

HOME BUYING INSPECTION GUIDE

by Jeffrey D. Leiser

The *Home Buying Inspection Guide* contains more than ten years of research in the field pertaining to new, old and custom built houses and their systems. This book will give you as a home buyer the fighting edge against making a wrong and costly choice in a real estate purchase.

As a result of information offered in the *Home Buying Inspection Guide*, a cost-effective and competent decision on the wearability and safety of your future home is brought into light.

Easy to follow steps guide you throughout the process of evaluating plumbing, electrical and roofing systems for present and future problems. In addition, you will find out the best systems for years of service. You'll learn about the possible energy loss due to poor insulation from attic to basement, and doors to windows. Learn what to spot when inspecting foundations, mechanical rooms, and the general layout of a home.

Not only does the guidebook highlight the most common systems, but optional systems as well, including alarm and central vacuum systems. In addition, a glossary and sample inspection check-off list, complete with codes and instructions, is provided.

New home buyers all over the United States find themselves paying thousands of dollars in unexpected repairs after a purchase of a home. Don't be one of them.

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FOREWORD

If you're a home seller, you'll want to make sure there are no last minute surprises on a contracted home inspection. And if you're inspecting a future home, there are several items you should keep in mind. First, just because a home is well decorated and showcased by either a well-known builder or real estate broker, doesn't necessarily mean that it is well built. If you are working with an agent, it's wise as the seller to know what to expect in an inspection of your property. As a buyer, it's best to know what you are really buying.

One last thing. Take your time in following the steps throughout this book. For many, buying a house is probably the biggest (*and either the best or worst*) investment they make. Good luck and happy hunting.

WORD TO THE READER

This book offers an informative view on many aspects of building components, along with signs to watch for to determine soundness or proper operation of these components. This, in effect, can avert serious to minor repair problems when choosing a home for purchase.

Even though this book covers the majority of defects that can be spotted by the average buyer utilizing this text, in no way does it replace the services of a professional structural engineer or building inspector when it comes to inspecting a home. The *Home Buying Inspection Guide* is merely a tool in pointing out symptoms of poor or failing craftsmanship, manufacturing, and/or construction. All factors are compared to industry norms and do not reflect or refer to any specific building codes that may be enforced in your area.

Home Buying Inspection Guide

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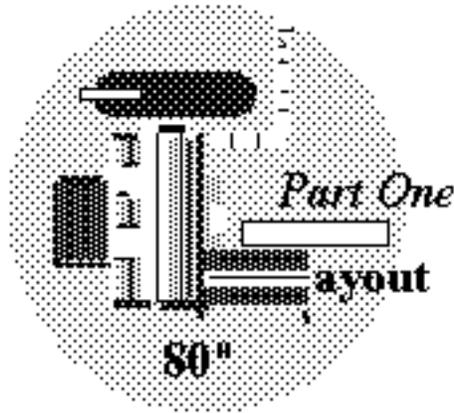
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Chapter 1, Layout



First, it is essential that you have a few tools to assist you in evaluating the properties you have chosen.

At the top of the list is a notebook for recording dates, addresses and major likes or dislikes of each home. This, in conjunction with the check list provided in the back of this book, will be invaluable to your purchasing decision.

Other items you will need to carry along are listed below, and their use will be explained throughout the text.

- Equipment list
- Area map
- Check list (provided at the end of each chapter)

- Flash light
- 409 Spray (or any high soap solution in a spray bottle)
- Nightlight (like for a child's room)
- Notebook
- Portable level
- Tape measure (25 feet or more)
- Large soft drink, with plenty of ice

Throughout the book, these items and their uses will be explained. If you are just dying to know about the soft drink thing, you can skip forward to windows, where it's actually the ice you'll be using. It's not in every case that these items will be necessary, but you will want to be prepared for any situation. You're most apt to be carrying all your inspection aids when a home is either vacant and/or devoid of the owner's presence while being shown by a realtor.

Evaluating the layout of a home is very important, as it can determine its present value to you and future prospective buyers. The best case scenario is a home in a neighborhood with low taxes, easy access, continued growth potential and low home turnover. Of course, depending on one's lifestyle and financial need, one should always look to the future, to a time where one would sell that very same home bought 10 or 20 years ago.

For example, think for a minute. If there are more than just a few homes up for sale, and times aren't bad, then ask why everyone is in such a hurry to leave the area. This may not seem like an inspection point, but ponder what would happen

if you found your dream home and it passed your inspection. Then three months down the road, “*Surprise!*” Your castle and surrounding area have been designated as blighted by the city to make room for a mall. This really happens, so buyer beware.

Alright, let’s say you were smart and picked a location that catered to your personal needs, such as near schools, shopping centers, local entertainment, and hospitals. Now, check out the neighborhood, as well as city and county restrictions for adding a pool, fence, tree, or maybe an addition to your home. Also, compare the differences in property taxes in the areas that you are interested in. This may sound like a lot of extra work, but most of the time the information mentioned can be gathered by telephone. Why have future headaches and high end-of-the-year tax bills, when a few phone calls can save you from this suffering? A good source of information can be the people who live in the neighborhood. Be sure to ask if there are subdivision dues, and how much, who picks up the trash, how are the local police and fire protection services, and what problems do the subdivision face. If you uncover problems, find out whose responsibility it is to make changes that would solve those problems.

Now, what about the location or lot this building is sitting on? Take a walk around the house. Look for high tension wires. Check for large trees that may be located too close to the house (within ten feet). Both of these things can cause problems in high winds or snowy conditions. Additionally, a large tree located too close to a home can cause roof damage if the tree’s large limbs were to fall on it. Roots can also damage sewer lines and foundations, Figure 1. A good rule of thumb is: a tree’s height and width (*starting at the first limb*) is comparable to its length and

depth of roots in the ground.

Of course, trees can be very helpful if carefully located on the property. In northern climates, a line of evergreens on the north side of the property can make an excellent wind break. Also, a well-placed leaf-bearing tree on the south side of a home, can provide cooling shade during the summer. When it loses its leaves in fall, it allows sunlight to enter south side windows for a passive solar warming effect.

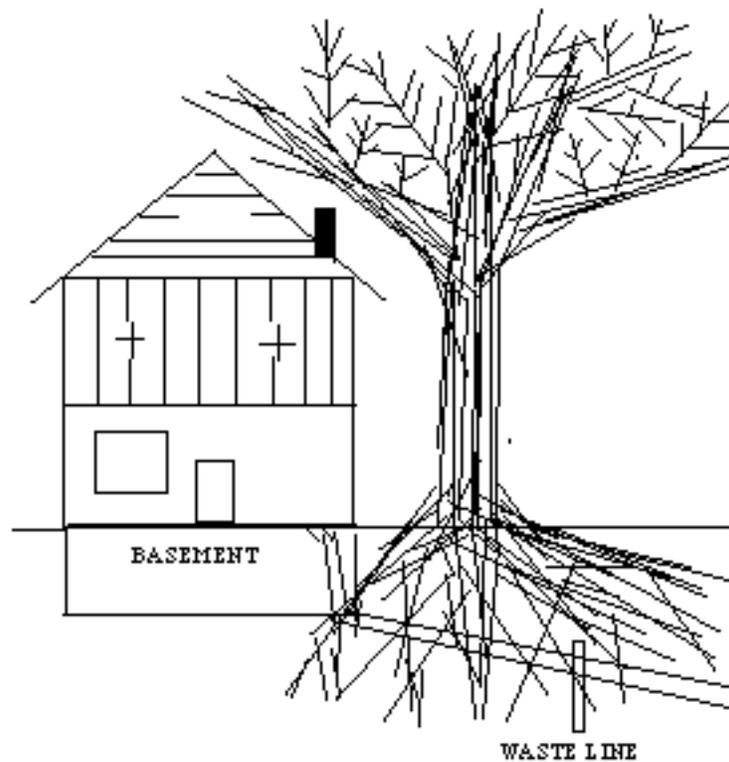


Figure 1. A tree's root system can damage a home's plumbing and foundation.

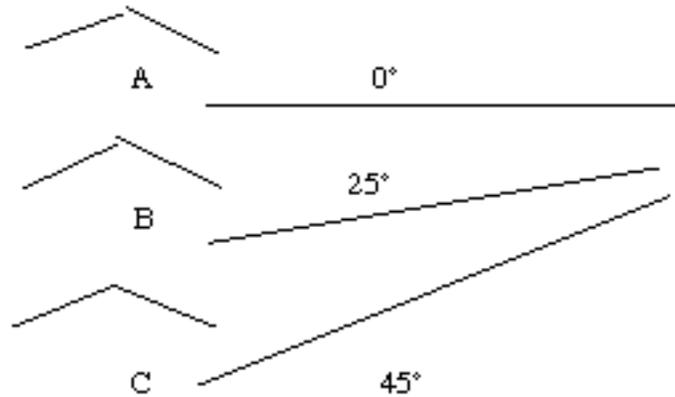


Figure 2. The three figures above show different degrees of inclines which could affect the house structure. Refer to Figure 3 for an evaluation scale.

Next check for high ground, which can be ideal if your dream house is located on it. This is an important point, because an incline of 25° or more and a height of ten feet or greater could increase the chances of moisture penetration into your foundation wall. More than likely, the higher elevations will be in the back or side yard of a home. If the home you're inspecting has this kind of situation, be sure to check the basement thoroughly for leakage. Another possible problem could be a small landslide that may ensue after a heavy rainfall. Figure 2 demonstrates possible elevation situations, and Figure 3 charts probable results.

If a retaining wall is located on the property, check for its serviceability. Some are constructed out of railroad ties or pressure-treated wood. These need to be properly anchored at each level, especially if the wall is over four feet in height. To relieve earth pressure against the structure, it's best for this type of retainer to be built in four or five feet tiers or a half on half with a "dead man" anchoring system. Both methods ensure that the wall averts buckling forward, and a breaching

	A	B	C
Foundation freeze	2	5	6
Water damage	3	6	7
Erosion	4	7	8
Dainage problems	1	4	6
Land slide condition	2	4	7
	1	2	6

Figure 3. The chart above refers to the elevation levels in Figure 2, “A” referring to level ground, and “C” referring to a high slope, rated from 1 (best) to 10 (worse).

of the earth is being retained.

The biggest problem in retaining walls can be found in the solid brick, stone, and concrete poured vertical walls. The factors that ultimately deteriorate these walls are inadequate water drainage within the wall structure and poor anchoring design. In fact, if some kind of drainage holes are not located throughout these types of walls, the water build up adds to the pushing force of the earth.

This situation can be compounded when a retaining wall is located so as to maintain a house level on an inclining property. Are you getting the picture? If not, take a quick look at Figure 4a.

The bottom line is, a property with a retaining wall that is in poor condition, leaning forward, or is over four feet in height without tiering or the necessary anchoring, will end up costing you money. The costs will be in repair or replace-



Figure 4a. This home had a poorly constructed retaining wall that gave way during a rain storm. Loose foundation earth underneath the home resulted in a complete structural collapse.

ment, or at resale time in the way of lost profits.

Another consideration should be erosion and an unstable building site. If a developer had to bulldoze the subdivision because it was too hilly for a road or home placement, these possibilities could exist. Even with the assurance of inspectors and builders that the ground is stable, this becomes of little comfort if your home is found sliding down a hill. If this is a new subdivision you are considering, with declines of 20° or greater, for your own peace of mind, get an engineer's topographical survey and appraisal.

In Figure 4b you can see the result of an unhappy homeowner who did not have the assurance of an engineer's report. Even though the builder, FHA inspectors, and Home Buyers Warranty (HBW) all confirmed that the houses were safe and within building code specifications, systematically every house in this subdivi-



Figure 4b. Massive problems occurred in Green Jade Estates subdivision near St. Louis when homes were built on unstable ground.

vision started to structurally deteriorate. Also, even with insurance protection from HBW that was supposed to protect the homeowners from building defects, many were still waiting to collect months, even years after.

Often, people are surprised to find out how little these warranties cover in the event of a disaster such as this. For your own protection, find out the history of the area and the ground beneath it, including information pertaining to nearby flood plains, especially if the subdivision is new.

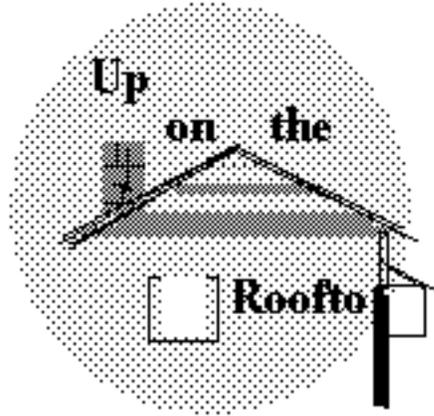
Ask to see a recent survey of the property and determine locations of “right of ways” and boundary lines. Note all underground services, like telephone and electrical lines. These are not only aesthetically pleasing, but also protect against personal injury from downed power lines.

Make sure there is plenty of space in the house (enough bedrooms, bathrooms, and living area) to accommodate your needs, check the outer structure for defects and early signs of trouble. The first step is to plan to get the house you can live with and afford. Know your price, by taking an honest appraisal through a loan officer at any bank or mortgage company, which will give you a specific price range to look in. Next, write down the minimum space you are willing to take. Example: you may want an extra large garage, but couldn't care less how many bathrooms you get. Make sure, though, you consider the future role the house might play, such as whether you are considering a large family. You should also look for the features that will be most sellable in the future, especially if you might be selling the house after a few years.

Check List

1. Target areas (2 to 4) in which you would like to live.
2. Select a couple of homes in your price range and from each area to make a drive-by list.
3. Eliminate homes from drive-by and make appointments to view the remaining properties.
4. After a fact-finding tour, list the defects of concern from this chapter (a check-list is provided at the end of the book).

Chapter 2/Up on the Rooftop



A roof's quality relies mainly on three factors: the age of the roof, materials used in its construction, and the design adopted to meet area codes and weather conditions. To start, take a slow walk around the house, focusing only on the roof.

As you are walking, as in all phases of inspection, make note of any structural inconsistencies such as missing or damaged roof tiles or shingles. Look for a plumb roof line, as well as over-tarred areas around chimneys, skylights, and waste stacks. This usually indicates an attempt at fixing a water leakage problem, which may still exist. A wavy roof line with over-tarred and brighter colored single roof shingles could mean structural trouble. Properly layed flashing around chimneys, skylights, waste stacks or roof vents should not require any tarring.

