the foundation wall and which sup-

ports the vertical supporting elements of the outside wall and inner load-bearing walls. Wooden sill plates that are not pressure-treated wood are critical inspection points for termites (Figure 3-25). They are one of the most common sites of termite invasion into the structure and need to be inspected, probed, and sounded wherever they can be reached. Be sure to

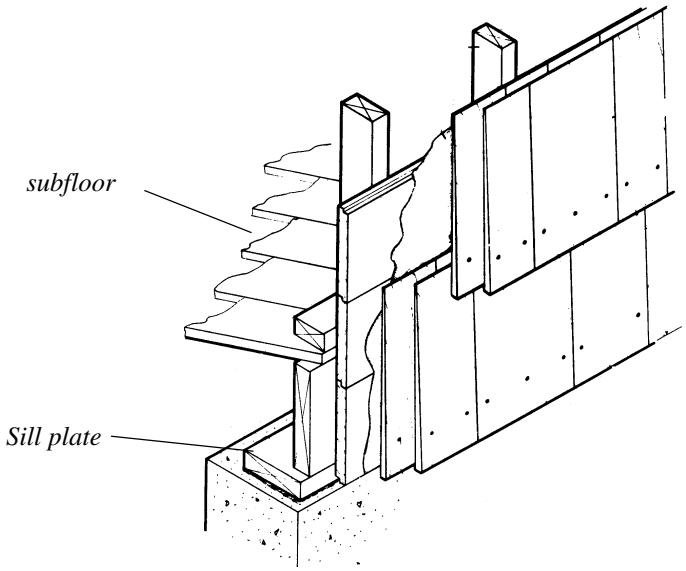


Figure 3-25
The sill plate area is a critical inspection points for termites.

check for termite tubes in the space between the foundation wall and the sill plate, and in corners made by the sill and other structural wood. Insulation should not be removed unless in suspect areas such as adjacent to earth-filled porches.

Earth-filled, raised porches and planters should be checked at the sill plate to be sure that there is a barrier between the sills, headers, and the soil (Figure 3-26).

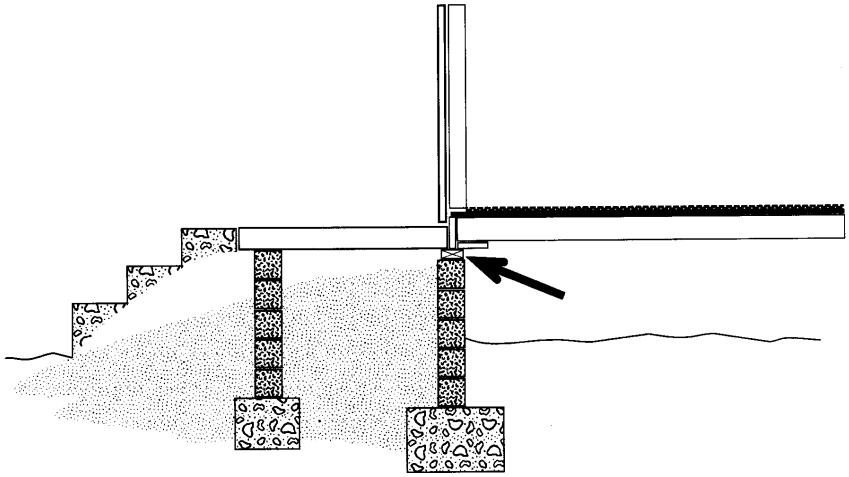


Figure 3-26
Check the sill plate area behind earth filled porches, planters, and similar high-risk areas.

Crawlspace floor

Look for wood debris, tree stumps, form boards, and wood staked in or on the soil. Any of these must be noted as a conducive condition. Inspect that wood for termite infestation, as well. Also check and report any wood that has been used on the soil surface to support plumbing lines or heating ducts or flooring. Check for termite tubes on any pipes, piers, supports, or anything else that goes between the structure and the soil below.

Bathroom, laundry room, and kitchen subfloors

Be sure to check the area under any first floor bathrooms, laundry rooms, and kitchens for leaks and evidence of moisture buildup. Because of common moisture problems, this area is prime for infestation of termites, carpenter ants, and powderpost beetles. Above-ground termite nests are possible here.

HVAC and other equipment

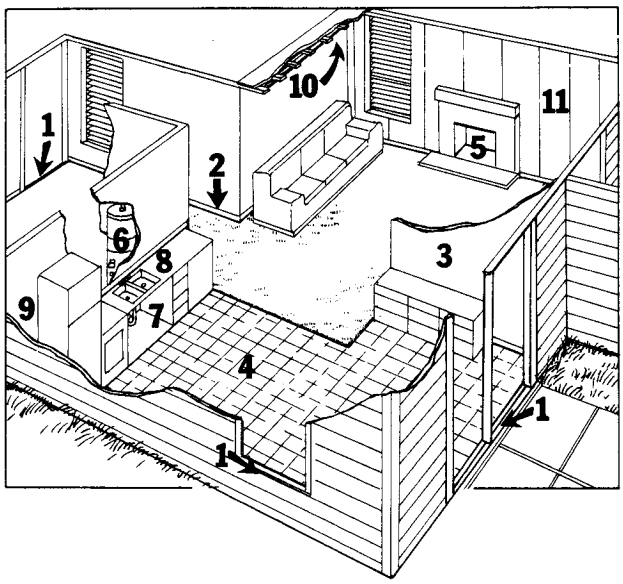
A crawlspace may contain elements of the heating and air conditioning system, duct work, hot water heater, water pumps, and other equipment. All should be inspected for termite tubes and other evidence of infestation, as well as for generating excess moisture through leaks or condensation.

Inspecting the Ground Floor of Slab-On-Grade Construction

Most of the potential termite entry points on the ground floor of slab-on-grade construction are hidden by floor coverings and interior finish and trim. Wood-destroying insect damage and termite tubing is commonly inaccessible and often undetectable. Inspectors need to concentrate their efforts in those areas most likely to present detectable evidence of WDIs (Figure 3-27). Also be sure to carefully check any areas behind problem sites identified in your exterior inspection.

Doors and windows

Inspect window and door frames for termite tubes and other evidence of wood-destroying insect infestation. Moisture problems are common in frames because of deteriorating finishes and poor caulking and sealing. Use a moisture meter if you have one to detect problem areas. Look for wood rot. Lightly tap the trim and discretely probe the wood with a small pick. Check for insect exit holes, and sawdust, pellets, and termite swarmers, carpenter ant swarmers, and powderpost beetles caught in spider webs or on window ledges. Bay windows are a common problem area and potential nesting site for carpenter ants.



1. Window/door sills
2. Baseboards
3. Partition walls
4. Floor coverings
5. Fireplaces/hearths
6. Water heater enclosure
7. Pipes, toilets, etc.
8. Sink areas (pull out drawers)
9. Around appliances
10. Exposed ceiling beams
11. Wood paneling

Figure 3-27
Concentrate on areas most likely to present detectable evidence of WDIs (adapted from University of Florida).

Door frames often exhibit moisture problems at their base. Sliding glass patio doors in slab-on-grade homes or walkouts are often mounted directly over an expansion joint between the door step and the interior slab (Figure 3-28). This is a common entry point for termites. Check the tracks for termite swarmer wings, shelter tubes, and dead carpenter ants.

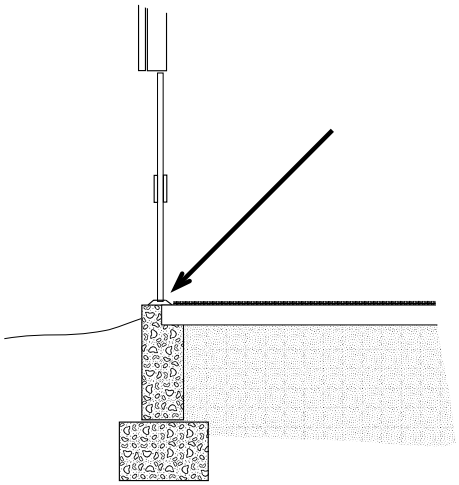


Figure 3-29
Check the tracks of sliding glass doors for termite swarmer wings, shelter tubes, and dead carpenter ants.

Perimeter walls

Look down plasterboard and fiberboard walls and check for waviness and slightly raised areas. If termites have been working inside the wall, they sometimes consume the paper between the gypsum and the paint, and this area will crumble when pressed. You can use your fingers to gently tap along the walls. Wallpaper in termite-infested areas may bubble and peel. Some types of moisture meter can detect moisture levels in wallboard without needle probes. If you have such a meter, spot check along the walls to locate any high-moisture areas which could indicate termite activity.

Trim and baseboards

Tap the baseboards to detect infested areas. Carefully check for termite tubes, mud, and carton in the crevices between the baseboard and the wall and floor, and between wood trim and the wall (Figure 3-29). In suspect areas, and if a crevice is large enough, you can insert a thin probe and attempt to drag out any soil or other evidence of activity. If you can reach it, check the ceiling/wall joint as well. Also check trim for powderpost beetle exit holes.

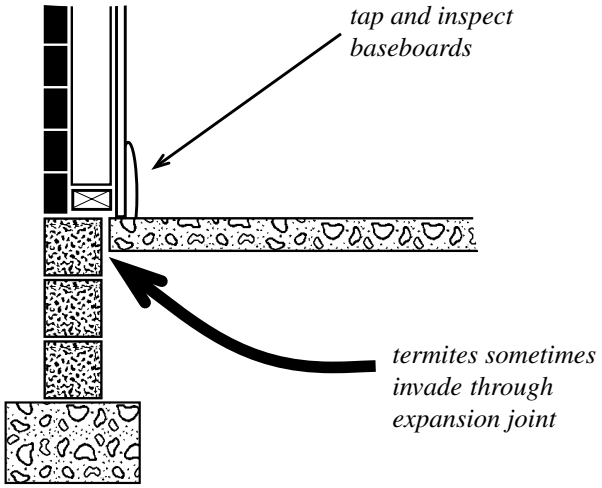


Figure 3-29
Carefully check for termite tubes, mud, and carton around the baseboard.

Utility access

Look for leaks and excessive moisture around shower pans, and evidence of carpenter ants there. The area around and below shower pans is a common nest site for carpenter ants. Open bath trap access panels and other nonelectrical utility access panels. Slab penetrations for plumbing pipes are common entry points for termites. Look for tubing and shed wings, and check any wood for damage. Check for wooden form boards and stakes that may have been left in place, and any evidence of leaks or heavy condensation from pipes. Report them as conditions conducive to termite infestation. Other

utility lines may penetrate the slab wrapped in felt or foam collars. If you see any such utility lines (they are typically inaccessible inside partition walls), check them for termite tubes.

In homes with well water, there may be a water tank utility closet at the point the water pipe enters the structure. Be sure to check this area for termite activity. It is typically damp and contains both electrical and pipe penetrations from outside.

Cabinets

Inspect carefully around, under, inside, and behind kitchen and bathroom cabinets, particularly those that contain sinks and pipes. Report any leaks and water problems, and check for evidence of wood-destroying insects. Look for termite tubes, mud, and carton in the crevices between the cabinet and the wall and floor. Check for termite tubes inside the wall where the pipes penetrate. Also check built in bookcases and alcoves.

Floors

Most floor coverings used in living areas over slabs make inspection of the floor difficult. Glued carpet, tile, sheet flooring, and similar floor coverings prevent you from seeing the condition of the slab and any expansion joints. The slab can also be covered by an underlayment of plywood or other sheathing. Edge-tacked wall-to-wall carpeting over a bare slab can sometimes be raised at the perimeter to inspect the wall/floor junction and the expansion joints of a floating slab.

Termites sometimes create holes in certain types of carpet by feeding on vegetable fiber backing. Typical carton and soil material can be found inside the hole. In wood floors, termite-damaged areas may show as slightly darker, or split or raised areas on the surface. Carefully probe and sound these areas, and discretely pry up slivers to locate evidence. Termite damage in subflooring is suggested by irregular sunken areas.

Certain types of flooring pose special problems and risk of termite infestation. A wooden floor installed on sleepers (also called screeds or stringers) embedded in a concrete slab can create numerous entrypoints for termites (Figure 3-30). The sleepers may be installed at any depth in the concrete, from less than an inch, to all the way to the bottom. The last obviously provides direct access for termites below the slab into the wood floor. But even when partially embedded, the sleepers often weaken the slab and cause cracks that can also provide direct access through the slab. Utility lines are often installed under this type of flooring and utility access panels may allow you to verify the type of floor and allow you to inspect a very small area.

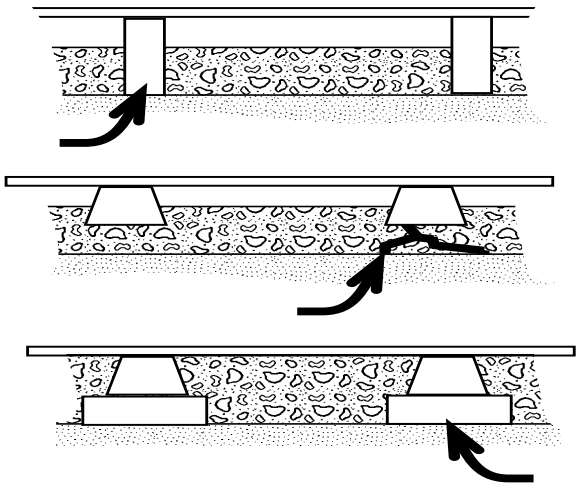


Figure 3-30
Three common types of sleepers embedded in concrete. All pose high risk of termite infestation.

