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## HOUSING FOR PLEASURE HORSES

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REVISED:

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Horses have a prominent place in Kentucky life, both rural and urban. Recently, interest in horses, particularly pleasure horses, has intensified as more and more people have become involved in riding and showing. Accompanying this has been increased construction of a considerable variety of horse barns. When planning to build a horse barn, there are certain essential features that you should consider. The primary requirements are that the barn:

- provide protection from extremes in weather,
- keep the horse free from drafts,
- provide plenty of fresh air,
- give the horse a dry place to bed down, and
- keep the horse in a stall or enclosure where it will not be injured.

These are not difficult requirements to meet, but there is a surprising number of barns or stable areas which do not adequately provide for these requirements. A common fault is the lack of sufficient fresh air. With Kentucky's climate, there is little reason for attempting to provide tight housing. Basically, the horse must be kept dry and out of drafts. When a building is made too tight, ventilation is restricted and moisture builds up within the barn. This is far more detrimental than cold temperatures alone.

As far as secondary requirements, good horse housing should also:

- meet zoning requirements and not be offensive to neighbors,
- have a convenient water supply that is protected from freezing,
- contain adequate storage space for feed, bedding and equipment,
- include convenient means of manure disposal,
- include a convenient way of taking horses out of the stall area to work them, and
- be constructed of durable materials which minimize maintenance and repair and fire risk.

Each of these requirements, both primary and secondary, are important and need to be carefully considered when planning a horse barn.

### Location

**Zoning and Neighbor Considerations**--One of the first things to do in planning for the housing of pleasure horses is to determine if any building codes, construction restrictions or board of health regulations will prohibit or restrict the construction. This is particularly important in suburban areas, though such restrictions are extending into the counties in many parts of the state and nation. These regulations exist to protect the quality of life and the health of people, and to prevent construction which will have an adverse effect upon the total community. Check with your local Board of Health and Zoning Board for any regulations which would affect your plans.

In addition to zoning or board of health restrictions, you should also check any deed restrictions, (water, gas or electricity) easements, or rights-of-way upon the property. Easements for utilities or along property lines for access to other properties usually prohibit the construction of any permanent facilities in the easement area.

It is also important to consider neighbors' reactions to your plans. The best possible horse housing will still result in an increase in flies, some odor, and some mud and manure at certain times of the year. Even if your neighbors have no legal means to prevent construction, their strong adverse reactions will probably reduce the pleasure of horse ownership. Advanced consideration of their thoughts and reactions and efforts to minimize any nuisance will do much to overcome such negative reactions.

**Drainage--**The single most important factor in selecting a location is to be sure it will provide good drainage away from the building. Ideally, the land should slope away in all directions, but this is often difficult to achieve. In most cases, the site should be graded so the actual barn site is elevated slightly above the surrounding area. On sloping sites, a diversion ditch must be cut into 'the hillside on the upward side of the barn.

A site should also be selected which avoids drainage running from the building towards residences or other buildings in the area. Manure should be removed from the stalls daily for optimum sanitation and health conditions. The removed manure should be placed in a manure pit or storage area located in a convenient place where it creates the least possible offense to others. Additional details on a manure storage area are given later.

**Access--**Another important factor is to locate the barn for convenient access from a driveway, road or other all-weather surface area.

