

# Horse Stall Design Features

G-95

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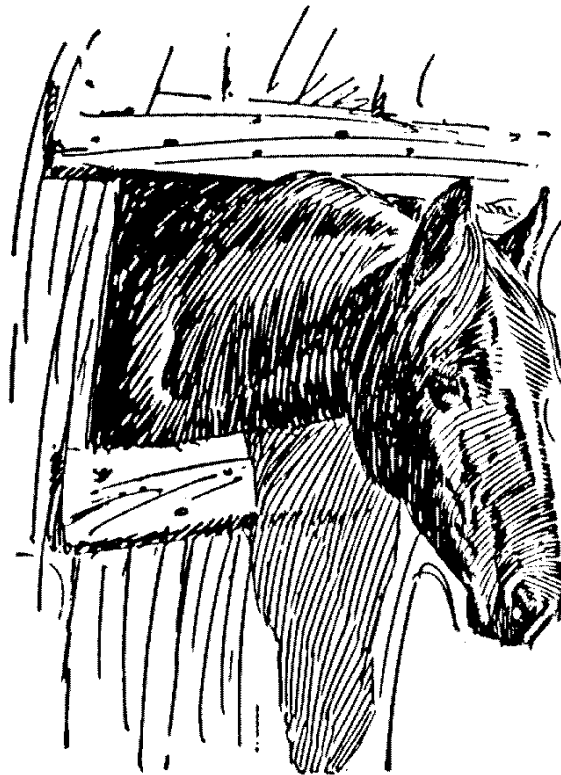
The stall is the basic functional unit of a horse stable or shelter. A simple backyard pleasure horse stall may at first appear different than a stall in a full feature boarding operation, but they are similar in their function of providing a suitable environment for the horse and handler. Safety for handlers and horses should be a primary consideration in stall design. Comfort for the horse is very important, as is convenience for the handler in performing chores associated with good horse care. No matter what your management style or needs, the basics of a safe horse stall are the same. Many options that have an impact on function and cost are available for horse stall features.

This fact sheet provides an overview of some basic stall features for a typical 1000-pound horse. Larger dimensions should be used for significantly larger stall occupants.

## Dimensions

The size of the horse and the amount of time the horse spends in the stall help determine stall size. Larger horses require more square footage than do smaller ponies to be able to turn around, lie down, and get up comfortably. A 12-foot x 12-foot stall has been a standard recommendation for a 1000-pound horse. Many stables are successful with stalls slightly smaller

than this but stall walls less than 10-feet in length are not recommended. Generally, the stall wall length is 1-1/2 times the horse's length. The more time a horse spends in a stall or the more active an individual is, there becomes justification for a larger stall size. A divider between two standard stalls may be removed to allow more space for a mare and foal or a stall-bound horse.



An 8-foot stall partition height has been considered standard. Partition height needs to be at least 7 1/2-feet to prevent horses from getting legs over the wall. Most horses can kick as high as 7-feet in the air. An 8-foot tall by 4-foot wide stall doorway opening has been the recommendation for years; although this is not often seen in stables. Stall door manufacturers typically supply a doorway opening of a bit over 7-feet tall with a 42- to 45-inch width. These are the dimensions of the actual open area through which the horse can pass. These smaller doorway openings appear adequate for horse and handler safety.

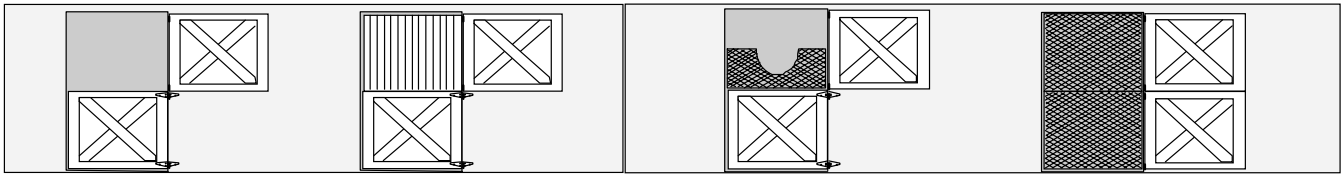
Horse barns are commonly built with a ceiling height of 10 to 12-feet with 8-feet being the minimum. A low ceiling, not only inhibits air circulation, but also increases the chance that a horse may strike its head. In fact, many stables have open truss or rafter construction with no ceiling, in which case, the minimum height is the clearance to the lowest item on which a horse may strike its head, such as a light fixture or truss bottom chord.

