

New research sheds light on bedding choices

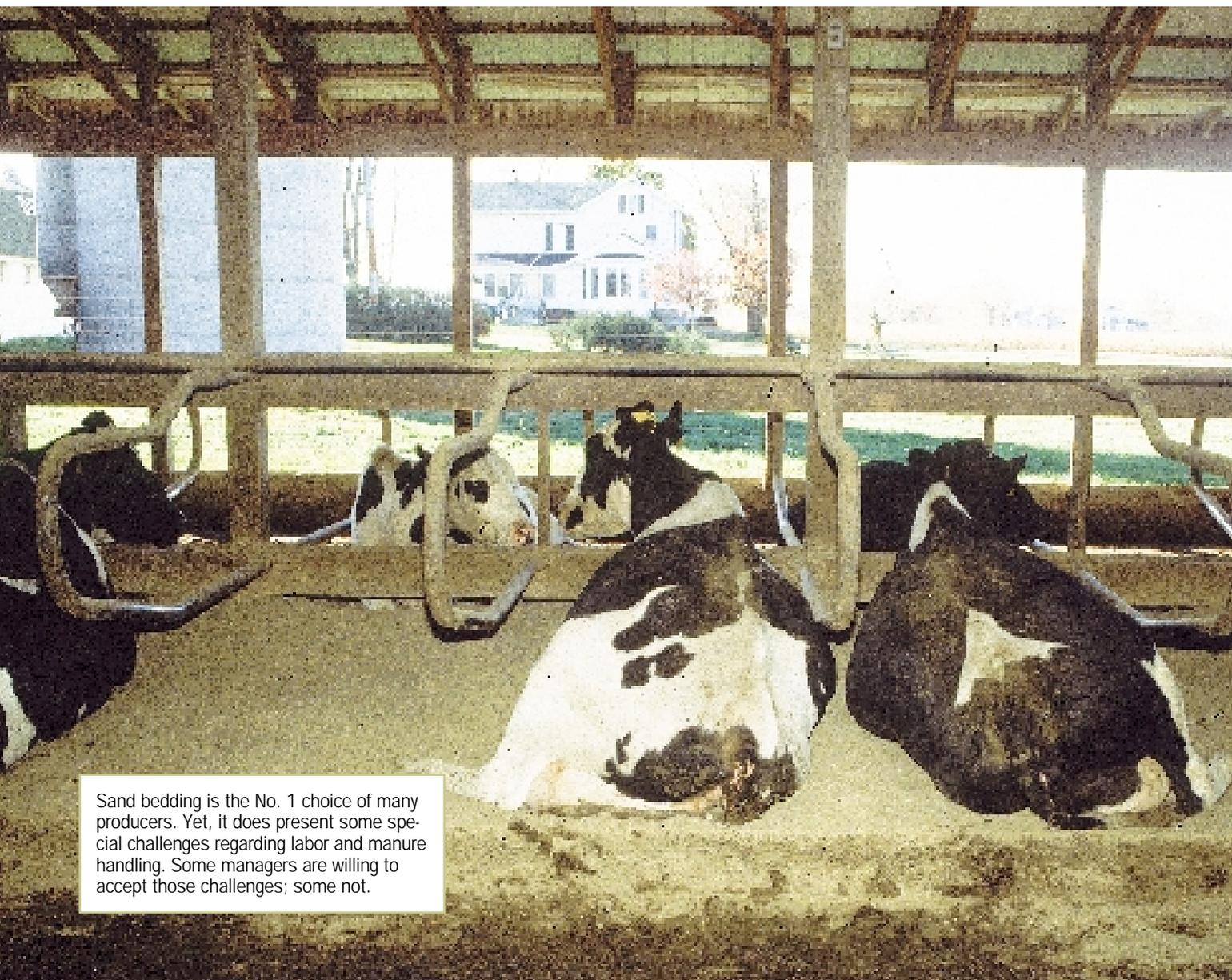
By Thomas Quaife and Roger Palmer

As technical services specialist with Monsanto Dairy Business, Brian Perkins gets onto a lot

of dairies around the country. Based on his observations, he's convinced that sand is the best bedding type for free-stall barns.

"Sand is incredibly forgiving. You can make a lot of mistakes in stall design and still have a high-performing barn (with sand

bedding)," he says. It's easier to maintain high cow comfort with sand than other bedding types, he believes. But, it takes work.



Sand bedding is the No. 1 choice of many producers. Yet, it does present some special challenges regarding labor and manure handling. Some managers are willing to accept those challenges; some not.

Fresh sand should be added to the stalls at least once a week. And, the type of sand used is critical. "The biggest mistake I see is that the sand is too fine, with clay in it," he says. That type of sand can turn hard — almost concrete-like.

Yet, others swear by mattresses. Carl Theunis, who runs a 1,800-cow operation in Kaukauna, Wis., switched from sand to rubber-filled mattresses four years ago because of manure-handling considerations. "I couldn't afford to haul sand-laden manure anymore," he says. "The cost of handling the sand became prohibitive." In the

meantime, the mattresses have done "a really good job for us," he adds.

According to new research from the University of Wisconsin, both bedding systems — sand and mattresses — work well if properly managed. Both provide high levels of cow comfort. So, you can base your decision on other considerations — cost, maintenance and manure-handling — knowing that the cows will use either bedding type.

