

## Benefits of Sand Extended to Tiestall Barns

### *Three Northern NY Farms Made the Switch... and Overcame the Challenges*

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*Sand is commonly referred to as the “gold standard” for bedding dairy cattle. Many newly constructed freestall barns are designed for sand stalls; however, it is uncommon to find it in tiestall barns. As producers in tiestall barns look for ways to improve cow comfort and health, sand is an option to consider. This paper describes how three Lewis County producers – John & Ron Williams, Ernie Beyer, and John Nortz – make sand work in their barns.*

**John Nortz**, Martinsburg, knew about the famous benefits of sand bedding for dairy cows. Visiting local freestall barns, he'd seen for himself the extra comfort a cow has when she lies on a bed that conforms to her body, and how much softer a landing when almost 1,000 lb comes down on two knees. He had also heard about the benefits to milk quality that comes when a source of inorganic bedding is used. He saw that it could be a good way to go for dairies with freestall barns, but he didn't even give it a thought for his own 80-cow tiestall barn.

Actually, it seemed like a very bad idea. The abrasiveness of sand would wreak havoc on his gutter cleaner and manure spreader. Milking units falling in the sand would occasionally take some of the materials into the milk line and through the transfer pump. Besides, he figured his barn would not be suitable since placing a retainer at the rear of the stall to accommodate sand would make the beds too short.

In the meantime, Nortz had seen his neighbor, **Ernie Beyer**, give sand a try in an 80-cow tiestall barn. After a few years with sand bedding, Beyer figured new developments in stall mats would give his cows adequate comfort and he could eliminate the inconvenience that sand caused. He abandoned sand in 2002 and opted to replace it with a newly designed stall mat and to bed with sawdust.

Beyer's departure from sand did not last long, however. He immediately noticed a decrease in stall



*The extra comfort from sand bedding has convinced John Williams that working through the challenges is worth it.*

use by the cows and soon began to notice hock lesions developing – the result of lying on an abrasive surface. In the spring of 2003, Beyer encountered a major mastitis problem, determined by his veterinarian to be caused by a *Klebsiella* bacterium (an organism that survives in organic bedding, but not so well on the teat end). Within 3 months of the start of the outbreak, he had shipped 20 percent of his herd, and it was clear to him that something major had to change. While the thought of tearing out the new mats was distasteful, Beyer was convinced that reverting back to sand was his surest bet to restoring health and comfort to his cows.

John Nortz was there to help his neighbor with the work of installing a 3-inch-high steel retainer at the rear curb of the stall (see Photo 1), designed to create a 4-inch deep sand bed on top of the original concrete stall base. After one day's work, half the stalls were filled with sand. Nortz could not believe what he saw when the cows were let in: “Cows came in and went straight for the sand stalls.” Witnessing the strong preference that cows showed for sand, he began to think that perhaps it would be worth considering.

Nortz spent a considerable amount of time dwelling on how to make sand work in his barn. His eventual solution to maintain his 68 inches of bed length was to bolt a 3 inch-diameter PCV pipe to a steel plate, 0.25 in. thick and 7 in. wide (See Photo 2). With 320 ft of this retainer made, it took a few people several hours one December day to lag it into the concrete stall base. The steel plate now overlaps the rear 4 inches of the concrete base and hangs over the manure gutter about 3 inches where the PVC pipe sits.

## The Advantages of Converting to Sand Bedding

*(The collective experiences of the Williams, Beyer and Nortz farms)*

- Cows spend more time lying down resulting in more rest and less foot stress.
- Lesions and baldness on the hocks is rare.
- Provides confident footing and good cushion, allowing cows to rise and lie down without hesitation. This can extend the productive life of cows.
- Fewer lame cows.
- Good balance of hoof growth and wear, reducing or eliminating the need for maintenance hoof trimming.
- Sand provides grit in center alley, eliminating concerns about traction when cows are moved out of the barn.
- Clinical mastitis is reduced because exposure to environmental pathogens is reduced.
- It is inexpensive to retrofit a tiestall barn to accommodate sand bedding.
- Bedding costs are reduced considerably.

### Three retainer designs used to create a sand bed over a tiestall base.



**Photo 1:** Ernie Beyer purchased this retainer – 3 in. high and 1.25 in. wide at the top. The base is lagged to the concrete stall base.



**Photo 2:** John Nortz design: a steel plate carrying the PVC pipe hangs over the gutter to maintain the bed length.



**Photo 3:** The Williams' simply lagged a 3 inch PVC pipe directly to the rear of the concrete stall base. Washers are sometimes used as spacers to provide drainage between the retainer and stall base.

