



Researching robotics

Two interesting debates at the moment are over once-a-day milking, and whether automated milking systems (AMS) will have a place in New Zealand dairyfarming.

The challenge for *Dexcel* is joining these concepts to drive down farm labour costs. And it starts now, with the arrival of a \$300,000 *Fullwood Merlin* AMS at Ruakura No. 1 dairy.

But why once-a-day milking, when the average European cow in an automated milking system is milked 3 times a day?

The typical AMS milks a herd of about 40 cows, which each present themselves for milking on average 3.4 times in 24 hours; i.e., 140 cow milkings every 24 hours. NZ herds are much bigger, so we start with the proposition that we can milk 140 different cows once a day with the same AMS here.

Meal inducement

European cows on AMS systems are for the most part stall-housed. Milking is a 'background' activity, with cows individually entering the AMS in their own time. There is some inducement, like a measure of meal delivered automatically by the machine to the newcomer.

The NZ commercial dairy is vastly different. Cows walk long distances, up to a couple of kilometres. Milkings are comparatively short spells of intense activity. We term this 'batch milking' and New Zealanders are the best in the world at it: 5 seconds to get a

set of cups on, even less to get them off.

To make our AMS work, we have to turn the system around completely, so that our milkings become a background activity associated with pastoral grazing, with a minimum of human supervision. Much will rely on the cows each making the walk independently or in small groups, from the paddocks to the AMS site.

Re-engineering

We know cows happily walk long distances from the farm dairy back to the paddock after milking. All we have to do is get them to go the other way . . .

No one ever said our task would be easy. So we are re-engineering the farm layout and its systems from the ground up.

We start with 20 cows and the AMS, housed in the old *National Dairy Laboratory* building at Ruakura. We hope to learn enough to upscale the AMS trial to many more cows, possibly on a green-field site designed from scratch. We have on our team an animal behavioural scientist, Dr **Jenny Jago**, and **Peter Copeman** was senior technician at No. 1 dairy for many years in trials involving milking and cow movement.

Our main challenges in moving from 'batch milking' to 'distributed milking' are continuous cow flow over long distances, and milking over a 24-hour period from pasture.

Initially, we have funding for 2 years. Part of this is from *AgMardt* and guardian of this investment is a farmer group, the *Waikato*

Automatic Milking Group, with chairman **Tony Wilding** and secretary **John Dawson**. The group is a valuable forum for the scientists in the project, providing farmer comments and ideas. *Dexcel* has matched the *AgMardt* funding.

We have strong backing from *Sensortec*, a joint venture of *DEC International NZ Ltd* at Hamilton and *Fullwood Packo NV* of Belgium. *Sensortec* aims to develop sensor technology as used in the *Fullwood Merlin* AMS and in on-line detection of milk components. *Dexcel* and *DEC* have a research agreement on the milking robot.

The considerable resource invested in the project shows we are serious in our aim of extending automation in the dairy industry right back to the start of the process, milking.

The comment has been made that the industries which are most

What we don't want is an AMS on a rotary platform. That would be perpetuating batch milking.

successful in commodities are those which drive out labour costs. The dairy industry is no different; its viability will be improved. Denmark, for example, will milk a third of its cows with robotic milkers within 5 years.

There are some strong advocates for once-a-day milking in New Zealand, among them Prof **Colin Holmes** of *Massey University*, Peter Copeman and myself. Once-a-day by itself has the potential to significantly lower milk harvesting costs.

Capital costings

At first glance, the AMS appears a high capital cost system. But, working through the issues, we find points of interest. We don't need the big building, the pipework and other infrastructure associated with a large conven-

To make our AMS work, we have to turn the system around, so that milkings become a background activity associated with pastoral grazing, with a minimum of human supervision.

tional farm dairy. The power costs may be lower with smaller vacuum and milk pumps.

What we don't want as a first approach is an AMS on a rotary platform. That would be perpetuating batch milking. We need to look at the opportunities for distributed milking.

The AMS is coming into its own in the northern hemisphere, with robotic milkers offered by 7 major manufacturers, including *De Laval*, *Lely*, *Fullwood*, *Westfalia*, *Gascoigne Mellot*. There are some 1000 AMS installations worldwide.

When I attended a world AMS conference in 1992, the challenge was attaching the cups accurately and quickly. Technology has met that challenge and many others, with computer mapping and storage of each cow's teat placement so that the robotic arm knows exactly where to put the cups once the machine has electronically identified the cow. When I attended the most recent AMS conference at Lelystad, Netherlands, topics discussed were the peripheral issues like teat cleaning, hygiene, animal health and welfare.

The mechanics of AMS milking have been sorted out to make robotic milking practicable in a northern hemisphere dairy system.

The *European Union* is funding a robotic milking project this year with several countries involved. We hope to have linkages between our work at Ruakura and the EU studies. **D**

FOR ALL YOUR IRRIGATION NEEDS

call us first



BOSCH IRRIGATION LTD
Freephone 0800 500 424

36-38 Porowini Avenue, Whangarei
Ph 09-438 2949 Fax 09-438 5099
S.I. Sales Engineer Ph 025-985 343

Sales Engineer now resident in the South Island