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Geotextile Feeding/Traffic Surfaces and Costs

by Larry W. Turner, Extension Agricultural Engineer

Mud robs Kentucky beef and dairy producers of performance from their cattle herds in winter and spring conditions. To help avoid the problems associated with mud and reduced performance, concrete pads or lower-cost all-weather surfaces should be used wherever animals congregate--- feeding areas, animal traffic areas and loafing areas. Although concrete is probably the most desirable surface for durability and low maintenance, an all-weather surface can be constructed of geotextile fabric, rock and fine surface cover for less than 1/3 of the cost of concrete. Rock over bare soil in Kentucky requires approximately 12" of depth for stability. In contrast, by using geotextile fabrics, rock depth can be cut in half and the rock stays in place, cutting down on repeated maintenance.

Floor or Pad Construction

Geotextile fabrics are basically of two types--- a "geotextile" fabric material, or a plastic-derivative cross-hatched "snow fence" type grid material. Both are used in the highway industry to support rock bases for roadbeds and to distribute the loads of vehicle traffic. Figure 1 illustrates the recommended construction details for animal-use pads.

The filter fabrics are porous, so water and moisture are passed through the material while the rock is held in place. Even with mud and manure buildup on the surface, the animals have a solid footing so that they do not sink in mud. In Kentucky,

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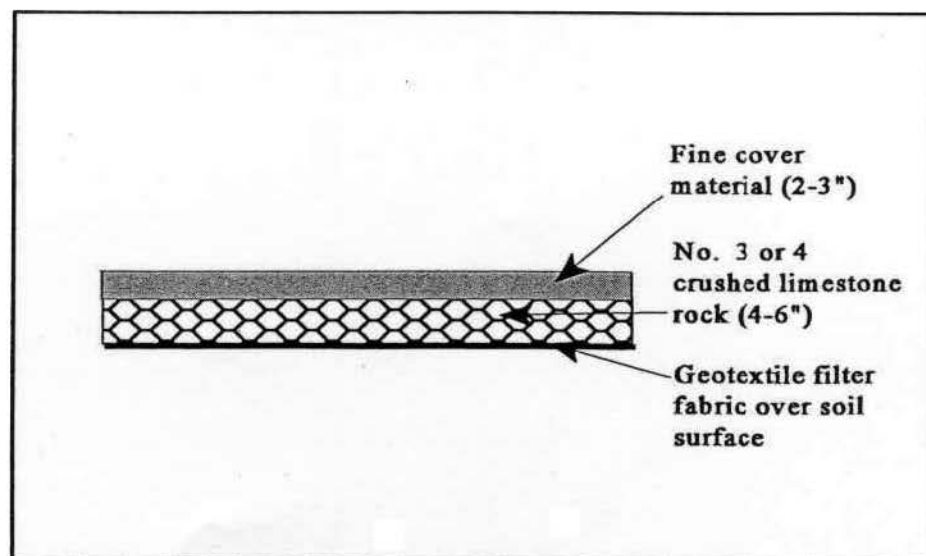


Figure 1. Construction details for animal-use pads.

recommendations are for a 4-6 in layer of No. 4 crushed limestone rock for the base material. A 2-3 in cover of sifted lime or "dense grade" (sometimes called "road mix") material will allow for easier scraping of the surface and less loss of rock through the box manure spreader. The use of the finer aggregate for surface cover also improves animal comfort/welfare and reduces potential foot injuries as compared to crushed rock. A sand surface was also tested, but the sand tended to shift easily and did not provide as firm a footing. The dense grade material is generally available from suppliers of highway surface material, and is typically composed of aggregate no larger than 0.75 in, with mostly finer aggregate and fines. The lime surface should be sifted so that it will not have a large portion of fines. Some fines are desirable for packing and stability, however.

On-farm trials and a trial installation on our University of Kentucky Woodford Co. Beef unit have been very successful in illustrating the effectiveness and durability of geotextile and rock pads. An Extension publication (AEU-68) developed by the Biosystems and Agricultural Engineering Department at the University of Kentucky provides additional construction information and a list of suppliers of the geotextile fabric materials (Turner, 1996; supplier listing available via web site).

