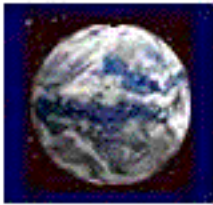


Intelligent Universe
Publications

Presents



THE **Better Earth News**

Guide to

Alternative Building Methods

Written & Illustrated by
Patrick McDonald

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Acknowledgments

I would like to send out my heartfelt thanks to the many people who helped this guide come to be. To my mother Marion and my brothers Frank and Jim without whose constant love and support I could never have succeeded, I am forever indebted. To my friends in Rico, Colorado who first introduced me to Alternative Building, thanks for the bonfire dancing in a mountain meadow. To my children who remind me why we are here on Earth; to play and laugh and love. And especially to my wife Susan who is my inspiration, fellow traveler and love of my life without whom my life would have no meaning at all.

The information in this guide was garnered from many different sources both library and internet based. To all those who have gone before me, I am deeply grateful. I am proud to join those for whom spreading the word of self-sufficiency and sustainability is of paramount importance.



Introduction & Welcome

Congratulations and thank you for your purchase of the Guide to Alternative Building!

With the information and resources include in this electronic book you really can build a beautiful home for as little as \$12 per square foot! Why spend between 30 and 75 thousand dollars on a “pre-fab” mobile home when you can have a “real” home that's twice as energy efficient and ten times as beautiful for half the cost? With one of the methods described below, you can have the exterior walls of your new home erected in a single weekend **and make money doing it!**

These alternative building methods allow the average person to do what we have all but forgotten in today's society: to **Live Self-sufficiently!**

Building your own home gives you many benefits:

- Alternative homes are beautiful, unique, energy efficient and inexpensive to build.
- You can save literally thousands of dollars in contractor, architect and labor costs!
- If you host a seminar, you can find people who will actually pay you to help you build your home!
- You can learn how to use passive solar energy and other “low tech” methods to keep your house warm in the winter and cool in the summer at a fraction of the costs of a conventional home.
- In many cases the government will actually pay you to save energy!
- The joy of living in an all natural environment with great air quality and none

of the toxins commonly found in a conventional home.

Enclosed in this book and its accompanying lecture series entitled “Project Self-sufficiency!” you will find:

- Floor plans, diagrams and guidelines for several excellent alternative building methods including:
 - **Straw Bale Homes**
 - **Adobe**
 - **Earthships**
 - **Other Alternatives**
- Our lecture series including reports on:
 - **Host A Wall-Raising Workshop!**
 - **The Best Places To Build In The United States**
 - **Do It Yourself Hydronic Floor Heating**
 - **Earth Plasters**
 - **Alternative Energy Sources**
 - **Rainwater Catchment Systems**
 - **The Self-Sufficient Garden**
 - **Government Energy Rebates**
- A large list of internet and library based resources for additional information on each and every topic!

So get ready to learn about the wonderful opportunities that await you in Alternative Building!

Chapter 1

Straw Bale Homes



Introduction

Straw bale construction uses baled straw to make walls which are then covered in plaster or stucco. They are easy to construct, inexpensive and environmentally sound.

The Better Earth News rates this method as the best and easiest building alternative out there. It's my number one choice for the inexperienced builder.

Keep in mind that we are talking about straw as opposed to hay. Straw is the left-over part of the plant (wheat, barley, rye, rice, etc.) after the seed heads have been harvested. Straw contains little or no food value and is therefore cheaper to purchase and of little interest to pests.

History

Although straw bale homes have been enjoying a renaissance all over the world, building with straw bales was first practiced in Nebraska and other of the "plain's states" in the late 1800's and early 1900's. There are many early buildings still being used today! This simple and wonderful technique can and has been used for homes,

farm buildings, schools, churches and many more types of structures.

Benefits


Straw Bale Homes (SBH) have many wonderful features and when built correctly are far better than conventional homes in many respects.

- **SBH** are inexpensive to build. Not only have these great homes been constructed for as little as ten dollars per square foot, you can hold a seminar and workshop (*see lecture series*) to offset the building costs.
- **SBH** have a high "R" factor which means they provide excellent insulation. This keeps you warm in the winter and cool in the summer at much less cost than a conventional home.
- When used in combination with "breathable" plasters, (*see the plaster section of the Lecture Series*) the **SBH** acts as a natural filtration system for your entire house keeping the inside air quality much better than that of "normal" homes.
- They are fun to build - when you host your workshop, have your friends and family out for a good old-fashioned "wall raising!"
- Straw Bale Homes are beautiful, strong and fire resistant.

Considerations

There are several things to consider before building your straw bale home.

Straw - It's best to buy your straw as close as possible to when you are going to use it. Storing straw and keeping it safe and dry is very difficult. If you must store it for a while, it's best to cover it with plastic first and then



with the best tarp you can afford. Make sure that the tarp is held down well or the first big storm will get you out there in the middle of the night trying to re-cover your stack. (I learned this one the hard way!) Also, stack it with a crown on top to insure that the water sheds off efficiently. As I said, if you have your straw delivered close to building day, a lot of this trouble will be avoided. To get the cheapest price on straw, buy it as close to harvest time as possible. I've seen prices vary from \$1.50/bale to \$5 and up!

Style

There are two basic styles of straw bale building: Post & Beam and Load Bearing. In this guide we will be exploring the load bearing or "Nebraska" style. Load Bearing **SBH** are best suited to single-story homes although several have been built as two-story homes.

Have Fun!

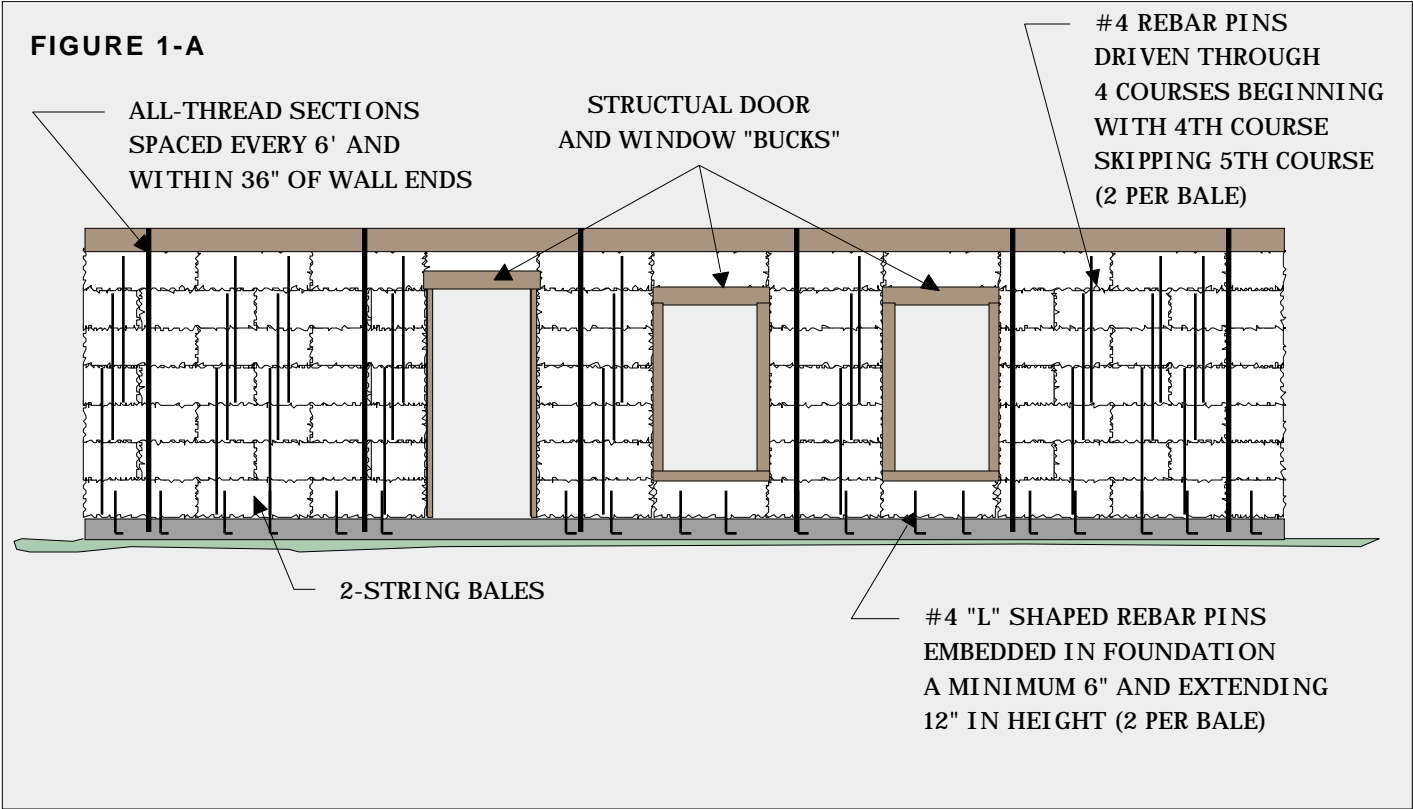
Straw Bale Homes are fun to build, lovely to look at and will give you a real sense of pride to own.

The fun part about building your own home is the freedom of expressing your personal creativity. Take the time to outline exactly what you want to build, but then, be open to changes as the building process begins.

