FUTUREDAIRY information sheet

# Automatic Milking

## Labour audit findings

by Kendra Kerrisk

In 2007, the FutureDairy team conducted labour audits and social research interviews on the DeLaval automatic milking system at Camden and at the Warren's commercial automatic dairy in Gippsland.

### Labour benefits

The study identified labour-related benefits associated with an AMS including:

- fewer, and more flexible hours spent on milking-related tasks,
- potential occupational health and safety benefits,
- less tedious tasks.

On the flip side, an automatic milking system operates 24-hours a day so a staff-member needs to be on-call all day and night.In reality, this is a minor inconvenience in an automatic milking system that is running smoothly. Staff at both dairies reported they'd prefer to be on-call at night than have to get up early each morning to milk in a conventional dairy.

### Shorter, more flexible hours

At Camden and the Warrens, the working day is much shorter than on a conventional dairy. In fact, it's close to normal business hours, generally starting between 7:30am and 8:30am and finishing around 4:00pm to 5:00pm. On average, about 2¼ hours are spent on milking-related tasks. Weekends are a little less than 2 hours a day and week days up to 2½ hours.

The labour audit defined milking-related tasks as all activities carried out on commercial farms in relation to milking, from fetching cows to cleaning up after milking and closing cows in the paddock (see box).

Paddock work, such as setting up temporary electric fences is a major component of the milking related tasks, taking on average 45 minutes a day.

Time spent training heifers was included in the audit but not included in the average times above.

### Milking-related tasks

- fetching any cows that didn't voluntarily move out of a pasture break
- setting up temporary fences for new pasture breaks
- hosing yards
- changing filter socks
- monitoring reports for animal alerts, system performance and machine performance alerts
- detecting and treating cows with mastitis
- changing computer settings for cows (eg which cows should be auto-drafted)
- attending any cows with any milking associated problems such as poor cup attachment
- refilling teat spray and chemical drums for auto-washing systems
- herd testing
- attending any alarms.

This is because training inexperienced animals varies greatly, depending on the approach taken. The FutureDairy team is developing a training regime that involves very little labour.

At Camden, office-related tasks average about 15 minutes a day. This includes monitoring reports and adjusting computer settings for the milking units.

While it doesn't involve a large amount of time, this more technical task provides a change from the physical, out-door duties plus the opportunity for staff to develop new skills.

An automated milking system involves less physical contact with cows. This brings potential occupational health and safety benefits, such as reduced risk of injury and illness.

### Call outs

An automatic milking system uses a system of alarms and callouts to alert staff to problems. 'Stop alarms' are

those that require attention from staff before a particular machine can continue to milk cows.

The Camden 2-unit automatic milking system averages about 4½ stop alarms a week. Of these about 3½ occur after hours, and the rest during working hours.

More than half the alarms can be dealt with from home by dialling up the robot computer and running a self-test prior to restating the machine. Only about 2% of alarms require the callout of a service technician.

### Conclusion

The labour audit findings suggest an automatic milking system has the potential to create a more sustainable working environment in terms of labour and lifestyle. This could assist in recruiting and retaining staff.

## What's the difference?

FutureDairy's labour audit identified main changes in the nature of work involved with automatic milking system, compared to a conventional dairy. The tasks that remained basically the same included:

- pasture management
- feeding out
- fencing
- calving
- irrigation
- accounting.

However, some tasks are quite different for an automatic milking system. These are outlined below.

### Milking

Milking in an automatic milking system is vastly different because there's no hands-on milking task. Milking has become a background operation and has no start and finish times.

It involves new tasks that are not needed in a conventional dairy such as removing hair from udders, generating new teat co-ordinates for cows that have less than ideal milking cup attachment ease and attending to alarms. Hair removal happens in some conventional dairies but it is essential in an automatic milking system for easy teat location by lasers and maximum milking efficiency.

### Cleaning

Cleaning milking equipment and hosing down an automatic milking system is quite different to a conventional dairy.

In a conventional dairy a complete hosing down occurs twice each day and the time taken depends on the shed design, wash down system and water pressure. Milking cups need to be cleaned individually if they are soiled during a milking.

