Cow movement options with robotic milking

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KEY POINTS

ROBOT MANAGEMENT

- ✔ Different systems of cow movement
- ✔ Free movement best suited to housed cows
- ✔ Batch movement gives more control

WITH a conventional milking system, cow movement is straightforward: the herd moves to the dairy twice a day to be milked. With an automatic milking system (AMS) there are several options for cow movement to and from the dairy. In general they fall into two approaches: voluntary cow movement (controlled or free) and 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-way 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.

This article focuses on two alternative approaches: AMS managed with free voluntary cow movement and batch milking.

Free cow movement

Free cow movement is 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.

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

Free cow movement is likely to suit farmers who:

- Are prepared to operate an indoor system feeding a partial mixed ration (PMR) or total mixed ration (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.

The farm layout can be relatively simple because the cows are housed indoors and are supplied with a TMR or fresh feed is that is 'cut and carried' to the barn.

An AMS with free cow movement offers flexible working hours. Cows that ▶

Batch milking example

LINDSAY and Jacinta Anderson batch milk about 200 mainly Jerseys with a double box robot on their property near Warragul in Victoria. Cows are managed in three groups, which are milked once, twice or two-and-a-half times a day depending on milk yield.

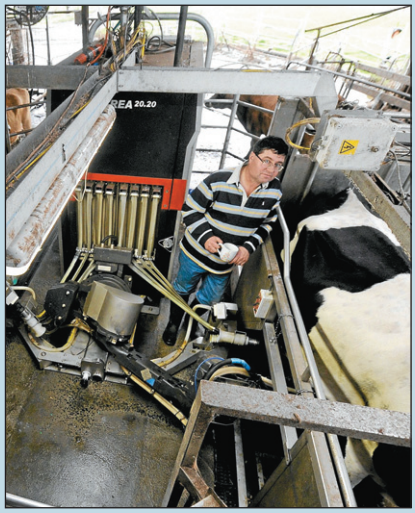
Mr Anderson opens the paddock gates and the cows make their way to the dairy yard. He doesn't need to stay during milking as the cows walk by themselves to the robot and make their own way back to the paddock once milked. Mr Anderson may shut the paddock gate before the next group is due to head to the dairy.

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

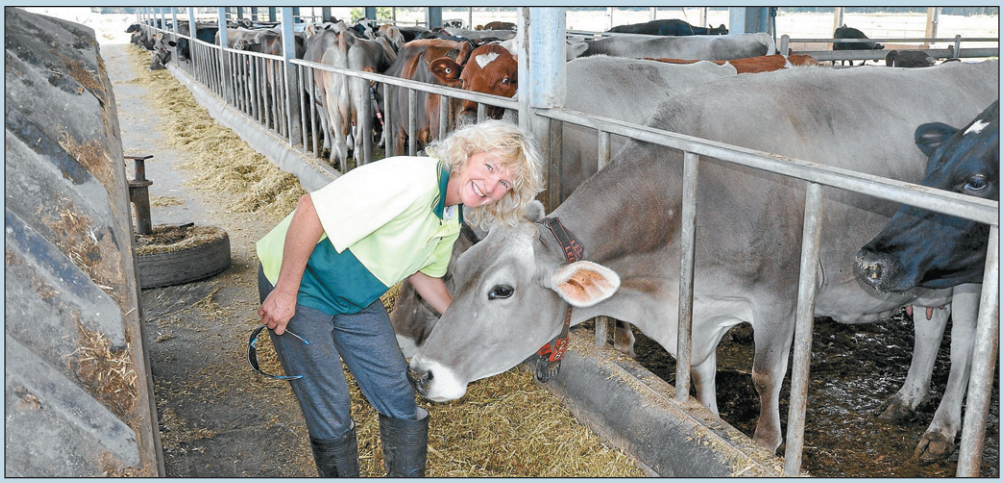
Mr Anderson chose batch over voluntary milking to control the milking frequency because he was concerned that cows would be pushed to or away from the dairy by bad weather and to ensure the robots operated steadily throughout the day.

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 Mr Anderson supervises for more hours now, the batch milk AMS operation involves just him and one part-time employee. The work is less physically demanding than conventional milking and the monitoring and computer work can often be done remotely.



Lindsay Anderson batch milks his herd through a robotic milking system. Picture by Justin McManus, *The Age*



Andrea Henry in the shed where the cows are housed at her family's 130-cow dairy farm.

Free cow movement example

JOHN and Andrea Henry dairy at Pyree, near Nowra, New South Wales. Their Automatic Milking System (AMS) involves two milking robots, with free cow movement.

The 130-cow herd has free access to the feedpad, robots and an indoor and outdoor loafing paddock.

The cows are fed a partial mixed ration plus home-grown forage, which is cut and carried to the feedpad.

The Henrys' 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 simple and cow friendly.

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 a 24-hour period.

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 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 don't voluntarily move to the dairy.

Cows may be left at the dairy to move through the milking units unassisted and back to their designated paddock. Depending on the farm layout, the farmer may need to make sure the entire mob has 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.

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

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 dump cows, hose out, treat cows and initiate system wash
8:00pm	Fetch herd A + open up return paddock

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 within the herd with different feeding regimes.
- Have labour available or semi-automatic systems to fetch cows (depending on the herd size, batch milking may not achieve dramatic labour savings over conventional milking but it is less strenuous than standing in the milking shed putting on cups).

A drafting gate at a dairy entry may not be needed. It is handy to have exit drafting gates at the post milking area so that cows can be retained for treatment, artificial insemination, sent down the laneway to their next paddock or swapped into another milking group.

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 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 at left). For example the dump cows may be milked between mobs so the farmer can stay in attendance to perform treatments.

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 alternate is to run them with normal groups but they will need to be drafted for treatment and this should be done before the next group comes to the dairy.

Switching systems

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 when only a small proportion of the herd is in milk.

If cows are batch milked for a long period they 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 three-way grazing. **D**

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