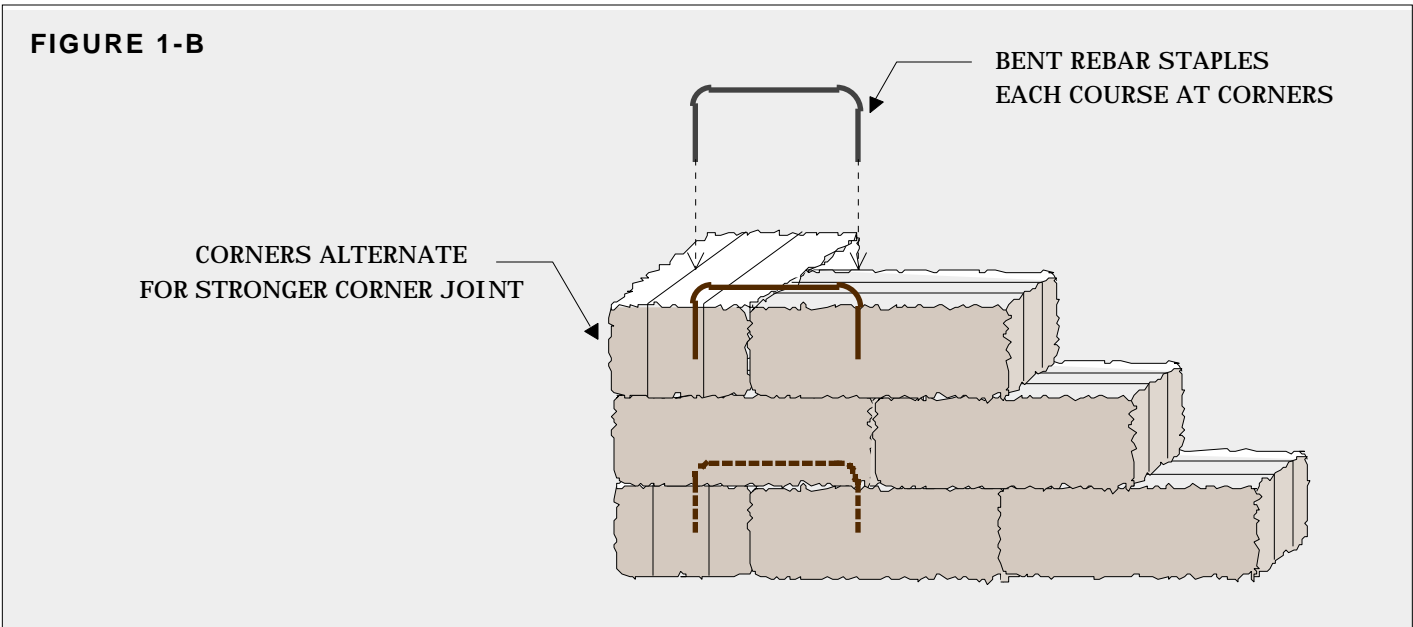
You don't have to have a professional set of blueprints, a contractor's license or a degree in architecture to build these homes. Many people have built beautiful, original homes just by scribbling a rough drawing on a piece of paper and going for it!

You can too!

Straw Bale Wall Diagram



Corner Detail



Materials and Tools

For Straw Bale Construction

Straw

Any kind of straw can be used in the building of your home. The most important factors are that the straw must be dry and tightly baled. You can tell if the straw is baled tightly by how tight the wires or strings feel. If it's fairly difficult to get your fingers under the wire, you have a good tight bale. Ask your supplier if the bales were made tight or loose.

Straw comes in 2-wire (or string) bales and 3-wire(string) bales. Although many people have used 3-string bales to build their homes, I personally recommend 2-string. 2-string bales are cheaper, smaller, easier to move around and easier to modify. Additionally, being wider, a 3-string bale requires a wider foundation which is more expensive. 2-string bales are roughly 41" long, 14" high and 18" wide.

Baling Twine

You will need baling twine (available from hardware and feed supply stores). The twine will be used to modify the size of individual bales. The process of modifying bales will be discussed later in this guide.

Tools

A few unusual but inexpensive tools will be needed to build your Straw Bale Home:

Rebar Cutter

This is a special tool for cutting and bending rebar. You'd be better off renting this tool for the day from a tool rental place (check your Yellow Pages under tool rental) You could buy one but all of the cutting and bending you need to do can be accomplished in a day. If you do choose to buy one be prepared to spend anywhere between \$75 and \$150.

Baling Needle

A baling needle for use in modifying bales is a must. I'll show you how to make one in the "Modifying Bales" section below.

Rebar Driver

To drive the rebar pins into and through several bales it makes it a lot easier to have one of these home-made drivers. (It'll also keep you from banging your hands with a hammer as much!)



Slip this over the end of the rebar pins and drive the pins in with a hammer.

Sculpting Tool

One of the nice things about bales is that they can be sculpted in a way that gives doorways and windows an open feeling (more on this later). However, in order to do that you need to have some sort of cutting tool. I have seen people use every thing from sharp knives to weed-whackers. Personally, I have found a small electric chainsaw to be the best overall tool.

Preparation

Foundation Details

Please see the chapter on foundations for more general information.

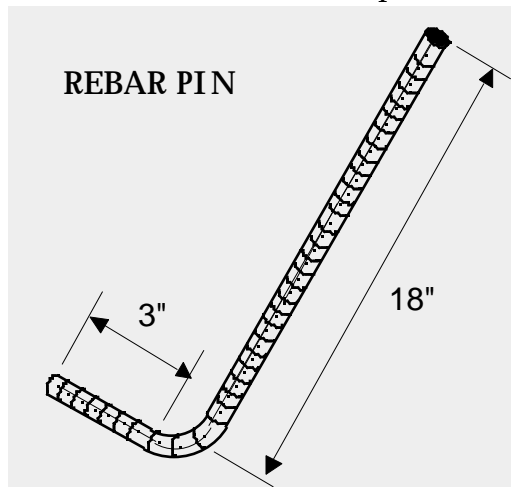
The foundation for a straw bale house requires certain additional features. The preparation is the same as outlined in the "Foundations" chapter, with the following extra necessities.

Width

The width of the foundation stem wall must be 18" in order to accommodate the width of a 2-string bale. In areas of extreme cold weather, foundations are often poured 16" wide with 2" of solid foam insulation board making up the additional width. The insulation helps guard against heat loss through the foundation (as much as 17% of your heat can be lost this way). Usually the insulation is unnecessary in areas with milder climates.

Anchor Pins & All-thread

Anchor pins are 21" pieces of #4 rebar that have been bent into an "L" shape (see below).



These pins are set into the foundation as the concrete is drying. Embed 2 pins for each bale at least 6' deep into the foundation (this will leave a 12" piece of rebar standing up out of the foundation). The bales will then be impaled on the pins.

If you mark the location of doors and windows on your foundation form boards, you will avoid putting pins where they don't belong. I have spent a lot of time using a hacksaw to remove pins from the middle of doorways because of poor planning on my part!

Additionally, standard 6"x1/2" anchor bolts (also known as foundation bolts) must be set in the center of the foundation stem wall every six feet and within 3 feet of corners of the house. These will be used with couplers to attach pieces of 1/2" all-thread. Please refer to figure 1-A for more details.

After the concrete is dry I've found it useful to mark (with spray paint) where the windows and doors will be located. If your going to host a workshop or just have a family wall-raising, the marks will help others as well.

Door and Window Bucks

You need to have built all your door and window bucks before you have your wall raising! Straw bale walls go up quickly and you don't want people standing around waiting while you build your framework.

