

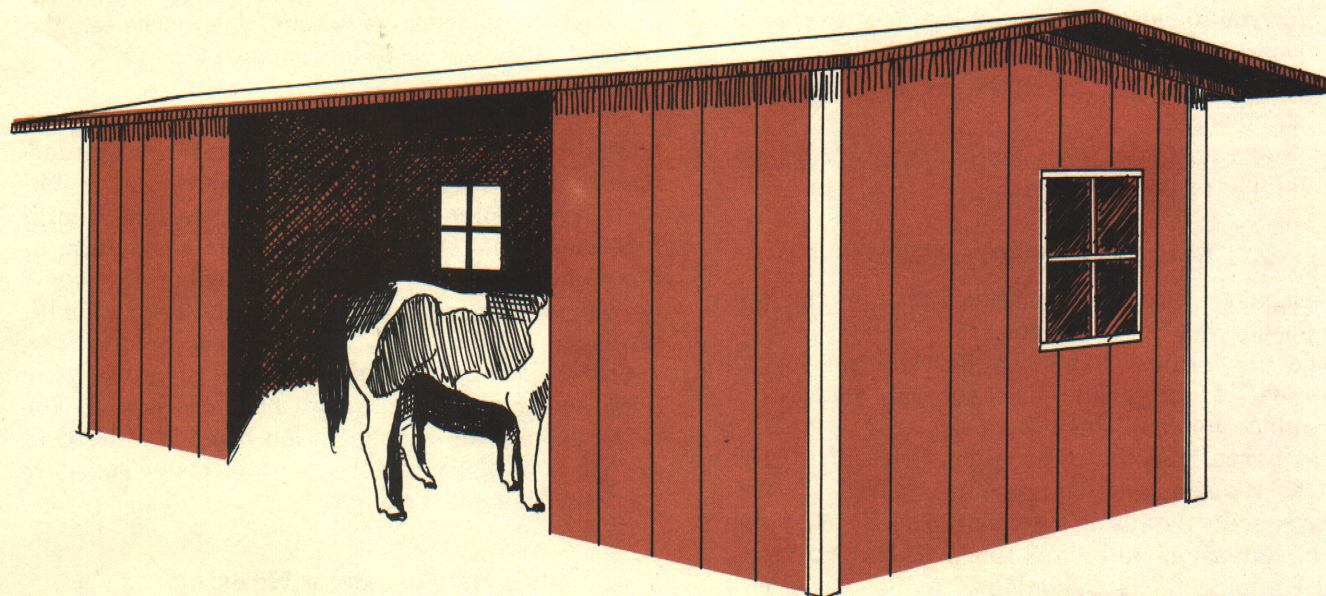
Cooperative Extension Service
Michigan State University

Housing Your Pleasure Horse

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Horses are becoming increasingly popular in Michigan. Many people are buying places in suburban and rural areas so that they can own and enjoy one or more horses. In most cases, housing has to be built or an existing building converted to meet the needs of the horse.

There are four factors to consider when selecting horse housing. The first two have to do with the horse and its needs. The other two have to do with you and your environment.

Horses need an environment that will keep them healthy. Furthermore, they need a certain amount of space for safety and comfort.

You, as an owner, need an environmental system that is acceptable to you. We all have an idea of what we can accept. Some people leave their horse out in the woods all winter; others want their horse inside a closed building. Most people use an open type of building. All are acceptable, within limits, to the horse.

Your neighbors could be your biggest problem in deciding on an acceptable environment for your

horse. Will the type of environment you choose be acceptable to them? Will they call the authorities if you keep your horse outdoors during the worst part of our Michigan winters? Some people, horse owners included, believe that a horse must be inside during the winter. If they are your neighbors, you could have problems with them.

This bulletin is not designed to provide all the specific construction details needed to build horse housing. It does provide basic concepts and principles to help you determine the horse housing that will best fit your needs.

Before You Buy, Build or Remodel

Before you start pounding nails, consider the following:

- Check the local zoning regulations. Can you have horses at your location? Does your proposed building meet local building codes?
- The site should be well drained. A building on wet soil will always be damp inside.
- The site should be easily accessible at all times to care for the animals and to bring feed in.
- Manure management and fly control should be considered before building. How are you going to handle the manure? Long-time summer storage leads to fly problems.

*The author expresses special thanks to Richard J. Dunn, Animal Husbandry Dept. and John F. Leech, Extension Agricultural Agent, Genesee County.