Another type of problem floor over a slab-on-grade is a wood parquet tile floor glued directly to the slab. While less of a risk than a wood floor over sleepers, settlement cracks in the slab and the expansion joints in a floating slab can provide direct access to the wood for termites below the slab. Tap on the parquet to locate damage and look for termite tubes in the cracks between the wood tiles.

Slab heating ducts

In some slab-on-grade homes and commercial buildings, the heating/air conditioning ducts are incorporated directly into or under the slab (Figure 3-31). Termites can enter these ducts directly from the soil below (subslab ducts) or through cracks in the slab (ducts in the slab).

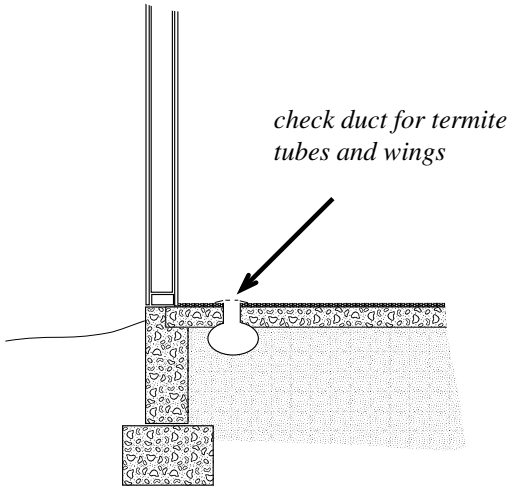


Figure 3-31
Heating/air conditioning ducts can be incorporated directly into or under the slab.

Inspecting Finished Basements

Finished basements offer the same challenges as slab-on-grade construction. Most of the critical inspection areas are inaccessible and should be so noted on the WDIR 100. Specific guidelines for inspection are the same as for slab-on-grade with a few additions.

Drop ceilings

Many finished basements contain drop ceilings. This may allow you to inspect the upper and outer perimeter of the basement by raising the ceiling sections and using a mirror to check for termite tubing and other evidence of wood-destroying insects in the sill plate area at the top of the wall.

Sump pit

Basements and crawls often experience problems with ground water, and many have French drain systems and sumps installed under the slab perimeter to help reduce hydrostatic pressure and water intrusion. If it is accessible, open the pit and check it for termite tubes and other evidence of wood-destroying insect infestation.

Inspecting Unfinished Basements

Basements may be completely unfinished or rough finished with minimal wall coverings, perhaps with a bathroom and utility room. In either case, they provide an excellent opportunity for inspectors to find wood-destroying insect infestations, just as in a crawlspace but far more comfortably. Structural wood is accessible in the most critical areas. You can probe and sound wood without risking cosmetic damage.

The most critical area in a basement is where the beams and joists rest on the sill plate at the top of the foundation wall (Figure 3-32). Remember also to check carefully behind all the potential problem areas you identified in your exterior inspection, such as dirt filled porches, poor grade, planter boxes, chimneys, and patio and porch slabs.

Foundation walls and other masonry elements

Look for tubes on foundation walls, pillars, interior walls, chimney bases and hearths. Inspect carefully for damage to mortar, moisture problems, and termite tubes hidden in crevices. Check for vertical cracks in foundation walls. They can act as a direct route from the soil up into the structure. Look for termite tubes inside the cracks.

Structural wood

Joists, headers, girders, box sills, piers and really any accessible wood must be inspected. Take your time and be thorough. Even wood that has been

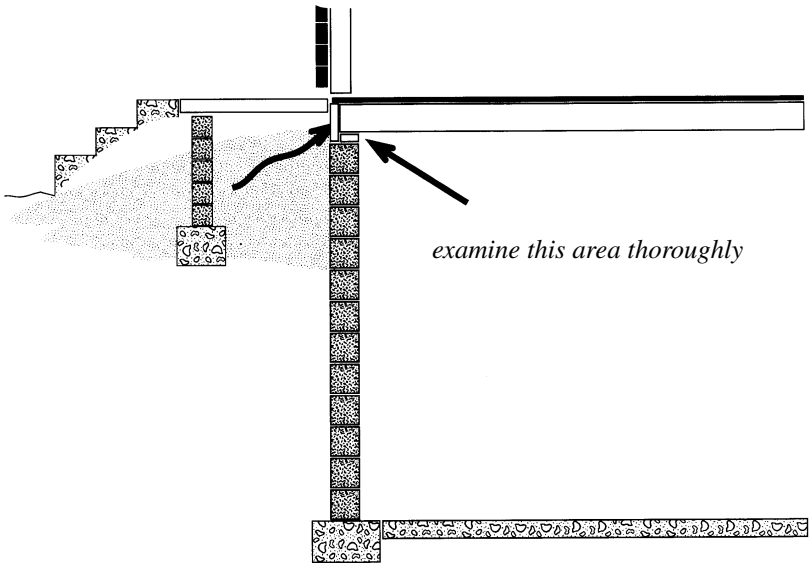


Figure 3-32
The sill plate is probably the most critical inspection areal.

heavily damaged by termites sometimes appear normal to the eye. Use a hammer or other tool to sound the wood. Termite-damaged wood is partially hollow and contains a mixture of soil and digested wood. It thuds rather than rings. Use a probing tool such as an ice pick or screwdriver to probe into wood that you suspect is damaged or that can't be sounded. Look for drop tubes from joists and flooring.

Look for powderpost beetle emergence holes, particularly in the floor joists. Spot check joists and other structural wood with a moisture meter looking for wet wood over 20 percent moisture level. Mold, fungus, or sap stains indicate moisture problems. Look in spider webs for powderpost beetle frass/sawdust and even dead adult beetles that have fallen from their emergence holes in the beams above.

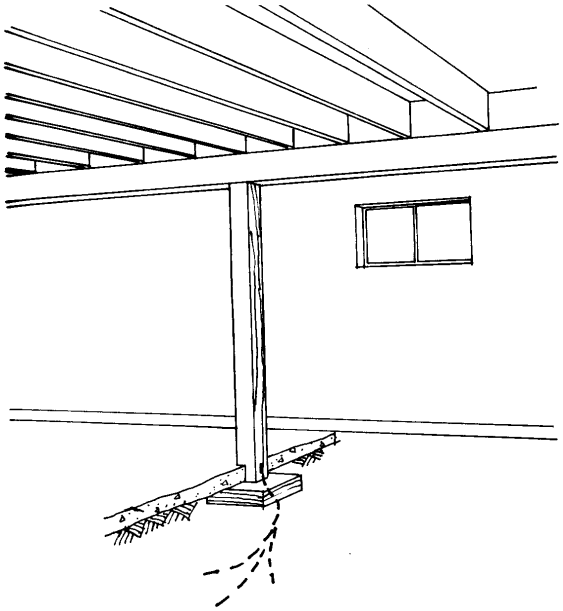


Figure 3-33
Sound and probe all wood imbedded in concrete.

Inspect the plates of wood partition walls and the bases of wood support posts and stair carriages. Look for wood embedded in concrete and if you find it, sound and probe it thoroughly (Figures 33 and 34). Remember, North Carolina rules require the sounding of wood members adjacent to slabs and other areas particularly susceptible to attack by termites (see rule .602 and definition (33).

Examine wood shelves and cabinets hung directly on the foundation wall, or any wood items placed over expansion joints or cracks in the slab.

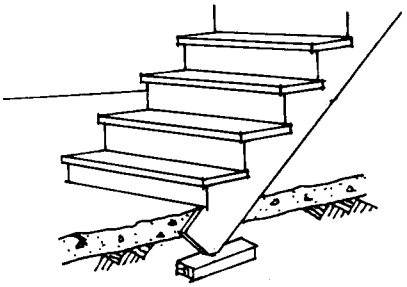


Figure 3-34
Wood stairs imbedded in concrete in old home.

Sill plate/bandjoist area

The sill or sill plate is the lowest member of the frame of a structure that rests, usually horizontally, on top of the foundation wall and which supports the vertical supporting elements of the outside wall and inner load-bearing walls. Sill plates/bandjoists are critical inspection points for termites. They are one of the most common sites of termite invasion into the structure and need to be inspected, probed, and sounded wherever they can be reached. Be sure to check for termite tubes in the space between the foundation wall and the sill plate, and in corners made by the sill and other structural wood.

Earth-filled, raised porches and planters should be checked at the sill plate to be sure there is a barrier between the sills/bandjoists and the soil. Insert a hacksaw blade or thin piece of spring steel under the sill and towards the earth-filled porch or planter. The blade should not penetrate beyond the sill or header, and should not come back covered with dirt.

Window wells

Window wells are a common entry point for termites, particularly when the window frames are wood or when moisture builds up under the well floor. Carefully check the trim around the window well (Figure 35).

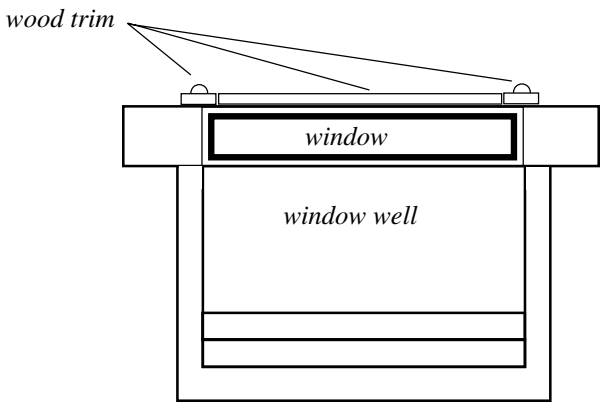


Figure 3-35
Carefully inspect any wood trim around window well

Bathroom and kitchen subfloors

Be sure to check the area under any first floor bathrooms and kitchens for leaks and evidence of moisture buildup. Because of common moisture problems, this area is prime for infestation of termites, carpenter ants, and powderpost beetles. Above-ground termite nests are possible here. Check the wood with a moisture meter.

HVAC and other equipment

A basement usually contains the heating and air conditioning system, duct work, hot water heater, water pumps, and other equipment. All should be inspected for termite tubes and other evidence of infestation, as well as for generating excess moisture through leaks or condensation.

Sump pit

Basements often experience problems with ground water, and many have French drain systems and sumps installed under the slab perimeter to help reduce hydrostatic pressure and water intrusion. If it is accessible, open the pit and check it for termite tubes and other evidence of wood-destroying insect infestation.

Inspecting Garages

Attached garages pose special risks for infestation by termites and other wood-destroying insects (Figure 3-36). They are usually unheated and often damp. Their construction tends to be of lesser quality than the rest of the structure. Often, the garage slab has been poured over loose fill and wood debris, and it may or may not have adequate footers. Slabs commonly settle and crack. The joint between the garage slab and the foundation is a common point of entry for termites, as is the bandjoist coming in from the crawlspace. Probe this bandjoist adjacent to garage from the crawlspace. Inspect that area especially carefully. Watch for inadequate clearance be-

tween wood trim and grade, and for wood penetrating the slab. Frequently, foamboard can be found in this area.

The intersection of the roof line between the garage and the main structure is a common area for roof leaks. Check any wood there for moisture problems. Sound any accessible wood, not forgetting door and window frames. Check any accessible sill plates for termite shelter tubes. Another problem area to check are steps leading from the garage into the main structure, or to the outside.

Do not forget to list any inaccessible areas due to stored items.

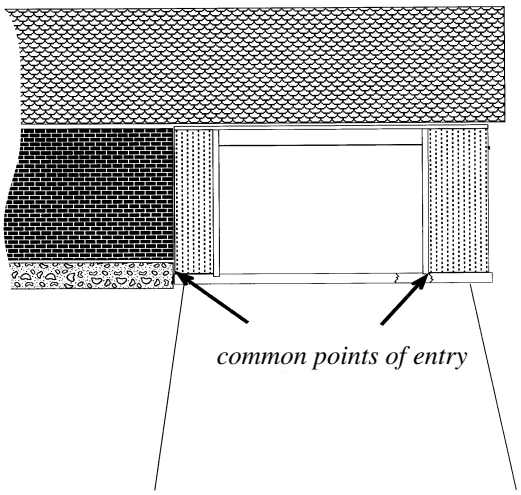


Figure 3-36
Attached garages create access for termites and other wood-destroying insects

(6) INSPECT LIVING AREAS

Most of the potential termite entry points in living areas are hidden by floor coverings and interior finish and trim. Wood-destroying insect damage and termite tubing is commonly inaccessible and often undetectable. Inspectors need to concentrate their efforts in those areas most likely to present detectable evidence of WDIs. Also be sure to carefully check any areas behind problem sites identified in your exterior inspection.

Doors and Windows

Inspect window and door frames for termite tubes and other evidence of wood-destroying insect infestation. Moisture problems are common in frames because of deteriorating finishes and poor caulking and sealing. Use a moisture meter if you have one to detect problem areas. Look for wood rot. Lightly tap the trim and discretely probe the wood with a small pick. Check for insect exit holes, and sawdust, pellets, and termite swarmers, carpenter ant swarmers, and powderpost beetles caught in spider webs or on window

ledges. Inspect and sound subflooring at exterior doors. Bay windows are a common problem area and potential nesting site for carpenter ants.

Perimeter Walls

Look down plasterboard and fiberboard walls and check for waviness and slightly raised areas. If termites have been working inside the wall, they sometimes consume the paper between the gypsum and the paint, and this area will crumble when pressed. You can use you fingers to gently tap along the walls. Wallpaper in termite infested areas may bubble and peel. Some types of moisture meter can detect moisture levels in wallboard without needle probes. If you have such a meter, spot check along the walls to locate any high-moisture areas which could indicate termite activity.

Trim and Baseboards

Tap the baseboards to detect infested areas. Carefully check for termite tubes, mud, and carton in the crevices between the baseboard and the wall and floor, and between wood trim and the wall. If a crevice is large enough, insert a thin probe and attempt to drag out any soil or other evidence of activity. If you can reach it, check the ceiling/wall joint as well. Also check trim for powderpost beetle exit holes.

