# Final Report on Rubber Mats on Concrete Slats in Deep Pit Confinement Buildings for Finishing Cattle

## A.S. Leaflet R2962

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**Summary and Implications**

Confinement housing of beef cattle is becoming more common due to increased environmental concerns and the desire to capture potential efficiencies in cattle performance and manure value. Deep pit facilities with slatted floors are being built, however one of the disadvantages may be the negative effect on feet and legs health, resulting in performance consequences for cattle housed on concrete slats for extended periods of time. Rubber mats designed to be installed over the concrete slats are being used to increase cattle comfort. No comparable data has been gathered in typical U.S feeding situations to measure potential benefit of these mats. This investigation is attempting to gather data to determine potential performance advantages of the mats.

**Introduction**

In the summer of 2011, a project with Summit Farms of Alden, Iowa was discussed. Summit Farms was building new deep pit beef confinement buildings and considering placing rubber mats over the slats. Iowa State University Extension and the Iowa Beef Center offered to help conduct a study and Summit Farms installed three different types of mats in 9 pens in combination with 3 pens of concrete slats with no mat. Comparisons of cattle performance, cattle footing, pulls, and death loss are being made.

**Materials and Methods**

Three replications of four pens each were laid out in 2 confinement deep pit beef barns in central Iowa area. Each pen is approximately 80 ft. by 40 ft. and is designed to hold 140 head at 22.5 sq. ft. per head with 6.75 in bunk space at maximum capacity. All four pens in a replication are side by side. Three pens have different rubber mat types, identified as Mat 1, Mat 2, or Mat 3, with the fourth pen having no rubber mat over the concrete slats. For 6 comparisons, similar type cattle were purchased at one time to fill one replication of four pens. The cattle were allocated between the four pens. In one of these replications there were sufficient numbers to fill five pens including four mat pens and one concrete pen. In three of the replications cattle were individually weighed going on trial to determine average pen weigh and weight variation within pen. On other replications an average pay weight for all the cattle in the replication was used for the average in weight by pen. Feed delivery was recorded daily as well as pulls and death loss by pen during the feeding period by farm staff. In some of the pens, while cattle are being checked during daily pen walking, a trained observer is observing slips and falls of cattle in rubber mat and concrete slat pens and recording that data on a periodic basis. Cameras have been set up to monitor one pen of cattle on concrete and one pen of cattle on mats. Gait scores on individual cattle in some rubber mat and concrete slat pens are being observed as cattle are worked to relate to lameness issues. Close out data from Summit Farms is used to document cattle performance in the individual pens. Death loss, treated cattle or cattle sold individually and not part of the group are included in the close out performance.

The first cattle in the barn and used in this trial were fed from October 2011 to March 2012. All three replications were filled during the first feeding period. Due to difficulty sourcing cattle only one replicate was fed from March of 2012 to Aug of 2012 and one more was fed from May of 2012 to Sept. of 2012. The 6$^{th}$ replication was fed from Sept. of 2012 to Feb. of 2013. All of these replications were heifers with an average in pen weight range of 696-884 lbs. and an average market weight range of 1170-1382 lbs. Days on feed ranged from 131 – 164 days. Number of head per pen averaged from 113 to 143 head.

In these six replications there were six concrete slat pens, six Mat type 1 pens, seven Mat type 2 pens, and six Mat type 3 pens.

It was determined that close out information for other pens that did not have direct replication could also be used in the analysis.

Ten additional pens that had data available to complete a close out were identified. These pens had in weights and market weights for a period of feed entirely on rubber mats or on concrete slats. There were two pens of heifers, one fed on concrete slat and the other fed on rubber mats over slats. There were eight pens of steers, five fed on concrete slats and three on rubber mats over concrete slats. In all but one pen that were fed on mats multiple mat types were used. The two pens of heifers started on feed in May and June of 2012 at weights of 820 and 701 lbs. and were marketed in Oct. and Dec of 2012 at 1280 and 1281 lbs. after 147 and 165 days on feed. 5 pens of steers 2 on rubber mats and 3 on concrete slats started on feed in the fall of 2012 at average per pen weight range of 605-909 lbs. and were marketed in the in late winter and spring of 2013 at weight range of 1244-1427 lbs. Pens were on feed fed for a range of 134-205 days. Three additional pens of steers, one on rubber mats and two on concrete slates, started on feed in Feb. and April of 2013 and were marketed in Sept of 2013 after being

on feed from 138-200 days. Market weight ranged from 1277 to 1433 lbs.

Installing mats in pens

**Results and Discussion**

In this report daily gain, feed efficiency, and feed intake based on pen close out on all lots is reported. In a previous report information on daily gain, feed efficiency and feed intake is reported from the first five replications on feed. Additional data on pulls and treatments, death loss, gait score, behavior, slips and falls and video information will be summarized in another report. In table 1 the mean and standard error for daily gain, feed efficiency and feed intake are provided by floor type over all pen closeouts and feeding periods. All rubber mat types are combined in this table and compared to concrete slats. The performance data analysis reported is controlled for difference in heifers and steers and feeding period. Rubber mats showed numerical differences in daily gain, feed efficiency, and feed intake as compared concrete slats on average in this trial, however differences were not statistically significant. Increased replications may statistically confirm a difference of the magnitude discovered.

In Table 2 rubber mat types are compared and identified by number. There were only 3 types of mats used but Mat 4 combo represents four group closeouts that were fed in pens with multiple mat types. Again there were numerical differences in feed intake, feed efficiency and average daily gain between mats but no statistically significant differences found.

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**Table 1. Comparison of daily gain, feed efficiency and feed intake between rubber mat flooring and concrete slats (Mean ± S. E.)**

| | Flooring Type | | |
|---|---|---|---|
| | Rubber mats | Concrete slats | Probability >F |
| Daily Gain lbs./hd/day | 3.35±.10 | 3.17±.11 | 0.2174 |
| Feed Efficiency lbs. feed/lb. gain | 6.60±.10 | 6.65±.14 | 0.6139 |
| Daily feed intake lbs. feed/hd/day | 21.92±.53 | 20.86±.59 | 0.1986 |

**Table 2. Comparison of daily gain, feed efficiency and feed intake between rubber mats (Mean ± S. E.)**

| | Rubber Mat Type | | | | |
|---|---|---|---|---|---|
| | Mat 1 | Mat 2 | Mat 3 | Mat 4 combo | Probability >F |
| Daily Gain lbs./hd/day | 3.24±.22 | 3.41±.22 | 3.16±.23 | 3.49±.15 | 0.8851 |
| Feed Efficiency lbs. feed/lb. gain | 6.68±.13 | 6.67±.20 | 6.80±.22 | 6.20±.15 | 0.7344 |
| Daily feed intake lbs. feed/hd/day | 21.50±.1.17 | 22.59±.1.17 | 21.31±.1.15 | 21.54±.76 | 0.8231 |