Proceedings of Teagasc National Liquid Milk Conference

February 24th, 2000

Minimising Labour in Milking
Eddie O'Callaghan, Teagasc, Moorepark

Doing It My Way
Tom Clinton, Dairy Farmer, Kells, Co Meath

Dairying under the New Quota Regime
Dermot McCarthy, Chief Dairy Adviser, Teagasc

TEAGASC NATIONAL LIQUID MILK CONFERENCE – FEB. 2000

Minimising labour in milking

Dr Eddie O'Callaghan,Teagasc,Moorepark.

Introduction

Milking is the main chore on dairy farms. When assessing the efficiency of a milking operation the total time taken to bring the cows to the milking parlour, the preparation time for milking, the actual milking time, wash-uptime and time taken to return cows to pasture or wintering unit should be measured. In the past most dairy farmers focused on having about ten cows per milking unit and space for additional units was in many cases omitted. Recent surveys in Ireland show that milking time on many commercial farms is over four hours per day, this is excessive. The main reasons for the long milking time was a combination of factors such as inadequate number of milking units, poor milking routines and parlour location. On many farms poor quality farm roads can increase the time to bring cows to the milking parlour, a few lame cows can also increase the overall time for milking operations. Also having a milking parlour located a distance from the wintering unit can increase the time to bring cows to the parlour and increase the quantities of soiled water to be disposed of. In the future, apart from restricted land resources, milking is likely to be the most important factor in the limitation of herd size and having a parlour with a large output in terms of kgs of milk produced per manhr will be necessary. Robotic milking systems are now considered by many farmers in order to reduce labour. Robotic milking systems are installed in a few farms in Ireland, all these developments are driven by the lack of skilled farm labour and also by the need to increase output per labour unit. In the present paper I will outline the main factors that influence the labour inputs in the total milking operation.

Output of milking parlours

In an ideal situation the milker can carry out the complete milking without leaving the pit for short periods. The following factors influence the output of a milking parlour:

- Design of milking equipment.
- Milk yield and milking routine
- Parlour design.
- Cow drafting
- Holding yard design.
- Skill of the operator.
- Location of udder wash hoses, teat spray jets, and power hose for occasional washing of cow standings.
- Location of parlour.

Design of milking equipment

The selection of high performance milking equipment has a major affect on the milk quality and on the number of units an operator can comfortably handle. The use of unstable clusters can disrupt milking and severely limit the number of milking units per operator. Recent research at Moorepark indicated the wide bore tapered liners developed on Moorepark guidelines give high levels of milk extraction vacuum when the liner is open. This vacuum was about 20% higher with simultaneous pulsation (4x0) than with alternate pulsation (2x2). It is important that a milking unit can give maximum output and can extract the maximum amount of milk while minimising the risk of new mastitis infections and injury to the teat. Some farmers are now offered new milking technology with little independent support data. Light clusters with narrow bore liners are been presented as the technology of the future. In a recent full lactation trial in 1999 the Moorepark milking system with wide bore tapered liners fitted in 3kg clusters and with simultaneous pulsation gave 5% higher lactation yields than a milking system with narrow bore liners fitted in light clusters and with alternate pulsation. This loss in production is excessively high and light clusters are not recommended. The milking time was also longer with the light clusters. In order to maximise the output of a milking unit the restrictions from the cluster to the milk pipeline should be minimised. With conventional New Zealand type milk meters the reduction in vacuum during milk flow is excessive, the milking vacuum is halved giving very slow milking. New designs of electronic milk meters minimise the drop in vacuum during milking. The installation of automatic cluster removers (ACR) does not increase the output in swing parlours when the milking routine is well organised. However in large one-man parlours ACR'S can reduce the stress on the operator. Overmilking for 2 minutes does not have an adverse affect on teat condition or new mastitis infections.

In many milking parlours inadequate number of units limits the throughput. The number of milking units depends on the work routine adopted and on the design of the associated facilities.

Milk yield and milking routine

Production levels, design of the milking units, and work routine time together decide the eventual performance of a parlour. The work routine time is the time taken to carry out all operations at a milking unit. . The work routine practised on a particular farm is the most important factor in determining the number of cows a milker can milk in an hour. The performance (P) of a parlour in terms of cows milked per manhr may be stated as P=60 /WRT. Typical work routine times for herringbone parlours with and without automation are given in Table 1.

