

# Time for Technology

## Automation in Feeding

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In my travels, particularly in Europe, it is becoming very clear that dairy farm automation and precision technologies are reshaping the way milk is produced. New technologies like robotic milking offer big opportunities for labour saving and also for more precise and more cow friendly application of management. Occasionally there can also be savings in capital cost in other areas of the business. Choosing the right technology from the options available today is difficult enough, but the best managers will also want to position themselves to take advantage of what is yet to come.

When it comes to automation in feeding and feed handling, each of the emerging technologies being marketed now have something to offer, but none appear to be the final answer. If the goal is simply to take the labour out of what we do today, there are several technologies that take major steps in that direction. Lely has recently introduced the Juneau, a battery powered robot that follows a predefined path around the barn to push up feed at the sweep in manger. On strictly labour saving, if you feed once per day and push up three times, this device might save you 10 minutes at evening chores and two fifteen minute trips to the barn for a noon and late night check. Forty minutes less chores per day at \$15 per hour is worth \$3600 per year. With that kind of return, if the robotic feed pusher costs \$25,000, or \$20,000 more than the lawn tractor you use now, it appears to be a reasonable investment. Pushing up feed more frequently should also stimulate more frequent eating, higher feed intake and perhaps higher milk production. Sceptics will point out that these trips to the barn are also valuable for other reasons, but if the budget includes pedometry for heat detection and a camera for general observation it would appear that the traditional late night barn check can be eliminated.

Several companies such as Rovibec, DeLaval, Mullerup and Pellon have harnessed computers and electronics in combination with stationary mixers and belt feeders or track mounted TMR mixers to mix and deliver TMR. These companies claim they offer “fresh feed” several times per day, and when tower silos are used, they achieve it by using electronics to open and close sealed silo doors, and lower and turn unloaders on and off. Except for taking out the silo doors and monitoring the system it appears that the job of feeding from tower silos can be fully automated. Unloading feed on demand from a bunker silo is much more challenging. Most



systems start with the dairyman removing silage from a packed, air tight bunker twice a week and dumping it loose in a bin, which then feeds the automated delivery system. While these systems feed several times a day, it is only fresh twice a week, and especially in hot weather, spoilage of ensiled feeds is a major problem. A European company called Trioliet has a track mounted TMR mixer and a “feed kitchen” that the operator fills once per

week with blocks of silage cut from the bunker. The kitchen has a computer controlled travelling cutter and a feed transport belt with load cells. The cutter cuts a thin layer off each block which is weighed into the TMR mixer using the combined weight on the belt and in the mixer. Bin ingredients are added on the belt by automated augers, and liquids by automated pumps. The mix is unloaded at pre-programmed points along the track. In terms of commercially available feeding automation this is the most sophisticated system I have seen. Proponents of these systems claim cost savings in barn construction because the feed alley can be much narrower when a track feeder replaces a truck or trailer mounted mixer. On the down side it is more difficult to feed in more than one barn or from feed storages in different locations with these track mounted systems.

At the 2008 EuroTier show the Dutch company Schuitemaker introduced a totally different approach. Their “Innovado” is a robotically operated self propelled TMR mixer. The unit I saw had a 3 cubic meter capacity vertical mixer and was powered by a 65 horse power combustion

engine that drives a variety of hydraulic and electric components. It uses buried transponders and a scanning system to follow programmed pathways from the bunker silos to the drive through feed alleys, driving at a maximum speed of 6 km per hour. In the bunkers, the scanners define the face and



direct the machine to a good cutting position. A face cutter with scales cuts the required amount of each ingredient. Wet by-products are loaded with a platform adaptor on the cutter. Wireless control of augers, doors, unloaders, pumps and valves are used to load product from

bins, upright silos and liquid tanks. The system can open and close doors and has a feed pusher that can push up feed or push away leftovers. It also has a manual back up capability so it can be operated as a normal self loading TMR mixer when there are problems. This system looks the most promising, since it offers greater flexibility for where feed is stored and delivered than track or belt systems, ensiled feeds are undisturbed right up to feeding time, it can push up and push out leftovers, and there is manual back up.

But when all is said and done, automated feeding should offer us more than just labour saving. In an ideal application it should also offer the capability to feed cows more precisely according to their requirements. Computer feeders are able to do this with grain, but the benefits of TMR for rumen health are well known, so we really need a system that can offer each cow free choice access to a TMR ration formulated precisely to meet its requirements. Track feeders can do this in tiestall barns today, and for freestalls, such systems are in development now, and will likely be commercially available in the next two years.

So what will the dairy barn with automated feeding look like in the future? Ironically, as illustrated here, feeding automation seems to be easiest to achieve with tower silos and tiestall barns. In the freestall barn, things are, as yet, unclear. The barn of the future might include a robotic mobile mixer and full width drive through feeding or a narrow alley serviced by a track feeder, or no feed alley at all and feeding stations that deliver cow specific TMR computer feeder style. While the barn we design today should focus on providing cow comfort and labour efficiency using the technology we have now, being aware of what technologies are on the horizon can be helpful in ensuring it works well in the future. Unfortunately, when it comes to feeding automation, which technologies will win out, is not very easy to pin down.