



# Cow movement in an AMS

by Kendra Kerrisk and Juan Molfino

There are two options for managing cow movement to the dairy in an automatic milking system (AMS):

- Voluntary cow movement (controlled or free).
- Batch milking.

Most Australian, pasture-based AMS use controlled voluntary cow movement, where the cows move from the paddock to the dairy and back again on their own. Smart gates are programmed to direct cows to different parts of the farm, depending when they were last milked and other criteria set by the manager. One-gates ensure cows continue to progress through the system rather than back track.

Controlled voluntary cow movement is a flexible option in terms of labour and lifestyle because milking can occur any time of the day or night without human involvement.

However it relies on accurate allocation of pasture and supplementary feed to achieve high levels of milking unit utilisation and evenly distributed milkings across a 24 hour period. For more information about voluntary cow milking, refer to FutureDairy's Information Sheet titled *Voluntary cow movement in automatic milking systems*.

This information sheet focusses on AMS managed with free voluntary cow movement and batch milking.

## Free cow movement

Free cow movement is very similar to controlled cow movement except that cows are not restricted or directed by gates. Cows are free to move in any path between milking, feeding and loafing without restriction.

To date there are no known pasture-based free cow traffic installations but this type of cow traffic is often used in systems where cows are housed indoors for all or most of the year.

### Farm layout

The farm layout can be relatively simple because the cows are housed indoors.

With a barn-style AMS and free cow movement it is useful to have a waiting yard with an automatic releasing gate in close proximity to at least one of the milking stations. This can be programmed to give fetched cows priority when they are encouraged to the milking stations and then

### ***Situations suited to free cow movement***

Free cow movement is likely to suit farmers who:

- Are prepared to operate an indoor system feeding a PMR or TMR.
- Want maximum flexibility for labour.
- Want to allow cows the complete freedom of truly 'choosing' when they will be milked, as opposed to cows being drafted for milking as they move between areas of the barn.
- Want to minimise infrastructure costs.
- Are happy to fetch cows that choose not to milk themselves within targeted intervals.

to re-open allowing the rest of the herd to access that milking station without human intervention.

### ***Labour and daily routine***

An AMS with free cow movement offers very flexible working hours.

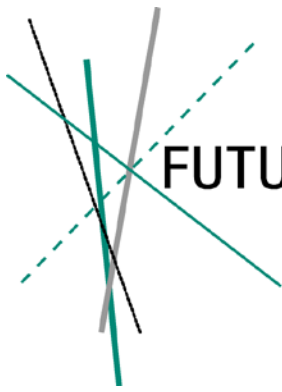
Cows that haven't volunteered for milking need to be fetched two or three times each day. These are most typically stale cows or inexperienced heifers.

The daily routine involves bringing fresh feed to the cows once or twice a day. At the feedpad, feed needs to be pushed up within reach of the cows regularly, to minimise wastage and ensure the feed is available throughout the 24 hour period.

### ***Australian example***

John and Andrea Henry dairy at Pyree, near Nowra, NSW. Their AMS involves two milking robots, with free cow movement. The 130-cow herd has free access to the feedpad, robots and indoor and outdoor loafing areas. Cows are fed a partial mixed ration plus home-grown forage which is cut and carried to the barn.

The Henry's main business is forage contracting. Automatic milking enabled them to re-enter dairying without compromising the rest of their operations. They chose free cow movement because it is both simple and cow friendly.



# FUTUREDAIRY information sheet

## Batch milking

With a batch milking system, cows are fetched to the dairy for defined milking sessions. To reduce the amount of time cows spend waiting at the dairy, the herd is split into several milking groups.

There has been increasing interest in batch milking with the commercialisation of the robotic rotary which is designed to handle both batch and voluntary cow traffic. There is also a commercial Australian AMS operating with batch milking.

In a pasture-based system with batch milking, cows may be fetched for milking manually or automatic gates can be programmed to open at the scheduled times for cows to move to the dairy. If automatic gates are used, the farmer will probably need to check the paddock and fetch any cows that haven't moved to the dairy.

Cows may be left at the dairy to move voluntarily through the milking units and back to their designated paddock. Depending on the farm layout, the farmer may need to make sure all cows within a group have returned to pasture and close the gate before bringing in the next milking group. Drafted cows should be attended to in time to return to their group before the next group is brought to the dairy.

### Farm layout and infrastructure

Compared with voluntary cow movement, batch milking may require less infrastructure in terms of laneways and gates.

A drafting gate at the dairy entry may not be needed. It is handy to have drafting gate at the post milking area so that cows can be retained for treatment, AI, sending down the laneway to their next paddock or swapping into another milking group.

### Labour and daily routine

Batch milking requires human involvement regularly throughout the day, although this is for relatively short blocks of time.

This means batch milking loses some of the benefits of labour flexibility that are achieved with voluntary cow movement. However, batch milking does have the advantage that there is no need for someone to be on call during the night for alerts (if the robots are not operating).

Let's look at an example farm with four robots and 200 cows. For batch milking the herd would be split into three mobs plus the dump cows. Herd A has the fresh cows which are milked three times a day. Herd B has the mid-lactation cows which are milked twice a day and herd C

## Situations suited to batch milking

Batch milking is likely to suit farmers who:

- Do not want to be on call 24 hours a day as is the case with voluntary cow movement.
- May be uncomfortable with the concept of voluntary cow movement.
- Want absolute control over milking frequency of individual cows.
- May be daunted by the need for highly accurate pasture allocation.
- Wish to manage different groups of cows within the herd with different feeding regimes.
- Have labour available or semi-automatic systems to fetch cows (batch milking probably doesn't save much time over conventional milking but it is less strenuous than standing in the milking shed putting on cups).

has late lactation cows which are milked once a day.

