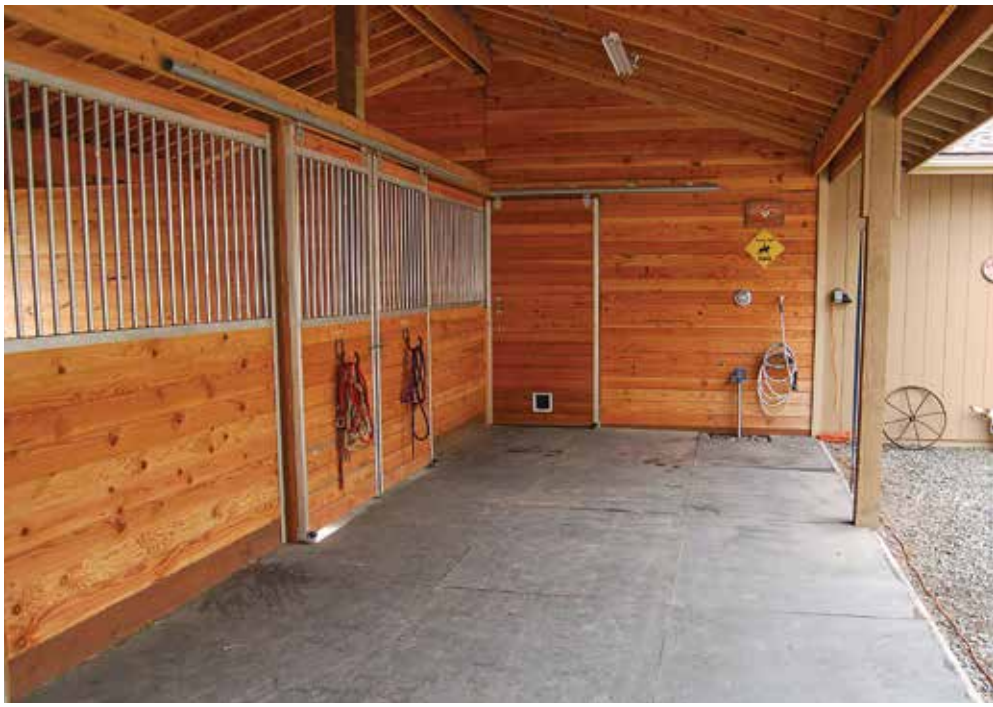
NANCY S. LOVING, DVM

Building a Vet-Approved Barn

Whether building from the ground up or retrofitting existing structures, prioritize your horse's health and safety

A barn is a wonderful shelter for a horse and makes a nice workplace for people to do horse-related chores. Barns range in shape, size, materials, and age. Some come with a property; some owners build after moving in. Regardless of whether you have an existing structure or are planning a new one, consider equine safety and comfort when retrofitting or designing it. Over decades in equine practice, I have encountered innumerable injuries and health issues, some quite serious, that owners could have avoided with practical design modifications of their stabling and management.

Matthew Johnson, architect and owner of Equine Facility Design, in Portland, Oregon, has devoted his career to designing equestrian facilities and barns with an eye for the details. He offers barn construction suggestions to help optimize horse health and reduce accidents and injury.



ALAYNE BLICKLE

A horse-safe stable should have ample airflow, aisles that are flat and offer good traction, and durable stalls without protrusions or gaps that could snag skin or ensnare horses' limbs.

Stalls

Walls Stabling a horse inside a confined area can be hazardous at times; careful consideration of materials and design goes a long way toward preventing injury. "Typically, stalls are made of either wood or HDPE (high-density polyethylene) recycled plastic tongue and groove lumber," Johnson says. "HDPE material is safe, doesn't splinter, is durable, nonabsorptive, and easy to clean, making it a low-maintenance option for barn owners."

To protect horses from each other in adjacent stalls, he recommends installing grilled partitions with solid walls adjacent to feed or water. "This gives horses privacy while eating but allows safe social interaction."

To discourage horses from chewing on wood edges in their stalls or paddocks, he suggests using prefinished chew-guard angle metal with countersunk attachments. Protect horses from sharp metal edges by ensuring the metal fits well with no protrusions. You might also choose nonwood materials with deburred (smoothed) or grounded edges or hemming that forms dull edges and won't cause injury.

Size "A minimum stall size of 12-by-12 feet is about one-and-a-half times a horse's length and allows an average-sized horse to walk in a circle, roll, and sleep without getting cast," says Johnson. Warmblood and draft breeds benefit from 12-by-16-foot stalls.

Doors and latches Johnson says the minimum industry standard width for stall doors is 4 feet. Secure sliding door panels with a high-strength wall-attached magnet that minimizes exposed hardware. "Door construction—how it's mounted, its strength and design—to avoid limb entrapment is essential," he says. "Spacing of stall grill bars needs this same attention. Bars need to be strong, welded securely, and positioned no wider than 3.25 inches (apart) so a horse can't get a hoof through them. Use door-mounting hardware that allows the door to be secured flush to the stall without gaps."

