Successful Home Contracting

How to save thousands of dollars and get a better quality home by acting as your own contractor.
Lesson Five

Planning Decisions

• Basic Choices
• Structural Systems

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SUCCESSFUL HOME CONTRACTING

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In the last lesson you learned what will be included in your Plans and Specifications. We also looked at various ways of getting your Plans actually drawn up.

In the next four lessons we will examine the various elements of the home to see what your choices are in all of your design decisions. We will take you systematically through the home, describing the elements and systems, and listing the items you may want to consider for your home. Some of the things are clearly optional items, like a sauna! Others are not.

As builder and owner, you will make all the decisions! The choices you make, as reflected in the plans and specifications, will be used by the appraiser who helps the bank decide how much money to loan you to build the home. It is important that everything is spelled out in as much detail as possible. When people have to start guessing what you want, is when you start getting things you don’t want. Don’t leave it to chance!

Perhaps you already know exactly what you want in your home. Maybe you've seen or lived in a home that you want to duplicate. Or you've been planning to build for a long time and have developed some ideas. If this is the case, great! You're ahead of the game. If you haven’t gotten quite this far, you’ll want to look at some basic decisions you’ll need to make to help establish the general direction your planning takes. After these basic decisions, we'll begin our first journey through the construction of the home, touching on all of the elements about which you will want to have some say.

This lesson will deal with the Structural Systems of the home. In the next lesson, we will examine the Mechanical Systems.

Note - Some of the information you encounter in the next four lessons is not presented as a basis for decision making, but rather as information only to educate you on the basics of home construction.

In looking at the various elements to be tied down, no distinction has been made between Plan items vs. Specification items. If an item can easily be shown graphically, then put it in the Plans. If not, put it in the Specifications.
WHAT YOU WILL LEARN IN THIS LESSON

• Basic decisions which need to be made in planning your home, incorporating such things as your basic goals, life style, and concerns about energy efficiency.
• Where to look for design ideas.
• A convenient way of categorizing all of the elements in the home.
• A good deal about all of the elements which comprise the Structural Systems in the home, including the
  - Footings
  - Foundations
  - Slab or Floor System
  - Walls
  - Ceiling
  - Roof
  - Stairs

BASIC DECISIONS

These are sort of basic questions you should start to tie down early. They really don’t address style or design. They just establish the parameters (limits) within which the design can take place.

GOAL

Start with defining your overall goal in building this home. What are you interested in accomplishing - saving money, or getting all the home you can afford? Are you building a home for yourself, or is this a home you will sell or rent?

LIFESTYLE

Are you outdoors people? Will you want patios, decks, gardens, a pool? Do you enjoy yard work, flowers, etc.? Do you like to entertain? What size groups?
Is your family young and growing, or are you an “empty nester”? How many bedrooms do you need? How many do you want? Do you want the bedrooms together or would you like the master suite in a separate area - called a “split” plan? Do you like the concept of a great room? Or do you prefer a separate den or family room? Do you want a formal dining room or a big eat-in kitchen?

**LOT RELATED CONSIDERATIONS**
If you already own a lot, the size, shape, and slope of the lot will have to be taken into consideration. Do you have room for a home that is 80 feet wide? Perhaps only a two story home will work (they can be narrower, since you’re “stacking” the space). Will a home that is deeper than it is wide work better? Will a basement work with this lot? Some people design a home and then find a lot that will work with the home. Others buy a lot, and then design a home to fit it.

**VIEWS**
How will the home sit on the lot? Are there opportunities for views? If so, how will you take advantage of them . . .decks, windows, etc.? What rooms should be oriented towards the views?

**OVERALL DESIGN**
Do you want a ranch design? A two story? A split level? You may not have thought about it, but a two story home is less expensive and more energy efficient than a ranch style. It is less expensive because you have a smaller foundation and roof for the same amount of living space. It is more energy efficient because there is less roof area through which conditioned air can escape.