Figure 5 illustrates these roof conditions for comparison purposes. In older

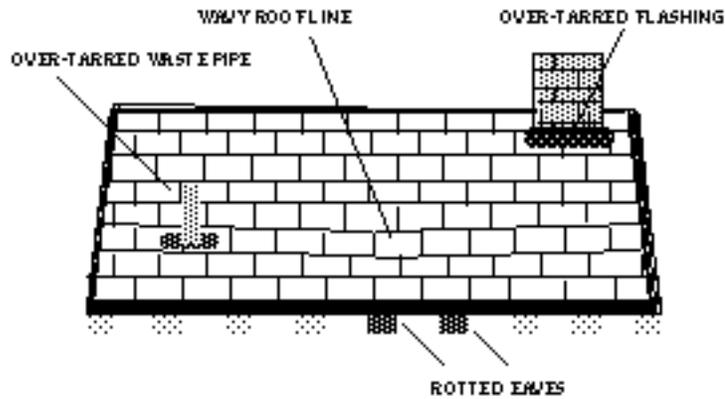


Figure 5. Roofing problems.

and modern day construction, chimneys placed at the edge of the roof line cause less structural stress, as well as fewer leakage problems. In an effort to increase natural light into a home, the use of skylights has increased. Improperly installed skylights can cause much damage in the way of water seepage and loss of energy efficiency to the surrounding structures. Taking a good look at any skylight from the inside of the house is a good idea. Look for any discoloration (yellowing or brighter white) that would indicate a problem with leakage.

OK, you have completed your *first* walk around; now begin with the *second* walk around. This time, check for wear or damage to eaves, soffits and overhangs. This can be done quickly. Note any rotting of wood, paint wear, or peeling. Look for open or damaged soffits or holes in which small birds or animals could enter the inner-roof structure. Birds and squirrels love to nest in attics and will cause a considerable amount of damage if left unchecked.

Though a roof up to 10 years old should show no appreciable wear, it is always good to give it a thorough once over to make sure. After all, the cost of replacing a roof could run into thousands of dollars. When an owner claims that a new roof has been installed recently, check to see if it was just new shingles placed over old roof shingles. This way of handling roof problems is common, but not long lasting. Damage beyond repair and water damage in other areas could be covered up. After all, this could be the real reason the owner is wanting to sell. Don't rule out a house if new roof shingles are put over old, especially if only one extra layer, but make note of it as a possible warning sign. A complete new roof includes removal of all old roof coverings and any damaged decking or trusses below it.

As a general rule, if you have new asphalt shingles, plan to repair or replace them in 10 to 15 years. This may need to happen sooner if your area is susceptible



Figure 6. An example of deteriorating wood shingles.

to high winds and hail damage. A wood shake or shingle roof will last much longer, Figure 6, but if not treated with some kind of fire retardant, forget it. Your insurance will go up (and so will the house) if the roof happens to catch fire.

The most desirable and fireproof material is a slate, tile, or cement-fiber roof. Roofs constructed out of these materials have some drawbacks, though. For example, the weight of the tiles demands a much stronger roof structure and when damaged, they are difficult and expensive to replace. Also, a home with a roof of one of these material types will most likely be an older home (50 years plus). But if well-constructed, the price is well worth a look, because a roof not only protects the roof decking underneath, but also protects the walls, ceilings, and interior items from damage. So, make sure the roof over your head is a sound one.

Slate, tile and cement-fiber roofing materials generally fall into the same class of durability. Each can be referred to in the same category as slate in Figure 7.

In some higher upscale homes, commercial types of roof coverings are being utilized. These include plastic compound tile and metal roofing. Each has its advantages and disadvantages, which can be researched from the manufacturer. But their main attraction would be longevity (75 years plus) and fire/storm proof qualities.

You may want to compare homes with similar features and square footage that have different roof lines. You may find that the ones with complicated angles

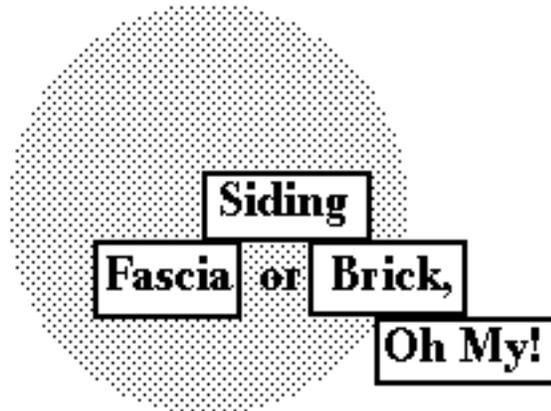
	Asphalt	Fiberglass Asphalt	Wood Shake/Shingle	Slate	Cement Tile
5-10 YEARS	GOOD-B	EX - A	EX - B	EI - A	EX-A
10-15 YEARS	GOOD-B	GOOD-A	EX-B	EI - A	EX-A
15-20 YEARS	GOOD TO POOR - B	GOOD TO POOR-A	GOOD-B	EX-A	EX-A
20-25 YEARS	POOR - B	POOR-B	POOR-C	EX-A	GOOD-A
30PLUS YEARS	POOR - C	POOR-B	POOR-C	GOOD A	GOOD A

Figure 7. This chart shows types of roofs, and their average durability over the period of time indicated. E = Excellent. Fire ratings are also indicated, by A, B and C. The best fire rating is A, the worst, C.

and roof dormers cost thousands more than the plain gabled home. Be warned that not only will they be more expensive, you can count on higher maintenance and repair costs.

Update your check list with information from this chapter.

Chapter 3/Siding, Fascia Brick, Oh My!



If you are looking at homes with 25% siding or more, you are probably looking at a framed (2 x 4) two-by-four built house. Normally, it is a combination of a framed backing with either plywood sheathing with a vapor wrap supporting vinyl (or aluminum) siding or frame backing with a polystyrofoam sheathing supporting a vinyl (or aluminum) siding.

In both cases, you can expect a good (not great) R-value of 19 to 24, Figure 8. This is only true, of course, if you are inspecting a newer home. An older house will exhibit a much lower R-value. R-value refers to the ability of a material to hamper heat exchange between an exterior surface and an interior environment.

A much better R-value can be accomplished if the home is built with 2 x 6 lumber and is well insulated with either fiberglass batting of a thicker grade, or

blown-in paper treated insulation. Also, if the 2 x 6 construction adheres to the same standard 2 x 4 spacing in stud exterior walls, a more stout and energy efficient home is the result. This could save you a bundle in energy costs, and would probably pay for itself within five years, thus offsetting the extra asking cost of the home.

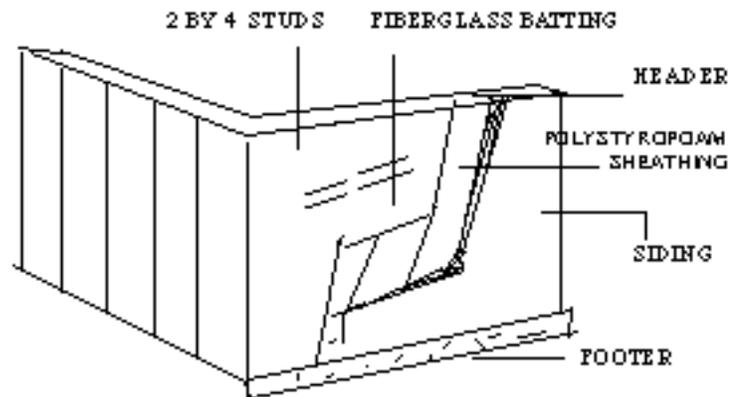


Figure 8. A cut-away of a typical 2 x 4 framed exterior wall.

When siding is new, it generally looks good and protects well against the elements. Walk around to check that the siding is intact and attached correctly. Upper and lower edges should line up with adjacent siding sections, with no warping or separations. This can occur in aging or poorly installed siding.

The majority of brick homes today are older homes, mainly because of the cost of labor and materials. These homes are fairly indestructible if the foundation is strong and it is not located in an earthquake zone. (The rigid construction does-

n't allow for any sway.) If you are inspecting a recently built brick house, there should be little concern of its soundness.

On the other hand, if it is a rehab building, check for good tuckpointing and for cracks, and ask about adequate insulation on outer walls. Tuckpointing is the removal of old worn mortar (about 3/4 to 1 inch deep) and then filling the gap with new mortar, Figure 9a. This is a must if the integrity and beauty of the structure are to stay intact. Several small or a few large cracks in walls could indicate that foundation problems are present. This is especially true if the wall lines are wavy or are dipping. If you find these conditions, more than likely mortar between the bricks will be gapped. This can lead to wall fatigue (and when the wall gets too tired it will lay down).

On the other hand, if you find the structure sound, just be sure that all modern insulation is present throughout the building.



Figure 9a. An example of a deteriorating brick wall that has been tuckpointed, and a rock foundation.

Now, let's discuss the single layer brick facing. It has many advantages when properly placed and it is used frequently on homes. It has all the beauty and insulation benefits of brick, without the structural problems.

One exception to this rule is when single brick facing posts are used for supporting porches, Figure 9b. This is due mainly to an inadequate foundation or binding. A tragedy showing the importance of this factor occurred in Dade County, Florida. Television cameras captured a disgruntled homeowner as he easily pushed over his brick pillar support on his front porch. There were other stories of shoddy workmanship in the same newly developed community. This can sometimes happen in a community built for speed, not quality, by a profit-oriented developer. To add insult to injury, the forementioned developer had purchased inadequate Home-Owner's Warranty (HOW) insurance, leaving the buyers with virtually worthless

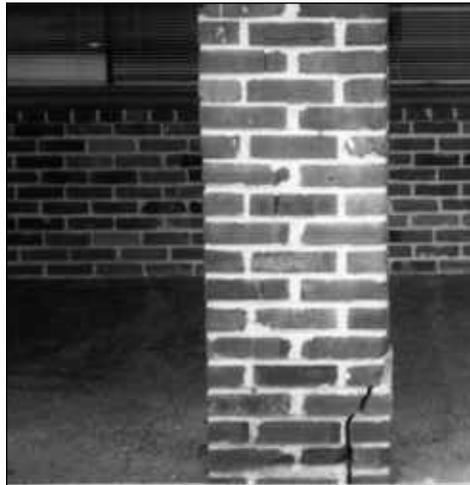


Figure 9b. An example of poorly affixed single brick facing for the purpose of supporting a roof overhang.

property, scheduled to be condemned.

To avoid this type of problem, be certain all bricking is properly attached to the foundation and main structure. Even though this is a single layer of brick, follow the same procedure for inspection as you would for a fully built brick house. The main concern when brick facing is utilized is the loss of R-value. A structure with well-placed brick is excellent protection from the elements.

There are several pseudo-brick or half brick products on the market for use as house facing that are less costly. In many cases, you can't tell the difference between them and real brick, once installed. That is, until you damage them, and then you find out how costly they are to replace. If found on the home you are



Figure 9c. Properly layed single brick wall.

inspecting, compare the price of a similar home with the single brick facing. In the long run, the single brick facing, if properly installed, Figure 9c, will save you more in repairs and energy efficiency than the pseudo or half brick cover. Half brick is very good for interior decor, but not for structural stability.

Another common building material, often used in the southeast and other regions in America, is cement block, Figure 10a. Cement blocks are a very durable material to construct a home with, but they can have the same weather breaks as brick in the respect that cracks can develop in the mortar between the blocks. These usually are produced by extreme weather conditions. That and cost-effectiveness keep blocks out of the northern new building scene. One other negative is that in order to fight off weathering, they are coated either with paint or stucco products, which demand frequent maintenance.



Figure 10a. An example of a deteriorating block wall.

Stucco, when newly applied, will keep its appearance for about 8 to 10 years, Figure 10b. If you buy a home with a stucco finish, you will soon find out how costly it is to replace.

Other common types of outer wall coverings are clapper board and shingles. If these types of protection are on a well-insulated wall and penetrated with a stain, they could prove to be both low maintenance and energy efficient. But if these sidings are on older installations ('60s or early '70s) there is a strong chance that they have a poor R-value and will possibly fuel a fire very well, thank you. Modern clapperboard and shingles are usually penetrated with a stain and flame retardant. Try to get proof of the latter from the seller. If painted, check for built-up areas and cracking. Any paint applied at a job site will not last much longer than 7 to 10 years, or even less time if a cheaper, non-acrylic paint base is used.

Today's most popular covering is vinyl siding, or its cousins, wood or aluminum siding. They are often fairly inexpensive and easy to maintain. Problems



Figure 9d. An example of stucco applied to a concrete block wall.

with this type of siding are often easy to spot, Figure 11 a and b.

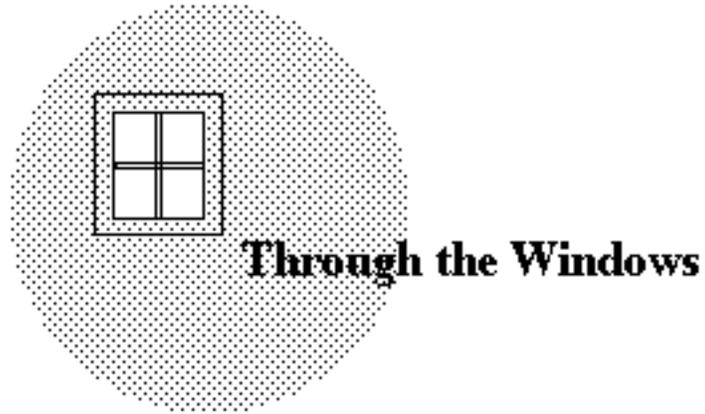
Update your check list.



Figure 11a. This poorly applied wood siding can be seen splitting at the corners on this five-year-old home.



Figure 11b. Aluminum siding falling off this four-year-old house.



Windows and doors should function properly!! They should open and close easily, with a proper seal. Now you may be thinking, “Great, how do I test the seal?” Well, I am going to tell you. For windows, take a regular sheet of paper and place it between any place you can when the window is open. Then shut the window and see if you can slip the piece of paper out. If you can, you have a bad seal. Anyway, this is one of those *inside* inspection methods, and we are still on the outside.

So, take a long circular look at the windows, checking for any sign of wear, such as peeling paint, dirty, cracked, or discolored caulking. Aluminum framing, if bare, will show white-like spots if it is older and not well maintained. Often in older style homes, you will find wood double-hung windows. These windows, even when maintained, could have problems with the sashropes and weights, which is usually the case if the window fails to open and close easily, or slams shut.

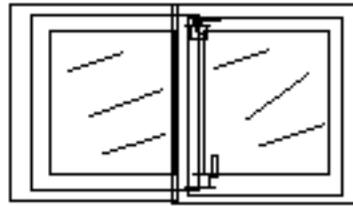
Whether new or old, wood-framed windows will cause maintenance and mechanical difficulties, as well as poor energy conservation, which is commonly referred to as High-E. There are many types, styles, and energy rated windows, as illustrated in Figure 12a, b, and c.