Wood Flooring

Check wood flooring for beetle and termite evidence. Look for frass in the joints between boards. Check area for piles of sawdust and powderpost beetle exit holes.

Utility Access

Look for leaks and excessive moisture around shower pans, and evidence of carpenter ants there. The area around and below shower pans is a common nest site for carpenter ants (Figure 3-37). Open bath trap access panels and

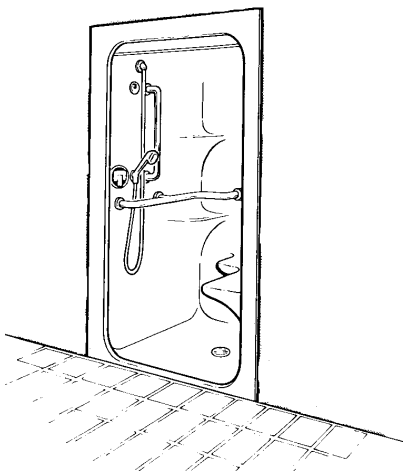


Figure 3-37
Around and below shower pans is a common nest site for carpenter ants

other utility access panels. Look for tubing and shed wings, and check any wood for damage. Check for evidence of leaks or heavy condensation from pipes. Report them as conditions conducive to termite infestation.

Cabinets

Inspect carefully around, under, inside, and behind kitchen and bathroom cabinets, particularly those that contain sinks and pipes. Report any leaks and water problems, and check for evidence of wood-destroying insects. Look for termite tubes, mud, and carton in the crevices between the cabinet and the wall and floor. Check for termite tubes inside the wall where the pipes penetrate. Also check built in bookcases and alcoves. Look for evidence of carpenter ant foraging activity in and around kitchen cabinets. Appliances may hide carpenter ant or termite evidence.

Sounds of Infestation

The noises that some wood-destroying insects make may help you identify and locate an infestation in finished areas. Occupants often report hearing such noises, particularly at night. Most often when occupants complain that they can hear their house "being eaten" the culprit is one of the large wood-boring beetles such as the old house borer.

Inspectors can use sound amplification systems, such as a stethoscope or electronic device, to listen for wood-destroying insect pests. Termites make a sound like typing on a keyboard; Formosan termites a little higher-pitched than native species. Carpenter ants makes a sound like the crinkling of cellophane. Powderpost beetles make a faint clicking sound that can be difficult for the inexperienced to distinguish from termites. Round-headed borers, like the old house borer, and flat-headed borers make clear "chewing" sounds. Key areas to listen are the same high-risk areas where you would most expect an infestation for a particular pest.

(7) INSPECT THE ATTIC IF ACCESSIBLE

An attic is considered inaccessible for the purposes of a WDIR 100 inspection if there is no entry, if you need your own ladder to enter it, or if it has no floor, if it is too hot, or otherwise unsafe. Even when the attic itself is accessible, parts of it will be inaccessible because of insulation, stored and stacked items, and structural restrictions. Be sure to record such areas, in detail, as inaccessible on the WDIR 100. Nevertheless, the attic can be infested by many different types of wood-destroying insects.

Be sure to wear safety equipment to avoid injury from low clearance, protruding nails, and other hazards common to attics (see Chapter 1). Check

the attic for signs of leaks, decay, and insects (Figure 3-38). See if the ventilation appears adequate.

Structural Wood

Examine roof rafters, the ridge pole, ceiling joists, wood vent frames, and top plates of partition walls for beetle exit holes, sawdust and frass, and termite tubes. Sound structural wood where it can be reached and probe where necessary. Be sure to carefully check the wood around any chimney, a common roof leak point, and around waste and exhaust vents.

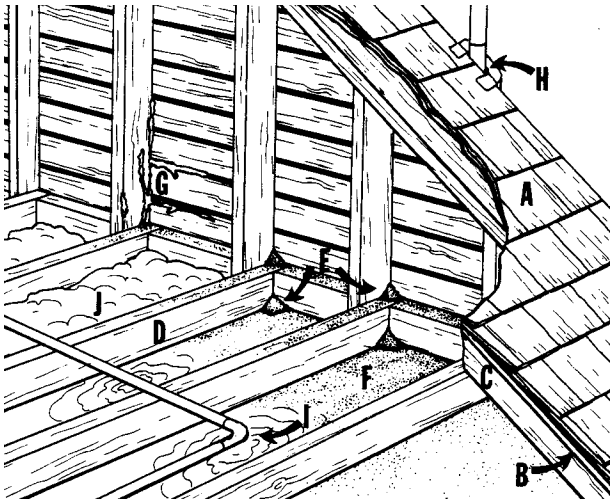


Figure 3-38
Areas in attic to check for wood-destroying insects and moisture problems (University of Florida)

A. Shingles
B. Sheathing
C. Rafter
D. Roof joist
E. Piles of frass
F. Frass and debris
G. Termite tubes
H. Leak at tv antenna
I. Plumbing leaks
J. Insulation
K. Back of porch slab

Aerial Termite Nests

Subterranean termites are so named, of course, because their nests are typically in the soil below the surface of the ground. However, when leaks or condensation cause wet wood in a building, our native subterranean termites can sometimes establish a nest completely cut off from the soil below. Formosan termites commonly produce aerial nests, producing "carton," a combination of saliva, chewed-up wood, and feces that act almost as a sponge to hold moisture. Formosan termites even establish above-ground nests in high-rise buildings.

Moisture is the key. Our native species need wet wood, above 15 percent moisture. Formosans can nest in drier wood, as long as they have a nearby source of water, such as standing water on a roof, or a leaky shower

stall. The two most important tools for locating above ground nests are (1) your eyes, to see obvious moisture problems, and (2) a moisture meter, to find wet spots in wood (and other materials such as stucco and plaster) not visible to the eye.

Leaky roofs

Leaky roofs are probably the number one source of water for aerial termite colonies. Check particularly the interface between roof levels, and between the roof and chimney. Look for termite wings and swarmers, too, since aerial-nesting termites often swarm in the attic. From the ground, look up to the roof and check for poor gutters, rotted soffits, and damaged or "bear-clawed" (old and curling) shingles, sure signs of a leaky roof. If any of these is observed, investigate further.

Flat roofs

Standing water on flat roofs can be a direct source of water for Formosan termites, and an indirect source for native species (Figure 3-39). Flat roofs often leak around vents and other weak spots, resulting in continuously wet wood, often well below the roof line.

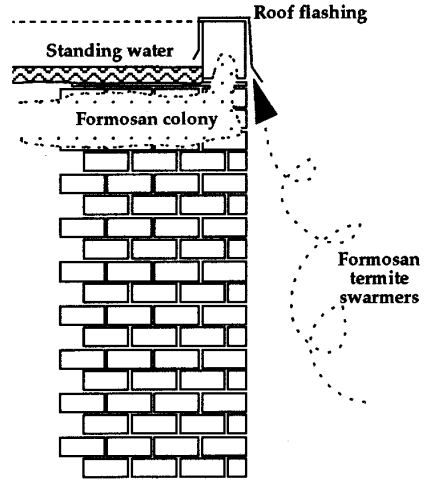


Figure 3-39
Flat roofs often provide water for aerial Formosan termite colonies

Plumbing leaks

Any plumbing leak will do, but check shower stalls in particular. Inspect under and around bath tubs, hot tubs, and toilets. Look for stains on wallpaper and ceilings. Look, too, for heavy condensation around pipes, vents, and windows.

Traditional Stucco

A notorious contributor to Formosan termite infestations, wet stucco can also provide the moisture necessary for native subterraneans. Make sure stucco does not extend below grade. Check that downspouts, air-conditioning drains, or automatic sprinkler systems do not regularly wet the stucco.

(8) CHECK FOR PREVIOUS TREATMENTS

An old infestation of termites cannot be considered inactive unless there is evidence of a previous treatment, so during a wood-destroying insect inspection you also need to check for evidence of any termite treatment in the past. First, ask the owner or occupant. They may have records of a past treatment.

Then check the structure. The surest sign of previous treatment is drill holes. Look for them in exposed slabs, exterior porch and patio slabs, piers, in block walls, and through brick veneer. In basements, you may find drill holes near the floor, near ground level, or anywhere in between, depending on the company that did the work and the era. Holes for short rodding under the slab are sometimes found through the foundation wall and just below the slab.

Interior wood may have been treated with borates or other chemicals, but this can be hard to determine.

Termite bait programs are commonly used today to control termites, but unless the program is still in place or there is a verifiable record of service and control, you cannot confirm a past baiting program.

If you do not see live termites in the structure and you find termite tubes, damage, cast wings, previously infested wood scraps and the like, you cannot classify the infestation as inactive unless and until:

(1) you find evidence that the house had been previously treated for subterranean termites (drill holes, service records, bait system, etc.):
   (a) drill holes must be adjacent to areas of infestation and must be in compliance with North Carolina regulations,
   (b) any bait system must be currently maintained,

OR

(2) your company treats the structure for subterranean termites.

Otherwise, such an infestation must be considered active.

Filling Out the WDIR 100

In this chapter, we will review how an inspection is performed, what will and will not be reported and step by step instructions for completing the form. We will also review the Structural Pest Control Division's enforcement policy concerning its issuance of the WDIR 100. Finally, we will look at how to complete the report under different scenarios and conditions. A copy of the form can be found in the appendix.

WHAT MUST BE REPORTED?

A WDIR 100 inspection consist of a careful visual examination of all unobstructed and accessible areas of a structure in order to determine the presence or absence of wood-destroying insects. All visible evidence of wood-destroying insects must be reported on the form including both active and inactive infestations. Any evidence which is present (in, on, under or attached to) the structure must be reported. Permanently attached decks, porches, storage sheds, etc. are included in these inspections. Out buildings and other detached structures are not usually inspected unless requested by the client. The inspection of detached structures will be discussed in more detail later in this chapter. In addition to reporting all visible evidence of wood-destroying insects, the PCO must indicate on the report all areas of the structure which were inaccessible or obstructed at the time of their inspection. Reporting of inaccessible areas will also be discussed in more detail later in this chapter.

Conditions conducive to subterranean termites must also be listed on the report. These conditions will vary depending on the structure inspected so only those conditions which are present in the structure at the time of inspection should be reported. Again we will discuss these conditions in more detail later in the chapter.

The WDIR 100 is often referred to as a "clearance letter" or "termite letter". Both of these terms are inaccurate in that the WDIR 100 addresses, not just termites, but all wood-destroying insects. The report also does not necessarily clear a structure. It is a report of the apparent presence or absence of wood-destroying insects at the time of the inspection.

The wood-destroying insects commonly noted on the WDIR 100 include subterranean termites, powderpost beetles, old house borers, carpenter bees and ants. Other less common insects such as dry wood termites may also be reported.

WHAT CONDITIONS ARE NOT REPORTED?

PCOs are required to report visible and accessible evidence of wood-destroying insect infestation, past and present, and the location of that evidence. It is not the responsibility of the PCO to report damage on the report. In situations where the wood-destroying insect evidence is found to be on wooden structural members, it must be assumed that there is some damage. In cases such as this, the PCO will indicate the type and location of the evidence and any determination concerning the existence and severity of damage should be left to a structural engineer or building contractor.

Evidence or damage from wood-decay fungi (wood rot) and wildlife are not required to be included on the report. Other items such as structural defects, electrical problems and leaky plumbing are not required to be listed. Situations where a leak has caused the wood to become wet may be required to be listed as a condition conducive to termites.

PCOs are not responsible for reporting any evidence that was inaccessible or hidden at the time of the inspection. In addition, a PCO is not responsible for reporting any evidence in areas listed on the report as being obstructed or inaccessible.

WHAT HAPPENS IF EVIDENCE OF WOOD-DESTROYING INSECTS IS FOUND?

The primary purpose of the WDIR 100 is to disclose if or not there is an infestation (active or inactive) of wood-destroying insects in the structure. If activity is noted, then a treatment may be proposed. In some situations, a termite treatment may be required when there is only evidence of a previous, now inactive, infestation of the termites. These treatments are required when there is no visible evidence of a previous termite treatment to the

structure. This will be discussed in more detail later. Section 2 NCAC 34 .0602 (b) of the regulation states:

"If during the inspection of a structure, a licensee or his authorized agent finds live subterranean termites or visible evidence of a past or present infestation of subterranean termites (such as tubes, damage, cast wings, infested wood scraps or other cellulose materials, etc.) in the structure and there is no visible evidence that said structure has been treated for subterranean termites, the licensee shall treat said structure for subterranean termites prior to the issuance of a Wood-Destroying Insect Report on the structure which states that the structure is free from subterranean termites."

Treatment options vary depending on the wood-destroying insect found and extent of the infestation. Conventional termite treatments involve the application of a liquid termiticide in order to establish a continuous barrier around the structure. During the performance of a WDIR 100 inspection, a PCO will be able to determine if the structure has had a previous conventional termite treatment by observing the drilling of foundation elements and trenching adjacent to the foundation. Subterranean termites may also be treated using a baiting system. An on going baiting program is considered as evidence of treatment and is easily identified.

Treatments for the control of powderpost beetles and old house borers may consists of an application of a liquid insecticide to the surface of infested timbers, moisture control or fumigation. In each case, a previous treatment for these wood-destroying insects is difficult to ascertain.

If a treatment for wood-destroying insects is performed in conjunction with the issuance of a WDIR 100, a copy of the contract and warranty, if any, shall be attached to and become part of the WDIR.