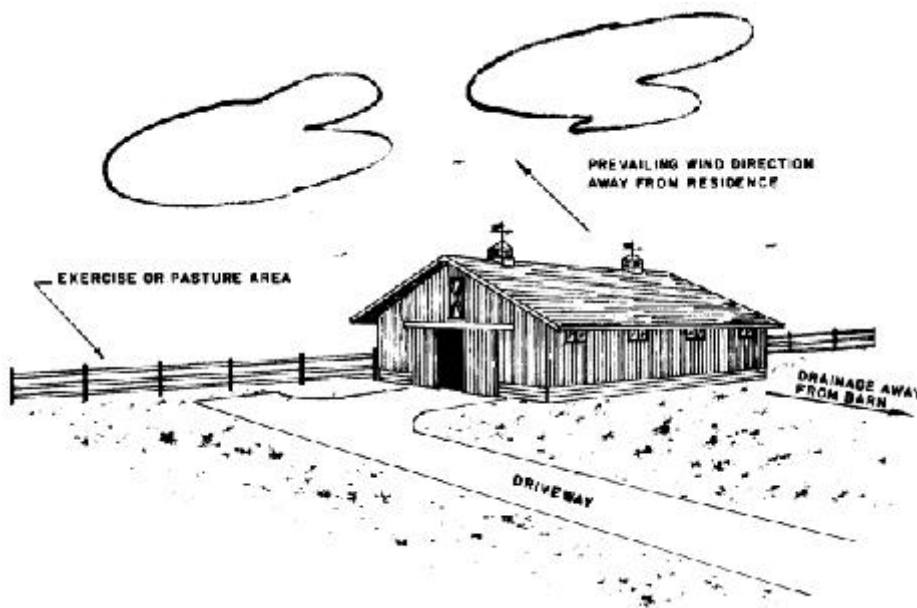


Figure 1.—Typical horse barn layout.

other all-weather surface area.

You will need to be able to bring feed and supplies to the barn, and you may wish to load or unload horses from a trailer near the barn. The barn should also be located in a place convenient to the horse exercise areas.

**Utilities--**Lastly, select a site which makes it easy to run utilities to the barn. Both electricity and water

will be mandatory and, if an office or work area is part of your plan, you may also need to provide for some form of heat.

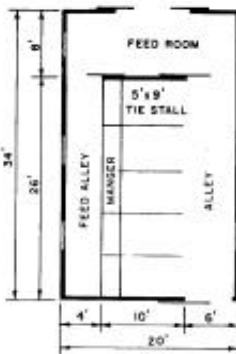
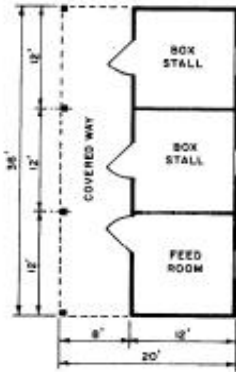


Figure 2.—Typical layouts and dimensions for horse barns with box stalls (top) and tie stalls (bottom). Plans for barns with two rows of stalls are available.

### Construction

Space Requirements--To determine the amount of space to provide in your barn, you first must decide the type of stall you want. The most common type stall is the box-stall; however, horses that are worked daily are sometimes housed in tie stalls. The main advantage of the box-stall is that it provides the horse with freedom to move around and thus obtain some exercise even when housed. The tie-stall uses considerably less space and can house more animals in a given size barn. Tie-stalls also reduce slightly the work associated with manure removal, especially with mares. The space recommendations for the two types of stalls are given in Table 1. Typical dimensional layouts are shown in [Figure 2](#).

Alleys between two rows of stalls should normally be at least 10 feet wide, and the litter alley behind a single row of stalls at least 6 feet wide. Feed alleys should be 4 feet wide.