	Maintenance	Weathering	Durability	E - Rated
AWNING	Med.	Med.	Med.	High
CASEMENT & HOPPER	Low	Med.	Low	Med
DOUBLE HUNG	High	Med.	Low	Med
FIXED PICTURE	Low	Med.	Med.	High.
SLIDING	High	Med. to Low	Low	High

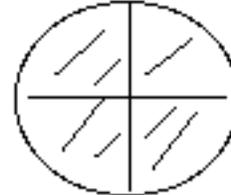
A. High-E single pane windows.

	Maintenance	Weathering	Durability	E - Rated
AWNING	Low	Med.	High	Low
CASEMENT & HOPPER	Low	Med.	High	Low.
DOUBLE HUNG	Med.	Med. to Low	High	Low
FIXED PICTURE	Low	Med.	High	Low
SLIDING	Med.	Med. to Low	Med.	Low

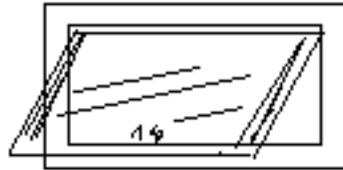
Figure 12b. Low-E double pane glass.



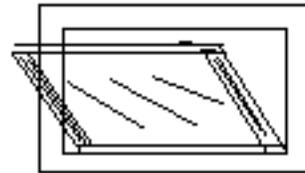
CASEMENT WINDOW



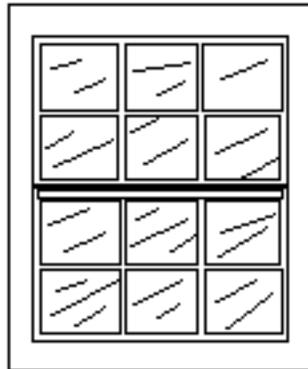
FIXED WINDOW



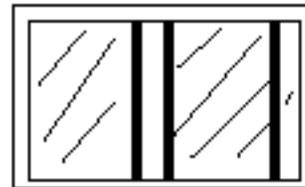
AWNING WINDOW



HOPPER WINDOW



DOUBLE-HUNG WINDOW



SLIDING WINDOW

Figure 12c. Several common window types.

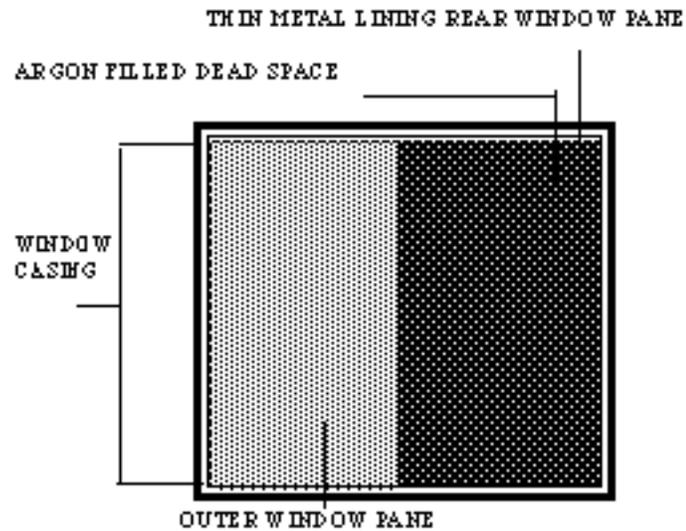


Figure 13. Thermal double pane window.

A more complex and energy efficient type of window is the thermal double pane window, Figure 13. To complete the view on windows, Figures 14 through 18 illustrate several specialty types of glass that are often used for impact for the buyer's eye.

Of the next five windows, the jalousie, Figure 14, is the most susceptible to energy loss, mechanical failure, and easy entry by burglars. An older model, in particular, can be forced open easily. Also, the crank action breaks far too often. In the newer jalousies, the mechanical failure is lower, but the E-value is poor, because it has only one pane of glass. E-value refers to a window's ability to efficiently reflect radiant heat in summer and contain interior radiant heat in winter. Low E windows consist normally of two panes of glass, with one coated with a thin metallic film, and the entire window insulated. Argon gas is injected between the two panes to

prevent heat being conducted between exterior and interior spaces.

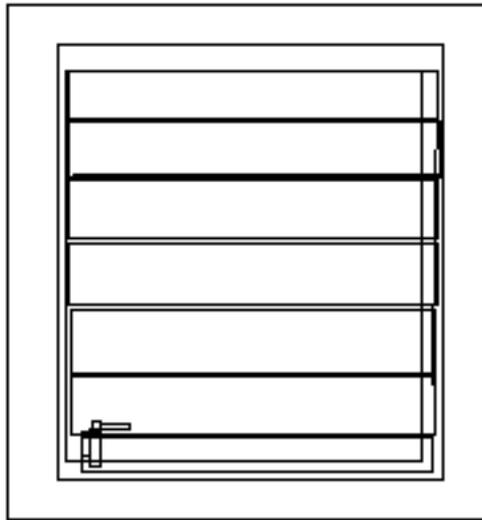


Figure 14. Jalousie window.

To confirm window efficiency, open the window, and use a hair dryer on the inside of the window, while holding your hand on the outside, feeling for the transference of heat. Do this for about two minutes. The more heat you feel, the worse the energy efficiency of the window. For more accuracy in this test, if feasible, place ice against one side of the window. If condensation appears inside the two panes, the argon gas has escaped and the seal is broken. Another method of confirming that the low E properties are still present is to inspect windows on a very cold day. A window with escaped gas will show condensation in the form of ice between the two panes of glass. Such a window needs replacing.

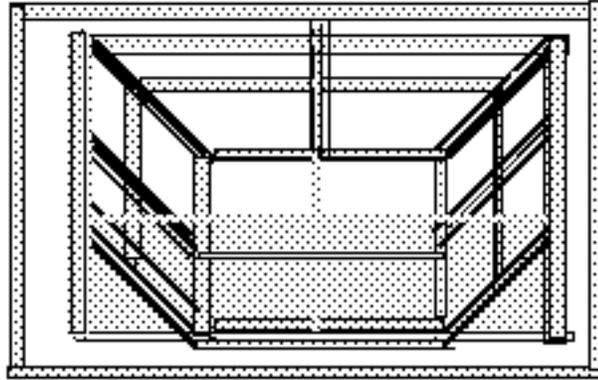


Figure 15. Greenhouse window.

The greenhouse window, for the most part, Figure 15, will be located in either a southern exposed room or kitchen. This style will, if new, have a low E-value. Viewing the frame and inside sill for wear will be necessary.

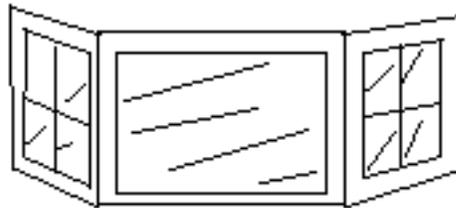


Figure 16. Bay window.

In bay window construction, Figure 16, the only concern is for the two double hungs.

Do you still have your piece of paper? Now is the time to employ the good seal test. There is not much to worry about when it comes to the fixed window. Just check visually for any signs of neglect.

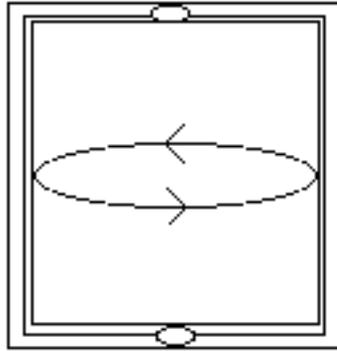


Figure 17. Pivot-type window, which rotates from the center.

Pivot-type windows, Figure 17, need their seals and mechanical action evaluated. Make sure the strip lining the inner frame is pliable and well cared for.

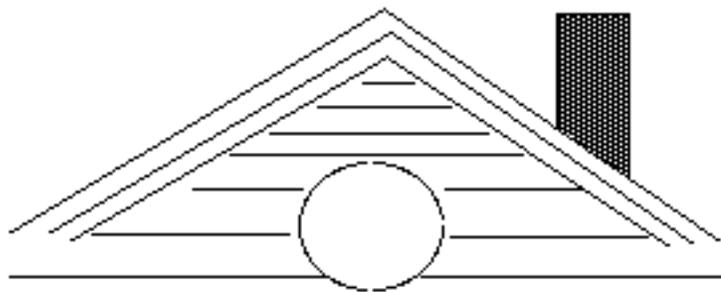


Figure 18. Clerestory window.

Clerestory windows, Figure 18, are usually located high up, in order to let in an increased amount of light without relying on skylights. These windows are, in general, perfect for providing additional light and energy efficiency, and have

low maintenance qualities. The downside is an older unit must be checked for missing panes and moisture wear. Also, if these windows are operational, you need to make the same maintenance check as you would for a casement window. Watch especially for discolored areas immediately underneath the window and sill.

One other subject I would like to touch on is screens. In many of the newer models of windows, screens are fitted inside. This prevents damage to them, and adds a more aesthetic look to the overall home.

In any case, if a window opens, it should have a screen that works, for it is the screen's job not only to keep out insects but also foreign matter, which could damage seals and mechanical parts.

An oldie, but a goody for low-E and light admission into a living area, is

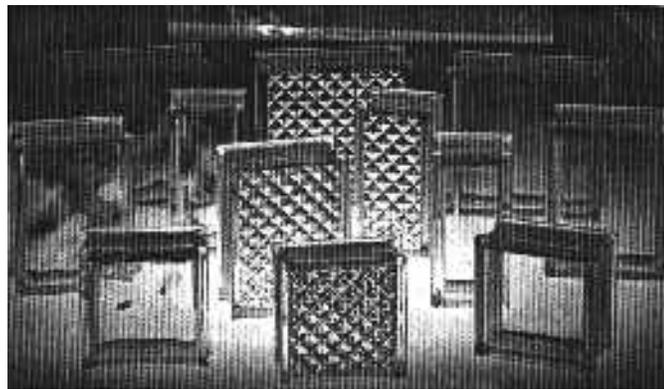


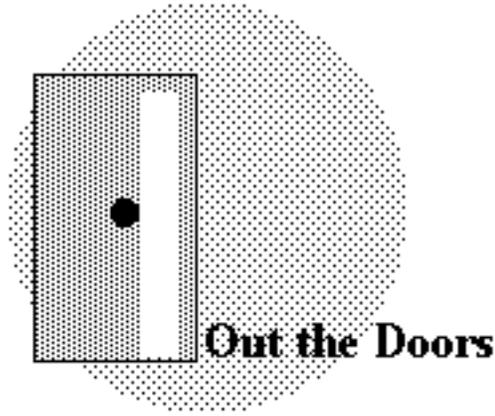
Figure 19. Glass brick, also known as glass block.

glass block, also known as glass brick. The beauty of glass block is freedom from maintenance. Also, it comes in a variety of styles. Use clear when you would wish to showcase a certain area, and frosted when privacy is desired.

One point should be made here. Even though it is referred to as glass block or brick, this product cannot be utilized as a structural member and should be incorporated in a manner which the manufacturer recommends.

Update your check list.

Chapter 5/Out the Doors



There are many types of doors and door styles. Each can be inspected in a similar way. First, check the frame for any signs of wear. Step back from the door. Does it appear to be straight? From the equipment list, you can use a portable level and physically see if the frame is plumb. Next, check the weather stripping around the edge of the frame or door. Is it worn, torn, or not there at all? Some weather stripping will be made of a rubber product and in some newer door units a magnetic seal is utilized. Test the ability of the door to open, close, and lock properly. No kidding, I have seen people who actually bought homes and never touched the exterior door knobs.

Now, slam the door. Does it close soundly, without shake the house or windows? If not, chances are the construction is only adequate. Now make notes on any and all discrepancies. In Figure 20, most of the common exterior doors are compared as to continuing upkeep, energy efficiency, and security.

	Maintenance	B-Value	Security
HOLLOW WOOD	HIGH	LOW	LOW
SOLID WOOD	HIGH	MED	MED
STEEL HOLLOW	LOW	LOW	HIGH
STEEL FOAM CORE	LOW	HIGH	HIGH
SLIDE GLASS	HIGH	LOW	LOW
GLASS BI-FOLD	HIGH	MED	LOW

Figure 20. A comparison of common exterior doors.

Make certain that all door jambs, castings, and stops are undamaged and free of poor workmanship. Some examples of this are hammer dimples, obvious nail heads or separation of wood facings. Most of these problems are avoided by the use of factory assembled pre-hung exterior doors. These are easily installed and since they are built in a controlled environment, there should be little concern for poor clearance and misalignment. Update your check list. Note what rooms have problem doors.

Figure 21a & b shows the inner workings of a typical door.

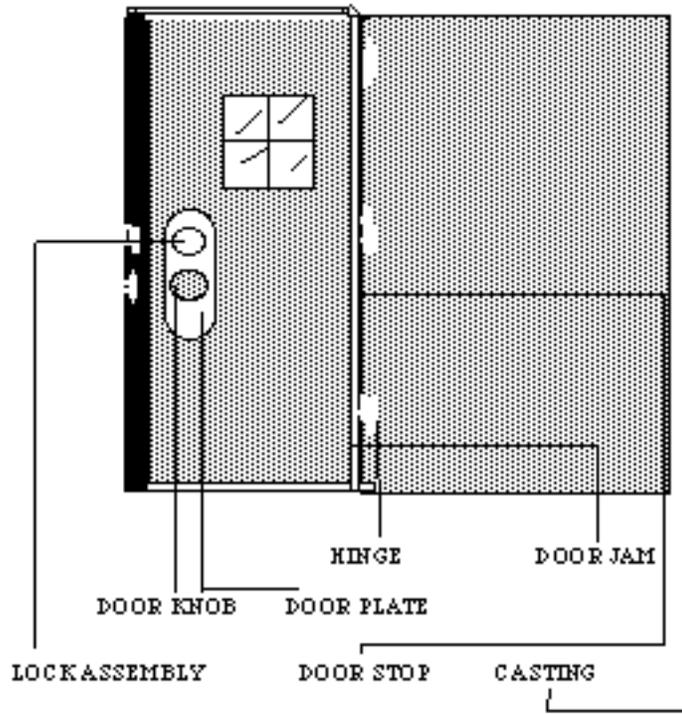


Figure 21a. Exterior door.