ENFORCEMENT POLICY

The WDIR 100 is the only form that may be used in North Carolina to report the presence or absence of wood-destroying insects and their damage in structures for sale. The form may not be changed or altered in any way. This includes the addition of an arbitration clause, or the use of the form as a proposal for treatment. Checklists of inaccessible areas and conditions conducive to subterranean termites are permitted in the remarks section provided that they do not alter the intent of the form. The PCO must check all items that apply to the structure inspected. Section 2 NCAC 34 .0602 (a) of the regulations states:

"Any written statement as to the presence or absence of wood-destroying insects or their damage in buildings or structures for sale shall be on the

WDIR 100. An incomplete or inaccurate Wood-Destroying Insect Information Report shall not be acceptable and the issuance of such a report is grounds for disciplinary action by the Committee. No Wood-Destroying Insect Information or Wood-Destroying Organism Report shall be issued before an inspection of the building or structure is made. Each Wood-Destroying Insect Information Report issued by a licensee shall be kept in the files of said licensee and made available for inspection upon request of the Division."

Any evidence of wood-destroying insects that is found during a WDIR inspection must not be removed or destroyed. Section 2 NCAC 34 .0602 (d) of the regulations states:

"A licensee, certified applicator or registered technician shall not remove or destroy, or cause the removal or destruction of, any wood-destroying organism evidence in, on, under or in or on debris under a structure inspected pursuant to this rule except as required by Paragraph (b) of this Rule."

INSTRUCTIONS FOR COMPLETING EACH SECTION OF THE WDIR 100.

Each section of the form must be properly completed. The following is a section by section discussion on how the form is to be completed.

Section 1. Property Identification

While most of the information required here is self explanatory, problems are often found in the reference to "Structure(s) Inspected." You must be specific with regards to which structures on the property were inspected and check the appropriate box for A – "Main Residence Only" or B – "Other." In situations where more than one structure on a property is inspected, it is recommended that a separate WDIR 100 be completed for each structure. It is often difficult to include all the conditions of different structures on one form when those conditions may vary greatly.

Example: A PCO is requested to perform a WDIR inspection on a property containing two structures. One of the structures is the main house and the other is a detached garage with an apartment upstairs. The main house has a crawl space with evidence of inactive powderpost beetles, active subterranean termites and no evidence of a previous termite treatment. The garage is on a slab with evidence of a previous termite treatment and evidence of a previous now inactive infestation of termites. The garage also has active old house borers. As you can see, it would be impossible to combine all of this information on one report.

Section 2. Inaccessible or Obstructed Areas

PCOs must list areas that were inaccessible during their inspection. Permanently installed items (e.g. floor coverings, wall coverings, wall voids, etc.) need not be listed individually in that they are covered in item 2 on the reverse of the form under "Conditions Governing this Report". Movable items (e.g. furniture, appliances, boxes, etc.) or items that may vary from structure to structure (e.g. insulation, attic access, etc.) must be listed individually for each structure inspected. It is important to remember that you must not simply refer to item 2 on the reverse of the form when completing the WDIR. Each structure is different so those items listed as inaccessible or obstructed should be specifically related to the structure inspected.

Section 3. Inspection revealed visible evidence of -

All visible evidence resulting from wood-destroying insects, whether it be active or inactive, must be indicated in this section on the report. Activity of the infestation is not a prerequisite for reporting evidence found. If any of blocks A, B, or C are checked, the appropriate box within that item must also be checked (i.e. box 1, 2, or 3). Visible evidence of wood-destroying insects is that evidence found in, on, under or attached to the structure inspected. Evidence, past or present, located in cellulose debris under an attached deck must be reported while evidence found in a stump located in the yard and away from the foundation wall would not have to be reported. The Division often receives questions concerning which wood-destroying insects are required to be included under 3-D "Others" on the report. This box should include dry wood termites, carpenter ants and carpenter bees. In situations where wood-decay fungi is present and the PCO elects to include it on the report, it is recommended that it be placed under remarks on the reverse of the form. Remember; this is a Wood-Destroying Insect Report. Wood-decay fungi do not have to be included.

Whenever any item is checked under section 3, you must indicate the location of that visible evidence in the adjacent box. The description of the location of this evidence must be adequate enough for a subsequent inspector (i.e. qualified building inspector) to readily locate this evidence. Be detailed and specific. Simply describing the evidence as being in the crawl space is not sufficient. Furthermore, describing the location of evidence, you must be specific as to whether or not the wood-destroying insect has infested wooden members of the structure.

Example: Subterranean termite evidence was located in sill plate adjacent to the crawl space access door.

One specific problem that the Division has encountered involves the description of subterranean termite evidence in structures containing no

visible evidence of a previous termite treatment. For example: A termite shelter tube is found on the foundation wall. No active termites are found associated with this tube. The structure contains no visible evidence of a previous termite treatment. The PCO checks 3-A-2 on the form indication that no control measures were performed and then uses the term "inactive" or "old" to describe the tube under location of visible evidence. By using these terms, the PCO has made a statement that the structure is free from subterranean termites when such a statement would be in violation of .0602(b) of the rules and regulations.

Another area of concern involves making treatment recommendations on the WDIR. For example, PCOs often recommend specific treatments under location of visible evidence or under the remarks section on the reverse of the form. The WDIR is not a treatment proposal and does not contain the required information that a proposal must have. All proposals and recommendations for treatment must be on a separate proposal form.

Section 4. No visible evidence of infestation from wood-destroying insects was observed.

By checking this block, the PCO has indicated that there is absolutely no visible evidence of wood-destroying insects past or present.

Section 5. Conditions Conducive

Any condition conducive to an infestation of subterranean termites must be listed on the WDIR. These conditions include but are not limited to, cellulose debris in the crawl space, wood in direct soil contact, insufficient clearance between the bottom edge of floor joists or girders and the soil and wood with a moisture content exceeding 20% as determined by a moisture meter. Other conditions may be present in a specific structure that may be conducive to termites in light of the overall condition of the structure. PCOs should use their own judgement in reporting these items.

Identification, Biology, and Habits of WDIs

NATIVE SUBTERRANEAN TERMITE

This section concerns the eastern subterranean termite, *Reticulitermes flavipes*, and the related species *R. virginicus* and *R. hageni*. The Formosan subterranean termite, *Coptotermes formosanus*, is discussed in a separate section.

Identification:

Reproductives (swarmers or alates) are about 1/3 to 1/2-inch (8 mm to 12 mm) long and are black in color (except *R. hageni* which is yellowish-brown). Soldiers are white and wingless and have enlarged yellowish heads that are oblong and rectangular in shape (compared to the oval-shaped heads of Formosan soldiers) with greatly enlarged, dark mandibles. Workers are approximately 1/8-inch (3 mm) long, wingless, soft-bodied, and gray to yellow-white (Figure A-1). They are indistinguishable from workers of the Formosan subterranean termite.

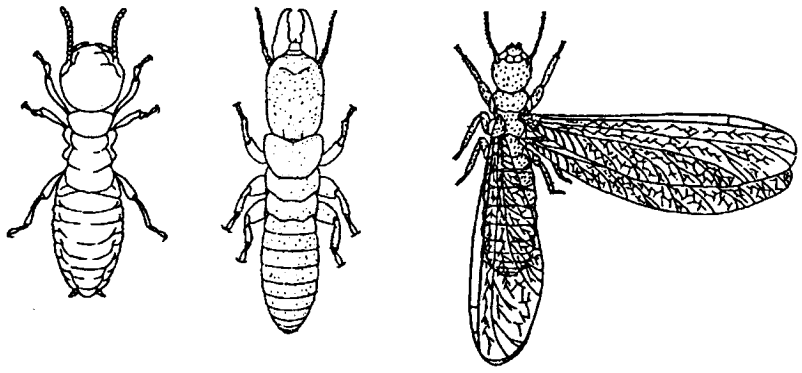


Figure A-1

Subterranean termites: left to right is a worker, a soldier, and a winged reproductive (swarmer)

Key Characteristics:

Swarmers have two pairs of wings that are identical in size and are practically hairless (unlike the Formosan's). Antennae are beadlike, not elbowed, and without a club at the tip.

Biology and Habits:

Subterranean termites typically live in soil and move through it to reach wood above ground. Although they normally maintain contact with the soil, subterranean termites can survive when they are isolated from the soil if they have a continuing source of moisture.

Termites enter buildings either through wood in direct contact with the soil, by building mud shelter tubes over or through foundation walls, piers, chimneys, etc., or by finding cracks or joints in concrete slab floors and building shelter tubes through them into wood above the crevices. Termite swarmers can also fly or be blown to a building site and then find a suitable spot to begin a colony.

When a *Reticulitermes* colony is well established, usually after at least 3-4 years, winged reproductives are produced. In most species, reproductives swarm on a warm spring day following rain. A single colony may produce more than one swarm. Swarmers usually emerge from the ground through mud tubes (called swarming tubes or "castles") that rise 4-8 inches above the ground or infested wood. After a short flight, the reproductives shed their wings and establish a nest in the ground where they mate and the female, or queen, begins laying eggs. The sterile workers that are produced care for eggs and young, feed and clean other termites, forage for food, and construct and repair shelter tubes. The workers are the termites who eat the wood. In a mature colony, soldiers are produced to guard the colony and defend against predators.

[For inspection guidelines and damage, see Chapter Two]

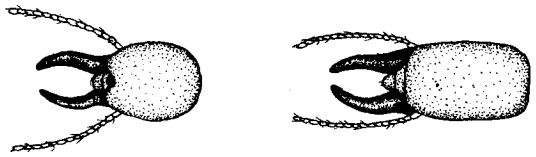
FORMOSAN SUBTERRANEAN TERMITE

This section concerns the Formosan subterranean termite, *Coptotermes formosanus*. The eastern subterranean termite, *Reticulitermes flavipes*, and the related species *R. virginicus* and R. *hageni*. are discussed in the previous section.

Identification:

Reproductives (swarmers or alates) are larger than Reticulitermes reproductives, about 5/8-inch (15 mm) in length and are yellowish-brown in color. Soldiers are white and wingless and have enlarged oval-shaped, yellowish

heads (compared to the more rectangular heads of the Reticulitermes soldiers) with a tubelike fontanelle gland on the front. Workers are approximately 1/8-inch (3 mm) long, wingless, soft-bodied, and gray to yellow-white. They are indistinguishable from workers of *Reticulitermes* spp.



Formosan termite *native subterranean termite*

Figure A-2
Comparison of the heads of soldier termites

Key Characteristics:

Formosan swarmers have 2 pairs of equal-sized wings that are hairy, compared to the hairless wings of *Reticulitermes* swarmers. Antennae are beadlike, not elbowed, and without a club at the tip.

Biology and Habits:

All subterranean termites typically live in soil and move through it to reach wood above ground. Although they normally maintain contact with the soil, subterranean termites can survive when they are isolated from the soil if they have a continuing source of moisture.

Termites enter buildings either through wood in direct contact with the soil, by building mud shelter tubes over or through foundation walls, piers, chimneys, etc., or by finding cracks or joints in concrete slab floors and building shelter tubes through them into wood above the crevices. Termite swarmers can also fly or be blown to a building site and then find a suitable spot to begin a colony.

When a Formosan colony is well established, usually after at least 3-4 years, winged reproductives are produced. Reproductives usually swarm in the evening on a warm rainy day in late spring or summer. A single colony may produce more than one swarm. Swarmers usually emerge from the ground through mud tubes (called swarming tubes or "castles") that rise 4-8 inches above the ground or infested wood. After a short flight, the reproductives shed their wings and establish a nest in the ground where they mate and the female, or queen, begins laying eggs. The sterile workers that are produced care for eggs and young, feed and clean other termites, forage for food, and construct and repair shelter tubes. The workers are the termites who eat the wood. In a mature colony, soldiers are produced to guard the colony and defend against predators. Formosan soldiers are more aggressive

than Reticulitermes soldiers and can exude a whitish, sticky substance from a tubelike opening on top of their heads.

Formosan subterranean termites are more vigorous and aggressive than other subterranean termites. The queen lays many more eggs and colony size is typically much larger than that of Reticulitermes spp.

Formosans make nests of a rather hard material called "carton" which resembles sponge. It is composed of chewed wood, soil, saliva, and fecal material. The carton nests are often underground but sometimes fill cavities in walls of buildings, allowing Formosans to build secondary, above ground nests. True aerial nests that never have ground contact occasionally occur.

The Formosan subterranean termite causes more damage to structures than Reticulitermes subterranean termites because of its more rapid population development, more extensive tube and tunnel building, its ability to more quickly locate and attack new food sources, its greater foraging distance, and the greater variety of woods attacked.

[For inspection guidelines and damage, see Chapter Two]

CARPENTER ANTS

Identification:

Carpenter ants are the largest structure invading ants in North Carolina. The queens, winged males, and workers range considerably in size (Figures 3 and 4). The winged reproductives may be up to 3/4-inch (18 mm) long. There are several sizes of workers, but the major workers are up to 7/16-inch (11 mm) long. The black carpenter ant (*Camponotus pennsylvanicus*) is mainly black, but other species have some reddish-brown or yellowish coloration. The larva is small, legless, white and grublike and is fed and cared for by the adults.

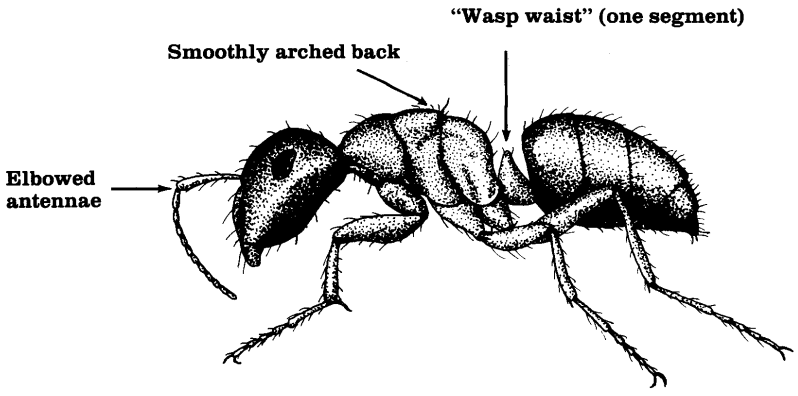


Figure A-3
Carpenter ant worker: elbowed antennae, smoothly arched thorax, one node.