**Table 1 .--Space Requirements for Horses\***

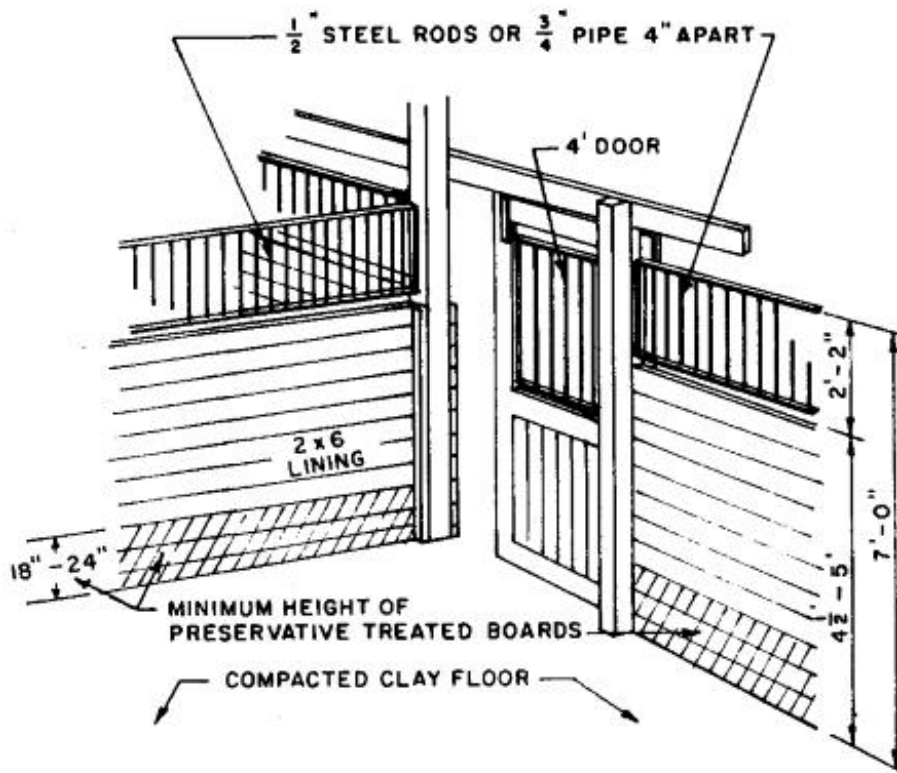
Type and Age of Horse	Box Stall (ft)	Tie Stall (ft)
Foal to 2-Year-Old		
average	10 x 10	4 1/2 x 9
large	12 x 12	5 x 9
Pony	9 x 9	3 x 6
Mature Horse		
small	10 x 10	
average	10 x 12	5 x 9
large	12 x 12	5 x 12

Brood Mare	12 x 12	
Stallion	14 x 14	

\*Source--Structures and Environment Handbook, Midwest Plan Service, MWPS-1, September, 1975.

### Stalls

Stalls, regardless of type, should be built of durable solid materials which will withstand the rubbing and kicking of the horses. Normally, at least 2-inch thick wood planking is used. Ideally, the planking



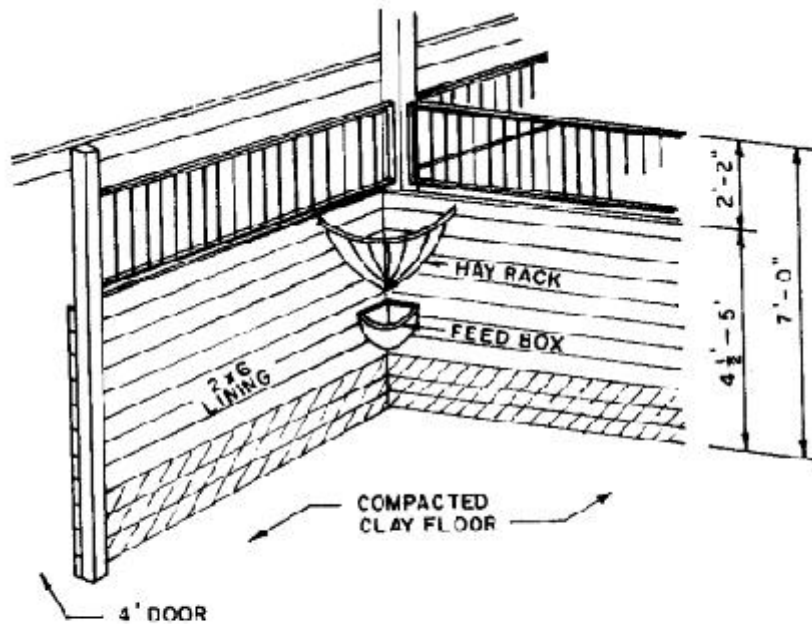
**Figure 3.—Typical box stall construction. The walls can be built of 2-inch planking or concrete blocks.**

should be tongue and groove. Treated wood is recommended for the bottom planking and posts since this wood comes in contact with the ground and with manure, both of which greatly shorten the life of untreated wood.