- Does the site have sufficient room for a season's hay storage, or will you have to buy hay weekly or monthly?
- Is your water supply adequate to supply water for your horses and meet your peak household needs? The same holds true for your electrical system.
- Will the property you are building on have room for you to ride your horse? It is best to ride on your property.
- Have you thought about the accessibility of fire equipment?
- Does your planning include adequate locks and latches on doors and gates?

Sources of Information

Several sources of information and plans can help you design your horse housing.

The Cooperative Extension Service, serving all counties of Michigan, has several sources of assistance for you. They have numerous plans for horse barns, and the publication, "HORSE HANDBOOK, Housing and Equipment," MWPS-15, that gives specific details on many of the needs in a horse barn. Extension Bulletin E-1057, "Horse Buildings and Equipment," is a catalog of plans. There is a charge for the handbook and for some of the plans. Most Extension agents can assist you in developing a plan to fit your needs.

Many lumber dealers have plans available from design services or lumber associations. A few have planning services. Some building contractors can assist in planning a horse barn.

One important point to remember: Make use of trained people in designing your horse building. It must meet your needs, and the needs of the horse.

Remodel an Existing Building

This probably is the biggest problem facing a horse owner with a building on his/her property. Remodeling is alright if the building can economically be converted to proper horse housing.

The first thing to look at is the condition of the building. Is it worth remodeling? Are the frame and roof in good condition? Are the building's footings adequate? Will the existing floor have to be removed in order to provide a proper floor for the horse? Will the ceiling height be at least eight feet above the finished floor? Can the existing building be ventilated properly? Is the location desirable for you?

In short, will the remodeled building give you a horse housing building that will satisfy you, and at a cost that is equal to, or less than, the cost of a new building?

How Much Shelter Do Horses Need?

The minimum requirement for horses in most of Michigan is no housing. Housing is not necessary for most horses if there is adequate shade from the summer sun and windbreak for protection from winter winds. Most farm woodlots can supply both of these basic requirements. Use of the woodlot for this purpose might not be compatible with your idea of good woodlot management. Furthermore, the woodlot might not be a convenient place for you to care for your horse.

Show horses with clipped, smooth hair need to be housed in warm housing or kept blanketed. Winter-time foaling will require shelter for the mare and foal. Aged horses and those with serious health problems, also, should be housed in some form of housing. Blanketing may be desirable for show horses, aged horses and horses with serious health problems.

One important consideration in planning your horse housing: how is lack of housing viewed? For many people, the concept of no housing is hard to accept—neighbors can create problems by charging you with cruelty to animals.

Types of Horse Housing

Basic requirements are that the horse housing be free from excessive moisture and drafts. The cold winter temperatures normally experienced in Michigan are only a secondary consideration. Horses, as well as other animals, can tolerate very cold temperatures, if they can get out of the wind. Excess moisture in horse buildings is responsible for many of the horse respiratory problems during winter months. Ideally, the relative humidity should be between 50 and 80 percent.

Three basic types of horse housing:

OPEN HOUSING—one or more sides of the building are left open (Fig. 1). Horses are not confined, but are free to move in and out of the building at all times. The inside temperature is about the same as

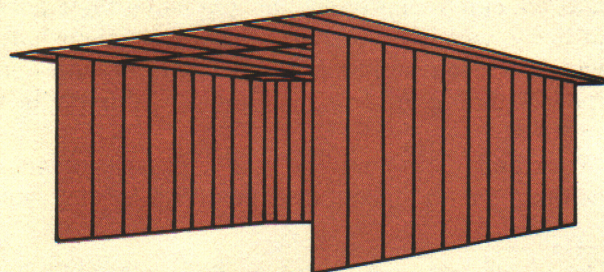


Fig. 1. Typical open housing.