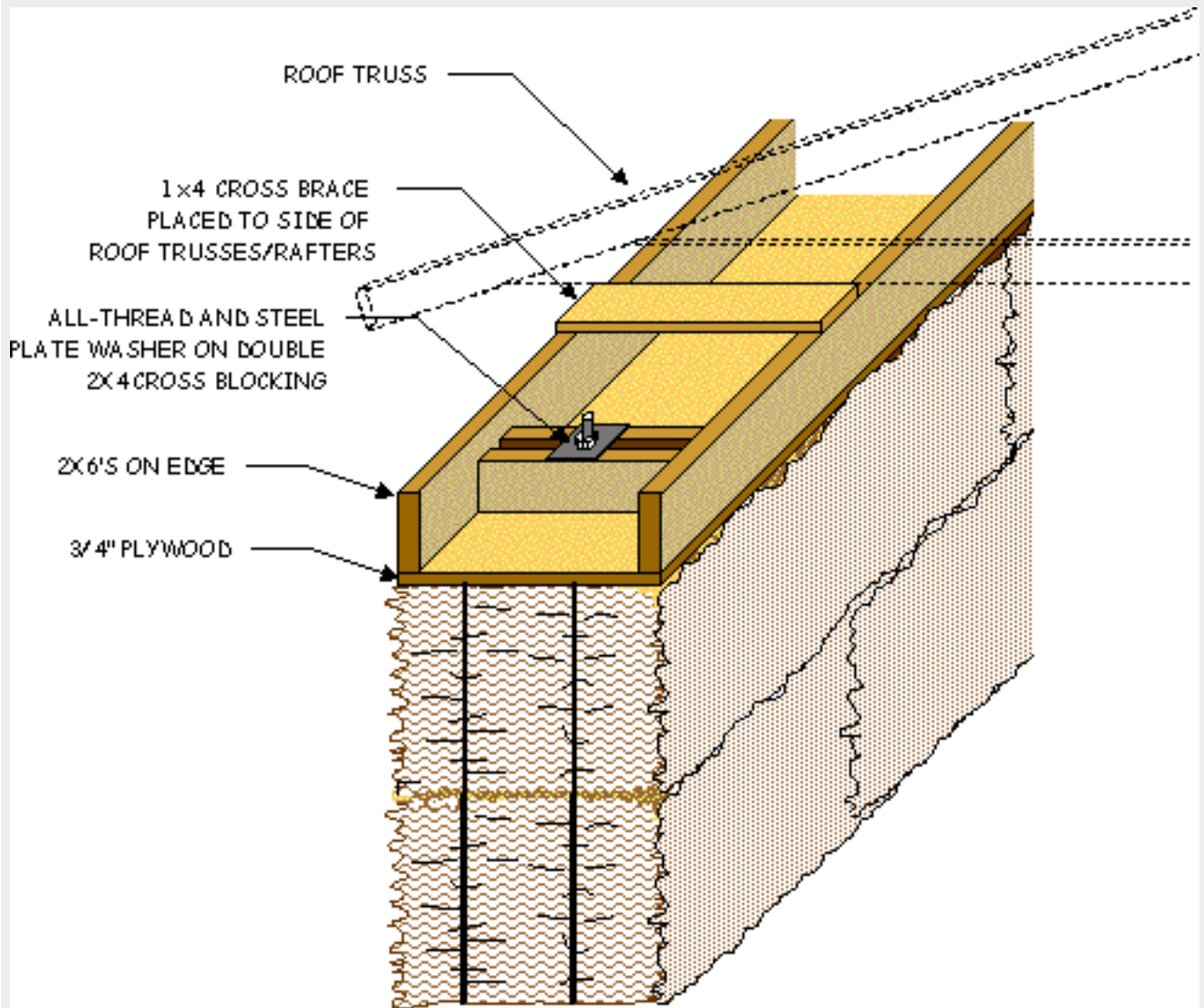
Please refer to the chapter on windows and doors for instructions on how to build bucks.

The Roof Plate

The roof plate sits on top of the bale walls and serves two basic purposes. It provides a strong and uniform structure to which the roof can attach and it (in combination with the all-thread running up through the bales) ties the roof to the foundation itself. Details of roof plate construction are shown in figure 1-C. An added benefit to using all-thread as a connector is that the bales may be "pre-compressed" (more on this later).

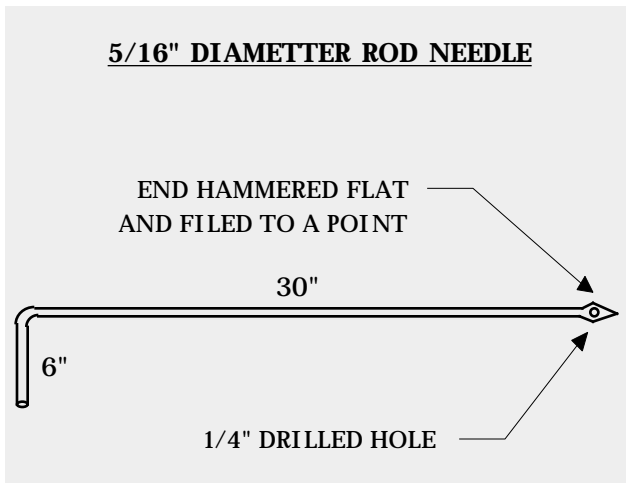
Roof Plate Detail

FIGURE 1-C



DESCRIPTION: The roof plate should be constructed in eight-foot lengths, where possible. Join separate plate sections with 2x4's laid flat against the interior of the 2x6's. To ensure uniform connection to the foundation, place the roof plate sections where they will be connected to at least two all-thread connectors. For best insulation results, stuff the roof plate cavity with sheaves of loose straw before putting up the roof. There have been many different types of roof plates used in straw bale construction. For other ideas please consult the resource section of this guide.

Modifying Bales



Straw bales can be modified to almost any size. In order to keep the bales from falling apart, you have to retie them with baling twine before you cut the original wires/strings. Here's how you do it, step by step.

Step 1: Turn the bale on its side so you can see the strings all the way around.

Step 2: Thread your baling needle with enough twine to go around to the other side of the bale. It's better to use too much twine than not enough.

Step 3: Placing the tip of the needle level with the top string, push the needle through the bale at the point where you want the bale to be split apart. Make sure that you keep the needle as straight as possible i.e. perpendicular to the bale and parallel to the ground.

Important point: Make sure that you do not twist the needle as you push it through or your two new bales will end up tied together!

Step 4: As shown in the diagram below, cut the string at the tip of the needle (make sure you have enough twine!) and retie both halves of the bale.

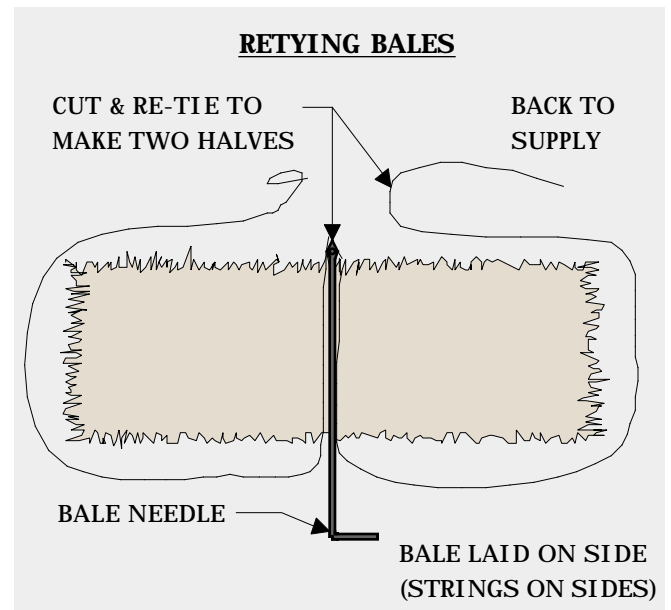
It's important to tie the bale as tightly as possible. The best way to accomplish that is to tie a loop at one end, put the string through and cinch it down. Then you can tie it off with a simple knot. (see diagram)

Step 5: Repeat Steps 3 & 4 with the lower string.

Step 6: Cut the original wires/strings and remove them, pull the bales apart and voilá you have two smaller bales!



Bales can also be easily notched or beveled at the corners to accept posts, door frames, etc. As mentioned above, a small electric chain-saw has proven to be the best choice for this task.



Chapter 2

Building with Adobe



Introduction

Adobe construction consists basically of using blocks of earth stacked into walls. Adobe is one of humankind's first building materials. Where as straw bale homes have insulation qualities as their chief benefit, adobe walls use "thermal mass" to aid in the comfort of the home. In the winter the mass of the adobe walls absorbs sunlight during the day and radiates it back into the house in the form of heat at night. In the summer months, (with the proper use of overhangs and site placement), The house will absorb the cool nighttime temperatures and radiate coolness during the day. Thus the temperature changes inside the house remain steady and relatively mild year round!

History

Building with earth goes back to pre-biblical times. Native Americans used to use layers of mud to build their homes, allowing each layer to dry before adding another. The Spanish adopted this idea and made earthen bricks which they called "adobe" from Arabic word "atob," which means "sun-dried brick." The Spanish used wooden molds to make the blocks; an idea which is still used today.

Benefits

Adobe homes have many wonderful benefits including:

- Great thermal mass/passive solar benefits that keep the house naturally cool in summer and warm in winter
- Beautiful and durable, adobe has a very natural feel. The soft, cool feel of the walls contributes to a very welcoming environment.
- Adobe is very "environmentally friendly" often made from the very dirt upon which it stands.
- Adobe homes are inexpensive, easy and fun to build.
- When used in conjunction with concrete, the walls are virtually fireproof.

Adobe Bricks

Adobe Bricks are traditionally 14 inches long, 10 inches wide, and 4 inches high. They are still made with straw to make the dried mud more weather resistant, and also have a small amount of asphalt mixed in to stabilize them. These bricks can be bought for a reasonable price from manufacturers (see resource section) or you can make them yourself. I recommend buying the blocks as your home could require more than 2700 of them and, unless you build a lot of forms and have a lot of help and dirt - well let's just say it would be a big job! The average cost to buy bricks is around 60¢ a piece as of this writing. This means that for an 1800 square foot house with a 160 foot perimeter the cost would be only around \$1,600 (or roughly \$10 per each exterior perimeter foot).

Adobe Construction

Foundation

The weight of an adobe house is much greater than that of a frame house. Therefore, both the footing and the stem wall of an adobe home must be larger because of the extra weight of the walls. The footing of an adobe house is commonly 24" wide and the stem wall 14". Please refer to the chapter on foundations for more general information.

