Now that you've had a HOME inspection…

LEARN how your home works

KEEP it maintained

SAVE energy

Compliments of your participating home inspector.
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The purpose of this publication is to provide accurate and useful information in regard to the maintenance of a residential building. Neither the publisher nor author is engaged in rendering legal, accounting or other professional service. If legal advice or other expert assistance is needed, the services of a professional should be sought.

Neither the publisher nor author is liable or responsible in any way for the specific use of any of the information in this book.

Maintenance involves risk to personal property and bodily injury. Before performing any maintenance or work, hire an appropriately qualified professional.

This book does not come with a warranty of any kind.

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Introduction

Nice house!

Now it is time to keep it that way.

Just like the engine of an automobile, your house works as a system of independent parts. Every part has an impact to the operation of many other parts. A typical home has over 10,000 parts. What happens when all the parts work together in the most desirable, optimal way? You are rewarded with a house that is durable, comfortable, healthy and energy-efficient.

You can make it happen in just a few steps.

Step #1: Monitor the house
Step #2: Recognize potential problems
Step #3: Correct problems properly

This book will help you do all three steps.

If you hired a certified home inspector - that was a good decision and money well spent. As you know, the home inspector is not an expert but a generalist. Your home inspector inspected the home and reported the home's condition as it was at the time of the inspection. That is the main responsibility of the home inspector. A home inspection does not include predictions of future events. Future events (such as roof leaks, water intrusion, plumbing drips and heating failures) are **not** within the scope of a home inspection and are **not** the responsibility of the home inspector.

Who's responsible? You are. The new homeowner. Welcome to home ownership. The most important thing to understand as a new homeowner is that things break. As time moves on, parts of your house will wear out, break down,

deteriorate, leak or simply stop working.

But relax. Don't get overwhelmed. You're not alone. This book is for you and every homeowner experiencing the responsibility of home ownership. Every homeowner has similar concerns and questions. And they are all related to home maintenance.

The following questions are those that all homeowners ask themselves:

#1 "What should I look for?"
#2 "What does a real problem look like?"
#3 "How should it be corrected?"

The answers to these questions are written in this book.

This book will guide you through the systems of a typical house, how they work and how to maintain them. The systems include the following: the exterior, interior, roof, structure, electrical, HVAC, plumbing, attic, insulation, bathroom and kitchen.

You will learn what to **monitor (what to look for)** as the house ages. Most of the conditions and events that you will see and experience will likely be cosmetic and minor. Most homes do not have major material defects.

Throughout the book, there will be references to the International Association of Certified Home Inspectors (InterNACHI). InterNACHI is the world's largest trade association of residential and commercial building inspectors. The InterNACHI Standards of Practice (SOP) defines what a home inspection is and lists the responsibilities of a home inspector. The SOP is located at http://www.nachi.org/sop.htm.

This book comments upon the responsibilities of a home inspector, because we are assuming that a home inspector has given you this book to read. Sometimes when a new homeowner is performing maintenance, apparent problems are discovered or revealed. Or as time goes by, things in the house leak or fail. A new homeowner experiencing a problem should refer to the Standards of Practice, which outlines the responsibilities and limitations of the home inspector.

The first nine chapters of this book describe the systems and components of a typical house.

Chapter 10 is about saving energy. This chapter describes how to make your home more comfortable and energy efficient by sealing air leaks and adding insulation —and you can do it yourself.

Chapter 11 has four maintenance checklists - one for each season.

Chapter 12 has a list of average life expectancies of systems, components and appliances in a typical home.

Home **ownership** is a great experience, and home **maintenance** is a great responsibility. This book will help you enjoy both.

Enjoy your house!

Chapter 1: InterNACHI Standards of Practice

The Standards of Practice of the International Association of Certified Home Inspectors is located at http://www.nachi.org/sop.htm. Throughout this book the Standards will be referenced and abbreviated. The complete version is not printed in this book.

According to the Standards of Practice, a home inspection is a non-invasive visual examination of a residential dwelling, performed for a fee, which is designed to identify observed material defects within specific components of said dwelling. Components may include any combination of mechanical, structural, electrical, plumbing or other essential systems or portions of the home, as identified and agreed to by the Client and Inspector, prior to the inspection process.

There's no crystal ball. A home inspection is intended to assist in evaluation of the overall condition of the dwelling. The inspection is based on observation of the visible and apparent condition of the structure and its components on the date of the inspection and **not the prediction of future conditions**.

You should expect to find problems in your house that were not identified in your home inspection report. That's because a home inspection will not reveal every problem that **exists or ever could exist**, but only those "material defects" that were observed on the day of the inspection.

A "material defect" is a condition of a residential real property or any portion of it that would have a

significant adverse impact on the value of the real property or that involves an unreasonable risk to people on the property. The fact that a system or component is near, at or beyond the end of the normal useful life does not make the system or component itself a material defect.

Report. An inspection report shall describe and identify in written format the inspected systems, structures and components of the dwelling and shall identify material defects observed. Inspection reports may contain recommendations regarding conditions reported or recommendations for correction, monitoring or further evaluation by professionals, but this is not required.

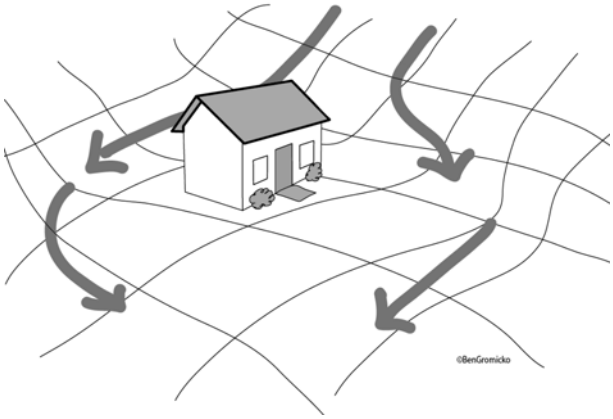
Chapter 2: Site and Environment

2.1 Property Drainage

During a heavy rainstorm (without lightning), grab an umbrella and go outside. Walk around your house and look around at the roof and property. A rainstorm is the perfect time to look at how the roof, downspouts and grading is performing. Observe the drainage patterns of your entire property, as well as the property of your neighbor. The ground around your house should slope away from all sides. Downspouts, surface gutters and drains should be directing water away from the foundation.

