Composting Bedded Pack Dairy Barns in Minnesota

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Composting bedded pack dairy barns, commonly called compost barns, are generating a lot of interest among Minnesota dairy producers who are upgrading their milking herd facilities. Minnesota has at least four compost barns in operation and more under construction. There are more producers interested in modernizing their dairy housing facilities who are considering compost barns as an alternative to freestall barns.

Composting bedded pack dairy barns require proper design, location, and exceptional management to provide a well-ventilated, dry place for cows to lay down. Well-managed compost barns can provide excellent cow comfort. Current design and management recommendations are based on the experiences of Minnesota dairy producers who have compost barns.

Minnesota composting bedded pack barns are the same width as three-row drive-by freestall barns. In a compost barn, the freestalls and freestall alleys are replaced with a composting bedded pack. Compost barns have a concrete feed alley, a composting bedded pack, a 4-ft high wall separating the pack and feed alley, and 4-ft high walls around the other threes sides of the bedded pack area. The 4-ft wall separating the bedded pack and the feed alley has a fence to prevent cows from walking over the wall, and walkways at each end for cow and equipment to access the pack area.

The bedded pack is sized to provide a composting bedded pack area of 80 ft^2 per cow. This allows all cows to lie down at the same time and still have space for a cow to get up to go and eat or drink. A 52-ft by 115-ft compost barn with a 12-ft wide feed alley can house 57 milk cows.

Minnesota compost barn owners are using fine wood shavings for bedding. Sawdust can also work well. The composting bedded pack is stirred (aerated) at least two times each day when the cows are being milked. Experienced compost barn operators suggest that the pack should be stirred to a depth of 12 inches twice a day. Bedded pack stirring is done with a cultivator attached to the front of a skid loader. The stirring aerates the pack to facilitate composting. Stirring also mixes manure and urine on the surface into the bedded pack, which provides a fresh surface for cows to lie on after returning from the milking center and eating. A semi load of fine wood shavings typically lasts between 18 and 40 days, depending on weather, before additional bedding is needed. Proper pack management and twice daily stirring, sufficient bedding, and plenty of ventilation are needed to keep the pack dry.

The concrete feed alley is scraped twice a day. The manure and bedding scraped together is stored in an approved manure storage unit until land applied according to a manure management plan. One producer put in a mini-pit for short-term storage.

The bedded pack area can have a clay base. Care must be taken when removing the bedded pack during clean out and pack stirring when the bedded pack is less than 1-ft deep. Fresh bedding is added when the bedded pack becomes moist enough for it to stick to the cows after they rise from laying on the composting bedded pack.

The composting bedded pack is typically cleaned out and land applied as part of a manure management plan in the fall after corn silage is harvested. This allows time for a new pack to accumulate and begin composting before cold weather sets in. Some operators remove some of the bedded pack in the spring before fields are planted to make sure there is sufficient space for pack accumulation during the summer.

Sufficient sidewall height is critical for enhancing natural ventilation and providing equipment clearance to the composting bedded pack. The sidewall height for a bedded pack is recommended to be higher than that for a freestall barn to accommodate the sidewall opening lost due to the manure pack walls. Minnesota compost barns have 14-ft sidewalls but some owners say they would go to 16 ft for their next barn to provide better access for bedding trucks.

The compost barns in Minnesota are all curtain-sided, naturally ventilated barns with open ridges that range from 1 to 3 inches per 10 ft of building width. One Minnesota compost barn has eight 3-ft diameter mixing fans located on the south side blowing air downward toward the middle of the composting bedded pack, hung high enough to provide room for stirring equipment at the maximum bedded pack height. Good ventilation is needed to remove cow heat and moisture as well as the heat and moisture that the composting pack generates. Minnesota compost barns have 3-ft eave overhangs to minimize the chance of roof runoff and rain being blown into the barn onto the bedded pack.

Waterers are located along cow side of the feed manger. Waterers are not located next to the bedded pack to minimize wetting of the pack and to keep the waterers cleaner.

Compost barns and their management will be part of the University of Minnesota Dairy Days program in January 2005. Watch for Minnesota Dairy Days information coming later this fall.

Written for Dairy Star (Vol. 6, No. 15, Sep. 25, 2004)