Mortar

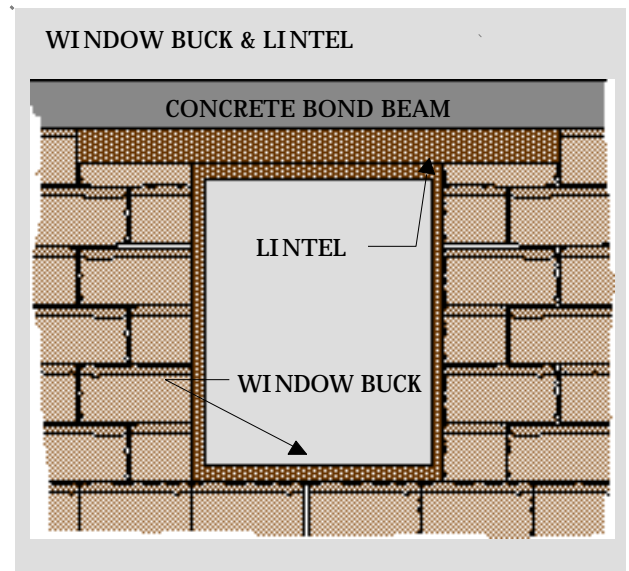
Generally, the same soil used in block making can be mixed with water to create mortar for binding the blocks together into walls. Cement can be added to the mortar mix for added strength, but this increases the cost. The main advantage of cement mortar is that it dries faster. The best mortar mix has a ratio of around 20% clay to aggregate. The right consistency will shake off a shovel. The mud is applied with a shovel and trowel. It must be applied evenly to the surface of each block about 1/2"-1" thick.

Construction

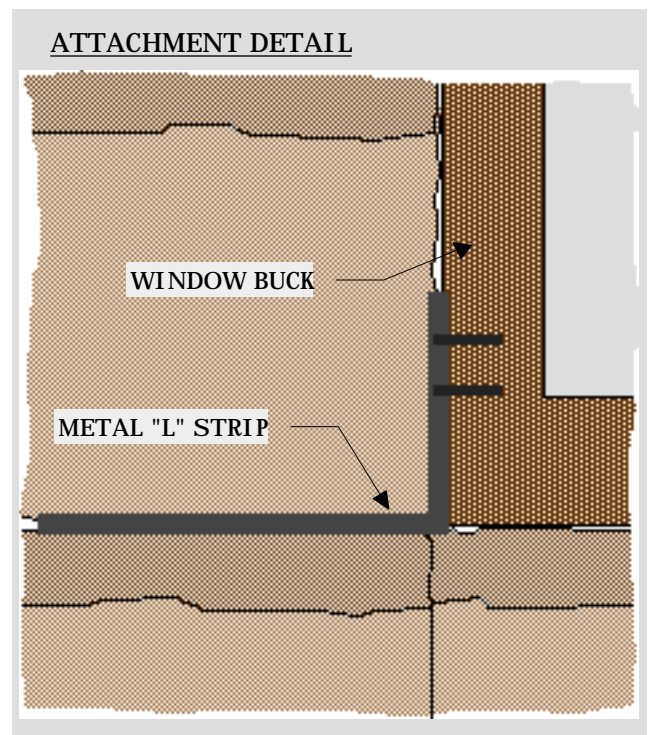
After the foundation is completed, the first layer or "course" of bricks is laid. You should use special adobe bricks that are made with more asphalt for the bottom course. It's best to build your adobe house in warm dry weather as the mortar will freeze or refuse to set if the conditions are not right. Unlike straw bale construction, each course is laid the whole length perimeter before continuing on to the next course. A string supported on poles at each corner provides a guideline for each course.

Lintels (beams of wood) are put over the window and door bucks. When the courses of bricks are high enough, a bond beam is laid to tie all the walls together (see roofing section).

Windows and Doors



The window and door bucks can be set in a bed of mortar and held in place by strips of metal attached to the bucks and embedded in the courses of surrounding bricks. (see below)



Chapter 3

Earthships



Concept

These things are so cool!

The Earthship is the brainchild of Taos architect, Mike Reynolds. He has been building, testing and refining earthships for over a quarter of a century. His company; **Solar Survival Architecture**, can be found on the internet at www.earthship.org They have a wide selection of products and services. If you discover that earthships are for you, exploring their site is a must!

Introduction

An Earthship is a completely self-sufficient home built from recycled materials. The exterior walls are made of recycled tires rammed with earth and covered in stucco. This makes the Earthship a virtually indestructible home. As in adobe structures, the thermal mass of the packed earth keeps the home cool in summer and warm in winter. Additionally, the Earthship employs a built-in ventilation system, making the use of fossil fuels to heat and cool unnecessary.

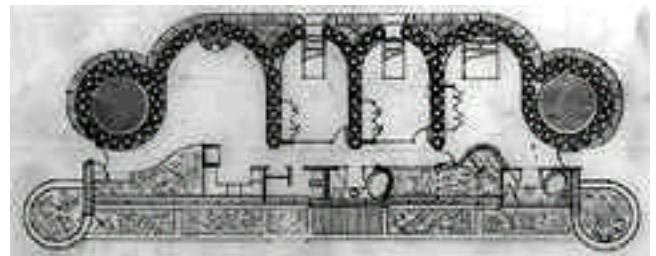
Earthships usually include various systems that allow them to be completely self-sufficient including:

- Solar and wind generated power
- Rainwater catchment and greywater distribution systems
- Food producing gardens inside the house!
- Waste handling systems that allow for self-contained flush toilets

As for the building materials, tires are readily available for free (some stores will even pay you to take them off their hands!) Because the Earthship is bermed into the side of an excavated slope, dirt from the building site is usually plentiful. As for the power systems, etc. they can be purchased as complete units ready to install or bought separately from various companies.

I recommend buying the ready to install units as they have been specifically designed with earthships in mind. (Please see the resources section)

Floorplans



Earthships do not inherently have the flexibility of other building methods however within certain constraints quite a bit of originality can be expressed. Generally, earthships follow these basic guidelines:

- They must be bermed into a south facing slope to take advantage of passive solar benefits.
- A series of connected “U” shapes forms the basis of individual rooms.

Other Considerations

- South facing slanted glazing allows for thermal gain in the winter months while overhanging shutters keep the sun out during the summer months.
- Built in to the structure are one or more cisterns that allow for rainwater catchment.
- Metal roofing is most often used (also for rainwater catchment)

Construction



One of the great things about Earthship construction is that the foundation is built of the same materials as the bearing walls i.e. earth rammed tires! First, a south-facing slope is excavated and then, the ground is compacted and the first course of tires is laid and rammed with earth. From that point on, the tires are laid like large round bricks; each course rammed with earth as the building continues.

Interior walls are made from aluminum cans! They are laid like bricks, layer after layer using portland cement as a mortar. The result is a super strong concrete matrix with excellent sound dampening qualities.

Building an Earthship is one of the most labor intensive alternate building methods. It is not for everyone. However it is also the one of the most self-contained, ecologically sound building method on the planet. Before making a decision on whether to embark on an Earthship voyage, make certain you study all the available material (see resource section).

Solar Survival Architecture has everything from blueprints to completed earthships for sale (or even for rent!) In fact, if you are willing to travel to New Mexico you can tour or even sleep in one before you decide if it's the route for you. Additionally, these wonderful homes are beginning to spring up all over the world as people come to recognize the joy of living completely independent of city utilities. Check around, there may just be an Earthship located near you!

Earthship Interior



Chapter 4

Other Alternatives

The world of Alternative Building methods is really limited only by your imagination. Below I have listed a few of the possibilities.

Cob

Cob is basically the same thing as adobe except the mud is not formed into bricks. Some very unique and lovely homes have been built out of cob all over the world! The basic method of construction involves simply making large balls of mud with as much straw packed in as it will hold and stacking it into walls. Get your family and friends to dive in and get muddy with you on a warm summer day - it's messy, but great fun! As you build the walls up you can add old bottles for light, windows, unique pieces of wood or whatever strikes your fancy! The roof usually consists of stripped logs called *vigas* and thatching. Of course, other roofing methods are entirely possible with a little imagination and adaptation.

Log Homes

Old fashioned log cabins have really come a long way! You can purchase an entire house in kit form, have everything you need delivered directly to your building site and put it all together yourself. Check out the internet for log cabins.

Timber Framing

Timber Framing involves using large wood posts and beams in lieu of conventional wood framing. Often these wood members can be gleaned from the dead and burned trees from national forests and thus be an excellent choice for the sustainable builder. This method is not for the beginner however. Though you can participate and "learn as you go", I advise you to obtain help from a professional if you want to go this route.

Teepees and Yurts

What these shelters lack in insulation they make up for in price and portability. If you live in a temperate climate and are looking for an inexpensive way to go this may be your answer. Individual yurts or teepees can be linked together into separate rooms and when placed under the shade of a tree or in the shadow of a slope, these structures can be quite comfortable year-round. I know of a couple living in Durango, Colorado who live in a teepee with a wood-burning stove and they keep quite warm despite the winter snows. More info can be found on the internet at: www.shelter-systems.com

Geodesic Domes

Developed by F. Buckminster Fuller, the geodesic dome is a spherical form in which skeletal struts and flat planes replace the arch principle and distribute stresses within the structure itself. There are a number of Dome Manufacturers. Good Karma Enterprises has been building such domes for over 25 years. American Ingenuity boasts an earthquake proof dome. Inexpensive Kits for Domes are also available and can be found at www.fastlane.net/~ega/ck.htm

Paint Buckets!