## Doors

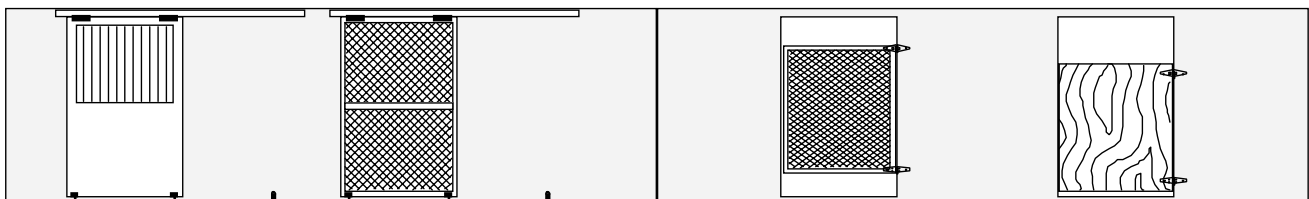
Swinging and sliding doors are common. Doors come in a wide variety of materials and configurations (Figure 1 provides some examples). Doors can cover the full length of the doorway opening, be divided into two panels (Dutch door), or partially cover half to three-quarters of the opening which is more common with metal mesh doors. Swing doors should open into the aisle rather than into the stall. Open swing doors decrease available aisle work area but may be latched open to alleviate this problem. Swing doors require less hardware to function properly, but heavy-duty hinges are needed to prevent sagging. Sliding doors, in addition to the overhead track, need a stop to prevent the door from being opened too far and falling off the

track and floor-level guides to keep the lower portion in place even when the horse is pawing, leaning, or kicking at the door. Full length doors should have less than 3-inches of clearance under them to prevent the horse from getting a hoof or leg stuck. All doors and doorjamb need to be free of sharp edges or protrusions (for example, door guides on sliding doors should be rounded and out of the traffic path), be durable, and latch solidly to prevent injury or escape. Door latches and other clasps that can be operated with one hand are an advantage at chore time. Position door latches out of reach of horses that may find pleasure in learning how to operate them. Horses may try to jump over doors that are half height (such as a Dutch door), however, there are options available that allow a horse to hang its head out yet discourage jumpers.

### Exterior Stall Doors



### Interior Aisle Stall Doors



### Interior Stall Doors with Safety Gate

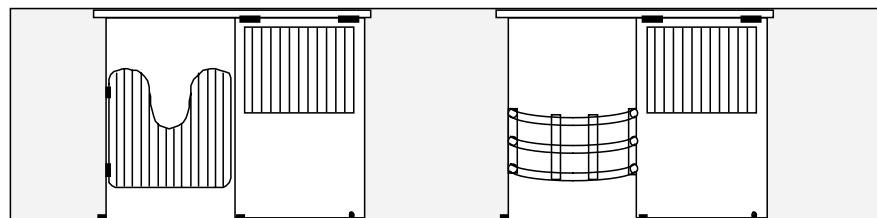


Figure 1. Examples of the variety of stall door designs.

## Environment: Lighting and Ventilation

Lighting is important for proper care and observation of stalled horses. Shadows and poorly lit areas make stall cleaning cumbersome and inhibit observation and care. For natural lighting, provide each stall a minimum of 4-square feet of window space. Glass windows need to be either out of reach of the horse (generally above 7-feet) or protected by sturdy bars or mesh. Plexiglass is an option for window glazing.

Place electric lighting fixtures along the front or side of stalls to decrease shadows on the horse. One fixture above the stall center causes a horse to be in shadow as it comes to the front of the stall for observation. A 100W incandescent or 20W fluorescent are suitable electric fixtures. Fixtures need to be placed at least 8-feet high to minimize contact with the horse. For further protection, provide a shatterproof cage, which is available at most lighting supply stores.

All electrical wiring in the barn setting should be housed PVC conduit, as unprotected wires may be chewed by rodents, creating a fire hazard. Metal conduit can be used but has a tendency to rust in barn environments. Position electrical wiring out of reach of horses, children and pets.

Fresh air should be available to every horse for its respiratory health. A window, which opens for each stall, eave and ridge vents, and no ceiling (or at least a high ceiling), will enhance fresh air exchange. Hay/bedding storage over top of the stalls is not recommended as these substances are not only a fire hazard, but also carry allergens and inhibit air circulation.

