

Time for Technology

Bedding Options are Getting More Complicated

Jack Rodenburg, DairyLogix

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Although pipe benders will argue that freestall design is a major factor in cow comfort, there is little doubt that what is under the cow is one of the most important aspects of the stall. Cow comfort and health, labour efficiency, and bedding and manure handling costs are all highly influenced by the choice of stall base and bedding materials.

While one might hope that research would establish which of the many options provides the most practical balance of cost, comfort and health, it would seem that in recent years the number of choices is expanding. Although there are numerous studies on cow comfort and preference, to my knowledge no one is doing comprehensive research that looks at all practical aspects of what works best overall. While the length and scope of this column cannot hope to cover all aspects of all the popular bedding options, the “state of the art” is definitely evolving, so I would like to address some of the newer and less frequently discussed aspects in the space available.

In North America, sand bedding has been widely adopted as the best choice for cow comfort and udder health. Although some larger farms are opting for complicated separation and recycling systems, single stage manure storage, combined with custom removal of settled solids with a high hoe and field application with dump wagons or tail gate spreaders, still ends up being one of the most economical bedding options we have. While sand provides excellent footing, resting times, especially in cold conditions or when stalls are not groomed, are only average. While still number one for udder health, one disconcerting observation is that in recent years there have been serious mastitis outbreaks in sand bedded herds. The solution in these cases involved removing all of the contaminated sand in the back of the stall and starting fresh. This phenomenon has become common enough that Superior Attachments, a company that makes sand bedding levellers has added a “sand remover” to its product line. Taking all the sand out of the stall once every few years is not the end of the world, but it does add cost and labour. The increasing incidence of contamination and mastitis in sand bedding is likely a reflection of the trend to bigger stalls. Although bigger is likely better with mattress stalls, stall size is always a compromise between cleanliness and comfort, and perhaps with the inherent better footing of sand stalls, it may be better to keep them lying straight with their tailhead over the curb.

For those who like mattresses, there are always new and improved combinations of rubber and foam that will keep us guessing which ones will pack, stretch and wear out first or last. At a recent workshop, the farm owner expressed disappointment that he thought he had bought the best mattress on the market; yet cows spent a lot of time standing in the stalls. If we look at the

research, the majority of studies show that cows like to stand in mattress stalls but the time spent lying down is nearly always shorter than in sand or deep bedding. My conclusion is that he and many others have been oversold on the level of cow comfort provided by most mattress systems. Even good mattresses are at best a compromise between cow comfort and other factors like low bedding use and convenient handling of liquid manure. Water beds offer an interesting alternative and reportedly result in less hock damage even when bedding use is minimal. The other benefit of water filled systems is that unlike foam and rubber crumb systems, they retain their resilience over their lifespan. The new “pasture gel mat” appears to take the water bed concept to another level. I have seen them in three barns so far and they appear to provide good support for the rising cow, as well as conforming nicely to the body of the cow while lying.

But according to research at the University of British Columbia, the longest lying times and greatest preference expressed by dairy cows is still for a stall base made from a deep layer of organic material such as straw or shavings. North American dairy producers abandoned these “deep bedded stalls” 30 years ago for a variety of reasons. These stalls used a lot of bedding and resulted in more problems with liquid manure systems, they required a lot of labour for stall maintenance and unless they were well maintained mastitis prevalence was higher. But there is no doubt that cow comfort was excellent.

In Europe, especially Germany, the deep bedded freestall is making a big comeback, and they are applying some very interesting approaches to reduce bedding costs and minimize mastitis risk. Over the last two years, the Vetvice group I work with in Holland has undertaken a project to interview producers using deep bedded stalls in order to use their experience to develop practical guidelines. The information presented here is a brief summary translated from their field reports. The basic deep bedded stall starts out looking much like a sand stall, with a 6 to 8 inch high curb at the back to hold bedding in and a brisket barrier at the front to do the same. Traditionally, these stalls were filled level full with shavings or straw, but these materials tend to dig out easier than some of the alternatives the Europeans are now working with. Probably the most popular material being used in Germany is a mixture with a ratio of 25 Kg of straw, 80 litres of water and 150 Kg of feed grade ground limestone. The straw goes in the TMR mixer, and the water is added slowly so it gets soaked up completely by the straw. Then limestone is added slowly to create a uniform mixture. Because the weight of the material can be a challenge for flail mixers, vertical and horizontal augur mixers are preferred. The mixture is added to the stalls once every 8 to 10 weeks to a depth of about 8 inches. In most weather conditions, this mixture forms a soft base that conforms to the body of the cow and provides excellent grip when rising, but it sticks together enough that cows have difficulty digging it out. The high pH of the limestone is thought to reduce growth of mastitis organisms, and is also reported to improve hoof health. These stalls do require daily cleaning and grooming to repair dug out spots. This will be a little more work than with other stall beds. As the top layer dries, the limestone can become dusty and stick to the teats, so many herds in Europe bed in between fillings with a light dusting of shavings on top of the mixture. In very hot dry weather, the stalls may pack in quite hard, and to prevent this, Europeans increase the amount of straw in the mix, or rake and wet the top layer to keep it soft. Reported bedding usage is about 75 Kg straw, and 450 Kg of

limestone per stall per year, which they estimate is roughly half the cost of using shavings in a deep bedded stall.

Other dairyman are experimenting with deep layers of horse manure, composted for 2 to 3 weeks at 60 to 70 °C. They are adding 4 to 5 cu ft per stall once every two weeks or so, using a bedding slinger. Composting and the fact that horse manure contains bacteria not implicated in mastitis, are given as reasons for good udder health in these herds. Still others are experimenting with pulp and paper industry byproducts, commercial compost, and digestate from anaerobic digesters. In general, these herds are experiencing better udder health, than in their previous system, which was usually deep bedded shavings.

Rising energy costs mean that wood products like shavings and straw will become more attractive as fuel sources, so systems that require a lot of traditional bedding will become increasingly costly. As substitutes, both composted manure from systems such as the Daritech Beddingmaster, and digestate from on-farm digesters are proving to be excellent bedding materials. Here in North America, we are mostly putting small amounts of these materials on top of a mattress system. But perhaps if we are truly committed to cow comfort, we could benefit from experimenting with these materials and the mixtures used in Europe in deep bedded stalls as well.



Deep bedded freestalls filled with a mixture of straw, water and limestone are very popular on dairies in Germany and other parts of Europe as well.