Daniel Herd, Hohenheim, and Hermann Seufert, Gießen

Work Organization in Large Parallel or Herringbone Milking Parlours

Foto: M. Herdt

Constant economic pressure on dairy farms forces them to increase efficiency and hence to optimize milking processes. Even on large farms with modern milking parlours there is often potential to improve the interaction of operators, animals and technical equipment and hence to exploit reserves in productivity.

Dr. agr. Daniel Herd is member of the scientific staff at the Institute of Agricultural Engineering of Hohenheim University, Garbenstraße 9, 70599 Stuttgart; e-mail: *daniel.herd@uni-hohenheim.de* Before he retired Prof. em. Dr. Hermann Seufert was Head of the Institute of Agricultural Engineering of Gießen University , Senckenbergstraße 3, 35390 Gießen.

Keywords

Milk production, parallel and herringbone milking parlours, milking routine, parlour productivity

Literature

Books are marked by •

[1] *Smith, J. F., J. P. Harner III, D. V. Armstrong, T. Fuhrmann, M. Gamroth, M. J. Brouk, D.A. Reid and D. Bray*: Selecting and Managing Your Milking Facility. In: Proceedings of the 6th Western Dairy Management Conference, March 12-14, 2003, Reno, NV

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Due to the permanent low milk price dairy farms are working under high economic pressure. Thus, in large parallel or herringbone milking parlours, there is a need to increase the efficiency of the milking process and to optimize the milking routine. In particular, if more than two or three milkers per shift are milking, it is important to coordinate and standardize all individual and different performed routine tasks. Also the handling and fine-tuning of the complex technology has to be trained. Last but not least the operators and the animals have to accustom themselves to the new milking technology and this adoption can take several months.

Goals

In this research project the milking procedures in a new double 32 parallel milking parlour was analyzed. Within this, the milking routine and the individual milking tasks of all operators had to be standardized. The important influences on the process and measured data like stimulation time, milk flow and milking hygiene was recorded. The milking technology, in particular the cluster positioning, the liners, the automatic cluster disinfection system, the pneumatic crowed gate and the rapid exit had to be optimized, too.

Research Project

In the research project from 2003 to 2006 one dairy farm (see photo) was analyzed. During the study there were 900 to 1100 milking dairy cows present. The farm used to have a rotary parlour and decided to build a new double 32 parallel milking parlour in 2003. In this parlour only healthy cows were milked. Sick and fresh cows were milked in a separate parlour. The milking process in the new milking system was analyzed three times in 2003 and only once in the following three years. Within these trials the individual milking tasks like strip, wipe, attach and dip were measured and important operating figures like entrance time per cow, milk performance, stimulation time, turn over and milk productivity were calculated. The time analysis was performed with a special protocol, which was developed to fit the milking system. Within this time analysis, measuring points in the parlour were defined to represent important steps in the milking routine.

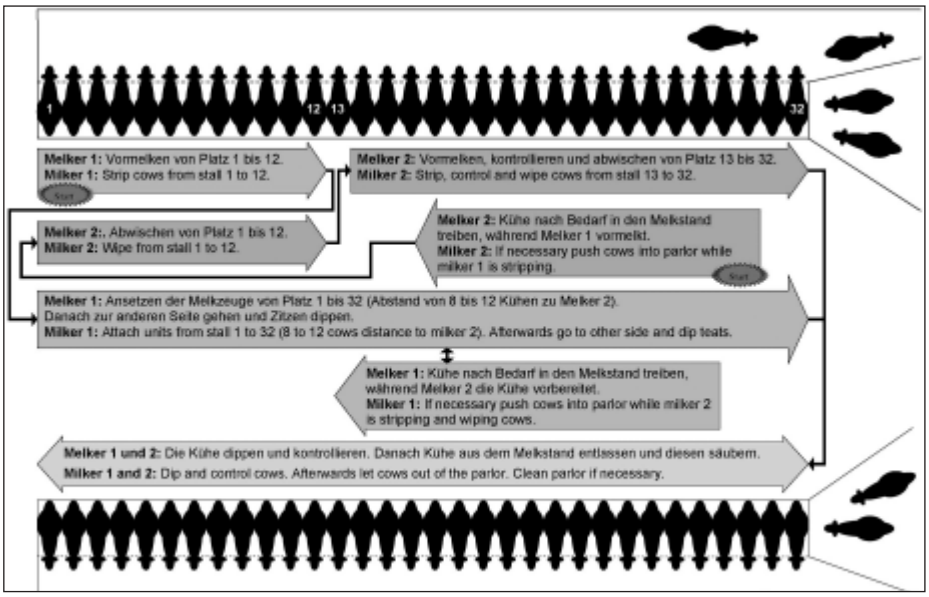

Fig. 1: Grouping and sequential milking routine in a double 32 SbS milking parlour, two operators

Optimization

The familiarization phase in the new milking parlour was very hard for operators and animals. The cows had a hard time to get used to the new system. They were trained several weeks consequently to enter and leave the parlour by themselves. Even the milkers needed some weeks to adapt to the new parlour, the equipment and the new environment. Furthermore the whole work organization and the shift plan changed. Tasks like cow pushing, littering, hoof trimming and herd management had to be adapted to the new system.