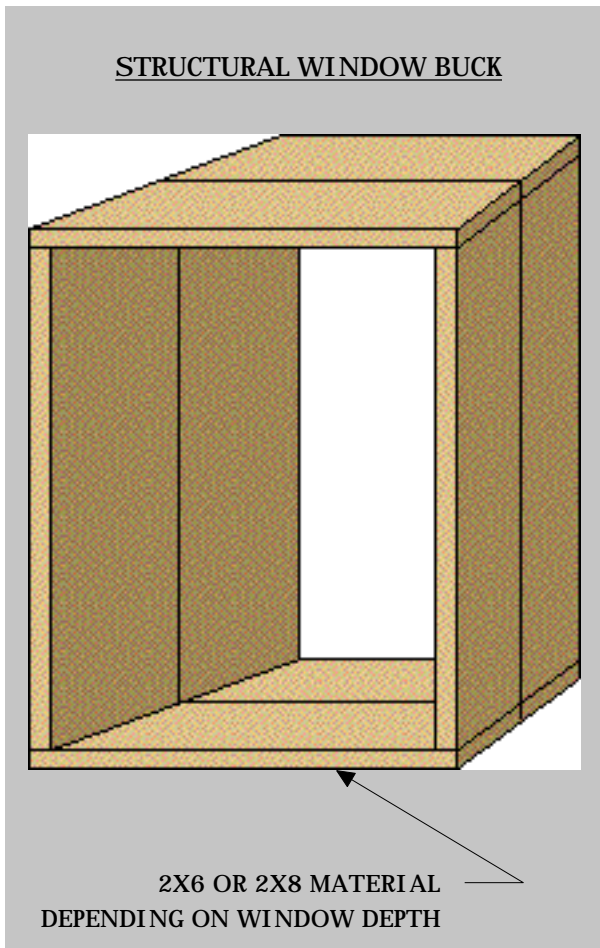
This one is a great new idea! Empty plastic five-gallon paint buckets are filled 1/3 of the way with concrete and then stacked up to make the walls of this unique house. Stucco netting is then attached on the exterior and interior and both sides are stuccoed. The air space in the buckets act as an insulator while the concrete gives the wall thermal mass. As with many alternative building methods, the walls can be curved, straight or whatever shape you please. The use of window and door bucks is similar to that used in straw bale and adobe construction.

Chapter 5 Windows & Doors

Prefabricated windows and doors require a stable wood surface to which they can be attached. In the building methods we have discussed this is most often accomplished with the use of structural members called "bucks". Bucks are constructed before the walls go up and are attached to the walls in different ways according to the type of construction. Straw Bale: The bucks are put in place and then wooden dowels are inserted through hole in the buck and 12 inches into the surrounding bales.

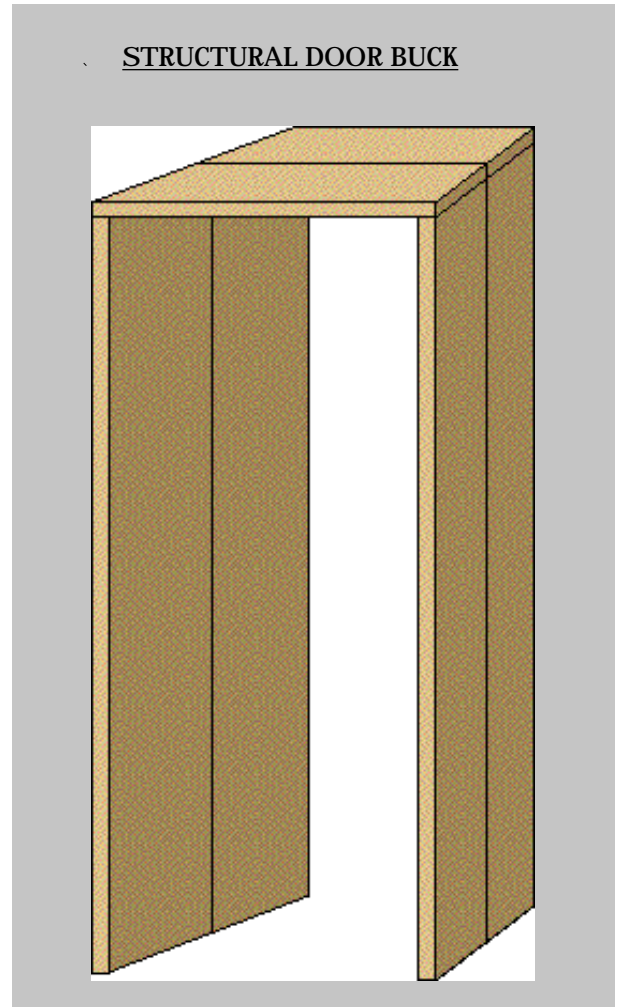
Adobe, Earthships and Others: The bucks are attached with metal "L" brackets into the mortar/earth. See page 12 for diagram.

Window Bucks



As shown in the diagram. Window bucks are often beveled to give a more open look to the window.

Door Bucks



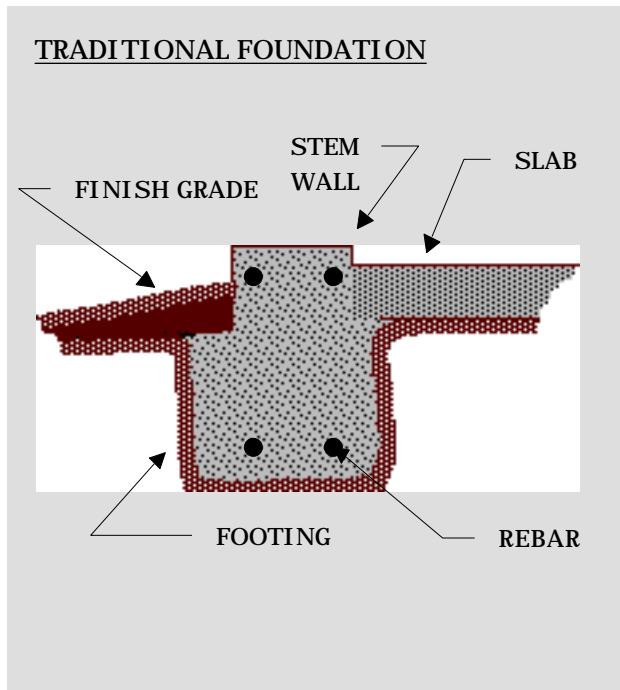
The chief difference between window and door bucks is that door bucks do not have a bottom sill. Both window and door bucks, should be as deep as the walls are thick and they must be securely attached to the walls. Check with the window and door manufacturers to determine the exact dimensions your window and door bucks should be.

Chapter 6 Foundations & Floors

Foundations

The foundation consists of two parts, the footing and the stem wall. The footing extends below the ground and the stem wall rises above. Usually, with concrete foundations, the footing, stem wall and a concrete slab floor are all poured at the same time. This is known as a *monolithic pour*.

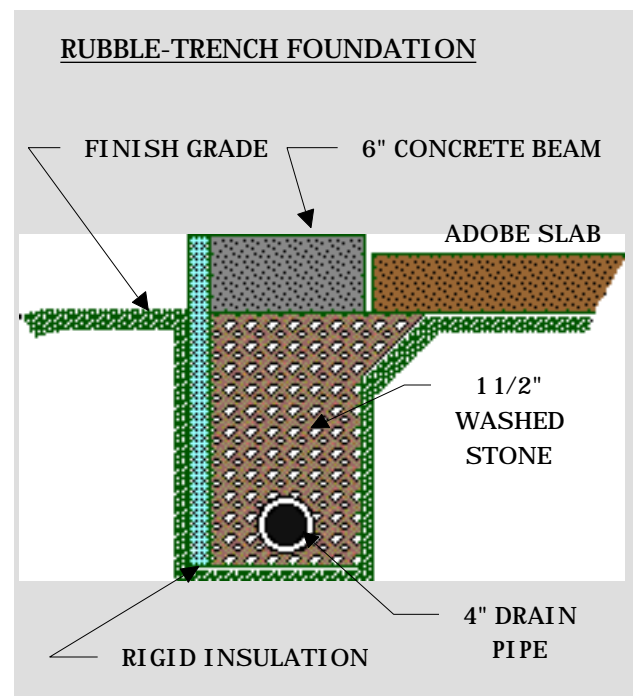
Concrete foundations must also have reinforcing bars or *rebar* running through them to keep the concrete from cracking. The footing must be deep enough to protect from the ground heaving when it freezes. The building codes for your area will provide you with information regarding the proper depth. Since this is a guide on alternative building methods, I felt it appropriate to discuss a couple of alternative foundations. Below is a diagram showing a common foundation.



Rubble-Trench Foundations

Used extensively by Frank Lloyd Wright, this foundation saves quite a bit of money in concrete through the use of a stone filled trench.

