Robotic Milking Systems

Part 1: Overview of RMS

January 2022

Robotic milking systems [RMS] (also referred to as Automatic Milking Systems or Voluntary Milking Systems) were developed in Europe in 1992 to address labor issues on dairy farms. This technology was introduced to the U.S. in 2000, and initial uptake was slow, however, with the current labor costs and shortages adoption has become much more rapid. Robotic milking is a voluntary milking system (VMS) that gives individual cows the freedom to enter the milking unit at their discretion. Cows are drawn to the system by the feed provided during milking, and the relief of the milking process. The most common manufacturers of these systems are Lely, DeLaval, GEA, Galaxy, and Boumatic, although we do not endorse any one system.

Benefits and Challenges

There are many benefits to the robotic-milking systems.

- Decreased pressures of labor
- Increased flexibility of time
- Less cow handling
- More consistent milking / less procedural drift
- Increased milking frequency and milk production in many cases

While robots can easily benefit farms, it is worth considering the potential downsides.

- Difficulty accessing technically trained labor
- On call 24/7 via smartphone in case of breakdowns
- Fetching cows and training heifers can be difficult and time consuming
- Cows may not acclimate to the robot due to hairy udders, teat color, teat locations, udder height, cow size, or disposition.
- Cost of repairs and the need for technical knowledge to make the repairs

Just like with any system there will be pros and cons. It is recommended that the farm do their due diligence to ensure that an RMS will work for them.

RMS Milking Process

Although rotary robotic milking does exist, most automatic milking systems are individual or tandem box stall arrangements and therefore will be what is referred to throughout this fact sheet series. Robotic milking systems work differently than conventional milking systems. As is currently standard with many conventional systems, cows are equipped with a remote radio sensing collar. This collar is the cow's digital identification and helps the robot keep track of the animal's data as well as determine whether or not she is eligible to be milked.

Once the cow enters the RMS stall, she is typically fed small amounts of grain at short intervals to keep her standing. This may not be the case on some farms, as feed is controlled by management choices, nutritionist recommendations, and individual cow stage of lactation. The robot arm will clean and stimulate the cow's teats and proceed to attach the teat cups.

The robot will remove the cup from each quarter as it milks out. After all quarters are completed, the robot will post-dip the cow's teats

with a protective disinfecting solution and open the front gate to release her from the stall.

After each milking the machine will backflush the cups. Two to three times each day the machine will automatically enter a full wash cycle of the milking system. These washes are scheduled by the farm during the initial setup. Additionally, it is advisable that the RMS be serviced and cleaned at least once each day, and to do this simultaneously with the wash cycle to minimize unit downtime. Cleaning should consist of washing down manure from the unit, rising the outside of the teat cups, and washing the milk separation buckets if utilized.

Making the Choice

When considering changing from a conventional milking system, or semi-automated system to robotic milking it is important to first think though all the changes that will need to be made to fit a more automated operation. Many farms fail to evaluate how the milking system will change their management style. The introduction of an automated system removes the opportunity for the farmer to look at each cow multiple times daily as she is milked. This will require a paradigm shift by managers to learn to effectively utilize data collected by the robot on each cow to identify any possible issues.

Another aspect to consider is if the herd is confined to the facility or allowed to graze. Grazing herds will require extra training and attention from management to ensure the robot operates at the ideal efficiency for economic return.

Reasons producers decided to transition to robotic systems:

- Time flexibility and improved lifestyle
- Human health reasons
- Labor management
- Enjoy farming but dislike the monotony of milking
- Better for cow health
- Prefer to manage equipment rather than people
- Affords more time for other areas of the farm

Economics

With the advent of $15/hr. minimum wage, an RMS will have a payback of 5-7 years based on labor costs alone. Of the three main milking systems – parlor, pipeline, or RMS – RMS's tend to have the lowest total cost of ownership. Some of this may be a function of the self-diagnostics in the RMS programming. It alerts the operator to service issues when it is an inexpensive repair versus waiting until it becomes a more costly issue. Add to this any lost production due to delays or poor performance.

RMSs in sand bedded herds do require more repairs and maintenance than sawdust or straw bedded herds due to sand's abrasive nature. However, this only amounts to an average of $250/RMS/year. If the RMS is servicing 55-60 cows and milk is $15/cwt, this only requires a 0.1 lb./cow/day increase to break even. Many herds have seen an 8-10 lb. increase after switching to sand.

Be realistic on cash flow planning. It often happens that cash flow will be tight the first few years after installing a RMS.

FACT SHEET SERIES: Robotic Milking Systems

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