

What the Research Shows about the Use of Rubber Floors for Cows

February 12, 2008

Brian J. Holmes
Professor and Extension Specialist
University of Wisconsin-Madison
460 Henry Mall
Madison WI 53706
608-262-0096
bjholmes@wisc.edu

The following statements are based on a limited search of the literature on the subject of rubber floors for cows as an alternative to concrete. There are also some observations included that are not research based.

Research and Observation Shows

High ranked cows in the dominance order used a rubber slatted floor resting area of a pen more than the lower ranked cows. This suggests dominant cows will push lower ranked cows from rubber floors.

Improved heat detection rate due to lame cows being more confident to express heat on rubber

Rubber floors have lower claw growth rate than concrete

Claw lesions did not increase on rubber vs an increase on concrete

Rubber floors allow animals to walk with more confidence. Animals on rubber floors move more efficiently

Rubber floors at the feed fence increase cows standing there and less time standing in stalls. When overstocking approaches 115%, rubber floors may be beneficial for standing as soft bed stalls may no longer be available to stand in.

Rubber floors at feed fence do not increase feed intake.

Rubber feed alleys with uncomfortable stalls increases cows lying on the rubber alley. This can increase dirtiness with consequences of increased cleaning time and increased mastitis infection.

Cows walk in single file staying mostly on the rubber floor when rubber and concrete floors are side - by - side. This behavior may actually increase movement time to the holding area. Plan to have full alley width of rubber if transfer efficiency is desired.

Cows on rubberized slatted floors had:

1. Lower claw lesions vs concrete
2. Higher caudal licking vs concrete- sufficient confidence to stand on three legs
3. Step length similar to pasture
4. Faster walking speed vs concrete
5. More time standing than those on slatted concrete or mastic asphalt, however, they did spend their 12 hours/day resting.
6. No effect on sole or white line lesion or dermatitis (heal wart) scores
7. Early lactation hoof wear was reduced vs concrete

Some rubber floors are slippery when wet and may not provide the benefits seen by less slippery floors.

Concrete can contribute to:

1. Damage to legs due to slipping
2. Excessive hoof wear

Cows walking on hard slippery surfaces have shorter gaits, wider posture, and asymmetric steps. With rubber mats, gait pattern was similar to walking on sand.

Cows show an improvement in locomotion when exposed to a floor of higher friction coefficient. When floor is too rough, cows show signs of discomfort by slower gait and shorter hoof contact. Floors with more friction and compressibility increase cow walking speed and decreased risk of slipping.

Floor slipperiness ranked from least to most slippery vs sand: Slatted and solid rubber, Solid Concrete, Slatted Concrete.

Cows preferred slatted and solid rubber vs concrete in the holding area when given the choice.

Lame cows walking on rubber had less pronounced lameness tendencies

Cows prefer to walk and stand on rubber vs concrete. Lame cows did not show a strong preference for either surface.

Cows need to walk 1.7-2.3 miles per day to stay in good physical shape.

“Inadequate quality of floors in the passageways is one explanation for the higher prevalence of lameness in cubicle (freestall) systems than in tied and grazed animals”.

Rubber mats reduced the risk of lameness in older cows.

There is little economic data about the use of rubber floors.

Recycled rubber with steel reinforcing can contribute to hoof injuries by puncture from steel fibers.

Odds of developing lesions were the same on rubber and concrete. Cows on concrete had greater odds of developing or exacerbating existing heel lesions. Odds of becoming lame were higher on concrete. Cows in second lactation had greater wear rates than third and greater parities. "At this point, the evidence supporting the use of rubber mat flooring is not strong and does not directly address the effect of rubber flooring on claw health of the mature and early lactation cow." Comment: this statement recognizes lameness may be caused by physiological changes occurring near calving. They may not have left their multiparis cows on the study long enough for lesions to develop.

Bulls given the opportunity to lie on rubber vs concrete slats preferred the rubber flooring. Net claw growth was higher on rubber vs concrete.

