Milking smarter

Choosing a new dairy

DairyNZ

For more information visit dairynz.co.nz or phone 0800 4 DairyNZ (0800 4 324 7969)

DairyNZ
Corner Ruakura and Morrinsville Roads
Private Bag 3221
Hamilton 3240

Disclaimer

Contents

Choosing a dairy and yard type is largely a case of meeting the specific needs and goals of the individual farm business, the budget and personal preference. This document covers some key considerations for the decision making process.

Initial considerations

Farm goals

- What does this dairy investment need to deliver?
- Long term goals for the farm including farm development and herd size
- Are you looking for a dairy for yourself to milk in for the long term with all the comforts or is this short term to medium term development project for on-sale where the personal preferences and technology investments may not be as important?
- Are you prepared to start basic and make improvements or expansions over time?
- Are you trying to free up time to get off the farm or out of the dairy?

A realistic budget

Discuss the most effective use of capital with your bank manager or farm advisor.

Timeframe

Allow plenty of time at the beginning to look around and check on alternative systems. Applying for consents and finalising plans with dairy and effluent designers can take time too. Will there be competition for tradesmen at the time you are planning to build? Large scale projects like this are hard to keep to time, is there any time sensitivity? There is a rule of thumb for project management variables: "Time, Cost, Quality - pick any two" e.g. if you are in a hurry and want good quality, it is going to cost you.

Farm workforce situation

Are you looking for a low labour system? How many staff are available to milk? Want more time out of the dairy? How long is milking currently taking? How comfortable are you investing in more technology, to reduce labour demands on the farm?

A list of what is and isn't negotiable

This is useful when you start making purchasing decisions as there is always a more expensive 'better' option for almost every component of the dairy from automatic cluster removers to computer software. It is very easy to get 'budget creep' with the temptation of 'upselling' on each individual purchase decision.

Visiting other farmers who have installed similar dairies, and/or used the same builder and designer is extremely valuable for feedback and ideas. Questions could include: Did they stick to the quoted price? Was it completed on time? Did you get value for money? Would you use them again? What would you change if you did it again? Firsthand experience from others is worth more than sales pitches and glossy brochures. Note though, that there are a lot of poorly designed dairies in existence - avoid copying the mistakes of others.

Seek a range of opinions

Including other farmers, sales representatives, bank managers, vets, technicians, herd testers, relief milkers, dairy assessors, anyone who visits a lot of dairies and hears feedback on performance and user-friendliness. While they may have personal preferences, they can offer valuable perspectives and insights.

Understand the numbers

A partial budget may be helpful in decision making. Appendix 1 is an example for including automation in a rotary dairy.

Herringbone dairies (HB) – advantages and disadvantages

Advantages	Disadvantages
• Usually the cheapest type of dairy to build and maintain • Ideal for herd sizes up to around 400-600 cows. • Mechanically simple, fewer moving parts • Easy to apply MaxT[1] routine • All of the cows are in full view during milking, milker can assess cows at the start and end of milking, making it easier to identify any animal health problems such as mastitis • Easier for oral drenching • Can be expanded by lengthening the pit relatively easily • Can be more social to work in, allowing staff to communicate easily as they work • More variety in the range of movements 'ergonomics', which can improve fitness and reduce the likelihood of repetitive strain injuries for staff.	• It is very important to have an organised and consistent milking routine to optimise throughput and labour use in a HB to avoid idle time for staff or clusters and avoid over milking. • Electronic identification (EID) for recording/ milk metering etc. and in-shed feeding is more difficult. • Loading and unloading can be slow in large HBs • A slow milking cow can hold up the whole row unless using MaxT[1] • More chance of being urinated or defecated on than in a rotary dairy • Requires a lot of walking and swivelling for milkers, can increase fatigue • Typically darker than a rotary dairy, harder to get natural light into the pit. Can have negative practical and psychological effects.