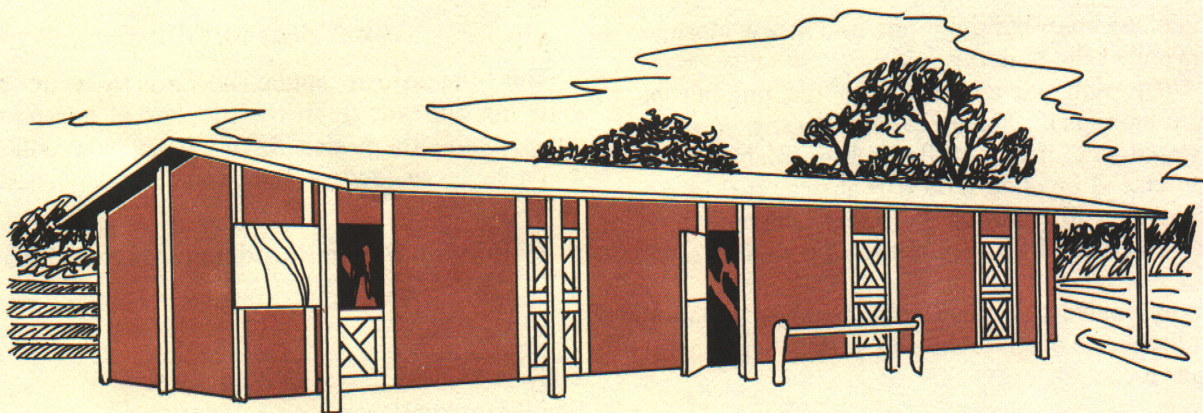


Fig. 2. Typical cold housing.

the outside temperature. This is one form of cold housing, but not included in the cold housing definition.

COLD HOUSING—building is enclosed and the inside temperature fluctuates with the outside temperature (Fig. 2). The inside temperature can be some warmer. Horses are normally kept in box stalls. Some form of ventilation is required to remove excess moisture from the building.

WARM HOUSING—building is enclosed and heated to maintain a desired temperature level during the winter months. Insulation is recommended. Horses are kept in either box stalls or tie stalls. Ventilation is required to remove excess moisture from the building.

Of the three types, open housing and cold housing are most popular with Michigan horse owners.

When using an open building or cold housing, you must feed the horse more high energy feed, such as corn, during periods of extreme cold weather. The added energy is needed to offset the energy expended by the horse to keep body temperature at normal levels.

When using an existing building as open housing, doors and windows on the side away from the prevailing winds are generally left open. This will normally provide enough ventilation for removal of excess moisture. Closing doors (sometimes done during periods of adverse weather) converts this type of open housing into cold housing. The horse is still loose.

A new open housing building can be a simple roof with two or more sides, located on a dry site, providing at least 100 square feet per horse. If your building is over 24 feet long, use at least three sides. The fourth side can be closed up to one-quarter of the length (Fig. 3).

The other popular form of horse housing is cold housing. This is an enclosed building in which the

horse is normally confined in a box stall. Daily exercising of the horse and cleaning of the box stall increases the need for good management.

Some means of removing excess moisture is necessary (See ventilation, page 6). If some heat is needed for a short period of time, a form of spot heat can be used.

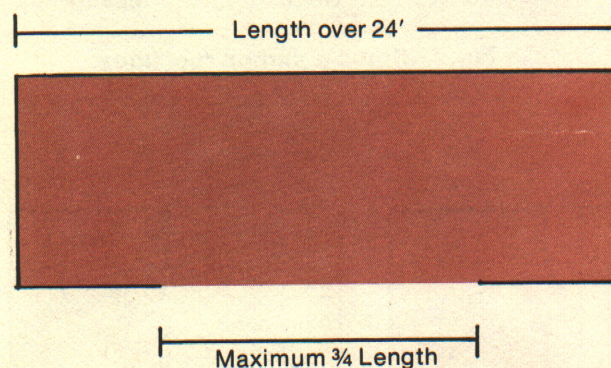


Fig. 3. Maximum opening for open housing buildings over 24 ft. long.

Warm housing is used mainly by a few horse owners who prefer to work in a warm area. The temperature level, usually between 45° and 65°F, is for human comfort.

Building Types and Roof Styles

A wide variety of possibilities exist in horse housing styles (Fig. 4). Most common are the Gable roof, using clear span trusses, and the Gambrel roof. The aesthetics of the building has a great bearing on the final decision. The developments in metal siding the last few years have done much to improve the looks of the clear span, post building.

The Gambrel roof is often used where hay and straw storage is desired overhead and where appearance is a consideration.

In the clear span building, hay and straw storage is at one end of the building.

The floor plan used varies with the number of horses to be housed. For up to four horses, you can use a single row of box stalls with an aisle that is either enclosed or open with a roof over it (Fig. 5). With four or more horses, the most common floor plan is two rows of box stalls facing a center aisle (Fig. 6).

In many cases, the clear span building is made enough longer to store lawn and garden equipment and other tools.

