

Time for Technology

Robotic Milking has Big Labour Saving Benefits

Jack Rodenburg, DairyLogix



Since current quota transfer regulations make expansion difficult, progressive dairy herds that are looking to re-invest profits will focus on improving efficiency as an alternative to expansion. Eliminating or reducing the expense of hired labour and all the personnel management issues that go along with it, will be an attractive option. As the impact of this new industry direction becomes more clear, robotic milking, the biggest labour savour to come along in decades will appeal to a wider range of herd sizes than it has up to this point in time.

Over the past two and a half years this column has featured articles on a dozen new “precision dairy management” technologies that save labour and improve individual cow care through the use of sensors and robotics. In order to demonstrate the range of these technologies, I have specifically avoided writing about robotic milking. Yet there is little doubt that this is the precision tool that will have the greatest impact of all on how we manage cows in the future. You only need to ask dairy farmers who have adopted this technology successfully and they will tell you their lives are forever changed. Most will tell you they will never go back to milking cows any other way. For others who were less successful, life changed as well, but not in the ways expected. Especially in the early years there were a number of failures which were well publicized in the coffee shops and meeting halls of rural Ontario. The experiences of these pioneers, both positive and negative have taught us a tremendous amount about methods of feeding, management, and housing that are appropriate for this management system. In order to explore the significance of robotic milking and the emerging principles of how to do it well, the next several “Time For Technology” columns will be devoted to milking with robots.

The benefits of robotic milking, particularly for the family farm, are proving to be substantial. In surveys of Canadian owners done in 2001 and again in 2005, the most common reason for choosing robotic milking cited by 87% and 63% of the owners surveyed, was to reduce labour. There is lots of evidence that it does this successfully. A field survey conducted in 2003, showed milking related chores on the 22 robot farms milking at that time were 1.02 minutes per cow per day vs 3.28 minutes on parlor farms with a similar herd size. With the improved technology available today, there are numerous examples of robotic dairies, run by a single producer, with or without family help, milking 100 to 150 cows. These herds typically report total daily labour

of 8 to 10 minutes per hectolitre of milk produced vs 30 to 35 minutes for parlor farms of similar size, and 60 to 80 minutes for tie stall dairies. Without robots, these farms would need one or two highly skilled employees who can do a variety of work, and since parlor milking this number of cows creates two or three short periods of high labour demand, scheduling employees is difficult and results in long days or split shifts. When one employee is sick or quits, farms with a small work force face a much bigger challenge filling in than larger dairies. For many robotic dairies, managing new technology has proven to be less of a challenge than managing employees has been for their parlor milking neighbours.

A second benefit which is most obvious on smaller dairies is the increased quality of life for the farmer. Chore times become more flexible, and that can mean sleeping in, getting out on a date in the evening and more freedom to schedule cropping and other work more effectively. Traditionally, milking has meant repeated bending down, or standing with arms raised and with this strenuous task eliminated, chores are also less physically demanding. Many dairymen also report that they also value the mental health benefits of eliminating the repetitive work of milking, and adding more stimulating work managing modern technology.

A third benefit which often goes unrecognized is the improved cow welfare associated with well designed robotic milking facilities. Over the last decade, much of the emphasis on cow comfort has focussed on bovine time budgets. Clearly, when cows are not forced to stand in a holding area for 2 to 3 hours daily, they have a better chance of finding the 12 to 14 hours of resting, 6 to 8 hours of eating, and 2 to 4 hours of grooming and socializing time they need to stay healthy and productive. Since the operator is not present during milking, robotic milking does mean that one of the key opportunities to physically examine the cow and her udder is lost, but the system goes a long way toward compensating for this by extensive use of sensors to monitor health through data collected at milking. Depending on the make and model, in-line monitoring of electrical conductivity, lactate dehydrogenase enzyme, somatic cell count and/or milk colour provide indicators of mastitis. Feed consumption measures, rumination counters, and in line measurement of milk urea nitrogen and beta hydroxy buterate or milk composition provide an indication of nutritional status. Activity monitors and body weight may provide some indications of general health. Concern for udder health attracted much attention a decade ago when robotic milking was still new, and while most studies show that there is a brief increase in somatic cell count due to stress with most start ups, field surveys in Canada, the USA and Europe, all show udder health and milk quality are similar in established conventional and robotic milking herds.