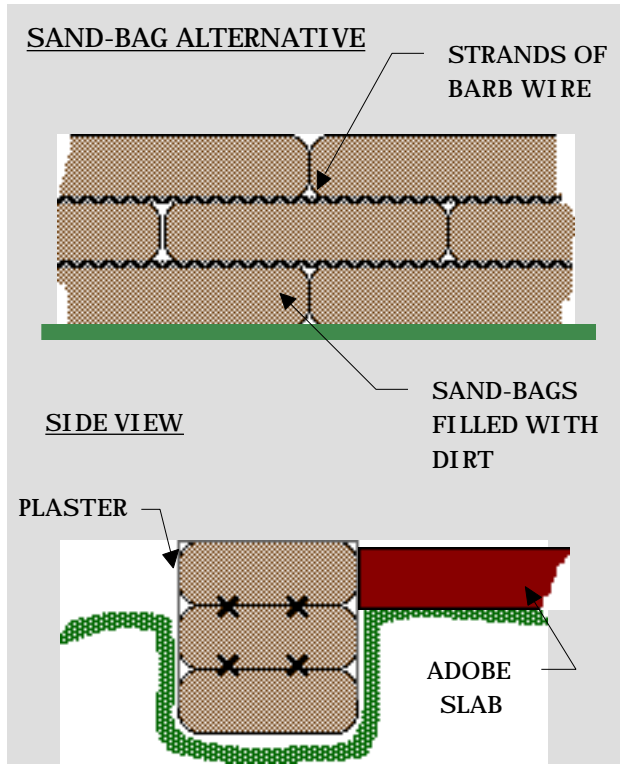
The bottom of the trench must be sloped and a perforated drain pipe laid in the bottom to prevent water build-up. When combined with an adobe floor, this method is strong and relatively inexpensive. In harsher climates, you may want to include 2" of rigid insulation (as shown below) to limit heat loss.



Sand Bags

Sand bags filled with moist dirt and allowed to harden like adobe bricks is a very inexpensive method of creating a foundation. The bags can be stacked with strands of barbed wire between them to keep them from shifting. Then, they can be plastered. Actually,

this could be a good method for wall construction as well!



Floors

There are many possibilities when considering what to use for a floor in your alternative home. In a standard home the floor consists of a concrete slab which is then covered with tile, stone, wood, carpet, etc. This however is very expensive. Here's some alternatives.

Adobe Floors

Our old friend adobe is a wonderful choice for floors. These floors can be mixed in place with the aid of a hose and a few barefoot friends. Simply put the dirt and straw in the house, mix it up with a moderate amount of water (enough to make it muddy) and then smooth it out with a trowel or "screed" it off with a 2x4 on edge. 3-4 inches is a good depth. The floor can later be stamped (or not) with a pattern (tile, flagstone, etc.) and then grouted with a different colored dirt. Finally, it can be sealed with boiled linseed oil or polyurethane. The finished floor can be waxed and polished and will hold up well with a little maintenance.

Brick or Tile on Sand

Also an inexpensive way to go, the tile or brick is laid out on a bed of compacted sand 3-4 inches thick. It can be laid out side by side or spaced to accept grout. Adobe bricks (see chapter 2) can also be used.

Colored Concrete

A very popular method nowadays is to use colorant in a concrete slab and then seal it with a gloss or semi-gloss polyurethane finish. As with adobe floors, the concrete can be stamped with a pattern or left smooth. This method obviates the necessity of additional coverings such as carpet or hardwood.

Chapter 7 Roofing Methods

Introduction

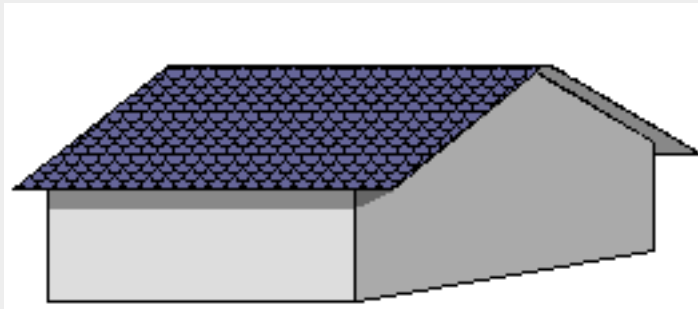
Almost any roof style and method is adaptable to all the alternative buildings in this guide. Although roofing can be difficult, it really is not that mysterious; despite what expensive roofing contractors would have you believe. Don't get me wrong, if you have

the money, it will save you a lot of effort to have a professional team build your roof.

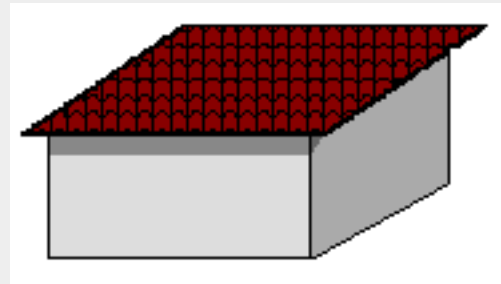
Roofs come in many different styles and combinations the diagram below shows a few of the most common ones.

ROOF STYLES

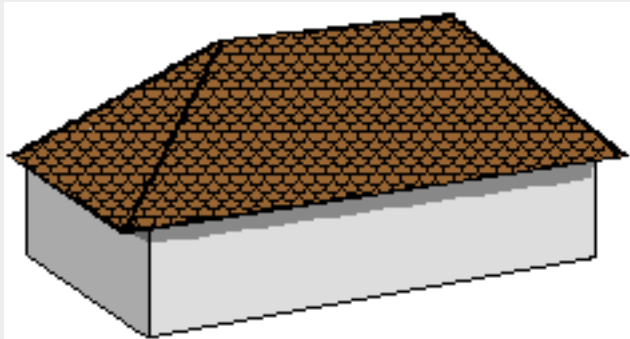
GABLE ROOF



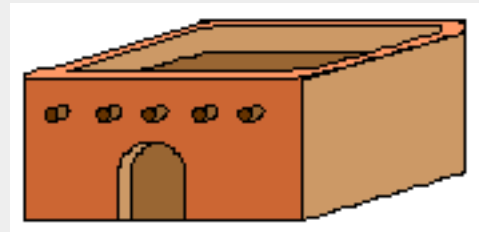
SHED ROOF



HIP ROOF



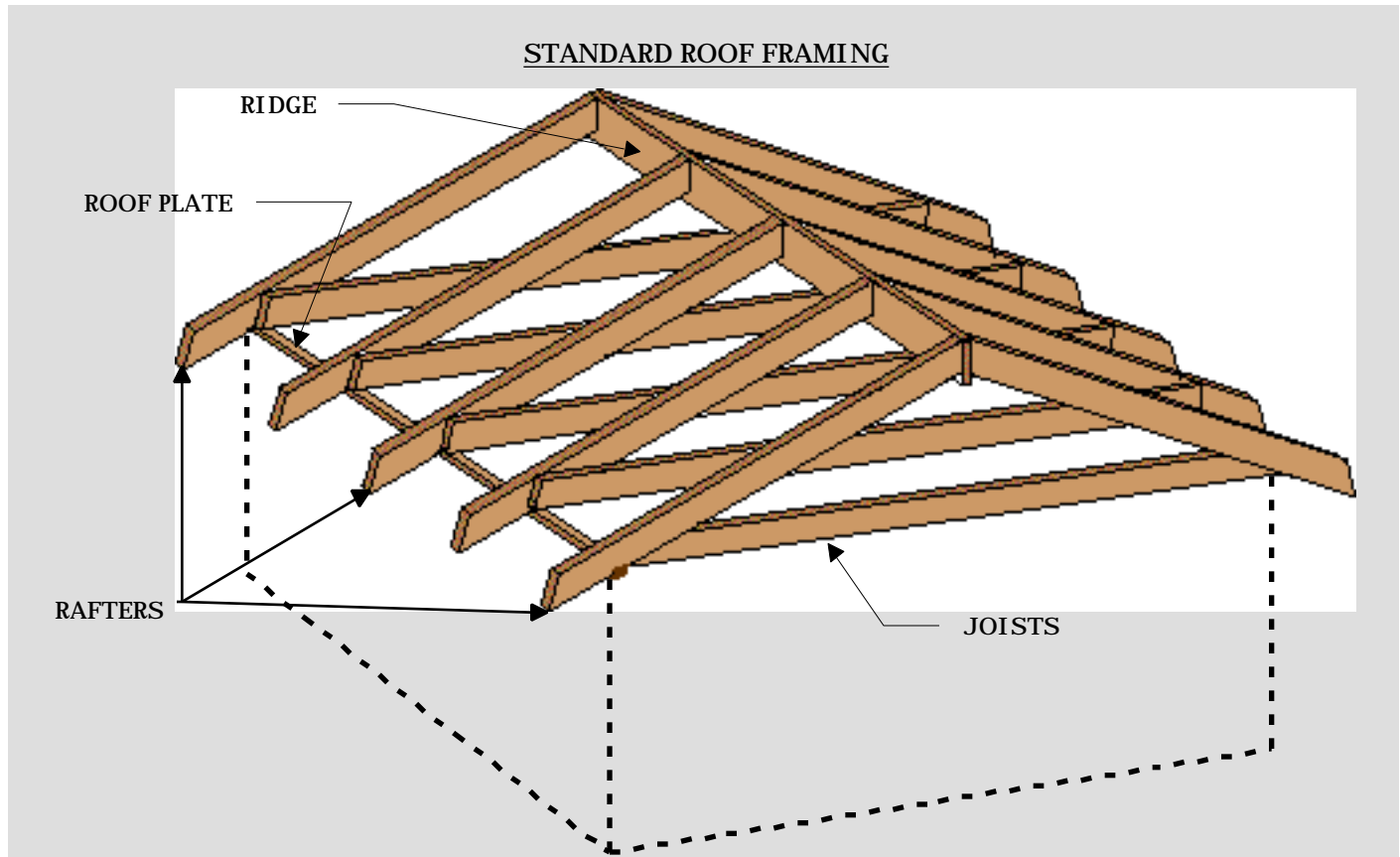
"FLAT" ROOF WITH PARAPETS



Rafters and Joists

The rafter/joist system of roofing is the most common. It involves a combination of diagonal members called rafters and horizontal members called joists. The joists act as a frame for the ceiling and attic floors while the rafters provide framing for the roof.

