Mastitis control in robotic milking systems

Peter Edmondson, UdderWise Ltd, Shepton Mallet, UK, outlines how robots are becoming more common as a way of milking cows improving the farmer's quality of life and helping with labour issues

Robots are becoming more common as a way of milking cows, improving the farmer's quality of life and helping with labour issues. In the last decade, we have learnt so much more about robots and their technology has improved. Milk quality and mastitis levels have improved significantly. It's important that vets understand robots and how they function in relation to mastitis and milk quality.

Robot capacity is decided by the volume of milk harvested each day rather than the number of cows. Efficient robots will milk between 2,000L and 2,200L per day. The one thing that everyone notices when you move to robotic milking is how quiet the cows become; their stress levels drop off and so, this is good for overall health. Some cows are very robot-efficient, that is they know how to play the system to maximum effect and present when they know they will be milked. Feed is the key factor that encourages animals to come for milking. Teat condition improves as you are milking individual quarters and so, risks from overmilking reduce. Here are some of the key points to minimise clinical mastitis.

Figure 1: Robotic units are very relaxed places for cows and staff.

COWS MUST BE KEPT CLEAN

One of the key steps to minimise clinical mastitis, is to keep cows, udders and teats as clean as possible. This means having a well-designed housing system where cows lie down on clean beds. Most robot systems have cows housed all year around. You need to make sure that the stocking density is correct and should have at most 95 cows per 100 cubicles, which must be well-bedded and comfortable. There should be wide passageways, which are regularly scraped. Occasionally, robot cows are kept on straw yards but they are difficult to manage as cows can lie anywhere. Remember, the robot has a set milking routine and can't differentiate between clean and dirty teats at present. However, technology might change this in the future, where cows with dirtier teats may have a lengthened or different teat prep. Udders should be singed every three or four months to avoid dirt getting trapped around the teat. Hairy udders make teat prep more difficult and can interfere with unit attachment if the lasers get confused with shavings or dirt trapped in hair. Tails must also be clipped regularly.

Figure 2: Udders and teats should be clean to minimise clinical mastitis.

Figure 3: Singe udders and clip tails every three months.

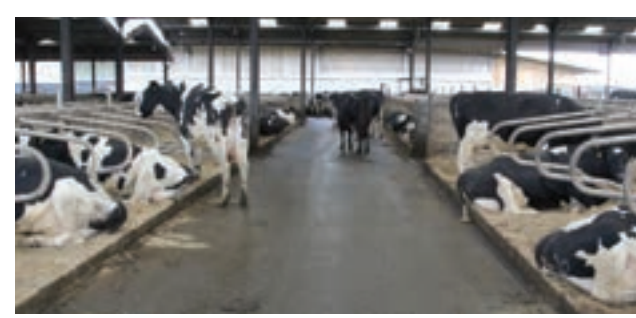

Figure 4: Wide passageways help keep cows clean.

Figure 5: This unit has built an excellent cattle crush, which allows easy access to the udder for mastitis and dry treatments.

COW SELECTION AT OUTSET

Spread of infection occur in any milking system irrespective of whether the herd carries out post-milking teat disinfection or cluster flushing with the disinfectant solution. Robots rinse the liners with water after each cow, which helps reduce the amount of residual milk but does not sanitise. Post-milking teat disinfection reduces the new infection rate by 50% if the entire surface of the teat is covered. Many robots apply dip through a fixed or moving spray nozzle. Parts of the teats are likely to be missed and there is an increased in spread of infection. It is important to remove cows with chronic subclinical mastitis before moving across to robotic milking. This reduces the level of infection in the herd and the impact of any spread will be reduced. In general, cell counts tend to be slightly higher in robotic systems compared to conventional herds.

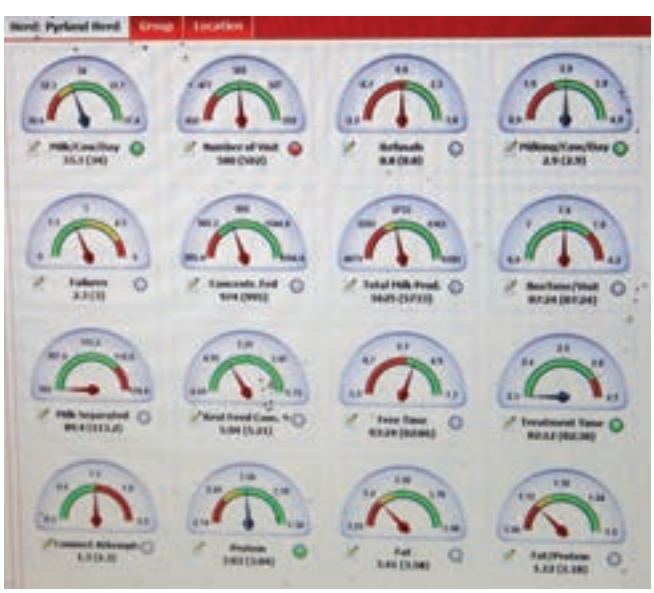

Figure 6: The computer is the heart of the system and tells you when there are problems.

