CAHI™ CONNECTICUT ASSOCIATION OF HOME INSPECTORS, INC.

MONTHLY

News and Views from the Connecticut Association of Home Inspectors, Inc. January 2009

Inside this Issue

Meeting Dates

Jan 10 **CT Law Seminar**

Jan 28 ***Chimney Maintenance & Repair*** **- Jim Jaffe , CT Chimney and Vent**

Feb 25 ***Foundation Cracks*** **- Gene LeBlanc, Concrete Raising Corp of CT**

Mar 25 ***Insulating Materials*** **– Bill Hulstrunk, National Fiber**

Holiday Inn
201 Washington Ave
North Haven
(203) 239-6700

President's Corner

Woody Dawson

The required 3-hour CT Law Seminar is January 10th, 2009 at 8:30 AM to 11:30 AM at the Holiday Inn (201 Washington Avenue, North Haven, CT). A Continental breakfast is included. This course meets the minimum requirements as set forth by the CT Home Inspection Licensing Board. Attendance certificates will be available at the conclusion of the seminar. Mail payments to: CAHI 75 Pond View Circle, Beacon Falls, CT 06403; or visit our web site at www.ctinspectors.com and Register & Pay. On the home page, click on "Special Events" then click on "CT Law Seminar"; Click on "add to cart", fill out the form, and pay by credit card. If you realize you have overlooked sending in your payment, you can pay our treasurer, Pete Petrino, the morning of the Law Seminar (although we do not like to make a habit of this). Credit cards are accepted at the last minute.

A friendly reminder to all members: please make sure you sign in on the sign-up sheet at the meeting so that you are sure to get your credits. If you do not sign in on the sign-up sheet, we will not know if you are there, and you will not get your credit for the meeting. These credits are very important for the renewal of your Connecticut home inspection license. Without these credits, you will not be able to renew your license. You should save all certificates, so when it is time to renew your license, you have all the certificates to check and see if you have enough credits. The speakers at these educational meetings are great and have a wealth of knowledge. Take heed of this reminder.

All members should have a copy of the Bylaws of the Connecticut Association of Home Inspectors Inc. If you do not have a copy, please get a hold of me and I will make sure you receive a copy. You can also call or email Barry Small, CAHI secretary (860-655-6383 or barrysmall@yahoo.com) and he will make sure you receive a copy.

I would like to inform all members that we now have a full executive board. All members will know who is on the board and will hopefully get a chance to talk with them and exchange thoughts and ideas to continue improving our association. I am including the names and telephone numbers of CAHI's executive board below. You can also go on CAHI's web site and get their email addresses, etc., for further communication, if needed.

President and Chairman:	**Woody Dawson**	**203-710-1795**
Vice President:	**Scott Monforte**	**203-877-4774**
Secretary:	**Barry Small**	**860-233-6948**
Treasurer:	**Pete Petrino**	**203-732-8810**
Director:	**Tom Hauswirth**	**860-526-3355**
Director:	**Ken Mita**	**203-269-0341**
Director:	**Randy Howland**	**860-268-7850**
Director:	**Malcolm Ford**	**203-798-8548**
Director:	**Al Dingfelder**	**203-284-1278**

I am looking forward to the many ideas and upcoming speakers and continuing education for the new year of 2009. I am discussing with the board members setting up a bus trip,

(continued on page 2)

(continued from page 1)

as we have done in the past. If any members have any ideas, please share them with me or any board of director. I would like to do this in the spring when it gets warmer out. With a full board, it is going to be much easier to accomplish a lot of the new ideas that I would like to introduce. The board members will be working with an accountant to come up with an annual report that all board members will have access to and I am working on making a budget for the year. Although we are in tough times, an educational bus trip is one of my main priorities and that is what we are about: education and serving the public with the best expertise that a CAHI inspector can give.