**SHAPE**
Will it be square, rectangular, L or H-shaped? How about a round house? Or will it be irregular? Here are some considerations. Each corner adds to the cost of the

A Complex Shape On A Small House
foundation and makes the roof design more complicated . . . hence more expensive. As far as energy efficiency is concerned, the most efficient shape (using straight walls) is the square. It will enclose the greatest area with the least outside wall exposed. Unless you’re a masochist, forget the round home. It is expensive, time consuming, and frustrating to make common building materials into curved surfaces.

**FOUNDATION AND FLOOR SYSTEM**
What kind do you prefer - concrete slab or crawl space with floor joists? A discussion of the difference is presented later in this lesson. What about a basement?

**ENERGY EFFICIENCY**
There are many, many things that can be done to conserve energy. Energy design is said to include active and passive elements. An active element may be a solar water heater. A passive feature may be the design of the roof overhang which will allow the winter’s warming rays, but exclude the summer sun.

Some energy considerations relate to the orientation of the home on the lot. Others concern materials, systems, and design. All of the things done to increase energy efficiency fall into one of three categories:

1. Control heat gain and heat loss - caulking, sealing, insulation, vapor barriers, window and door design, etc.

2. Make use of free energy - solar, hydroelectric, thermal, etc.

3. Make the best use of purchased energy - heat pumps, high efficiency appliances, etc.
This course will not present an exhaustive review of the current state-of-the-art ideas and equipment in this field. The Internet is a great source for additional information in this area. (Click here for another great site). We will point out where energy considerations may come into effect as each section is presented.

LOOKING FOR IDEAS

WHERE TO LOOK
There are many places to look for ideas as to how you want your new home to look and what you want it to include. Plan books in the homes magazines, are full of ideas. You can also spend some time in the “field” looking at existing homes in your area. Not only can you visit new home sites, but also open houses for used homes that are on the market. Many cities have annual tours of “designer” homes where you can get a wealth of ideas.

ACCUMULATING YOUR IDEAS
You may develop a scrapbook or file folder of ideas you have seen that appeal to you. This will be a big help to your architect or residential designer, when it is time to actually do the drawings. These ideas may be in the form of pictures you have torn from magazines, photos you have taken, or sketches you have done.

If you are in a new home you particularly like, you may be able to get a floor plan sheet. If not, you can make a sketch of the plan while you are there. Just step off the rooms, figuring about three feet to the average stride. This will give you approximate dimensions which will be close enough to recreate the plan later. Make it a habit to carry a camera and a note pad when you go house shopping.

ELEMENTS OF THE HOME
Now it’s time to examine all of the elements of the home from footings to roof. As we move through the home, it will be helpful for you to have a model in your mind of what is happening. You can think of the home as composed of the following groups of elements:
1. **The Structural Systems** - Footings, Foundation, Floors, Walls, Ceiling, Roof, Stairs- (Covered in this lesson)

2. **The Mechanical Systems** - Plumbing; Electrical; Heating, Ventilation and Air Conditioning (HVAC) - (Covered in Lesson 6)

3. **The “Skin” or Enclosure** - Windows, Exterior Doors, Sheathing, Siding, Veneer, Drywall, Roof Decking, Roofing - (Covered in Lesson 7)

4. **Trim** - Interior Doors, Base Board, Window and Door Casing, Chair Rail, Crown Mould, and Other Interior Trim; Cornice, Pediments, Pilasters, and Other Exterior Trim - (Covered in Lesson 8)

5. **Finishes** - Paint, Stain, Stucco, Wallpaper - (Covered in Lesson 8)

6. **Equipment and Fixtures** - Cabinets, Fireplace, Appliances - (Covered in Lesson 8)

7. **Outdoor Choices** - Porches, Decks, Patios, Drives, Walks, Landscaping - (Covered in Lesson 8)

**THE STRUCTURAL SYSTEMS**

In this lesson we will examine the first of the groups of elements presented above - the structural systems of the home. Much of what we will look at will be in the way of getting some general knowledge about the subjects covered, rather than just pointing out choices for planning decisions. You will be able to refer back to the next few lessons when you get into construction.

