Cattle Pen Maintenance

***Will Boyer Jeff Davidson Herschel George**, **Ron Graber** and **Stacie Minson**, Kansas Center for Agricultural
Resources and the Environment (KCARE), Kansas State University*
***Joe Harner**, Department Head, and **Pat Murphy**, Professor Emeritus,
Department of Biological and Agricultural Engineering, Kansas State University*

Pen maintenance plays a vital role in the performance of animals in feedlots. Pen design can provide cattle with resting locations, reduce drying time for lots and control feedlot runoff. Excessive mud and dust in the pens can negatively affect animal health and performance and contribute to odor concerns. Cleaning pens regularly with proper equipment can reduce insect populations and improve overall feedlot animal performance with minimal financial inputs.

Pen Design

Initial pen design should consider sites that divert all extraneous water flow away from the feedlot pen. Drainage from feed roads should drain away from the bunk, and feedlot runoff should include only rainfall that falls on the pen surface. Feedlot designs with pens on both sides of the feed road should have bunks and feed aprons running north-south so that direct sunshine accelerates drying on both east- and west-facing pen surfaces. Single row pen designs with southern exposure provide good pen drying conditions but have reduced sunshine in the bunks and on the feed road. Pen surface slopes of 2-5% and a pen space of 300-400 square feet per head allow for adequate drainage with minimal pen surface erosion. Bunk length per head should allow three inches of bunk space per 100 pounds of cattle.

A pen gate system that allows tractor access from the feed road to clean the concrete bunk apron enables bunk area cleaning while avoiding pen surface travel in muddy pen conditions. Fences between pens should be built to prevent runoff water from traveling into the next pen. Waterers also should be raised to improve drainage away from the waterer site and should be located for all-weather access from the bunk apron. Mounds can provide a dry resting place for cattle and can improve pen drainage. Mounds should be constructed and maintained with compacted soil to a height of three to five feet with 5:1 side slopes so that manure cleaning equipment can travel over the mounds. Mounds should extend to the concrete apron and run straight downhill to avoid problems with standing water.

Manure

Mounds should not be used to stockpile manure. Scraped manure should be removed and stored away from the pens and distributed to fields as soon as practical. Runoff from stockpile areas should flow into an adequate treatment system to protect surface waters. Regular pen scraping and manure removal are important to maintain cropland or perennial grass buffer treatment areas that receive runoff from the pens. Stored manure has value and should be spread at agronomic rates to crop fields.

Pen Cleaning

The frequency of pen cleaning depends on factors such as weather, stocking rate, diet, days on feed, and pen design. For livestock health purposes, pen cleaning prior to each new group of animals is recommended. A complete cleaning of bunk, lot, fence, and manure storage areas should occur annually. Cleaning a portion of the pen ahead of forecasted heavy rains or snow can improve cattle performance by providing an improved area for resting.

The majority of manure is excreted near the bunks and waterers, therefore using concrete or other hard surfaces for these areas allows timely manure collection and removal. Narrow aprons are difficult to clean with a tractor or loader. A concrete apron, 12 - 15 feet wide is recommended. In continuous-use feedlots, the bunk apron width can be increased another 10 feet with concrete or rock/lime screenings over geotextile fabric.

Equipment

Manure can accumulate along fence lines and feed bunks. A low-profile blade attached to a skid-steer loader, is a good tool for pushing manure out from under a fence or feed bunk (Figure 1). Box scrapers are very useful for collecting manure and leveling the pen surface to prevent areas of standing water. Front-end loaders can be used to load scraped manure into field spreaders. To maintain good drainage, operators should avoid damaging the pens' compacted hard-pan surface layer with manure removal equipment. After scraping the feedlot, adding and compacting clay soil to the low areas of the pen may be necessary to re-establish the pen's original slope and drainage.

Mud

Lack of or improper pen cleaning can result in an uneven feedlot surface that can impede effective runoff control. Prolonged periods of mud in the feedlot can hinder cattle performance and profitability. Research reveals that four inches of mud may reduce feed efficiency by 10% and increase cost of gain by 56%. In deep, muddy feedlot pens, cattle skeletal trauma and lameness are potential problems. Muddy conditions also can create odor problems. Concentrating animals in muddy conditions will increase the amount of time to dry the pen's surface. Water tanks, gutters and extraneous drainage should be monitored. Muddy conditions can result from waterers that leak or overflow.

Dust

Dusty conditions during dry, hot summers can cause respiratory problems and increase cattle treatment costs, especially if pens are constantly dusty. Cattle limit their activity during the heat of the day but increase their activity at sundown, generating greater dust within the pens and across the entire feedlot. Dust can cause respiratory health problems in newly arrived or heavy weight cattle. Scraping the pen surface weekly or at least monthly will greatly reduce dust problems.

Flies

Feedlot pen maintenance and manure management play an important role in fly control. Flies reproduce and mature in muddy pens, wet manure piles, manure build-up under fence rows, and wet spots around waterers and feed bunks. Flies can exacerbate heat stress problems. Keeping pens clean and dry will reduce fly populations, enhance cattle performance and minimize a feedlot's reliance on chemicals and other costly fly-control methods.

Figure 1. An example of a box scraper in use. Photo courtesy of Herschel George.