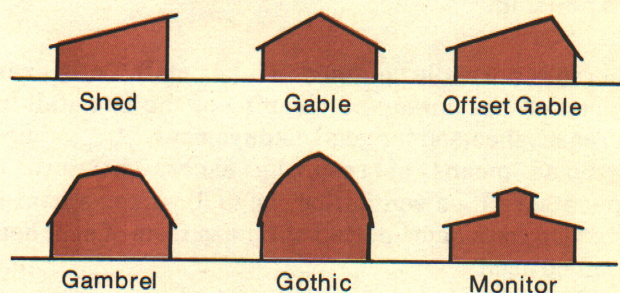


Fig. 4. Some common roof lines.

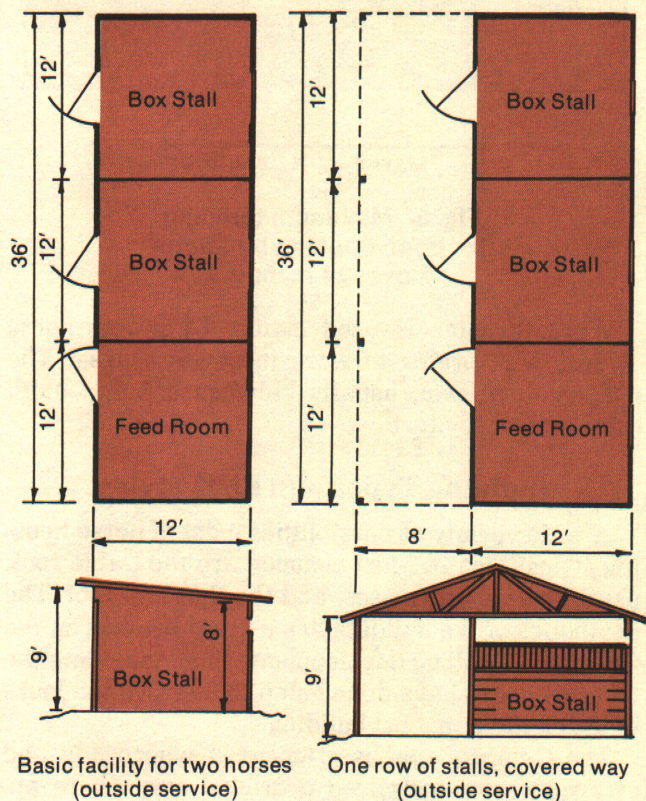


Fig. 5. Cold housing for up to four horses.

What Size Building?

The amount of space needed in your horse building depends upon the number of horses to be housed and their size. In addition, you will need room to store feed, a tack room, and perhaps an aisle.

Minimum Space Requirements Per Horse

	Minimum Box Stall (feet)	Tie Stall (feet)
Pony	9 × 9	3 × 6
Small Mature Horse	10 × 10	5 × 9
Medium Mature Horse	10 × 12	5 × 9
Large Mature Horse	12 × 12	5 × 12
	(most common)	
Brood Mares	12 × 12	--
Stallion	14 × 14	--
Up to 2 years old	10 × 10	--

