

Milking parlour upgrades:

## From the pits to a palace

**F**or many, it will be a familiar scenario: A herringbone parlour that, a couple of more decades ago, was shoehorned into one end of the shed grandfather used to milk his 30 cows in. The roof is low, the light is poor and, apart from the odd pipe and pump repair, the parlour is much as it was when first installed.

**Today the only difference is that, instead of milking 60 cows, there's upwards of 160 cows wanting to be milked** – and the time spent milking each end of the day is now in its third or even fourth hour. You don't like it, your herdsman doesn't like it and, most important of all, your cows don't like it.

According to Roy Birchall, 90% of the UK's parlours could benefit from an upgrade,

*Even where there aren't the funds for a new milking parlour, it makes sense to keep the equipment up to date with targeted upgrades.*

*There are several good reasons to upgrade a parlour, points out dairy equipment specialist, Roy Birchall, of Crewe-based dairy kit company Green Oak. Not least is the fact that cows milk better and quicker, and their udders are much healthier when milked through a modern plant. Andy Collings reports*

which would deliver improvements that could not only reduce overall time spent milking but also improve herd milk yield, quality and udder health.

"The milking parlour is the engine of the dairy farm," he explains. "And, as years go by, those engines will grow tired and inefficient while manufacturers design much better and more efficient engines. It doesn't make any sense not to take full advantage of the technical advances."

He points out that the demands on milking parlours have changed dramatically, and it is not just in the number of cows that herds have increased. It's also the yield of the modern cow.

"A couple of decades ago a cow giving 5,000 litres was considered to be a high yielder, and the milking equipment was geared towards handling this volume of milk," he says.

**"Today there are herds averaging 10,000 litres and more,** and this requires a new approach to the milking operation and one that's difficult for a parlour designed and built 20 years ago to handle – unless it has received some upgrades."

Having said that, Mr Birchall concedes the current economic downturn in the dairy industry is not conducive to large investments being made in milking machinery.



## Case study 1 - The Shepherds

It was the long four hours it took to complete the morning milking, plus the three and a half hours in the evening, that were the main incentives for the Shepherd family to make some major upgrades to their milking set-up. Based at Ledsham, in Cheshire, milk producer Mark Shepherd and his sons William and Andrew milked their 170 cows through an old 16/16 herringbone parlour that had been installed about 25 years ago, when the dairy herd was significantly smaller in number and the milk yield was nearer 5,000 litres.

**The parlour was fitted with jars that cluttered up the parlour and, as we've heard,** affected vacuum pressure every time the jars emptied. There were also gates that were worked by vacuum. And the greatest sin of all, says Mr Birchall, was the use of small-bore, dead-ended vacuum pipes.

"It was one of those situations where it was a good, high yielding herd that was well managed but there just wasn't the right machinery in place to milk them with," he says.

First decision made was to extend the parlour by six milking points either side to create a 22/22 configuration.

"The parlour pit had already been built to accommodate an increase," points out William. "But we had never really contemplated using the extra capacity until recently."

All the jars were removed and a direct-line milking system installed, with the milk being collected in a stainless steel

100-litre tank before then being pumped through a heat exchanger and into the main tank.

For milk recording, an electronic system was fitted that records the yield of each cow every time she is milked, with the data stored directly on a computer. This system also controls the level of feed each cow receives in the parlour in respect of average yield over the last six days.



*William (left) and Andrew Shepherd. Recent upgrades to their 16/16 herringbone resulted in 3.5hrs less time each day being spent milking the farm's 170 cows.*

**The extra milking points meant a greater demand for vacuum, and a new pump was added that works in tandem with the existing one.** A larger 100-litre vacuum header tank was also installed and, to complement it, large-bore, looped piping. Other upgrade changes ran to a separate vacuum line for the ACRs and a switch over to compressed air operated gates. Putting the spec icing on the cake was an automatic washing system which, left to its own devices, utilises a sequence of rinses with water and chemical solutions to thoroughly clean out all the milk pipes after each milking.

It had not escaped William Shepherd's attention that the milk holding tanks and not insignificant lengths of wide-diameter pipes meant that at any one time there was a reasonable volume of milk in transit.

"When we had finished milking, this milk was still in the pipelines and, left there to be washed out, was a volume of milk that we could ill afford to lose. Throughout the year it adds up to a lot of milk," he says.

As a result, a compressed air flushing system was also installed to drive the last few litres of milk out of the pipe-work. So, with the all of the work now completed a few months back – the cost was about £40,000 – what kit benefits have been achieved?