In an automatic milking system, the machines are self cleaning, but the machines and yards still need to be hosed down when they become very soiled. This is often done when there are not many cows present at the shed. So the timing can be variable.

Also, making sure that the camera and lasers are clean is a job that has to be done several times a day (usually in passing). This can make the difference between being called out at night, or not.

### Milking machine maintenance

The maintenance program for the milking plant in an automatic milking system is much stricter than in a conventional dairy. Liners have to be changed every 14-20 days, depending on machine utilisation levels. In a conventional system liners are only replaced every five months or so. Both systems involve replacing liners at 2,500 milkings but an automatic milking unit does more milkings per set of cups each day.

Because the automatic milking system has fewer milking units, tasks such as changing liners are quick and can easily be fitted into a normal work day. For example at Camden it takes less than 20 minutes to change the liners for the two units, or 40 minutes when the milk tubes are also due to be changed.

This is different in a conventional dairy where the large number of units often means a half or whole day has to be set aside just to complete one maintenance task such as changing rubbers.

### Monitoring and recording

An automatic milking system generates high quality electronic records of cow visits and milk production. Monitoring these records accounts for about 15 minutes each morning. Because milking occurs throughout the evening and night without observation, staff check summary reports of overnight milkings and deviations every morning. At the same time, any cows requiring attention are set for auto-drafting or for an alert to be sent to staff via mobile phone.

## Automatic milking in a pasture system

There are two keys to operating an automatic milking system efficiently – voluntary cow movement and distributed milkings.

**Voluntary cow movement:** Cows must move from the paddock to the dairy and back again on their own. We refer to this as 'voluntary movement'. The benefits of an automatic milking system are lost if cows have to be fetched from the paddock regularly. There's no point in replacing the labour needed in the dairy with labour needed to fetch cows.

**Distributed milking:** In a conventional system, milking occurs in two or three concentrated 'milking times' such as morning and afternoon.

To operate efficiently, an automatic milking system needs to be used fairly continuously, with a steady trickle of cows visiting the dairy. Milking must be spread or 'distributed' evenly throughout the 24 hour period. We refer to this as 'distributed milking'.

**Incentives:** The need for voluntary cow movement and distributed milkings creates a very different approach to managing the whole farming system with an automatic milking system.

Cows do not respond to udder fill or pressure as a motivation to be milked. They will come to the dairy in the search for feed, water, shade, shelter or herd mates.

A key to the automatic milking system is the use of incentives to motivate cows to move around the system: from paddock to dairy and back to paddock again, which in turn generates the opportunity for milking.

### Herd testing

In a conventional dairy, herd testing usually involves quite an effort by workers to collect a sample from each cow, once each month. In an automatic milking system this process is automated, saving considerable time. Each herd test requires about 35 minutes attention.

### Fetching cows

The task of bringing in the cows differs on each farm. Typically in a conventional system there is a need to assist with bringing the whole herd in for milking, and returning them to new pasture (or a night paddock in evening), twice each day.

In an automatic milking system, most cows will voluntarily go to the milking unit and back to the paddock. Incentives such as the strategic location of supplementary feed can be used to encourage cows to move around the system.

Most automatic milking systems involve some fetching. For example, each morning and afternoon, those cows that have not yet been up to the dairy, or cows selected for treatments are fetched from pasture paddocks. This is usually when fences and water sources are moved and cows are observed for heat.

The number of cows to be fetched varies with the system and the incentives in place. Sometimes there'll be none to fetch. An increased proportion of cows need fetching when a large proportion of the diet is pasture and/or a large proportion of the herd is in late lactation. Increasing the number of pasture breaks from two to three a day is likely to reduce the number of cows needing to be fetched.

### Pasture allocation is more critical

Managing pastures is different on each farm and there are no common differences that depend on the milking system.

Pasture allocation tasks are the same in conventional and automatic milking systems. But it is much more critical in an automatic milking system because pasture allocation as an important incentive in encouraging cows to move around the system.