**DEFINITION OF STRUCTURAL ELEMENTS**

The structural elements of the home are those which carry the weight or load of the home to the earth on which it rests. Hence, they are often referred to as load-bearing elements or load-bearing systems. They include the Footings, Foundation Walls, Floor, Walls, Ceiling, and Roof. It is important that these elements be properly designed and constructed. For they must not only support their own weight, but a portion of that from above. For example, the walls must be strong enough to support the weight of the ceiling and the roof.
Here is a discussion of each of the structural elements. This is provided as general information and knowledge on your part, and to help you make intelligent decisions on the design of your own home.

**FOOTINGS**

**DEFINITION**
The footing is the thing upon which the home rests. It is usually formed by concrete poured into a trench. Most homes are constructed on 2500 psi (pounds per square inch of compressive strength when fully cured at 28 days) concrete footings. In some areas, steel reinforcing rods, also called re-bars, are required in the footings. This makes the concrete much tougher and less likely to fail. Steel reinforcing rods are required in the footings in areas where the existing soil does not present a good bearing capacity, such as sand.

**ACTIVE SOILS**
Active soils are very fine particle clay soils, e.g. Bentonite, that expand when they absorb moisture. If active soils are present in your area, your footing and foundation system must be designed by a structural engineer who is familiar and experienced with these conditions. These footing/foundation systems are complex. The engineer may require the home to rest on concrete piers, called *caissons*, dug down to bedrock, and the use of special "void materials" to keep the expansive soils from causing the foundation to move. Do not try to design this system yourself. It requires special knowledge and testing of the soils present on your lot.

**DIMENSIONS**
The dimensions of the footings will vary from place to place, again depending on the bearing capacity of the soils present. In many areas a footing that is 8" deep and 16" wide is used. The bottom of the footing should be at least 12" below the finished grade line (surface of the ground). It may need to be deeper. It must be below the frost line. Water expands when it freezes. If the bottom of the footing is not below the frost line, it may be exposed to the upward pressure of the freezing ground water, which may cause structural damage to the home.
**DRAINING**
Footings should be well drained to prevent the damage that water pressure and freezing water can cause. This is accomplished with sand, gravel, and drain pipes. See the Wall Section in the sample plans linked in Lesson 4.

**GRAVEL FOOTINGS**
Wood Foundations call for a footing of gravel! Of course, the bearing capacity of the soil must meet certain requirements. The linked site has a wealth of information.

**FOUNDATIONS**

**DEFINITION**
The foundation is the system on which the home sits. Sometimes the foundation rests upon the footings and supports the floor system - as with conventional foundation walls and piers. Sometimes the foundation is also the footing - as with a home built on piles driven into the ground. Sometimes the footing, the foundation, and the floor system are one - as with the monolithic slab (page 136).

**TYPES OF FOUNDATIONS**
Which system you choose will depend on several factors. Some people believe a foundation system with a crawl space is better. They prefer the “live” feel of a wood floor system and believe it is not as cold as a slab. The fact is, a properly insulated slab can be just as warm as a wood floor. If you have a basement, you’ll have a slab at the basement level and a “conventional” (framed wood) system at the other floor(s). If you have a crawl space, you’ll have to provide an access door of at least 18”x24.” You must also provide ventilation at a rate of one square foot of opening for each 150 square feet of crawl space. This is usually accomplished with rectangular foundation vents. One vent has to be within three feet of each corner.

**CONVENTIONAL MASONRY AND CONCRETE SYSTEM**
Many foundation systems consist of a continuous, masonry or formed concrete perimeter foundation wall sitting on a concrete footing. Inside the perimeter there may also be a number of piers, columns, or posts, which sit on their own individual footing pads, and are there to support girders or beams, which in turn support the floor joists.
Masonry foundation walls can be block or brick or a combination of the two. If you use block, do your mason a favor - order block made from lightweight concrete. He'll love you!

The thickness of the wall and the sizing of the columns and piers depends on the materials used and the loads being supported. Placement (spacing) of the piers depends on the size of the beams sitting on them (larger beams will span greater distances).

Your architect will be comfortable in specifying the proper size and spacing for each of these elements. If you are unsure, check your building code and with your local building official.