I would like to thank all board members and also CAHI members that were so thoughtful in sending me sympathy cards and fruit baskets after the passing of my sister during this holiday season. It is nice to know that so many friends and business associates take their valuable time to call and send cards and fruit baskets, etc. I thank you all from the bottom of my heart for your kind words and gestures.

On a happier note, we can all look forward to the coming New Year 2009. Try to hold strong. Keep your prices in line and be a good, professional businessman. For those that I might not see at the Law Seminar, I wish you all a happy holiday. Try to spend as much time with your families as possible. They are the greatest possessions of your life. Have fun and I will see you at the next CAHI meeting and hopefully most of you at the Law Seminar on January 10th.

Your president,

Woody Dawson

P.S. I would encourage all members to get familiar with all board members, and at every meeting, introduce yourself to the lady or gentlemen sitting next to you. The attendance at our educational meetings has been great!

Upcoming Events

01/10	**CT Law Seminar**	**(This 3 hour course is required every 2 years for license renewal)** Presented by Attorney Kent Mawhinney from 8:30 to 11:30 am at the Holiday Inn in North Haven. Please sign up above under "Special Events".
01/28	**Monthly Meeting**	**Chimney Maintenance and Repair presented by Jim Jaffe of CT Chimney and Vent** Discussion of common chimney issues, identification, and repair.
02/25	**Monthly Meeting**	**Diagnosing and Repair of Foundation Cracks presented by Gene LeBlanc of Concrete Raising Corp of CT** Learn about the methods of diagnosing foundation cracks, common foundations issues, and methods of repair.
03/25	**Monthly Meeting**	**Identification and Installed Performance of Insulating Materials presented by Bill Hulstrunk Technical Manager for National Fiber** Learn about how to identify different insulating materials, their insulation methods, and performance once installed.

Chimneys

By Daniel Friedman

Most Frequent Chimney Defects

- **Chimney cap and crown defects:** missing chimney cap, damaged chimney crown or top seal, leaks into the chimney leading to rust damage on metal flues or frost and water damage to masonry flues, leading to an unsafe chimney.
- **Chimney thimble ports abandoned or hidden**, covered-over by drywall, wallpaper, or a simple metal "pie-plate" enclosure - a fire and flue gas leakage hazard.
- **Creosote or heavy soot in chimneys**: a possible chimney fire hazard, especially at wood-burning fireplaces or woodstove flues.
- **Damaged, blocked, or unsafe chimney flue**s: a damaged chimney flue risks leaking dangerous combustion gases into the building or risks sparks which could start a building fire. Movement and cracks in a masonry chimney, rusted metal flues, unlined single-brick wythe flues, water leaks through chimneys, frost damaged chimney clay flue tiles, missing or open chimney cleanouts, dead-end flues, are examples. Look for conditions likely to rust a metal flue; look for conditions likely to cause cracking, breaking, or spalling of clay flue liners. Look for improperly constructed clay-tile lined masonry chimneys leaving concrete between joints that prevents thorough chimney clearing, or causing leaks and frost damage to the chimney flue or chimney structure.
- **Dead end flues** - a chimney that is entered by a flue vent from a heating appliance, woodstove, or similar device right into the very bottom of the chimney flue. Common in older homes, such flues are easily blocked by falling debris - an unsafe condition.
- **Fireplace inserts for wood or coal installed into an existing masonry flue** without chimney inspection and if needed, re-lining.
- **Missing chimney cleanout doors,** open cleanout doors: a fire hazard as well as a cause of improper, unsafe heating appliance operation.
- **Movement in chimneys**, especially masonry chimneys: a dangerous condition, movement can cause hidden cracks and breaks that make a chimney unsafe, risking flue gas leakage into the interior or causing a building fire.
- **Orphaned gas-fired water heaters** not venting into any chimney, or a gas-fired water heater venting alone into a large masonry flue. The water heater may never develop sufficient heat in the old masonry flue to establish a working draft - flue gases spill backwards into the building, an unsafe condition.
- **Rusted or damaged chimney or fireplace components**: rusted, damaged, inoperative or missing fireplace dampers. Examples include a damper that has rusted through, a metal damper enclosure in the chimney throat rusted through, a metal fireplace insert rusted out at the chimney base.
- **Unlined chimney flues in single-brick wythe chimneys** of older homes - a fire and flue gas leakage hazard.
- **Un-sealed flue-vent connectors at chimney thimbles**: metal flues not sealed in the thimble, missing thimble, risking flue gas leaks or sparks; common at woodstove and heating system metal flue connections into a masonry chimney.
- **Unsafe fire clearances** between metal flues or other types of chimneys and nearby combustibles.