Monitor the following:

Poor drainage. Most problems with moisture in basements and crawlspaces are caused by poor site drainage. The ground should slope away from window wells, outside basement stairs, and other ways of egress. The bottom of each of these areas should be sloped to a drain.



Each drain should have piping that connects it to a storm water drainage system (if there is one) or that drains to either a discharge at a lower grade or into a sump pit that collects and discharges the water away from the building.

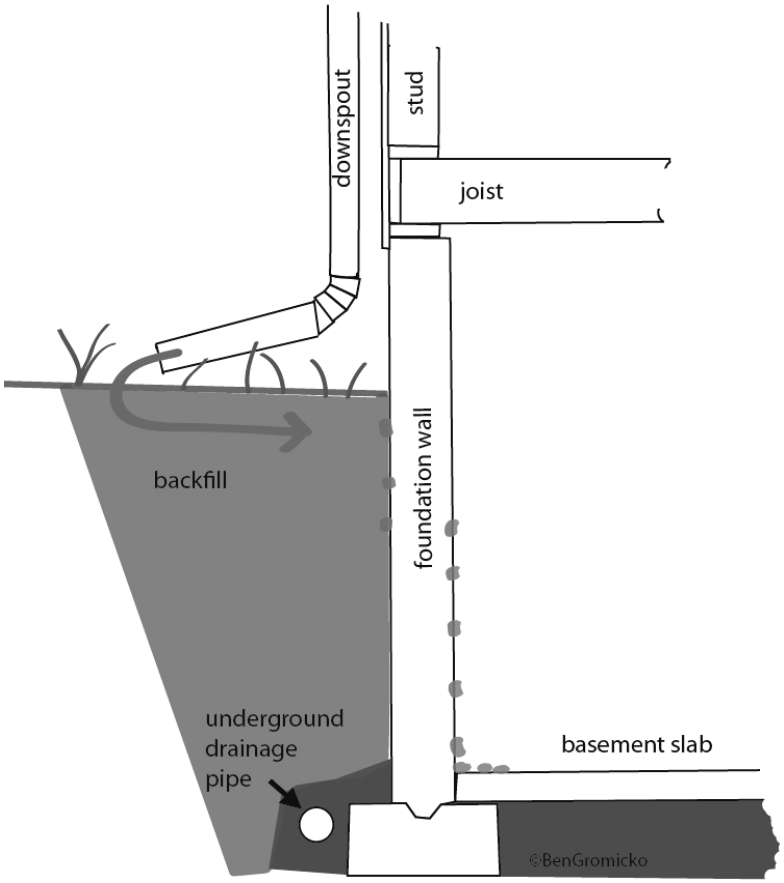
Your job is to monitor and maintain the drains and piping. Drains and piping should be open and clear of leaves, earth and debris. A garden hose can be used to check water flow, although its discharge cannot approximate storm conditions.

Hillside. Where a building is situated on a hillside, it is more difficult to slope the ground away from the building on all sides. On the high ground side of the building, the slope of the ground toward the building could be interrupted by a surface drainage system that collects and disposes of rainwater runoff. Swales can be used to direct surface water away from the foundation. There are two general types of surface drainage systems: an open system, consisting of a swale (often referred to as a ditch), sometimes with a culvert at its end to collect and channel water away and; a closed system, consisting of gutters with catch basins.

Planters.

✔ Check the planting beds adjacent to the foundations. Plantings are often installed in a way that traps water. The structure around the planting beds acts like a dam and traps water. Flower planters should never be installed up against a house exterior wall.

Puddles are not good. The ground surface beneath decks, porches and other parts of a building that are supported by posts or cantilevered structures should be checked. It should not have any low-lying areas, but should be sloped so that water will not collect and puddle there.



Settled backfill allows water to collect next to the foundation wall and penetrates into the basement. See illustration.

Downspouts need adjustment. Water from the roof reaches the ground through gutters and downspouts or by flowing directly off roof edges. Because downspouts create concentrated sources of

water in the landscape, where they discharge is important. Downspouts should not discharge where water will flow directly on or over a walk, drive, or stairs. The downspouts on a hillside building should discharge on the downhill side of the building. The force of water leaving a downspout is sometimes great enough to damage the adjacent ground, so some protection at grade such as a **splash block** or a paved drainage chute is needed. In urban areas, it is better to drain downspouts to an underground storm water drainage system, if there is one, or underground to discharge at a lower grade away from buildings.

Water that flows directly off a roof lacking gutters and downspouts can cause damage below. Accordingly, some provision in the landscaping may be needed, such as a gravel bed or paved drainage way.

Sump pump should not recycle. When a sump pump is used to keep a building interior dry, the discharge should drain away from the building and should not add to the subsurface water condition the sump pump is meant to control.

Naturally wet. Look around the entire site for the presence of springs, standing water, saturated or boggy ground, a high water table, and dry creeks or other seasonal drainage ways, all of which may affect surface drainage.

2.2 Landscaping

Well-maintained landscaping and other improvements to the property are important for the enjoyment of a healthy and durable property.

Monitor the following:

Plants, trees, and shrubs.

Check the location and condition of all trees and shrubbery. Those that are overgrown should be pruned or trimmed. Where trees or bushes have overgrown, complete removal may be necessary.

Trees need to be trimmed. Overhanging branches should not interfere with a chimney's draft, damage utility wires, or deposit leaves and twigs on the roof, or inside gutters and drains. Trees and shrubbery that are very close to exterior walls or roofs can cause damage. They can make it difficult to perform homeowner maintenance inspections and make repairs. Branches around the perimeter of the house should be pruned back. Tree roots under concrete walks can

cause damage. Roots are usually exposed near the surface and can be cut back. Tree roots can cause **foundations to crack by pushing** against foundations from the outside. Consider hiring an arborist. An arborist is a specialist in the cultivation and care of trees and shrubs, including tree surgery, the diagnosis, treatment, and prevention of tree diseases, and the control of pests. Find a certified arborist in the U.S. at http://www.natlarb.com and http://www.canadian-forests.com/urban_con.htm for Canada.