In the case of a cathedral ceiling, joists are not used. This system calls for comparatively large (2x8, 2x10) members which may increase cost. Also, a rafter system can take a little more time to construct compared to the truss system explained later.



Roof Coverings

As with all the roofing methods described here, the roof covering is a matter of choice. One of the most inexpensive roof coverings is corrugated tin over 2x4 or 1x4 purlins. Plywood or OSB sheathing can be quite expensive but provides a solid roof deck upon which you can use shingles or roof tiles. Check your local suppliers to estimate costs and decide what type of roof fits your

needs; both aesthetic and financial. If the local climate is favorable, some lovely roofs have been made by going back to the old methods of thatching over bamboo or aspen poles. Thatching has enjoyed a renaissance of late. The thatch can be sprayed with borate or other chemicals as a measure of fire prevention.

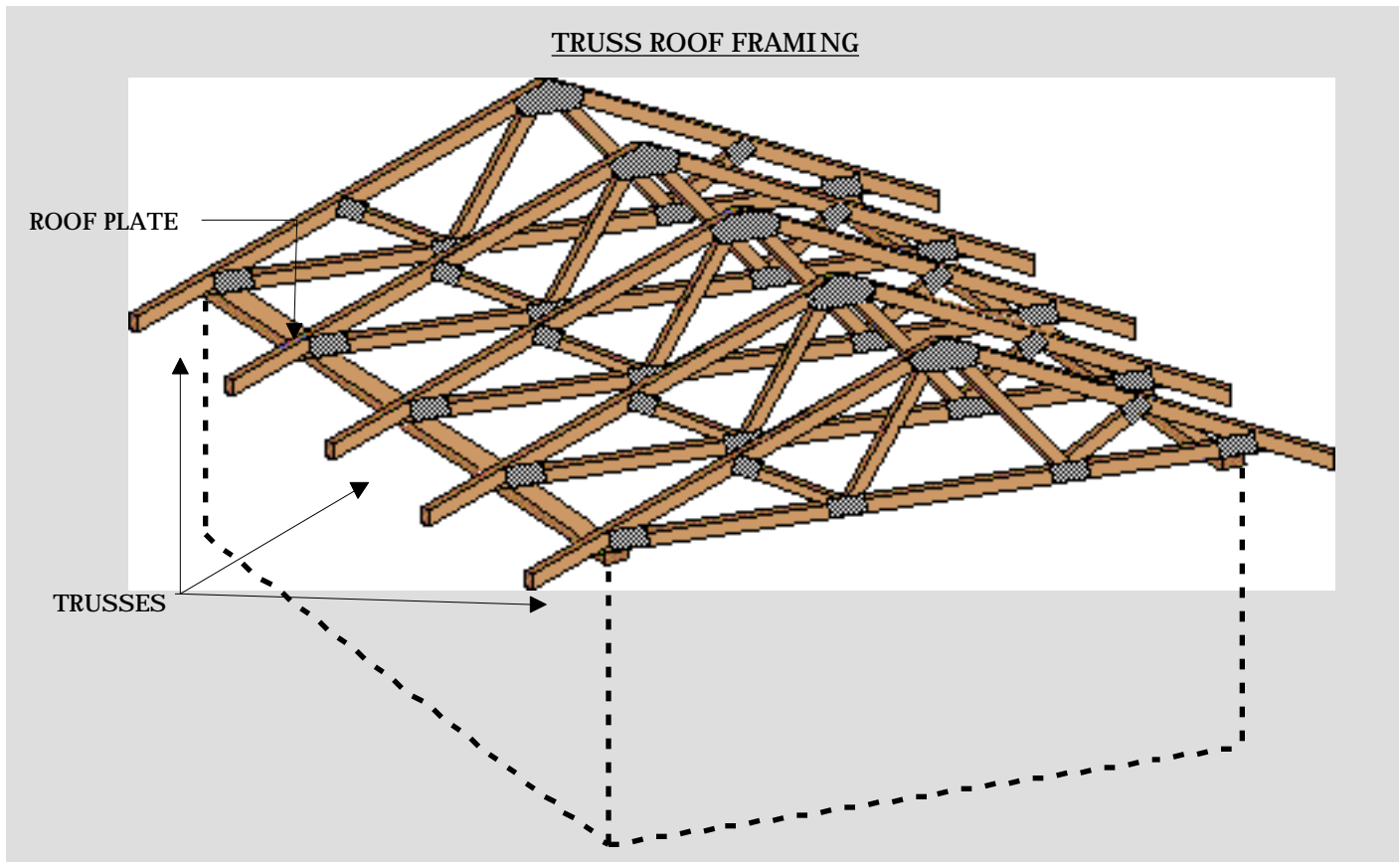
Roof Trusses

A wonderful roofing option for the owner/builder is to use prefabricated roof trusses. A roof truss is a framing member constructed of shorter pieces of 2x4 or 2x6 lumber. They are connected together with a number of flat metal gussets called truss plates. They have a number of advantages over traditional rafter systems:

- Resistant to sagging over time.
- Even distribution of weight on the bearing walls.
- No support requires in the center allows for more open living spaces using smaller dimensional lumber.
- Roof trusses can be made to accommodate any style of roof.

- Construction time is short. You can have the trusses delivered and erected in a matter of a few days.
- Smaller dimensional lumber translates into savings of energy and trees.

You can build your own trusses. This however requires a large flat area to lay out the individual pieces. In place of metal truss plates, plywood gussets are often used on both sides of the truss. The trusses are erected one by one and connected to each other with pieces of 1x4 purlins. Care must be taken to brace the trusses as they go up for if one falls, a domino effect can take down the whole set!



“Flat” Roofs

A flat roof is not really flat, it does have a slight slope to allow for drainage. Because of their low slope, extra care must be taken to

avoid leaks. Flat roofs are very popular with adobe homes as they give the home a “southwest” look.

Floor Plans

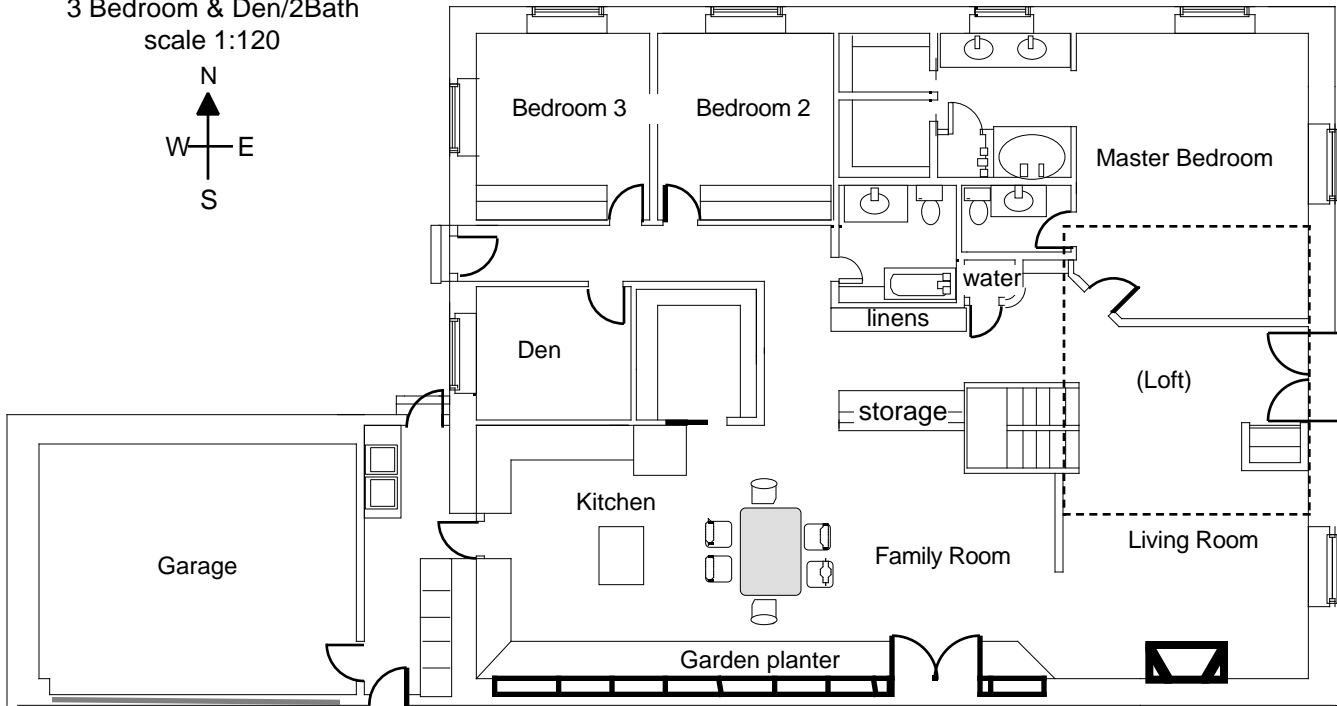
Straw Bale House

Design: Patrick McDonald, 1996

2679 sq. ft.

