Avoiding Disasters with Freestall Design

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Examples of Stall Problems, Diagnoses and Solutions

**1. Is Surface Cushion Adequate?**

**Signalment**

Herd A is a 300 cow dairy with a RHA of 25,215lbs and a mean annual somatic cell count of 390,000/ml. Cows are housed in a six-row barn, with wide loop dividers and pasture mats. Cow Comfort Index is 29% and there is a high rate of predominantly environmental clinical mastitis (196 quarter cases per 100 cows per year).

**Diagnoses**

Stall surface was adequate. Resting area was clearly defined and of appropriate dimensions. Stalls were 7 feet 4 inches long with a 4 inch front. The brisket board was 12 inches high and the divider had been mounted too low. The point where the lower rail meets the front wall should be 32 inches off the stall surface. It measured 24 inches.

Cows could not front lunge as the bars were too short and struggled to use the side lunging area between the bars and the front wall – because the divider was mounted 5 inches too low and the high brisket board reduced the space available for the head. The neck rail, which was too low also inhibited the rising movement of the cow.

**Solution**

The solution to the problem is to move the neck rail forward and remove the lower mounting bar in front of the cows. Dividers need to be hung on vertical posts – leaving the open front for lunging. Any bar higher than 8 inches off the stall surface will impede the lunge motion of the head as the cows lunges and moves.

**2. Is there a Clearly Defined Resting Area of Adequate Size?**

**Signalment**

Herd B is a 204 cow dairy with a RHA of 22,414lbs housed on Pasture mat stalls with Michigan dividers in a four-row barn. Lameness Prevalence was assessed by Locomotion Scoring was 34% and Cow Comfort Index was 31%. 63% of cows had hock abrasions.

**Diagnoses**

Stall surface was adequate. Resting area was clearly defined and of appropriate dimensions. Stalls were 7 feet 4 inches long with a 4 inch front. The brisket board was 12 inches high and the divider had been mounted too low. The point where the lower rail meets the front wall should be 32 inches off the stall surface. It measured 24 inches.

Cows were forced to side lunge, yet the lower rail of the narrow divider was too high to allow this. This will inhibit the lobbing motion of the lunge and inhibit raising. In order for the cow to access a lower bar height, she stumbles forward on the bed, but now when she rises, she becomes trapped before the retractor - which is already too close to the rear curb.

**Solution**

The solution is to lower the narrow divider so that the lower rail is no higher than 12 inches at the point of the brisket board. In order for the retractor to be correctly located, it must be raised up to a height of 46 inches on a parallel divider, fitted onto the upper rail of the divider and positioned directly over the point where the brisket board meets the stall surface.

**3. Is there Adequate Lunge and Bob Room?**

**Signalment**

Herd C is a 295 cow dairy with a RHA of 19,608lbs housed in a six-row barn on Pasture mats with narrow loop dividers and slatted flooring. Lameness Prevalence was 29% and Cow Comfort Index was 25%.

**Diagnoses**

Stall surface was adequate. Resting area was clearly defined and of appropriate dimensions. Stalls were 7 feet 4 inches long with a 6 inch front. The brisket board was 12 inches high and the divider had been mounted too low. The point where the lower rail meets the front wall should be 32 inches off the stall surface. It measured 24 inches.

Cows could not front lunge as the bars were too short and struggled to use the side lunging area between the bars and the front wall – because the divider was mounted 5 inches too low and the high brisket board reduced the space available for the head. The neck rail, which was too low also inhibited the rising movement of the cow.

**Solution**

The solution is to raise the divider by 8 inches and reduce the height of the brisket board to 6 inches above the stall bed.

**4. Is the Neck Rail Correctly Located?**

**Signalment**

Herd D is a 1055 cow dairy with a RHA of 22,573lbs housed in a six-row barn in sand stalls with narrow loop dividers. 125 cows were affected with medial hock lesions and 3 cows had died of laminitis. The herd was also suffering an increased mastitis rate and an elevation in the number of injuries sustained in the stalls.

**Diagnoses**

Stall surface was adequate. Resting area was clearly defined and of appropriate dimensions. Stalls were 7 feet 4 inches long with a 6 inch front. The brisket board was 12 inches high and the divider had been mounted too low. The point where the lower rail meets the front wall should be 32 inches off the stall surface. It measured 24 inches.