Open panels on the tops of stall dividers and open mesh doors are a great advantage for air circulation within the stall interior. Often the aisles of stables are well ventilated while the stalls suffer from stagnant air caused by poor air circulation.

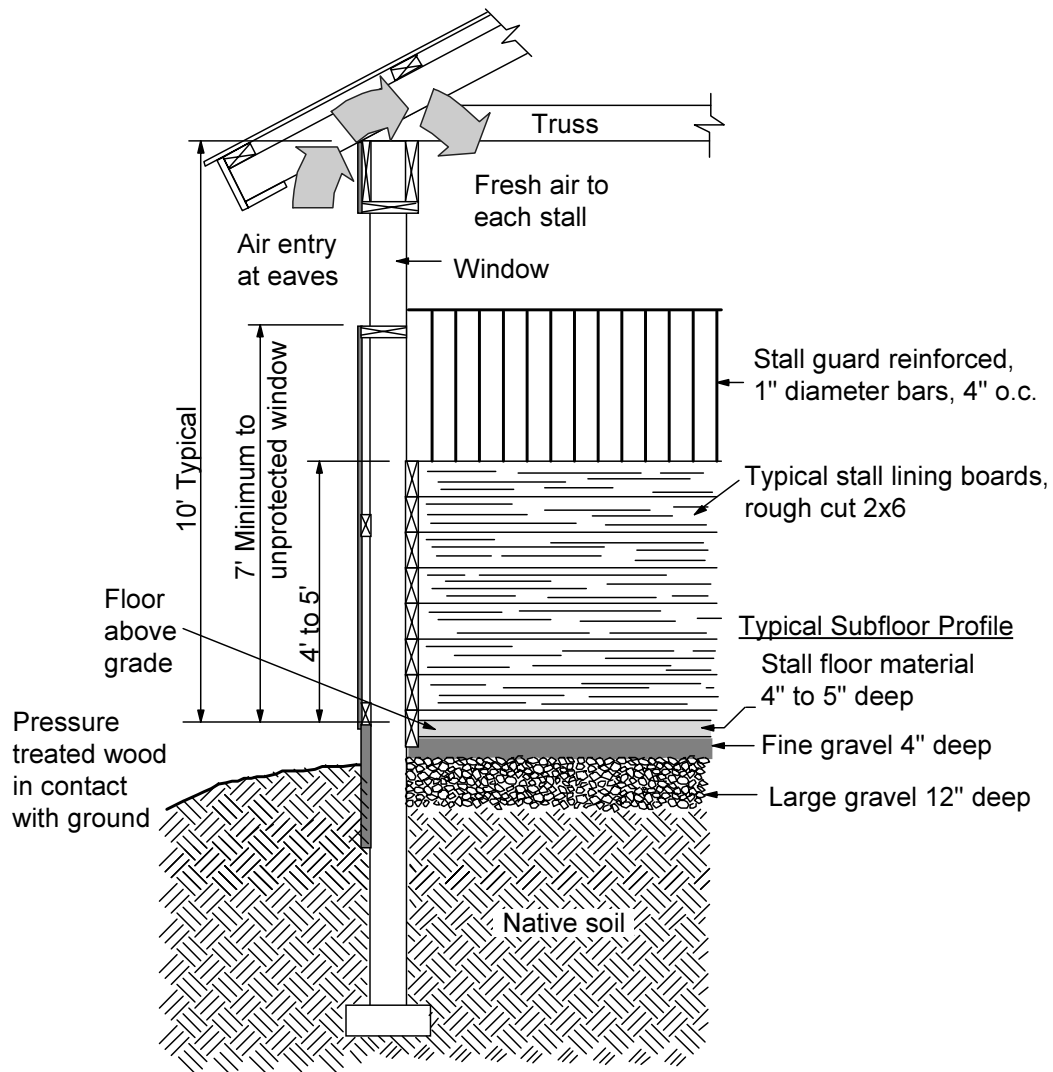


Figure 2. Stall cross-section showing typical dimensions and components.

