

## Observations:

### Lying Times:

Onset Pendant G data loggers fitted to the hind leg of each cow recorded whether the cow was standing or lying, every 30 seconds. So lying time, percentage of lying time, the number of lying bouts, and the average lying

bout length could be determined.

Video recordings which recorded lying position, were taken during the periods where cows were exposed to the beddings.

The cows on the wet bedding had about one third the time lying of those cows on the other two surfaces.

As well, they spent more time lying down during their six hours on pasture. This is at the expense of feeding time. Even so, their total lying times were less.

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They also spend less of that time lying in a lateral position with their head supported on their body or the ground, positions

Cattle will reduce their lying time on wet bedding to the extent that it affects their welfare. They also spend less of that time lying in a lateral position with their head supported on their body or the ground, positions conducive to sleep.

conducive to sleep. (They only experience rapid eye movement sleep with the head supported). Cows on wet bedding also spent more time shifting weight between their back legs, an indication of inadequate lying time.

The cows on the clean bedding spent a little more time lying on their bedding compared with those on dirty bedding, and least time lying during the six hours on pasture. Their total lying time in the 24-hour period was greatest.

The comparative times spent lying on the three bedding types suggests that the moisture content of the surface, rather than the contamination, was the factor which deterred them from lying down.

### Lying bouts:

The cows on the wet bedding had fewer lying bouts, but there was no significant difference between the average length of these. They had more frequent bouts of

longer duration, when on pasture, while over all they had fewer lying bouts.

Cows on the clean bedding had more lying bouts, though the average duration of these was shorter than those on the dirty bedding. Number of lying bouts and duration was similar to the cows off the dirty bedding, during their six hour pasture phase. Overall, the "clean cows" had the most lying bouts but of less duration than the "dirty cows".

### Gait score:

Gait score before and after each of the five day no choice periods was recorded. While gait scores did not exceed 2 on a scale of 1 to 5 in the study, increases in gait score of six of 12 cows on the wet bedding over this short time indicate that cows on wet bedding are more likely to experience lameness when exposure is longer. And as hooves absorb water quickly, this leads to softer hooves and an increase in lameness.

### Hygiene:

Hygiene scores were assigned before and after exposure to the bedding types. Time and location of defecation and urination was recorded. Unsurprisingly, cows on the dirty bedding were dirtier than those on the clean and wet bedding, who had

"Cows have an aversion to wet and dirty conditions. Photos Grant Shackell.





The three bedding surfaces, (left to right), clean, dirty, wet. (Photo supplied by Dr. Karin Schutz).

**FARM GEAR**  
BEDDING SURFACES

# More than *cow comfort*

*Researchers have studied the effects bedding surfaces on cattle behaviour, preference and hygiene. Tim McVeagh reports.*

**T**he work of AgResearch scientist Dr Karin Schutz, investigating suitable bedding materials for stand-off facilities featured in the November 2016 Dairy Exporter.

She, along with co-authors Cave, Cox, Huddart, and Tucker have recently published the results of their most recent research in the Journal of Dairy Science:

**Effects of three surface types on dairy cattle behaviour, preference, and hygiene.**

Some consider stand-off surfaces to be principally a creature comfort feature, but as Schutz points out, these can affect not only lying times, but production, lameness, mastitis, stress, and energy requirements.

With cows being housed on stand-off areas for up to 24 hours a day, and on consecutive days, stand-off surfaces can have a marked effect on cow welfare. And where cows are grazing pasture for a restricted time after being housed on uncomfortable bedding, they may lie down at the expense of eating.

It has been shown that cattle on hard surfaces like concrete, even temporarily, have less lying time, lose body weight, show impaired gait patterns, and have

higher glucocorticoid metabolites, (a stress indicator).

While it is recognised that cows avoid lying down on wet muddy surfaces, to date it has been unclear whether their dislike of muddy surfaces is due to its moisture or manure contamination. Here's a summary of their trial work.

**Study format:**

Eighteen in calf dry cows at AgResearch's Ruakura Research Farm were monitored while on different 400mm deep wood chip surfaces.

The bedding consisted of pinus radiata wood chipper fines, with a particle size that will pass through a 10mm square mesh. Three bedding surfaces were included, these being:

- "Clean"; (clean and dry), dry matter (DM) of 44%;
- "Dirty", (manure contaminated) DM of 40%. Soiled wood chip and manure were mixed, (40/60 ratio), and spread over the clean wood chip.
- "Wet", (and clean), DM of 23%. Water was sprayed onto the wood chip until the water table was about 15mm below the chip surface, and water was visible when subjected to treading.

- Before the study began, the cows were housed on clean dry bedding for 18 hour periods over three days, to get them accustomed to the facilities. The procedure after this was:
- Housing on one of the alternative bedding treatments for five days, (18 hours a day).
- Nine-day recovery period on pasture. (During this period, the bedding materials were replaced).
- Housing on the alternative bedding for each group for five days, (18 hours a day).
- Nine-day recovery period on pasture.
- Housing in pens which allowed them to choose between the two bedding types to which they had been exposed. This was for 18 hours a day, for two days. This protocol meant that each cow was exposed to two of the bedding types, (one at a time), with a recovery time between each. Then after another recovery period, each cow was allowed a choice between these two. While in the observation pens, (18 hours from 3pm until 9am), they had no access to feed. They went onto a fresh sward of pasture (and silage) for the other six hours of the day.