Introduction to Inspection of Chimneys and Flues

A chimney must be moisture and gas tight and convey the products of combustion to the outside atmosphere. It sounds like a simple job, but because chimneys are exposed to weather, high and low temperatures, water and moisture, squirrels, nest-building hornets and birds, corrosive gases, occasional incompetent builders or installers, combustible products, potentially fatal flue gases, and even sparks that could cause a fire, and because proper venting of flue gases is necessary for safe and efficient heating system operation, a periodic and careful chimney inspection is important.

What makes for a reliable chimney inspection for safety and function? A combination of these three things:

1. **A chimney inspection procedure**. Having an inspection procedure helps assure that no critical topic or chimney condition is ignored
2. **Chimney & Venting Alertness**: the inspector cannot rely on a checklist or procedure to guarantee that a chimney inspection is complete and accurate. While checklists and procedures help this process, no checklist and no procedure can list every possible chimney defect or unsafe condition. Alertness includes attending to construction methods and materials or site conditions that might raise a concern about a

(continued on page 4)

(continued from page 3)

chimney and might justify additional investigation, even when no problem is immediately visible.

3. **Good knowledge of chimney construction**, safety, venting requirements, various chimney materials and construction methods and what tends to go wrong with each method.

This helps the inspector to recognize a chimney defect or safety hazard even if seeing it for the first time. This article catalogs and gives details of chimney problems that can be observed from outside and from inside of a building.

A naturally drafted chimney for natural gas or oil fuel appliances lasted many years because of the hot gases venting up through the clay flue.

Photo 1

Changes in the way chimneys are used, including changes from coal, wood, or oil heat to natural gas adds still more chimney problems, some of which are dangerous.

Outside, by attending to even minor clues we might detect improper or unsafe heating system operation, collapse hazards, building leaks and water damage, and other concerns. Of these, most critical and life threatening problem for which a home inspector or homeowner should be alert is the risk of leaks of combustion products into the dwelling - gases which could contain the sparks of a fire or the threat of fatal carbon monoxide poisoning.

Photo 1 shows a cracked chimney top seal or "crown" and also that there is no chimney cap installed. Notice my green pen [DF] sticking right into the chimney masonry at the top? Water and frost damage are risks for this flue. What else can we see on this chimney top? The flue looks pretty clean - perhaps this is a gas-fired appliance. The top clay liner looks good - at least the part we can see in the photo, but don't assume anything about the rest of the flue before it's inspected.

Inside the building we may spot abandoned chimneys, unsafe chimneys, fire hazards and flue gas hazards. During the chimney inspection we may see little clues which point to potentially serious concerns, like broken clay flue tile liner parts in the bottom of a chimney cleanout opening.

Chimney Components & Definitions

NFPA 54, the National Fuel Gas Code, recommends that when a new appliance is retrofitted into an existing installation, or an existing appliance is removed from a common vent, the entire venting system, which may include a masonry chimney, should conform to current codes.

Many houses inspected have had higher efficiency appliances installed, some direct vented, and we observe corroded vent connector pipes, corroded chimney cleanout doors and disintegrated masonry at the cleanout. It is the intent of this paper to inform and suggest to the ASHI members methods of inspecting chimneys and flues so as to provide a more complete inspection for the client.