Wood Foundations
If you are interested in a Wood Panel...
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Foundation system mentioned above, check out the official web site here. Thousands of homes have been built using this system. The advantages are the ability to get the foundation in during bad weather, the elimination of one trade (masons or concrete foundation sub), and it is fast. Click here for a good book on the subject.

SLAB

Definition
The slab is a system consisting of (from the ground up) 4” of sand, gravel, or crushed stone; a layer of 6 mil polyethylene used as a vapor barrier; a layer of wire mesh - usually #10 wire welded in 6” squares (6x6-10/10) which is embedded in the concrete; and 4” of 3000 psi concrete. Studies have shown that most of the heat loss in a slab is through the edge. The edge of the slab is insulated with styrofoam to reduce the heat loss through the slab into the ground.

Some people prefer slab construction, because it can be less expensive than other systems. Also, with a slab, you never have to worry about a squeaky floor! If your area tests high for radon, click here to see an EPA publication on design techniques to reduce the radon threat with slab construction.

[Image of a diagram showing the components of a slab foundation system, including foundation wall, grade, footing, undisturbed soil, compacted sub soil, 4" sand, polyethylene, welded wire mesh, and styrofoam insulation.]
Monolithic Slabs
In this type of slab, the edge of the slab is supported by the foundation wall, or by a turned down portion of the slab which serves as foundation wall and footing. If the slab is supported at its perimeter by a foundation wall, chances are there has been some backfilling of dirt within the foundation walls to provide a supporting surface for the slab. This fill material should be compacted to minimize its shrinking away from the bottom of the slab. Also, it's a good idea to dig a few holes through the fill dirt down to undisturbed soil before pouring the slab. That will allow the concrete to flow down into the holes and provide additional support for the slab.

Post-tensioned or Engineered Slabs
Another form of slab is the post-tensioned or “engineered” slab. This slab has steel cables running through it in both directions. Once the slab has cured, the cables are stretched and secured at each end so that a force is placed on the slab. This makes the slab tougher and more crack resistant. This process can only be done by qualified professionals. It should be supervised or approved by an engineer. Engineered slabs are more common in areas where active soils or soils with very poor bearing capacity are present.
FLOOR SYSTEMS

DEFINITION
Floor systems are either wood or concrete slab (discussed above). Parts of a wood floor system include supporting members (beams and girders), floor joists, and flooring. The second floor in a two story home rests on the first floor walls and other supporting structures (headers and beams).

SUPPORTING MEMBERS
These may be wood or metal or some combination of the two. Some typical examples are:

COMMON BEAM
Usually two or more 2x’s (pronounced two by) pieces (2x8, 2x10, etc.)

FLITCH BEAM
Two 2x’s with a piece of steel plate or plywood between. A typical example would be two 2x10’s with a 1/2" x 9" steel plate. These pieces are bolted together.

BOX BEAM
This beam is constructed with a 2x top and bottom, and with plywood sides. The sizing of the material, depth of the beam, and load it will carry determine its span capability.

LAMINATED BEAM
This beam is made up of several pieces of wood (usually 2x4's) glued together. This is a factory made item.
STEEL I-BEAM
Steel is often used when longer spans are desired. Often a 2x wood plate is fastened to the top of the steel beam to make it easier to attach joists.

MICROLLAM®
Microllam® is a registered trademark of Trus Joist, a Weyerhaeuse Company. This beam (pictured below) resembles a very thick piece of plywood. It comes in various thicknesses and widths. When ordering, you specify the length you need. As a manufactured item, it can be cut to any desired length.

COLUMNS AND POSTS
In some cases there is no wall to support a second story load. This is typical in garages and under porches. Often, a post or column is the answer. This may be a simple 3 or 4 inch steel column, a turned post, or a turned or fluted column for the porch. Porch columns are available in wood or aluminum. Sometimes a porch column is made of 1x6’s nailed together to form a box shape.