Fences fall apart and lean over. Fences are usually installed to provide physical or visual privacy. Fences should be plumb.

 Check wooden fences for development of rot or insect infestation. Check metal fences for rust development. All gates and their hardware should have proper fitting, operation and clearances. Fences are often addressed in homeowner association bylaws and deed covenants. Pay special attention to fence locations and your property lines. Neighbors can get quite “un-neighborly” about property lines.

 **Concrete pavement cracks and settlement**. Monitor paved areas. Where there is a difference in elevation in a walk or drive that creates a tripping hazard, the higher portion of concrete may be ground down to the level of the lower portion, although the grinding will change the appearance of the concrete. Paved areas immediately adjacent to a building should **slope away** from the perimeter of the building walls (foundation walls). Paving that is not sloped to drain water away from a building should be repaired. Repair any paving that has large cracks, broken sections, high areas, low areas that trap water and tripping hazards. Repairing concrete often requires total replacement. Resurfacing with a thin layer of more concrete cannot repair concrete. Concrete should be no less than three inches thick. Cracks in concrete can be cut open and sealed with a flexible sealant compound, which will extend its service life. For sidewalks that have settled downward, it may be possible to lift up sections.

Asphalt surface. Sealing asphalt paving extends its life. Homeowners should seal coat their asphalt driveways every 3 to 5 years. Examine the paving to determine when sealing is needed. Check asphalt driveways for sunken areas that hold water. Low areas in asphalt paving can be brought to level with an asphalt repair.

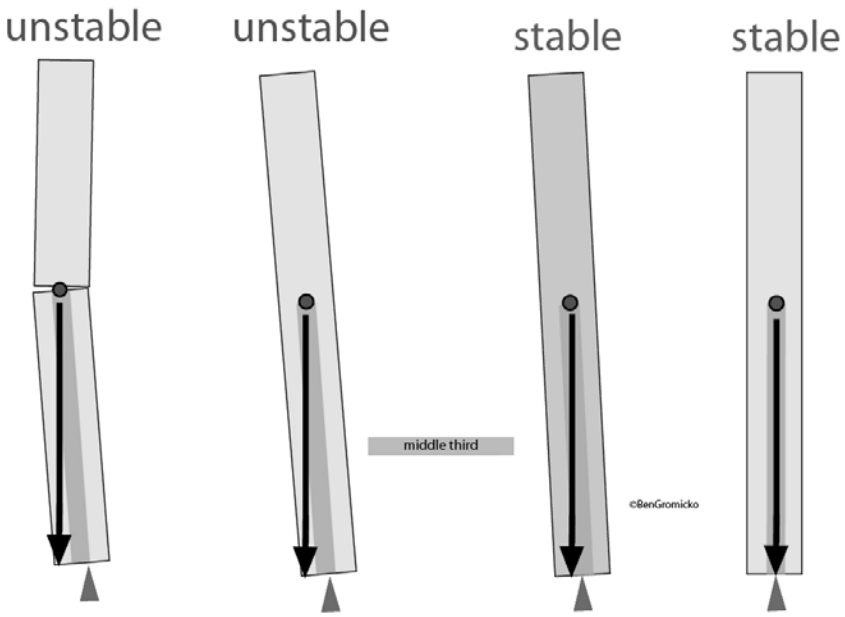
Paving. Paving does not last forever. Brick or stone patio paving could be set on a concrete slab, in a mortar bed with mortar joints or in a sand bed that is laid on earth. Mortar joints can be tuck-pointed. Loose bricks or stones can be reset

in a new mortar bed. Pavers set in sand can be taken up easily, sand added or removed, and the pavers replaced. The maintenance and repair of sidewalks, drive aprons and curbs at the street may be your responsibility or that of the local jurisdiction.

Exterior steps. Check the condition of exterior stairs and railings. Every once in a while, shake all railings vigorously to check their stability and inspect their fastenings. Every stair with more than three steps should have a handrail located 34 to 38 inches (865 to 965 mm) above the edges of the stair tread.

Stairs that are more than 30 inches (760 mm) above the adjacent grade and walks located more than 30 inches (760 mm) above the grade immediately below should have guards not less than 36 inches (915 mm) high and intermediate rails that will not allow the passage of a sphere 4 inches (100 mm) in diameter. Wooden steps should have proper support and strength and no rot or insect infestation should be allowed to develop. At steel stairs, look for the development of rust, weakened strength or poor attachment. Deteriorated stairs should be repaired or replaced. Stair treads should be as level as possible without holding water. Stair riser heights and tread depths should stay uniform.

Retaining walls. If possible, weep holes and related drains should be looked at following a heavy rain to make sure they are working properly. If they are not discharging



water, the drains should be cleaned out and observed again in the next rain. Retaining walls more than two feet in height should be backed with drainage material, such as gravel. There should be drains at the bottom of the drainage material. The drains should discharge water either at the end of the wall or through pipes. These drains and the drainage material behind the wall relieve the pressure of ground water on the wall. Failure to drain could be remedied by excavating behind the wall, replacing the drainage material and damaged drainage piping, and backfilling. In all but the driest climates, improper drainage of water from behind a retaining wall can cause the wall to fail.

Look for movement in your retaining walls. Bowing (vertical bulges), sweeping (horizontal bulges), and cracking in retaining walls can be caused by water pressure (or hydrostatic pressure). Bulging can also be a result of inadequate strength to resist the load of the earth behind the wall. Bowing and sweeping failures may be correctable if found early enough and if the cause is poor drainage.

There are other types of failures of retaining walls. Failure by over-turning (leaning from the top) or sliding may be caused by inadequate wall strength. In addition, water behind a wall can create moist bearing, especially in clay soils, and contribute to sliding. Retaining walls also fail due to settlement and heaving. Settlement occurs whenever filled earth below the wall compacts soon after the wall is built, or when wet earth caused by poor drainage dries out and soil consolidates. Poor drainage contributes to failure in cold climates by creating heaving from frozen ground. Both overturning and sliding may be stabilized and sometimes corrected if the amount of movement is not extreme. Settling may be corrected on small, low walls of concrete or masonry, and heaving may be controlled by proper drainage. Significant failure of any kind usually requires rebuilding or replacing all or part of a wall. Consult a qualified professional when major repairs or corrections are needed.