Costs

As shown in Table 1 below, the cost of geotextile pads is about \$0.49/ft², while concrete costs in the range of \$1.50/ft². Rock over bare soil in Kentucky requires approximately 12" of depth for stability. In contrast, by using geotextile fabrics, rock depth can be cut in half and the rock stays in place, cutting down on the repeated maintenance usually required for rock pads.

Table 1. GEOTEXTILE-BASED ROCK PAD COSTS

Geotextile filter fabric	\$0.10/ft ²
Rock base (No. 4 Crushed Limestone)	\$0.18/ft ²
Fine Cover Material	\$0.09/ft ²
Total Materials	\$0.37/ft ²
Labor/grading work	\$0.12/ft ²
TOTAL COST	\$0.49/ft²

Facility Layout

Width, slope and drainage. Feeding pads should be 10-12 ft wide next to a bunk as a minimum depending upon the size of animals. Slopes should be 3/4-1 in per ft. away from the feed bunk. The location of the bunk and pad should be a generally well drained area that offers good drainage away from the site, and an area where excess manure buildup can be stored if the pad is not scraped daily. For traffic surfaces, widths should be 8-12 ft. Traffic lanes should be slightly crowned in the center of the traffic lane.

Layouts. Figures 2-4 present typical layouts for feeding pads and facilities for

cattle using geotextile pads. These installations will improve animal performance, while reducing erosion and runoff from feeding sites.

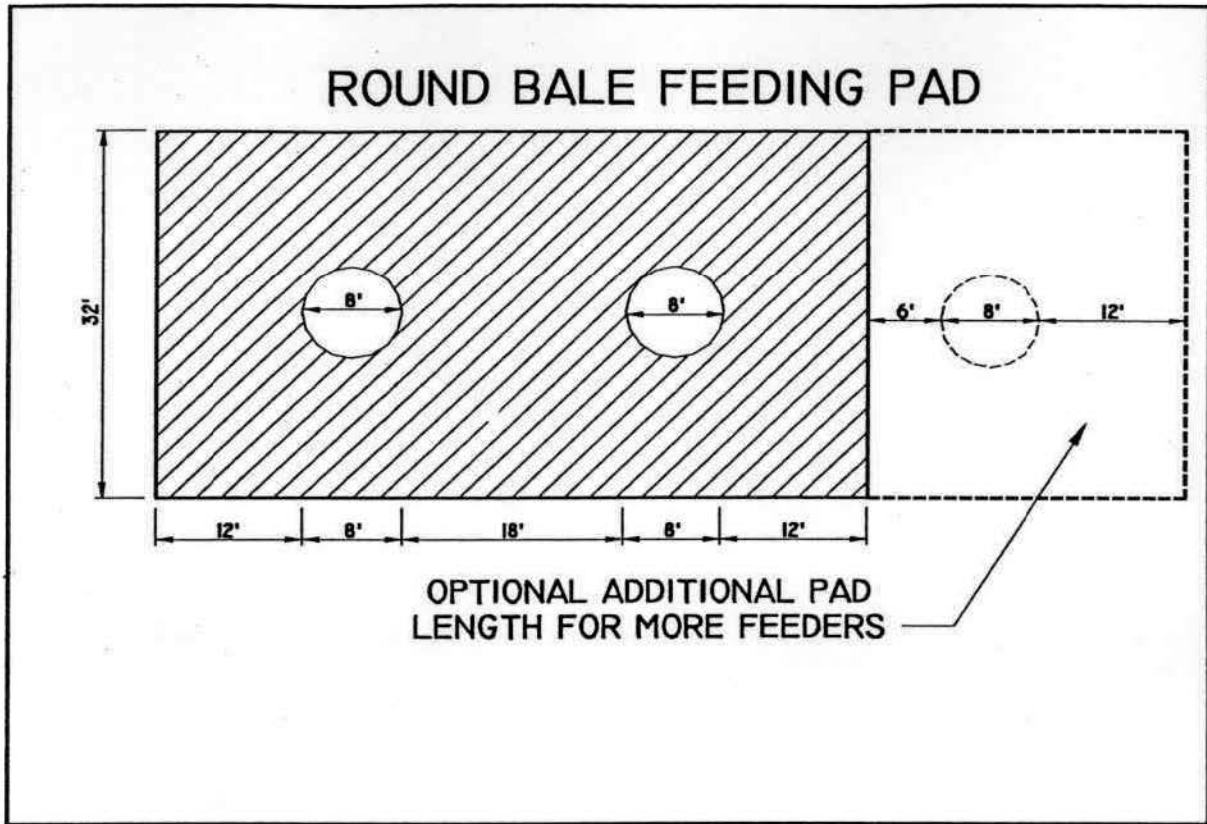


Figure 2. Large round bale feeding pad using hay rings.