For acceptable durability, wood should be treated commercially by a pressure method to assure good penetration of the preservative. Either oil-borne preservatives (penta or creosote) or water-borne preservatives (osmose, wolman,

salts, etc.) can be used. Wood treated with a waterborne preservative, once it has been redried, is easier to paint.

The lower portion of the walls should be 4 1/2 to 5 feet high. Above this, a strongly built open panel is often used. This allows for observation and fresh air movement, yet keeps the animals separated. The open paneling may be of vertical 1/2-inch steel rods or 3/4-inch pipe spaced 4 inches on center, #4 gage welded steel mesh fence, chain link fencing, or 1-inch by 4-inch vertical wood slats spaced 1 1/2 inches apart. If an open section is not provided at the top of the wall, the solid wall should extend 6 to 7 feet above the floor. In place of wood for the stall partitions, many people are now using masonry



**Figure 5.—Box stall with a commercially manufactured corner hay rack and feed box.**

blocks since they are easy to erect and very durable. The doors to box stalls should be 4 feet wide and must also be solidly built. The latch should be operable from both the inside and outside, or a separate latch or hook provided for each side. The latch should be simple to operate, but not so simple that the horse can open it. The hinges or sliding track should be heavy duty. If you're planning on sliding doors, a bottom guide is required to hold them in place. Normally, the doors are made of 2-inch planking.

Mangers in the stalls must be strong and capable of

withstanding chewing by the horses. To prevent chewing, the edges of wooden mangers can be covered with metal at the key points. A hay manger should be installed at about 2/3 the height of the horse's withers. This is about 38 to 42 inches high for mature horses. Such a manger should be 30 to 36 inches in width. For foals, the height should be 30 to 36 inches and the width 24 to 30 inches. Grain boxes should be removable for easy cleaning. They should be the same height as the manger and 24 to 30 inches long, 12 to 18 inches wide, and 8 to 10 inches deep (Figure 4). Corner or wall hay racks can be used in place of built-in wooden mangers. These metal racks are made by a number of barn equipment manufacturers. A typical rack is shown in [Figure 5](#).

### Floors

The floor of most box-stalls is packed clay or earth. In tie-stalls, concrete or wood laid on top of concrete is sometimes used. The wood is difficult to keep clean and often there is an odor problem. Concrete floors are not as desirable since they tend to be slippery when wet, and cause stiffness and excessive hoof wear in the horses. When concrete floors are used, extra bedding is generally recommended to minimize these problems. Concrete in the feed alley and in the feed and tack rooms is common. Asphalt pavement is also used in some barns and it is not as hard on the horses; however, it is more difficult to clean and requires somewhat more maintenance.

### Ceiling Height

Small barns should have a minimum ceiling height of 8 feet. If a tractor is to be used in the center alley to bring feed into the barn or to remove manure, a 9 1/2-foot ceiling is suggested. If a rider is to be

mounted on the horse in the barn, the ceiling height should be 12 feet. In addition to providing adequate height for safety, high ceilings also generally result in improved ventilation since the air can rise and move through the upper part of the barn area without causing a draft on the horses.

