

Dairy Directions – Analysing Farm Systems for the Future

Providing robust analysis of the impact of on-farm changes and innovation on the profitability of dairy farm systems

Feasibility of automatic cluster removers in the dairy – do they pay?

What are cluster removers?

Labour is a scarce resource and there is ongoing pressure on dairy farmers to find ways to increase the efficient use of available labour. Automatic Cluster Removers (ACRs) are a common labour saving device installed on Victorian dairy farms. They are an attachment on the normal milking cluster that measures milk flow rate and when this rate falls below the set rate, the ACR removes the cluster from the cow. Despite the popularity of the installation, there is little information available on the economics of this technology.

Is this labour saving device a good investment?

A partial budget was used to determine if ACR technology was a good investment. A range of milking sheds, multiple herd sizes and levels of labour saving were analysed. An assumption was made that ACRs did not reduce milking time per cow. Savings were determined by an increase in the number of clusters operated per person, reducing the labour required in the shed at milking.

The Internal Rate of Return (IRR) was used to judge how well ACRs performed as an investment. The IRR is the weighted average of the return on capital for the ten years following installation. An IRR of less than 5% was considered to be an unattractive investment. If the IRR was between 5 and 10%, the economic benefits were still not considered to be enough to justify the capital expenditure. However, combined with intangible benefits that are of value to the owner, it may be a worthwhile investment. An IRR of greater than 10% was considered sufficient to justify the investment.



Estimated installation costs

There is substantial variation in the price of ACR units. A middle-range price of \$1,700 per cluster installed was used for this analysis. An annual maintenance cost of \$10 per year was also included. In order to realise the full labour savings in each shed, an automatic teat spray unit was also purchased, at a cost of \$6,000.

How did it look—Swing-over Herringbone?

Two swing-over shed sizes were analysed; a 15 unit and a 25 unit dairy. Each shed size was analysed with a herd size of 150 and 300 cows.

As minimal labour savings were possible in the 15 unit shed, the economics of ACRs were not attractive. The IRR of the investment was -9% when milking 150 cows and 5% with 300 cows when the full labour savings (0.1 labour unit) were achieved. A negative IRR was generated for both herd sizes when only 0.05 of a labour unit could be saved.

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In the 25 unit shed, ACRs were a good investment, when at least 150 cows were milked. If labour savings of 0.4 labour unit were used, about 300 cows were required to be milked for ACRs to be a good investment. If greater labour savings were achieved, (0.75 labour unit) then the return on investment over time was significant (Table 1).

Table 1. Assumptions and results for installation of ACRs into 'swing-over' dairy.

Results for Swing-Over Herringbone Dairy						
Dairy cluster number	15	15	15	25	25	25
Herd size (cows)	150	300	300	150	300	300
Milking time (hours)	1.5	3.0	3.0	0.9	1.8	1.8
Labour saving (labour units/year)	0.1	0.1	0.05	0.75	0.75	0.4
Years to break even (before interest)	>10	8	>10	5	2	5
IRR (%)	-9	5	-9	17	57	20

How did it look—Double-up Herringbone?

Three shed sizes were tested for the double-up herringbone, a 16 unit (8 per side), 28 unit (14 per side), and a 50 unit (25 per side) shed. The two smaller sheds were analysed with 150 and 300 cow herds, while the 50 unit dairy was analysed with 300, 400 and 600 cow herds. The level of labour savings that could be achieved was a critical factor in determining whether ACRs were a worthwhile investment.

Installation of ACRs in small sheds that can be managed by one person, such as the 16 unit 'double-up', was not an attractive investment. For ACR investment to be attractive, the 16 unit 'double-up' had to be managed by one person milking 300 cows over the entire year (IRR of 11%). When a second person was required, for even 5% of milkings per year, such as during calving or joining, then the IRR dropped to -6%. The installation with a herd of 150 cows was not an attractive investment.