Definition of Chimney: A chimney is a structure manufactured or constructed to form and enclose one or more vertical passages (flues) through which products of combustion pass to the outside atmosphere. A masonry chimney needs to have a sound foundation to prevent settling and movement, and must be soundly constructed so as not to leak combustion gases as well as to prevent setting the building on fire.

Definition of Flue or Chimney Flue: A pipe or shaft for the passage of smoke, hot air and gas in a chimney. A single masonry chimney may contain more than one flue. There are important safety regulations about the construction, separation, and use of chimney flues within a chimney. In general chimney flues are not shared among devices on different floors, and sharing of flues among devices on a single floor is limited to certain heating equipment combinations.

(continued on page 5)

(continued from page 4)

Definition of Vent Connector or Flue Vent Connector:
A vent is a manufactured product intended only to serve a specific type of appliance under narrowly defined conditions. For example, the thin-walled metal pipe, typically 6" in diameter or larger and used to connect an oil-fired heating boiler or a gas-fired furnace to a metal or masonry chimney is properly called the flue vent connector. Lots of people call this component the "flue pipe" or "stack pipe". There are important safety regulations about the components, installation, fire clearances, and fire ratings of flue vent connectors and their component parts.

Inside Chimneys
All chimneys whose construction is entirely internal to the structure up to the roof line are considered *inside chimneys*.

Outside Chimneys
Chimneys with three walls exposed to the outdoors are considered *outside chimneys*. Vents may experience continued condensation. A "Type B" vent or a listed chimney lining system passing through an unused masonry chimney flue is not considered to be exposed to the outdoors.

The Functions of a Chimney Wall
The chimney wall has two primary functions: structural and draft inducing or thermal performance. Masonry chimney walls are generally built of brick, stone or concrete masonry units. Codes dictate the thickness and mortar requirements.

All concrete products must be waterproofed and all mortar joints solid through the thickness. Masonry chimneys may not be supported on structural elements of the building.

Photo 2

Masonry chimneys must be fully self supporting. Photo 2 shows an unsupported chimney in the top floor of a pre-1900 home. This chimney has it all (bad): the masonry chimney rests on floorboards between floor joists - it does not support its own weight. The chimney is cracked, damaged, and has evidence of a fire. There are other defects as well. Notice the glass chemical fire extinguisher hanging from the ceiling? Will that be effective against a fire at the chimney? (And are its contents toxic?)

Abandoned chimneys that have been partially removed may also be structures that are no longer self supporting. Surprising to some people is the discover that the lower portion of an internal masonry chimney has been removed in a building, leaving the inadequately-supported weight of remaining chimney sections in an attic or on upper building floors.

Choices for Re-Lining Masonry Chimney Flues
This article will discuss when and why chimney flues are re-lined and lists a few of the chimney repair or relining alternatives. Selection of the chimney liner system depends on the configuration of the flue. Straight flues are not difficult whereas offset flues will require a flexible liner system or the removing of brick work at the offsets so that angle fittings can be installed. Both flexible and single wall rigid metal liners can be insulated to further avoid condensation. This is very important in cold climates and for high chimneys.

Damaged Chimney flues: cracks, holes, spalling
Spalled brickwork can be replaced brick by brick or the chimney can be rebuilt after tearing it down to a sound level. This allows for new flue tiles to be installed if needed. Cracks need to be evaluated to identify the cause - a crack may indicate serious chimney movement, structural damage, risk of collapse, flue gas and fire hazards, or improper construction leading to thermal cracking.

Metal Chimney Component Replacement
Metal components can be replaced and single-wall flue connectors, if corroded on the bottom of horizontal sections, can be replaced with Type B or L flues which will maintain the flue gas temperature and minimize condensation.

