CowTime's 'Maximum Milk Out Times' was a good marriage of research and practice change

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Abstract. Slow milking cows reduce the efficiency of the milking process in many dairies. In traditional herringbone sheds one cow can have a significant impact on labour productivity. Research conducted by the National Milk Harvesting Centre showed that putting an upper limit on the time a cow could be milked could save time in the dairy. This technique did not result in increased milk quality concerns or animal health issues. The research was trialled on local farms in each of the main dairy regions of Australia. A CowTime Shed Shake-up (a field day with a difference) called 'Shorter Milking Secrets' was used to present the research findings to the dairy industry around Australia. These were supported by the personal experiences of the trial farmers. The 'Shed Shake-ups' used a mixture of prepared media (video, PowerPoint slides, verbal presentation) as well as facilitating lively discussions. External evaluation of these practice change activities found 74% of participating farms made changes within 6-8 weeks. Most reported saving 15 to 20 minutes at a milking. The three key learnings were: farmers appreciated that it was based on good research, having a local champion was powerful, and about half of the participants shared information from the field day with others who did not attend demonstrating a considerable trickle down affect.

Key Words: Milking speed, milk harvesting, labour productivity

Introduction

The National Milk Harvesting Centre (NMHC) was created in 2000 to work on issues relating to milk harvesting. The central problem identified was improving labour productivity in milk harvesting. The NMHC was a virtual centre with a small number of staff working in research, development and extension.

In 2000 several members of the NMHC were discussing the various reasons for poor labour productivity in the milking activity. Slow milking cows (cows that take a long time to have their milk removed) were identified as one of the reasons. Personal observation had shown that seven slow cows could make at least a fifteen minute difference in milking time. In a swing over dairy, a slow cow can hold up all the clusters; in a double up, one cow can hold up half the clusters in the shed. It was common practice on rotary dairies for 8-10% of cows to go around twice as they were not finished by the end of one rotation.

Research overseas, particularly in North America, showed that stimulating teats and raising automatic cup remover (ACR) thresholds can reduce milking times. This is a labour intensive treatment and relies on the use of automation. Would it be possible to come up with a technology that is simple, inexpensive and applicable to Australian dairies?

Research phase

A proof of concept experiment was run by the NMHC during 2000-2001. The impact of the following on the milking times of slow milking cows was investigated:

- increasing the ACR flow rate setting from 200 to 500ml/min
- stimulating teats prior to cluster attachment combined with an ACR setting of 200ml/min
- setting a maximum milk-out time (MMOT) based on the time it took to milk out the 4th, 5th, and 6th slowest milking cows combined with the 200ml/min ACR setting.

This work involved the 64 slowest milking cows of the herd at the Department of Primary Industries (DPI), Victorian research farm at Ellinbank, and ran for 5 months. A description of the work can be found in Clarke et al (2007).

The research found that '…the combination of ACR flow rate threshold level (200) with maximum milk – out time (MMOT) produced the greatest reduction in milking time. The ACR ensured the cows were not overmilked and the MMOT ensured slow milking cows did not limit the batch milking times unduly.' (Clarke et al. 2007, p34)

As a result of the findings in the proof of concept work, further experimentation was funded. Experiments 2 and 3 ran from 2002 to 2004 and used the Ellinbank research farm, the TasDPIW Elliot research farm, 3 commercial farms in Victoria and 1 in New South Wales. Both of the experiments provided evidence that the use of MMOT could reduce milking duration without having a detrimental effect on milk production.

In 2004-2006, experiment 4 looked at the impact of this work on milk quality and udder health. Specifically the work concentrated on somatic cell counts (SCC), mastitis (both clinical and sub-clinical) and milk yield. The results of this work conducted across 6 different herds indicated that using '...MMOT did not adversely affect cows' milk quality or udder health status.' (Clarke et al. 2007, p36)

Final result of the experiments

The end result of all of the experimental work showed that it is possible to set a maximum allowable milking duration (maximum milk out time) to reduce milking times of the herd and to improve labour productivity.

Table 1 shows the relationships between the expected litres at a milking and the time it should take to extract that amount of milk. The shaded sections of the table indicate yields for which there is limited data available on which to base the expected MMOT. Modelling has been used to predict suitable MMOTs. See further discussion of MMOT for high yielding cows in Clarke et al. (2007, pp. 22-32).

Table 1. Maximum Milk Out Time (MMOT) table

	Estimator for MMOT		
Litres of milk	'conservative' MMOT rule (min:sec)	'conservative' MMOT rule (decimal minutes)	Average Flow Rate (L/min)
7	04:51	4.8	1.44
8	05:20	5.3	1.50
9	05:48	5.5	1.55
10	06:15	6.3	1.60
11	06:42	6.7	1.64
12	07:07	7.2	1.69
13	07:32	7.5	1.72
14	07:57	8.0	1.76
15	08:21	8.3	1.80
16	08:44	8.4	1.83
17	09:07	9.2	1.86
18	09:30	9.5	1.90
19	09:52	9.8	1.93
20	10:14	10.2	1.95
21	10:36	10.6	1.98
22	10:57	11.0	2.01
23	11:18	11.2	2.03
24	11:39	11.6	2.06
25	12:00	12.0	2.08
26	12:20	12.3	2.11
27	12:40	13.0	2.08
28	13:00	13.6	2.05
29	13:19	13.3	2.18
30	13:39	13.6	2.20

Shaded sections of the table indicate yields for which there is limited data available on which to base the expected MMOT

This strategy does not harm herd production or negatively impact on udder health or milk quality but it does shorten milking times. Follow up on farms that implemented the technology showed that the time saved is between fifteen and twenty minutes per milking. This is a considerable saving and is valued on many farms. A simple cooking timer can be used to keep track of the time. It is not necessary to have more sophisticated technology installed.

