

Horse Farm Design: An Agricultural Engineering Approach

Research-based information for the planning and construction of well-designed equestrian facilities.



Paddock with Run-in shed

Horse Farm Design

We address topics that are often not carefully considered in initial horse stable design. Those topics include:

- Ventilation ([Horse Stable Ventilation](#))
- Manure management ([Horse Stable Manure Management](#))
- Safety via fire protection ([Fire Safety in Horse Stables](#))

We provide technical recommendations for facility features such as:

- Stall dimensions ([Horse Stall Design](#))
- Flooring materials and drainage ([Horse Stable Flooring Materials and Drainage](#))
- Fence planning ([Fence Planning for Horses](#))
- Riding arena footing materials ([Riding Arena Footing Material Selection and Management](#))

This information is very useful to equine enthusiasts who are planning barn construction or redesign of agriculture buildings. An emphasis is put on providing good air quality in the indoor environment, good stewardship of the outdoor environment, and layout for management efficiency.

General Information on Facilities

Horse Stable and Riding Arena Design Eileen Fabian Wheeler 2006. hardcover, 308 pages Published by Wiley-Blackwell

Horse Facilities Handbook MWPS-60 Eileen Wheeler, Bill Koenig, Jay Harmon, Pat Murphy, David Freeman 2005. paperback. 248 pages. Available from [MidWest Plan Service](#) (MWPS) and [Penn State Extension](#)

Recommended Publications for Horse Farm Design and Construction Eileen Fabian Wheeler [2018 PDF document](#)

Additional information on Riding Arena Surfaces

All-Weather Surfaces for Horses Ray Lodge and Susan Shanks 2005. hardcover, 96 pages. Published by J. A. Allen

Equine Arena Handbook: An In-Depth Guide to Arenas and Running Surfaces Robert Malmgren 2010. paperback, approx. 126 pages. Published by Alpine Publications

Under Foot: The USDF Guide to Dressage Arena Construction, Maintenance and Repair [U.S. Dressage Federation](#) (USDF) 2015. paperback, approx. 68 pages. Available from the [U.S. Dressage Federation](#) store

Additional Information on Horse Stables

Complete Plans for Building Horse Barns Big and Small Nancy Ambrosiano and Mary Harcourt 2006. paperback, approx. 261 pages Published by Breakthrough Publications

Design Handbook for Stables and Equestrian Buildings Keith Warth 2014. paperback, approx. 152 pages Published by J. A. Allen

Healthy Stables by Design John Blackburn with Beth Herman 2013. hardcover, approx. 183 pages Published by Images Publishing

Horse Housing, How to Plan, Build and Remodel Barns and Sheds Richard Klimesh and Cherry Hill 2013. paperback. approx. 216 pages Published by Trafalgar Square books (reprint)

Horsekeeping on Small Acreage Cherry Hill 2005. paperback, approx. 308 pages Published by Storey Publishing



PennState Extension

The Perfect Stall Karen E. N. Hayes 2003 paperback, 144 pages Published by Ironhorse Publishing LLC

Roofs and Rails Gavin Ehringer, 2002 paperback, 143 pages Published by [Western Horseman Inc.](#)

Stablekeeping, A Visual Guide to Safe and Healthy Horsekeeping Cherry Hill 2012 paperback, approx. 160 pages Published by Storey Publishing

Stables and Other Equestrian Buildings Keith Ward 1997 hardcover, approx. 102 pages Published by J. A. Allen

Other Sources

Some titles list specific sources. Otherwise, local bookstores can special order titles for you. Also try these online booksellers:

- [Alibris](#) (an independent seller source for books)
- [Amazon](#)
- [Barnes & Noble Booksellers](#)
- [Breakthrough Publications](#) (specializing in books on horses)

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Horse Stable Engineering

Horses are housed in stables for many reasons but they seem to fall into three general categories that include human convenience, providing a less severe environment than experienced outdoors, and tradition. The first two reasons are related to providing an environment where the handler is comfortable working and the horses are efficiently cared for. The environment and management of the stable is designed to be an improvement over outdoor conditions or the horse will be disadvantaged by being in a stable. The third reason, tradition, has received little discussion. Keep in mind that the horse is most often more healthy, both physically and mentally, by outdoor living.

Horses have traditionally been kept in stables. Horses as the precursors to "cars", or "trucks", or more appropriately, "SUVs", were kept in a stable behind the home/business like our cars. In this tradition, horses were used all-day, virtually every-day, and stored for the night in a stable until they were needed tomorrow. Compare to the current Amish expectation where horses are consistently expected to drive dozen of miles each day and auction horses change hands with the ability to drive 20-miles each way to a work site. Now we use our cars everyday to move dozens of miles and use most of our horses for recreation with few miles per day. It may be alright to close our cars in a garage and to let them be idle most of the day but a living breathing horse is better suited to being outdoors or, if confined, in an open airy environment.

The "traditional" use of the horse has dramatically changed, but not our horse housing. Most horses are kept in suburban settings for recreation use rather than for any type of "work." This is fine but perhaps our thinking about horse stabling needs to change to match the change in how we use horses.

Modern horses are often inactive most of the day and confined to a stall where they originally were only expected to rest and sleep for work the next day.



Horses can be housed outdoors in groups with a run-in-shed designed shelter

Throughout this bulletin series there are several references made to horse housing design in relation to livestock housing design. This upsets some horsemen and horsewomen since they don't think of horses as "livestock". Indeed, within our American culture we do not eat or derive food products from horses as we do from hogs, cattle and poultry. But there is an unnecessary trend in stable design toward more residential-type construction that is not appropriate for healthy horse keeping.

Horse housing needs to be more like livestock housing than residential housing. Horses are our companions and treated as family, in many cases, but horses are livestock when it comes to housing. Horses are large, strong animals with instincts and habits that require they be housed in facilities that recognize their needs. As livestock, horses will drop feces and urine on the floor. As livestock, horses are fed and bedded with relatively dusty materials. Horses respire gallons of water into the stable air. Horse stables have more moisture, dust, and odor than found in human-occupied environments, and hence, require the substantial ventilation rates typical of our best livestock facilities. In fact, horse stables should have even better air quality than typical livestock facilities to maintain horse health and athletic ability.

The Horse Facilities series of bulletins accessed at this web site are written in relation to a typical 1000-pound horse. Clearly, scale-up proportionally for larger animals. We don't often scale down for smaller equine but in the case of significantly smaller ponies and horses, accommodate their needs with fencing and stall panels that allow them similar safety and ability to see neighbors, respectively, as provided for the typical 1000-pound horse.

One of the biggest challenges in conveying the information contained in the Horse Facilities bulletins is the wide range of suitable horse housing designs. Designs vary from the simple, low-cost back-yard facility thoughtfully planned and constructed for fully functional horse care. In contrast, some back-yard facilities incorporate beautifully detailed, expensive

construction. Stables large and small can be successful with informal features or may incorporate every available convenience. Within large horse enterprises there is wide variation from "high-end" facilities to average construction. Some readers will be picturing their stable with chandeliers and impressive architectural features while others want advice on how to most economically achieve horse housing goals. These bulletins have been written to provide recommended practices for an average, well-built stable that will be attractive with features that others will recognize as thoughtful, functional design. There is an emphasis on labor-saving functional planning. Surely, special features and finishes may be added to enhance visual appeal of the facility once fundamentals of housing the horse in a suitable environment are provided.

Individuals using the technical information from the Horse Facilities bulletins will be able to effectively plan and design a facility that best meets operational goals.

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