

Monitoring and analysis of the milking process in the parlour

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The milking parlour is the most used equipment on a dairy farm and one of the major investments of large dairies today. Well run parlours benefit not only from the equipment itself but also from the management behind it. It is the knowledge of the milker and the milking routine as well as the milking management data that is needed to operate maximum parlour efficiency.

Automated milking process

GEA has developed new software DairyNet which operates the new automated rotary – the DairyProQ. This system allows a fully automated milking process, where each stall module does the automatic attachment, cleaning, pre dipping, udder preparation, inspection of the foremilk, post dipping and detachment. All processes run quarters individually.

It is a fact that all these processes should work for each cow, therefore a sound control and interface of the software for cow and machine is necessary.

As everything works automatically, the one operator required for monitoring the milking process is able to maintain a constant overview of all processes on the rotary platform.

A graphical display is integrated and displayed on industrial PCs at the rotary platform as well as on mobile devices like tablets and smartphones. It visualises information for control, analysis and monitoring of the milking process.

It informs the operator which cow is on the platform and shows information for that cow. At each stall of the platform the screen shows the cleaning of teats, the start of milking, and it displays which teat is currently attached.

Each process step is visualised with different colours. The milking, the dipping and the detaching of the teat cup can be tracked.

The different technical status of the stall – whether it is in normal use, blocked or undergoing services – is displayed at each

stall. Changes or inconsistencies are highlighted by different colours for a quick and easy glance.

Warning messages for cows or equipment are displayed for fast access or necessary intervention. Sorting of the animal can be initiated directly via the graphical display if necessary.

This kind of visualisation of the milking process in real time is a very useful tool to give important information needed at the right spot: this can be either at the touchscreens right by the parlour entrance and exit or on the tablet PC when the operator is in the barn.

Utilise the data

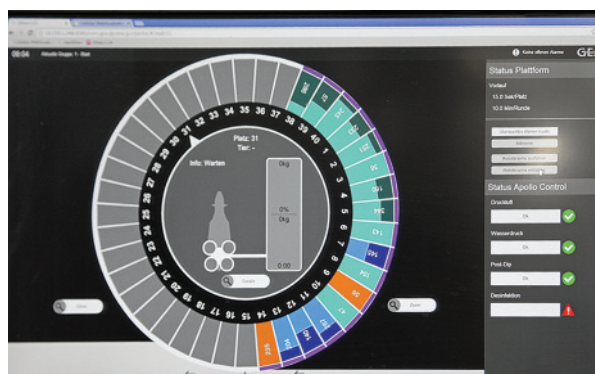
The amount of data being obtained from an automated milking system like the DairyProQ system can be relatively high. Nevertheless it is necessary to know how to utilise data from these systems. This role is taken over by the product DairyNet.

As well as the complete herd management of the animals this farm management software monitors and analyses the milking process. Statistical data collection with detailed analysis and reporting give an overview of the performance of the milking procedure.

With the start of milking and the entering of a cow onto the rotary, all relevant data of that animal is sent from the management system to the milking control system of the robot.

Therefore the robot knows which teats should be milked, knows the detachment level for that particular cow, the predicted milk yield and of course the status of the cow and other relevant individual cow data.

Data on the separation of milk due to different sensor information is necessary to ensure good milk quality. During milking a lot of data for each cow being milked is collected by the software. For a single milk visit that can be many parameters.



Graphic visualisation of the milking process during the milking session.

It contains data regarding the performance and the milk quality, which means for example milk yield, milking duration, average and peak milk flow rates, conductivity and colour of the cow's milk.

Furthermore, the performance of the milking session can be determined. Session efficiency values and statistics about the milking session can be monitored in an historical overview.

Detailed analysis

The analysis comprises the number of cows milked in total, the evaluation of cows milked per hour, the amount of milk harvested per hour, the milk start and milk end time and the duration of the session.

Parameters like cows per hour and milk per hour are very common ones for measuring parlour performance. They are easy to calculate and well known for efficiency measurements.

Benchmarking of these important key performance indicators can improve the processes and productivity due to constant monitoring.

With a deeper view into each single session the attributes of an individual cow with its contribution to that particular milking session can be analysed.

A graphical display with dots shows single cows having entered the parlour one after the other. Data about the identification, the

Continued on page 12

Continued from page 11 status and the performance at that milking are shown.

Inconsistencies like separation of milk, reattachments, revisits, supervised milking etc are displayed and analysed.

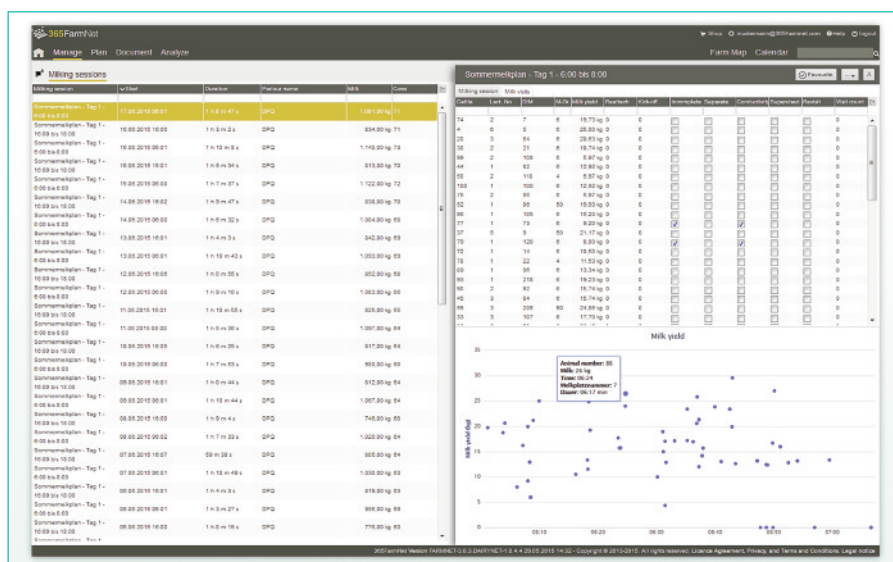
High conductivity and colour values measured at quarter level are marked for suspicious cows in each session. In future evaluations of milk flow, curve parameters of a single cow are displayed as well to monitor bimodalities, average flow rates and milk yield in the first 15, 30 and 60 seconds after attachment.

Evaluation of milk flow curves represents good milking routines and precise working processes. Those data can be aggregated to herd and group data to have a complete overview of the entire herd at a glance.

Visualisation tools keep the operator continuously informed about what is going on during milking. The software displays present detailed data on every milking cow and on the status of the stall. It supports the operator at every single step of the complete milking process.

Key performance indicators

Key performance indicators for parlour performance ensure high efficiency for milking management and can compare milking sessions regarding working



Analysis of the milking session.

procedures. Graphical analysis of the milking session provides transparency of the milking routine. Detailed analysis of a single cow at each milking session monitors the performance in an historic view.

To automate the capture of data in farm management software has a high potential to become the key to tuning the parlour.

For automated systems it is a must to draw statistics about the performance of the

equipment and the cows in DairyNet.

In conventional milking systems the parlour analysis can be a tool to provide transparency of the milker's routine.

A reliable monitoring procedure from teat cleaning to taking off the teat cup ensures good parlour performance and milking management. This is also the main area for optimising milk quality and working efficiency.