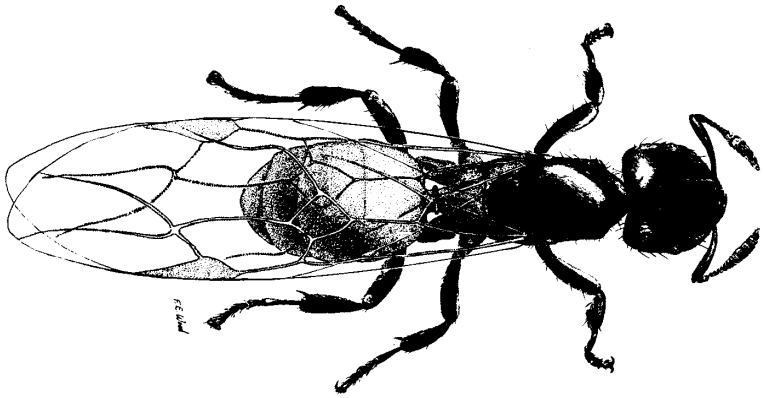


Figure A-4
Carpenter ant swarmer (winged reproductive). (F.E. Wood)

Key Characteristics:

The thorax is rounded in profile and there is one node between the thorax and abdomen. Carpenter ants have a circle of hairs around their anal opening. The reproductives (swarmers) have two pairs of wings that are unequal in size. Antennae are elbowed, but not clubbed.

Biology and Habits:

Carpenters ants do not "eat" wood like termites and powderpost beetles. They use their jaws to dig into the wood to make a nest site. Winged reproductives ("swarmers") are first produced when the colony is 3 to 6 years old. Winged males and females emerge from established colonies anytime from early spring until mid summer. Mating occurs in flight and the female then seek a suitable site to establish a new colony.

Carpenter ants do not sting but they have the ability to bite painfully. They feed primarily on sweets. Outside, they feed on honeydew excreted by aphids and some other plant-feeding insects. They also feed on dead insects and on plant and fruit juices. Inside, they feed on sweets, meats, grease, and fat. The white, legless larvae are cared for in the nest by the adult ants. Worker ants regurgitate food to feed other colony members and larvae. Adult ants forage mostly at night.

[For inspection guidelines and damage, see Chapter Two]

ANOBIID POWDERPOST BEETLE

Identification:

Anobiid beetles range in size from 1/8 to 1/4-inch (3 mm to 7 mm) in length and are reddish-brown to nearly black. They are elongate and cylindrical in shape. The larvae are grublike, C-shaped, and nearly white with a brownish

head and mouthparts. Larvae of the largest species, when full grown, are nearly 7/16-inch (11 mm) when extended.

Key Characteristics:

The pronotum area behind the head of the adult beetle is hoodlike. When viewed from above, the pronotum completely conceals the head. Most have conspicuous grooves or rows of pits on their wing covers. Antennae are not club-like at the tip (Figure A-5).

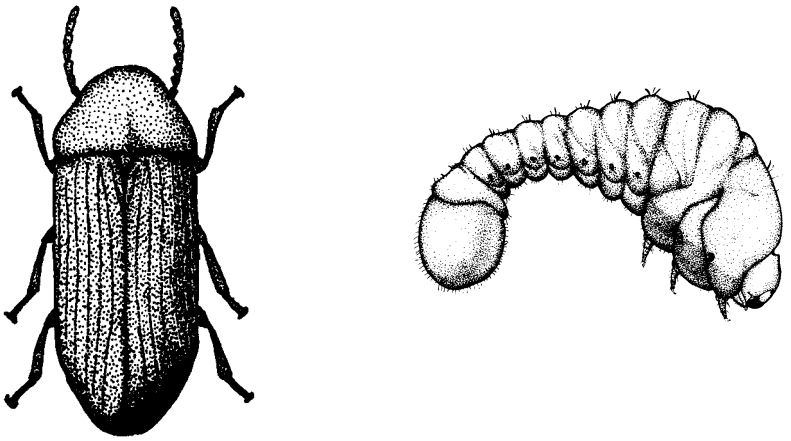


Figure A-5
Anobiid powderpost beetle adult, *Euvrilleta peltatus* at left, larva at right.

Biology and Habits:

The female beetle lays her eggs on the surface of the wood under splinters, in cracks, or in old exit holes. She requires a rough wood surface for egg laying so painted or varnished wood is rarely attacked. The newly hatched larva tunnels into the wood where it usually takes at least 2 or 3 years to complete its development. If the wood moisture content is too low (usually below 14%), or if the wood has little food value, the life cycle takes longer or the larva may die. Fully developed larvae pupate inside the gallery. Emerging adults bore exit holes straight to the surface of the wood. Adults are active during the spring and summer. They do not feed.

It is normally 10 or more years before the numbers of beetles infesting wood become large enough for their presence to be noted. They reinfest seasoned wood if environmental conditions are favorable. Usually reinfestation occurs in wood in the same immediate area.

Anobiids are particular problems in coastal areas where the soil water table and the relative humidity are high, resulting in high wood moisture content.

[For inspection guidelines and damage, see Chapter Two]

LYCTID POWDERPOST BEETLE

Identification:

Lyctid beetles range in size from 1/8 to 1/4-inch (3 mm to 7 mm) in length and are reddish-brown to black. The beetles are small and elongate, and somewhat flattened. The larvae are grublike, C-shaped, and nearly white with a brownish head and mouthparts. When fully grown, the larva is usually less than 1/4-inch (7 mm) long when extended.

Key Characteristics:

The pronotum area behind the head of the adult beetle does not cover the head (when viewed from above) as in the anobiids and bostrichid powderpost beetles. The pronotum is almost square and somewhat wider at the front. Antennae have a two-segmented club at the tip (Figure A-6).

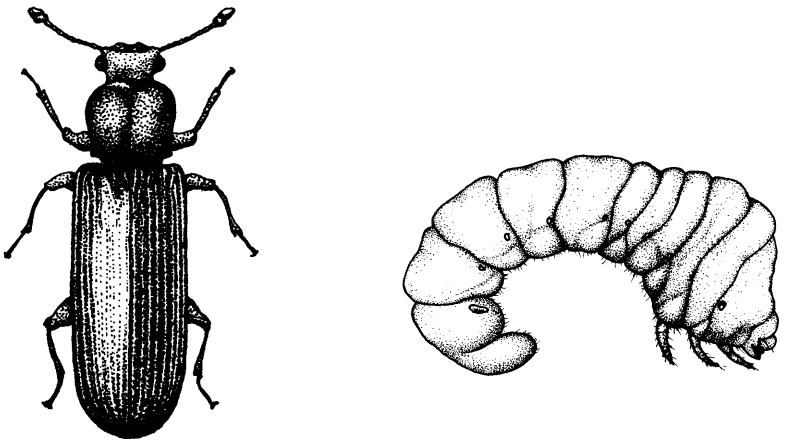


Figure A-6

Southern lyctus powderpost beetle adult, *Lyctus planicollis* at left, larva at right.

Biology and Habits:

The female lyctid beetle lays her eggs inside the springwood vessels and pores, or in cracks and crevices, of hardwoods. Females prefer to lay their eggs on recently dried wood that has a higher starch content, and reportedly do not lay eggs in sapwood that has a starch content less than 3 percent. The higher the starch content of the wood, the greater the survival of lyctids.

The newly hatched larva bores into the wood, gradually enlarging its tunnel as it grows. When mature, it forms a pupal chamber just under the wood surface. The emerging adult beetle cuts a circular exit hole, pushing out some of the fine frass as it does so. The entire life cycle for most lyctid species takes 9 to 12 months, but all will develop more quickly if temperature, moisture, and starch content of the wood are optimal. Adults are most active at night in late winter or early spring. They are also common in the mountains, particularly in log homes.

[For inspection guidelines and damage, see Chapter Two]

BOSTRICHID POWDERPOST BEETLE

Identification:

Bostrichid beetles range in size from 1/8 to 1/4-inch (3 mm to 7 mm) in length and are reddish-brown to black. They are elongate and cylindrical in shape. The larvae are grublike, C-shaped, and nearly white with a brownish head and black mouthparts. Mature larvae range from 3/16 to 5/16-inch (5 mm to 8 mm) in length when extended.

Key Characteristics:

The pronotum area behind the head of the adult beetle is hoodlike. When viewed from above, the pronotum conceals the head. The front edge of the pronotum is often raspy and rough-looking. Some with wing covers that are concave or depressed at the rear end and may have spines. Antennae have a loose, 3 to 4-segmented club at the tip (Figure A-7).

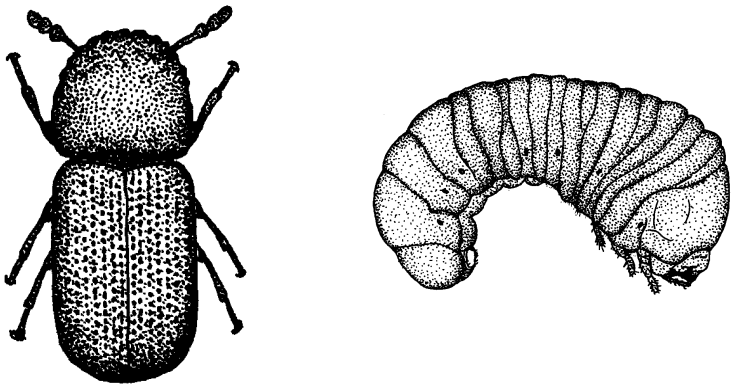


Figure A-7
Bamboo powderpost beetle adult, *Dinoderus minutis* at left, larva at right.

Biology and Habits:

The female beetle bores entry holes into the wood to prepare egg tunnels. The newly hatched larva tunnels farther into the wood with the grain, enlarging the tunnel as it grows. It normally takes almost a year for the larva to complete its development, longer if the wood dries too rapidly. The bamboo borer, however, can complete development in as little as 51 days. After pupation in the wood, the emerging adult cuts straight through to the wood's surface. Unlike the anobiid and lyctid powderpost beetles, the bostrichid adult feeds on wood before mating. Adults are active during the summer months. Bostrichids rarely attack or reinfest seasoned wood.

[For inspection guidelines and damage, see Chapter Two]

OLD HOUSE BORER

Identification:

Old house borers (*Hylotrupes bajulus*) are in the beetle family known as roundheaded borers. Adult beetles range in size from 5/8 to 1-inch (16 mm to 25 mm) in length and are slightly flattened. The adult beetle is brownish-black in color with many gray hairs on its head and the fore part of the body. The larvae is whitish with black mouthparts, grublike, and widest just behind the head. Fully developed larvae are about 1-1/4 inch (31 mm) long.

Key characteristics:

The pronotum area behind the head of the adult beetle has a shiny ridge down the middle and a shiny raised knob on each side, giving it the appearance of a face with a pair of eyes. The wing covers sometimes have four patches of gray hairs that form two indistinct cross bands or spots. The antennae are at least 1/3 of the body length and not clubbed (Figure A-8).

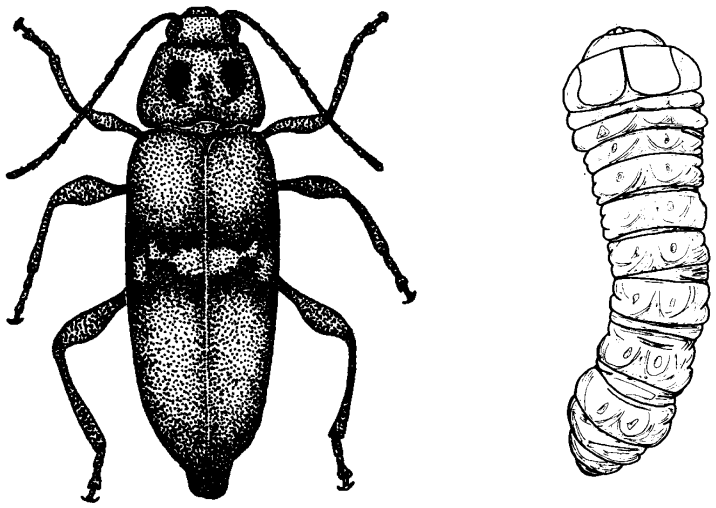


Figure A-8

Old house borer adult, *Hylotrupes bajulus* at left, larva at right.

Biology and Habits:

The female beetle lays her eggs in cracks and crevices in softwoods, typically in stacks of lumber. Newly hatched larvae tunnel into the wood, penetrating deeper into the sapwood as they grow. The higher the protein level in the wood, the faster the larvae develop. In southern states, old house borer larvae usually feed and develop for 3 to 5 years before emerging as adult beetles. In very dry wood, such as in attics, it may take 12 to 15 years for one generation. Larvae develop most rapidly at wood moisture levels between 15-25%. Fully-developed larvae pupate near the surface of the wood

in the spring. Adults may remain in the wood for some time before emerging. They are active from April to October, with the greatest activity in June and July. Adult beetles do not feed on wood. They can reinfest wood if conditions are right but rarely do so in heated, occupied buildings.

[For inspection guidelines and damage, see Chapter Two]

WOOD-DESTROYING FUNGUS

Identification:

White Rot

Wood infected with white rot is spongy with a whitish, bleached look. There may be dark lines bordering the bleached area, and there may be whitish, cottony growths on the surface of the wood. The wood is stringy when broken. In advanced stages there may be some cracking across the grain, although the wood surface does not collapse or shrink dramatically.