Table 1. Elements of work routine (min per cow)

Let cow out	0.20	Auto	
Let in and feed	0.25	Auto	
Foremilk	0.10	Omit	
Wash and dry udder	0.20		0.10(Omit wash)
Attach cluster	0.20		0.20
Move to adjacent cow	0.02		0.20
Remove cluster	0.10	Auto	
Disinfect teats	0.10		Auto
Total	1.17	0.5	
Cows/man/hr	51		120

It is probably more logical to express output of a parlour in terms of kilograms of milk pumped into the bulk tank per manhr. In this situation the clusters are applied as soon as the first stall is filled and the operator is not required to leave the pit. In parlour time studies in the USA washing and udder preparation decreased parlour throughput by 20%. Clean cows increase cow throughput. If cow flow is poor and it takes a long time for cows to enter and exit, it can increase milking routine time and reduce cow throughput. In Ireland most milking parlours have 2 stalls per milking unit, cows are milked in batches and the units are transferred across the pit. It is estimated that this design of parlour is equivalent in performance to double-up parlours (1 stall per cluster) with 50% more units.

In Table 1 the effect of automating some elements of the work routine shows that the output of a parlour can be increased to at least 120 cows per manhr. This assumes that the number of milking units is not a limiting factor. The number of milking units, the milking time per cow and the milking routine have to be matched to give the optimun performance. Generally in Ireland the number of milking units particularly when cows are at peak production is very inadequate, the operator can often indulge in activities outside the milking pit waiting for cows to be milked. The performance of a parlour can be expressed as 60 divide by the work routine time as shown in Table 1 or as 60 multiplied by the number of units divided by the milking time. If we assume that a high yielding cow with 20 kilograms per milking can be milked in about 8mins to achieve a performance of 120 cows per manhr it is necessary to install a 16-unit parlour with automatic feeding and have minimal pre-milking preparation.

Parlour Design

The design of the feed mangers can influence the cow control and can limit the number of milking units a operator can comfortably handle.There is a wide range of design options for milking parlours. The cluster spacing vary between 660mm (2′2″) and 910mm (3′). Double rump and breast rails are standard when concentrate feeders are not installed. In some new designs of milking sheds the stallwork at the front of the cow standing is elevated in order to reduce the exit time of cows. Generally cow control is better in side-by–side parlours with cluster spaced at 660 to 686 mm spacing. Also indexed feed mangers give good cow control and eliminate the possibility of cows passing in automated parlours that have automatic cow

identification at the entrance to the parlour. For maximum cow flow cows should move in a straight line from the holding yard into the parlour. Covering the holding yard eliminates the need for narrow entrance doors. In many parlours the narrow entrance doors restrict cow flow. Rectangular yards are now more popular than circular yards .The holding area should be sloped towards the parlour entrance. The installation of an open channel at the entrance to the parlour can prevent yard washings entering the parlour. A fall of 1in 60 is recommended in the parlour floors from the entrance to the exit. This assists cow loading and the milklift at all milking units is equal. Excessively high breast rails can restrict cow flow and the height of the breast rail should not exceed 810mm. A single pipe can be placed about 600mm above the breast rail to restrain cows. The need for a backing gate probably depends on whether or not concentrate feed dispensers is installed. In modern milking parlours cows are identified at the entrance to the parlour and concentrates can be dispensed automatically. There is still a lot of discussion on the reasons to feed in a parlour or not. Generally cow entry time is considerably reduced when concentrate feeders are installed. In most automated milking parlours swing-over arms are used. Installation of changeover arms is justified in large parlours. These devices minimise the sagging of the milk tube and also allow the operator to activate a changeover switch for automatic milk recording. Also the centre of the pit is not obstructed in any way, a set of udder wash hoses and teat spray nozzles are installed at both sides of the pit.

The installation of a permanent dump milk pipeline that is washed during routine circulation washing is a basic requirement in a large one-man parlour. Some companies supply automatic valves for diverting milk to the dump milk pipeline. A alerting system should be available with this system as a erroneous diversion could result in a contaminated tank of milk.