Cows were allowed to walk on Concrete, "Animat", Felt and "Pasturemat" surface. Cows displayed most confidence walking on Pasturemat vs the others.

Animat was beneficial to hoof health.

There was a significant reduction in lameness and thin soles after rubber flooring addition in a 3221 cow herd.

Lameness in General

Milk loss precedes a lameness diagnosis up to 5 months before treatment/diagnosis.

A New York herd lost an average 3.3 lbs milk /cow/day due to lameness with second lactation cows having larger losses than first lactation cows. Severe lame cows had 5.5 lbs/cow/day loss.

When farmers were asked to estimate lameness in their herds, the rate ranged from 0-35% with an average of 6%. When measured by trained personnel it ranged from 0-50% with an average of 22%. Therefore, farmers tend to underestimate lameness.

Lameness in the US is estimated at 20-25% of cows. Recommended lameness is less than 20%.

Proper treatment and recovery for lameness may take several months.

Lameness can contribute to:

1. Delayed estrus
2. Poor breeding performance/fertility
3. Shortened lactation
4. Lower milk fat

5. Sudden drop in body weight
6. Reduced milk production
7. Higher replacement rates
8. Higher vet charges

Areas of concern for lameness as it relates to floors:

1. Slatted floors can increase lameness
2. Excessive hoof wear contributes to lameness
3. Sharp turns while cows are moving contribute to lameness
4. Hurrying cows contributes to lameness
5. Crossovers contribute to turning
6. In grazing herds, travel lanes are used for long distances and could be a concern
7. Long standing times can contribute to lameness
(examples include heat stress, poor stalls, holding areas, overstocking etc.)

A 1996 study showed 15% of cows were culled based on lameness while lameness may have contributed to another 49.1% of culls because of production and reproduction effects.

Some new concrete has sharp pointed surfaces which can contribute to excessive hoof wear.

Manure and moisture are detrimental to hoofs contributing to heel horn erosion and microbial activity which can attack the hoof.

P. H. Robinson, UC Davis says milk loss is related to locomotion scores as:

Locomotion Score	Milk Loss (%)
1	0
2	0
3	5
4	17
5	36

Points for Discussion

Benefits of rubber flooring may be a function of current system (rough concrete, slippery concrete, overcrowding, travel distances, stall comfort, time in holding area etc).

Economic benefits of rubber floors could be from:

1. Reduced time to move cows to milk and other activities
2. Reduced cost of lameness treatments
3. Improved breeding efficiency
4. Reduced cull rates
5. Improved milk production due to reduced lameness (expression of lameness)
6. Reduced injury due to slipping

When using rubber floors, UW School of Veterinary Medicine (Nordlund and Cook) recommend: Holding Area, Parlor, Return Lanes, Transfer Lanes (especially when long, i.e. multiple barns).

In addition to rubber floors consider alternative practices:

1. Groove concrete for traction
2. Grind new concrete to remove sharp points
3. Slope alley floors in two/three directions to concentrate water and drain it away from cows especially when water is added to alleys (flushing, waterer clean out, sprinkling etc.)
4. Give cows an opportunity to get off concrete sometime during the year
5. Provide comfortable stalls to promote resting in stalls
6. Provide heat stress relief to promote resting more in stalls
7. Reduce time in holding area to no more than one hour per milking.
8. Use sand based stalls to encourage sand in alleys for traction
9. Use rubber tired scraper vs steel to avoid polishing concrete floors
10. Avoid overstocking
11. Don't use slatted floors
12. Move cows gently without hurrying.
13. Design facilities to avoid sharp turns while moving cows.
14. Develop management systems to diagnose and treat lameness early
15. Develop management systems to avoid lameness (nutrition, hoof trimming, slow cow movement, foot baths, etc.)
16. Avoid stones in alleys (dragged in by equipment, carried in with sand bedding, etc)