Therefore pasture allocation requires more attention than in a conventional system. The effects of getting it wrong are greater than just affecting pasture utilisation rates. It also affects cow traffic, milking frequency and production.

### Animal health management

Animal health treatment in an automatic milking system presents different challenges than in a conventional setting. With an automatic milking system, treatment is often spread through the day whereas its more likely to be done in a single block of time on a conventional dairy farm. In a conventional setting when all cows require treatment (e.g. drenching) they can be held after milking and treated all at once or treated during the milking process.

Due to the voluntary milking in the automatic system, treatments have to be spread over the day, perhaps being done in three or four batches. Some cows may not

come up during workday hours, and so will have to be fetched.

When individual treatments are needed the machine can be set to hold a cow or to automatically draft her. Handling an outbreak of mastitis can require an increase in work with fetching cows etc.

The extra effort required is offset by the flexibility of being able to spend short periods doing a smaller number of treatments and 'fit in' with the daily routines.

### *Reproductive management*

Detecting cows on heat is ***not*** more challenging with an automatic milking system than a conventional set up. Heat detection is generally carried out during morning and afternoon fetching times.

Cows identified can be set for autodrafting by the machine to a holding yard for insemination or treatment.

A progesterone priming (synchrony program) requires more work since the cows need to be injected at certain hours, and will have to be brought into the dairy. It also tends to be very disruptive to individual cow routines.

Pregnancy testing cows can be more cumbersome in an automatic milking system. At Camden we tend to book the vet for the afternoon to allow cows to be autodrafted all morning. This ensures that cows required for the vet inspection are on hand. It will depend a bit on how-easy going the vet is and how urgently the pregnancy test results are needed.

When it comes to running the bulls with the cows the options include training bulls to go through the system or turning them back at the smart gates. Essentially the bulls self-train themselves to move around the farm system by following the cows. Natural mating has been successfully incorporated into an automated milking system on a New Zealand research farm.

## *For more information*

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## About FutureDairy

FutureDairy aims to help Australia's dairy farmers manage the challenges they are likely to face during the next 20 years. The challenges are expected to be related to the availability and cost of land, water and labour; and the associated lifestyle issues.

Our activities are structured around two priority areas – Precision farming (including automatic milking and innovations) and Feedbase (forages and feeding). These are the areas where there are opportunities to address the challenges related to water, land and labour resources.

For Precision Farming we are investigating technologies with potential to improve farm productivity, efficiency, labour management or lifestyle. FutureDairy is pioneering the development of pasture-based farming systems that use robotic milking for larger herds. Our research is conducted at Australia's first automatic milking system (AMS) research farm, at the NSW Department of Primary Industries' Elizabeth Macarthur Agricultural Institute at Camden. From mid-2009 we will be testing a new concept automatic milking system designed specifically for Australian conditions, while continuing to further develop the farming system around the milk harvesting equipment.

Our Feedbase goal is to develop sustainable dairying systems for the future, with the intensification of home-grown feed to enable more efficient use of land, water and grain. Our trials are being conducted at the University of Sydney's Corstorphine dairy farm and Mayfarm. The investigation is complemented with modelling and component field research in areas of forage production and utilisation.

We are investigating a complementary forage system (CFS) that involves triple cropping on 35% of the farm area and growing pasture on the remaining 65%. Our target is to produce more than 25t DM/ha/y rover the whole farm area, in a sustainable way. The three crops include:

- a bulk crop (eg maize);
- a legume for nitrogen fixation (eg clover); and
- a forage to provide a pest/disease break and to improve soil aeration (eg a brassica).

FutureDairy is now in its second phase. During the first phase, we used existing technology for automatic milking to test the feasibility of robotic milking in a pasture based system. The promising results paved the way for testing a new prototype AAMS with a larger herd during phase 2.

In the first phase, our Feedbase studies tested the feasibility of a complementary forage rotation grown on a small area, both under research and commercial conditions. Phase 1 combined technical research with social research and extension research. During phase 2 we are drawing upon that learning experience to improve our linkages with major extension groups.

### Contact us

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