

COW COMFORT

By Rick Grant

Management and cow behavior responses impact productivity and health.

Cow Comfort Economics 101

Over half of the variation among farms in milk production is explained by variation in the management environment. Increasingly, dairy producers are realizing that modest investments in housing, or changes in their cow management routines, can pay large dividends in greater cow health and performance. As we look to the future and the continuing volatility in feed and milk prices, we need to sharpen our focus on the consistent economic benefits of improved cow comfort – information that we can literally “take to the bank(er)!”

Time is Money – for People and Cows

Time is money to the cow – and the farmer. Everything we do when we design housing and management routines for our dairy herds should be aimed at making sure that the cow can meet her daily behavioral needs.

Dairy cows at approximately 100 percent stocking density in freestall housing eat 3 to 5 hours/day and consume 9 to 14 meals per day. They ruminate 7 to 10 hours/day, spend approximately 30 min/day drinking, 2 to 3 hours/day outside the pen for milking and other management practices, and require about 11 to 12 hours/day of lying time.

Three important time management budget considerations include:

- 1) about 70% of the cow’s day is spent eating and/or resting, so we cannot afford to get it wrong.
- 2) each day only has 24 hours.
- 3) the cow only has, on average, 2.5 to 3.5 hours/day to spend outside the pen and away from the feed, water and stalls. If we force the cow to spend more than this time outside the pen, then she will need to give up feeding and/or resting time.

Every farmer should know how long their cows spend outside the pen in a freestall barn, and it should be less than 3.5 hours/day.

University of Wisconsin veterinary scientists have shown how time spent outside the pen and lameness interact to affect the cow’s daily time budget. Lame cows with a mattress stall base can only be outside the pen for approximately 0.5 to 1.5 hours/

day to still meet their requirement for 11 to 12 hours/day resting time. In contrast, healthy cows can stay outside the pen up to 4 hours/day. At some point, it becomes impossible to meet time budgeting requirements for lame cows. They are chronically short-changed on lying time and their health cycles downward.

Does time spent away from the pen really matter to the cow in any measurable way? In an on-farm case study, Matzke (2003) observed the effect of 3 versus 6 hours/day outside the pen. Pen size was adjusted versus parlor capacity to manipulate time outside the pen for milking. Mixed primi- and multiparous cows (30:70 ratio) at 100% stocking density of stalls and feed bunk were observed for 14-day periods. As much as possible, factors other than time outside the pen were kept constant. Cows gained over 2 hours/day of rest and nearly 5 lb/day milk when they were outside the pen for only 3 versus 6 hours/day. Incredibly, first-calf heifers gained 4 hours/day of rest and 8 lb/day more milk (**Figure 1**).

Failure to meet time budget needs also affects longer term health status of the cow, such as lameness. In fact, the long-term economic consequences of poor time budgeting may outweigh any short-term changes in milk yield. Minnesota researchers found that prevalence of lameness in high producing cows was most highly associated with greater time outside the pen. This is poor time budgeting!

Economic Consequences of Cow Comfort

A combination of controlled research and field case studies provide a substantial and growing body of information on the expected cow responses to specific changes in the management environment.

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FYI

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THE MANAGER

tie stall barns that were added onto still use the main water line that was in place 40 years ago! Today the barn may have more cows that each produce more milk. Work with a local water equipment supplier and plumber to be sure the system has water lines properly sized with adequate pressure. Some new water buckets have high flow valves to accommodate high producing cows. Don't forget to maintain water buckets. I cringe when I see cows having to work hard to manipulate old worn out buckets just to get a little water to flow.

Some producers have put water trough systems in their tie stall barns and eliminated water bucket maintenance. The trough also acts as a reservoir so plenty of water is always available.

Ventilation: This is a big item. Many stall barns use tunnel ventilation. When properly sized and designed, fans can minimize production drops during hot weather. Formulas are available to make these calculations. Don't just hire the low bid when choosing a contractor to install tunnel ventilation. You may end up with too little in the bargain. Ask the contractor to show you their calculations for the total cfm fan capacity and the square footage of inlet opening needed. Many dairy Extension educators can do these calculations.

