



# milking parlours

SUPPLEMENT

International  
**Dairy  
Topics**

# Successful planning of a dairy farm

## Successful planning of a dairy farm with the automatic milking system Mlone from GEA Technologies.

Just like in a conventional dairy farm, attention must be paid to all the generally important parameters for an Automatic Milking System (AMS) design. Stall climate, feeding and manure management are equally important factors as animal logistics, animal health and hygiene.

It is a peculiarity, however, that for automatic milking systems the milking cows are in a closed system on a farm. Depending on the management model, the cows have to be integrated into the system (heifers or cows after calving) or they leave the system for a time (problem cows or dry cows). When planning a system for automatic milking it must be taken into account that the cows are milked in a 24/7 operation. The cows are therefore permanently in their barn (except for systems with pasture) and on average are milked three times a day.

Various functional areas of a dairy farm come together in an AMS barn and can be found around the robot. A milking centre has to be arranged which can save on working time when optimally designed. 80% of the herd is routinely milked by the robot, but the remaining 20% of the cows require most of the work. So for optimal design of a new AMS Barn (or even rebuilding) one focal point is the efficient organisation of the working and functional areas around the milking robot.

## Advantages of a MultiBox robot

GEA Farm Technologies' Multi Box robot (Mlone) has many advantages within AMS planning compared with the single-box systems, as it permits several different solutions. Various sizes of herds or groups can be managed in one single system with one or several milking boxes.

From the technical point of view operation, service and regular control are only necessary for one system, no matter whether it involves one or five boxes. Future expansions can be easily achieved using forward-looking planning. Here, for instance, the structural foundations for four milking boxes could be built although the operation starts just with three milking boxes. A complete working and milking centre could be realised with the Mlone at its heart. Through the use of automatic sorting gates the cows can be separated into various functional areas near to the robot.

**Dairy producers from 12 states recently attended GEA Farm Technologies' Innovation Dairy Tour in Michigan. The producers toured Gingrich Meadows Dairy in Leroy, Michigan, where they heard from owner Amy Martin on her experiences with the Mlone robotic milking system. Martin told the group that the system allows cows to enter and be milked up to five times per day, creating a calm efficiency in the parlour.**



The animals of several boxes are only guided by a single return lane and could thus be sorted into one selection area. This means huge advantages in terms of logistics and labour efficiency.

## Automatic sorting of cows

The use of automatic sort gates in an AMS primarily helps the people in saving time and work. In conjunction with suitable herd management software, the operator/manager is in a position to guide the cows into specific areas based on defined characteristics or to sort them out completely. This is of particular use if you bear in mind that it is a 24/7 operation and that the operator/manager is only present in the barn at certain times. With automatic pre-selection, which decides whether a cow is due for milking or not, unnecessary visits to the milking robot can be avoided. The loading on the individual milking boxes is thus optimised and the waiting area not overburdened.

An automatic post-selection has the special advantage that conspicuous cows or cows that must be sorted out for special actions or treatment are placed exactly where they can be worked upon: in an extra area near to the robot. If problem cows need to be additionally sorted into a special needs area, it is advisable to plan direct access back into the waiting area. Like this you can easily guide problem cows manually to the milking boxes and, where necessary, milk them by hand under supervision. The areas should be built following the cows need in her respective lactation phase, for example a straw box for the special need cows.

With the use of sort gates the operator/manager does not therefore necessarily have to run into the barn to look for cows. This is time consuming and means unnecessary stress for the rest of the herd in front of the robot. If, for instance, a veterinarian visits the farm, he can deal directly with the relevant cows, because these have been especially sorted out for him during the day. An AMS barn can be divided into three essential main areas: The 'normal' barn area for feeding and resting, the milking centre with its functional areas and the interface area between the milking centre and barn.

The selection gates come into use in this interface. Depending on the type of barn the waiting area in front of the milking boxes is planned with the appropriate pre- and post-sorting gates. The size of the milking system and the optimum cow logistics are decisive factors in the exact design of this area. The cows have to reach the robot day by day of their own free will and without any disturbance. For this reason the transfer out of the 'normal' barn area to the milking boxes is a highly sensitive area while planning. It makes a significant contribution to whether the system is accepted by the cows or not. In principal one pre- and one post-sort gate would be necessary for a basic system.