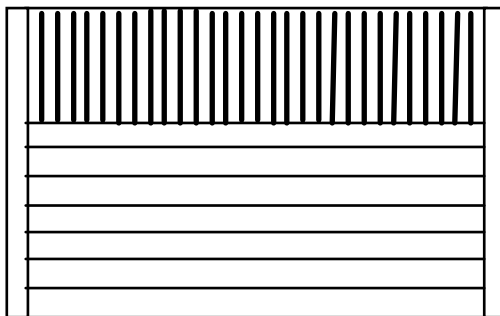
## Partition Design

Stall dividers are commonly 2-inch thick rough-cut oak or tongue and groove pine. Kicking and chewing damage is more obvious with softwoods with most of the kicking damage in the lower 5-feet of the partition. Bottom boards in ground contact should be pressure treated lumber. Plywood, 3/4-inch minimum thickness, is an alternative to boards. Unlike boards, which may shrink, warp, or crack, plywood dissipates impacts, giving it a better strength to weight ratio. For a more fire-resistant alternative to wood, concrete (block or poured), and stone may be utilized. Concrete provides strength and durability but has been criticized for thermal characteristics, high construction cost, and unyielding nature against kicks.

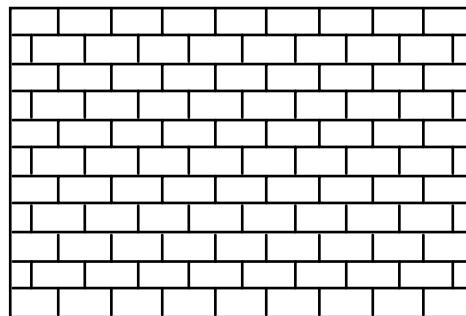
Stall partitions should be about 8-feet high and be flush with the stall sub-floor to prevent hooves from getting caught underneath. Boards can be spaced up to 1-1/2-inches apart to enhance air movement between stalls while discouraging encounters between stall occupants. With spaced boards, vertical center bracing is needed to stabilize the 12-foot long wall and prevent

the boards from breaking if they are kicked. Horizontal wood edges are vulnerable to being chewed by horses unless capped with metal.

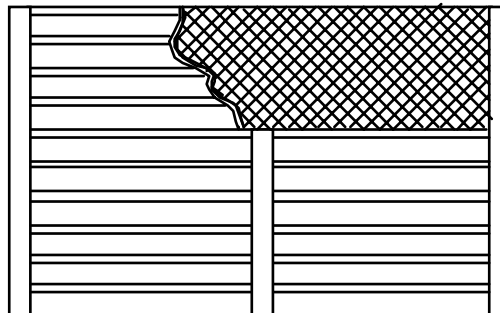
Stall walls do not necessarily need to be solid all the way to the top. An open panel design at the top allows for better ventilation and easy observation of the horse. It also allows horses to see their companions and other barn activities which can decrease boredom and vices. An open panel partition has solid materials along the bottom 48 to 60-inches with an open panel on top. Bars of 3/4 to 1-inch diameter tubular pipe, or equivalent, are common. Place bars to leave no more than a 3-inch opening between bars or use a heavy gage wire mesh with approximately 2-inch openings. The objective is to keep horse hooves from being stuck between the openings. Be sure that bar material is reinforced so that it will not bend when kicked and allow the foot to go through and get stuck. Metal electrical conduit is not strong enough for bars. Some horses behave better if they can not see their neighbors, in which case, a temporary solid panel (plywood, for example) can be installed over the bars or mesh.



A. Solid panel (boards shown) below with stall guard (vertical bars shown) above.



B. Solid panel may be 2 x 6 boards, tongue and groove lumber, 3/4-inch plywood, or concrete block (shown)



C. Spaced board panel with 1-1/2-inch air gaps between boards. Panel may be totally solid (shown on left) or with stall guard (wire mesh shown on right). Center wall board support is needed.

Figure 3. Stall partition options.

## Fixtures

Horse stall interiors need to be smooth, free of projections, and rugged. This includes hardware. Typical stall fixtures include a water bucket or automatic drinker, feed tub, a ring for tying the horse and optional items such as a hay rack or ring for a hay net/bag and environmental enrichment devices (toys). Characteristics to consider when purchasing stall fixtures are durability, ease of replacement, ease of cleaning, especially for feed and water buckets, and cost. Horses are fast and strong animals that have all day to work on the stall components. Choose high quality, strong hardware for long term, trouble free use.