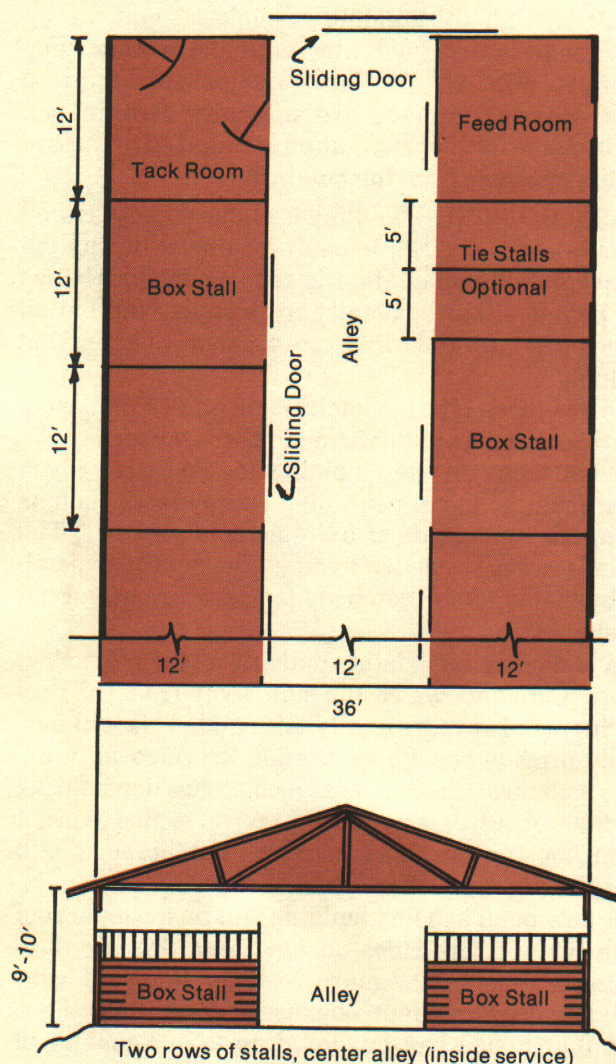


Fig. 6. Floor plan for four or more horses, cold or warm housing.

Characteristics of Stalls

Item	Box Stall	Tie Stall
Exercise	Limited in stall	Daily out of stall
Bedding	More required	Less required
Manure	More carrying	Less carrying
Feed	In stall	In stall
Water	In or out of stall	In or out of stall
Floor space	100 or more sq. ft.	Up to 72 sq. ft.

In addition to a stall for each horse (if stalls are used), you will need a tack room, feed storage, and perhaps an enclosed aisle.

The amount of equipment and feed you wish to store and the depth of the box stalls or tie stalls will determine the size of the tack room and feed storage area.

The tack room should be at least 60 square feet to store a saddle, bridle, some medicines, grooming tools and the like (Fig. 7). Increase the tack room by at least 20 square feet for each additional horse.

Feed storage must contain space to store hay, grain and straw. You will need 60 cubic feet of storage per 1,100 pound horse to store one month's hay supply; 10 cubic feet to store 1 month's grain requirements; 60 cubic feet to store one month's straw needs per horse. Total space required = monthly space needed $\times$ the number of months you desire to store hay and straw $\times$ the number of horses.

An enclosed aisle is desirable if you wish to work on your horses in the winter months. The aisle can

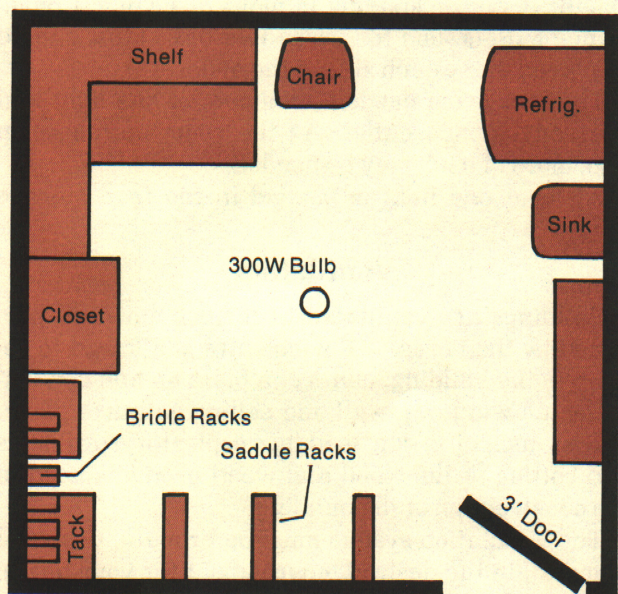


Fig. 7. Typical tack room.

be used for horse and feed movement, grooming, shoeing and saddling. This aisle should be at least 10 feet wide.

After you have decided on the total amount of space needed, determine the actual dimensions of the building.

Floors

The floors in the stalls and aisles usually are packed clay and sand on a well drained base. This is one of the best floors for horses. It minimizes foot problems and lameness and is also easy to maintain and stays dry when properly installed and drained.

Wood planking, or in some cases, wood blocks are also used. This might be the choice in remodeling an existing building where the wood is laid over existing concrete floors. Wood floors are hard to keep dry, odor free and disease free.

Concrete floors are the least desirable. They take considerable bedding to prevent leg stiffness.

Some artificial materials are being marketed for horse housing floors with varying success. Some people are using asphalt pavement in the aisle with good results.

The tack room, wash areas, and grain storage areas should be concrete and well drained.