Brown Rot

Brown rot shows up as a brown color or brown streaks on the surface or end grain of the wood. There may also be whitish, cottony growths on the surface of the wood. In advanced stages, the wood turns dark brown, cracks across the grain into "cubes," and the wood surface shrinks and collapses, eventually turning into a brown powder.

Poria incrassata, sometimes called "dry rot," is an unusual type of brown rot that produces water-transporting tubes (rhizomorphs) that are dirty white, aging to brown or black. The tubes are usually 1/4-1/2-inch (7 mm to 12 mm) wide and can extend for almost 30 feet (9.2 meters). *Poria* also produces fan-shaped mycelial mats that start out whitish, become yellowish, and eventually turn brown as they age and dry.

Surface Mold and Sapstain Fungus

Surface molds like mildew are powdery in appearance and may be green, black, pink, or orange. They can be brushed or sanded off of the surface of the wood. Sapstain fungus, also called bluestain fungus, is similar to a surface mold except that the blue, black, or gray discoloration goes deep into the wood and cannot be brushed or sanded away. These two fungi discolor wood but do not damage or weaken it.

Biology and Habits:

Decay fungi are living plants that lack chlorophyll. They send tiny threads, called "hyphae," through damp wood which break the wood down into

usable food (Figure A-8). Since they cannot produce their own food, these fungi digest the cellulose in the wood, gradually decomposing it. As they grow, the hyphae branch many times, sometimes forming white masses called mycelial mats or fans on the surface of the wood.

Figure A-8
Microscopic thread-like hyphae feed on the cell walls of wood.

Decay fungi require warm temperatures, moisture, poor ventilation, and the presence of oxygen. Wood fungi will not grow if temperatures are too low (lower than 70° F. or higher than 90° F.) or if the moisture content is 20% or less.

Many decay fungi can grow for long periods without producing any evidence of their presence in wood. Eventually fruiting bodies (sporophores) are formed on the surface of decaying wood. Fruiting bodies can be crusts, shelflike brackets, or mushroom-shaped. These fruiting bodies produce millions of tiny spores which can spread the decay fungus to other areas.

Poria incrassata is an unusual brown rot. It has root-like, water-transporting strands (rhizomorphs) that can move water from a wet area (usually the soil) to a dry one. This allows it to decay wood that is initially dry as long as there is a moisture source nearby that it can draw from.

[For inspection guidelines and damage, see Chapter Two]

CARPENTER BEES

Identification:

Adult bees are stocky and black or blue-black in color. Carpenter bees are 1-inch (25 mm) or more in length. Larvae are white, legless and grub-shaped.

Key Characteristics:

The top of the abdomen is shiny black and hairless and the thorax is covered with yellow, orange, or white hairs (Figure A-9). Bumble bees look very similar but their abdomen is covered with dense hairs. The male carpenter bee has a yellow marking on his face.

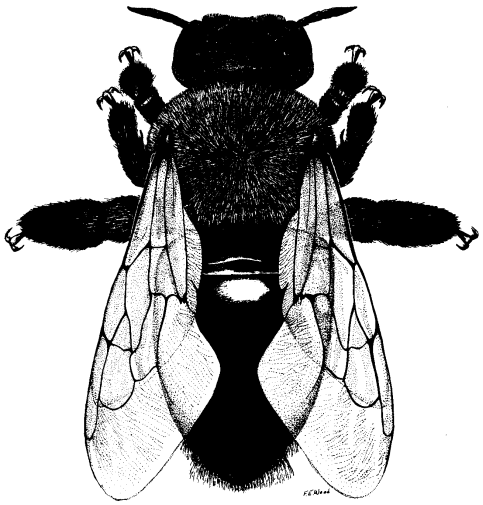


Figure A-9
Carpenter bee adult.

Biology and Habits:

Carpenter bees do not feed on wood. It is the tunneling of the adult female to create nest sites that causes the damage to wood.

Adult carpenter bees overwinter in abandoned nest tunnels, emerging in the spring to feed on nectar and mate. Females may either excavate a new tunnel in wood or clean out an old gallery. Several females may share a common entry hole. Several carpenter bees may nest in the same general area and they tend to reuse favorable nest sites year after year.

Once the female has excavated her brood gallery, she provisions it with a mass of pollen and nectar, lays an egg on it, then seals the cell with wood pulp and saliva. She then repeats the provisioning and egg laying until she has completed six cells. The development time from egg to adult is 5 to 7 weeks. Newly developed adults usually emerge from the gallery in late summer, hibernate over the winter in existing nests, and mate the following spring.

The male carpenter bee is very aggressive in patrolling the nest site, but he cannot sting. The female can sting but is very docile and rarely does so.

[For inspection guidelines and damage, see Chapter Two]

Construction Terms and Technology

Aggregate- A mixture of sand and stone and a major component of concrete.

Air space - The area between insulation facing and interior of exterior wall coverings. Normally a 1" air gap.

Apron- A trim board that is installed beneath a window sill

Attic access- An opening that is placed in the drywalled ceiling of a home providing access to the attic. This usually requires a ladder for access.

Backfill- The replacement of excavated earth into a trench around or against a basement /crawl space foundation wall.

Balusters- Vertical members in a railing used between a top rail and bottom rail or the stair treads. Sometimes referred to as 'pickets' or 'spindles'.

Balustrade- The rail, posts and vertical balusters along the edge of a stairway or elevated walkway.

Bandjoist- The header attached to the outer edges of the floor joists and resting on the sill plate

Base or baseboard- A trim board placed against the wall around the room next to the floor.

Base shoe- Molding used next to the floor on interior base board. Sometimes called a carpet strip.

Bearing partition- A partition that supports any vertical load in addition to its own weight.

Bearing wall- A wall that supports any vertical load in addition to its own weight.

Bearing header- (a) A beam placed perpendicular to joists and to which joists are nailed in framing for a chimney, stairway, or other opening such as a door or window

Bottom plate- The "2 by 4's or 6's" that lay on the subfloor upon which the vertical studs are installed. Also called the 'sole plate'.

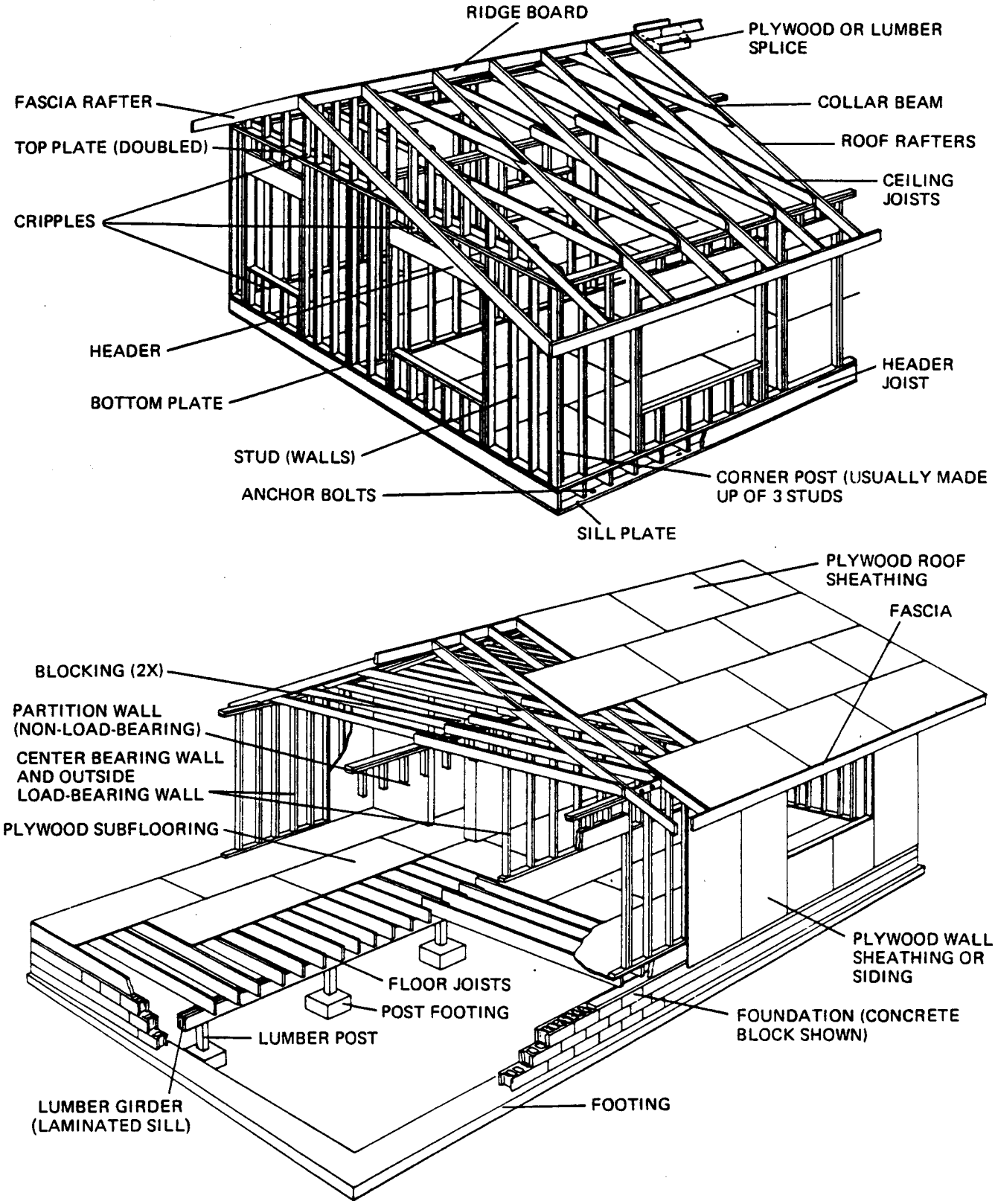


Figure B-1
Names of structural members in houses

Boxsill- The combined assembly of the sill and bandjoist

Brick veneer- A vertical facing of brick laid against and fastened to sheathing of a framed wall or tile wall construction.

Bridging- Small wood or metal members that are inserted in a diagonal position between the floor joists or rafters at mid-span for the purpose of bracing the joists/rafters & spreading the load.

Building codes- Ordinances governing the manner in which a home may be constructed or modified. The North Carolina code will adopt national ICC codes in

Cap flashing- The portion of the flashing attached to a vertical surface to prevent water from migrating behind the base flashing.

Casing- Wood trim molding installed around a door or window opening.

Ceiling joist- One of a series of parallel framing members used to support ceiling loads and supported in turn by larger beams, girders or bearing walls. Also called roof joists.

Chase- A framed enclosed space around a flue pipe or a channel in a wall, or through a ceiling for something to lie in or pass through.

Column- A vertical support structure of combined wood members or masonry material such as a pier in a crawlspace

Concrete block - A hollow concrete 'brick' often 8" x 8" x 16" in size.

Course- A row of shingles or roll roofing running the length of the roof. Parallel layers of building materials such as bricks, or siding laid up horizontally.

Crawl space- A shallow space below the living quarters of a house, normally enclosed by the foundation wall and having a dirt floor.

Crawl space access- An opening for entry into the crawlspace.

Cricket- A second roof built on top of the primary roof to increase the slope of the roof or valley. A saddle-shaped, peaked construction connecting a sloping roof with a chimney. Designed to encourage water drainage away from the chimney joint.

Cripple- Short vertical "2 by 4's or 6's" frame lumber typically installed above or below a window, door, or floor.

Door stop- The wooden style that the door slab will rest upon when it's in a closed position.

Dormer- An opening in a sloping roof, the framing of which projects out to form a vertical wall suitable for windows or other openings.

Downspout- A pipe, usually of metal, for carrying rainwater down from the roof's horizontal gutters.

Drain tile- A perforated, corrugated plastic pipe laid at the bottom of the foundation wall and used to drain excess water away from the foundation. It prevents ground water from seeping through the foundation wall. Sometimes called perimeter drain.

Dry-well- A covered pit with open jointed lining frequently with gravel to allow drainage from the foundation or roof to seep into the surrounding soil

Eaves- The horizontal exterior roof overhang.

Earth-filled porch- Raised porch that is filled with dirt, often right against the foundation wall. Also called dirt-filled porch.

Efflorescence- A bloom, coating, or powdery residue on the surface of wood.

Escutcheon- An ornamental plate that fits around a pipe extending through a wall or floor to hide the cut out hole

Expansion joint- Area in and around a concrete slab to permit it to move up and down (seasonally) along the non-moving foundation wall.

Exterior Insulation and Finish System (EIFS)- Also known as synthetic stucco, has the look of traditional stucco but is made by attaching rigid foamboard to walls studs and covering with a spreadable synthetic parge. This type of construction is very prone to moisture infiltration leading to decay and termite infestation.

False chimney -- a chimney structure that has no purpose other than as a decorative piece. This is commonly used with gas logs that vent to the outside but the chimney is used for visual appeal only and is not used for smoke or heat escape.

Fascia- Horizontal boards attached to rafter/truss ends at the eaves and along gables. Roof drain gutters are attached to the fascia.

Final outside grade- The finished level of soil around the foundation after construction at the foundation is complete.

Fire stop- A solid, tight closure of a concealed space, placed to prevent the spread of fire and smoke through such a space. In a frame wall, this will usually consist of 2 by 4 cross blocking between studs. Work performed to slow the spread of fire and smoke in the walls and ceiling (behind the drywall). Includes stuffing wire holes in the top and bottom plates with insulation, and installing blocks of wood between the wall studs at the drop soffit

line. This is integral to passing a Rough Frame inspection. See also 'Fire block'.