### Grain and water

Feed and water stations need to be placed apart in a stall. A horse will drop grain into the water bucket as he stands and chews his ration if it is placed within

reach of the feed tub. Water and feed buckets should be fastened to the wall rather than being placed on the floor where they can be tipped over. The bucket rim should be positioned just above horse chest height at nose level. This is low enough to allow the horse to reach it comfortably, yet reduce the chance of the horse stepping in it. Unfortunately, the correct placement of buckets is the ideal height for manure to be deposited in them. Fixtures to hang buckets need to be smooth, free of gaps and fasten securely to the wall. An eye hook and double-ended snap work well for buckets with a bail handle. Some manufacturers provide feed tubs and buckets with hardware for safe and secure wall attachment. Be sure that the hardware is equally safe whether the bucket is present or not. Be sure that fasteners facilitate easy bucket removal for frequent cleaning.

Water is provided in buckets or by using automatic watering devices. This decision is usually based on

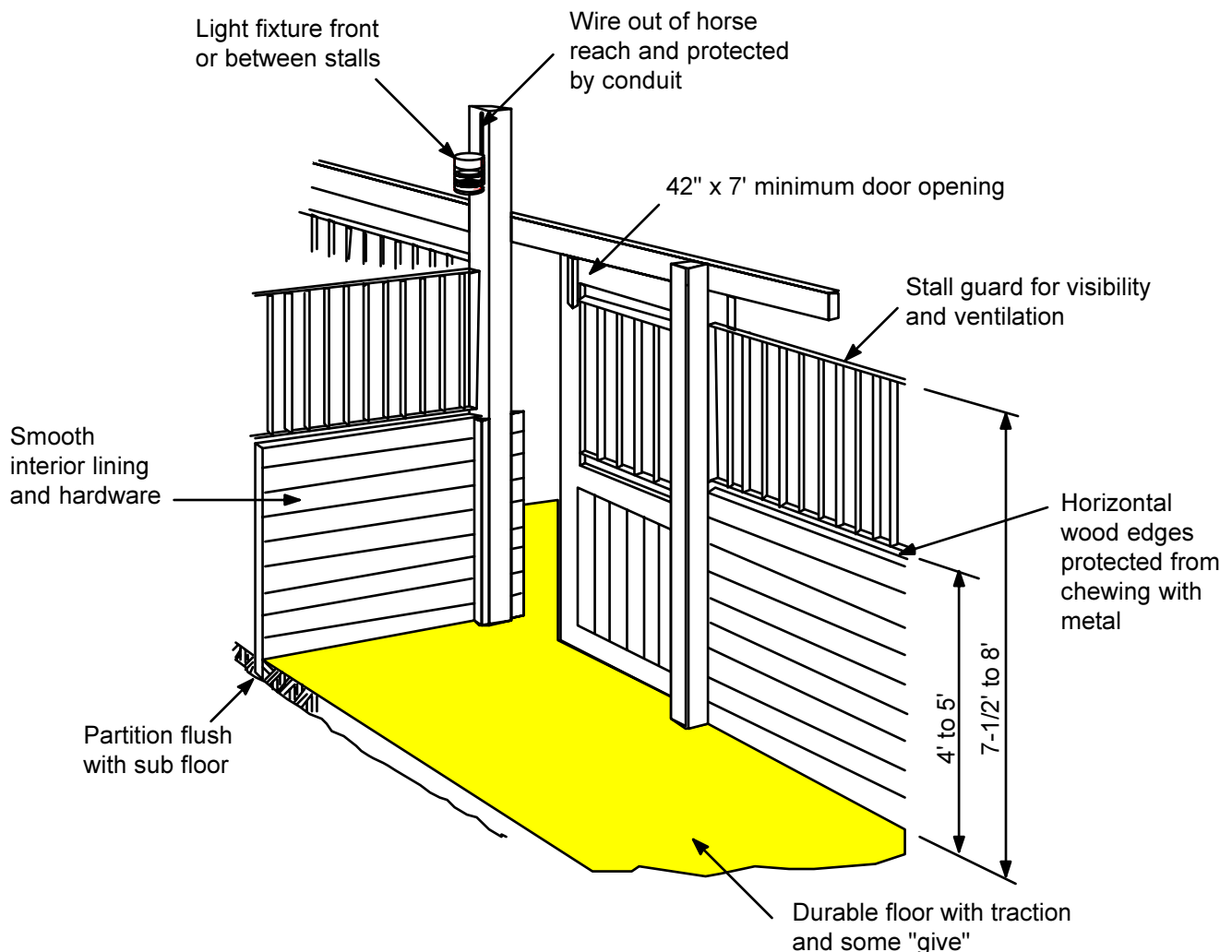


Figure 4. Typical box stall construction.