After ten years of working with these systems, we also have a much clearer picture of what we can expect in terms of milk production. Because 3x milking at 8 hour intervals in the milking parlor increases production 12 to 15 % compared to milking twice daily, there was an early

expectation that cows milked an average of 2.6 times with robots would give substantially more milk as well. But as illustrated by the graph in Fig.1 the average number of milkings for a robotic herd is made up of widely varying milking intervals for individual cows. Table 1 illustrates how the blended production expected from some cows milked 4 times and others milked less than twice per day results in a lower production response than what is expected from a uniform increase in milking frequency for all cows in a parlor. For each cow in the table the production change from twice daily milking at 12 hour intervals is typical of what has been found in research studies. When individual cow responses are blended together, the table illustrates that we can expect 3 or 4 % more milk from a robotic herd with 2.6 milkings per day.

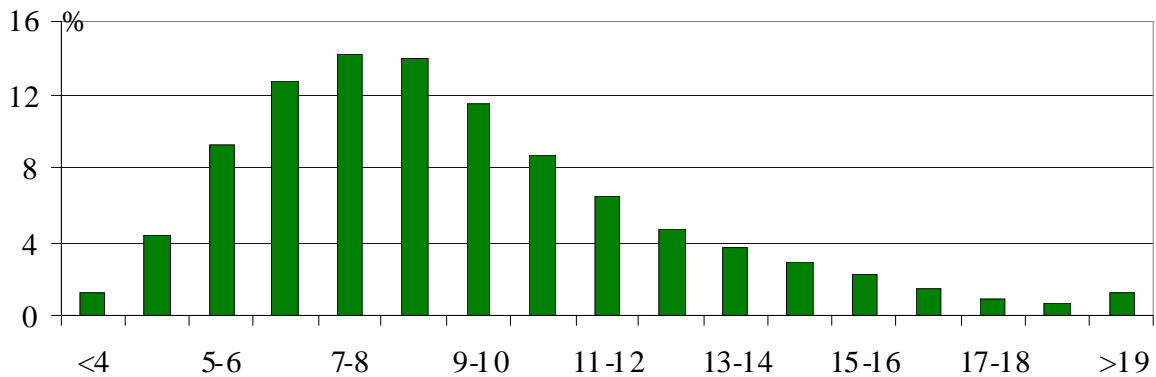


Fig 1. Distribution of milking intervals in a typical robotic milking herd with long interval cows fetched at three points during the day . (DeKoning and Ouweltjes, Proc. Of the Int. Symp. On Robotic Milking, Lelystad, 2000)

Cow	Milking intervals	Milkings per day	Production vs 2x
A	5-6-6-7	4	+18%
B	12-7-5	3	+ 6%
C	15 - 9	2	- 2 %
D	15 - 15	1.6	- 6%
Ave	9.3 hrs	2.65	+ 4%

Table 1. Predicted milk production relative to twice daily milking for the average of 4 cows with widely varying milking intervals

Using this illustration it takes about 2.3 milkings in a robotic herd to match the production of twice a day parlor milking. Although specific numbers are hard to come by, herds that achieve 2.6 to 2.7 milkings with robots can expect 3 to 4 % more milk than 2x parlor herds and 8 to 10% less than 3x herds. Of course, as the number of milkings increase, the milking interval also becomes more uniform, so robotic milking herds with 3 milkings or more tend to show a substantial advantage in milk production per cow.

In summary the key benefits of robotic milking that make it a success are the labour savings offered as well as the greater flexibility in when and how the work is done. Future columns will take a detailed look at economics, and at addressing some of the new management challenges these systems bring into play.