Cows had to side lunge, yet the lower rail of the narrow divider was too high to allow this. This will inhibit the lobbing motion of the lunge and inhibit raising. In order for the cow to access a lower bar height, she stumbles forward on the bed, but now when she rises, she becomes trapped before the retractor - which is already too close to the rear curb.

**Solution**

The solution is to lower the narrow divider so that the lower rail is no higher than 12 inches at the point of the brisket board. In order for the retractor to be correctly located, it must be raised up to a height of 46 inches on a parallel divider, fitted onto the upper rail of the divider and positioned directly over the point where the brisket board meets the stall surface.

**5. Is the Curb Height Correct?**

**Signalment**

Herd D is a 1055 cow dairy with a RHA of 22,573lbs housed in a six-row barn in sand stalls with narrow loop dividers. 125 cows were affected with medial hock lesions and 3 cows had died of laminitis. The herd was also suffering an increased mastitis rate and an elevation in the number of injuries sustained in the stalls.

**Diagnoses**

Stall surface was adequate. Resting area was clearly defined and of appropriate dimensions. Stalls were 7 feet 4 inches long with a 6 inch front. The brisket board was 12 inches high and the divider had been mounted too low. The point where the lower rail meets the front wall should be 32 inches off the stall surface. It measured 24 inches.

Cows could not front lunge as the bars were too short and struggled to use the side lunging area between the bars and the front wall – because the divider was mounted 5 inches too low and the high brisket board reduced the space available for the head. The neck rail, which was too low also inhibited the rising movement of the cow.

**Solution**

Sand replacement had been infrequent and levels were low in the stalls – effectively shortening the bed by uncovering the curb and raising the height of the lower rail of the divider to 18 inches. Hoofs were damaged because cows were forced to be diagonally in a short lane, with the upper hind leg hanging over the lip of the curb into the alley way – creating pressure on the bony prominence of the medial hock.

The fix was to fill the sand stalls more frequently and maintain a 6 inch minimum depth of sand.

Sand at a depth of 6 or more inches is the optimal stall surface for a cow. Thick rubber mats or concrete are unacceptable. A Cow Comfort Index - measuring the proportion of cows in stalls, which are standing, one cow before milking, is an easy way to assess cow comfort. No more than 15% of cows should be standing in stalls at this time.

High curbs greater than 6 - 8 inches reduce stall acceptance by herds (they are fearful of backing off a high curb) and contribute to increased weight transfer to the tendons and stretching of flexor tendons in cows which stand half in and half out of the stalls. Currently, curbs of 6 inches or less are rarely seen in North American Freestall barns.

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Examples of Stall Problems, Diagnoses and Solutions

**1. Is Surface Cushion Adequate?**

**Herd A**

A brisket board with a height no greater than 6 inches should be located 68 inches from the rear lip of the stall for a 1400 lb cow. This board would position the cow correctly, allowing her to be deposited into the alley way while being low enough to allow her to put her front leg over the top of it. Dividers should be mounted 45 - 48 inches on center, depending on the size of the cow.

**2. Is there a Clearly Defined Resting Area of Adequate Size?**

**Herd B**

Adult dairy cows require a 3 foot of lunging room. The stall must be 8 feet 6 inches long or more for the cow to lunge forward. If the stalls are shorter, there must be space to lunge into the adjacent stall. There should be no impediment in a zone from 6 inches to 32 inches above the stall surface in the ‘boot zone’, where the muzzle drops to its lowest point. If the cow has to side lunge, the lower rail of the divider must be no higher than 12 inches from the stall bed.

**3. Is there Adequate Lunge and Bob Room?**

**Herd C**

The neck rail should be 45 inches off the stall surface. It measured 24 inches.

**4. Is the Neck Rail Correctly Located?**

**Herd D**

The layout of the stall area is determined by the retractor and the height of the lower rail. The stall must be 8 feet 6 inches long with a 6 inch wide curb was not available for lying area, reducing the length behind the brisket from 6 feet 6 inches to 5 feet 2 inches.

**5. Is the Curb Height Correct?**

High curbs greater than 6 - 8 inches reduce stall acceptance by herds (they are fearful of backing off a high curb) and contribute to increased weight transfer to the tendons and stretching of flexor tendons in cows which stand half in and half out of the stalls.