The ideal stall door latch is difficult for a horse to open and isn't likely to impale animals (or people) as they pass through. "Latches with two-sided operation are an important safety feature for people entering and exiting horse-occupied stalls," he says. "Finger latches with minimal hardware are effective."

Windows and ventilation Ideally, your barn and stalls have windows for light and airflow. The air a horse breathes is integral to his health and performance so good ventilation is critical. Johnson says good ventilation also keeps things dry and, so, prevents mold from growing on tack and feed. He says a design with plenty of windows establishes natural ventilation through cross-breezes.

Johnson recommends using safety glass (which is less likely to break and, if it does, won't produce sharp, jagged edges) in windows around horse-accessible areas. You might add screens or operable window guards (which make accessing the glass easy for cleaning) to stall windows for safe ventilation.

"Stall fronts with grills or open partitions like a Dutch door also promote airflow," he says. Facility owners can supplement natural ventilation with mechanical systems such as barn fans. When possible, don't close the barn up at night but, instead, allow air to flow through.

Utilities

Electrical outlets For safety, sheath electrical components in metal conduit or enclose them behind finishes. Johnson stresses that electrical work must be grounded and installed in accordance with building codes. Don't locate light switches or receptacles in horse-accessible areas.

"Enclose stall lights with guard protection that not only prevents a horse from breaking a light but also keeps out dust, debris, and cobweb contact with the bulbs," says Johnson.

Water sources Also ensure that electric-powered automatic waterers or heated water troughs are grounded. Johnson recommends burying an 8-foot copper grounding rod at least 7 feet as a backup if the waterer or heater's own grounding fails—this can prevent harm or death to horses and humans. To further reduce risk, install GFCI (ground-fault circuit interrupter) outlets designed to detect faults and prevent shock with electrical water units. Even the slightest electrical current in a water source will deter a horse from drinking, which can result in colic.

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>
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Work Areas, Floors, and Aisleways

Ceiling height Johnson prefers a 10-foot minimum ceiling height in horse-trafficked areas of the barn, although 8-foot ceilings work well, too. In fact, an 8-foot ceiling might discourage unruly horses from rearing—ears touching the ceiling often cause a horse to drop back to the ground.

Design features such as clerestories (high windows), Dutch doors with transom windows (located above the door beam), attached run overhangs, and roof slopes might require a ceiling height closer to 12 feet.

Barn floors and aisleways In stalls Johnson says he prefers rubber mats atop a concrete base, which provides a flat surface and a barrier to earthen material that doesn't absorb moisture. "Interlocking rubber mats hold … together so there is less chance of hoof entrapment," he says.

Alternatively, you might install a compacted gravel or dirt base. If using these materials in a stall or paddock without mats, watch for and smooth out any ruts that might cause a horse to get cast.

Johnson also recommends using interlocking rubber mats or pavers for aisles and grooming areas due to the combination of cushion and traction they provide. He says interlocking mats work fine for wash stalls, but permanent seamless rubber flooring systems are easier to clean.

"When a stall needs to serve both purposes (grooming and wash stall), a solid rubber mat is best, as long as the floor slopes slightly to direct water to the drains," he says, which prevents the area from getting swampy and slippery.

Provide drainage throughout the rest of the barn, too, to avoid standing water that could serve as mosquito breeding grounds. Gutters along the eaves of the roof also move water away from doorways to prevent puddles—slipping hazards for horse and human any time of year.

The less clutter in an aisleway, the better. Horses react unpredictably, and a spooked horse can bump into saddle racks, tack trunks, or other equipment—keep those items in a tack room or storage area. Fold-out saddle racks save space and lie flush with the wall until time to groom and saddle up. Similarly, drop-down-style bars on stall fronts keep blankets out of the way when they're not in use; just take care in keeping horses' teeth away from them.

When cross-tying a horse, use breakaway materials (such as baling twine) to attach the tie to the wall. That way, a horse that panics gets loose rather than flipping backward when the halter or fasteners break.

Johnson recommends placing grooming stalls out of the aisle to keep walkways clean and clear. Also keep cleaning equipment, such as wheelbarrows, manure forks, and brooms, in a space separate from where you groom or walk. Additionally, you might design niches or small cubbies into barn aisle walls for storing small items like fly spray and turnout boots.

Biosecurity Due to the risk of infectious

disease outbreaks on horse farms, consider adding quarantine areas separate from the main barn and work areas for housing sick horses or horses new to the property. Configure isolation areas with separate entrances; use materials that can be disinfected and will hold up to caustic agents; separate water, feeding, and cleaning equipment; and devise a way to disinfect people's feet upon entry and exit.

Feeding Strategies

Hay storage Store bulk hay in a building separate from the barn, and designate a small area within the stable to store hay for immediate use. "This is important both from a fire safety and horse health perspective," says Johnson. A hay loft over the stalls or arena makes putting up hay a chore and generates dust that adversely affects horse (and human) respiratory health. Ceiling lofts reduce natural daylight and ventilation, he adds.