The farmer has the flexibility to decide which cows get milked when (see example daily routine below). For example the dump cows may be milked between mobs so the farmer can stay in attendance to perform treatments etc. The bonus of this is that a system wash can be done when the dump cows are finished milking. This minimises water and chemical use compared with voluntary cow movement where a system wash is needed after each dump cow is milked. It is not essential to manage dump cows as a separate group. The alternative is to run them with normal groups but they will need to be drafted for treatment and this should be done prior to the next group coming to the dairy.

Example daily routine for AMS batch milked herd	
Time	Task
4:00am	Fetch herd A + open up return paddock
6:00am	Fetch herd B + open up return paddock
8:00am	Fetch herd C + open up return paddock
10:30am	Fetch dump cows, treat and initiate system wash
12:00	Fetch herd A + open up return paddock
2:00pm	Fetch herd B + open up return paddock
4:00pm	Fetch and treat dump cows, system wash, hose out, prepare for next morning
8:00pm	Fetch herd A + open up return paddock

### Australian example

Lindsay and Jacinta Andersen and family batch milk about 240 mainly Jerseys with a double box robot on their property near Warragul in Victoria. Cows are managed in



# FUTUREDAIRY information sheet

three groups which are milked once, twice or two and a half times a day depending on milk yield. Lindsay opens the paddock gates and the cows make their way to the dairy yard. Lindsay doesn't need to stay during milking as the cows walk by themselves to the robot and make their own way back to the paddock once milked. Lindsay may shut the paddock gate before the next group is due to head to the dairy.

A major reason for the Andersons investing in AMS was to reduce reliance on employed labour and to reduce Lindsay's physical workload due to health problems. Their previous operation involved 400 cows and four employees.

Lindsay chose batch over voluntary milking to control milking frequency and to ensure the robots operate steadily during the day. He was concerned that cows would be pushed to or away from the dairy by bad weather with a voluntary system. He is happy to get up in the middle of the night to fetch a group of cows as he goes back to sleep easily. He has set up the routine so that he gets to see more of the family.

Although Lindsay himself supervises for more hours now, the batching milk AMS operation involves just Lindsay and one part time employee. The work is less physically demanding than conventional milking and a lot of the monitoring and computer work can be done remotely.

### ***Switching between batch and voluntary milking?***

It probably is possible to switch from batch to voluntary milking, but not regularly.

For example, some farmers may choose to batch milk initially as a stepping stone to voluntary milking. Or, in a seasonal calving herd, a farmer may choose to batch milk for a short period at the start of calving.

Beware! If you batch milk for a long period the cows will probably take several months to adjust back to voluntary movement. The cows need to learn to start behaving as individuals rather than batching themselves and this can be quite challenging. If nothing else changes in the routine it can take time to break established habits.

If shifting from batch milking to voluntary, additional laneways and drafting gates may be needed as voluntary cow movement is most successful if the farm layout is set up for 3-way grazing.

### ***For more information***

Dr Kendra Kerrisk  
FutureDairy project leader  
ph 0428 101 372  
email [kendrad@sydney.edu.au](mailto:kendrad@sydney.edu.au)

## **About FutureDairy**

FutureDairy is an R&D program to help Australian dairy farmers manage the challenges they are likely to face during the next 20 years.

As one of the big challenges is the availability of labour and the associated lifestyle issues, FutureDairy's focus is on automatic milking systems, or 'robotic milking'. While robotic milking technology is now in wide use overseas, there's less experience with automatic milking in grazing-based farming systems such as in Australia.

FutureDairy's research is investigating the real impact of automatic milking on labour, reproductive performance and voluntary cow traffic, especially in larger herds.

In addition, we support farmers and their advisors to adapt their farming systems to automatic milking. As well as training advisors, we develop tools and resources for farmers and provide direct support through group activities, on-line communication and individual advice when needed.

### **Sponsors**

FutureDairy is a collaborative project based at the University of Sydney's Camden campus. Sponsors include Dairy Australia, DeLaval, the University of Sydney and the Department of Primary Industries, NSW.

### **Previous work by FutureDairy**

FutureDairy started in 2004, exploring opportunities for productivity gains by substantially increasing forage and feed production and utilisation on farm and technological innovations with the potential greatest impact on farmers' lifestyle labour management.

There were two key areas of investigation: development of farming systems for automatic milking within a grazing system and development of complementary forage rotations. We explored how our findings work under commercial conditions through partner farms. This allowed us to study how technical issues are affected by 'people' issues that can make a difference between a technology being used on-farm or not.

From 2008 to 2011 FutureDairy focused on two key areas: Feedbase and Precision Farming (AMS and other technologies). A major initiative was working with DeLaval to co-develop the 'robotic rotary', an innovative automatic milking system designed for large herds and Australian dairying systems. We also developed farming systems based on complementary forages. We put our recommendations from our research to the test by working with DPI NSW to assist farmers in the Hunter Valley in implementing complementary forage systems on their farms.

### **Contact us**

Project leader

Dr Kendra Kerrisk ph 0428 101 372  
email [kendra.kerrisk@sydney.edu.au](mailto:kendra.kerrisk@sydney.edu.au)