MASTITIS WARNING MESSAGES

It's easy to recognise a cow with clinical mastitis in a parlour. With robots, you are totally reliant on technology. They detect mastitis in a variety of ways, including electrical conductivity, light emission through milk, etc. Warning systems err on the side of caution and so, there will be more warning messages than true clinical cases. The farmer can then go and look at the computer and check things like milk production, number of visits for milking, activity, etc. This will help decide if there is a problem and if the udder needs to be checked.

When you speak to robot users, they tell you that there are between five and eight warnings for every true case of clinical mastitis. This is something to be expected. Not all warning messages mean trouble. Be aware that some farmers are convinced that the technology is 100% accurate and so, every warning message means that something must be treated.

ADMINISTRATION OF TREATMENTS

It's easy to administer treatments, such as an intramammary tube, in the parlour. With robotic systems, you must find the cow, bring her somewhere to administer treatments safely for the cow and operator. All this takes time. Some set-ups have a separate crush; others treat in the cubicles which is not very safe or hygienic. Some treat cows in the robot, but this can be dangerous as there is a risk of getting injured, especially from cow kicks. Frequency of treatment is a consideration and once a day is preferable to twice daily as it reduces stress on the cow and is less work for the staff.

IDLE TIME

Idle time is when the robot is available for milking but not used. You should aim for a minimum of 15% idle time. This will maximise throughput and yield. Think of a busy bar at a football match. There is so much queuing and barging that

Figure 7: You should see robots empty at various times throughout the day.

it is difficult to get to the front of the bar to be served. You might even give up trying to get a drink altogether. The same if you try to have low idle times.

If there is adequate idle time, cows will be milked more frequently as there is less queuing, they will have lower cell counts and lower levels of clinical mastitis. One robot farm with a 5% idle time, dried off three cows from a batch of 50. The following day the volume of the milk from the remaining 47 remained the same, ie. milk per cow increased due to increased visits and so robots were inefficient when overstocked. This shows the importance of idle time. Low idle times increase the risk of clinical mastitis as there will be a higher stocking density. The quiet milking times are often around 2am to 4am when cows are more relaxed. You should see robots empty at various times.

Robots are expensive and every farmer is keen to maximise return on investment. However, the robot cannot milk 24 hours a day. They are washed three times a day. The wash cycle length caries according to the manufacturer, some take 12 minutes while others take longer. After milking cows with mastitis, there is a long period of cluster rinsing to ensure that no antibiotic residues enter the bulk tank. High levels of clinical mastitis reduce idle time.

FITTING ROBOTS IN TO EXISTING FACILITIES

Cow flow and environmental management is key to success. Some people try and squeeze robots into existing facilities without fully considering the true impact of cow flow and acceptance.

Cow flow is critical. For free-access robots, where cows can walk straight into the robot whenever they want, you need a five-metre area around the robot. If you have two robots side by side, this needs to be seven metres. You need to carefully consider if you can fit robots into existing facilities. There have been disaster cases where this has occurred, but also great successes when properly designed. Probably the best units are well-designed, green-field sites. The importance of farmers visiting as many robotic farms before finalising plans for a new unit, is to be encouraged. Designs can always be improved.

LABOUR INPUT

Robots do not necessarily reduce labour input; people just work differently. With robots, you have to fetch cows for treatment, carry out lots of checks as you don't see cows in the parlour twice a day. You have to work with the computer to find out where potential problems lie. You need high levels of stockmanship and people who understand the robot's computer.

It does change the way you work and the environment is very quiet and relaxed. You don't have to stick to a strict timetable and if there are problems, the robot will alert your phone.

MILK YIELD

You need to feed cows well to make robots perform to their best. A key performance indicator (KPI) is to aim for at least three milkings per day by day 21 post-calving. Lactation yield will reduce if you don't achieve this. It's interesting that in many early lactation animals, especially heifers, are milked between four and six times a day and they time their visits so that they are not rejected. Robots will reject cows that were milked very recently. This is another reason why you need adequate idle time.

ECONOMICS

It costs more to milk through a robot than a conventional system. Everyone agrees on this, you are buying a lifestyle choice. However, well-managed systems use the time they free up from milking in a conventional parlour to improve management and so increase yield and productivity. As a result, these systems can be more profitable and far more enjoyable places to work.