Flashing- Sheet metal or other material used in roof and wall construction to protect a building from water seepage.

Floating slab- A slab that rests on fill material with an expansion joint between the slab and the foundation.

Foamboard- synthetic expanded poly isocyanurate, expanded polystyrene or similar material used as insulation. This material is usually rigid and is formed in panels and is not permitted below grade in most areas.

Foundation vent- An opening, usually screened, to allow ventilation of crawlspaces and other air-restricted spaces; sometimes equipped with automatic devices that open and close with environmental conditions.

Footing- Base at bottom of foundation wall, wider than thickness of foundation wall.

Form- Temporary structure erected to contain concrete during placing and initial hardening.

Foundation- The supporting portion of a structure below the first floor construction, or below grade, including the footings.

French drain- An underground system of gravel and pipe designed to remove ground water from under and around the perimeter of a structure.

Gable- The end, upper, triangular area of a home, beneath the roof.

Girder-A large, horizontal weight-bearing beam, usually the primary support of a structure, and often spanning a large distance

Grade- Finish: top surface elevation of lawns, walks, drives or other improved surfaces; natural: elevation of the original or undisturbed natural surface of ground; sub grade: the elevation established to receive top surfacing or finishing materials

Header- (a) A beam placed perpendicular to joists and to which joists are nailed in framing for a chimney, stairway, or other opening. (b) A wood lintel. (c) The horizontal structural member over an opening (for example over a door or window).

I-joist- Manufactured structural building component resembling the letter "I". Used as floor joists and rafters.

Insulation board, rigid- A structural building board made of coarse wood or cane fiber in 25/32-inch and other thicknesses. It can be obtained in various size sheets and densities.

Insulation- Any material high in resistance to heat transmission that, when placed in the walls, ceiling, or floors of a structure, and will reduce the rate of heat flow.

Jack post- A type of structural support made of metal, which can be raised or lowered through a series of pins and a screw to meet the height required. Basically used as a replacement for an old supporting member in a building. See Monopost.

Joist- Wooden 2 X 8's, 10's, or 12's that run parallel to one another and support a floor or ceiling, and supported in turn by larger beams, girders, or bearing walls.

Joist hanger- A metal "U" shaped item used to support the end of a floor joist and attached with hardened nails to another bearing joist or beam.

Monolithic slab- A slab poured in a single piece including footer, wall, and slab.

Mudsill- Bottom horizontal member of an exterior wall frame which rests on top a foundation, sometimes called sill plate. Also sole plate, bottom member of interior wall frame.

Oriented Strand Board (OSB)- a plywood replacement using wood pieces formed by adhesive into boards. Some OSB is treated with borates.

Pier- A column of masonry, usually rectangular in horizontal cross section, used to support other structural members. Also see Caisson.

Pilaster- A pier forming part of a masonry or concrete wall; can be also in a crawl space

Plate- Normally a 2 X 4 or 2 X 6 that lays horizontally within a framed structure, such as:

- Sill plate- A horizontal member anchored to a concrete or masonry wall.
- Sole plate- Bottom horizontal member of a frame wall.
- Top plate- Top horizontal member of a frame wall supporting ceiling joists, rafters, or other members.

Plenum- The area under the ground floor in plenum house construction that is used as a heating/cooling duct.

Pressure-treated wood- Lumber that has been saturated with a preservative.

Ridge- The horizontal line at the junction of the top edges of two sloping roof surfaces.

Riser- Each of the vertical boards closing the spaces between the treads of stairways.

Roof joist- The rafters of a flat roof. Lumber used to support the roof sheeting and roof loads. Generally, 2 X 10's and 2 X 12's are used.

Roof sheathing or sheeting- The wood panels or sheet material fastened to the roof rafters or trusses on which the shingle or other roof covering is laid.

Sheet rock- Drywall-Wall board or gypsum- A manufactured panel made out of gypsum plaster and encased in a thin cardboard. Usually 1/2" thick and 4' x 8' or 4' x 12' in size. 'Green board' type drywall has a greater resistance to moisture than regular (white) plasterboard and is used in bathrooms and other "wet areas".

Sill- (1) The 2 X 4 or 2 X 6 wood plate framing member that lays flat against and bolted to the foundation wall (with anchor bolts) and upon which the floor joists are installed. Normally the sill plate is treated lumber. (2) The member forming the lower side of an opening, as a door sill or window sill.

Sill plate (mudsill)- Bottom horizontal member of an exterior wall frame which rests on top a foundation, sometimes called mudsill. Also sole plate, bottom member of an interior wall frame.

Slab on grade- A type of foundation with a concrete floor which is placed directly on the soil. Slab construction can usually be floating, supported, or monolithic.

Soffit- The area below the eaves and overhangs. The underside where the roof overhangs the walls. Usually the underside of an overhanging cornice.

Sole plate- The bottom, horizontal framing member of a wall that's attached to the floor sheeting and vertical wall studs.

Step flashing- Flashing application method used where a vertical surface meets a sloping roof plane. 6" X 6" galvanized metal bent at a 90 degree angle, and installed beneath siding and over the top of shingles. Each piece overlaps the one beneath it the entire length of the sloping roof (step by step).

String, stringer- A timber or other support for cross members in floors or ceilings. In stairs, the supporting member for stair treads. Usually a 2 X 12 inch plank notched to receive the treads.

Stucco- A finish for exterior walls traditionally composed of cement, sand, and lime, and applied when wet. Newer stuccos are also available made from other materials.

Stud- A vertical wood framing member, also referred to as a wall stud, attached to the horizontal sole plate below and the top plate above. Nor-

mally 2 X 4's or 2 X 6's, 8' long (sometimes 92 5/8"). One of a series of wood or metal vertical structural members placed as supporting elements in walls and partitions.

Stud framing- A building method that distributes structural loads to each of a series of relatively lightweight studs. Contrasts with post-and-beam.

Subfloor- An underlayment to a finished floor, or a restricted void area beneath a floor.

Supported slab- A slab that rests on separate foundation walls and concrete beams or posts.

T & G, tongue and groove- A joint made by a tongue (a rib on one edge of a board) that fits into a corresponding groove in the edge of another board to make a tight flush joint. Typically, the subfloor plywood is T & G.

Termite shield- A shield, usually of galvanized metal, placed in or on a foundation wall or around pipes thought to prevent the passage of termites, but was really designed to force termite tubes to be more obvious. Termite shields have been shown to be ineffective.

Terra cotta- A ceramic material molded into masonry units.

Threshold- The bottom metal or wood plate of an exterior door frame. Generally they are adjustable to keep a tight fit with the door slab.

Trap- Curved, "U" shaped section of a drain pipe that holds a water seal to prevent sewer gasses from entering the home through the water drain.

Treated lumber- A wood product which has been impregnated with chemical pesticides such as CCA (Chromated Copper Arsenate) to reduce damage from wood rot or insects. Often used for the portions of a structure which are likely to be in contact with soil and water. Wood may also be treated with a fire retardant.

Truss- An engineered and manufactured roof support member with "zig-zag" framing members. Does the same job as a rafter but is designed to have a longer span than a rafter.

Underlayment- A material placed over the subfloor plywood sheeting and under finish coverings, such as vinyl flooring, to provide a smooth, even surface. Also a secondary roofing layer that is waterproof or water-resistant, installed on the roof deck and beneath shingles or other roof-finishing layer.

Utility conduit- a pipe, cable or other device carrying electric, water, or other utility lines.

Valley- The "V" shaped area of a roof where two sloping roofs meet. Water drains off the roof at the valleys.

Valley flashing- Sheet metal that lays in the "V" area of a roof valley.

Vapor barrier- A building product installed on exterior walls and ceilings under the drywall and on the warm side of the insulation. It is used to retard the movement of water vapor into walls and prevent condensation within them. Normally, polyethylene plastic sheeting is used.

Veneer- Extremely thin sheets of wood. Also a thin slice of wood or brick or stone covering a framed wall

Wafer board - A manufactured wood panel made out of 1"- 2" wood chips and glue. Often used as a substitute for plywood in the exterior wall and roof sheathing.

Weep holes- Small holes in storm window frames that allow moisture to escape.

Wonderboard ™- A panel made out of concrete and fiberglass usually used as a ceramic tile backing material. Commonly used on bathtub decks.

NCPCA WDI Inspector Examination Procedures

Congratulations on your participation in the NCPCA WDI program. This program is known as one of the best in the country. NCPCA has prepared this sheet to guide you through the process.

Step One: Review requirements and prepare the affidavit. Licensees do not need to be included on the affidavit as it is designed for owners to guarantee eligibility.

Step Two: Register for the course and include affidavit and registration fees.

Step Three: On the day of the course, take the exam. The exam contains 50 questions and candidates must get 40 correct to pass. You will have up to one hour to take the exam. Test results will be sent to NCPCA and matched up to the affidavit and course records to ensure that the candidate took the course and qualifies. Results will be sent to candidates within two weeks of the exam.

THE FIRST TEST FEE PER CANDIDATE IS INCLUDED WITH THE PROGRAM REGISTRATION FEES SO THERE IS NO ADDITIONAL CHARGE. IF A CANDIDATE DOES NOT PASS, THEY CAN RETAKE THE EXAM AN UNLIMITED NUMBER OF TIMES BY PAYING $35.00 PER ATTEMPT. TO REGISTER TO RETAKE THE EXAM, CONTACT NCPCA.

Step Four: Upon successful completion, NCPCA will send the official notification and stamp to the newly accredited inspector. The inspector agrees to abide by the code of ethics which is provided.

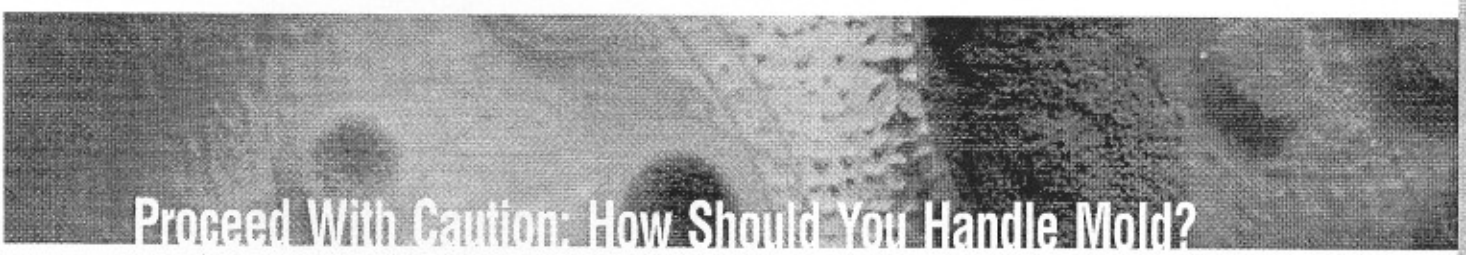
Step Five: Market your company as having the highest level of training in the state but make sure that only accredited inspectors are sent if a customer asks for an NCPCA Accredited Inspector. Remember, the designation is with the individual and not the company.

NPMA LIBRARY UPDATE

Update

MAY/JUNE
2003

Insert this update into the NPMA Pest Management Library, which can be purchased from the Resource Center. phone: 703-573-8330 fax: 703-573-4116



Proceed With Caution: How Should You Handle Mold?

Background

NPMA previously issued a Library Update titled *Deconstructing Toxic Mold,* in November/December 2002 (to read it, visit www.pestworld.org), which covered the biology of molds and introduced the industry to some of the health and legal issues related to molds. As a follow-up, NPMA leadership appointed a panel of members and staff to further address the mold issue so that members are properly informed as to the distinction between pest management and mold inspection and remediation. This update reports the panel's findings and recommendations.

EPA and CDC Weigh In

Both the Environmental Protection Agency and the Centers for Disease Control and Prevention have become involved in the mold issue. EPA, primarily through the indoor air quality responsibilities, has published an online brochure about molds including information on background, testing, and mitigation. The brochure is available at www.epa.gov. The Centers for Disease Control and Prevention (www.cdc.gov) has examined the health effects of molds, so at least two government agencies are involved in the mold issue, as well as myriad state and local agencies.

Health Consequences

While there has been an explosion of lawsuits related to health consequences of molds, the CDC's National Center for Environmental Health report that at this time, there is no evidence concluding that any particular species of mold will lead to particular symptoms or disease. CDC reported to Congress in 2002 that there are between 50,000 and 250,000 species of molds and perhaps 200 species produce toxins that may cause a reaction. The important point is that there are many molds in the air and not just one particular type of mold — such as the famous *Stachybotrys chartarum* — causes reactions. CDC made three very important points about molds in its testimony before Congress:

1. There is no standard for sampling (therefore no standard can be established for acceptable levels)
2. Molds are everywhere
3. People have different sensitivities to molds; some are allergic

Previously CDC reported infant deaths allegedly due to molds in Ohio. A review of the data by CDC has led to their reversing their position. Now the CDC position is that infant deaths previously attributed to mold now have an unknown cause.

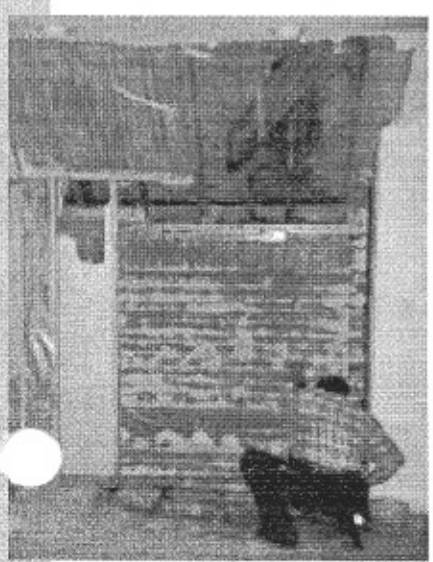
NPMA LIBRARY UPDATE

Litigation

While the mold *S. chartarum* continues to grab most of the media and even litigation limelight, litigation against homeowners, inspectors, and insurance companies can come from any suspected mold presence. Even PMPs can be pulled in due to a potential causal link between inspections for termites, WDO, general pests, and mold — if the inspector did not report suspected conditions conducive as required by the state. The insurance industry, both homeowner and business, has taken steps to reduce or eliminate insurance coverage. State legislators and insurance regulators have found in favor of the insurance companies sometimes by reducing the limits on insurance policies or allowing insurance companies to exclude mold claims totally. Many molds can grow in 24-48 hours after moisture is present, so the mold presence may be absent when a technician is on site and present just a few days later.