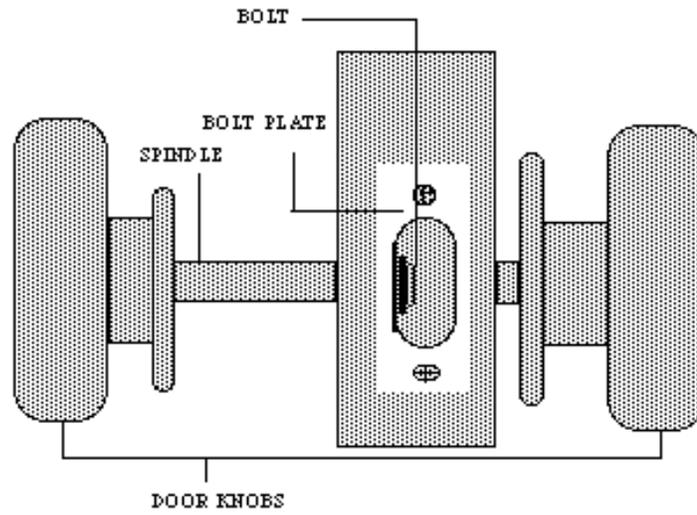
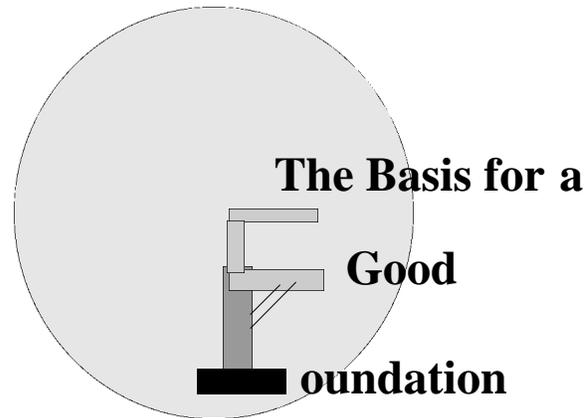


Figure 21b. Exterior door knob assembly.



All structures need a good footing. A foundation that has been shifted, either by tree roots, floods, or even an earthquake or construction faults, can expensively damage your home. A good inspection of the foundation can avert some of these problems, thus saving you a great deal of money on repairs.

Now, if it is a basement foundation you are inspecting, most of your inspection will not take place outside, but inside the house. But there are a few things you can examine on the outside that may give clues as to what to expect on the inside. Since there are four basic types of foundations, we will exam each one at a time and point out symptoms to watch for.

The old rock-laid foundation is first. It is most common in older homes that have been either well-kept or have been renovated. Little moisture can penetrate the stone, but the mortar, on the other hand, can be weak and deteriorating. Observe the condition of the mortar by scraping it with a nail. Is it powdery and yellowish? If it is, there is a good chance the damage has been done. Even if it passes this test, wait to make your final deci-

sion until you have examined the basement. Follow the same procedure as done on the outside. Some perfectly fine walls still may let water into the basement, and the only sure way of finding this out is to wait for a hard rain before you inspect. This isn't always convenient, so hunt for water stains at the base of the stone wall.

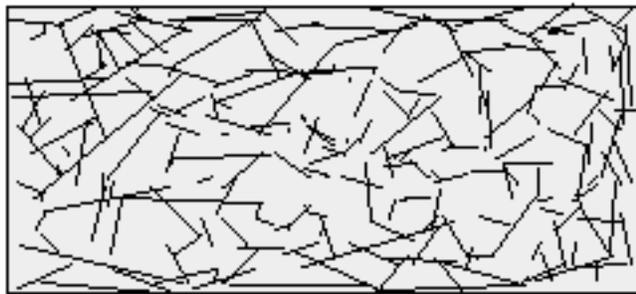
The second type of foundation wall is brick. This wall has very good strength, and if moisture-proofed on the outer wall, will provide many good years of trouble-free maintenance. To inspect, check for spaces between bricks and cracked or misaligned brick. If a brick wall seems to sway as you look at it from the side (something that is best evident when inspecting windows and doors) problems are not far away.

Next is the masonry block wall. Begin by inspecting for rust and water stains. Also make note of any cracks (major or minor), especially near the ground level, that could allow moisture in if water collects near it.

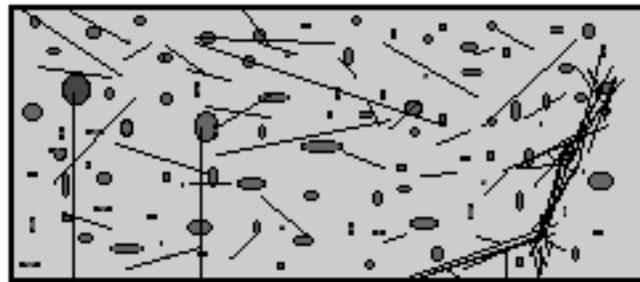
Last, and the most recent kind of foundation wall, is poured concrete. It is very important that this wall is poured and cured properly. Curing refers to the right amount of time allowed for a certain thickness of poured material to dry with a supported form. If not properly cured, as in any poured concrete surface, it will lack strength and smooth texture. Other results are cracking and chipping throughout the whole pour. In Figure 22a & b, the concrete defects to look for are illustrated.

In these times of advancement in building technology, we find old standards giving way to new. This is true for waterproofing of outer foundation walls (referred to as moisture proofing). The reason for this change is the failure of this process to fend off water penetration after 3 to 5 years. The more advanced systems used today in the fight against wet basements are moisture proofing along with a PVC drainage line located at

the base of the wall, allowing water an escape route away from the foundation. But even now, a better mouse trap is in the works. The better trap is a plastic channeling system which lines the whole outer basement wall below ground level and completely seals it. Water is carried off at the footer by PVC piping, allowing for years of piece of mind.



Crazing is caused by a higher than needed cement ratio to sand in a pour. Since more cement was added than was necessary, the rate of shrinkage is greater during the curing process. This, along with an improper curing period, can cause these hairline surface cracks to appear.



Pop outs are a result of soft materials mixed in with the concrete poured slab or wall. These soft materials can range from clay to sand stone.

Large cracks in a cement structure are caused mainly by mixture too rich in water, or the pour mixture placed in a form without proper compaction.

Figure 22a & b.

Another recent innovation is the introduction of fiberglass into a concrete pour to strengthen a slab flooring without the use of metal mesh. This saves on labor and money at the time of construction, and improves the life of the pour, along with its resistance to cracking or pop outs by retaining moisture during the curing period.

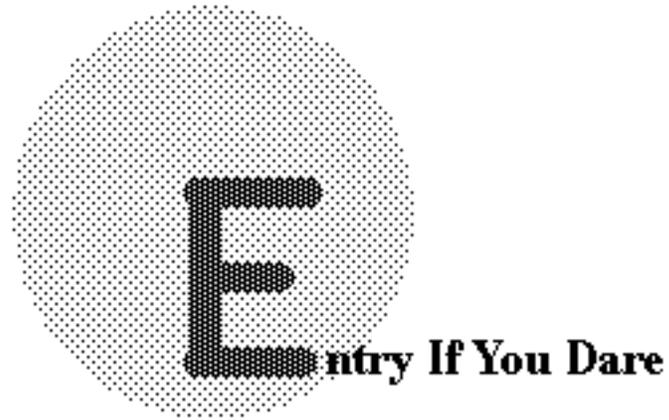
Advantages for basements are extra storage, easy access to mechanicals, and an extra room potential. Disadvantages could be flooding, old air ducts wrapped in asbestos, and the potential for radon gas, if there happens to be a crack in the wall or flooring.

Some homes built in low land or manufactured homes will have what is known as a crawl space. The foundation wall would be dug out two feet to a footer and have an exposed wall of 12" to 18" above ground level. This allows for a three foot or so clearance under the length of the house.

Note: poured slabs for foundations, garages, and basement floors all can be inspected like a poured concrete wall. Again, refer to Figure 22a & b.

Part Two

Chapter 7/Entry If You Dare



With the satisfaction that the outside has been well inspected, you should be standing in the entry way, evaluating the view. Do you like what you see? Scan the walls and ceiling and note any discrepancies in their surfaces. Are entry way light switches located conveniently? See Figure 23. Do they work? View the floor in the entry way for wear and poor workmanship. This the first thing a visitor will see when coming to call. Hardwood and tile floors for an entry way are ideal. These stand up to heavy traffic and weathering that you may subject them to. Carpeting in the entry way will be subjected to heavy traffic and will wear very quickly, costing time and money in replacing it.

Now is the time to see if the layout of the home meets your needs. Make notes of the rooms, closets/storage and bath areas. Refer to your advance notes on the home and keep in mind how many bedrooms, bathrooms and living areas were

claimed to be within. Sometimes a listing will have missed an area, or the seller states that a room is meant for a specific function when it cannot adequately perform that function. Example: the seller is calling a room that is 12x10 foot in area, and he or she is referring to it as a bedroom. Well, technically a bedroom requires a closet to be a bedroom. This kind of substitution of description is called “puffing.” For realtors, “puffing” is illegal. For a FSBO (for sale by owner) it may be an honest mistake.

Note heavily travelled areas, such as hallways, and check doorways for adequate clearance throughout the house for the movement of furniture. Some homes lack the necessary space for getting your furniture in and out. Also, keep in mind the look you wish to present to guests when they visit. Be sure to write down what you find. If you are inspecting several homes, it is easy to get them mixed up.

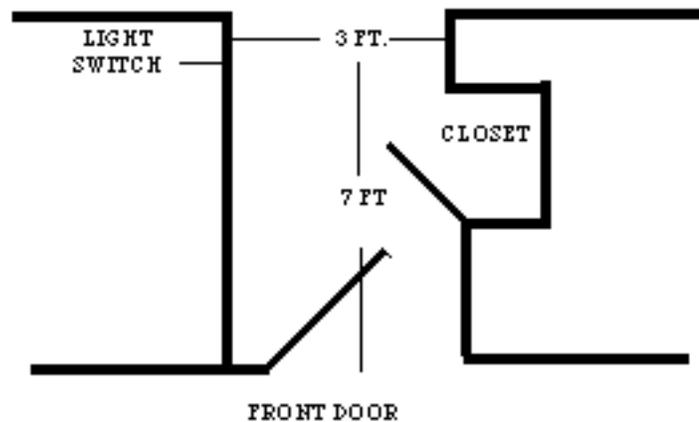


Figure 23. Entry way, indicating poor maneuverability. Note the narrow passage, making furniture entry difficult. The closet door opens in a way which blocks the entrance. Also, note how far one must travel to turn on a light.

There are a few other tricky ones. A laundry room, for example, should have a standard door, not just an area off the kitchen, or it should be called a laundry “area”. A utility room should, by rights, have a utility sink and be connected to the outside. Technically, a full bath should include a bath tub, not just a shower.

These things shouldn’t necessarily make or break a sale, but you should be aware of them. If you buy a house that has any of these limitations, you should know what you can legally call the rooms when you decide to sell the home.



In the kitchen, many things can be deceiving. Don't worry though, you can catch these problems in time. It just requires that you adjust your point of view from looking at the beauty of the kitchen to the mechanical make-up of the kitchen. Most of the time a *new* kitchen won't present many, if any, problems. However, in a rehab, remodeled, or older home, things may not be what they seem.

Start with the sink area. Note features of the sink such as single or double bowl, power spray, garbage disposal or even a water filtration system. Examine water pressure by turning on the faucet. Note: if the water is shut off to the home, you may want to pass over this house. Too many undetected problems could exist.

The faucet and all its working parts should operate smoothly and efficiently. Problems with water pressure could indicate mineral blockage in pipes. Now look under the sink, Figure 24. Does the cavity show signs of water leakage, such

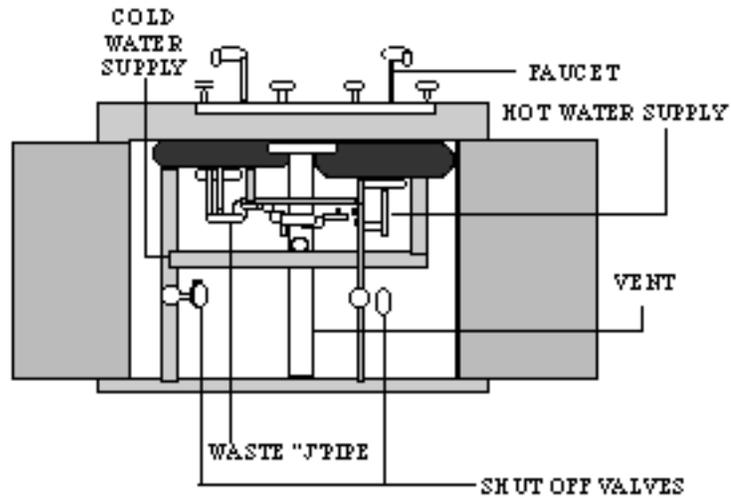


Figure 24. Under the sink cabinet.

as water stains or a damp cabinet floor? If a garbage disposal is present, Figure 25, this is the time to check its operation. With cabinet doors open, turn on the water and then the garbage disposal. While it is running, get back to your knees and take a good look at the unit. You should be noting any unusual noises, rust and water leakage if it is evident.

The sink should be properly vented. In that I mean either a stack that goes through the roof, Figure 25, or if an island sink, a circle vent. Either allows for a smooth waste water flow and the release of gas above nose level.

Note the styling of cabinetry. Inspect drawers and cabinets for smooth operation and look for construction defects. Real hard wood cabinets usually are more

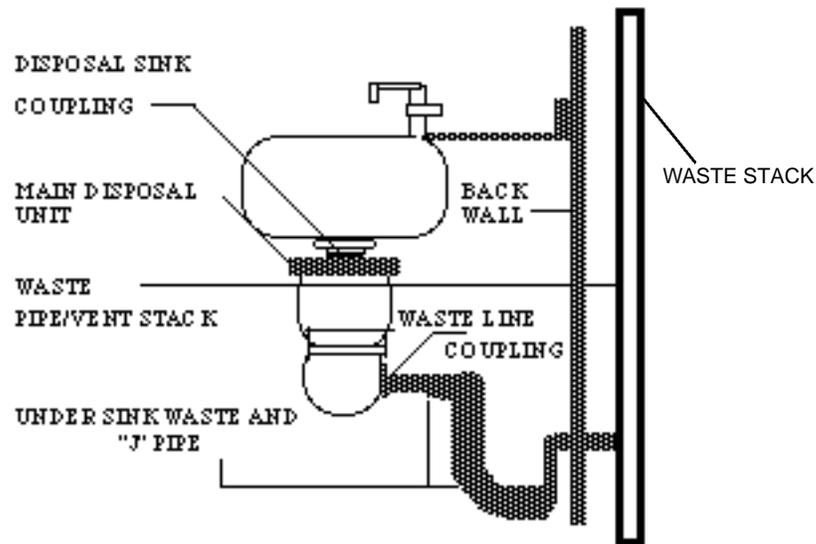


Figure 25. Garbage disposal.

