SAND OR OTHER DEEP BEDDING provides the most ideal resting place for cows. Comfortable stalls allow cows to lie down and get the rest they need.

Deep-bedded stalls for the win

In most situations, loose bedding material does the best job at keeping cows comfortable and clean.

by Jan Hulsen, D.V.M

OVER the last 15 years, my colleagues and I have visited more than 1,000 dairy farms all over the world. We evaluated countless stall beds and hocks of cows, often with dairy farmers and dairy consultants who have many kinds of expertise. All these observations, discussions, and challenges back our point and have only made us stronger in our opinion: Cows need a soft bed, and the best soft beds are made of loose bedding.

Comfortable freestalls ensure that cows can lie down as much as they want or need. This supports health, longevity, and production. A lack of resting time brings lower milk production, more pressure on weak cows, and more hoof problems.

Sand ranks highest

In my opinion, sand is the best bedding material and also provides better grip in the alleys. But many other loose bedding materials can give excellent results regarding cow comfort, hygiene, and udder health. Along with that comes good economical bottom lines and competitive labor efficiency. Examples of useful bedding are: sawdust, chopped or milled straw, manure solids, and straw-lime-water mix. In Europe, no waste products, like paper, are used as bedding, so we have no experience with this, but farms in other countries use materials like these.

Stalls that do not need daily maintenance only exist in our dreams. To maintain a low infection risk in the area where the udder rests, this area needs attention at least twice a day.

The key word here is dry. Slaked lime ($Ca(OH)_2$), chalk ($CaCO_3$), or calcium sulfate ($CaSO_4$) can be used to keep the udder area dry. They need to be applied daily. Slaked lime has a higher pH and is more aggressive on the skin of the teats and hocks. To manage this, you might need a teat dip that contains more glycerine and is more appropriate for skin care.

Keeping the level of the bedding higher than the curb is the first and most important step to both guarantee cow comfort and minimize labor. Cleaning and leveling is very easy to do. And when a cow walks backward out of a well-groomed stall, an added bonus is that it may kick a manure pile out of the stall.

The definition of comfort

You can check the comfort of freestalls by observing cows. Do they fit in the stalls? Can they lie down and get up? Are their hocks and knees undamaged?

Hock damage comes from two mechanisms: trauma and abrasion. Understanding these mechanisms helps us to better understand the demands in which a freestall bed should comply to.

Trauma is caused by hard surfaces. Hard surfaces make the cow develop subcutaneous swelling and thickening of the skin, which results in a swollen hock. Because hard surfaces also provide little grip for the hooves, cows, especially weak cows and cows with low body condition score (and fewer muscles), will land harder on the surface. And these animals will lie down for longer periods as they are too weak and too scared of a painful landing to comfortably get up and lie down on their other side. You can just look at the cows: No hock swelling means soft landing and soft lying.

Young animals are not as heavy and still have more muscle. Older cows (bigger and heavier, with bigger udders) and weak cows are the first to develop thick hocks. The older cows are making your profit, as they produce the most milk and have paid for their raising costs. Production peaks in lactations 4, 5, and 6. As for weak cows, they need their rest to recover.

Abrasion is caused by horizontal movement of the skin of the hock over the surface of the freestall. Abrasion cuts off the hock hair and irritates the skin. In severe cases, it leads to lesions that will get infected. Moisture on the bed elevates the impact of abrasion to the skin of the hock and heavily stimulates skin infections.

Try it yourself

You can test the abrasiveness of a freestall bed with your hand. Put the back of your hand to the surface at the end of the freestall where the hocks rest. Put some pressure on it, and rub your hand 8 inches to the left and then the right five times. Now you are experiencing exactly what the cows are experiencing. If you don't mind this, the cows won't either. Again, you can also just look at the cows; when all hocks have hair growing on them, the beds are not abrasive.

The hardness of a freestall bed can be assessed with the knee test: Drop five times on your knees in the freestall. A cow is five to six times your weight, so this gives you a comparable experience as cows when they lie down. If you don't mind the landing, it shouldn't bother the cows either.

Mattresses often are too hard, and they also provide little grip to the cows' hooves. Good mattresses are soft and provide good grip, over longer periods, and should last at least 10 years. The ones that meet these standards have a high sales price. This doesn't mean they are expensive, as they bring a lot of cow comfort value. Water beds probably have longer durability than mattresses providing softness with foam and other layers.

Soft mattresses will not match all the demands the cows put on the stall surface like loose bedding does. A good mattress will, however, be better than poorly managed deep bedding.

The surfaces of mattresses and water beds often are too abrasive. A rough surface helps to maintain bedding material but raises the risk for skin abrasions. Using more bedding is the solution in this case, and using lots of bedding also benefits cow comfort, as the University of British Columbia proved years ago.

When the hygiene of the beds is not maintained, the hind part of the cow will be wet more often, thus elevating hair loss, skin lesions, skin infections, and udder infections. In this case, the farm staff needs to put more effort in keeping them clean. Some farmers will reduce the length of the freestall by moving the neck rail and/or brisket locator back. Unfortunately, this can reduce comfort of the freestall and create more hoof problems and stress.

Curved neck rails are an effective improvement over straight ones, as they position the cow better so she lies down straight. To work well, they should be at an angle somewhere between 20 and 40 degrees with the horizon.

Cows do not necessarily produce more milk when they rest longer, but they produce less milk when they cannot rest as long as they want. This is mostly because of stress. They have this stress because they want or need to lie down, but they don't dare to lie down because it is difficult, and landing and lying are painful.

Many scientific studies have shown the advantages of loose bedding over other types of sufaces for freestalls. As examples, I recommend everybody read the excellent work of Nigel Cook of the University of Wisconsin-Madison and Rick Grant of the W.H. Miner Institute.

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