Buried oil tanks. A buried oil tank can be covered-up by heavy landscaping. Buried ferrous metal oil tanks are common on older properties that have the home or domestic water heated by oil. The presence of a buried oil tank usually can be determined by finding the fill and vent pipes that extend above ground. Abandoned and very old buried ferrous metal oil tanks are an **environmental hazard**. If you have a buried tank on the property the soil around it should be tested by a qualified environmental professional for the presence of oil seepage. If leaking has occurred, the tank and all contaminated soil around it must be removed. If leaking has not occurred, it may still be a potential

problem. Even if a tank is empty, it still may have residual oil in the bottom that is a pollutant.

As with all underground items, a buried oil tank is not within the scope of a visual home inspection.

2.3 Other structures

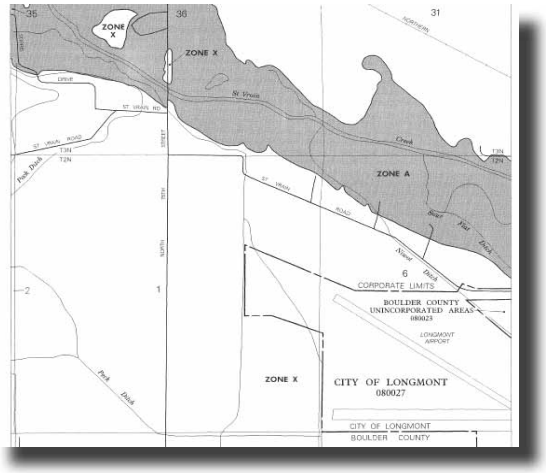
Keep detached garages, storage sheds and other outbuildings in good condition in the same way that your home is maintained. Monitor each outbuilding's water shedding capability and the adequacy of its foundations. Look for roof leaks from inside the buildings. Wood frame structures should be checked for rot and insect infestation. Check that doors and windows provide adequate weather protection and security for the buildings. Small outbuildings should have sufficient structural strength to sustain wind loads or seismic forces - this may be more than just a simple judgment call. If the site is in a hurricane or high-wind region, check all outbuildings for their ability to resist a storm without coming apart and becoming windborne debris. Consider consulting a qualified professional.

2.4 Yards and Courts

In urban areas, two or more dwelling units may share a yard or court to provide light and ventilation to interior rooms. The adequacy of the light provided to the interior rooms of the home may be a function of the dimensions of the yard or court. Check these characteristics, as well as zoning and building and housing code requirements pertaining to light, ventilation, and privacy screening for yards and courts. Such requirements may affect the reuse of the property and their implications should be understood before the property is altered.

2.5 Flood Zones

Check with local authorities to determine if your home is in a flood-risk zone. If it is, check with local building officials. Higher standards than those set by national agencies have been adopted by many communities.



The Federal Emergency Management Agency and the National Flood Insurance Program have established and defined five

major flood-risk zones and created special flood resistance requirements for each. For a flood map visit http://www.msc.fema.gov/. Improperly designed grading and drainage may aggravate flood hazards to buildings and cause runoff, soil erosion and sedimentation in the zones of lower flood risk, the Interflood Zone and the Non-Regulated Flood Plain. In these locations, local agencies may regulate building elevations above street or sewer levels. In the next higher risk zones, the Special Flood Hazard Areas and the Non-Velocity Coastal Flood Areas (both Zone A), the elevation of the lowest floor and its structural members above the base flood elevation is required. In the zone of highest flood risk, the Coastal High Hazard Areas (Velocity Zone, Zone V), additional structural requirements apply.

2.6 Other Factors

The following are several factors about a home and its property that are often overlooked.

Slope. Look at the property around the house and the slope of the ground. If your house is on a ground slope of 20 degrees or more (in all seismic regions, including regions of low seismic activity), a structural engineer should be considered to further examine the building in relation to the slope.

Wind. Look for loose fences, tree limbs, landscaping materials such as gravel and small rocks, and other objects that could become windborne debris in a storm, if the building is in a hurricane or high wind region.

Floods. Check with local authorities. Major flood-risk zones have been established to define where floods occur and special flood resistance requirements have been created for each zone.

Lead. Consider checking for the presence of lead in the soil, which can be a hazard to children playing outdoors and can be brought indoors on shoes. Lead in soil can come from different sources such as discarded lead-based paint, lead-based paint chips at the perimeter of stone foundations where the paint is flaking and old trash sites where items containing lead were discarded. Consider having the soil and home tested for lead by a qualified professional inspector. For more information visit http://www.epa.gov/lead.

Wildfires. In locations where wildfires can occur, some jurisdictions have requirements for hydrant locations and restrictions on the use of certain building materials as well as restrictions on plantings close to a building. In the context of fire control, defensible space is the area around a structure that has been landscaped to reduce fire

danger. Check with the local building official and the fire marshal for such requirements.

Construction Expansion. If a future construction project on the house includes expansion, an assessment of the site for this future work is critical. The use of the land around the existing house is likely restricted by coverage and set-back requirements, which define the areas of the property that can be used for future construction projects.

Site Restrictions. Homeowner association bylaws and deed covenants sometimes include requirements that can affect changes or additions to a building or out-building.

Accessibility. When universal design is a need, consult a code-certified professional inspector for detailed information about parking, walks, patios and egress.

2.7 Inspection Standards

The inspector is responsible for checking the roof gutters, downspouts and surface drainage, but is not responsible for inspecting any underground drainage pipes. The inspector is not required to inspect erosion control, earth stabilization measures, geological or soil conditions.

Chapter 3: Pitched Roof Coverings

Monitor roof covering, because any roof can leak. To monitor roofs that are inaccessible or that cannot be walked on safely, use binoculars. Look for deteriorating or loosening of flashing, signs of damage to the roof covering, and debris that can clog valleys and gutters.

Carefully watch the exterior walls and trim for deterioration developing beneath the eaves of pitched roofs that have no overhang or gutters.