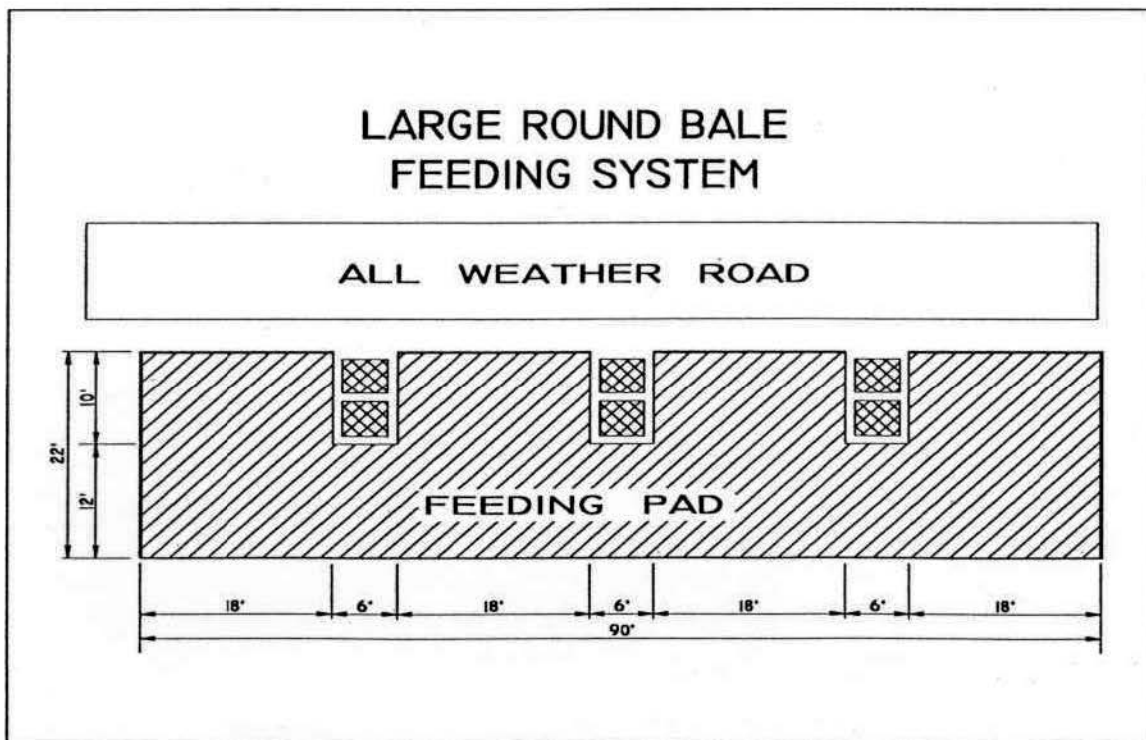


Figure 3. Large round bale feeding pad with drive-by all-weather road feeding.

