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Mound Design for Feedlots

Shaping each feedlot pen to minimize mud problems is an important part of feedlot design.

Paul Q. Guyer, Extension Beef Specialist

Mud is our most costly weather hazard. Shaping each feedlot pen to minimize mud problems is an important part of feedlot design. While mud cannot be eliminated, proper shaping can reduce the number of days when it is a profit robber. And, proper shaping will also reduce the number of fly breeding areas within the pen, adding to summer comfort and gains. The cost is minimal at most locations if shaping is done before installing fencing, bunks, waterers and aprons. The following are points to consider in shaping lots for maximum cattle performance.

1. Complete the shaping before fences are built, concrete is poured or water lines are installed in new lots. In most cases, soil for the mounds can come from the lot itself or from soil removed to make debris basins or holding ponds. On sites with less than a 2% slope away from bunks, soil may have to be hauled in to provide adequate mounds. Mounds can be built in old lots from a mixture of manure and dirt, but clay is preferred. They should be well packed in 8- to 12-inch layers as they are built, and large enough to permit use of heavy equipment in maintenance. Snow may need to be removed from time to time. Rough ground may need to be smoothed occasionally so cattle can move freely during freezing weather. Most mounds will need reshaping and soil added each year.
2. The basic goal of using mounds is to remove water as quickly as possible from the pen with minimum erosion of soil and manure. This requires short relatively steep slopes in the mound itself, with less slope in the valley, yet good drainage out of the pen. If long slopes are too steep, erosion of soil and manure will cause problems in management of runoff from the feedlot. Avoid using bedding as it absorbs and holds moisture, defeating the purpose of the mound.

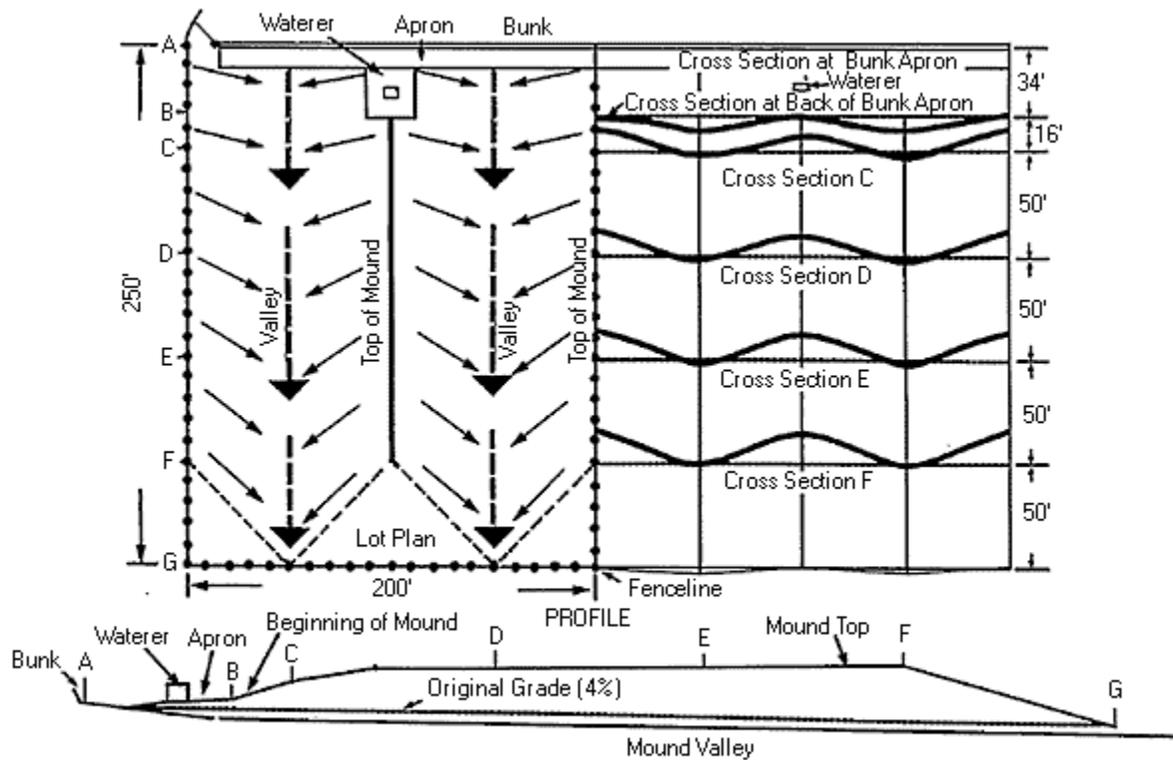
Clay soil is the preferred material for mounds. When packed, it sheds moisture well. For other soils or soil and manure mixtures, incorporating 2 inches of agricultural limestone in the surface of the mound will reduce the amount of water absorbed and increase run off. Cover 30 to 40% of the mound top with limestone and disk it into the top 2 to 3 inches of soil. Some soft limestone may be soft enough that a rather coarse grind may be used. On the other hand, high grade limestones may need to be near the size of agricultural lime for this purpose.

3. Start the access to the mounds at the bunk apron. Where possible, locate lots with the general slope directly away from the bunk. Then the mound can be made perpendicular to the apron. Where mounds must be built on side slopes, they should join the bunk apron diagonally with the valley on the high side of the mound having good drainage the full length of the lot.
4. Incorporate most of the lot in the mounds and valleys. Building one mound in the center of the lot with the waterer just behind the bunk apron, and connecting the mound to the waterer apron, works well. Then build a comparable mound on each side with the fence line following the crest of these mounds. Where mounds must be built on side slopes, connect them diagonally to bunks also.

Having the fence on the crest of the mound results in manure working away from the fence, eliminating manure buildup under it which would become a fly breeding area during the summer months.

5. When the general lot slope is in the range of 3 to 6% away from the bunk, raise the crest of the mound 4 to 8 feet higher than the water trough apron and continue it at about this level to about 3/4 the length of the pen. When slopes are less than 3%, mounds need more build up.
6. The diagrams in *Figure 1* illustrate some principles which may be helpful in building satisfactory mounds.
 - a. The lot plan view shows a design for 200 head of cattle and allows almost 1 foot of bunk space and 250 square feet of pen space per head capacity. The illustration shows a 4% slope away from the bunk. The mound crests extend down the center of the lot and under each fence. Valleys to the mounds are located about 50 feet inside each fence line.
 - b. The profile shows the general, top of the mound, and the valley grade lines. Build up the crest of the mounds several feet above the level of the waterer apron within 15 to 20 feet of the waterer apron, and carry this level back until the side slopes reach a 3:1 or 4:1 slope. Then it can drop with the grade to within 50 to 60 feet of the back of the lot where it can drop quickly to the grade line. Where ample soil is available, the steep slope can be carried closer to the back of the lot if desired. Much of the soil needed can be scraped from the valley between the mounds.
 - c. For this illustration, the pen at the bunk line is essentially level. The bunk apron and the apron around the waterer will slope about 1/2 to 3/4 inch per foot. The apron on the back side of the waterer should be level back to the mound, but slope to the side at 1/2 to 3/4 inch per foot.
 - d. Drop the valley rapidly beginning at the bunk apron to provide adequate drainage in this high traffic area. A drop of 10% until 2 feet below the normal grade level is desirable, but must be adjusted to the soil and slope.
 - e. Build up mounds to produce slopes of 3:1 or 4:1 and that provide cattle adequate area to lie down during the winter muddy season.
 - f. Locate the debris basin outside the lot and maintain a slight mound to the back fence line for most complete lot drainage. Mound drainage should discharge into debris basins without causing erosion.

Figure 1.



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