Daniel Friedman - principal author/editor of the InspectAPedia™
www.inspect-ny.com/chimneys/chimneys.htm

Foundations

By Randy Howland

It is critical that the supporting structure be designed to resist gravity and support the weight of a dwelling and its contents. Just as the human body is dependent on the feet and legs to support it, a house needs vertical support in order to stand. The actual weight of a house is called, "dead load." The weight of the people and furnishings in it is called, "live load." A house also needs to be well-built horizontally. It is vital that it is built on a sound foundation. The foundation of a house anchors it to the earth and provides the platform necessary to prevent it from sinking into the ground. Furthermore, a good foundation is needed to keep water and soil gases, fungi and insects out the house.

There are three types of foundations: Full Basements, crawl spaces, and slabs. These choices allow a contractor to consider different factors, such as the cost of construction, the type of soil on which the house will be built, the impact the structure on its surroundings, seasonal temperature variations, and wood-destroying insects, which may be present. In homes in Connecticut, it is possible to find all three variations of foundations.

Basement

The Full Basement foundation begins with the excavation of a sight by digging a hole.

In the configuration of the house, the footing will be at the perimeter of the hole. A footing is a solid concrete pad on which the foundation and the house rest. It transfers the structural load of the house to the soil beneath it. Aptly named, the footing is what the house stands on.

The footing is usually 16" to 24" wide and 6" to 16" thick. Its width and thickness may vary depending on the local building codes. If the foundation is 8" (8 inches) of poured concrete or a concrete block, the footing will normally be 16" wide. Footing placements are critical. They determine the position of the rest of the structure. Footing locations are determined by an engineer or a contractor who is able to use a transit. Footings should extend below the frost line to prevent the structure from lifting.

Foundation walls

The foundation walls that sit upon the footings need to be sound. Just as the legs transmit the body weight to the feet, the foundation walls relay the weight of the house to the footing. The construction materials most commonly used today in building foundations are concrete blocks and poured concrete. Manufacturers of these materials stress the flexibility of their product. The strength of either type of foundation depends greatly on the quality of the installer/contractor. Concrete blocks tend to be more porous and prone to water penetration. In addition, if the vertical holes in the blocks are not properly capped with concrete, they can allow termites to enter. The standard poured concrete foundation is 8" and the concrete block foundation is approximately 7.5" thick. Because of this, the first is considered superior to the latter in its "load" capabilities.

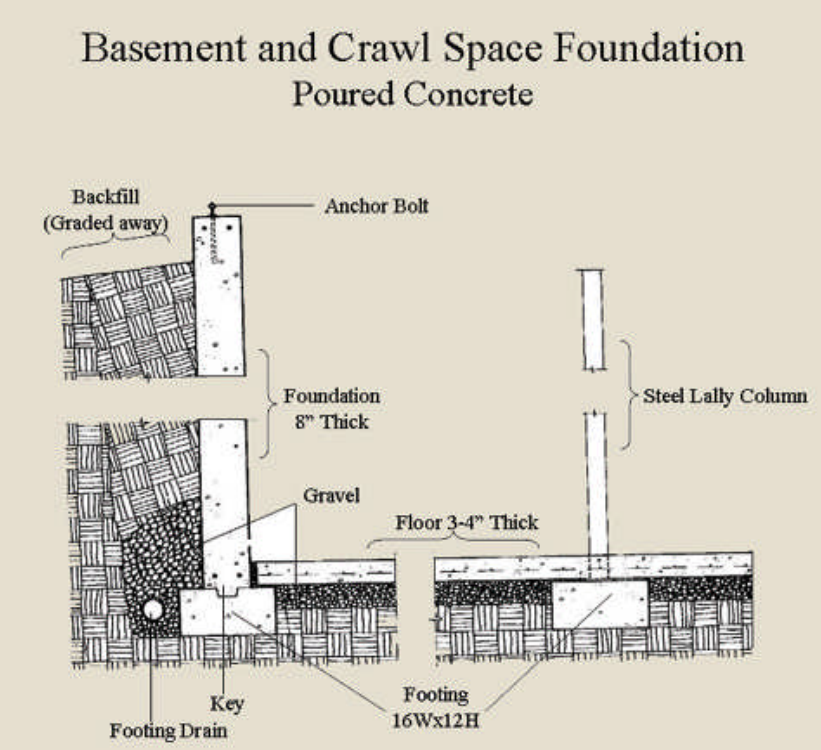
Both, concrete block foundation joints and poured concrete foundations require a number of days to cure. Ordinarily, a concrete company will suggest that building contractors allow 30 days to cure the concrete, but most will not be so patient. Modern day codes require foundations to be waterproofed from the exterior, as well as to have "footings" or weeping drains. After WWI, the installation of drain tiles began, to help prevent moisture from entering the foundation into the lower areas of the structure.