## Optimum design parameters

For the barn primarily the general rules apply which bring about an optimum, healthy barn climate. Attention must be paid to the factors of light, air and water just as much as in conventional barns. It is good practice for animal health and hygiene that the freestalls are always dry and clean. The design of the alleys should be hoof friendly. As the cows should reach the robot of their own free will planning should be made using generous dimensions. The cycle of the cows between lying, milking and feeding should be undisturbed, that is to say that the animal traffic should not be restricted by building construction.

The feedlot/freestall ratio should not exceed 1:1.5 for conventional feeding, but could be 1:2 for automatic feeding. The robot with its adjacent rooms (for technical, milk tank and office) must be set up in frost-free conditions in the barn (depending on the climate region) and the view of the milking boxes should be clear for the cows.

The service area of the robot should be able to be reached comfortably where possible.

Below are some basic requirements for the essential areas within the barn which are necessary for an efficient AMS:

#### ● Alleys

The normal alleys must be at least 3.0m and the feed alleys at least 4.0m wide. That means that low ranking cows can avoid boss cows in the wide alleys. Dead ends should also be avoided where possible. The length of the alleys should not be too long in relation to the type of barn, as a long distance to the robot causes a negative impact on milk efficiency.

#### ● Crossovers

The crossover with drinking troughs should be wide enough so that weak cows can also pass without any problems. The first crossover should be near to the robot, otherwise it is recommended to set a crossover after every 20 freestalls.

#### ● Waiting area

Five cows must be able to wait in front of every milking box so that cows do not feel threatened through skirmishes. This means a net depth of the waiting area of 5.0m (excluding all gangways). The width depends on the size of the multi-box system.

#### ● Selection area

The selection area should be laid out for at least 10% of the herd. As cows may have to wait for some time, water and feed must be available in addition to a resting area. A technical must be self-locking safety feed fences for inseminations, checks and other special cow actions or even the access to a palpation rail. From here the cows should be able to be brought to other areas or out of the AMS barn.

#### ● Special needs area

In the straw box at least 10m<sup>2</sup> per cow should be planned. A direct access to the waiting area is optimal so that cows can be guided directly to the robot without disturbing the routine operations. Due to regular cleaning, it should be next to an outside wall.

#### ● Office, milk tank, technical

For the work on the PC an office must be located near to the robot from where the various areas can be monitored, also visually. Short and optimal working paths between the working areas assist both internal and external personnel in their daily routine work and are immensely time saving if they are well planned. The size of the technical and milk tank room depends on the technical specification of the complete system. Compact arrangements of the rooms and a short distance to the multi-box system assist to improve economic installation and piping.

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## Lely's Astronaut lifts off

Ian and Wendy Corner, along with their children Tim and Victoria, farm 350 acres, running a closed herd of Jersey cows near Somerton in Oxfordshire in the UK. They are milking with two Lely Astronaut A4 robots that have been fitted with the specially designed Jersey kit, which allows for the comfort of the smaller framed Jersey cow within the robot. Ian first considered Lely A2 robots shortly after taking over the herd from his father. After visiting a Lely A2 robot farm near Marcham, he was 'absolutely amazed' when seeing the robots in action. However, due to financial commitments Ian opted at that time to further invest in his parlour.

### Automated milking

After attending a robot seminar in 2010, Ian became hooked on the idea of automated milking. After spending considerable time researching the different systems on offer, Ian finally settled on the Lely Astronaut A4 milking robot. When asked why he chose Lely, Ian listed the following reasons: "Everything on the robot is made for the cow. The solid arm went the lowest, which is ideal for Jerseys, and the excellent T4C cow management programme is completely user friendly." The first Astronaut A4 robot was installed on 20th November 2012. The second followed soon after in March 2013. Ian remarked that if he could do it again he would have had both installed at the same time, as it made it quite difficult milking a portion of the cows through the parlour.

### Grazing and automated milking

The Corners also have a Lely Grazeway selection box, which allows the Jerseys to have the freedom and choice to graze. Even with the Lely Grazeway, the cows are achieving 3.1 visits and have had an increase in milk production of 10% since the robots were installed. The cows are presently averaging 24kg per day.

### Improved herd health

"Since installing the robots our cases of mastitis have dropped," continues Ian. "I believe this is due to the pura steam cleaning between each cow, less stress on the cows and no under or over milking due to each cluster being taken off by the robot individually. We have had only one case in three months."