The response from Nortz's cows as they entered the barn that evening was a repeat of what he saw at Ernie Beyer's. They did not hesitate to enter the stalls as they often did with the old mats. Within the first few days he saw, for the first time in his barn, all cows lying down at once. In the past few months since he introduced sand, hock lesions that occasionally caused lameness in the past are now extinct. Prior to sand, Nortz never saw a somatic cell count below 270,000, but it has now been 190,000 or less for 5 consecutive months. In the last 9 months, milk production has averaged 2.5 lb per cow higher compared to the same period of 2003 and Nortz attributes much of this increase in milk production to the sand bedding. He notes that sand extended the productive life of one large cow that, previous to sand, was having trouble rising. Reflecting on bedding costs, Nortz notes that bedding cost is reduced from \$0.33 per stall per day to \$0.12. This adds up to annual savings of over \$6,000!

### Eight years experience with sand

At the north end of the county in Deer River, using sand bedding in their 90-cow tiestall barn is "old hat" to **John and Ron Williams**. According to John, the tremendous benefit to the cow makes sand a no-brainer. At this farm, manure conveyed by the gutter cleaner is dropped directly into the open top of a side-slinger spreader parked below the level of the barn floor. They milk twice daily, average 75 – 80 lb per cow, and have increased cow numbers in the last 2 years from 90 to 140. New sand – typically 250 lb per stall - is added weekly with a skid steer. Sand is then leveled manually with a rake.

The Williams' freely discuss their experiences – both the ups and downs – with sand in a tiestall barn.

They have identified a number of challenges that sand poses – primarily related to wear on machinery. More importantly, they have found ways to work around them. A list of some of the challenges and solutions this farm has experienced is shown in Box A.

Beyer and Nortz, like the Williams’, spread manure daily but use an auger to lift manure from the barn to the spreader. In both cases the auger (completely covered for safety) works efficiently, but requires monitoring for wear. Beyer discovered that it is important to install the auger in a way that allows it to be removed for repair. In particular, a neoprene bushing that guides the lower part of the auger shaft must be replaced regularly (in his case, every 4 months at \$40) to prevent contact between the auger flights and the metal trough. Beyer is making two adjustments to the auger system to reduce wear: 1) He installed a gear reduction to reduce the rotational speed by half, and 2) he will redirect manure from the gutter cleaner away from the lower end of the auger shaft, thereby reducing the rate of wear on the bushing.

**Conclusion**

Producers housing cows in tiestall barns should consider sand bedding as a low-investment option for improving cow comfort and health. Many barns have

the basic requirements needed to accommodate using sand and three local producers have found ways to overcome the challenges associated with it.

**Additional articles on using and handling sand and sand-laden manure:**

**Sand Bedding Has Benefits and Costs** – Ontario Ministry of Agriculture  
[http://www.gov.on.ca/OMAFRA/english/livestock/dairy/facts/info\\_sandbed.htm](http://www.gov.on.ca/OMAFRA/english/livestock/dairy/facts/info_sandbed.htm)

**Sand for Bedding Dairy Cow Stalls** – PRO-DAIRY  
<http://www.ansci.cornell.edu/prodairy/facilities/facpub.html#Sand>

**Effective Means of Handling Sand-Laden Dairy Manure** – PRO-DAIRY  
<http://www.ansci.cornell.edu/prodairy/facilities/facpub.html#Sand>

**The Influence of Barn Design on Dairy Cow Hygiene, Lameness, and Udder Health** - U. Wisc. <http://www.vetmed.wisc.edu/dms/fapm/comfort.htm>

**Box A.** Challenges and solutions to sand bedding in a tiestall barn as experienced by the Williams Farm

Challenge	Solution	Frequency	Annual Cost
<b>Equipment</b>			
Concrete manure gutter wears	Line the gutter with 3/16" hardened steel	4 yr	\$250
Gutter cleaner paddles and chain wear	Purchase inexpensive chain and replace	4 yr	\$1,200
Manure spreader (side slinger) expeller wears	Replace	4 yr	\$250
Milking unit sucks sand with premature fall off	Use units with automatic shut-off to minimize this	.	
Sand entering milk line wears housing of milk transfer pump impeller	Keep extra part on hand. Repair or replace part	1 yr	\$30 to repair; \$200 to replace
<b>Labor and Management</b>			
Cows kick sand into feed manger. More difficult to sweep and potential for decreased intake.	Increase height of front curb slightly from 6" to 9" so a full stall (4" sand) is still contained. Use PVC pipe, rubber, or wood.		
Sand is heavy and difficult to handle	Skid-steer and access/space in barn is necessary to handle sand. This resulted in improved overall labor efficiency.		
Labor involved in leveling sand when stalls are filled	The Williams believe leveling is important. Others have dumped sand in front of stall and allow cows to level it. A consideration if barn design allows is to construct an attachment for the skid-steer.		
Manure deposited in stall is retained	Remove manure and wet spots regularly; Keep electric cow trainers properly adjusted. Washers can be used as spacers between retainer and stall base to allow some drainage.		
Sand-laden manure cannot be stacked	If using daily haul, enough accessible land must be identified for all seasons. Short- or long-term storage (and pumping) is an option.		