3 Bedroom & Den/2Bath

scale 1:120

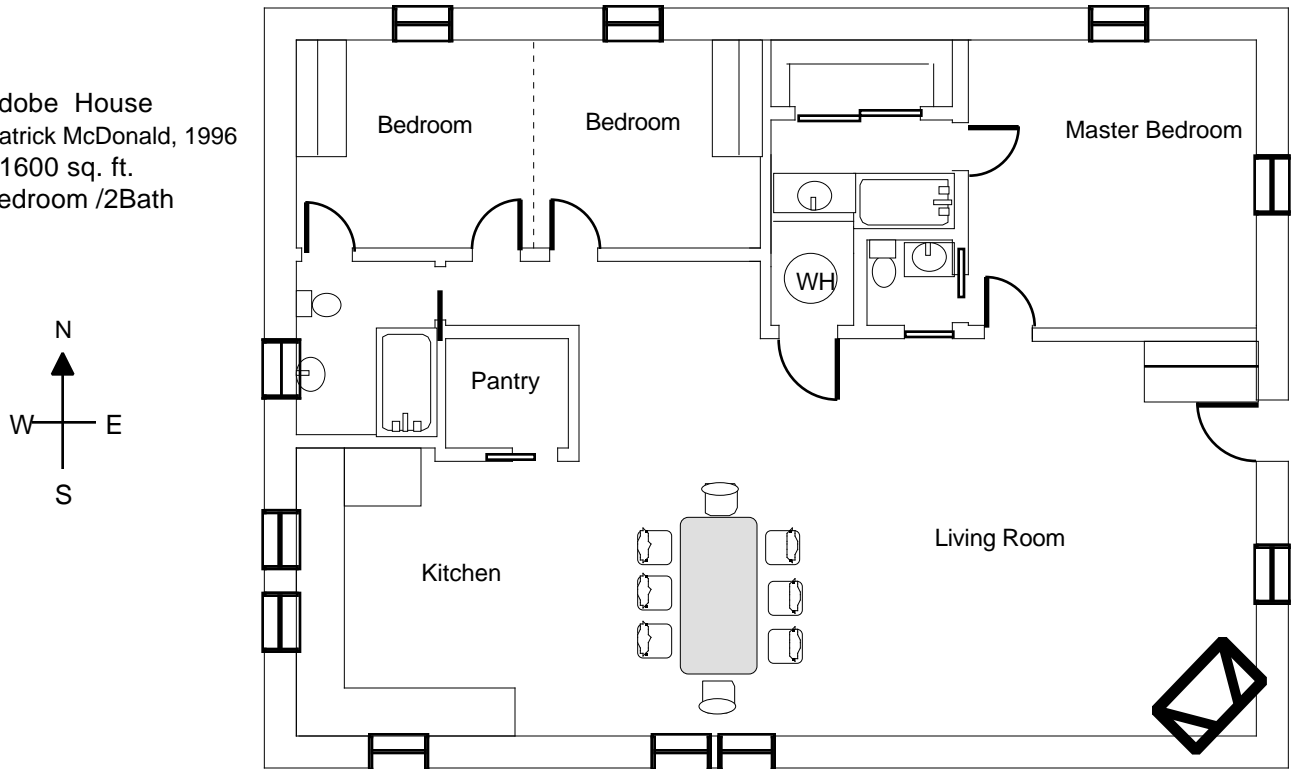


Adobe House

Design: Patrick McDonald, 1996

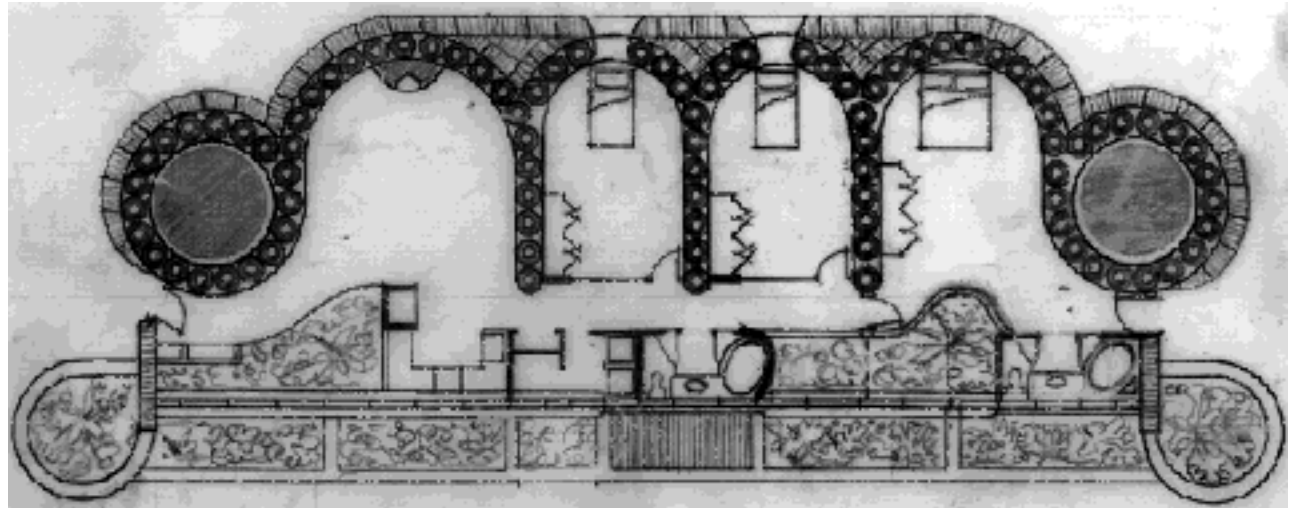
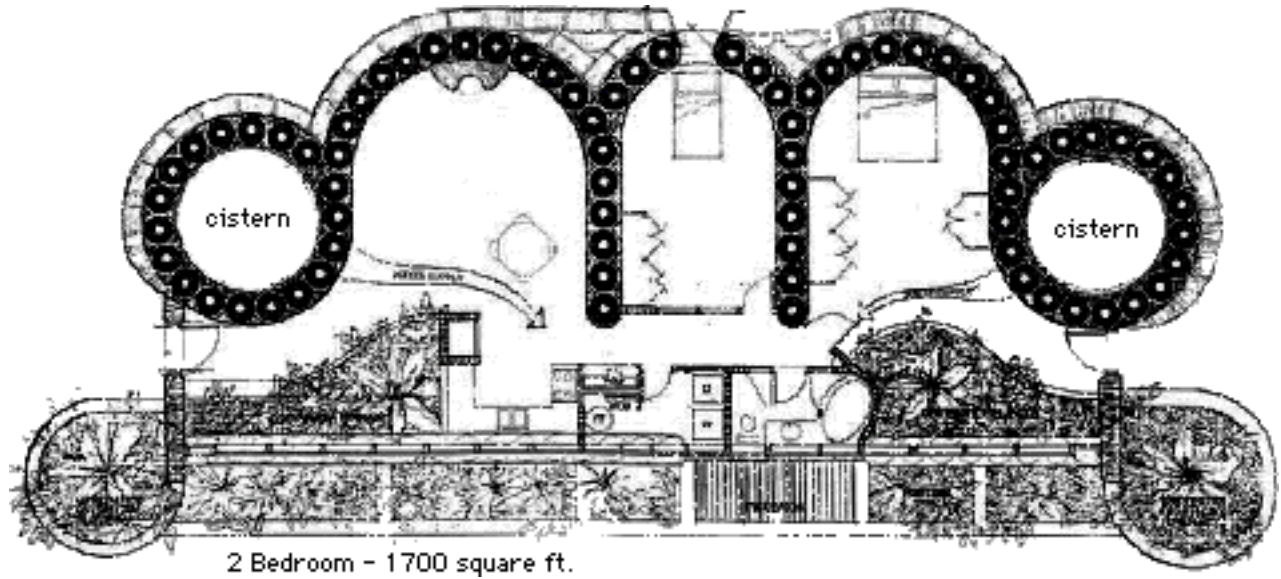
1600 sq. ft.

3 Bedroom /2Bath



Earthships

courtesy of Solar Survival Architecture
www.earthship.org



Resources

The bulk of the information in this guide was gathered on the internet. With a little patience you can find just about everything you need to build your alternative home. Listed below are some resources found both on the World Wide Web and at your local library.

Straw Bale Homes

Straw Bale Association of Texas

3102 Breeze Terrace
Austin, TX 78722
(512) 499-0526 (voice mail)
monthly meetings, lectures, resources

The Straw Bale House

Steen, Steen and Bainbridge, 1994
Chelsea Green Publishing
White River Junction, Vermont
ISBN 0-930031-71-7

Build It With Bales, 2nd edition

MacDonald and Myhrmann, 1997

Guidelines to Straw Bale Construction for the Owner/Builder

Steve Kemble
Sustainable Systems Support
(602) 432-4292

Newsletter:

"The Last Straw"

P.O.Box 42000
Tuscon, AZ 85733-2000
(520) 882-3848

Websites:

Surfin' Strawbale

<http://www.moxvox.com/surfsolo.html> and
<http://mha-net.org/html/sblinks.htm>.

The Strawbale listserv is an excellent resource for those interested in the down to earth details of designing and building strawbale buildings. To subscribe to the Strawbale Listserv, send email to **majordomo@crest.org** with the message **SUBSCRIBE Strawbale**

Adobe Houses

www.homeownernet.com/articles/adobe.html

Earthships

www.earthship.org

"Green" Building

www.greenbuilder.com