A few producers have converted to insulated sidewall curtains to improve ventilation. This is more common with new additions, and also when obstructions make tunnel ventilation unfeasible. Curtains can work well. When there is no breeze, circulating fans may be necessary to supplement natural ventilation.

Lighting: Many choices are available. Florescent fixtures are

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Here are some of the most economically important relationships:

- Stalls per cow (1.7 lb/cow/day per 0.1 increase in stall availability), feed for refusals (+3.5 lb/cow/day), and feed push-ups (+8.7 lb/cow/day) all increase herd milk production.

- Commingling first-calf heifers with older cows leads to loss of resting activity, rumination and milk yield. Plan on a ~10% loss in milk for the heifers. When stocking rate is increased, the negative effect is even more pronounced, even at low levels of overcrowding, such as 110 to 115% of stalls and headlocks.

- Improving the comfort of a stall, according to numerous case studies, should improve milk yield (3 to 14 lb/cow/day), lower turnover rates (-6 to -13%), lower somatic cell count (-37,000 to -102,000), and reduce lameness (-15 to -20%).

- Optimizing the feeding environment will promote aggressive feeding behavior and greater dry matter intake which translates into more milk production. For Holsteins, 1 lb of dry matter intake translates into 2 lbs of milk.

- Lameness results in a loss of nearly 2,000 lb/cow/yr of milk annually, greater culling rate and reduced fertility.

- As bunk space decreases from 24 to 12 in/cow, percent of cows pregnant by 150 days in milk decreases from 70 to 35%. Also, conception rates are reduced with higher stocking densities. Given that pregnancy is valued at about \$300, this is an important, and often overlooked, effect of overstocking.

The list could go on, but it is clear that economic consequences

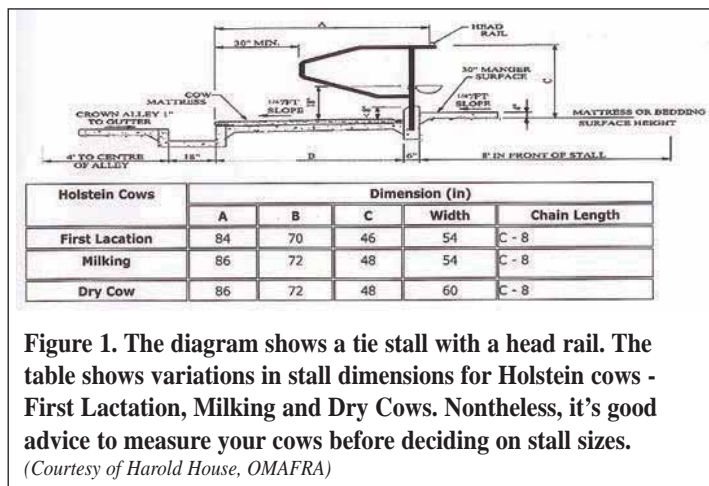


Figure 1. The diagram shows a tie stall with a head rail. The table shows variations in stall dimensions for Holstein cows - First Lactation, Milking and Dry Cows. Nonetheless, it's good advice to measure your cows before deciding on stall sizes.

(Courtesy of Harold House, OMAFRA)

most commonly used when new lighting is installed in tie stall barns. Select fixtures designed to tolerate moisture and dust. Lighting systems can also be designed to manipulate photoperiod to increase milk production. Work with a professional to design a system that provides adequate uninterrupted light to the cows, along with five to six hours of uninterrupted darkness. This requires the use of a timer to control the lighting.

Work with a competent electrician to install cow trainers, and new lighting and fans, to avoid problems with stray voltage. □

associated with improvement, or neglect, of cow comfort are very real. Research makes it clear that there is a predictable link between management, cow behavioral responses, and productivity and health. Now is the time to take advantage of what we know about improving cow comfort to improve the farm's bottom line. □



Figure 1. When time outside the pen is kept to 3, rather than 6 hours/day, cows respond with more time lying and higher milk production.