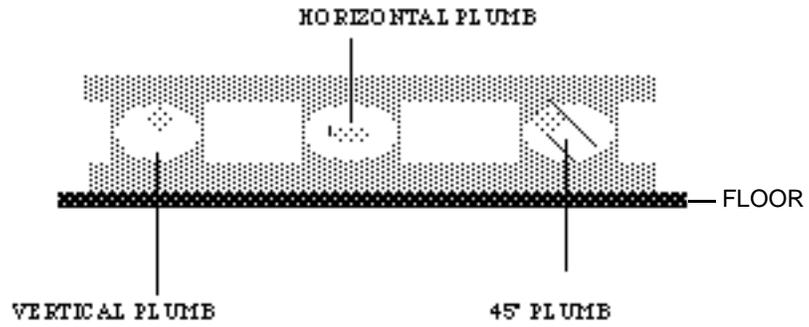
durable than pressed board. Using your level, check to see that counters, appliances, and cabinets are plumb. Figure 26a & b shows examples of level applications. Also note the backsplash, which should be the proper height (3" min.) and should be properly caulked.

Check the quality of the flooring. Vinyl tile, sheet or individual squares come in no-wax shine varieties. The product is easy to clean and maintain, although not very durable, especially the self stick tile squares. These are very susceptible to water damage and in a few years, start to deteriorate. Check baseboards underneath cabinetry for lifting and damaged vinyl edges. In ten years, you will probably want to pull up the old flooring and replace it. Also confirm that the flooring is level. This is when your level comes in handy. Just lay the level on its side (bubble side up) and take a reading. Refer to figure 26a.

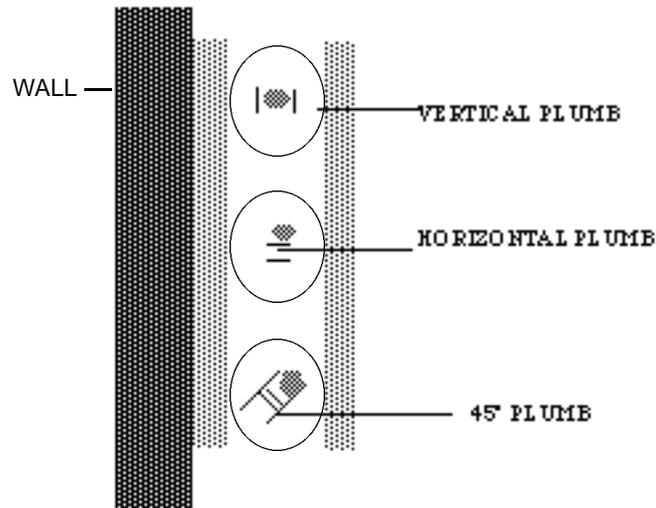
If part of the sale contract, refrigerators, stoves, and dishwashers should be inspected for wear and operation. Check rubber seals for pliability and wear, as well as cracks, by pressing down on them to see if they bounce back. If a gas stove is present, check all burners and the oven to see if they are in working order. Appliances should be level, thus the floor must be level. Appliances can be self-leveling or a shim (a wedge-cut piece of wood) could be used under the low side of an appliance to level it up. Levels can be checked by placing the level on a flat top surface and read as in figure 26.

Note the brand names and age of any kitchen appliances that will come with the home. These are the types of things the bank will take into consideration when lending a builder money for construction, and could be a savings point for you if you know their worth. Check for warranties on any of these items.

Update your check list now.

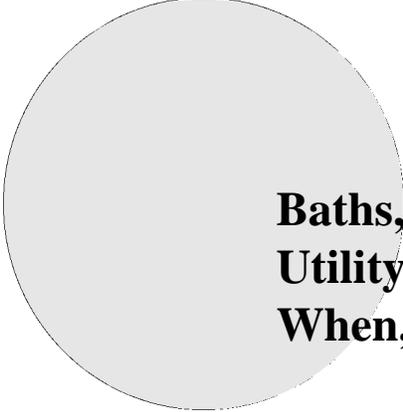


A. Level usage. When placed on a perfectly flat horizontal surface, the center horizontal plumb bubble settles in the middle of the liquid filled tube.



B. When the level is placed on a perfectly flat vertical surface, the plumb bubble settles in the center of the vertical plumb tube.

Figure 26 a and b. The proper use of a level.



Baths, Half Baths, and Utility Rooms: When, Where, and Why

Just before leaving the kitchen, turn on the faucet again and leave it on. Note any noise or water leakage caused by opening and closing faucets. Then go to all of the other faucets in the house and turn them on. Check to see if the water pressure drops. All that is required is to turn on one faucet at a time and observe if the flow has decreased in the remaining faucet. Turn on the shower or tub, along with the sink faucet, and get the temperature of the water where it is comfortable. Then flush the toilet. Is the water still at a safe temperature? If not, make a note of it, and consider whether this is an important issue for you. Especially if young children or the elderly will be living in the home, you may want to consider having an anti-scalding device installed.

Check under the sink with the flashlight for clues of water leakage. Today's building standards call for copper piping for supply lines and PVC or cast iron for waste (non-pressurized lines) water. Inspect for rust or corroded fittings. Check flooring and walls for loose or broken tiles. Make note of any damage to the tub, shower and sinks. Figure 27a, b, c and d show examples of half and full bath layouts, along with the inner workings of a toilet.

In the utility room, make sure venting, drainage and the appropriate outlets are supplied for the washer and dryer. If the washer and dryer are included in the purchase, note their brand name and age, just as you did the kitchen appliances.

Another item to check for is a white deposit or a milky-soapy solution in the faucets and drains in the tubs and sinks, after testing the water pressure. This is indicative of a high magnesium and calcium mineral deposit present in the water system. This can eventually slow water pressure to a trickle, by building up in the pipe. It also isn't so hot to drink.

If rust spots are seen in wash basins and bath tubs, excessive iron in the water is present. Also, mells such as rotten eggs or bleach could indicate high sulfure or chlorine content in the water.

Many of these symptoms can be cured by a good filtering/water softener system. Now if some type of water softener system is in place and these problems are present, inspect the filters and make note of the unit for the make and year. Inquire about the date of last servicing and whether or not it will be repaired before the closing of the home.

Test the shut-off valves near the sink and toilet supply lines. These valves are usually located below sinks on cold and hot water supply lines for the purpose of shutting off the water while making any repairs. The shut off valve for the toilet is usually located behind it near the floor. Make certain that all valves are functional and make note of any that are not.

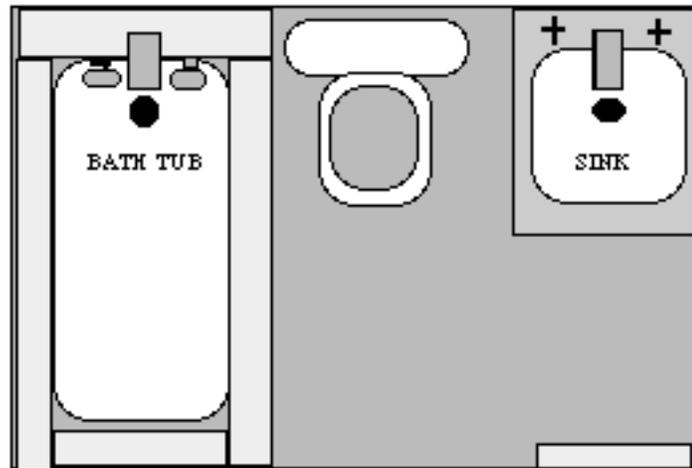


Figure 27a. An example of a full bath layout.

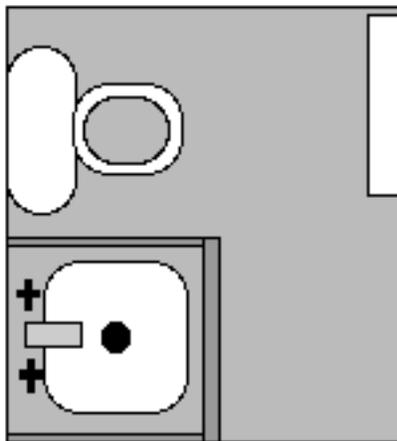


Figure 27b. An example of a half bath layout.

An older system that contains a variety of plumbing piping can cause a lot of problems with mineral deposits, lower water pressure and constant repairs to faucets or valves. This problem does not exist in newer homes, so keep in mind that if you are looking at an older home to save money, it will cost you much more in many cases to replace old exist-

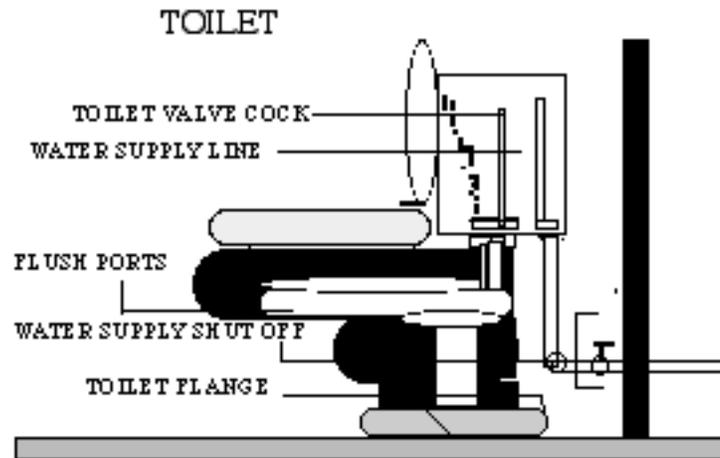
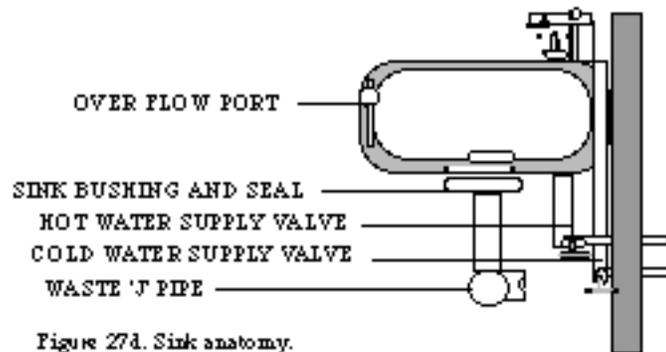
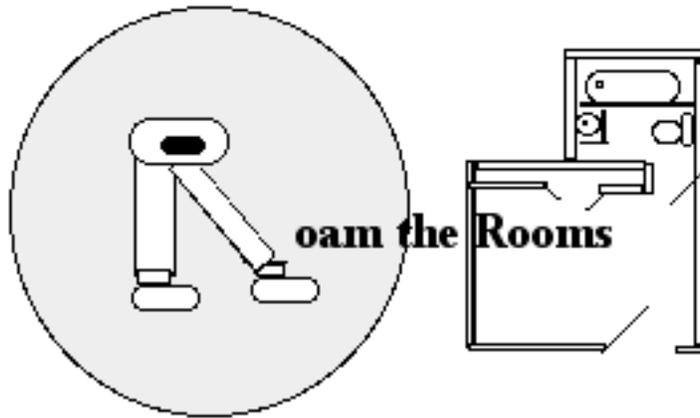


Figure 27c. Toilet anatomy.



ing plumbing with new up to date piping.

Chapter 10/Roam the Rooms



Now it's time to make your final check of the main floor of the home. Inspect all the doors and windows for operation. Note any water damage to the walls or ceilings. Get the nightlight out and make sure all of the electrical outlets have current. Check the bathroom for GFI (Ground Fault Interrupter) outlets. To prevent serious injury, the GFI will stop the flow of current when in contact with water. These should be located in every wet area. If GFI outlets are not present in wet areas, check to see if GFI Circuit Breakers have been installed in the electrical panel, which is also acceptable.

Check the number of electrical outlets in each major room. Look over all fixtures for missing covers and good operation. If you have children, make note of any metal air registers located just below an electrical outlet. If within an arm span of a small child, the child may be able to place a metal object in the outlet and touch the register simultaneously. This will cause a current-to-ground condition, and could kill. Note that less than one amp can kill, and electrical outlets can contain up to 30 amps.

If the home has a fireplace, check the operation of the damper, Figure 28. In a

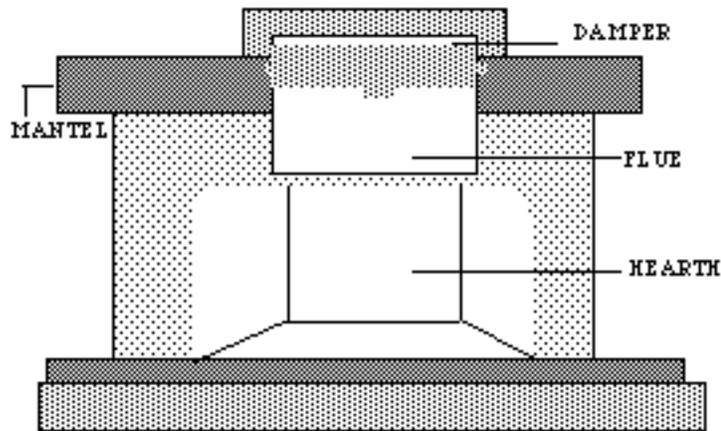


Figure 28. Anatomy of a fireplace.

home that is not new construction, ask when the chimney was last swept. Creosote can build up in the flues and if left unchecked could cause smoke to fill up in the home, or even worse, chimney fires. Wood stoves should be inspected in the same fashion, Figure 29. Check the condition of all exposed flue piping for holes or gaps between connecting sections. The house may have a faux wood fireplace with electric or gas burning logs. With these, I would check for a primary shut-off for the gas supply and adequate wiring for the electric logs.

Inspect the attached garage by checking for the door to lock, open, and close smoothly. The wall in the garage that is directly fixed against the main part of the house should be built of fire resistant material, usually made of fire resistant drywall. Inspect any automatic garage openers for proper operation. Note: chain driven garage openers frequently malfunction. A screw type is more reliable.

All open walls in the garage should have electrical wires to outlets and switches inside metal raceways, except where local codes allow open wiring. Note the general con-

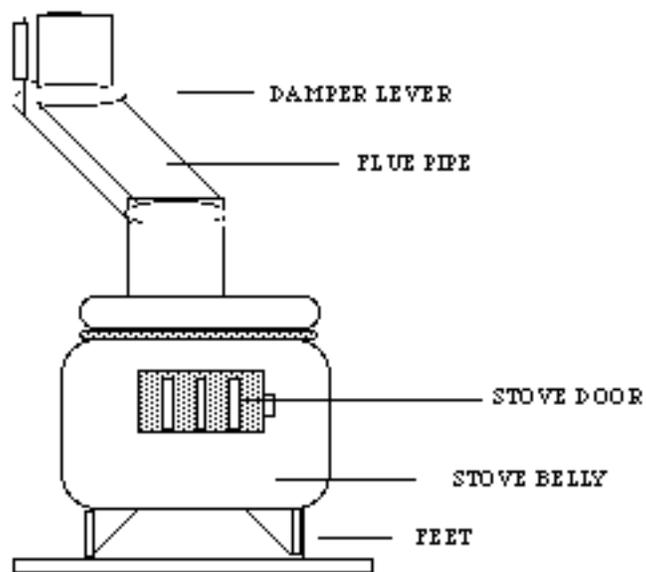


Figure 29. Anatomy of a wood stove.