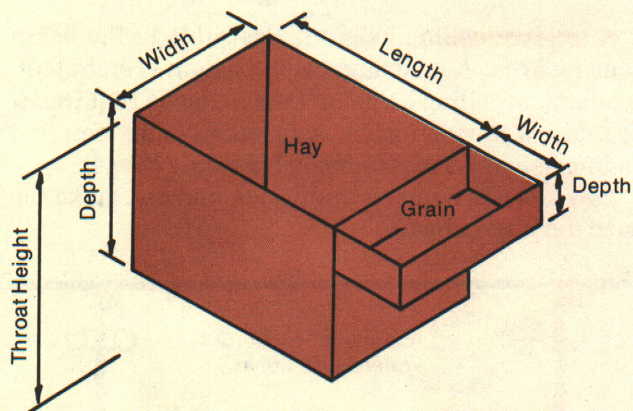


Fig. 8. Feed box dimensions.

Feed Mangers

The size and height of the hay manger and grain box are an important design feature. When properly sized, they allow the horse to eat comfortably and with a minimum of feed wastage (Fig. 8).

The following table gives the recommended dimensions for horse feed boxes. The smaller sizes are for small horse breeds.

Hay Manger

Dimensions	Mature Horse	Pony	Foal & 2-yr old
Length	30" - 36"	24"	24" - 30"
Width	20" - 24"	18"	16" - 20"
Depth	24" - 42"	32"	32" - 36"
Throat Height	38" - 42"	32"	32" - 36"

Grain Box

Dimensions	Mature Horse	Pony	Foal & 2-yr old
Length	20" - 24"	18"	16" - 20"
Width	12" - 16"	10"	10" - 16"
Depth	8" - 12"	6" - 8"	6" - 8"
Throat Height	38" - 42"	32"	32" - 36"

The hay manger and grain box should be made out of 2" native hardwood. Horses will chew on pines and other softwoods. A second choice is 2" treated southern pine.

Some horse owners use commercially available metal or plastic hay mangers and grain boxes.

Locate the feed boxes in the box stall where it will be easy to do the feeding (Fig. 9).

There should be no sharp corners on which the horse could injure itself.

Ceiling Height

A ten-foot ceiling height is desirable in the horse housing area. A minimum ceiling height is eight feet. A minimum ceiling height of twelve feet is required if you desire to ride inside. A fourteen to sixteen foot ceiling height is most common for riding areas.

Low ceilings hamper ventilation and can make the barn dark and unsafe.

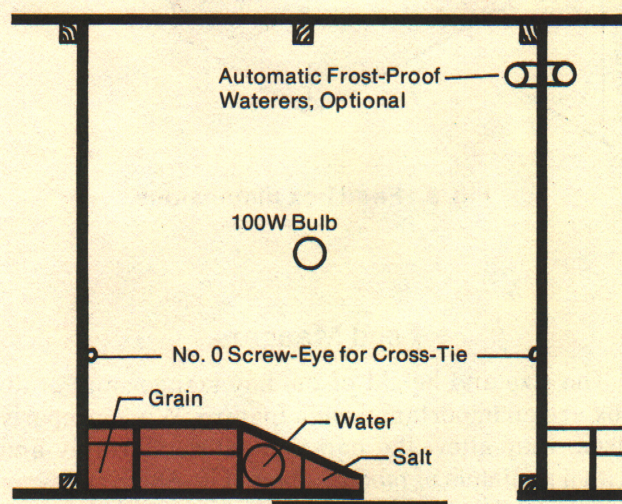


Fig. 9. Typical box stall arrangement.

Water

Each horse will require 8 to 12 gallons of water each day. You should plan on having water available in the horse housing at all times.

Horses kept loose or in open housing can be watered year-round with an electrically heated water bowl. Up to 10 horses can use one bowl.

An automatic waterer can be placed between two stalls. This can be heated or unheated, as needed, according to the housing temperature.

Most horse owners water the horses with a pail. A frost-proof hydrant is one way to provide water during freezing weather. Another way is to use electric heat tape on all exposed pipes.

Electricity

An adequate electrical service should be a part of your building. The service should be large enough to handle lighting, grooming tools, ventilation, heat tape and space heaters, if used. You may also want a small refrigerator for medicine storage, and a water heater.

All lighting fixtures should be dust proof. This greatly reduces the fire hazard caused by dust buildup on light bulbs. Locate lighting fixtures so that the horse cannot bump and break them. In some cases, recessed fixtures may be desired.

Convenience outlets should be the covered outdoor type, so that dust and moisture cannot get into the outlet.

Each box stall should have a light in it. This will provide light for treating the horse when needed and for you to see to check on the horse.