Cow Drafting

In a large parlour the installation of a automatic cow drafting system allows the operator to remain in the pit during milking. Commercial automatic drafting systems are now available in Ireland. The cows are identified using either eartag or neckband types transponders from an antenna in the drafting stall and can then be drafted into a number of holding pen. Manual cow drafting systems are installed in New Zealand. A mechanical arm from the front of the pit usually operates the drafting gate on the exit race. A manual or automatic drafting system is required to achieve an output of at least 100 cows per manhr. In New Zealand more emphasis is placed on the design of the entrance and exit of parlours than in Ireland. This is probably a reflection of the larger parlours in New Zealand.

Rotary milking sheds

Rotary milking parlours should be considered in large herds above 300 cows. The output of rotaries installed in Ireland in the sixties and seventies was disappointing, this was mainly due to inadequate number of milking units and problems with centre bearings and the failure of backflush wash systems. A new design of automated rotary milking parlour is now available with cambered wheels and with no centre bearing. With cambered support wheels there is minimal maintenance. Automatic cluster removal, automatic milk recording and milk diversion and simple washing systems are now a feature of modern rotary milking parlours. The main question now concerns the

possible output of a large rotary possibly operated with one operator. If the cows arriving at the cluster attachment point are very clean and minimal preparation (dry wipe) with a work routine time of 0.3min per cow an output of at least 200 cows per hour is possible in a fifty-stall rotary. In one-man rotaries fitted with cluster removers automatic drop down devices can prevent cows that are not completely milked from exiting the platform have now been developed.
I think rotaries should now be considered for large herds as most of the traditional maintenance and operational problems are solved.

Holding yard design

Rectangular holding yards are generally used in integrated dairy units. The holding yard and entrance to the parlour should allow a free flow of cows into the parlour, narrow doors at the entrance to the parlour restrict cow flow and limit throughput. In existing parlours covering the holding yard can eliminate the justification for narrow doors at the entrance to the parlour. If a large throughput is required a motorised backing gate is a basic requirement, this should be operated from any position in the milkers pit. The use of high volume (>30gls/min) and low-pressure (30-50psi) pumps for yard washing minimise the time for yard washing. The wash pumps should have a pressure switch and wash points should be installed at the front and back of the pit. Slotted channels should be installed in the holding yard and at the front of the cow standings, these channels can make significant reductions in the time taken for yard washing.

Robotic milking systems

About 250 farms in Holland now use automatic or robotic milking systems. These systems are mainly installed on farms with minimal pasture grazing and with cows producing in excess of 7000kgs per lactation. Reduced labour demand and a better social life for dairy farmers are the main attracting benefits. The real challenge with robotic milking systems is to establish a protocol for efficient milking when cows are on pasture. There are possible advantages for farmers in Ireland with 100% autumn calving and with high yielding cows in using robotic systems. About four farms in Ireland have installed robotic milking systems.

Location of milking parlours

The location of a milking parlour relative to the wintering unit and the main farm road can have a major impact on the labour in milking. In the mid-eighties most new milking parlours were located adjacent to the wintering unit or under the same roof as the wintering unit. The main advantages of this design are:

- The time to bring cows to the milking facility is reduced compared to units where the milking parlour is a functionally separate building.
- Cows can be diverted directly back to the wintering unit
- The holding yard can be a multi-purpose yard for cattle handling.
- When the holding yard is slatted the time for yard washing is minimised.
- Groups of cows can be returned and procured from the cubicle section of the unit while milking is in progress.
- The quantity of yard washings can be minimised.

- The cubicle and feed passages can be used to hold cows if cow numbers are increased.

Disadvantages:

- Expansion may be limited particularly when the dairy is constructed at the front of the milkers pit and a slatted tank is placed in the holding yard with the last milking unit adjacent to the slatted tank. When these units are been planned adequate space should be left for additional milking units, also the dairy should be sized to accommodate a larger tank. Many farmers regard expanding the number of milking units from 6 to 10 as radical, however when they make the decision to expand it is rarely regretted.

National Liquid Milk Conference 24th February 2000

Doing It My Way !!!