Feeding stations Construct in-stall feeding stations out of safe materials, and place them at an appropriate height (this depends on the type of feeder and size of horse) that helps prevent injury while keeping airways clear.

"While some owners like to feed from grain bowls, others use permanently installed hay and/or grain feeders," Johnson says. "Metal (with rounded edges) is the best material for these because of its strength. Some horses grab the edges and pull on them like toys; metal withstands this better than plastic alternatives."

Feed rooms "Secure feed room doors with a horse-proof latch and an additional lock to amplify safety," Johnson urges. Serious health problems, from colic to laminitis, can arise if an escaped horse has free access to grain or supplements.

When designing for the size and shape of a feed room, consider its uses:

- Will you use a feed cart?
- How many types of feed do you store?
- What design helps streamline and minimize meal preparation efforts, especially in high-volume barns?

Rodent-proof feed containers are musts in feed rooms. "These might be plastic or aluminum trash cans, although specialized feed containers offer aesthetic and ease-of-use advantages," says Johnson. "Elevating containers off the floor eases cleanup of spilled feed and prevents rodent attractants."

Fire Prevention Strategies

Rebecca Gimenez Husted, BS, PhD, of Technical Large Animal Emergency Rescue, in Gray, Georgia, offers practical suggestions to mitigate barn fire risks. Ideally, she says, construct your barn out of masonry or cinder blocks, with metal or tile roofing, sand or other noncombustible flooring, sheath electrical lines in conduit, and paint wood surfaces with flame-retardant paint. Compartmentalize areas of the barn to reduce chances of a fire starting and/or spreading.

Install carbon monoxide detectors, lightning suppression systems, and flame and heat detectors with electronic eyes that signal the presence of heat or flame rising. Cheap smoke detectors aren't as useful, Gimenez Husted says, because they often give false alerts from air particulates and dust. Remove dust and cobwebs regularly throughout the barn.

Check tags on fire extinguishers monthly, and update contents at the local fire department as necessary. Extinguishers should be at least 10-20 pounds, she says, and placed in multiple obvious locations within a barn. When possible, install an appropriate size and type of sprinkler system, such as a dry sprinkler for cold climates.

Gimenez Husted says hay, straw, and bedding are best stored in a building separate from the main barn. Hay can combust spontaneously and fuels the spread of fire.

Also develop a fire evacuation strategy for your facility. It takes 30 to 60 seconds to halter and lead a horse to an exit, Gimenez Husted says. Keep halters by each horse's stall, and never lock a stall door. Fire can turn a barn into an inferno within three to five minutes, she says, so time is critical. If possible, don't open stall doors to allow horses to escape, because loose horses often return to the barn and can run into people or impede emergency vehicles.

For emergencies it's essential to have two means of stall egress, even if an exterior run isn't attached to a stall. Gimenez Husted recommends installing 8-by-8-foot doors every 50 feet along the barn's outside wall to enable horses and humans to reach a run-out lane that attaches to a holding paddock a sufficient distance away. Everyone at the barn should know emergency response details and practice evacuation plans routinely.—*Nancy S. Loving, DVM*

Tack and Medication Storage

Install cupboards and shelves to keep tack rooms free of clutter. Place some up high for storing infrequently used items. You can organize smaller yet more commonly used items in tack trunks. Large tack cabinets also create a tidy space.

To keep children, pets, and unauthorized adults away from medications, syringes, and other materials, install a locking cabinet and/or a secure refrigerator box for drug storage. Most facility managers keep these items in the feed room so they can conveniently administer them at feeding time, says Johnson. If you need to store medications in a temperature-controlled environment, install a locked storage area in a climate-controlled tack room.

Paddocks and Runs

Fencing depends on a variety of factors, says Johnson, including:

- The types of horses housed;
- The area of installation; and
- Barn owner preference.

Polyvinyl chloride (PVC) rail fencing is known for its low maintenance, pleasing appearance, and safety. Some barn owners prefer the classic look of a four-board wooden fence. For foals, quality mesh fencing is safe and appropriate.

"Often, combining these types of fencing with electrical hot wire or tape maximizes horse safety while also preventing horses from chewing or cribbing on the fence," says Johnson.

Some property owners use metal panels as paddock perimeters. If you choose this route, make sure they are designed for horses, because cattle panels are often constructed with metal "feet" that can entrap a horse hoof or foal head. Check gate connections to fence posts for excessive gaps and protruding bolts—cut bolts flush with the fence post. Any enclosure that includes T-posts should have caps on all the posts to prevent a horse from impaling himself.

Take-Home Message

Attention to small details of design can make barns safer and more comfortable for you and your horse, along with improving chore efficiency. The proactive measures you implement are invaluable for promoting equine health and minimizing injuries.