### Daily routine starts with Lely T4C

Ian and Tim closely monitor their herd using the Lely T4C (time for cows) computer management system. Ian states that his first job in the morning is to look at his computer, "Firstly, I check the late cow list. Other things I look out for are heat detection, it's a fantastic innovation. It picks up the cows that to the eye are showing no signs of being in heat. We now serve those cows indicated by the programme and have so far been PD+. Even before I see a cow in the morning I have a good picture of what I am to expect!"

### Happy cows

The greatest benefits of installing the Lely Astronaut A4 robots are that the cows look happier, as they are carrying less milk and they are more comfortable. The robots offer us more time management flexibility, running the farm more efficiently around the cows, rather than milking time. When asked if there are any comments he would like to make, Ian replied. "The farmers mind-set has to change – the robots work for us, we don't work for them!"



# Afimilk's Chinese success story

For people familiar with China, names like Shandong or Sichuan may be already in the list of well known places. What about Ningxia? In the Central-North part of the country hides one of China's smallest provinces: Ningxia. The climate is continental and semi-arid, with average summer temperatures rising to 25°C and average winter temperatures dropping to -10°C. Although annual rainfall may be just 200-500mm, irrigation systems are well developed and existing from ancient times, since important rivers cross the area and supply abundant water.

The characteristics of Ningxia make this place very suitable for dairy farming: dry climate, not too-cold in winter, large plots of land and plenty of water for growing excellent alfalfa and corn. In 2011 the Chongqing Agriculture Investment Co selected Afimilk as its partner for the establishment of a new dairy project for 6,000 cows and 4,000 heifers: TianNing farm, in Ningxia province. The design was performed by A. B. Planners, an Israeli design company that works in association with Afimilk. The project was organised in two independent farms for the cows – each one for 3,000 heads – and a separate farm for the heifers. The three farms and the feed centre are located in a single compact plot.

## Fully equipped farms

Each farm is equipped with two adjoined parallel milking parlours (Afimilk), each with 2 x 32 milking stalls, making 128 milking posts per farm. The housing system is head-to-head free-stalls: at each farm there are four double-sheds – almost 300 metres long – with a central corridor leading to the milking parlour. Each shed allocates 416 cows, which can use open yards when the weather conditions are adequate. The initial herd was 4,000 heifers, mostly brought from Uruguay and some from Australia. They were 14-16 months old at arrival and started to be inseminated two months later. Calvings started in May 2013 and by December 2013 there were 3,150 cows in milk and 730 pregnant heifers.



In parallel, the TianNing farm sent the appointed farm manager and the main second-rank managers (milking parlour, veterinarian, herd, nursery) for a two-month course on advanced dairy farming in Israel. The course was especially planned and organised by Afimilk and included three days a week of theoretical lectures and three days a week of practical training at local farms. Special focus was given to use of the AfiFarm management system, management of large herds, organisation of a large dairy farm, milking practices, nutrition, calves



and heifers raising, fertility, selected health subjects, etc. The progress made by the trainees was examined by weekly tests and on concluding the training a report was prepared for the TianNing farm with evaluation of each participant. Most of the trainees continue to be at the project today.

According to Afimilk's vast experience, close professional supervision and continuous training are pre-requisites for achieving good results in projects of this kind. Therefore, since the beginning of 2013 an Israeli consultant has been at the farm, giving support to the project. He is backed by 1-2 young assistants who, after having concluded university studies in animal sciences, were trained for more than three years by Israeli farm managers that work on behalf of Afimilk in China. The results have been quite impressive: by the end of October 2013 (with more than 3,000 cows in milk) the average daily production was 30kg milk/cow (all of them first calvers), with 4.01% fat and 3.08% protein, and 200,000 SCC. The average body condition at calving was 3.4 and at lactation peak it dropped just to 3.15. Conception rate at first service for the cows has been 46.1%. The Afimilk milking system has worked flawlessly and the AfiFarm system is providing all the needed information for an effective management of the herd: heat detection, organisation of the veterinarian visit, monitoring of health with a preventive approach, etc. Cows demanding some kind of treatment (inseminations, veterinary care, change of group, etc) are automatically sorted to a special yard while exiting the milking parlour.