**"Well, for starters, the time to milk the herd has reduced to a more acceptable level – two hours in the morning and one and a half in the evening,"** says William. "The total saving of three and a half hours a day is valuable time that can be used more profitably."

William also reports that the cows now seem to enjoy being milked and they let their milk down quicker as a result. Udder health has also improved with a marked reduction in mastitis – not that it was a major problem before.

More generally, he believes the herd average – currently 9,000 litres – could increase and that cows will be in better health overall to the point that they can remain in the milking herd for longer with fewer replacement costs.



*The cluster. Note the receiver that allows the volume of milk to exit via the milk pipe. Too low a capacity, and the milk from one quarter can 'jet' up another teat cup and make contact with another quarter – risk of cross contamination etc. See also the twin pulsator lines; these should be the same length.*

*The installation of an electronic cow management system should be a serious consideration when upgrading. This one provides a number of recording services and includes a full feed-to-yield package.*



*It might seem a basic improvement, but a roll of paper towel placed conveniently in the middle of the parlour saves time and leads to better hygiene. Don't be fooled into thinking that all parlour upgrades must, by default, be high-tech and high cost. Simple ideas are just as important.*

## Case study 2 - The Scarisbricks

For Ian Scarisbrick, it was an absolute determination to create a parlour that was enjoyable to use, was comfortable for his dairy cows to be in and, through a modern system, would ensure udder health was maintained, that set him off down the equipment upgrade path. "The parlour is the most important part of the farm," he comments. "It is where I spend many hours, where the cows must be content and where the goods are delivered."

**Mr Scarisbrick farms at Valley Farm, Mill Lane, Goostrey, Cheshire** and he currently milks 100 cows – a number that could rise to 140. Until recently he was milking his cows through a 12/12 herringbone parlour which had, among other dated systems, jars, dead-ended vacuum lines, its ACRs working off the same line as the all-important clusters and even vacuum-operated feeders. "There had clearly been many technical advances in milking machinery that we needed to take advantage of."



*Ian Scarisbrick in what he considers to be the 'engine' of his farm: "It's where the cows need to be content, and where the goods are delivered."*

**One of the first changes concerned the cows themselves which, through different positioning,** were angled with their heads further away from the pit edge. This allowed them to be milked through their legs, rather than the side which, according to Mr Scarisbrick, is a much better position.

"Apart from being safer for me in the pit from being kicked, the cluster sits better on the udder with a more even weight distribution," he points out. A direct-line milk system was installed with full electronic metering, as was a large-diameter looped vacuum line plus larger clusters, the latter gaining new jetter trays to rinse the teat cups.

**The vacuum header tank was increased in capacity and a new pulsation system incorporated,** plus a separate line for the ACRs. Electric in-parlour feeders have also been installed rather than the old vacuum-operated ones. All of which adds up to quite an upgrade and one that he reports as being well worth the cost (about £20,000).

"All of the cows are milking better, their health is being maintained, and they seem happy. And when the cows are happy, I'm happy too."

Even so, he says there is much that can be done to an existing parlour that would see it handling a greater number of cows, the cows milking more efficiently and the parlour being a more pleasant environment for those who spend time in it.

**"Technology has moved on," he explains. "Most will know about milk recording systems, automated feeding systems** and so on, but not many actually understand how a milking machine works – and the advances that have been made to ensure it remains working efficiently. "The point is this: Cows should want to be milked. It should be a pleasant experience for them, and this is only possible if the milking machinery is right."

Key to the system is vacuum – a vacuum that provides a constant pressure in the milking cluster. Fluctuations in vacuum pressure at this critical point can cause all manner of problems: Teats can become damaged, cows start to become irritated and then won't let their milk down. This results in udder problems and so on. Achieving a vacuum level of -38Kpa to -40Kpa (about 12in mercury) is not that easy, apparently. It can be affected by any items utilising the same vacuum source: Pulsators, pneumatically operated gates, automatic cluster removers (ACRs) and, probably the worst culprit of all, the milk recording jars, which often cause a big change in vacuum when milk is released from them. And if you think about it, it



*Gates that draw on vacuum supply are bad news; they cause vacuum fluctuation. Upgrade to a compressed air system, as the ram can usually be adapted to cope.*



*Milk recording jars have no place in modern parlours. Jars should be replaced with electronic systems that measure milk flow and do not affect vacuum pressure.*



*Vacuum lines should be looped back to the header tank; this has a positive effect on milking efficiency. Large-diameter piping creates a vacuum reservoir.*

*With the jars out of the system, a milk receiver tank needs to be installed. The milk is then pumped to the main tank via a cooling system. Once again, note the use of large-diameter pipes.*



has to be down to the large volume of incoming air required to replace the milk being pumped out.