By

Tom Clinton
Dairy Farmer

Farm History

My family became involved in milk production in 1961. We started with 6 cows and had 61 acres of land. However we became unhappy with the price we were receiving for creamery milk and as a result began producing Liquid Milk in 1974. We now farm 700 acres (400 acres owned) and we hope to supply 300,000 gallons of milk from 180 cows by the end of the next quota year. Due to a TB breakdown in the early 90's we improved the genetic potential of our herd by importing new genetics from the continent. About 60% of the milk produced on the farm is supplied to Glanbia for the Liquid Market and the rest of the milk is supplied to Lakelands and Golden Vale North for manufacturing. Beef production is another enterprise on the farm but due to declining profitability, this enterprise is questionable in the long term. We have our own machinery and have been involved in contracting for a long number of years.

Limited Land

There is only 70 acres that can be utilised by the cows. In the future, the plan is to alter the current calving pattern towards more Autumn calving. There is a large emphasis placed on producing our own feed on the farm. This includes cereals, maize silage and grass silage. We have being growing maize silage for over 10 years and it will remain very much part of feeding system for the future. More home-mixing of feeds is planned for the future.

Our Future Direction

Our aim is to have 180 cows producing 2,000 gallons of milk per cow in the near future. In the coming years we expect milk yield/cow to improve by 150 gals/yr. Our existing milking parlour was very labourious and now as labour is becoming a more limited resource, we envisage that 1 person will be able to look after the cows in the future. Recently we have installed a Robotic Milking System and this will allow us to minimise labour on the farm but at the same time providing more comfort for man and beast. In addition, a new cow shed has been built to facilitate the new milking system but also to minimise the work involved. Automatic separation of cows exists, scrapers on slats are operated, headlocks are available and carpet mats are provided for the cows. This new system is now four months on and is now a pleasure to work with. The herd is looking very well and herd health is very good. In addition our fertility performance has improved with a conception rate (1st service) of 70% and a submission rate of 85% (cows 65 days post-calving). In this regard I must pay complement to Eddie O'Donnell.

Improving Milk Production

By installing the milking Robot, we hope to milk the cows on average 3 times/day. This has improved milk production substantially. While the cows are in the shed, cows will be milked in excess of 3 times/day, however the challenge facing us will be utilising the Robotic Milking System while cows are at grass. Improved milk production cannot be achieved without good feeding management. Complete diet feeding is practiced on the farm and there is always feed available to the cows. Maize silage has been part of the feeding regime for the last 10 years and will continue to be because it has always improved milk production. In addition cows are fed on the basis of feeding to yield. Our breeding strategy will continue to focus on improving milk production however greater emphasis will be placed on type and feet in the future.

Robotic Milking

As with any new system there were many teething problems at the start. It is true to say that the change from the milking parlour to the Robotic Milking System was a far greater change than the change from hand milking to the conventional milking parlour. A much higher level of management is required. Every morning the following checklist on the computer is gone through:

- Total milk yield
- Number of milkings
- Attention list of longest cows
- Conductivity test (Mastitis)
- Activity test (Bulling)
- Milk Deviation (low yield)

Special attention has to be paid to the heifers and fresh calvers. The cows are walked through regularly during the day to keep culling rates (yield, feet and fertility) as low as possible.

Future Direction of the Industry

About 80% of World Milk Production is produced in the Northern Hemisphere. If free trade in milk becomes a reality then seasonal milk production will be practiced in the Southern Hemisphere and the South of Ireland. Our aim will be to continue to produce Liquid Milk and fresh products e.g. Baileys. It is my view that we made the correct decision in 1974 to produce Liquid Milk and we will continue to reinvest in dairying and allow future generations to carry on dairy farming. The industry must maintain its image of producing clean fresh milk for the future. A differential in milk price must continue to exist and a repeat of the current UK milk price scenario must not be repeated here. To this note, the Liquid Milk producers of Leinster should be indebted to the work Michael Ludlow has done in ensuring a good milk price. The Farmers Journal gives a poor service to liquid milk producers and advocates a system of dairy farming that cannot be practiced in northern part of Ireland. Why is this so? Lastly I ask Denis Brosnan, would he encourage any of his children to go into dairying with a milk price of 80p/gl in 10 years time? Allowing for inflation, this is equivalent to 55-60p/gal today!!!