[1] *For more information about applying MaxT in your dairy visit dairynz.co.nz/MaxT*

Rotary dairies – advantages and disadvantages

Advantages	Disadvantages
• Minimal entry and exit times if the system is working well (cow entry and exit is automated) • Cow flow is less affected by people/cow interactions than HBs • Usually a low line milk line (lower vacuum required than HB dairies, potentially more gentle on teats) • Less walking required for staff • Slow milking cows do not hold up more than one cluster • Platform speed sets the milking rate (can be a positive and a negative) • Platform speed can be altered according the time in the season and milkout speeds • Automation (ACRs, EID, feeding systems) generally easier to install in rotary dairies • Some animal health and husbandry tasks may be easier to administer in a rotary dairy, especially with a vet stand. E.g. tail painting, heat detection and monitoring, vet checks etc. • Usually have better natural lighting and higher ceilings than herringbone dairies, making them a nicer work space • Less likely to be urinated or defecated on by stock while working.	• More expensive to build, a greater capital outlay • Difficult to expand • Without automation (ACRs, automatic teat spraying and drafting), it requires two milkers to be present • Sole milkers with ACRs, does not allow the milker to visually assess the cow after milking before she exits the dairy • Awkward for oral drenching • If ACRs are not in place, and platform speed is too slow, cows are frequently milked out before they get to the cups-off station (overmilking) • More moving parts than a HB, requiring more maintenance • If milking routine is not organised and consistent, and cow flow, cupping and platform speed is too slow then milking efficiency (cows milked/hr) will not be achieved despite increased investment costs • More repetitive movements, with small range in type of movements- can lead to fatigue and repetitive strain related injuries for staff • Less social for staff- especially if automatic cup removers are in use and dairy is set up for a single operator.

The influence of herd size

<600 cows	600-1000 cows	> 1000 cows, large farms
For a herd size less than 400 cows, a HB is generally the first choice. For herds between 400 and 600 cows, either a HB or a rotary can suit. Generally a HB will be cheaper to build than a rotary. HB dairies are typically built with up to 44 sets of cups. HB dairies bigger than this may struggle with milk harvesting efficiency (over-milking, cluster idle time), unless there are additional milking staff. One person can milk comfortably and efficiently with up to 24 sets of cups. Between 24 and 36 sets of cups there can be inefficiencies in the work load between 1 and 2 people, too much for one person with the risk of over milking, not enough to fully occupy 2. One person can milk alone in a HB with 30 sets of cups and ACRs, although this is not likely to be more efficient than 24. Two people are required to optimise work routine with 36 or more sets of cups.	Generally rotary dairies are preferred for medium to large herds because of the labour and work time efficiencies. With a fully automated rotary, it may be possible to have one person in the dairy for much of the milking period, depending on what other tasks are required seasonally (i.e. calving, mating etc.). 50 bails is the optimal size for a rotary. Rotary dairies bigger than 50 bails start to become less efficient in terms of labour saving per dollar invested. 70-80 bail rotaries have inefficiencies in terms of platform speed and milk out time requiring 2 cups-on operators to keep up with the faster platform speed required.	For large herds, large farms, or farms with long walking distances for cows, it may be more efficient long-term and easier for cows and staff to split the farm in half and build two smaller dairies

Yard shape and size

Yards need to be designed in a way that allows cows to enter calmly in their walking order, and have sufficient space to rearrange themselves into their milking order once in the yard.

Rectangular yards	Circular yards
• Preferred for yard shape if farm layout allows for it • Best for cow flow (if entry is at the rear of the yard) • Cows prefer to walk up-hill, a rectangular yard allows for a gentle slope up towards the bail area, and in HB dairies, this can continue up the length of the pit towards the exit gate. • Can be extended • Can put a second or third herd behind a high lift gate.	• Generally the preferred yard design when farm layout requires cows to be turned around (to go back the way they came) • Difficult to enlarge • Good cow flow if cows enter from an appropriate location (as far from the entry to the dairy as practical) • Easy to clean with a central hose or wash system under backing gates • If yard is a full circle, can put a second herd into the same yard if have second backing gate.

