8-1997

Using Geotextiles for Feeding and Traffic Surfaces

Larry W. Turner
University of Kentucky

COOPERATIVE EXTENSION SERVICE
UNIVERSITY OF KENTUCKY • COLLEGE OF AGRICULTURE

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Larry W. Turner, Extension Agricultural Engineer
Department of Biosystems & Agricultural Engineering

Mud robs Kentucky beef and dairy producers of performance from their cattle herds in winter and spring. To help avoid the problems associated with mud and reduced performance, producers should consider using concrete pads or lower-cost all-weather surfaces wherever animals congregate (e.g., 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 one-third of the cost of concrete. Rock over bare soil in Kentucky requires approximately 12 inches of depth for stability, but using rock over geotextile fabrics can reduce rock depth by half. Repeated maintenance usually required for rock pads is also reduced because the fabric keeps the rock in place.

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.

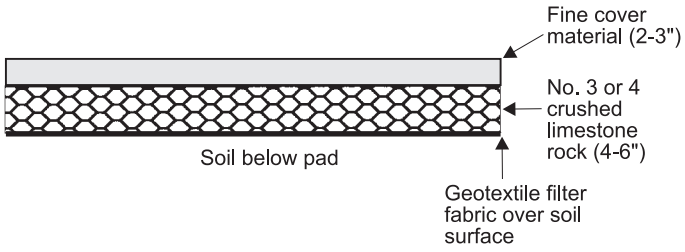

Figure 1. Construction details for animal-use pads.

The geotextile fabrics are porous, so water and moisture pass 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, recommendations are for a 4- to 6-inch layer of No. 4 crushed limestone rock for the base material. A 2- to 3-inch 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. Using the finer aggregate for surface cover instead of crushed rock also improves animal comfort and welfare and reduces the potential for foot injuries. 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 inch, with mostly finer aggregate and fines. The lime surface should be sifted so that it will not have a large portion of fines. However, some fines are desirable for packing and stability.

On-farm trials and a trial installation on the University of Kentucky Woodford County 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). A list of suppliers is also available at the following Biosystems and Agricultural Engineering Web site: <http://www.bae.uky.edu/> under "Departmental Research and Extension Information/Resources."

Costs

As shown in Table 1, the cost of geotextile pads is about \$0.49/ft^2, while concrete costs in the range of \$1.50/ft^2. One reason for the lesser cost is that less rock is required for stability when geotextile fabrics are used.

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/ft^2

Facility Layout

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

Layouts. Figures 2, 3, and 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.

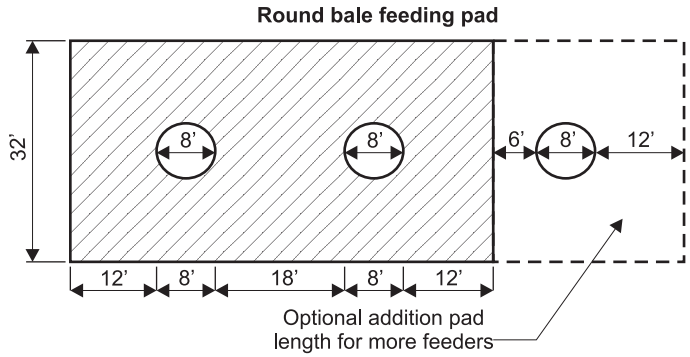

Figure 2. Large round bale feeding pad using hay rings.

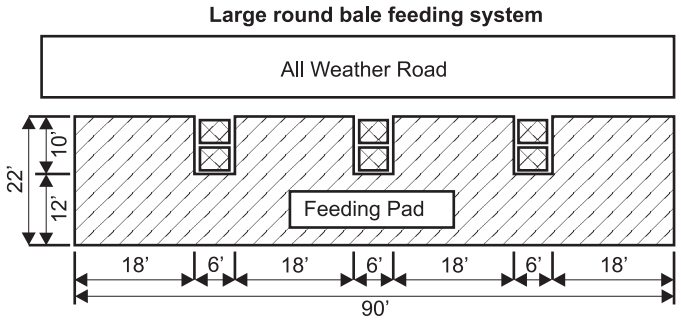

Figure 3. Large round bale feeding pad with drive-by all-weather road feeding.

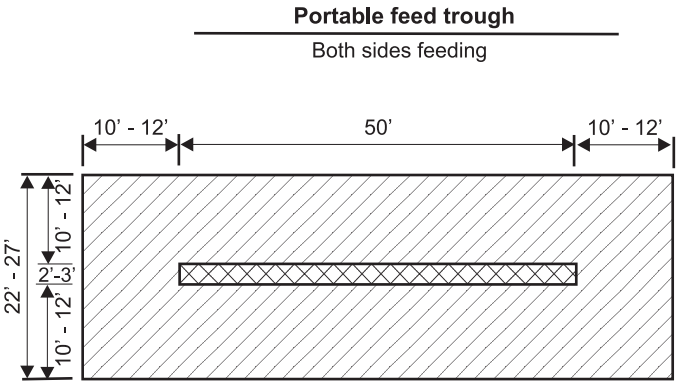

Figure 4. Geotextile pad for feeding with portable trough.

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 Service 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."

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, C. Oran Little, Director of Cooperative Extension Service, University of Kentucky College of Agriculture, Lexington, and Kentucky State University, Frankfort.

Issued 8/97, 3000 copies