## Ideal conditions

Conditions at Ningxia province are suitable for growing good quality forage: the corn silage has a quality not often found in China and the locally grown alfalfa may be compared to Grade A in the US. The ration for the milking cows includes 11.5kg of corn silage, 2.5kg of alfalfa, 1.0kg of oat hay. The available grains are corn, wheat and barley, while the main protein sources are soybean meal, rapeseed meal, cotton meal, DDGS and whole cotton seeds. The TMR is prepared three times/day and the milking cows are eating around 22kg of dry matter/day.

All in all, results have been quite impressive and this project is going in the right direction. Not surprisingly, the Chongqing Agriculture Investment Co is presently considering replicating it in other provinces in China. [noa@afimilk.co.il](mailto:noa@afimilk.co.il)



# UK's biggest dairy conversion

Sansaw Estates is a family run farm in Shrewsbury, Shropshire, UK, that has been converted to dairy in a large scale and high profile conversion. It is understood to be the biggest conversion to dairy in the UK.

Sansaw Dairy was officially opened by the British Secretary of State for the Environment, Food and Rural Affairs, the Rt Hon Owen Paterson MP, who described the complex as 'the future of the industry' with 'world-class technology'. Sansaw Estates has invested about £3 million in cattle, dairy equipment and other infrastructure, with the animals and dairy technology selected mostly from New Zealand – a country known for its high return dairy farming expertise. The conversion is a strategic move designed to maximise profits from the 1500 hectare property, which includes about 700 hectares of prime dairy land.

New Zealand owned dairy technology leaders, Waikato Milking Systems and UK dealer M. R. Dean Ltd were chosen to provide and install the dairy technology, and are proud of their involvement in the project. Waikato Milking Systems is a designer and manufacturer of innovative products that make the lives of dairy farmers easier and more productive, while also improving milking comfort and health for cows. M. R. Dean Ltd is one of the most experienced milking machine companies in the UK.

## Close co-operation

Waikato Milking Systems and MR Dean Ltd have worked together for many years. They worked together on this project to provide a 70 Bail Waikato rotary milking system with a range of efficiency gaining technology in the new parlour.

Sansaw Estates' managing director, James Thompson, says he chose a rotary from Waikato Milking Systems because: "It works and it works well." He chose M. R. Dean Ltd because their reputation for service is outstanding. Sansaw Dairy is currently milking about 1100 cows, with plans to expand. The parlour has a range of smart technology from Waikato Milking Systems, designed to increase efficiency and provide a healthy and well managed milking environment.

The company's smart range is designed to streamline the milking routine, improve dairy hygiene, and reduce mastitis and labour costs. Sansaw Dairy's smart technology choices include SmartECRs – premier cup remover technology with built-in BailGates (electronic bail retention devices). The dairy has SmartPULS – a digital pulsation system that delivers consistent and reliable pulsation, and SmartSPRAY – an automatic teat spray system for rotaries that optimises spray coverage.

Waikato Milking Systems' chief executive, Dean Bell, says: "Our smart technology brings the best benefits of innovation and science without over complicating your milking machine and without making it too expensive." Ian Dean, the managing director of M. R. Dean Ltd, added: "I'd be happy fitting a



Waikato milking system from the top of Scotland to the bottom of England – knowing the customer will get reliability."

Waikato Milking Systems is involved in markets all over the world, including established and developing dairying nations – meaning their systems are tried and tested in many countries and under all milking scenarios. Whether you are looking to invest in a rotary or in-line (herringbone) milking system, Waikato Milking Systems has a wide range of high performing options to suit every dairy farming type. Options are available for every size and scale of set-up, ranging from large scale 24-hour milking operations to single operator parlours.

The company is involved in more than 20 countries around the world. Their technology is known for delivering results, and for exceptional reliability and ease of use. All their products are designed to add value to your farming business while saving you time, money and manpower in your milking routine. ■ [grant.wisnewski@waikatomilking.co.nz](mailto:grant.wisnewski@waikatomilking.co.nz)

## Sansaw Dairy

**Number of cows:** About 1500 New Zealand Friesian and cross-bred cattle.

**Type of dairy:** High performing rotary from Waikato Milking Systems.

**Size of plant:** 70 clusters.

### Integrated technology from Waikato Milking Systems:

**BailGates:**  
Electronic cow restraints for rotaries.

**SmartECR:**  
Automated electronic cup removers.

**SmartSPRAY:**  
Automatic in-bail teat spray system.

**SmartPULS:**  
Consistent and reliable digital pulsation system.

**SmartDRIVE:**  
Variable speed milk pump controller – designed to make milk pumping and cooling much more efficient.



# Fullwood provides ideal layout

For Anthony and Stephen Bolland, investing in a new milking parlour has enabled them to expand their dairy herd, modernise the way they manage their cows and look forward to a long future in milk production. Anthony Bolland farms with his son, Stephen, at Bolton Abbey in the Yorkshire Dales, UK, where they run a 240 acre tenanted farm on the Duke of Devonshire Estate. They are currently milking a herd of 150 commercial black and white cows, with 80 followers.

