

Barns East and West

**Timber craftsmanship for all creatures great and small
a model for other applications**

CARL DARROW

Designed primarily to shelter and protect, the traditional barn ranks among the most simple expressions of utilitarian beauty.

Farmers today frequently turn to quick-and-easy, prefabricated industrial kits using pole or steel framing. Still, architects designing barns continue to explore the aesthetic and practical qualities of heavy timber construction. Two recent examples demonstrate variations on this classic theme.



Morven Foaling and Broodmare Barns



Straitsview Barn

Morven Foaling and Broodmare Barns

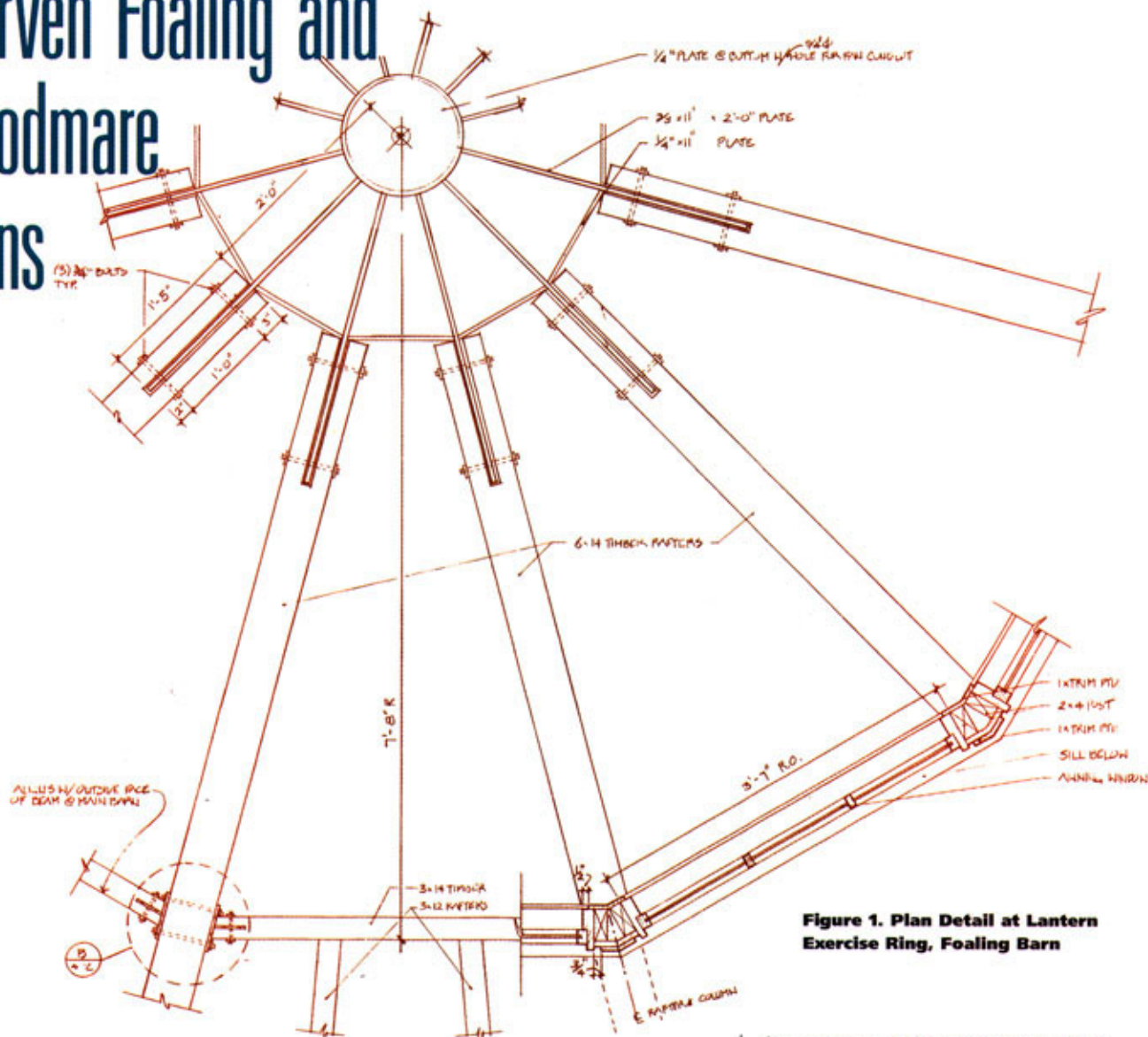


Figure 1. Plan Detail at Lantern Exercise Ring, Foaling Barn

Nestled among rolling foothills of the Blue Ridge Mountains in Charlottesville, Virginia, a trio of new buildings at Morven Stud adapt the style of early barns remaining on the property since the late 1800s. These new structures include a 20- and 13-stall broodmare barn [Photo 1], along with a smaller foaling barn.