Adapted from *Horse Handbook Housing and Equipment*. Midwest Plan Service. 1994.

cost and management preferences. An automatic drinker is more expensive than a bucket to purchase and install. Drinkers reduce the time needed to complete daily activities but are not a watering “cure-all”. Drinkers, like buckets, need to be checked daily to ensure that they are free of manure and contain fresh water. Any watering device needs to be cleaned of algae and debris on a regular basis. Horses will drink more water if the bucket is clean and the water fresh. Buckets allow water to be easily removed from the stall for post-exercise or treatment purposes and generally allow better monitoring of water intake.

Selection of automatic drinkers should take into consideration the strength and maintenance requirements of the materials that will come in contact with the horse, the smoothness of these surfaces, water refill mechanism, and ease of cleaning. A drinker with a float will require the horse to lower the level of the water to refill it, whereas a refill mechanism that requires the horse nose to open a valve can be difficult or frightening for some horses to use. Valve mechanisms can also become a “toy” and some horses delight in holding the valve open and flooding the stall. In colder climates, waterline protection is needed to prevent freezing and breakage (deeply buried lines, heated barn, and/or electrical heat tape on exposed water lines). Proper drinker placement has similar attributes to water bucket placement in height and separation from feed tub. Some models allow two stalls to share one drinker.

### **Hay feeding**

The ideal way to feed forage (hay) varies among horseman. Hay can be fed directly off the ground. This method has been criticized because it allows the forage to come in contact with waste, dirt, and to be mixed with the bedding. A corner apron of concrete can minimize forage contact with a dirty floor. A primary advantage of floor feeding is the natural position it allows the horse.

Hay racks, hay bags, and hay nets are options for keeping forages off the ground. Hay fixtures should be used with extreme caution since a horse’s leg may become caught if the horse kicks or rears near the rack or net. The horse’s habits, personality, and behavior need to be given strong consideration before selecting a fixture. When a hay rack, net, or bag is used, the bottom end should be at wither height for the horse. Too high, and hay dust falls into the horse’s eyes and nostrils; too low and the horse may become tangled. All weld joints on racks need to be strong and smooth and corners rounded.

There is much disagreement over the proper hay feeding station. Feeding from a rack or net is disliked by some horsemen due to the inhalation and irritation of dust from the hay and its unnatural position for a horse to eat. An alternative to a rack or net for those who disagree with feeding off the floor, is a hay manger. Mangers let the horse eat in a more natural position, are less prone to trap the horse, and reduce dust fall. A well-designed manger is usually wooden, starts flush with the floor and ends above horse chest height. Hay chaff and dust will tend to accumulate in the bottom of the manger and will need to be removed regularly.

### **Tie ring**

A ring for tying the horse is often placed at or above horse wither height. It is usually placed away from the feed and water buckets and toward the back on one of the sidewalls. This keeps the horse secure when cleaning the stall or grooming and tacking. Be sure that the wall is strong enough to withstand resistance from a horse and that fasteners are smooth on both sides of the wall.

### **Flooring**

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Many stall floor options are available, however, it should meet most of the following requirements. Horses are hard on flooring so it must be durable against pawing and use by a 1000-pound occupant. A good floor has some “give”. A floor that absorbs some of the impact and weight of a horse will reduce stress on the horse’s legs and ease foot problems. The floor should be non-slippery as slipping can lead to injuries, especially muscle pulls when the horse tries to stand from a lying position. Floors that are slippery can inhibit the horse from even trying to lie down. Horses have their heads close to the ground for most of the day and a non-odor (ammonia) retentive, non-absorbent floor is beneficial. Minimize the time needed to clean and maintain the stall floor by choosing a low maintenance material. No single flooring material seems to have all the desirable attributes. Dirt has “give” but is not durable; concrete is durable but has no “give”. Some of the hardness of concrete and other hard materials can be overcome through the use of rubber mats or deep bedding. Sufficient bedding helps prevent sores or abrasions. Rubber mats and clay can be slippery when wet. For more information on flooring please see *Horse Stable Flooring Materials and Drainage*, G-96.