FLOOR JOISTS
Floor joists are usually wood 2x’s. The size depends on the type of wood, the span, and the anticipated load they will carry. There is a manufactured joist on the market called a TJI®, also a registered trademark of Trus Joist. It consists of two 2x4’s (top and bottom) with a plywood web between. (See photo next page) It’s advertised benefits are no-squeek floors, consistent quality, lightness, and ease of installation. Depending on the market, the TJI® may or may not be less expensive than 2x’s.

Another type of joist is the floor truss. Its advantages would include the ability to achieve greater unsupported spans, keeping in mind that the greater the span the greater the depth of the truss that would be required.
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From Manual for House Framing, National Forest Products Association, 1961

Trus Joist being set

Cantilevered Floor Trusses

Details of Floor Joists at the Foundation Wall, showing the Sill and Band Joists. From Manual for House Framing, National Forest Products Association, 1961

Tongue and groove, one-piece floor system, combines sub and finish floor
Floor joists are usually placed at 16" or 24" on center. At the foundation wall they usually sit on a sill plate or mud plate - a treated 2x placed flat and bolted to the wall. Treated wood has been impregnated with special salt solutions under high pressure to retard rotting in the presence of moisture. The joist which is placed at the end of the other joists is called the band joist. Joists can extend over the foundation wall, or, in the case of the second floor of a two story home, over the first floor wall, creating an overhang. This is called a cantilever.

**FLOORING**
Subflooring and finish-flooring are sometimes combined into one piece. This would typically be a plywood product, perhaps tongue and grooved. It would be attached to the floor joists with glue, nails, screws, or a combination thereof.

When separate layers are used, the sub layer can be plywood (typical) or 1x lumber (rarer these days). Since two layers are being used the plywood is thinner - usually 1/2". The top layer (finish floor) can be plywood, particle board, or hardwood. A layer of 15 pound “felt” paper is often laid between the layers as a vapor barrier. Plywood with a waterproof glue is preferred in wet rooms (kitchen and baths). This is because particle board tends to decompose when wet.

**WALL SYSTEM**
You may not have given it much thought, but an exterior wall is a pretty sophisticated system! It is called upon to keep the elements out, keep your conditioned air in, and provide support for the roof. The exterior wall as a system includes not only its structural parts but also the siding, sheathing, insulation, and drywall, as well as the exterior doors and windows. It also may contain parts of other systems like the plumbing or wiring. In this lesson we will only discuss walls as part of the structure. The other parts of the wall will be discussed as we explore the other groups of elements in your home (skin, systems, doors and windows, trim, finishes, and equipment).

Most walls are constructed of 2x4 lumber. Some homes use 2x6’s for the exterior walls so that more insulation can be used. Steel studs have been promoted for homes, but these haven’t caught on in most places.
The parts of a wall include:

**BOTTOM PLATE**
This member is usually the same size as the studs but is laid flat. If you are building on a concrete slab, this member should be treated wood. The codes actually permit this member to be a 1x (remember, this is pronounced one by) but most builders use a 2x because it gives them more surface to nail the floor board to when the trim work is being done.

The bottom plate for exterior walls is often set on a bed of caulk or a “sill sealer”, which is a roll of insulating material as wide as the plate. This will help prevent heat loss and infiltration under the outside walls.

The bottom plate of exterior walls are bolted to the foundation wall or slab.
**STUDS**
These are the vertical members of the wall. They are usually placed at 16" or 24" on center. When you space the studs in the exterior wall at 24" on center, you reduce the wood in the outside wall, which can help save energy (wood is a much poorer insulator than fiberglass).

**TOP PLATE(S)**
Most builders use two top plates. The uppermost is used to overlap and tie adjacent walls together. It also helps keep walls straight. A single top plate has been approved by the codes if the roof trusses are placed directly over the studs. In this case, the breaks in the top plate and adjacent walls must be tied together with steel plates called tie plates. These are approximately 3" x 6" and come with nail holes.

**CORNER BRACING**
This is bracing designed to prevent racking (this is the movement in a rectangle which would cause it to become a parallelogram. Corner
bracing is usually a 1x4 “let-in” to the studs at a diagonal. Let-in means that the studs are notched the depth of the brace - usually 3/4" - so that the brace is flush with the interior surface of the stud and hence does not interfere with the later application of drywall to the studs.