Roofs are designed to be **water-resistant**. Roofs are not designed to be **waterproof**. Eventually the roof system will leak. No one can predict when, where or how a roof will leak.

Hail and wind damage. Hail and wind can cause significant damage to your asphalt shingle roof. After a storm, consider hiring a reputable roofing contractor or certified home inspector to evaluate the condition of your shingle roof. There's no need for you to risk your life doing something that an experienced professional does everyday. Hail and wind damage may likely be covered by your homeowner's insurance policy.

Thermography. An infrared camera can be used to detect areas of moisture at roof structures. Once located, these areas can be more thoroughly checked with a moisture-metering device. Such evaluations must be performed by an inspector who is trained in thermography and building science. Ask to see their certifications.

There are four general categories of pitched roof covering materials and their condition should be monitored as follows:

Asphalt shingles. Asphalt or "composition" shingles have a service life from 15 to 40 years depending upon the shingle quality, installation and maintenance. When they begin to lose their granular covering and start to curl they should be replaced. No more than two layers of asphalt shingles should normally be in place at any one time. If a second layer of asphalt shingles has been applied, check to see if all the flashing materials of the first layer were

removed and replaced with new flashing at the second layer.

The roof slope. The slope (or pitch) of a roof is expressed as a ratio of the rise (vertical distance) over the run (horizontal distance). The run is usually expressed as 12, and a typical slope might be 4 in 12 or 6 in 12. A slope of 4 in 12 or steeper is referred to as normal. A slope of between 3 in 12 and 4 in 12 is referred to as low. A 45º roof slope would have a pitch in of 12 in 12. Typically asphalt shingle roofs should not be less than a 4 in 12 slope.

Underlayment. There should be underlayment installed. It should be at least a single layer of 15-pound (6.8 kg) asphalt saturated felt. Low-slope roofs should have at least two such felt layers. If ice dam flashing at overhanging eaves is needed or present, there should be additional measures taken and particular underlayment materials applied. The number of underlayment layers and the installation of underlayment are difficult to observe and would only need to be investigated if water intrusion occurs.

Wood shingles or shakes. This type of covering has a normal life expectancy of 20 to 30 years in climates that are not excessively hot and humid. Durability varies according to wood species, thickness, the slope of the roof, and whether shingles are made of heart-wood. Maintenance may include periodically treating the covering with preservative.

Shakes are hand-split on at least one face and either tapered or straight. Shingles are sawn and tapered. They should not be walked on. These materials are easily broken. The minimum slope for wood shingles is 3 in 12 and the minimum slope for shakes is 4 in 12. As wood shingles and shakes age, they dry, crack and curl. In damp locations they rot. When more than one-third shows signs of deterioration, consider replacing them.

Metal roofing. Metal can last 50 years or more if properly painted or otherwise maintained. Metal roofs may be made of galvanized iron or steel, aluminum, copper or lead. Each material has its own unique wearing characteristics.

Monitor metal roofs for the development of rusting or pitting, corrosion due to galvanic action, and loose, open, or leaking seams and joints. The types of metal, seams, and slope determine the construction details. There are three basic seam types— batten, standing, and flat—as well as flat and formed metal panels.

The slope of metal roofing can be from one-half inch per foot (1:24) to very steep. Snow guards on roofs with steeper slopes should be installed. In locations with heavy, long-lasting snow, bracket and pipe snow guards also may be necessary.

Low-slope metal roofs that are coated with tar-like material are probably patched or have pinholes and can NOT be counted on to be water-resistant and reliable.

Slate, clay tile, and asbestos cement shingles. These roof coverings are extremely durable and, if of high quality and properly maintained, may last the life of the structure. The minimum slope for roofs of these materials is 4 in 12. Slate shingles should be secured by copper nails except in the very driest of climates. Nail heads could be covered with sealant. Nails for tile roofs should be non-corroding.

All of these roof coverings are brittle materials, are easily broken and should not be walked on. Use binoculars to look for missing, broken or slipping pieces. Slate is particularly susceptible to breakage by ice or ice dams in the winter. You

should have snow guards on steeper slopes, and in locations with heavy, long-lasting snow, snow guards also may be necessary. Moss will sometimes grow on asbestos cement shingles, but it can be removed with a cleaner to prevent capillary water leaks. Slate, clay tile, and asbestos shingles should be repaired or replaced by a qualified roofer.

3.1 Low-Slope Roof Coverings

A roof that is nearly level or slightly pitched is called a low-slope roof. No roof should be *actually* level and flat; it must have at least a *slight* slope to properly drain. Low-slope roofs can be expensive to repair, so care should be taken in their maintenance.

Regular maintenance and periodic inspections for low-slope roofs are necessary. Problems in low-slope roofs are common and more difficult to diagnose than pitched roof problems because the path of water leakage through flat roofs is often quite hard to trace.

Watch for signs of ponding water (or puddle formation) on the surface due to either improper drainage or sagging of the roof deck. If the cause is a sagging deck, it should be structurally corrected.

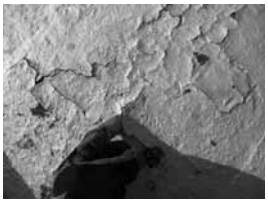
Monitor the flashing and joints around all roof penetrations, including drains, soil stacks, chimneys, skylights, hatchways, antenna mountings and other roof-mounted elements. Check to see if metal flashings need painting or re-anchoring and if asphalt or rubber flashings are brittle or cracked. Parapet wall caps and flashing may develop damage due to wall movement or moisture.

There are four categories of low-slope roof covering materials and they should be monitored as follows:

Built-up roofing. Built-up roofs are composed of several layers of roofing felt lapped, cemented together with bituminous material and protected by a thin layer of gravel or crushed stone. Built-up roofs vary greatly in life span but those used in residential buildings usually last about 20 years, depending on their quality, exposure, number of plies and the adequacy of their drainage. Because built-up roofs are composed of several layers, they can contain moisture in the form of water or water vapor between

layers. Moisture not only accelerates deterioration, it can also leak into a building.