## Ventilation

In Kentucky, barns will generally receive adequate ventilation if you provide sufficient openings and do

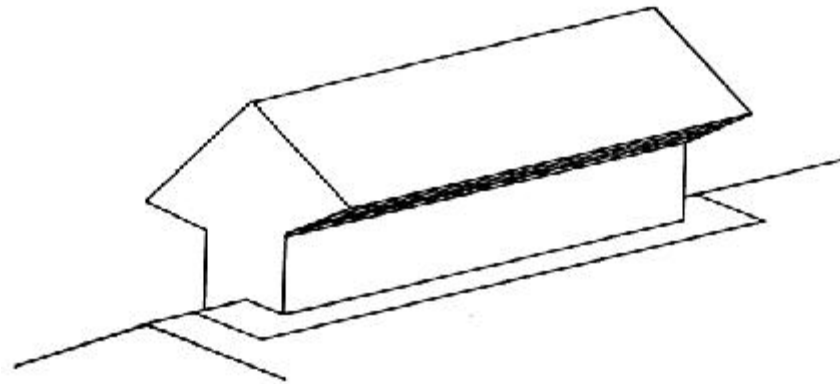


Figure 8.—Commercial ventilator for natural ridge ventilation.

not make the building tight during the winter. To provide adequate minimum winter ventilation, the area between the rafters and the plate should be left open as shown in Figure 6. To exclude birds, 1/4-inch by 1/4-inch mesh or screening should be installed. To further improve the natural ventilation, a ridge vent is also recommended. The vent can either be one of the commercially available types

or can be built as part of the roof construction (Figure 7 and [Figure 8](#)).

The eave vents and ridge vents will assure a continuous draft-free movement of air through the barn. This will move the winter moisture produced by the horses out of the building. If the moisture is not moved out of the barn by ventilation air, it will condense on cold surfaces, drip into the stall areas, and generally result in unhealthy conditions.

During the summer, extra openings are required in addition to the eave and ridge openings. Typically, a window is provided in each stall. The window should be at least 4 square feet in area. The bottom of the window should be about 6 feet above the floor. If the horse can reach the window, welded wire or a steel grill should be placed on the inside of the window to keep the horse from damaging it. An awning-type window is particularly desirable since it can be left partially open during rainy periods to provide ventilation, yet it will usually prevent rain from entering. If the stall doors open to the outside, dutch-type doors are often used which allow you to open the top half of the door for ventilation. If the barn has an alley between stalls, the doors at the ends of the alleys are usually left open during the warm weather to provide ventilation, then the windows adjusted as necessary.

In place of windows, hinged wall panels may be used. These panels are usually installed in the upper portion of the wall and the opening is generally covered with mesh wire on the inside. The panels can be covered with a translucent rigid plastic covering material for additional light, as long as the sunlight during the day or late afternoon does not shine directly upon the horse within the stall. Placing the panels in the north wall will minimize this problem. Extending the roof overhang will shade the walls and help reduce summer temperatures within the barn. Translucent skylight panels are not recommended in low horse barns because of the summer heat which will come through along with the light.

The roof should preferably be built of some solid sheathing material (solid boards or plywood) rather than spaced boards underneath a rigid roofing material such as metal roofing. Though using aluminum or

white painted steel greatly reduces the amount of sun absorbed by the roofing, the high thermal conductivity of such materials causes the bottom side of the roofing to become warm under the best of circumstances. This, in turn, causes a radiation heat load in the animals within the building. Using solid materials of low thermal conductance largely eliminates this problem, though it is helpful even with solid decking to use a light colored or reflective metal roofing. An alternative to solid wood sheathing is to use rigid insulation board underneath metal roofing, either as a ceiling liner below the rafters or on top of spaced boards or purlins.

Warm housing requires that the barn be heavily insulated, mechanically ventilated and possibly provided with a supplemental heating system. Such barns are not recommended for Kentucky.

### Feed, Bedding and Water

Within any barn, adequate facilities and space must be provided for feeding and watering the horses. Table 2 gives the feed storage space requirements for horses and Table 3 gives the water requirements. To determine the total storage space needed, multiply the amount of feed per horse by the number of horses and then by the number of days for which feed is to be stored. These figures were based upon assumed densities of 10 pounds per cubic foot for hay and 26 pounds per cubic foot for grain. The grain storage space is based upon the average density for oats. For mixed rations, the densities will be higher than this and therefore somewhat less space may actually be required. When stacking hay or using grain storage cans, you will lose some space so provide at least 25 percent more space than the required amount you calculate.