The aisle should have a light at least every 20' of length. A closer spacing is more desirable. Convenience outlets, one for every two box stalls, should be placed along each side of the aisle.

The tack room needs a minimum of one light and one convenience outlet. As the room increases in size, more of each may be needed.

At least one light is needed in the feed storage area.

Ventilation

Buildings are ventilated to remove moisture produced by the horse. If the moisture is allowed to remain in the building, odors can build up and condensation on windows, wall and ceiling will take place. Excess moisture can lead to respiratory problems and rotting of the wood and wood products used in the construction of the building.

The ventilation system must be properly designed to maintain the desired environment for your horse. The environment throughout the housing should be fairly uniform.

The ventilation system consists of three basic requirements:

- A way for fresh air to enter the building
- A means of moving the air through the building
- A way for the stale air to leave the building

If these three components are not properly designed, the system will not work as it should.

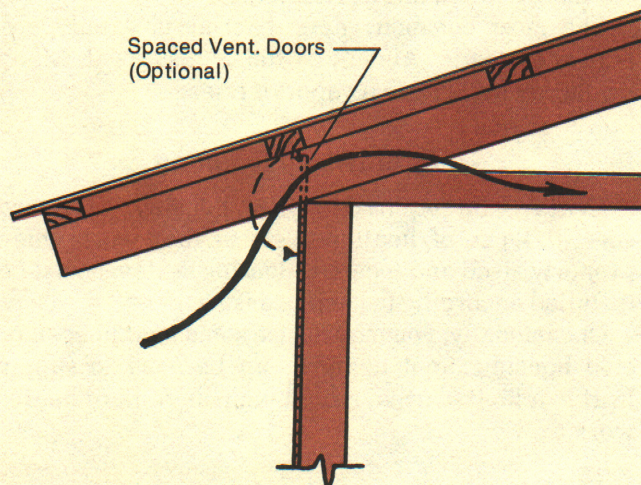


Fig. 10. Example of under eaves air intake.

OPEN HOUSING—uses natural air movement for ventilation. The open front should be to the south or east, away from prevailing winds.

Air inlets along the back are required to allow the fresh air to enter the building. The air inlets can be openings under the eaves (Fig. 10) or adjustable windows. The air will move across the building and exhaust through the open front. Insulation is recommended under roof or in the ceiling to help to prevent condensation.

COLD HOUSING—Ventilation is similar to open housing. In most cases, air moves naturally through the building. Electric fans are occasionally used to aid in the air movement. There must be a place for air to enter the building and to exhaust. Air inlets can be openings under the eaves (Fig. 10) or adjustable windows. Air exhausts can be either open doors or adjustable windows. Insulation in the ceiling or under the roof is recommended to prevent condensation.

WARM HOUSING—The ventilation of warm housing is complex. The building must be insulated and vapor barriers used. Heat is required to maintain desired temperatures. In most cases, electric fans

are used to provide air flow (Fig. 11). Fans on controls require no further attention once set. Controls can be thermostat and/or timer. Care must be used with setting thermostats so that they do not conflict with the operation of the heating system. Timers, alone, prevent this problem. Windows or adjustable panels can be used to control air flow. This system has two drawbacks. Considerable attention is required by the owner, and heat can be wasted by constant air flow through the building.

Fans with a capacity of 100 cubic feet per minute for each horse will provide adequate ventilation when temperatures are below 60°F.

The air flow of the selected fans should be rated at 1/8" static pressure. This gives the fan the ability to move air through the stable.

The motor on the fan should be totally enclosed and protected against burnout by an overload protection device.

Shutters are needed on fans to prevent back drafts. The fan should be shielded to protect people, animals, birds and the fan.

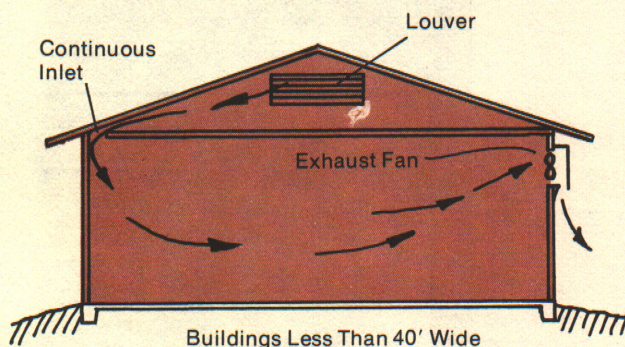


Fig. 11. Example of warm housing ventilation system.