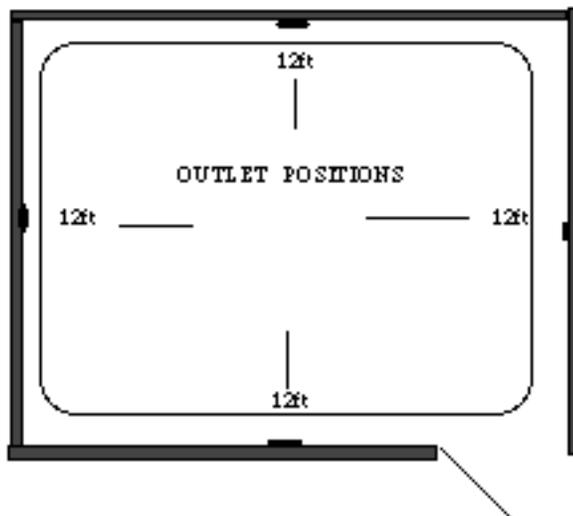
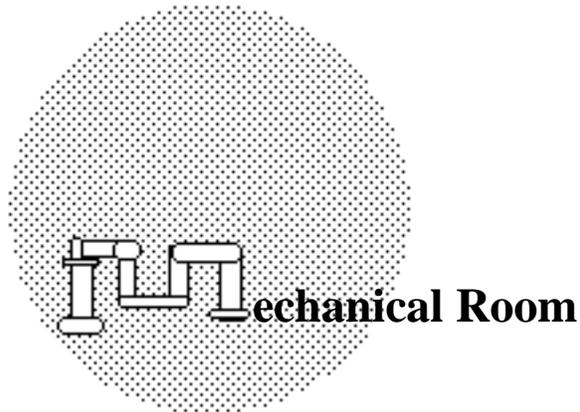


Figure 30. A square 12 x 12 bedroom. In theory, the minimum number of outlets should total four. This standard is employed to avoid overload conditions when using too many plug-ins on one outlet.

dition of the garage and whether or not it meets your needs for storage, car space and work areas.

A normal electrical outlet count for each room is usually determined by room dimensions. A popular formula in the industry, and some building codes, directs that one outlet be installed for every twelve feet of wall, Figure 30. This means that a 12 x 12 room theoretically should contain four electrical outlets. Older homes will rarely have this many outlets.

Chapter 11/Mechanical Room



Quite often, all of the heavy appliances and main power sources are located in the mechanical room. Inspect them in the same way you inspected the other appliances.

First start with the furnace. See if the thermostat is in good working order. There are many varieties, and Figure 31a illustrates one of the newer ones. Note the age and condition of the parts and examine the manufacturer's information plate. This should give the year, model number and BTU (British Terminal Units). Be sure the BTU output is correct for the size home you are inspecting. This is determined by the home's square footage and its overall R-value. The needed R-values for ceilings, walls, and floors are illustrated in Figure 31b for the area you are considering for residence.

If the furnace is a gas model, this is the time to use the 409 spray bottle. Just spray on to the fittings and valves, and with flashlight in hand, watch for bubbles. This would indicate gas seepage and you must be repaired. The same method can be employed on any

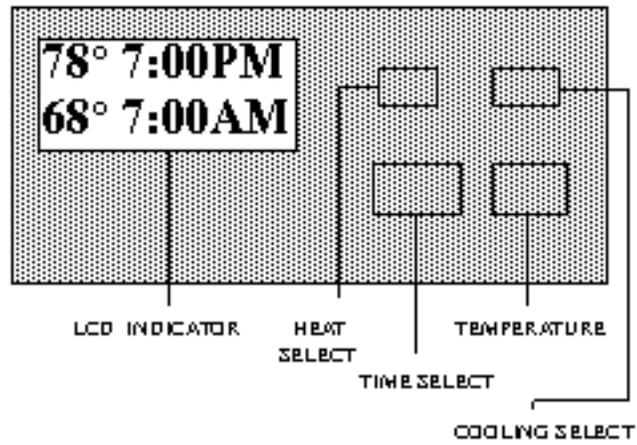
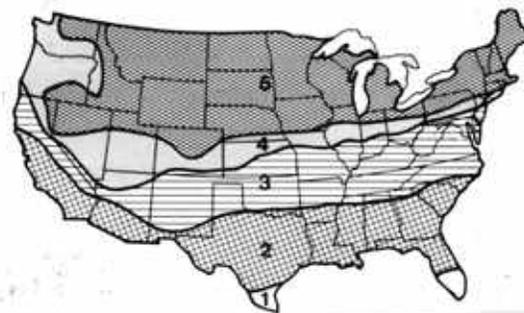


Figure 31a. Solid state thermostats can be set to time and temperature desired.



Zone	Attic Floor (Ceilings)	Sidewalls	Floors
1	R-19	R-12	R-11
2	R-30	R-19	R-11
3	R-38	R-19	R-13
4	R-38	R-19	R-19
5	R-49	R-19	R-25

Figure 31b. U.S. area zoned installation requirements.

gas pipe fittings and valves. Make sure you check to see if the gas service is on. Any indication of leakage cannot be detected without pressure on the line. Oil burning furnaces, in this day and age are, for the most part, inefficient and costly. Another type of heating system is radiator coil. Mostly found in older homes, it is hard to regulate, inefficient and demands constant maintenance. The newer base board self-contained heaters are very efficient, since you can control heating in selected areas of the house. Electric forced air heating is probably the safest and most prevalent type of home heating system.

If the home you are inspecting has a zone heating/cooling system, be sure all the diverters operate and inspect all thermostats for correct operation.

When inspecting the water heater, use your flashlight to take down information from the manufacturer's plate. It contains the water capacity (30 gallons for an average

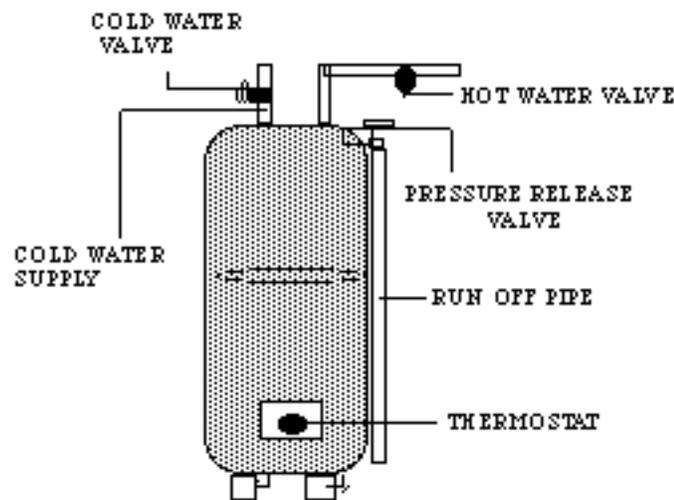


Figure 32a. Anatomy of an electric water heater.

house), operation cost (if a newer model) and date of manufacture. Check for rusting at the base or at the water connection that may be clues of water leakage. This procedure is followed by the testing of both electric and gas water heaters, Figure 32a and b.

Update your inspection list.

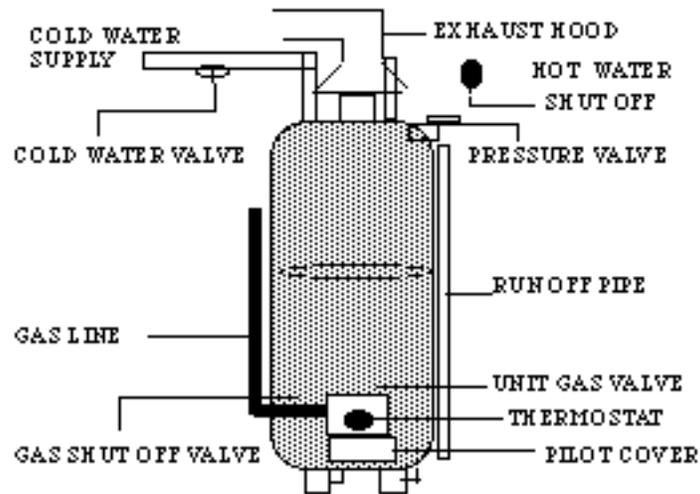
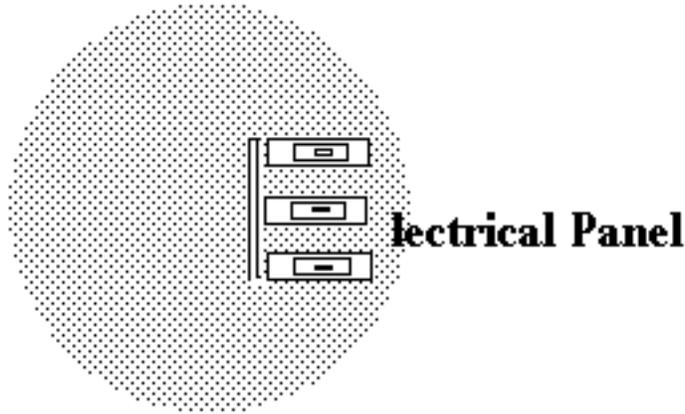


Figure 32b. Anatomy of a gas water heater.

Chapter 12/Electrical Panel



There are a variety of amp rated panels and fuse boxes. Just on the basis of safety and convenience, you may want to steer clear of homes with a fusebox as the main electrical distribution system. Usually this type of system supplies less amperage than what is generally needed for today's power demands and have many maintenance problems.

Now, if the home you are inspecting has a gas stove, water heater and furnace, it would need no more than 100 amps. On the other hand, an all electric home requires a 150 to 200 amp service. Most modern homes are equipped with 200 amp services even with some gas appliances. This allows for any electrical expansion without having to install a subpanel to handle the extra load. Another method of determining power needs is 100 amps for every 1000 square feet of living area of a home.

If possible, see if you can read the numbers of smaller wire coming out of the panel. The code standard wire for 110-115 VA with less than 30 amps is a minimum 2-14

with ground. A better built home would have 2-12 with ground. Note that the thicker the wire, the lower the gauge number.

Since 2-12 wire is a thicker wire, it presents less resistance to current. The result is less taxing on the insulation and wire, making for a safer and more effective electrical system.

Remember when you were checking in bathrooms and the kitchen for GFI electrical plugs? Take a look in the panel and see if there is one or more GFI breaker, which normally takes the place of GFI plugs. It is possible to have a single GFI circuit breaker, which is fair, but realize that if you happen to trip the bathroom GFI, the kitchen and utility room will be off line also. The convenience of resetting the GFI at the outlet is nice but not necessary. Figure 33 shows a GFI outlet.



Figure 33. GFI outlet. To check its operation, push in the red test button. Insert your nightlight into both sockets. No power should be present, thus a dark nightlight. Reset and reinsert the nightlight into the socket to confirm that a normal current is present.

A proper house ground is a must to handle high transient voltage/current which can cause system burn outs and electrical fires. To confirm house ground connections, look for a bare copper wire that is about a quarter inch in diameter. It can be found attached to the main bus bar located in the electric panel (Figure 34) and usually runs to either the closest cold water supply line entering the home or attached to a house grounding rod placed outside, Figure 35.

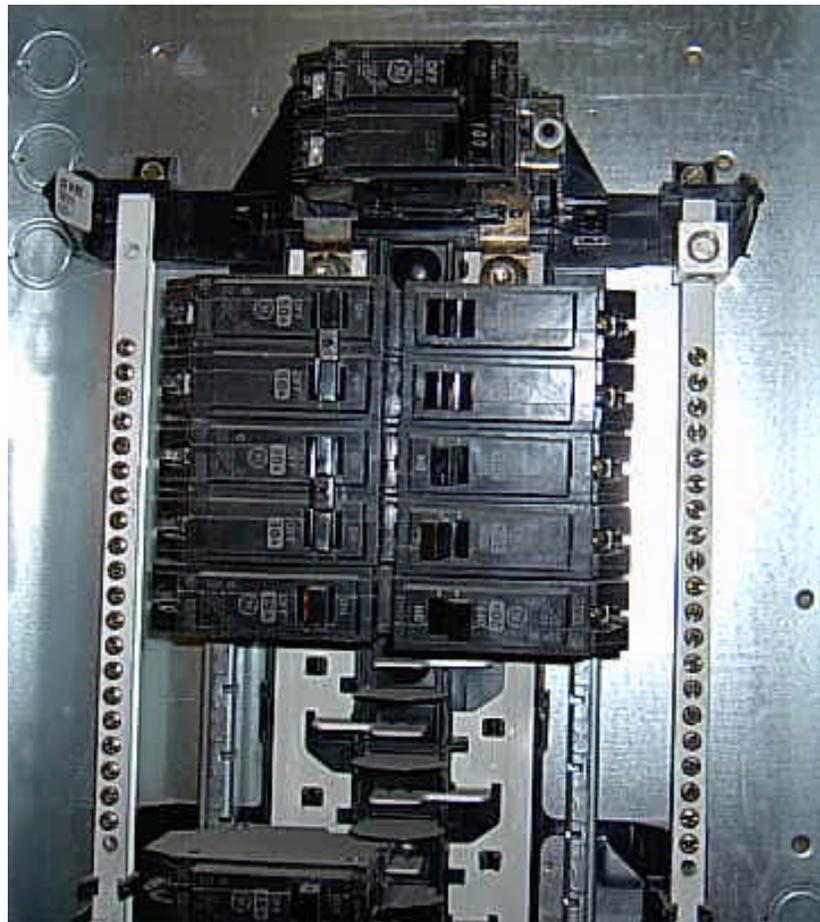


Figure 34. Electric panel.

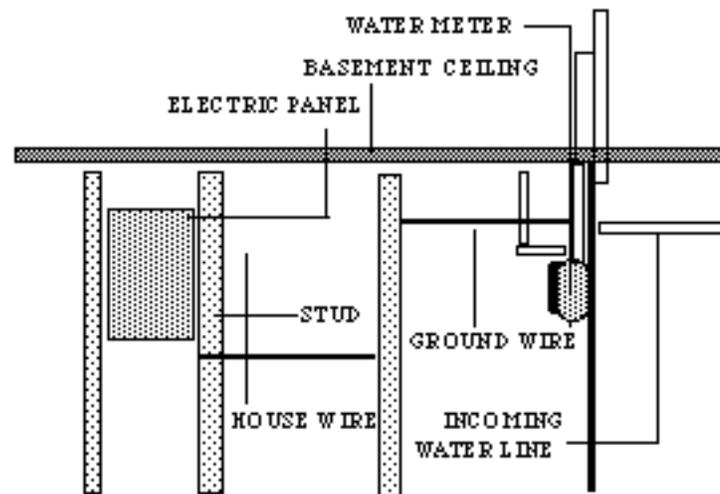


Figure 35a. Grounding wire to cold water supply line.