**Table 2.--Light Horse Rations\***

Type and Age of Horse	Weight (lb)	Daily Allowance (lb per 100 lb weight)	
	Grain	Hay	
Stallion in Breeding Season	900-1400	3/4 - 1 1/2	3/4 - 1 1/2
Pregnant Mare	900-1400	3/4 - 1 1/2	3/4 - 1 1/2
Foal Before Weaning	100-350	1/2-3/4	1/2 - 1 1/2
Weanling	350-450	1 - 1 1/2	1 1/2 - 2
Yearling	450-700	summer	pasture-
in training	450-700	3/4 - 1 1/4	3/4 - 1 1/4
Yearling, or Rising 2-Year-Old	700-1000	1/2 - 1	1 - 1 1/2
Light Horse at Work			
hard use	900-1400	1/4 - 1 1/2	1 - 1 1/4
medium use	900-1400	3/4 - 1	1 - 1 1/4
light use	900-1400	1/2	1 - 1 1/4
Mature Idle Horse	900-1400		1 1/2-1 3/4

*\*Source--Light Horses, USDA Farmer's Bulletin 2127.*

**Table 3.--Water Requirements for Horses**

Type and Age of Horse	Water Required (gal/head/day)
Mature (mare or gelding)	8 - 12
Brood Mare	8 - 12
Foal to 2-Year-Old	6 - 8
Stallion	8 - 12
Pony	6 - 8

The hay can be stored in any open area. The grain, however, should be stored in insect and rodent proof containers. Large garbage cans are normally ideal. For large quantities of grain, the circular steel grain storage tanks manufactured and sold by grain storage companies can be used. To allow the grain and hay to be handled conveniently, a large door in the feed storage room should be provided so that the delivery truck can pull near the storage area. The hay can be stored in an open front section of the barn where it can be unloaded easily.

Bedding also needs to be stored. Straw, shavings or sawdust are all used. Straw requires about twice as much storage space as hay on a pound per cubic foot basis.

Furnishing an adequate supply of fresh water is essential for the horses. Most horses are hand watered in barns. For in-stall watering, the automatic watering devices need to be of the non-freezing type (electrically heated). Such waterers should be located where spilled water will drain out of the stall area without causing a muddy or damp floor area. When hand watering is used, a freeze-proof hydrant normally is provided in the alley area. Regular hose outlets can be used if electric water-pipe heating cable is wrapped around the pipe and outlet to prevent freezing.

### **Manure Handling**

Arrangements must be made to handle and dispose of the manure. Ideally, manure should be disposed of daily; however, this often cannot be done or it is not practical. A temporary storage area consisting of a concrete slab which slopes away from the building is often desirable. About 12 square feet of area per animal is normally recommended. During the fly breeding season, the storage should be emptied at least weekly.

### **Lighting**

Electricity should be provided for general purpose lighting in each stall and in the alley areas. Protect lights that animals can reach with wire guards. Wire guards also are recommended for all other lights which might be bumped by pitchforks or other equipment. Glass globes over the light bulbs will keep chaff and cobwebs away and reduce the fire hazard.

Convenience outlets should be provided in the alley area, storage area and tack room. All electrical wiring should be installed according to building codes.

**Tack Room**

The room for storing tack and other equipment needs to be enclosed and relatively dust-tight. Separating the tack room and feed storage room helps minimize dust problems. The amount of space needed varies widely depending upon the number of horses and the nature of the horse operation. In many cases, the tack room is insulated to provide a heated work area at the barn.

**Horse Barn and Equipment Book**

A book of plans in reduced 8 1/2" x 11" copies can be obtained for \$2 from the following address: Plan Service Office, Agricultural Engineering Department, University of Kentucky, Lexington, KY 40546-0075. Your local county Extension office may have a copy of the book for your inspection. Full size 17" x 22" blueprints are available for specific plans from the above address at \$2.00 per sheet.