To hold the foundation firmly, the soil backfill should only be placed after the first floor platform is framed. Without proper support, the backfill will put undue stress on the foundation. It should be pitched away from the

(continued on page 7)

(continued from page 6)

foundation to avoid the build up and entry of water into the basement. To conclude the foundation process, the interior basement flooring is poured onto a bed of gravel and wire mesh. The wire mesh is intended to further strengthen the concrete. The floor should be is 3 to 4" thick.



Over the years, other materials have been used in building foundations, as well. These are:

1. Cinder Blocks; 2. Lime Mortar; 3. Brick; 4. Wood.

1. Cinder blocks, made from ash, cinders and slag from steel making, deteriorate over time. They retain moisture and tend to break when frozen. Also, the iron particles, used as a portion of the cinder materials, may cause rusting and staining.

2. Stone or rubble foundations are sturdy and can last for centuries. They are found in houses predating WWII. These foundations can be 16" to 24 " thick. However, the lime mortar that was used by the masons of the time, tends to deteriorate due to exposure to humidity and soil moisture. Many old, three-story homes in the city of Bridgeport, Connecticut, for example, have mortar joints that are becoming sandy and are disintegrating. The strength of the stone used and the quality of the joint compound, or the lack of these, can cause the foundation to stand or to crumble. The settling of the house can also allow the entry of water into the basement. Another problem, particular to stone foundations, is that the stone used can also be a source of Radon.

3. Brick, used in the construction of foundations, is no longer cost effective. Used below the soil line, bricks may deteriorate, due to the quality of the clay in it. In addition, because bricks are porous, they can absorb water from the soil and spall or chip in thin layers when frozen. Finally, many brick foundations were constructed without footings and are more susceptible to settlement.

4. Wood for the building of foundations was first developed in the 1960s, after the creation of pressure treated wood. The wood was treated by injecting chemical preservatives into it, so that insects and the fungi could not destroy it. Currently, there are over 300,000 homes in the United States built with wood foundations. 2" x 8" treated studs are placed on a bed of gravel without footings. The exterior is clad in 5/8" treated plywood and film wrap before backfilling. This process eliminates the need for concrete and the basement or lower level can be directly insulated and finished.

(continued on page 8)

(continued from page 7)