Cows on camera

The University of Wisconsin study was conducted in a four-row free-stall barn. Six different stall base types were randomly distributed among the 104 stalls. One half of the barn had a 100 percent stocking rate, while the other half had a stocking rate of approximately 70 percent.

Two video cameras

panned the barn on a continuous basis, recording the cows' behavior. Four times a day — at 2 p.m., 8 p.m., 4 a.m., and 9 a.m. — when cows weren't being milked, the cameras recorded which stalls the cows were standing in or lying in.

Cows showed some preference for sand when it came to lying down in the stalls, although rubber-filled mattresses were close behind. (See "Wisconsin research at a glance" on the next page.)

Everyone can agree that it is best to have the cows lying down in stalls. And, sand rates a slight edge in that regard. But, a number of cows will stand in the stalls, as well, which should be considered part of the cow-comfort equation. It's better to have cows at least occupying a stall whether it's standing or lying — than having them out in the

concrete alleys.

In the Wisconsin study, cows were more likely to stand on mattresses or rubber mat-based stalls than other stall base types. Apparently, they provide a softer standing surface than sand. With sand, the surface can get compacted over time unless fresh sand is added on a regular basis. And, the rear curb can become an obstacle, especially when some of the sand is eroded away and the surface is no longer level with the curb.

Confirms previous research
Two years ago, Iowa State University researchers conducted a similar experiment, with video cameras watching the cows' behavior. They found that cows were most likely to lie in stalls that had sand bedding with a Sand Trap *continued on page 22*



Mattresses, shown here with a thin layer of bedding over the top, provide a good alternative. New research from the University of Wisconsin indicates that cows will lie in mattress stalls about as readily as sand-exclusive stalls.

BEDDING CHOICES

device underneath. Close behind were rubber-filled mattresses:

Percent lying in stalls:

- Sand with Sand Trap, **68 percent**
- Rubber-filled mattress, **66 percent**
- Foam-filled mattress, **64 percent**
- Sand alone, **62 percent**

Previously, researchers at the University of Illinois found that cows preferred to lie in stalls with rubber-filled mattresses:

Percent lying in stalls:

- Rubber-filled mattress, **43 percent**
- Rubber/plastic-filled mattress, **40 percent**
- Plastic-filled mattress, **34 percent**
- Sand, **26 percent**

European research has found that some cows develop a preference for waterbeds over time.

Temperature differences The University of Wisconsin study, meanwhile, monitored the cows over a nine-month period from May 2001 to February 2002. Some differences did show up in the cows' behavior, depending on the temperature.

In moderate temperatures — between 20 degrees and 80 degrees F — sand bedding did a good job of encouraging the cows to lie down. But, when temperatures exceeded 80 degrees, rubber-filled mattresses were superior in that regard.

Temperatures exceeding 80 degrees **Percent of time stalls had cows lying down in them**

- Rubber-filled mattress, **53 percent**
- Sand, **44 percent**

Cows also showed a preference for rubber-filled mattresses when temperatures dropped below 20 degrees.

Management is key Some key assumptions must be noted here:

- Cow preference is an indication of cow comfort.
- It's better for cows to at

least occupy a stall — whether lying or standing — than standing out on the concrete alley.

- Not all sand-filled stalls are equally desirable.
- Not all mattresses are equally desirable.

Based on those assumptions, one can conclude that sand and certain

mattresses are good stall base types. And, waterbeds can work well, too.

Each of these bedding types will work if managed properly. ^{PH}

■ *Roger Palmer is an assistant professor of dairy science at the University of Wisconsin-Madison.*

WISCONSIN RESEARCH AT A GLANCE

Researchers at the University of Wisconsin used video cameras to record the behavior of cows in a 104-stall free-stall barn. Different stall-base types were interspersed among the stalls. The tendency for cows to choose certain stall-base types over others was recorded four times during the day — at 2 p.m., 8 p.m., 4 a.m., and 9 a.m. — over a nine-month period.

Data are based on the percentage of time that the stalls had cows in them, either lying down or standing.

It should be noted that the 104-stall free-stall barn was divided in half in terms of stocking density. One half had a 100 percent stocking density. The other half had a lower stocking density of approximately 70 percent. On the side with a lower stocking density, sand bedding was not offered as an option because of manure-handling complications.

SIDE WITH 100 PERCENT STOCKING DENSITY

■ Cows are most likely to lie down in sand-bedded stalls
Percent of time stalls have cows lying in them by stall base type:



■ But, overall "occupancy" rates — including both standing and lying — are higher in stalls with rubber-filled mattresses
Time stalls are occupied by stall base type:

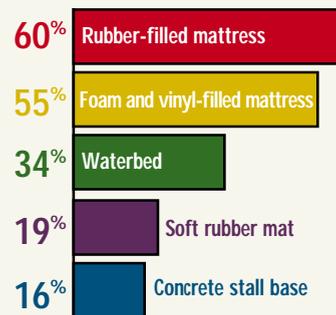


SIDE WITH STOCKING DENSITY OF APPROXIMATELY 70 PERCENT

■ Mattresses rate very high
Percent of time stalls have cows lying in them by stall base type:



■ And, cows spend more time in mattress-based stalls
Time stalls are occupied with cows either standing or lying by stall base type:



Source: University of Wisconsin