## Summary

By following simple guidelines that consider both handler and horse needs, a pleasant and safe stall environment can be provided. Fortunately there are many good options in the components for a horse stall. For example, doors and flooring materials are quite

variable among successful stables. Good, safe, and easily managed stables will have incorporated the features presented here which address stall size, durability, and horse care. Providing a stall of proper dimensions with a good environment is essential.

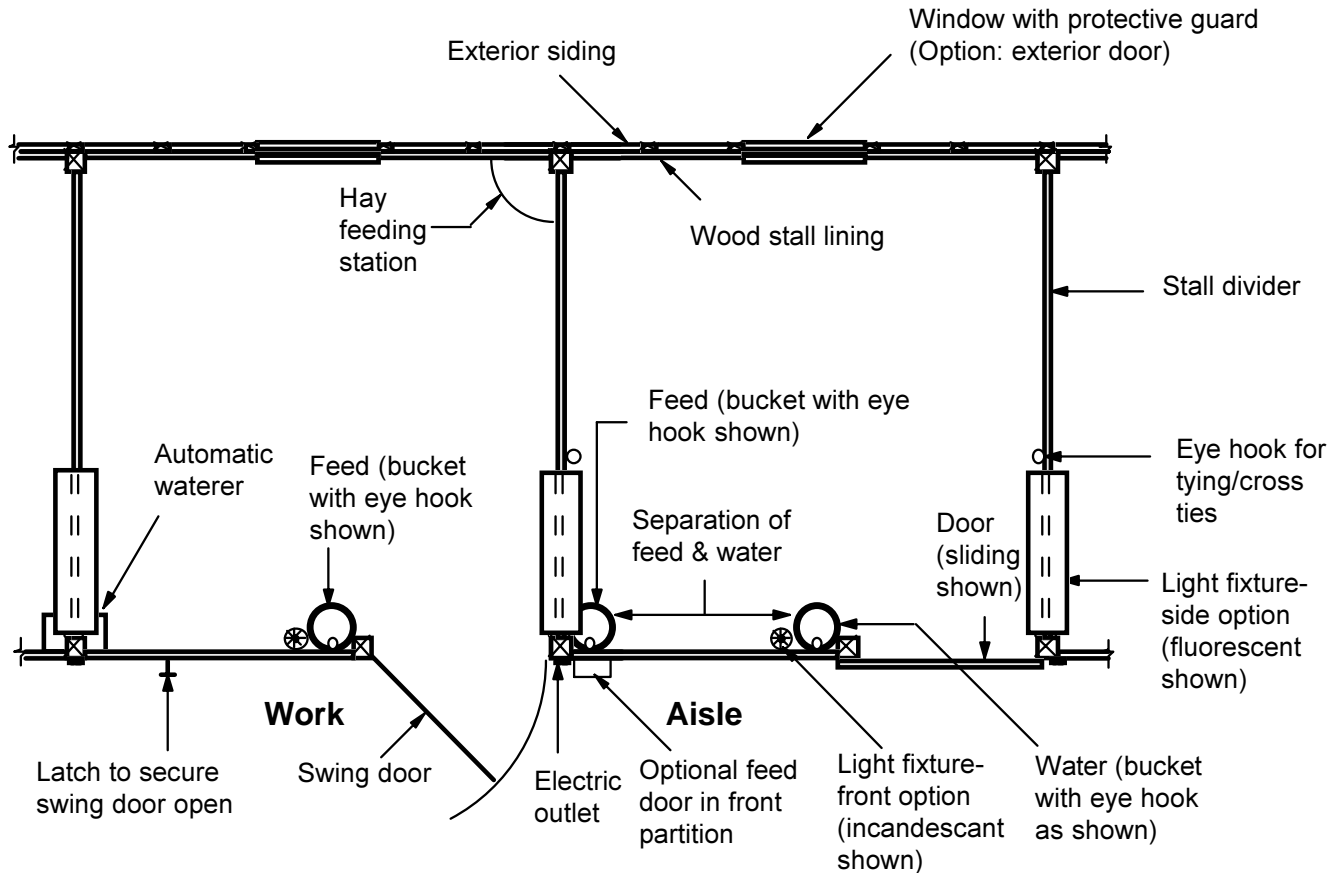


Figure 5. Overhead view of horse stall features including options for doors, feed, and waterer locations and lighting fixtures.

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