Another method of bracing the corner is to simply use a piece of plywood in place of sheathing at the corner. The third form of commonly used bracing is the metal strap. Its cross sectional shape is a “T”. A saw kerf in the appropriate location of each stud is all that is required to prepare this brace for nailing.

**HEADERS**

Headers are used to span openings, like over a door or window. Usually a header is constructed of two 2x’s placed on edge. An alternate method suggested in the Arkansas Home, an energy efficient system once promoted by Owens Corning Fiberglas, is to glue and nail a piece of plywood to the outside of the studs above the window or door opening. The advantage is that you have an open space for insulation. Headers are supported by “jack studs” or “jacks.” The continuation of the studs between the header and the top plate is called a “crippl.” In concrete block construction, the header is a prefabricated, reinforced concrete lintel, which simply sits on the blocks that frame the opening.

**DEAD WOOD**

Dead wood is nailed to the sides of wall studs and top plates to provide a nailing surface for the edges of the drywall. Since it has no structural duties, scrap materials can be used.

Dead wood can be eliminated entirely if drywall clips are used. These are metal clips designed to secure the drywall edges to the framing members. By using these clips, the third member of a wall “corner” can be eliminated allowing the corner to be insulated. Other
than that, they probably don’t save much, since scrap materials (bracing, etc.) can be used for dead wood.

**A NOTE ON LOAD BEARING VS. NON-LOAD BEARING WALLS**

Load bearing walls carry the load of the ceiling and roof structure to the foundation. Non-load bearing walls carry their own weight. Framing around door and window openings in non-load bearing walls can be much simpler. Headers can be single 2x’s framed flat, with no supporting jacks. It’s not always easy for the novice to tell which walls are load bearing. You really don’t need to worry with this level of detail. The framers will do it automatically. The framing inspector will make sure.

**THE CEILING**

Ceilings are not as complicated as walls. The simplest ceiling is formed by the bottom chord of a roof truss. In this case, there is no additional step to constructing a ceiling. The roof truss is set in place, and that’s it.

If trusses are not used, the ceiling is constructed much like the wood floor. In fact, in a two story home, the ceiling of the first level is the floor of the second. The members are called ceiling Joists. They rest on the walls, or on beams which span between the walls. Occasionally there is no wall to support a beam, and a post of some kind becomes necessary. Working these into the design of the home so that they are not obtrusive is half the fun of home design!

Some builders use a vapor barrier on the ceiling prior to installing the drywall. Others believe that this should be omitted to allow moisture generated in the home to escape.

**ROOF SYSTEMS**

The roof structure will either be “stick built”, trussed, or a combination of the two.
TRUSSES
Roof trusses are those roof shaped frames that you’ve seen stacked at construction sites. Trusses are engineered and shop built for each job. By careful design, the truss is constructed to concentrate the entire roof load at the ends of the truss. This means that the truss actually spans the distance between its two end bearing points. Although there may be walls under the truss, they are partition (non-load bearing) walls.

The advantages of using trusses are cost and speed and ease of installation. Trusses can be constructed to accommodate almost any roof configuration, but in a practical sense, the simpler the roof, the more attractive trusses are to use. They are ideal for straight runs of a gable roof.

The disadvantage of using trusses is that the webbing required to create the strength of the truss takes up a lot of space. When you go up into a trussed space, it's like running into a spider web every two feet. There's not much usable storage space.

Are trusses as good as an old fashion, conventionally framed roof? Many people think not. We think so. Trusses have proved to be just as sound structurally as the old system. In some cases, even more so. It's hard
Just Some of the Types of Trusses Available
The alternative is to “stick build” the roof - which is exactly what it sounds like. All of the roof members are cut and installed on the site. The photo (right) shows you some of the members involved in a stick built roof. One advantage is the additional storage space you’ll have in the attic. A disadvantage may be a more complicated load carrying system throughout the house.