Development phase

During the experimental phase, all the NMHC team were kept up-to-date with the progress of the work. At various occasions a member of the extension team helped with some of the research and visited some of the commercial farms involved to see how the experiment was set up and monitored. At the end of the experimental phase the task of making the information accessible to the dairy industry was tackled.

It was recognised by the program designers and the researchers that having farmers in each dairy area who had positive experiences with the technology would be a powerful aid to adoption. To that end a number of example or pilot farms were identified around Australia. At least three farms in each of the eight Dairy Australia regional development programs were approached. Those farms that agreed to try the technology were visited by either a researcher or one of the extension staff to explain the process.

About 40 farms across Australia were involved in the pilot. These farms helped the researchers and extension officers understand how the technology could be implemented on farm and identified some of the barriers to adoption as well as providing case study examples to use for the development of the videos and marketing resources for the extension program. These local champion farmers could also be a source of local support for other farms in their area.

Extension phase

There were two markets to reach - advisors and farmers. Two of the researchers and a former extension officer put together a package for advisors to explain where the technology may be useful and how to implement it, depending on the particular farm situation. This resulted in a booklet entitled *Shorter Milking Times research program: Technical information package for advisers*. An information session was held to familiarise farm advisors and take them through the process.

The farmers were to be reached through the CowTime program which was the main extension activity of the NMHC. A publication of best practice milk harvesting for the Australian dairy industry called the *CowTime Guidelines* was produced along with other written materials called Quick Notes on specific topics to provide more detail on special topics. CowTime also has a number of benchmarking tools available online dealing with labour productivity and energy use. Currently almost all of the resources developed by CowTime, including video resources, are available on the website www.cowtime.com.au.

CowTime developed a series of field days called Shed Shake-ups as its main physical interaction with farmers. The format of the field days consisted of a session of approximately two hours in a hall or room where information was presented using discussion, video, and in some cases a formal presentation, depending on the subject matter. Holding such sessions removed distractions and kept the focus on the material being delivered. Participants were encouraged to share their experiences and learnings with the group and to challenge any of the material offered.

After lunch the group then moved to a dairy where the material covered in the morning was reinforced in the environment of a working dairy. This format has proven popular. Not only has the information been valued, but the peer interactions and sharing have been positively commented on by the participants. As well dairy farmers have valued the opportunity to visit other dairies.

Previous topics for Shed Shake-ups have included: animal handling and cow flow, the impact of milking on people, energy use in the dairy and, recently, milking once-a-day and the use of automatic milking systems.

In developing the Shed Shake-up program to deal with the Maximum Milk Out Time concept, a video was produced to support the program. The use of the video enables the consistent delivery of material to all groups. Where participants can take a copy enables accurate reinforcement of the messages rather than relying on participants taking notes. Each participant at a Shed Shake-up was given a folder that contained the relevant Quick Notes and a copy of the video program.

Where practical a local example farmer in each area was invited along to share their experiences with the participants at the field day. As an effort was made to select example farmers that would be seen as good farmers and have the respect of their peers, their contributions were valuable to the success of the program.

A pilot of the program was run in October 2006 to test the process and identify potential improvements. To give participants individual relevant information a calculation was required based on their cows' current milk production and the time it took to milk. A wheel calculator was developed to help with the calculation. The pilot showed that the wheel calculator was too difficult to expect a group to deal with in a large forum so while the message of the program was well received it was necessary to work out a simple method to provide individual calculations. This was solved and in the actual run out of the program each farm was given results calculated on a computer from information supplied by participants and processed by an assistant during the first part of the field day.

To help with the promotion and marketing of the Shed Shake-ups, farm cases studies from the pilot farms were used. These regional examples helped to put a local face on the information and helped to suggest the relevance of the program to the local communities.

Stuart Crosthwaite, one of the pilot farmers, commented that '…knowing CowTime's recommendations were based on research conducted at Ellinbank, Victoria and Elliott, Tasmania gave us the confidence to give it a go.' (Monks Communication, 2007)

Forty four Shed Shake-up events called '*Shorter Milking Secrets'* were held around Australia in 2007 with 1059 people attending.

Each farm was also given a simple timer to take home to work out how long their slowest cows took to milk and to work out how long they spent milking a shed full of cows or to accurately time the rotation of their rotary platform.

To build on the exit evaluation conducted on the day of the Shed Shake-up, a random selection of participants was interviewed by Down to Earth Research (Watson 2007) about six weeks after they had attended the field day.

The results of those interviews revealed the following:

- 72 percent were either implementing or planning on implementing the MMOT concept when their herd was milking at peak.
- those that implemented the MMOT were saving an average of 15 minutes per milking
- 58 percent used the timer provided at the Shed Shake up to work out how long their slow milking cows were taking
- 68 percent worked out the milking time for a full shed or for a platform rotation
- 32 percent watched the video again at home
- 52 percent shared the DVD or information learned on the day with others who did not attend.

Conclusion

The outcome of the MMOT Shed Shake-up program was a real success story for the dairy industry. Because the program was developed and delivered by people with a good knowledge of the research, it was easy to describe and explain the technology of MMOT and handle questions from the participants. External evaluation showed substantial uptake of the strategy. A cost-benefit analysis showed a rate of return varying from 10:1 to 17:1. This program has demonstrated the value of involving extension in the research from the beginning to produce a final extension product that hits its target well.

Three key learnings:

- Farmers appreciated that the program was based on good research.
- Having a local champion was a powerful aid in getting the message across.
- About half of the participants shared information from the field day with others who did not attend, demonstrating a considerable trickle down affect.

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