During the fist months the group structure in the barn was not satisfactory. On the one hand the average group size of approximately 100 cows was too small, but the holding area was properly designed for 250 cows. Due to these facts the animals did not enter the parlour properly, because there were not enough cows in the holding area to optimize cow flow.

On the other hand there were too many groups which needed too much time for cow pushing.

In order to optimize cow flow and reduce time for cow pushing, the number of groups was reduced and the group size was increased to on average of 200 cows per group. Beyond these actions the pneumatic crowed gate was optimized to automate cow flow. The technical settings were changed so that the crowed gate moves constantly with low pressure.

Another problem was slow milking cows, which had negative influence on the improving parlour productivity. In order to increase the efficiency of the milking system, the automatic cluster removing settings were increased from 200 to 300 g/min and an extra group for slow milking cows was established. Furthermore the cluster position was optimized to minimize turning forces and leverage on the udder.

Milking routine

During the research period the milking routine changed several times. At the beginning three operators performed a sequential milking routine. Within this routine the operators split up the individual tasks of the milking procedure on the persons. They work as a team following each other performing their individual tasks [1].

Due to organizational reasons the milking routine changed after June 2005. Only two instead of three persons were milking in a shift. The new milking routine which is displayed in *Figure 1* is a mixture between a grouping and sequential milking routine.

Both milkers have to work in a team performing their individual tasks after each other. Milker 1 starts, as soon as cows are standing in the front stalls, to fore strip at cow no. 1. During this, milker 2 pushes cows into the parlour. After that he walks back to stall 1 and starts to wipe cows. If cows 1 to 12 are fore stripped by milker 1 he walks back to stall no. 1 and attaches clusters from cow 1 to cow 32. Milker 2 strips, checks and wipes udders beginning at cow 13 up to the end of the parlour. Due to the fact that milker 1 attaches clusters faster, than milker 2 can strip and wipe cows, milker 1 has time to push cows into the parlour if necessary. The interspace between the operators is dependent on the duration of the single routine tasks. In this case the space should not be less than 8 cows and not more than 12 cows. This restriction comes from the requirement that the stimulation time of a cow, which means the time between preparation and attachment or start of milk flow has to be at least 60 s and at most 90 s [2, 3].

Routine tasks

Besides the analysis of the milking routine, the following single routine tasks were also measured: fore strip 3.95 s (n = 105), wipe 4.18 s (n =112), attach 5.56 s (n= 109) and dip teats 2.79 s (n = 112). Despite the very fast performance of the tasks, working quality was on a good level. During the research period, somatic cells were between 180 000 and 220 000 per ml. It was not seen that the change to the new milking parlour or the very good and fast performance of the routine tasks had a negative impact on milk quality.

Milking productivity

Besides the analysis of the milking routine and the single routine tasks the overall productivity of milking was calculated. *Figure 2* displays the productivity in cows per hour and cows per man hour. Cow pushing, that means bring cows to the holding area and bring them back into the barn after a group is milked is included in the data. *Figure 2* shows also that it took almost one year until the milking productivity was on a constant high level. Maximum productivity reached 285 cows per hour and 95 cows per man hour in October 2004.

The decision to reduce the number of operators from three to two operators in June 2005 decreased parlour productivity to 220 cows per hour but it increased labour productivity to more than 110 cows per man hour.

Conclusions

The organization of the milking process, especially in large milking parlours, is an ongoing challenging task for the management. In order to get an optimal milking routine and work organization around the milking process there are many influencing factors of operators, animals and equipment to be considered. The persons or operators have to perform their individual milking tasks constantly fast but also with high quality. Also it is important that teamwork and coordination between the milkers works perfect to optimize stimulation, prep lag time and milk flow. The animals have to get used to the new milking system and need to be trained consequently to enter and leave the parlour on their own. Even in new parlours the technical equipment has to be optimized and adjusted to the herd. Variable adjustment procedures have to be made for persons and cows.

The change to a new milking system can be hard, it can take several months until the maximum productivity is achieved and all structural changes in the operation are done. These results show that labour productivity of 110 cows per man hour can be attained, even with qualitative high hygiene standard.

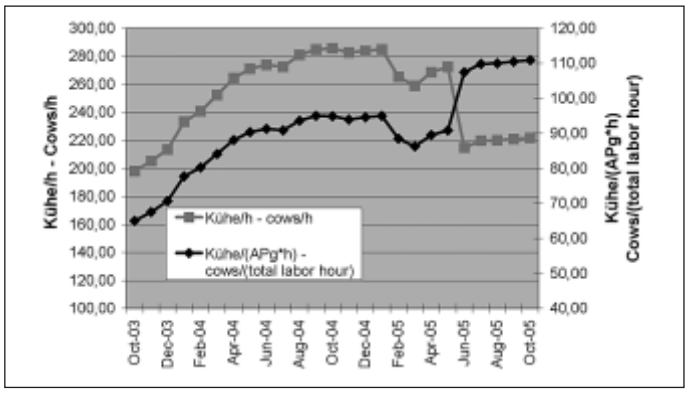

Fig. 2: Milking productivity