**ROOF PITCH**
With the other structural elements you’re pretty well stuck. Walls go straight up and down. Floors and ceilings are flat. But roofs slope! And you get to decide how much.
The slope is expressed as so many inches rise (or fall) in 12 horizontal inches (see "Truss Parts", above). A “12/12” pitched roof is sloped at a 45° angle. A 5/12 to 7/12 pitch is pretty typical in most parts of the country. In warm climates like the desert southwest and Florida, lower slopes are common. Up north steeper pitches are used to help shed snow loads. The higher the pitch, the more roof surface you’ll have, and the more sheathing, paper, and roofing you’ll need. Also, roofers charge more for steep roofs because they’re harder to work on. You may want to find out at which pitch they start to raise prices in your area.

**FLAT ROOFS**
Flat roof construction is unusual in single family construction. It is the most difficult to do without having leaks. Avoid them if you can.

**OTHER PARTS OF THE ROOFING SYSTEM**
Here are some other things that, although they are not structural are presented here because they are attached to the roof.
THE OVERHANG
This part of the roof (which is often called the cornice) is used to shade the home and to get the water that drains off the roof not to run right down the side of the home. With improved insulating materials, solar screening materials for windows, and gutter systems, the overhang is mostly decorative. It also provides a shadow line that is architecturally pleasing.

The parts of the overhang are:

The Fascia
is the vertical board that drops down at the edge of the roof. It is attached to the ends of the roof rafters or trusses. It is the surface on which the gutters are attached. The fascia is often made of a 1x6 or 1x8. It can also be made of aluminum or vinyl.

The Soffit
is the horizontal section that runs from the fascia back to the wall of the house. This is where you will often find some eave vents.

The Rake
is the overhang that occurs at the gable end of the roof. It also consists of a fascia and a soffit. There is usually a piece of trim on the rake fascia just under the roofing material. This could be shingle mould or simply a piece of 1x2. Sometimes the rake is omitted. That is, there is no overhang on the gable end. In this case, the rake is usually replaced by a 1x placed flat on the gable end and running just below the roofing.

DORMERS
are the little roofed projections protruding from a roof which provide an opportunity to get some window space into a room which is tucked up under the roof. Sometimes they are added for looks, even though there is no room!
CRICKET is a little pitched roof which is built behind a chimney to shed the water away from the junction of the chimney and the roof - a vulnerable spot for leaks.

STAIRS
Stairs are not really structural elements, but they are included here since they are an integral part of the structure, especially in two-story designs. Stairways can be a straight uninterrupted run, winding, or broken with landings where they change directions. Spiral staircases are occasionally used in residential construction. Today, many builders use stairs which have been fabricated by a specialist. The advantages are consistent quality and speed of installation.

PARTS OF THE STAIRS
Stairs are made up of the stringers, risers and treads. The stringers are the notched boards running under the steps along each side. The risers and treads are nailed to them. The tread is the thing you step on and the riser is the piece your toe hits if you try to step too far forward. An “open” stairway has no risers.

DIMENSIONS AND PROPORTION
The building codes specify the dimensions and proportions of the risers and treads. These are not presented here because everyone concerned (your architect and carpenters) should be thoroughly familiar with them. One that you should know about is the head room required between any tread and the ceiling above . . . you must maintain a minimum of 6’-8".
Well, now we’re really getting into it, aren’t we? We looked at the plans and specifications in general in the last lesson. Now we have begun to look, in a systematic way, at all of the things you will have control over in the design of your new home!

In this lesson we examined some Basic Decisions you’ll need to make before design really gets underway - such things as basic goals, lifestyle, and general ideas you already have about the shape, look, and energy efficiency of your new home.

Then we went through the structural systems of the home, including the footings, foundations, floor, wall, ceiling, and roof. We also included a look at the stairs, even though they are not really a part of the structural systems in the strictest sense of the word.

In the next lesson we will continue our trek through the home. We’ll be taking a look at the mechanical systems of your home - the plumbing, electrical, and HVAC (heating, ventilating, and air conditioning). In future lessons, we’ll examine the enclosure, doors and windows, trim materials, fixtures, equipment, hardware, finishes, and so forth.