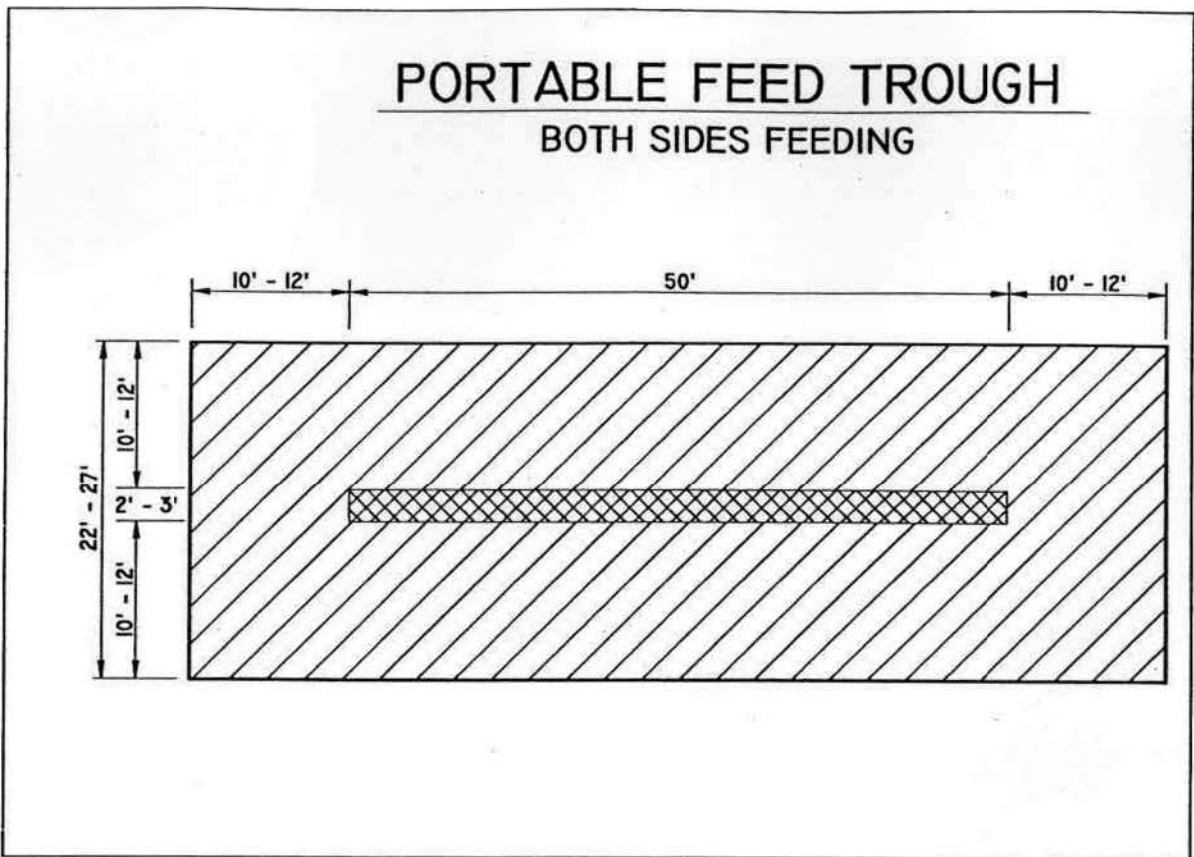


Figure 4. Geotextile pad for feeding with portable trough.

References

Turner, L.W. 1996. "Reducing Mud Using Highway-Type Filter Materials", AEU-68, Department of Biosystems and Agricultural Engineering, Cooperative Extension Service, College of Agriculture, University of Kentucky, Lexington.

"All Weather Geotextile Surfaces for Livestock and Vehicle Areas"; VAE-1051; Length-11:06. Cooperative Extension Video, available from the University of Kentucky Cooperative Extension Service, Department of Agricultural Communications Services.

Turner, L.W. 1997. Listing of Geotextile Fabric Sources. Biosystems and Agricultural Engineering Web Site - (<http://www.bae.uky.edu/>). Under "Departmental Research and Extension Information/Resources". April.

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Geotextile Fabric Vendors



Am Con Construction Products
Box 1516
Somerset, KY 42502
800-866-0369

American Excelsior Co.
415 W. Seymour Ave.
Cincinnati, OH 45216
513-761-7384
800-325-2135

C&P Supply
P.O. Box 376
Allen, KY 41601
606-874-8052
FAX 606-874-2310
(distributor for Am Con)

Carthage Mills
4243 Hunt Road
Cincinnati, OH
513-794-1600
FAX 513-794-3434
800-543-4430

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P.O. Box 1756
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910-883-6624

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904-462-1466

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FAX 502-561-8521
Contact: Lewis Morris

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FAX 903-758-7187
Contact: Theresa Brockman

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Geosynthetic Products Division
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Fax: (423) 899-7619
Internet: www.fixsoil.com

TC Mirafi
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Phone: 888-TCMIRAFI
Fax: 706-693-4400

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Morrow GA 30260
800-292-4457

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2263 Hoxie Road
Mannsville NY 23661
800-633-3661

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