Regular maintenance and periodic inspections are necessary. Look for cracking, blistering, alligatoring and wrinkling, all of which may indicate the need for roof replacement or repair. Consult an experienced roofer or certified home inspector for a further evaluation if you have doubt about the roof's apparent condition.



Single-ply membrane roofing. A single-ply membrane roof consists of plastic, modified bitumen and synthetic rubber sheeting that is laid over the roof deck, usually in a single ply and often with a top coating to protect it from ultra-violet light degradation. Single-ply roofs are installed in three basic ways: fully adhered; mechanically attached and; loose laid with ballast. If properly installed and properly maintained, a single-ply roof should last 20 years.

Roof penetrations and seams are the most vulnerable parts of single-ply membrane roofing and should be carefully monitored. The material is also susceptible to ultraviolet light deterioration. A protective coating can be used to protect it, but the coating will need to be reapplied periodically. Check carefully for surface degradation on an unprotected roof and fading of the coating on a protected roof. Check also for signs of water ponding and poor drainage.

Roll roofing. Roll roofing should be inspecting before and after the winter season. Roll roofing consists of an asphalt-saturated, granule-covered roofing felt that is laid over the roof deck. Inspect roll roofing for cracking, blistering, surface erosion, and torn sections. Seams are the most vulnerable part of roll roofing, and should be carefully checked for separation and lifting. Also check for signs of water ponding and poor drainage.

3.2 Parapets and Gables

In seismic zones, check the bracing of masonry parapets and gables. Consider consulting a structural engineer to determine the need for additional bracing or strengthening.

3.3 Skylights

A leaking skylight is a common experience. From outside, watch the glazing for cracks or breaks, loosening of the flashing, and rusting or decaying frames. Skylights should be checked from

the interior too. Don't be surprised if your skylight develops a leak.

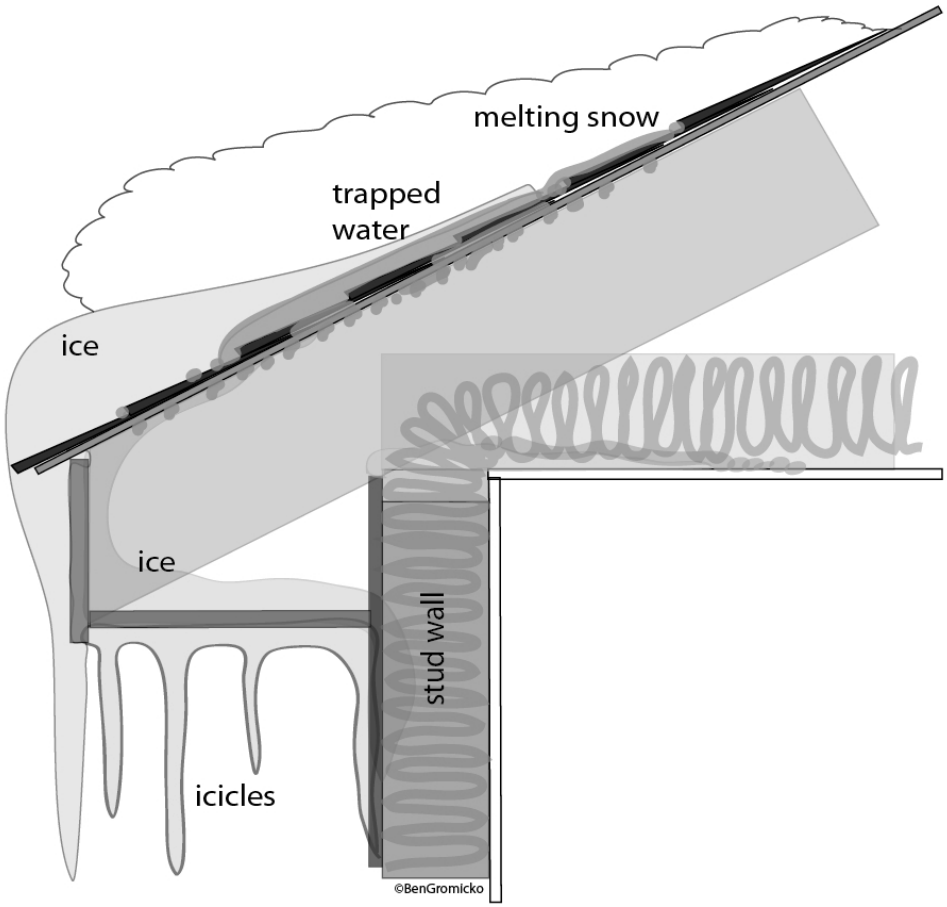
3.4 Gutters and Downspouts

All gutters need to be kept clean. They should slope uniformly, without sags, to downspouts. Gutter and downspout materials are usually galvanized steel, aluminum, copper or plastic.

Buildings with pitched roofs can have a variety of drainage systems. With a sufficient overhang, water can drain directly to the ground without being collected at the roof edge.

Drainage of low-slope roofs is accomplished in one of three ways: without gutters or downspouts; with gutters and downspouts; or by downspouts that go down through a building's interior. Drainage without gutters and downspouts can damage the exterior wall with overflow. If the roof has no gutters and downspouts or interior downspouts, carefully monitor the exterior walls for signs of water damage.

Most good, functional gutters have a minimum ratio of gutter depth to width of 3 to 4. The front edge is typically one-half inch (13 mm) lower than the back edge. Four inches is considered the minimum



width except on the roofs of canopies and small porches. If there is a screen or similar device to prevent anything but water from flowing into the gutter, its performance during a rainstorm should be checked to be sure water can actually enter the gutter. Check gutters without screens or similar devices to be sure that basket strainers are installed at each downspout.

Cleaning the gutters is a fun homeowner maintenance job.

Joints at the gutters should be soldered or sealed with mastic. Otherwise, they'll leak. The steeper your roof pitch, the lower the gutter should be placed or positioned. On roofs with lower slopes, gutters should be placed close to the roof's surface. Hangers should be placed no more than three feet apart. Where ice and snow are long lasting, hangers should be placed no more than 18 inches (460 mm) apart. The strength of a gutters fastening to the roof fascia or building exterior should be strong and secure. Rusted fasteners and missing hangers should be replaced.