When ACRs were installed in the larger sheds, it was assumed that one person could be removed from the dairy for half of the year (28 unit) or for all of the year (50 unit). ACRs were a good investment when the full labour savings were achieved. In the 28 unit shed, the returns were substantially higher for a 300 cow herd (IRR of 36%) than a 150 cow herd (IRR of 9%).

Automatic Cluster Removers in the 50 unit 'double-up' dairy were a good investment over the range in herd sizes analysed - 300 cows (IRR of 19%), 400 cows (IRR of 32%) and 600 cows (IRR of 61%). These IRR values could be obtained if one person could be removed from the dairy for the whole year. If only half the potential labour savings were



achieved, the 400 cow herd generated an IRR of 6%. Only the 600 cow herd was a good investment when half the labour savings were achieved with an IRR of 19% (Table 2).

Table 2. Assumptions and results for installation of ACRs into 'double-up' dairy.

Results for Double-Up Herringbone Dairy						
Dairy cluster number	16	28	50	50	50	50
Herd size (cows)	300	300	300	400	600	600
Milking time (hours)	3.9	2.2	1.3	1.7	2.5	2.5
Labour saving (labour units/year)	0.1	0.5	1.0	1.0	1.0	0.5
Years to break even (before interest)	6	3	5	3	2	5
IRR (%)	11	36	19	32	61	19

How did it look—Rotary?

In a rotary dairy, it was assumed that installation of ACRs could save one full labour unit over the year. For example, if it usually took three people to milk, it could now be managed with two. Under this assumption, ACR investment in a 50 unit rotary dairy, milking either 400 or 600 cows was a very attractive investment. The expected IRR for 400 and 600 cow herds were 25% and 49% respectively (Table 3).

Table 3. Assumptions and results for installation of ACRs into rotary dairy.

Results for Rotary Dairy				
Dairy cluster number	50	50	50	50
Herd size (cows)	400	400	600	600
Milking time (hours)	1.5	1.5	2.2	2.2
Labour saving (labour units/year)	1.0	0.5	1.0	0.5
Years to break even (before interest)	4	9	3	6
IRR (%)	25	3	49	14

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Is economics the only reason to install ACRs?

When investing in a physical change on farm, it is desirable for the investment to be profitable. However, it may be legitimate to invest when there are significant intangible benefits for the managers or enterprise. Some other potential benefits of ACR installation are discussed below.

Herd health

The impact that ACRs have on herd health has been widely debated. ACRs can reduce over-milking, and the associated mastitis infections. However, not having someone at cups-off may lead to mastitis infections being missed at the early stage. This is something that needs to be considered carefully.

Increased managerial control of the parlour

This is of particular value to those who regularly use casual staff or struggle to find reliable staff. ACRs mean that the manager can set the level that cows are milked to, and that cows are milked to exactly the same level every milking.

Reduced milking time

Some American trials have shown that milking time can be reduced without impacting on milk quality or herd health by stopping milking at a high flow rate. These results have not been successfully reproduced in Australian research.

Improved worker comfort/OH&S reasons

During a typical milking in a non-automated shed, one person can lift an accumulated weight of over 1 tonne. By removing cups-off, this weight may be reduced by up to one half in a 'double-up' dairy. The reduction in handled weight may not be as great in a 'swing-over' dairy. There is, however, an increased OH&S risk associated with a single person milking in a shed. It should be noted, that installing labour saving devices will do little to improve working conditions in a poorly designed or maintained shed.



Flexibility and risk management

The labour reductions associated with this report may not actually be achieved in many dairies. Instead, ACRs can be used to free up labour for other tasks as they arise. Also, if an employee is unavailable at the last minute, the manager knows that the shed can be managed without them.

Final thoughts

Labour saving devices certainly have their role in today's dairying environment, and if managed to ensure labour savings are made, ACRs can be an attractive economic investment. The intangible costs and benefits are also important factors to consider when choosing to install ACRs.

Further Information

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