Older parlours are also likely to be fitted with 'dead-end' vacuum pipes, pipes that travel down each side of the parlour and end abruptly by the last milking point. In, say, an eight/eight herringbone parlour these pipes provide the vacuum for the 16 milking points – eight from each pipe. And with a little thought it is not difficult



For those who feed in the parlour, electronic metering systems should replace versions that are vacuum-activated, to prevent vacuum pressure fluctuations.

to realise that the milking point furthest away from the vacuum pump is the most susceptible to changes in vacuum; it is lost when the clusters are removed or attached to udders, and the effect from the pulsators is more pronounced the further along the parlour one goes.

**Mr Birchall goes as far as to say that cows entering such a parlour get to know about these problems** and choose to position themselves at milking points closest to the pump where the vacuum tends to be more constant.

“It’s worth asking a herdsman where his best milking cows stand in the parlour and, after he proclaims there isn’t any particular position, a little contemplation sees most herdsman realising that these cows actually do tend to stand at a point closest to the incoming vacuum.”

The solution is to install vacuum piping in a loop that returns to the header tank – and to use large-diameter pipework, which acts as a reservoir in its own right, rather than the smaller diameter pipes found in older parlours.

For ACR operation, a separate vacuum line is the preferred option and one that helps to maintain the required vacuum levels. For pneumatically operated gates a change to compressed air from a separate compressor is also a sensible option; in some cases, the piston and cylinders can be adapted to accommodate pressure rather than vacuum.

Vacuum issues aside – though in milking parlours one is never far away from them – there have been some changes in milking cluster design. With the modern cow giving so much milk and hopefully, with the correct and constant vacuum, letting



Upgrades should also include a look at the hot water system. Modern systems use heat from the incoming milk to reduce heating bills. Having sufficient hot water volume is also important bearing in mind the larger diameter pipes that need to be cleaned.

it down rapidly, the flow through clusters is now much higher than before. This has led to a larger cluster being required that has the capacity to allow the milk to flow freely away down the milk line. This, in turn, requires a greater ingress of air to create the flow and, if there is insufficient reservoir of vacuum, it can lead to – yes, you’ve guessed it – major fluctuations in vacuum at the teat ends.

But worse than that, any hold-up in the milk flow away from the cluster causes the milk to ‘wash’ about, with the milk from one quarter then coming into direct contact with another – infection risk etc.

A high-capacity vacuum header tank should be part of any parlour upgrade. This one has a 100-litre capacity and provides separate lines for the parlour’s ACRs, pulsators and clusters, all of which are looped back to the tank.



### Key parlour upgrades

- No jars – milk goes direct to line
- Always fit looped vacuum lines
- Have a high capacity vacuum header tank
- Install large diameter pipes
- Use compressed air rather than vacuum to operate pneumatic in-parlour gates
- Operate automatic cluster removers from separate vacuum line
- Have the system tested to record vacuum changes at teat ends

**On the subject of pulsators – the units that relieve the congestion of teat tissues, caused by the pressure difference across the teat canal as milk is drawn from the teat – there can be excessive vacuum loss, although by definition it is impossible to eliminate it totally.**

During the pulsation cycle, atmospheric air is allowed into the pulsation system that causes the liner to collapse around the end of the teat. When the air flow is cut off, the vacuum is equal on both sides of the liner and the liner opens up away from the teat once more – and the cycle is repeated.

A detail to watch is that pulsation vacuum lines are of the same length, particularly when employing an alternating pulsation system, which requires a separate line to the front two teat cups and another to the rear pair. Air is ‘elastic’ in that it can be squeezed and stretched, unlike a fluid. So if unequal lengths of pipe are used, there is a greater volume of air available to be squeezed. This results in unsatisfactory operation – and an unhappy cow.

“I’m convinced the potential of a modern, high yielding cow can only be realised by employing modern milking equipment that is sympathetic to her requirements,” says Mr Birchall. “She is a living animal that should be treated with respect.”



The parlour office, complete with the essential computer on which all the cows’ records are automatically placed from the in-parlour recording systems, is now essential for efficient herd management. Every herd should have one.