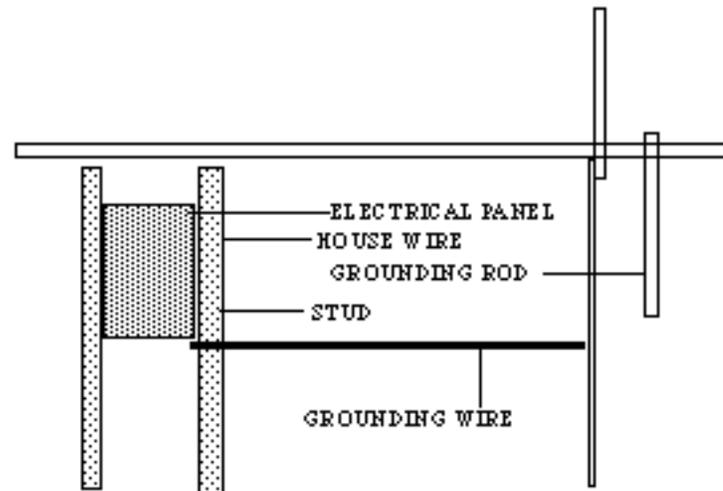
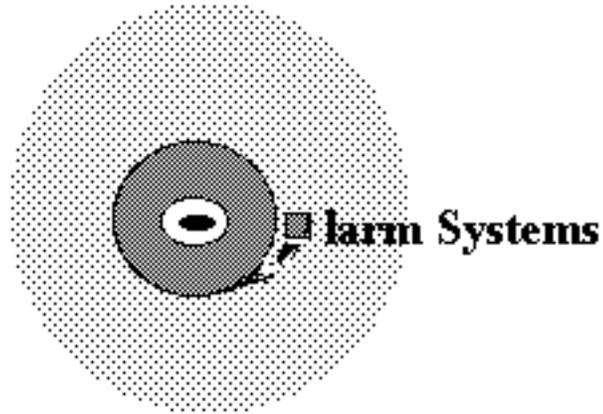


Figure 35b. Grounding wire from panel to grounding rod.

Chapter 13/Alarm System



Alarm systems come in many models, styles, and sensor arrays. A good system that endures the test of time is one with a magnetic contact on every opening. These should be discretely placed on any possible entry point in the home, with smoke detectors placed correctly and wired into the system. If the system reports to a central station, many insurance companies will reduce your rate up to 15% on homeowners' insurance.

Unfortunately, with most fast-install security systems, the slant is on profit and not protection. They will install one or two Passive Infrared Relays (PIRs) that detect sudden changes in room temperature, plus a few contacts to monitor any exterior doors. These are well and good if you are not home and you don't mind an intruder getting all the way into your home before being detected. Also, the PIR systems are notorious for going into a state of inoperation, or to sleep, if they are not stimulated on a fairly frequent basis with either a periodical movement of a warm body or a supervised jolt from the alarm panel.

When inspecting a security system, all protected areas should be clear of movement and windows and doors should be closed. Next, arm the system at the key pad,

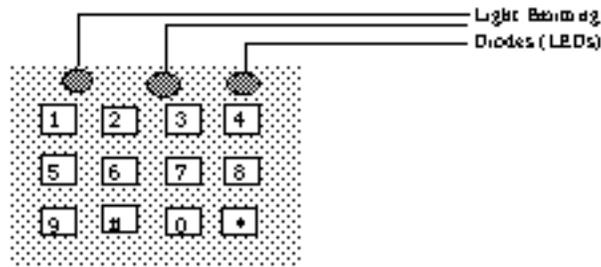


Figure 36a. Programmable key pad for alarm system.

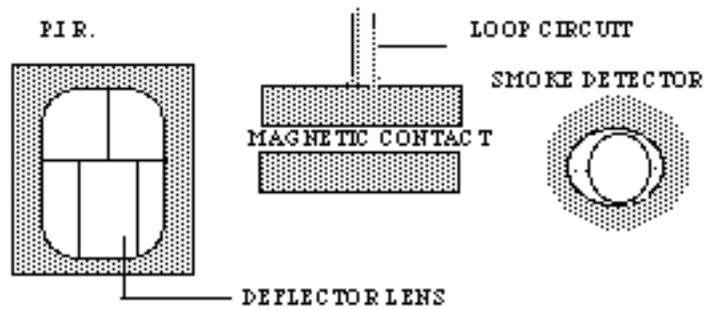


Figure 36b. Pir, magnetic contacts, and smoke detectors.

Figure 36a & b. There are various styles, including one in which a green light is on when disarmed and a red light will appear on the panel when armed.

Open the front door or any door in which a delay time has been programmed. Check to see that a warning buzzer goes off and time it to the length it was set. This gives the home owner time to enter the home and disarm, before the warning system is activated. After the test, have someone go around opening each zone protected, while you watch the panel for open reports. Usually this is indicated by a red light coming on when a zone has been activated.

Most new homes equipped with a security system will have a local and central station reporting alarm. The word “local” refers to a siren that sounds off when a break-in occurs. The central station is hooked into the phone system, and in most cases cuts into your telephone line as it is reporting the emergency. This type of system could include smoke detectors for fire, sensors for burglars on the perimeter or interior, or both. An emergency remote panic button may be included in order to set off the alarm when the system is not armed. Note: to test smoke detectors of any type, aim a blow dryer on high at the smoke detector until it activates. As you are checking for opening and closing of each part of the system, look for loose or exposed wires.

Components such as magnetic contacts, PIRs, glass-break vibration detectors, smoke detectors, and dual-tech or multi-tech detectors should be discretely placed to cover intended areas. Glass-break detectors can be tested when activated by shaking a jar half full of coins.

Note the warranty on all equipment and which company honors this guarantee. Make sure there is a good back up battery system, and if a central station is in effect, test its accuracy of reporting what kind of alarm has been sent, when and where the alarm occurred and note how long it took to transmit to the central station. To accomplish a complete test, call the central station to notify them of the test. Then systematically open each zone and allow it go into an alarm. After disarming the alarm, check with the central station as to what information was received. If the information was correct, move to the next zone and repeat. This process should be repeated every month to ensure correct system operation.

SMOKE DETECTORS

Every home should have a working smoke detector on each floor, Figure 37. Since

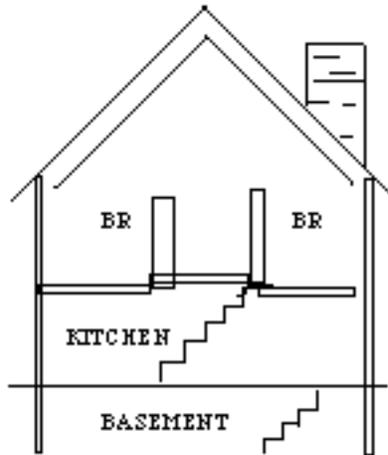


Figure 37. Smoke detector house placement.

these are fairly inexpensive, they should not be a determining factor in buying a house and should merely be replaced if necessary after a home is purchased.

Update your check list now.



If the building you are inspecting has access to an attic, make a point to give it a thorough look over. Newer homes usually have all the required updated codes in wiring, insulation, and ventilation. By newer, I mean homes of 10 years or younger.

Access to attic areas can be as simple as a crawl space portal in the ceiling of a closet or hallway to a full set of stairs.

In a finished attic, not much can be detected in the way of structural integrity. The only clues you might find are some water stains on the walls or ceiling. This would indicate some necessary repairs to the roof structure, but not the extent of damage.

On the other hand, an unfinished attic will provide plenty of clues to insulation, wiring techniques and structural soundness of the roof. Begin by checking the trusses for

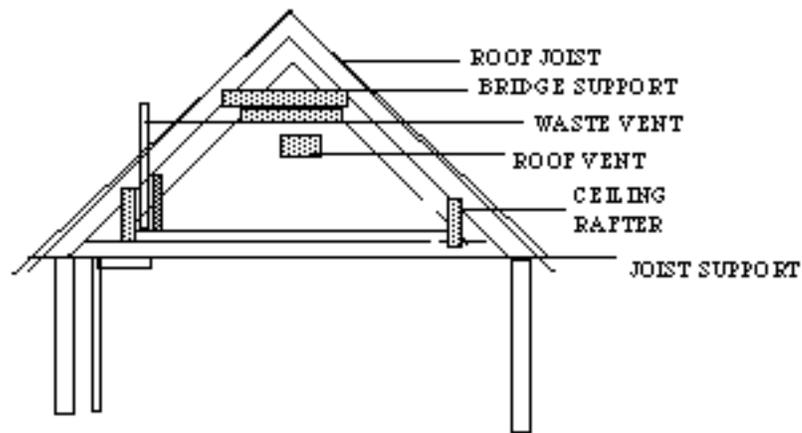


Figure 38. Roof structure.

uniform color. Trusses are the structural braces which hold the roof deck to the home, see Figure 38. Discoloration of some trusses in the area around vent piping could indicate poor flashing around pipes, which will allow water to pass into the roof structure.

Also make any notes on new or replacement wood decking and trusses which support roof decking. This could mean repairs were performed to a continuing roof problem. Always inquire about such repairs and to the extent of the damage. Note the date of repair and whether or not it was covered by any kind of warranty.

Basements are very common and convenient for the home inspector; in many cases, all of your mechanical basic structures are there in full view. In the basement, check the wall and floor conditions. Make note of any large cracks, patchwork or water stains on the walls and/or floor. If the basement is finished, check in the mechanical room for clues of trouble. If unfinished, you can survey all of the plumbing connections (supply and waste pipes) and examine flooring surrounding them for clues of seepage.

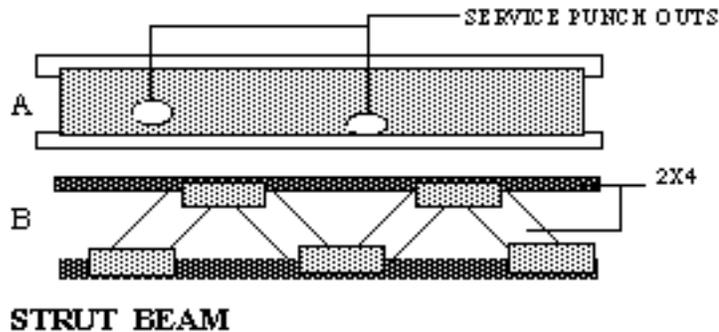


Figure 39. (A) Laminated I-beam. (B) 2 by 4.

Often in an older home you will notice that where the bathroom is located just above, the wood may appear to be darker or rotted. This is due to a leaky toilet seal (a wax ring which seals the toilet to the waste pipe). So with your flashlight, make a close inspection of all the areas where the plumbing is located. Also inspect for old wiring that consists of just two black wires. This is a dangerous electrical situation, because the insulation could be frayed or brittle in places concealed behind walls just waiting to ignite. Also, there is no house ground for protection for transient voltage.

Next inspect the joist system. Normally 2x12s or 2x10s are employed for floor joists. Make sure they are not rotted and no insect damage is visible. There are, of course, the newer joist systems coming along, such as laminated I-beams and 2x4 strut beams, as illustrated in Figure 39.

Both the laminated I-beam and the strut are easier for the builder to install, and in the same configuration as the standard 2x12 or 2x10, they can span a greater distance and provide better support. In the long run, though more costly, the laminated I-beam or strut will prove to wear better.

If this is a home located in area where the temperature will drop below freezing, check for sill cock shut off valves, Figure 40. These are devices that will turn off the supply of water to outside water spigots (or outside house mounted sill cocks). This is an important point, in that if the freezing point is reached at any length of time, there is a chance that the sill cock and connecting water pipes could freeze. Freezing water expands in the pipe and could result in bursting pipes and hundreds of dollars of repairs.

Now, one other problem that should be covered is pest infestation. If this is an older home you are inspecting, be sure to check all exposed wood structures in the basement and attic for evidence of termites, carpenter ants, or powder post beetles. Signs of this kind of trouble are sawdust-looking deposits or small, worm-like holes riddled throughout the wood. Be especially careful to examine main load bearing beams and pil-

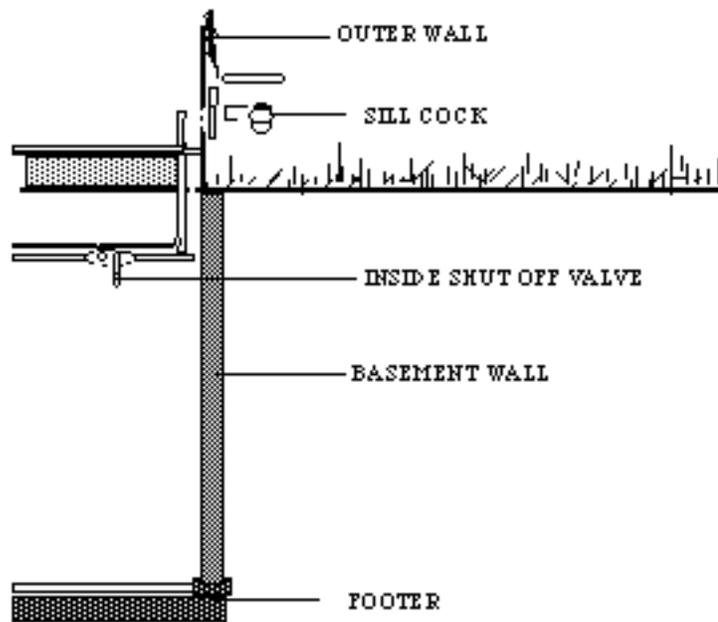


Figure 40. Sill cock shut off valve.

lars. Even if the seller is required to supply proof of passing a termite inspection, it is possible that the damage is irreversible. If you are really set on purchasing this home even with some pest damage present, have a licensed exterminator and a structural engineer assess the property.



DECKS

Decks should be constructed out of pressure treated wood, cedar, or the newer plastic resin hybrids, which are more costly, but practically maintenance free. Support pillars should be anchored in a cement footer which protrudes 6 to 8 inches above the ground and 4 inches in circumference of the pillar. Pillar footers also should be anchored below ground frost levels (18" to 24" deep). Inspect for rotted and warping wood. Examine the footer for cracks that lead from the pillar to the outer part of the footer. These types of problems are more prevalent in old decks or poorly cured cement.