Effect on the PM Industry

These topics have led to involvement by the pest management industry for several reasons. First, there can be confusion as to whether inspections should cover mold, especially if visible molds are present and can be reported as evidence of high moisture. High moisture is a condition conducive to infestation. Note that this can be for pest control work as well as wood destroying insects or organisms. Second, some pest management companies are actively engaged in the inspecting and testing for mold. Third, some companies are engaged in the mitigation or removal of mold. This has led to the perception of a relationship between the mold situation and the pest management industry. Mold is an issue not only for crawlspace construction but can be an issue in any type of construction where there is the possibility of moisture infiltration.



Upon removal of wet drywall in suspect areas, molds can be present. Steps should be taken to protect technicians and occupants.

Recommendations for PMPs

1. Defining Wood Destroying Insects and Wood Destroying Organisms

In 38 states, the federally mandated NPCA-1 is used to report findings of wood destroying insect inspections. On that form, the scope of the inspection is clearly defined as specific *insects only* and does not include any wood destroying organisms. The form states that the following insects only are reported: "termites, carpenter ants, carpenter bees, and re-infesting wood boring beetles." Further, "conditions conducive to infestation" are not part of the scope of the inspection unless required by the states and very few states using the NPCA-1 require organism reporting. This provides some protection by defining the pests; however, litigation can occur regardless of how clear the language is. NPCA-1 can be used if organisms are required to be listed, and **NPMA has developed an attachment that is available at no charge through the Resource Center (contact NPMA at 800-678-6722 or at www.pestworld.org).**

Some state forms have followed suit by limiting the scope of the report to specific listed insects; however, some states have maintained their unique forms due to a state requirement to report organisms or conditions conducive to infestation. If a state form and regulations are silent as to the scope of the inspection, a clearly defined scope should be developed, or the state lead agency should develop a position on the scope.

If organism reporting is required and the state regulations are silent on the scope, NPMA has taken previous positions that wood-destroying organisms include insects named above, and only wood-destroying fungi. The Mallis *Handbook of Pest Control* defines decay fungi as brown or white rot. Molds and "mildews" are specifically excluded. NPMA concurs with that definition and defines a similar position in the NPMA WDO Library (which can be found on www.pestworld.org) section *Decay Fungi*, so *mold and "mildew" are not wood destroying organisms and should not be listed as such unless required by the state*

lead pesticide regulatory agency. The USDA Forest Products Laboratory agrees (*Techtime*, 6/02, and *Wood Handbook*, 1999).

2. Defining Conditions Conducive to Infestation and "Sanitation Reports"

Conditions conducive to infestation go beyond just wood destroying insects. In some states, fungus is an indication of moisture that is a condition conducive to infestation. Frequently on WDI/WDO and pest control inspections, inspectors call attention to fungus as a condition conducive to insect infestation when in fact, the fungus is an indicator of free water. State regulations even require fungus reported as conditions conducive in some states. Moisture is the key condition conducive to infestation. Moisture can be brought to wood by earth/wood contact, faulty grade, structural leaks, wood debris in crawls or adjacent to structures, plumbing leaks, and poor drainage.

If conditions conducive are noted during pest control inspections, such as during regularly scheduled quarterly pest control, then moisture must be part of the report unless conditions are specifically noted on a check sheet. **The company should define the scope of the conditions conducive to pests (non-WDI/WDO) on any copy given to the customer,** as the states are generally silent on that issue. If a service ticket doubles as a report of conditions, it perhaps should not be called "Sanitation Report." It should be called "Pest Management Report" or something similar. Sanitation reports are now defined under food and drug regulations, and that term should no longer be used unless the technician is trained in those areas...especially in commercial accounts.

3. Taking Steps to Reduce Chances of Introducing Molds to Customers *and* Employees

Some engineers theorize that working in areas where mold spores are present might introduce molds into the living space. Advanced Energy, a non-profit energy efficiency research firm, has found that over 50 percent of the air in a house may have at some time passed through the crawlspace. Taking that further, the same is most likely true of basements. Stirring around in those areas during inspection/servicing may increase the mold spores in the air. Technicians should consider doing the following:

a. Turn off air handler and/or create negative pressure in crawl or basement.
b. Before entering crawls or basements (unconditioned) use the following personal protection equipment as suggested by the EPA: goggles, durable gloves, coveralls, respirator (N-95 or better and remember to perform the OSHA-required fit test).

4. Preparing Document Disclaimers

NPMA recommends using disclaimer language in reports and contracts and in any other appropriate documents signed by customers. The company attorney should review any language used to make sure that it is consistent with state laws. There are many versions available, but suggested language for WDI/WDO comments might be: *Molds, sometimes improperly called "mildew," are not wood destroying insects (or organisms). Nor are they conditions conducive to infestation by WDI (or WDO). Pest management companies are not qualified nor do they have a duty to inspect for or report presence of these organisms. Any questions regarding mold should be referred to a qualified professional.*

Prior to performing work, a disclaimer can be presented as part of the contract stating (adopted from PCOC):

"There may be health related issues associated with the work being performed under the terms of this agreement. These health issues include, but are not limited to, the possible release of mold spores during the course of the work. We are not qualified to and do not render any opinion concerning such health issues or any special precautions. Any questions concerning health issues or any special precautions to be taken prior to or during the course of such work should be directed to a qualified professional before work begins." (Other sample disclaimers can be found at www.pestworld.org.)

It's not just for crawlspaces or basements. Mold can be found anywhere there is excessive moisture. This situation was observed on a second floor study area.

5. Reviewing Insurance Coverage

Some insurers are excluding mold coverage from their insurance policies for PM companies. Policies should be checked to make sure that any liability regarding mold claims arising from pest management inspections or completed operations is covered. If the insurer no longer covers mold claims, a special mold endorsement should be considered. Further information can be obtained from your insurance agent.

6. Inspections & Mitigation of Mold

Some companies may choose to inspect for mold. EPA clearly discourages the testing of spaces or surfaces for mold. There are no authoritative established protocols, so results have limited meaning. Also, some mold testing and sampling techniques are questionable in that frequently the person doing the sampling has no understanding of scientific sampling. Online mold certificate courses have not been recognized by EPA to date. However, some customers or realtors request mold testing. If a company is considering getting into mold testing, **it should be clearly understood that mold testing and mitigation are not part of the scope of pest management**. Testing and mitigation should be considered add-on services and consideration should be given to setting up a separate company. Care must be taken to reduce confusion by the customers who might question why testing was done in some cases and not in others—especially if related to pest control services.

EPA has deferred protocols for mold mitigation to the standards of the American Conference of Governmental Industrial Hygienists. While a solution of sodium hyperchlorite (bleach) will kill molds, the free spores in the air are not affected and may cause new mold growth in as short as a day. Some products specifically tailored to the pest management industry will probably be released in the near future, but NPMA's advice on keeping mold mitigation separate from pest management business should be seriously considered.

Finally, note that often mold inspection and mitigation are specifically excluded from general liability insurance policies.

7. Moisture Control

Many companies are involved in moisture control. EPA and CDC both agree that the best way to reduce the chance of mold is to reduce moisture. That may inadvertently drag PMPs involved in moisture control into the mold control realm. **Companies that do moisture control should use language to disclose to customers that the moisture control is not mold remediation.** Research firms such as Advanced Energy are evaluating moisture control methods and their data will be reported in the near future. Moisture control, as part of pest management, should not cross the line into mold control unless the above guidelines are considered.

8. Legislative Advisory Panels

PMPs might be asked to participate on state legislative advisory panels regarding the issue of mold. NPMA suggests sharing talking points presented in this document but PMPs should not accept invitations to participate on panels. PMPs can stay informed but accepting a position on the panel could imply that mold is in the scope of pest management. NPMA should be the clearinghouse for information.

Future Notices

NPMA will continue to work on behalf of the pest management professionals on this issue and will continue to keep members posted on any developments.

White fungus can be encountered during inspections in areas of very high humidity. Insulation shields the joists from excessive moisture in some cases. *Photo by Kevin Spillman, Innovative Pest Solutions.*

THIS REPORT IS MADE IN ACCORDANCE WITH AND SUBJECT TO THE CONDITIONS ON THE REVERSE SIDE OF THIS PAGE
This is not a structural damage report. Neither is this a warranty as to the total absence of wood-destroying insects.

OFFICIAL NORTH CAROLINA WOOD-DESTROYING INSECT INFORMATION REPORT

This is to report that a qualified inspector employed by the below-named firm has carefully inspected readily accessible areas of the property located at the address below for wood-destroying insects. This report specifically excludes hidden areas and areas not readily accessible (see section 2 below) and the undersigned pest control operator has not made any inspection of such hidden areas or of such areas not readily accessible. **This is not a warranty as to the total absence of wood-destroying insects or damage from the same.** The inspection described herein was made on the basis of visible evidence. **This report is submitted without warranty, guarantee, or representation as to concealed evidence of infestation or damage or as to any future infestation.**

1. Seller's Name(s) _____

Buyer's Name(s) _____

Address of Property _____

Structure(s) Inspected: A. Main Residence Only _____ B. Other _____

FINDINGS

2. Areas of the property which are deemed to be obstructed or inaccessible: _____

Note: Certain areas of all structures are obstructed or inaccessible (see numbers 2 & 3 on reverse side for conditions governing this report).

If there is evidence of a previous or an active infestation of subterranean termites and/or other wood-destroying insects **in the wooden members,** it is assumed that there is some damage **to the wooden members** caused by this infestation, no matter how slight. If this is the case, the structural integrity of this property should be evaluated by a qualified building expert. (For the purpose of completing the report "infestation" means evidence of past or present activity by a wood-destroying insect visible in, on, or under a structure, or in or on debris under the structure.)

3. **Inspection revealed visible evidence of:**	**Location of visible evidence of infestation:**
☐ A. Subterranean termites ☐ 1. Control measures were performed. ☐ 2. No control measures were performed. ☐ 3. Visible evidence of a previously treated infestation, which now appears to be inactive.	
☐ B. Powder Post Beetles ☐ 1. Control measures were performed. ☐ 2. No control measures were performed. ☐ 3. An infestation which now appears to be inactive.	
☐ C. Old House Borers ☐ 1. Control measures were performed. ☐ 2. No control measures were performed. ☐ 3. An infestation which now appears to be inactive.	
☐ D. Others_____ ☐ 1. Control measures were performed. ☐ 2. No control measures were performed. ☐ 3. An infestation which now appears to be inactive.	

☐ **4. No visible evidence of infestation from wood-destroying insects was observed.**

5. The following conditions conducive to subterranean termites were noted in this property: _____

FIRM: _____ PCO Lic No. _____ Date: _____

ess: _____ Telephone: _____

Signature of Authorized Company Rep: _____ Title: _____

Purchaser's signature is required on reverse side.

OVER

CONDITIONS GOVERNING THIS REPORT

1. This report is based on observations and opinions of the inspector. It must be noted that all buildings have some structural wood members which are not visible or accessible for inspection. It is not always possible to determine the presence of infestations without extensive probing and in some cases actual dismantling of parts of the structure being inspected. Extensive probing and dismantling have not been performed.

2. This inspection and report are made on the basis of what was visible at the time of the inspections. An opinion is not given on areas that were enclosed or not readily accessible: finished areas of ground level rooms (basement and split level); areas concealed by wall coverings, floor coverings, furniture, equipment, stored articles; or any portion of the structure in which inspection would necessitate tearing out or marring finished work. Furniture, appliances, equipment, insulation, fixed ceilings, etc. were not moved for inspection purposes.

3. Inspection did not include any area to which visible access would require the use of ladders or drills. Such areas are not considered to be readily accessible.

4. Detached garages, sheds, lean-tos, other buildings or fences on the property are not included in this inspection report unless specifically noted.

5. Neither I nor the company for which I am acting have had, presently have, or contemplate having any interest in this property. I do further state that neither I nor the company for which I am acting is associated in any way with any party to this transaction.

REMARKS

This space should be used to clarify any statement made above.

IT IS THE RESPONSIBILITY OF THE CLOSING AGENT TO OBTAIN PROPER SIGNATURES.

Purchaser's Signature(s) _____ Date Acknowledged _____

_____

WDIR 100 As approved by the North Carolina Pest Control Association and Structural Pest Control Committee, North Carolina Department of Agriculture.
Revised July 1, 1992

NORTH CAROLINA PEST CONTROL ASSOCIATION

Accredited Wood Destroying Insect Inspector

Code of Ethics

To maintain a high level of moral responsibility, character and business integrity; to practice fairness, frankness and honesty in all advertising and in all transactions with the general public.

◊

To hold our industry in high esteem and strive to enhance its prestige.

◊

To perform all WDIR inspections according to the highest standards and methods outlined in the NCPCA Accredited Inspector Manual.

◊

To keep the needs of our client always uppermost.

◊

To perfect our skills and business practices through continuing education and learning.

◊

To respect the reputation and practice of other pest control operators.

◊

To encourage, establish and maintain high standards of competence, knowledge and performance.