INSULATING WARM HOUSING—In southern Michigan, a minimum recommended insulation "R" value is 14 for the sidewalls and 23 in the ceilings. Higher "R" values are desirable in northern Michigan. The "R" value is a measure of a material to resist the flow of heat through it. The higher the "R" value, the better the insulating material.

There are many types of insulating materials. Used correctly and in the proper amounts, most will properly insulate your horse barn (Fig. 12).

VAPOR BARRIER IN WARM HOUSING—A vapor barrier is a vital part of the insulation and ventilation system. A vapor barrier slows or stops the movement of water vapor through the building walls and ceiling. Water vapor moves through walls and

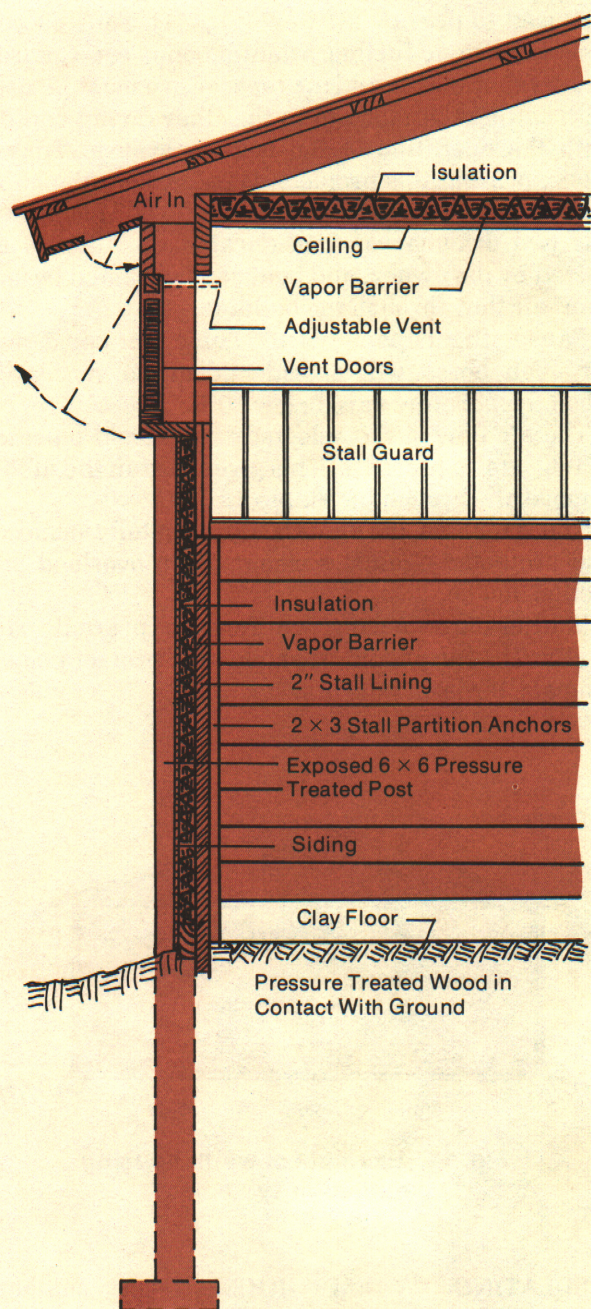


Fig. 12. Typical insulation and vapor barrier placement.

ceilings from the warm areas to the cold. Therefore, the vapor barrier belongs on the inside of the building walls and ceiling (Fig. 12).

As the water vapor moves through the wall, the dew point is reached and the vapor condenses in the wall. This lessens the insulation value of your insulation and can cause rotting of the wood in the wall.

The vapor barrier should be as tight as possible. It should be protected from mechanical damage by covering with an interior surface.

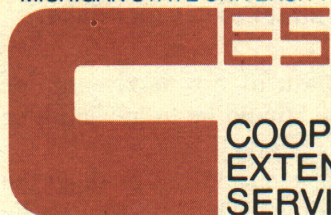
The most common vapor barrier is 4 mil polyethylene plastic. Aluminum foil is also used. Many insulation batts have a vapor barrier.

Heat in Horse Housing

Heat will be required in warm housing. There are several types of heating systems that work when properly sized and located. Heating systems must be installed according to local codes.

Occasionally, you may desire some heat in open or cold housing. Spot heaters can be used to supply heat in a limited area, a heat lamp or radiant heater work well.

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