Ice dams. Ice dams can form on pitched roof overhangs in cold climates subject to prolonged periods of freezing weather, especially those climates with a daily average January temperature of 30 ºF (-1 ºC) or less. Heat loss through the roof and heat from the sun (even in freezing temperatures) can cause snow on a roof to melt. As water runs down the roof onto the overhang, it freezes and forms an ice dam just above the gutter. The ice dam traps water from melting snow and forces it back under the shingles and into the building's interior.

Watch the edge of the roof overhang for evidence of ice dams and look at the eaves and soffit for evidence of deterioration and water damage. If the house has an attic, the underside of the roof deck at exterior walls can be checked for signs of water instrusion.

Downspouts. The rule of thumb for downspouts: at least one downspout for each 40 feet (12 m) of gutter. For roofs with gutters, make sure that downspouts discharge so water will drain away from the foundation. Downspouts can be checked for size. Seven square inches is generally the minimum except for

small roofs or canopies. There should be attachments or straps at the top, at the bottom, and at each intermediate joint.


Downspout fasteners can rust, deform, fail or become loose. On buildings with multiple roofs, one roof sometimes drains to another roof. Where that happens, water should not be discharged directly onto roofing material. The best practice is to direct water from higher gutters to discharge into lower gutters through downspout pipes.

Occasionally, wooden gutters and downspouts are used, usually in older or historic residences. They may be built into roof eaves and concealed by roof fascias. Wooden gutters are especially susceptible to rot and deterioration and should be monitored.

Pitched roofs in older buildings may end at a parapet wall with a built-in gutter integrated with the roof flashing. At this location, drainage is accomplished by a scupper (a metal-lined opening through the parapet wall that discharges into a leader head box that in turn discharges to a downspout). The leader head box should have a strainer. Monitor the scupper for deterioration and open seams. All metal roof flashings, scuppers, leader head boxes and downspouts should be made of similar metals.

3.5 Inspection Standards

The inspector shall inspect the roof covering from the ground or eaves, vents, flashing, skylights, chimney and other roof penetrations. The inspector is not required to walk upon the roof, perform a water test or warrant the roof. Skylights are notorious for leaking water. Prediction of when, how or where a leak will develop is beyond the scope of a visual home inspection.

Chapter 4: Building Exterior

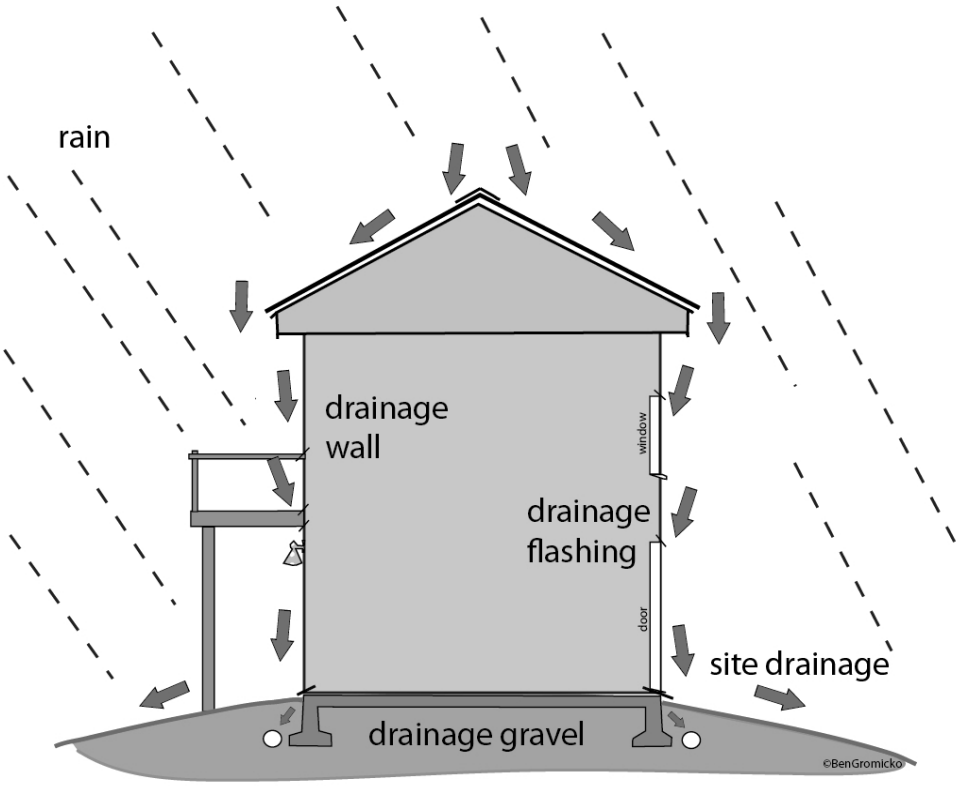
The exterior of your home is slowly deteriorating and aging. The sun, wind, rain and temperatures are constantly affecting it. Your job is to monitor the building's exterior for its **condition and weathertightness**. Check the condition of all exterior materials and look for developing patterns of damage or deterioration.

In hurricane regions, examine screen and jalousie enclosures, carports, awnings, canopies, porch roofs and roof overhangs to determine their condition and the stability of their fastenings. Then examine the following four critical areas of the exterior to determine their condition and strength: roofs; windows; doors; and garage doors.

In locations where wildfires can occur, some jurisdictions have restrictions on the use of flammable exterior materials. Check with the local building official or the fire marshal, or both, for detailed information.

4.1 Foundation Walls and Piers

It is easy to walk around the house and simply **check** the exterior of the foundation and



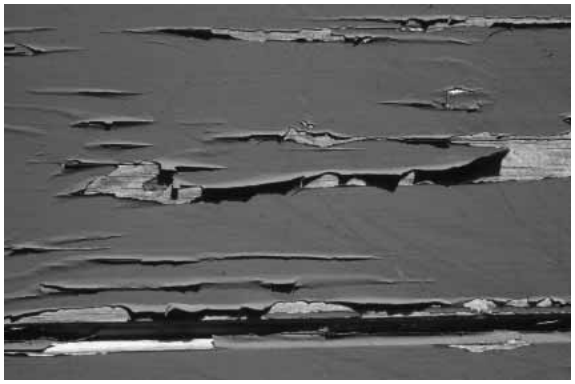
structural supports.