Labour

There are significant opportunities to reduce labour demands in relation to milking through careful consideration of the following aspects of dairy design:

Dairy type and number of bails:

- HB < 24 bails one person can milk
- HB 24-36 bails- awkward number of bails, too much for one person to milk efficiently, but not enough work to engage two people fully (inefficient milking routine or use of labour)
- HB > 36-44 bails, two people are required to optimise throughput and harvesting efficiency
- A rotary without automation will require at least two milkers to be present.
- A 50 bail rotary with automation (automatic cup removers, bail retention arms, automatic teat spraying, automatic drafting) can be comfortable for one operator outside of busy times such as calving and mating.
- Diminishing efficiencies building a rotary with more than 50 bails due to cost, the faster platform speed required, and need for additional labour

Wash down

Automated plant and yard wash-down systems can save labour time, electricity, and water, particularly if flood wash water recycling is in place in the yard area.

Energy saving

Reducing energy consumption for milk cooling, milk harvesting and hot water production, provide the greatest energy savings. Keep in mind future milk cooling requirements and trends in electricity and gas prices.

Consider these factors:

- Milk cooling: Adequately sized plate coolers, double-bank plate coolers, cooling towers, and milk silo insulation wraps.
- Milk harvesting: Variable speed drives for vacuum and water pumps, aiming for the shortest milking times possible (use of Max T and milk harvesting efficiency strategies).
- Hot water: Optimise water-use and temperatures, off-peak heating, insulating pipes and cylinders, heat-recovery or gas water heating systems.

These options may be worth investigating to see if they demonstrate a viable benefit for installation in the dairy:

- Energy efficient (e.g. LED) and motion activated lights in and around the dairy
- Energy saving milk cooling options such as nocturnal water cooling (cooling water overnight on the shed roof or in a cooling tower)
- Gas water heating
- Wiring a generator plug into the switchboard for significant power outages (this is much cheaper and easier to do when the dairy is built, than retrofitting).

Other useful resources to review when building a new dairy:

Responsible Dairy Conversions

dairynz.co.nz/farm/farm-construction

Smart Water use resources for reducing fresh water use around farm and dairy

dairynz.co.nz/environment/water-use/smart-water-use

DairyNZ Health and Safety resources

dairynz.co.nz/people/health-and-safety

DairyNZ effluent system design and management resources

dairynz.co.nz/environment/effluent

Appendix 1: Partial budget example

Scenario: Weighing up the costs and benefits of including full automation in a new rotary. This includes: automatic cup removers, electronic identification, automatic drafting, and recording software, in-shed feeding.

Positives	Negatives
• Faster milking routine (cows return to pasture sooner, staff able to move onto other farm tasks) • Integrate into farm monitoring, recording and reporting software- may assist management in decision making and planning. • Reduction in over-milking and subsequent teat damage and mastitis costs • Fewer 'go-around' cows on a rotary (with ACRs set for a higher minimum flow rate), results in shorter milking times, frees up labour, cows return to paddock faster, reduced shed running costs such as electricity and water use. • Potential for single operator in the dairy (reduction in milking staff required?) • In-shed feeding option may improve feed utilisation, and overcomes bullying issues. • Opportunity to include supplementary minerals in feed ration such as calcium, removes need for paddock dressing with causmag (wastage and imperfect dosage issues) • Automatic washdown programs and greenwater flood yard wash systems can save labour time and costs associated with manual cleaning, freshwater use costs, reduce effluent volumes, storage requirements and effluent application management and maintenance costs.	• Cost of debt servicing for new technology. - Automatic cup removers $/bail - Dairy software packages one off costs and subscription charges - In-shed feeding. • Subscriptions and user-rights to software • Repairs and maintenance on technology and parts (for example ACR parts, consoles for computer/ user interface, upgrades EID tags etc.) • Internet requirements for software and home network linked technology.

dairynz.co.nz