

A Revised Beef Cattle Feeding Hoop Barn

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Introduction

A hoop barn system, built in 2004, was compared with an outside feedlot with a shed over several years, under common management. Cattle performance was similar between the two systems, although the labor needs were more continuous for bedding operations in the hoop barn. The hoop barn had minimal runoff. The barn was one of the first working examples of feeding beef cattle in bedded confinement hoop barn systems. The site was visited by thousands of cattlemen. Now confinement hoop barns are a proven housing system for cattle. The objective was to replace and revise the original hoop barn, which was destroyed by wind in 2017.

Materials and Methods

The original hoop barn (50 ft x 120 ft) was constructed in 2004 at the ISU Armstrong Research Farm, Lewis, Iowa. It housed 120 head of finishing beef cattle in three pens with approximately 50 square ft/animal. The hoop barn had a fenceline feedbunk with concrete apron and scrape alley. The original remaining floor was crushed limestone over geotextile fabric. Cornstalk bedding was used to facilitate solid manure handling. Manure was composted during the summer and winter months for land application in spring and fall.

Design features of the original hoop barn included a north-south orientation; 10 ft sidewalls; a fenceline bunk with waterers

inline along the east wall of the hoop; a fabric covered overhang or awning to shelter the fenceline bunk; three equal sized pens; a continuous open ridge vent; concrete paving along the bunks and for the scrape alley; and a sorting alley along the exterior of the west wall with access gates in a wooden west wall. The rock floor was paved after a few years due to erosion of the base in the wetter areas.

Results and Discussion

Several lessons were learned about the design of the original hoop barn, including 1) a ridge vent was not needed with this building length and orientation, 2) the awning over the bunk required a gutter to avoid dripping into the bunk, 3) the west wall gates into the sorting alley were difficult to use due to bedding buildup, and 4) the waterers in line with the bunks did not provide maximum access.

In June 2017 a windstorm with 70+ mph straight line winds demolished the original hoop barn. The laminated wooden support posts along the west wall were sheared near ground level and the structure failed.

In fall of 2018 a new hoop barn (Span-Tech, Inc.) was constructed on the site (Figure 1). The existing concrete floor and fenceline bunk were used. The new barn was 68 ft x 132 ft. The larger hoop barn was longer to allow space to set the new posts and was wider to provide room for the drive alley under the hoop and eliminate the need for an awning and gutter. The primary changes were 1) no ridge vent, 2) a concrete west wall about 6 ft tall with no gate openings, 3) the feeding alley under the hoop structure and no awning, 4) steel I-beam support posts with 9 ft walls,

5) a curtain above the concrete west wall, and
6) access to pens through gates in the pens only for sorting and bedding. A bale processor with blower will be used to bed the pens with cornstalks.

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Figure 1. The revised hoop barn (68 ft x 132 ft) for cattle feeding (not fully finished).