

# Time for Technology

## **Cow handling is critical in robotic milking barn design**

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Robotic milking and other precision technologies will result in substantial change in the way we house and manage dairy cows in the future. Since these technologies decrease the routine labour needed to care for normal healthy animals, sorting, diagnosing and treating problem cows and handling individual management processes such as calving, dry off, and breeding become the biggest tasks left for the manager. And because there is so little work to do it is usually done by one person. Even on larger robotic dairies it makes more sense to have one person in the barn at a time and provide greater coverage of the day, rather than having two people working together. The gold standard for these barns is that one person working alone can move one cow from any group into the handling facility in one minute or less. Once there it should be possible to deal with her safely and effectively, record the action in the computer, and return the cow to the appropriate group in a minimal amount of time.

Handling can involve dealing with an individual animal, such as for breeding or examination and treatment for mastitis, or with a group of cows as with the veterinary herd health visit. On any dairy, an ideal handling system is one that minimizes operator labour, minimizes the disruption and stress for the cows and provides a safe and stress free place to perform the handling activity. In that regard headlocks are less desirable than sorting systems, because they require restraining and thereby stressing all the cows in order to handle just a few. They also result in more labour because the handler still has to identify the cows he or she needs and has to take equipment, drugs and record keeping tools to the cow.

In tie stall herds cows can be handled in their own stall at any time. In parlor herds, all cows in a group can be identified and sorted over a short time span in the return lane. In a robotic herd, milking times are spread out, so sorting a cow or group of cows at milking for handling at a specified time will require up to 15 hours of lead time. Hence a good sort pen must provide the sorted cow with feed, water, a place to rest, and the opportunity to return for additional milking. If your preferred handling system is headlocks, parlor milked cows are hungry after milking, and when they return to the barn nearly all go to the manger and willingly lock themselves in. Headlocks for robot barns are problematic because without a period away from feed many cows are not interested in going to the manger when fresh feed is delivered. Because both sort pens and headlocks are problematic, many robotic milking herds do treatment work by crowding cows into freestalls, chasing them into headlocks, or fetching them into the holding area strictly for timely separation. It is ironic that while robotic milking is intended

to save labour, on many robotic farms today, cow handling is a bigger chore than in parlor dairies.

With robotic milking, cows flagged for sorting by the herdsman or by the management software, can be separated automatically as they leave the milking stall. But because milking takes place continuously, you will need to start sorting cows for tomorrow morning's herd health visit by supertime today, and the barn layout must include a separation area large enough for all the cows needed on herd health day. The separation pen must be located so it is accessible from all robots, and designed so cows housed in it for up to 15 hours have access to feed, water, a place to rest, and access to a robot for additional milking. In barns with several robots they need to be clustered close together so that separated cows can be sorted to a common separation pen. If this pen is behind one of the robot rooms, the separated cows can be given access to the fetch pen beside that robot so they can be milked again and returned to the pen. These requirements are most easily met if cows do not have to cross a feed alley. Hence robotic milking barns lend themselves well to layouts with perimeter feeding and all cows and robots located centrally. Perimeter feeding also keeps rain, sun and frost out of the cow areas further enhancing cow comfort.

Determining the right size for the separation pen is a difficult decision. On most typical days the number of cows being separated will vary from none to one or two cows separated by the software, to 4 or 5 cows separated by the herdsman. But on herd health day the vet may want to look at as much as 25 to 30% of the milking herd. In a 120 cow 2 robot herd, providing space for 30 cows in a separation area that is only used two nights per month before herd health days, is not practical. But if the dry cows are also housed behind the robot a freestall area with flexible gating that can be moved can offer a practical solution. As an example, a barn for 120 milking cows could include 24 stalls for dry cows and close up heifers, plus 6 stalls for separated milking cows behind one of the robots. On the days that no cows are being separated the dry cows and heifers have lots of room, and the robot access could be used to put close up heifers in the fetch pen and train them to go through the robot voluntarily. This introduces them to the feed, and makes them familiar with the milking stall and the noise of the robot arm. Most heifers trained this way need no further help after calving resulting in less stress and less labour for the operator.

On days when a few cows are being separated the gates are set so that dry cows have adequate space but no robot access, and separated cows have the 6 stalls immediately behind the robot. While these cows wait for handling they can access the robot for additional milking. If 30 cows are being separated for herd health day, set the gates so that the 24 dry cows are crowded into an area with 16 stalls, 12 hours before the time of the herd health visit. Since the overcrowding is only for one 12 hour periods every two weeks it should not be a big concern. This makes 14 stalls available for separated milking cows, and since they are being sorted throughout the night, overcrowding will not become an issue until 4 or 5 hours before the vet's arrival. If instead of freestalls, the dry cow housing area was a bedding pack, the stress of crowding on herd health days would be even less. Alternatively doing herd health weekly with fewer cows is another option. With strategic gating, a section of headlocks in the dry cow area could

be used to restrain cows during the pregnancy exam, or they can be examined in the handling chute.

In a two robot barn, the area behind the other robot can be used as a bedding pack for fresh cows and cows with mobility issues. Giving these cows the freedom of a straw pen provides additional comfort for them and having them close to the robot, means less walking for the cow. Often weak and lame cows need to be fetched and fresh cows require some assistance, so housing them close to the robot means less labour for the operator as well.

With milking groups in front of the robot rooms and separation, dry cow and fresh cow groups behind them, the area between the robots becomes the ideal location for the handling facility itself. Depending on herd size, the dairy might choose for a single handling chute that incorporates restraints for hoof trimming or separate chutes for trimming and other handling and on very large farms it could include a management rail. Gating should be designed to direct cows into the devices and the area should also incorporate excellent lighting, equipment storage, hot and cold water, and a desk and computer for dealing with treatment records.

The goals of robotic milking include reducing labour, improving cow comfort and reducing stress on both the cows and the farmer, but when handling facilities are inadequate and cows have to be chased around and examined in freestalls, the results can be disappointing. In a robotic milking project, whether it is a renovation or new construction, paying attention to handling considerations will pay big dividends.



**A working chute in a central location provides easy access for handling cows from all groups in this perimeter feeding barn with two robotic milking stalls.**