TEAGASC NATIONAL LIQUID MILK CONFERENCE – FEB. 2000

Dairying under the New Quota Regime.

Dermot McCarthy, Chief Dairy Advisor, Teagasc

The current quota regime has placed a heavy burden on active suppliers with every three milk producers now supporting one sofa producer.

Opposition to change and defence of the current regime by sofa producers while understandable amounts to no more than defending the indefensible. Over the past 10 years the scales have been very much tipped against the active milk producer. Imminent changes will go a long way towards a re-balancing of returns between active and sofa producers.

For active producers the current regime often results in: -

- Uneconomic lease prices
- Uneconomic quota purchase costs
- Leasing unwanted land at inflated prices
- Sofa production becoming more profitable than active production (particularly when combined with an Early Retirement Pension)

By lobbying to retain such a regime, sofa producers run the risk of "killing off the hen that laid the golden egg", particularly when we are moving into a time of tighter margins.

The new quota regime will mean: -

1. A long overdue re-balancing of returns in favour of active producers by controlling the cost of quota while still giving fair returns to sofa producers.
2. A levelling of the playing pitch between all active producers in that all will have access to Restructuring quota at reasonable prices (after those with a track record of temporary leasing have been satisfied).

On the negative side, the problem of leasing unwanted land at inflated prices has not been tackled with regard to lease renewals. There is a need to re-look at this situation before the new regulations are completed with a view to separating land and quota for lease renewals. However we must be sure that this does not result in another form of temporary leasing. Any new provisions should favour definitive transfer of quotas rather than lease arrangements.

Background to Changes – Agenda 2000

The forthcoming changes in quota regulations have been precipitated by changes in E.U. Regulations agreed under Agenda 2000. Under the Agenda 2000 agreement, quotas are to continue to 07/08, and Ireland is to get additional quota of 20.5 million gallons this year and 11.5 million gallons next year. There is to be a review of the quota regime in 03 with a view to abolition after 07/08. Support prices for butter and skim milk powder are to be reduced by 5% p.a. for the three years, 05,06,07. If all production was going into these products this would translate into 16.2p/gal. The

Teagasc FAPRI economic model estimates price reduction as a result of these changes will be 10 - 14p/gal. from the '98 price.

As compensation for these price reductions, a premium will be paid on each gallon of quota rising to approx. 9p/gal.

Also contained in the Agenda 2000 agreement are provisions, which allow for the separation of land and quota under certain circumstances. Our Dept. of Agriculture in consultation with the industry has chosen to use some of these new provisions in drafting the new quota regime for Ireland.

Milk Price

The Teagasc FAPRI economic model predicts that milk price (incl. VAT) will fall from 104p/gallon in 1998 to 90-94p/gallon in 2007. If we add back the 9p/gallon compensation then this milk price reduction is 1-5p/gallon. These price predictions take no account of any cuts in export refunds that might happen as a result of WTO negotiations and assume a slightly stronger Euro-Dollar exchange rate than pertaining currently. While a worst case scenario could leave milk price lower than these figures, we need to be careful as an industry not to talk down milk price especially in advance of WTO negotiations. The battle with regard to export refunds still remains to be fought.

New Quota Regulations – April '00

As and from April 1st of this year, the land quota link will be broken with three exceptions: -

1. Family transfers
2. Sale of a Farm as a going concern
3. Lease Renewals

Specific provisions will be included in the new regulations to facilitate transfer of quota within families. Such transfers will be tied to land. Lease of land and quota will continue to be allowed within the family. Family transfers will most likely include the same categories as are eligible for exemption from clawback currently. This would include parent to child / grandchild and uncle to nephew.

Sale of a farm as a going concern is likely to be tightly defined. After purchase such farms will have to be operated separately and amalgamation of purchased quota with the purchaser's original quota will be prohibited.

Renewal of land/quota leases between the existing lessor and lessee will be allowed under the new quota regulations after April 1st. The relevant land relating to such leases will continue to have to be taken.