POOLS

An in-ground pool's construction is usually either poured concrete or a one-piece fiberglass insert. First, note the age of the pool, pump filter system and, if included, the pool water heating system. Examine the piping to and from the pump. Note whether it has galvanized or PVC piping. Check for rust around the base of the pump and observe the pump's operation. Note any unusual noises or water leaks in fittings or around the

pump.

Check for obvious defects in and around the pool. A fiberglass one piece liner, Figure 41, or applied surface is low maintenance and can handle expansion and contraction due to weather conditions more efficiently than concrete pools.

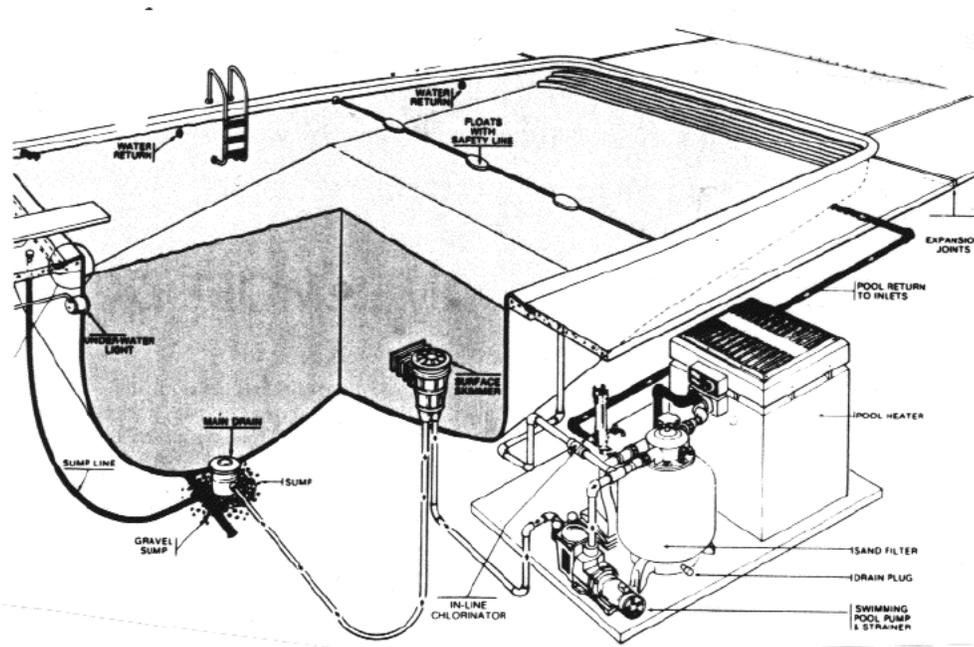


Figure 41. Anatomy of a pool.

Inspect hot tubs and whirlpool tubs in the same fashion, especially the electrical wiring. Also, check the performance of the water jets, and make certain that the system is connected to a ground fault circuit (GFC) breaker at the main.

CENTRAL VACUUM SYSTEM

The anatomy of a central vacuum system, Figure 42, is a series of PVC piping that branches off into convenient locations throughout the home. A special hinged cover with a rubber seal is secured over each access opening. This prevents unwanted vacuum pres-

sure loss while plugged into a particular outlet.

To inspect, start by activating the system. If it is an attachment activated system, check each of the outlets for its ability to turn the system on and off. Next, by employing a 3 x 5 filing card placed over the attachment opening, watch for consistent vacuum pressure. Remove the card while suction is applied and note inconsistencies in any of the remaining outlets.

In the dust-free models, check venting for damage and a clear passway to the outside. This feature in home convenience is quickly gaining popularity in newer mid-range homes. An older system will not have many of the labor saving features of newer models, and will frequently require emptying and servicing. If the home you are inspecting has a central vacuum system, check the condition of the main unit first. Get the information

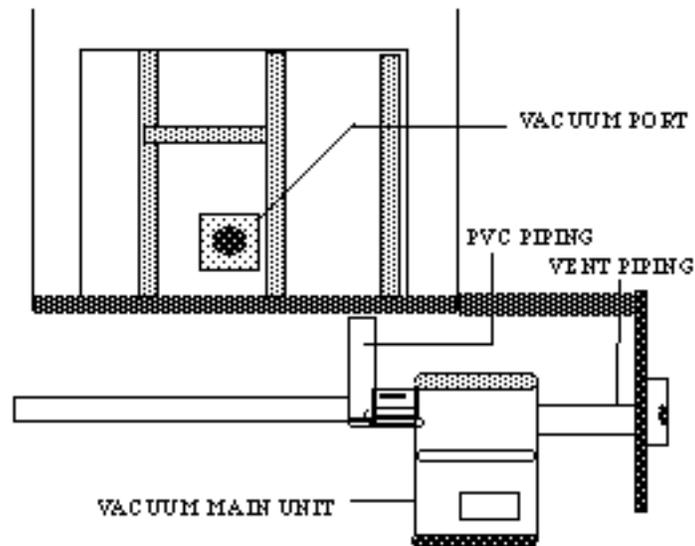


Figure 42. A central vac system.

from the manufacturer's plate, such as year, model, and the existence of warranties. In Figure 42 you can see the basic make-up of a central vacuum system.

SPRINKLER SYSTEMS

A sprinkler system consists of several basic components, Figure 43. Primarily it is made up of pipe feeder lines spaced for maximum distribution of water, sprinkler heads, and a turn on valve system (either manual or automatic).

Inspect the system for proper operation by checking that all sprinkler heads have an even distribution of the water supply. If it is an automated system, test the timer for on/off precision by setting it for a short duration cycle. More advanced systems have PVC piping throughout with pop-up sprinkler heads at ground level, all controlled by a home computer automation system.

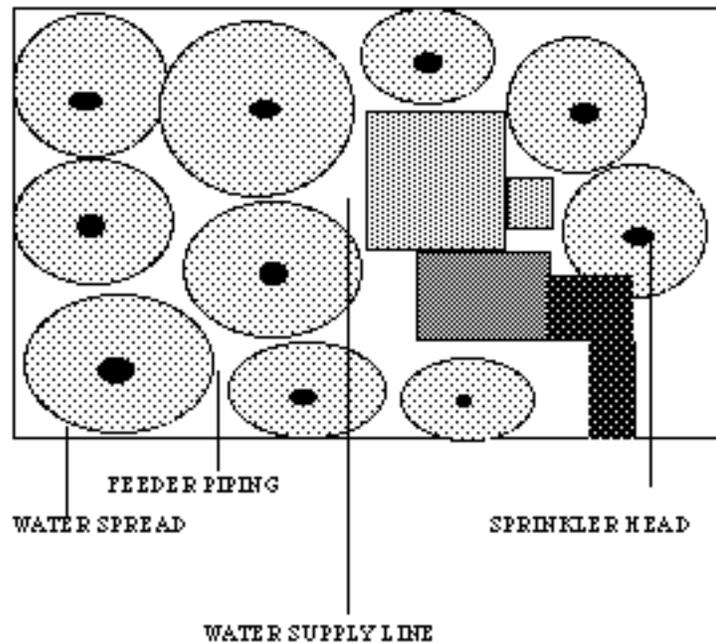
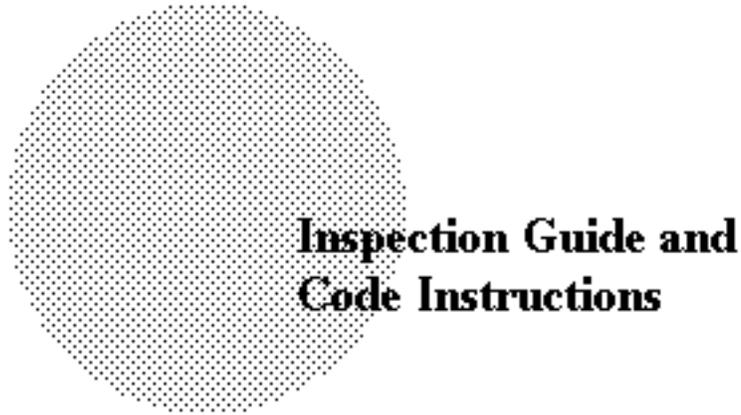


Figure 43. Anatomy of a sprinkler system.



The next few pages cover the use of the check off list. This is a valuable tool for training yourself in the correct way of looking at a future home. Even though the aesthetic beauty of a house should be a factor in your purchase, it is the structural and mechanical components that are going to allow this beauty to continue to stay intact.

It is often difficult to write down necessary information in long hand when walking around with an interested party talking your ear off about how great the house is. Thus came the development of the check off list and its simple set of code notations. After you have studied this book thoroughly, start lining up homes in your area that have a diverse age and price range. This will give you a good handle on how proficient the system works for you. As you continue to practice with this mode of comparison, you will find that making a sound choice in a home can be simple and fun. It's just a matter of combining the features of the beauty and location of the home with the mechanical and structural harmony of the house. As your experience grows with this method of inspection, you will find

that these procedures will start to become second nature.

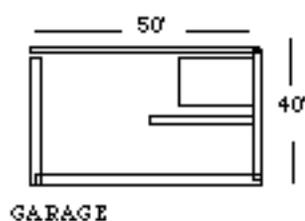
How to start is quite simple. After you have plotted, for example, five to six houses to be inspected, take your check off list and put in sequence the addresses you wish to inspect. Place all pre-inspection data on each of the properties on the forms before leaving. This is usually information gathered by an ad in a paper or given by the real estate broker or owner.

Next, place the check off lists in a simple folder or notebook, and attach the code list on the opposite inside cover. In this way you can refer back and forth from the check list to the code columns.

The first heading is exterior inspection. This is where you will note all discrepancies relating to the exterior structure.

The square footage may be listed, or the agent or owner may know the exact figure, but for your own benefit you should be able to determine an approximate square footage. This is to ensure that you are getting the room you need for you and your family.

A simple method to determine square footage is to measure the rear or front outer wall (this is assuming that they are both of equal length). Then, using your tape measure find the length of either side of the house. Multiply the two dimensions and note the product. Then subtract an allowance for wall thickness and any nonliving areas such as garages or breeze ways. Figure 44 illustrates this technique.



50' X 40' = 2,000 SQ. FT. Most walls are six inches thick if wood frame with siding, and up to a foot thick if walls are constructed from block or brick.

Add the two dimensions together and divide the sum by two if wood frame. Example: $50 + 40 = 90/2 = 45$. Then subtract the 45 feet from 2,000 feet, giving a total of 1955 square feet.

Figure 44. Equation for figuring square footage.

When filling out the line containing foundation, list the type and condition by using the code sheet. For an example: foundation (CP/CH-N)F. This, if you refer to the code chart, translates to concrete pour that contains cracks and holes. Overall foundation needs repair and is in fair condition.

The subject entitled siding covers the type and condition of the exterior wall. Example: SIDING (AL/BR-F)G, which means aluminum siding with brick front in good condition.

Next is type and number of windows. A possible noting of this could look like: 4 (AW-WD) F. . .6 (DH-AL-LE) G. . .2 (CLW-WD-LE) G. . .2 (SG-AL-SP) F. . .2 (BY-WD-LE) G. Deciphering the first set of codes, we find that there are four awning windows made of wood that are of fair condition. Using the code chart, decode the other four window classifications.

Once you have applied this method of notation with codes on a few houses, you will begin to find it easy and quick. Keep in mind that this guide will help sharpen your observations. Don't fall into the trap of taking somebody else's opinion on what the facts are about the home your inspecting. See and confirm it for yourself.

Next on the list, driveways, sidewalks, patios, decks and porches are items on which you should note dimension, type and condition.

In the blank for garage you should indicate the size, type of door, system of operation (automatic or manual) and whether or not it is attached. Remember, garages, basements and decks are not considered living areas. Be sure to subtract their measurements to get a better idea of square footage. Knowing where the property line lies is important for any future plans you may have for erecting a fence, placing an out building, or constructing a pool. In some areas it is against local code to install any of the above items within a certain distance from your property line. Also, this provides a comparison to similar houses with different land dimensions for pricing purposes.

The rest of the exterior inspection list is self explanatory. Now when you get to the noted outside damage section, write down any outstanding or unusual faults or even characteristics of the home. And let's not forget to note the address and the asking price of the property.

INTERIOR INSPECTION

The start of this section is bedroom description. What you are going to record here is the size, type, and condition of each bedroom. For example, a 14x16 master bedroom

with a half bath and walk in closet would be coded: 14x16 MBD...BT1/2-WK.

The same applies in the case of bathrooms. The exception is when you run into special features. These you log at the bottom of the page in the interior noted damage space.

Living room through utility room are subjects that can be elaborated on, especially the kitchen, where there are a lot of appliances and plumbing involved.

In some areas, the fireplace must be inspected by a local government before a new owner can operate it. In any case, inspect this item very carefully, making sure that flues have been cleaned and dampers work properly.

Next, locate and note all telephone jacks and be sure there are enough to satisfy your needs. In days gone by, the mighty phone company used to install jacks in your home as part of the start up service. Now they charge as high as \$150.00 for a single jack addition.

For the rest of the entries, refer to the guide book for entry suggestion. As before, log any special case items in the interior noted damage section.

HOME BUYING INSPECTION
CHECK LIST
EXTERIOR INSPECTION

TOTAL SQUARE FOOTAGE _____

FOUNDATION _____ SIDING _____

TYPE/NUMBER OF WINDOWS _____

DRIVEWAY _____ SIDEWALK _____

PATIO _____ DECK _____ PORCH _____

GARAGE _____ EXTERIOR DOORS _____

PROPERTY SIZE _____ SHED _____

OUTSIDE LIGHTING _____

SPRINKLER SYSTEM _____ SILL COCKS _____

POOL OR HOT TUB _____

EAVES _____ SOFFITS _____

ROOFLINE _____ FLASHING _____

SHINGLES/TILES _____ OVERHANG _____

_____ FIREPLACE _____

CHIMNEYS _____ SKYLIGHTS _____

LAYOUT _____

NOTED EXTERIOR DAMAGE _____

ADDRESS _____

ASKING PRICE _____

INTERIOR INSPECTION

BEDROOM DESCRIPTION _____

BATHROOM DESCRIPTION _____

LIVING ROOM DESCRIPTION _____

KITCHEN DESCRIPTION _____

DINING ROOM DESCRIPTION _____

HALLWAYS _____ CLOSETS _____

UTILITY ROOM _____

FIREPLACE _____

TELEPHONE/INTERCOM _____

_____ ALARM _____

HEATING _____ AIR _____

W/HEATER _____ VACSYSTEM _____

INTERIOR DOORS _____

ELECTRICAL _____

PLUMBING _____

FLOORING _____

BASEMENT _____

NOTED INTERIOR DAMAGE _____