Crawl space

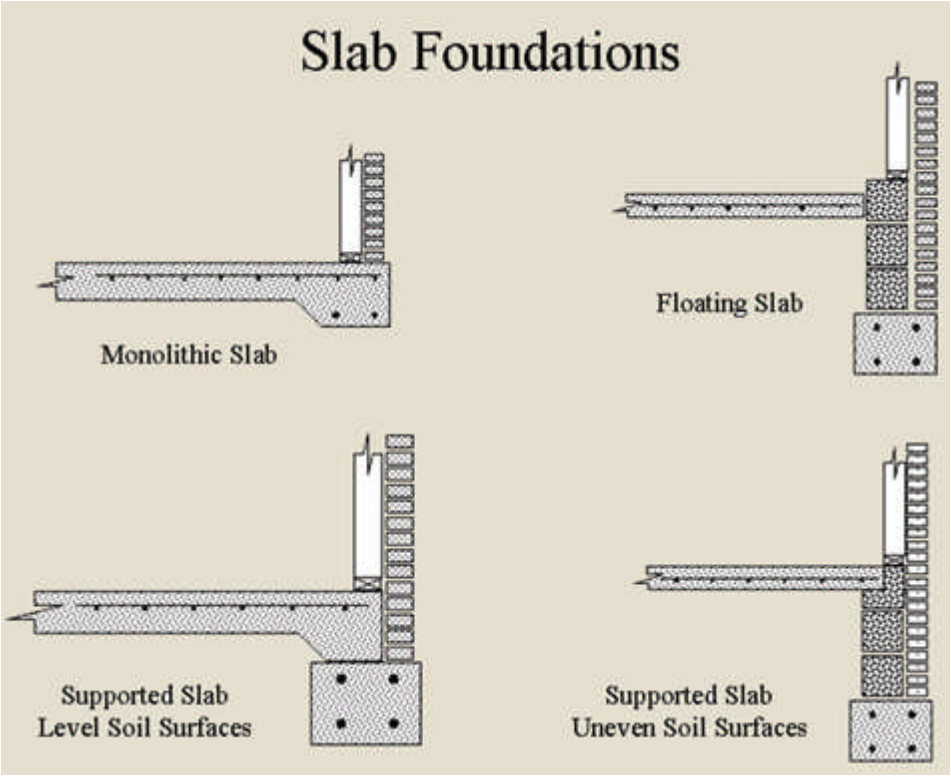
A crawl space is constructed in the same way as a basement. The predominant reason for the option of a crawl space is reduction in the cost of construction from that of a basement. Usually, concrete blocks are used in the construction of crawl spaces, because they more adaptable to height and less expensive than poured concrete. Poured concrete is limited in the size/height of the forms available. Crawl spaces allow for getting the house off the ground, the installation of duct work, plumbing and electrical systems, and easy access to these. However, many crawl spaces do not have adequate flooring at the soil level. This may cause the containment of moisture and the entry of Radon into the crawl space. Crawl spaces should be appropriately floored and sealed. Adequate flooring will avoid future expenses on the part of the proprietor.

Slab

The slab is the easiest foundation to build, because it takes very little site preparation, less labor and less concrete form work. The slab is a ground supported foundation. A slab may be reinforced with wire mesh to prevent settlement and shrinkage. Slabs are generally 4 to 6" thick and vary in their construction. There are methods offering additional support for load-bearing walls, chimneys and fireplaces, that can offer vary in style from traditional to contemporary foundations. Slab foundations come in four basic variations.

1. **Floating or pinned:** This variety is most commonly used for garage floors. The floor, itself, is poured onto a bed of gravel and floats between two walls and the footings. It is free standing, in that it is not supported by some form of support at its edges. Some floating floors are pinned at the edges to tie the walls and floor together.

2. **Monolithic:** The slab floor, and foundation are poured as one piece with mesh and a steel bar to add reinforcement and strength. With the monolithic floor, the edges are also thicker to offer support to



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(continued from page 8)

the load bearing walls.

3. **Supported, footed, or concrete-block supported:** These are variations of the same basic concept. They are comprised of a slab resting at its edges, where vertical support is needed for the framing, or on a direct footing such as the basement variety. They can also be constructed on footing and a few courses/layers of concrete blocks and footing where the soil grading is not leveled, but pitched. Another variety has a shoulder cut at the top of the foundation for the edge of the slab to rest on.

It is not uncommon for water supply and waste lines, heating ducts, or hot water heat plumbing to be located below the slab. When building a slab, it is required that all these systems be installed, before the concrete is poured. Constructors should inquire of the local municipalities about codes of sub slab systems.

Problems for foundations:

1. Irregular soil settlement
2. Undue pressure on the foundation created by improper back fill

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