Loss of a land/quota lease will have serious consequences for lessees under the new regime. While this should not be a frequent occurrence it will have serious financial

consequences where it does occur. Measures to alleviate these situations will be necessary under the new regime

Restructuring Scheme

Under the new regulations Restructuring through a co-op pool will become the major mechanism for quota transfer. Quota from retiring dairy farmers will be sold to the co-op and re-sold to all applicants at a moderate price. All dairy farmers regardless of size will have an entitlement to quota under the new Restructuring Scheme. Distribution most likely will be along the lines of the flexi milk distribution scheme.

A new feature of the Restructuring Scheme will be partial restructuring. This means a quota holder will have a right to sell part of his quota into restructuring.

Temporary Leasing

The quantity of milk in temporary leasing will be greatly reduced over the next 2 – 3 years. Dairy farmers who have temporary leased (to co-op) 100% of their quota over the past three years will not be allowed to continue such leasing as and from April 1st of this year. Land and quota leases cannot be entered into for such farms and if such farms are sold quota will not transfer with the land. Such farmers will have the option of producing the relevant quota or selling it into restructuring.

The net result of this restriction is that approx. 20 m gals of the temporary leasing pool will end up in restructuring in the coming quota year with a consequent reduction in the temporary leasing pool. Dairy farmers who have had a track record of temporary leasing will get priority access to such quota.

Dairy farmers who have been leasing their quota with land up to April of this year will also have a right to put their quota into a temporary lease. However the limit will be one year in such cases.

Dairy farmers embarking on temporary leasing from next year onwards will also face a limit of one year.

Land & Quota Leases

Where a lease has been in existence pre October 13th '99 there will be an option for the lessee to purchase quota from the lessor on termination of the lease provided both parties are agreeable. The sale price will be agreed by the lessor and lessee but is likely to be at a small premium over the restructuring price as there is only one customer and the alternative is sale into the Restructuring Scheme or producing the quota.

Leases can still be entered into up to March 31st subject to clawback. Leases commencing after Oct. 13th will not confer any right of quota purchase.

Land bought with quota pre Oct. 13th can be sold after April 1st of this year without quota.

No new leases of land and quota will be permitted after April 1st except within family.

Capital Allowances

Under the programme for Prosperity & Fairness, it has been agreed that quota purchases after April 1st will qualify for capital allowances for income tax purposes. The rate is likely to be 15% p.a. for 6 years and 10% in year 7.

A limit on cost for write off purposes equal to the Restructuring Scheme price will apply.

Repayment on quota purchase at 1.40/gal over 7 years @ 5½% amounts to 24p/gal and this will be fully allowable against Income Tax. This now makes purchase more attractive than lease.

Implications of Agenda 2000 / New Quota Regulations

The challenge facing dairy farmers over the period of the new quota regime will be to maintain profits in real terms in a period of static to falling milk price (including premium), static variable costs and rising fixed costs. To do this, dairy farmers will have to focus heavily on cost control and take any opportunities presented to enlarge scale. Cost reduction will be necessary to counter any price decrease and scale increase will be necessary to counter the effects of inflation.

More specifically targets to maintain profits should be: -

- To keep common costs of production at less than 40p/gallon for liquid milk.
- That small and medium sized producers increase scale by $^1/_3$ over the next eight years. Large producers will also need to increase scale but may not easily achieve the same percentage increase in all co-ops.
- To minimise labour requirements on dairy farms and reduce dependence on hired labour.

Economics of Quota Purchase

Quota purchase at or close to Restructuring Scheme prices will increase farm profit in almost all cases. Farm cash flow however must be carefully evaluated where large quantities of quota are to be purchased especially where such purchases also involve stock purchase and capital investment in buildings and equipment. In general, borrowings will need to be over 7 years to ensure repayments have a neutral effect on cash flow.

Where stock and facilities are already sufficient to supply additional purchased quota, both cash flow and profit will be enhanced through quota purchase. This situation applies on most farms as there are excessive cow numbers and low yield/cow.

Conclusion

Dairy farmers who are prepared to bring common costs under 40p/gal and are prepared to scale up by up to $^1/_3$ over the next 7/8 years will be able to maintain profitability in real terms and secure long term viability. The new quota regulations will greatly facilitate scaling up and reduce quota costs to realistic levels.