Foundation walls and piers in residential buildings are usually made of masonry and should be monitored for cracking, deterioration, moisture intrusion and structural adequacy.

Be sure to hire a professional building inspector to properly monitor the structural integrity of your home, including wooden posts, wooden columns, concrete foundations, and concrete piers. Annual inspections are recommended. To find a certified inspector, visit www.inspectorseek.com.

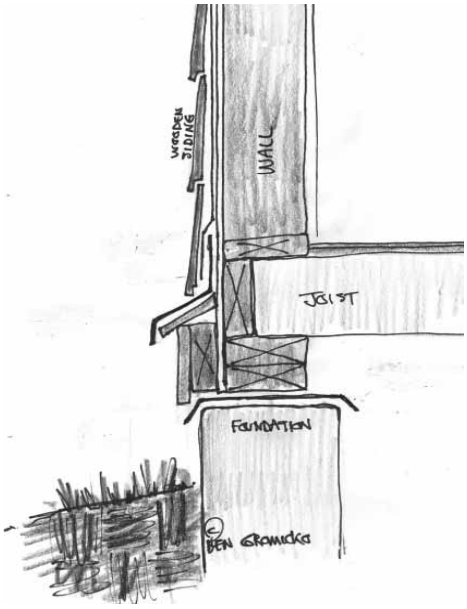
4.2 Exterior Wall Covering

Exterior walls above the foundation may be covered with a variety of materials, including wood siding, aluminum, vinyl, wood or asbestos cement shingles, plywood, stucco, brick, or stone masonry or an exterior insulation and finish system.



Exterior wooden components.

Periodically look at all painted surfaces for peeling, blistering and checking. Paint-related problems may be due to vapor pressure beneath the paint, improper paint application or excessive paint build-up. Corrective measures for these problems could vary from the installation of moisture vents to complete paint removal. Mildew stains on painted surfaces do not hurt the wood and could be cleaned with a mildew remover. All wood elements should be checked for fungal and insect infestation at exposed horizontal surfaces and exterior corner joints.



Clearance. Check the distance between the bottom of wood elements and grade. In locations that have little or no snow, the distance should be no less than

eight inches. In locations with significant lasting snow, the bottom of wood elements should be no less than eight inches above the average snow depth. Do not pile up against the house wall landscaping materials such as wood chips and mulch.

Aluminum and vinyl siding. Aluminum and vinyl siding are low maintenance materials. When you are outside, you can easily look around and check the siding. Check for loose, bent, cracked or broken pieces. Seasonally, inspect all caulked joints, particularly around window and door trim. Go to Chapter 11 for seasonal checklists. Many communities require aluminum siding to be electrically grounded; confirm for such grounding.

Asbestos cement shingles. Asbestos is a hazardous material. They do not allow asbestos to be used in building materials anymore. Do no cut or sand asbestos siding. Dust containing asbestos fibers can be inhaled. Asbestos siding can be replaced with modern (safe) siding pieces. Asbestos siding can be completely removed or covered over. Read Chapter 5.12 for more information about asbestos.

Like aluminum and vinyl siding, asbestos cement shingles may cover decayed or insect-infested wood. Check for loose, cracked or broken pieces. Check around all window and door trim for signs of deterioration.

Stucco. Check stucco for cracks, crumbling sections and areas for potential water intrusion. Old and weathered cracks may be caused by the material's initial shrinkage or by earlier building settlement. New, sharp cracks may indicate movement behind the walls that should be investigated by a qualified professional. Stucco can be cleaned. It can also be painted.

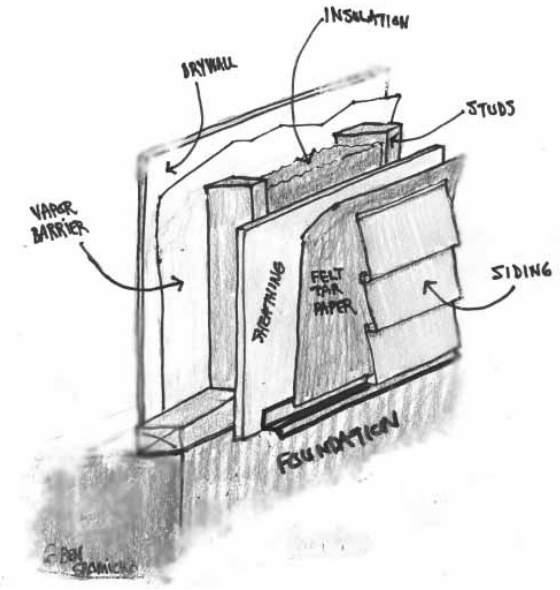
Brick or stone veneers. Inspect veneers for cracking, mortar deterioration and spalling. Refer to Sections 6.3 and 6.5 for monitoring the condition of above-ground masonry walls.

EIFS. Exterior insulation and finish systems. EIFS has been in widespread residential use since the early 1990s. It generally consists of the following product layers (moving outward): insulation board, mesh and base coat layer, finish coat, and sealant and flashing. EIFS was originally designed as a non-draining water and moisture barrier system. A drainage-type EIFS that allows water and moisture to penetrate the surface and then drain away has been developed more recently. Most existing EIFS in residential applications is installed over wood framing and is of the non-draining type. Water leakage and consequent rotting of the wood framing have become serious problems in many installations, especially at wall openings such as windows and doors, where inadequate flashing details can allow water seepage into the wall interior. Manufacturers of EIFS differ in their installation methods.

Inspecting existing EIFS is difficult because it is a proprietary product and there are no standard construction details that everyone agrees with. Consult a trained stucco inspector to check for concealed water/moisture intrusion and damage.

Infrared certified

Insulation. Exterior walls of older homes may contain little or no thermal insulation. Examine behind the siding when possible to determine the presence of insulation, if any, and assess the potential for insulating the exterior walls. Consider hiring a professional home inspector who is certified in **thermal imaging** and building evaluations. http://www.infrared-certified.com/



Moisture. Check for signs of moisture problems. Where mildew and mold are evident on