Blackburn Architects retained the painted board-and-batten siding, timber frame construction, gabled slate roof, and deep overhangs of earlier buildings for consistent good looks as well as for contributing to the smooth working order

of this thoroughbred breeding farm [Photo 2].

"The goal is to design a barn using natural means that creates a safe and protected environment for the horse," says John Blackburn, whose firm specializes in barn architecture. Since the building is not heated or cooled mechanically, it is designed to prevent extreme heat buildup in summer and stiff cold winds from entering in winter. "Basically a barn is there to replicate as much as possible the conditions of a paddock, where horses can run behind a hill for protection

from a very cold breeze or under trees for shade," he says.

Douglas fir post and beam framing, wood siding, and wood decking help insulate the building from heat and cold. There are two beam-column assemblies each consisting of a series of 8x8 columns supporting 8x12 beams spliced with metal plates. The two beam-column assemblies run in parallel lines along either side of the central corridor. The beams support roof rafters at their midpoints. The roof deck consists of random length 2x6 tongue-and-groove decking. Diagonal bents were attached to supporting columns at each bay more for visual appeal than as added bracing [Photo 3].



Photo 4. The exercise ring in the foaling barn where the main 6x14 timber rafters converge to a steel compression ring. See Fig. 1.

“Heavy timber wood frame construction makes for a beautiful interior of a barn, it insulates well, and in our opinion makes a safer structure because it will stand in a fire longer than a steel structure,” says the architect. “When clients ask us to frame a barn in steel, we try to convince them otherwise.”

The barns are positioned near the crest of a ridge and perpendicular to prevailing summer breezes to force wind into the barn for natural ventilation. Air entering through exterior Dutch stall doors is pulled up and out of the buildings through ridge vents running between



Photo 1. Looking beyond the 13-stall broodmare barn to the identical 20-stall barn. Board and batten siding was back-primed before installation.

Code brief

U.S.

The Virginia State Building Code is based on the BOCA National Building Code which classifies horse barns as Use Group U. For Type 4, Heavy Timber construction, the maximum allowable area is 12,600sf and four stories of building height. Regular wood-frame construction is allowed a maximum of 8,925sf and two stories with a one-hour fire-resistance rating [frr], and 4,200sf and one story with no frr. Sprinklering and open perimeter access of 30ft. on four sides can increase building area up to 56,700sf.

dormers. The barns are ventilated vertically, rather than horizontally, to avoid the transmission of airborne germs from one horse to another and to allow heat and ammonia gases to escape.

Other design elements also help to create a healthy environment for the horse. Dormers supplement numerous windows to bring natural light into the barn, contributing to the broodmare's normal fertility cycle. (In older or darker barns, farmers typically left lights on.) Interior stall doors are of 2in. steel mesh to prevent hoofs, especially a foal's, from getting caught. Steel angles connecting posts and 4ft. concrete masonry bases are let into the wood to prevent injury to the horse.

The natural beauty of functional wood members is apparent in the 48ft.-diameter roof of a circular exercise ring in the foaling barn. Radiating rafters meet in a compression ring that forms a rigid connection between the boards and clerestory windows that cast a glow through the space [Fig. 1 and Photo 4].

According to Blackburn, the timber frame barns at Morven Stud represent the convergence of critical factors. "The ideal barn should first and foremost demonstrate concern for the health and safety of the livestock, then fit into the landscape and be easy to maintain. The point is to design and detail for these concerns, yet when the barn is finished, it should look nice and honest and simple."

Morven Stud Barns

Architect: Smith Blackburn Stauffer Architects and Planners

Engineer: Robert Theobald & Associates

Construction: Martin and Horn Contracting

Photos: Michael Dersin

Cost: withheld at owner's request

Area: Foaling Barn: 6,130sf, Broodmare Barn [13 stall]: 6,100sf., Broodmare Barn [20 stall]: 9,632sf.



▲ **Photo 2. Timber framing, gabled roof and deep overhangs give a fresh elegance to the familiar barn.**

▼ **Photo 3. 8x8 Douglas fir posts support an 8x12 beam. The two beam-column assemblies run in parallel lines along the forward edge of each line of stalls, supporting the roof rafters and decking.**



Product Specs

Structure: Douglas fir lumber used throughout, 8x8 columns, 8x12 glulam beam spliced with 8x8 metal plates, 3x8 bents and 2x10 rafters, wall sheathing 1/2in. APA CD/EXT, BD/EXT where one face is exposed, interior has 3/4in. Douglas fir plywood, BB faces where both sides exposed, BC or BD faces where one side is exposed. Connectors – bolts, plates, anchors and hangers were mainly used. Steel connections exposed to the exterior were galvanized

Roofing: slate over 2x6 tongue & groove decking, V-groove one side, pressure-treated wood used as nailers for support of metal flashing

Siding: board and batten

Finishes: Benjamin Moore Ltd. alkyd primer and acrylic latex semi-gloss topcoat, all wood back-primed before installation; semi-transparent Olympic stain used on various surfaces