## Looking to expand

Prior to Stephen's return to the family-run farm in 2010, the dairy herd numbered 110 cows. But, upon Stephen's inclusion into the business, cow numbers were increased to 130 to lift milk output and overall productivity. "We wanted to expand the herd to make the business more viable for two generations of the family," Anthony told *International Dairy Topics*. "But more cows meant more time spent in the farm's old parlour." In those days, the cows were milked through a Fullwood 12:12 herringbone parlour which was originally installed in 1975. "The parlour still worked well," Anthony continues, "but it was taking 2.5 hours to do each milking. With more cows coming into the herd we were spending far too long in the parlour at the expense of other key jobs such as focusing on fertility and maximising productivity."

The old parlour was also a very basic set-up with no automation and no way of monitoring individual cow performance. With Stephen keen to carve a long career for himself in milk production, the family therefore decided to invest in new milking facilities, with the specific goal of reducing milking times. "We looked at a number of makes and configurations of parlours, including various swingover layouts," Stephen explains, "but decided to opt for a double-sided herringbone system because that's what we're used to. The old parlour had served us well, despite being out-dated, so we saw no reason to over-complicate things."

## Finding the ideal layout

The new parlour, a Fullwood 20:20 direct to line herringbone with 50 degree stalls, was installed by Harry Travis Ltd of Otley and commissioned in May 2012. "We opted for a 50 degree parlour because the cows have more room and stand a lot better than in a traditional 32 degree setup," Anthony explains. "The 50 degree system also takes up less space resulting in less walking up and down the pit during milking." The Bollands worked closely with Tony Friend of Harry Travis Ltd who advised them on which type of parlour would best suit their needs. "We worked closely with Anthony and Stephen to make sure they chose the right parlour layout and design for their buildings to ensure smooth cow flow and a comfortable working environment," Tony describes. "We looked at various options and eventually came up with a solution that created the ideal layout for their herd." The new par-

**The Fullwood 20:20 herringbone parlour features 50 degree stalls, in-line conductivity monitors and auto-segregation gates for easier cow handling.**



**All cows wear a pedometer for automatic ID recognition, activity monitoring and heat detection.**

lour features a range of facilities that the old parlour was lacking, including automatic segregation gates, pedometers, in-line conductivity meters and Fullwood's Crystal herd management software system.

"We don't milk the cows any differently," Anthony explains, "but we have changed the way we manage the herd. Each day we look at the computer screen to see which cows are bulling and which cows need drying off. Our herd management and fertility spotting is more accurate and we have seen a steady improvement in the herd's average calving index."

## Greater insight into cow performance

"We are also working more efficiently, with facilities such as the segregation gates making it possible for one person to milk the cows without having to leave the parlour pit. The new Fullclean washing system also reduces the daily workload as it makes cleaning the plant a one-button routine instead of having to manually open and close an array of valves and pipework. "The result is that we are now milking 40 more cows and saving almost an hour per milking. That's a huge amount of time saved and more than justifies our decision to invest. It also allows us to catch up on other jobs away from the parlour." Anthony and Stephen have also seen a number of additional benefits since they started milking through the new parlour. "The shorter milking routine means the cows are standing in the collecting yard for less time which has reduced bullying within the herd and reduced lameness."

Meanwhile, the in-line conductivity meters have helped the Bollands to reduce the incidence and severity of mastitis by spotting any new cases during the early stages. "We're still getting to grips with all the data available," Anthony remarks, "but it's already obvious that the Crystal software is a powerful herd management tool. As a small family-run business, we already knew each cow individually, but the new system has given us an even greater insight in each cow's individual performance and health status. We're confident that we now have the right tools in place to improve yields and to get the most out of the cows." ■

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**Left to right: Anthony Bolland, Tony Friend and Stephen Bolland in the new parlour.**



**GEA**



## **ml ONE** – The Multibox-System

Say hello to your independence!

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