Dairy Shed Building Guide

Don Chapman Waikato Ltd

A guide to assist farmers with the dairy shed building process

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Background information about Don Chapman Waikato

Don Chapman Waikato Ltd is a licenced installer of Chapman Dairies ,
Originating in the Waikato region of New Zealand, Chapman Dairy™ have licensed construction teams operating across New Zealand. We bring the best features of New Zealand pastoral based farming systems to you, the farmer.

Don Chapman Builders was created on 1st April 1988 By Don and Yvonne Chapman

Since then we have built over 550 farm dairies throughout the Waikato and NZ.

Questions to consider when building a new dairy shed

Which builder should I use?

Rotary or Herringbone?

What plant installer should I use?

Which Electrician

Round yard or rectangular?

Farmers often invest between $1m and $2m in dairy parlour development and milk harvesting systems. While most will say initially that they are happy with their investment, (who wants to be seen wasting money?) in reality very few are 100% satisfied with the choices they have made or the process they have been through. This is generally because farmers will only go through this process once in a lifetime and therefore lack the experience to plan out what is best for them, evaluate the quotes they receive, properly contract their chosen provider, and effectively manage the installation project.

This e-book has been prepared to help farmers and other decision makers better manage their investment in building a dairy shed, so that in the end the project is completed within budget and they are satisfied with their decisions. The information is prepared in the form of questions to ask providers, along with advice to help farmers through the decision making process of choosing the right design, the right people, and the right dairy shed design and milking plant installation for them.

This booklet does not set out to recommend any one design over another, nor do we claim to be the only authority on dairy parlours. We strongly recommend that you view as many dairy parlours as possible and talk to as many farmers and providers as possible before making final decisions.

Dairyshed building contractor selection

Invariably farmers don't get what they initially think they are contracting for.

Sections of the dairy parlours mysteriously "fall through the gaps". In response to questions from the farmer the builder or milking provider may say: "the earthworks are the farmers responsibility," "the electrical wasn't in my quote," "the shed plumbing is not my responsibility," "I didn't quote on the vat stand," "if you want a vet platform that will be an extra," or following a year of electrical problems the installing electrician might say "you chose the cheapest price so what do you expect?" or when the rails at the front or side of the of the yard bend outward because someone left the backing gate on too long you realise you could have used 65NB pipe posts instead of 50NB.

The following check list might help avoid some of these traps.

1. View the last three or four sheds your quoting builder has built.

2. Talk to the four farmers to check builders references

3. Ask the four farmers the following questions:

Was the quote easy to read and understand?

Was the quote accurate compared to the final cost?

What were the surprises?

Did the job take as long as expected or longer?

Were the builders on the job full time until it was completed?

Were the builders easy to deal with – between the farmer and the builders; the builders and the other contractors?

Were they tidy throughout construction and did they tidy up afterwards?

Was the farmer happy with the quality of the finish on the concrete, the pipework, the nibs, the drainage?

What is the cow flow like? Does the exit slow cow flow? What is the drafting like? Is there sufficient holding pen space?

Dairyshed building contractor selection cont.

4. Have a good look at the holding yard. In particular the following:

Are there any puddles in the shed or yard? There should be virtually no flat or level areas in a cowshed.

How are the nibs formed? If they are made of concrete blocks are they reinforced and tied into the concrete floor; are they grouted in between; are they finished with an oval top? Are they straight? Poured nibs are generally stronger but the same questions need to be asked of them.

What size pipes are used for the drainage? These need to be a minimum of 100mm with 150mm leaving main yard area

Does the yard hold the promised number of cows? Allow 1.2 square metres per cow for the number of cows you want to hold in the yard area.

What are the yard post sizes and heights and how are they anchored?

For example:

Gate posts need to be 80NB or 100NB galvanised pipe.

All other posts need to be 50NB or (40NB will suffice in a curved yard)

Posts need to be 1200mm above ground and 450mm below ground. (1500mm above ground in holding yards where cows are more likely to want to jump out)

Concrete should encase the post for the first 600mm – made up of footing (350mm), the yard thickness (not less than 100mm), and the nib (150mm).

All posts need to be welded together by way of yard railings or within the concrete including all gateways posts for earthing purposes.

Gate frames need to be of 32NB min galv. pipe.

Top rails need to be of 32NB min galv. pipe.

Lower rails and gate rails need to be of 25NB min galv. pipe.

Yard concrete should ideally be not less than 100mm thick.

Yard fall should be no greater than 25mm per metre.

Cows walk uphill on to the yard to the shed better than downhill, and washing (especially auto washing) is easier.

Yard should be finished with a pan finish or other non slip (but not too rough either) surface. Reinforcing mesh should be included in the cow entry yard back from the bridge or entry area to

provide good earthing. This mesh should also be welded (i.e. welded not wire tied) into the yard posts, building and rotary platform to ensure good earthing.

*Key Point:
Ensure you pack your tape measure, camera and this booklet when visiting new dairysheds.

Dairyshed building contractor selection

cont.

5. Check out the Cow Shed

What kind of structural steel is used? RHS is much stronger and easier to weld suspended rump rails to than C purlins. Is the finish galvanised or painted? Rust streaks after a couple of years are not a good look.

What is the quality of the finish like?

The concrete finish – is it too slippery or too rough? Are there any puddles on the floor?
What is the welding like?
What is the finish like on the walls?

Is there good natural light? This is very important.

What ancillary rooms do you want and how big do you need them to be? Do you want a staff room? A toilet? Chemical storage? A vet and drugs room? A crèche? See what other farms have. A shower often seems like a good idea. Is it for emergency chemical spills or for staff to have a shower after milking? Do you provide hot water to the shower? We have seen many shower cabinets being used to store Causmag!

Do these ancillary rooms have drainage? Given the likely traffic of wet dirty gum boots it is likely they will need to be hosed or at least washed out from time to time.

What sort of doors do they have? Wooden doors are not suitable for wet situations.

Is there a roof vent? Some sheds virtually rain as the frost thaws and condensation forms on the underside or are stifling hot in the summer.

What are the drainage grates like? Will they let through grass and hair but stop larger objects? Are there enough grates to make hosing out easy?

Is there good fall to at least four drains in the ring drain around the circumference of the rotary platform? Any water laying here?

Is the building bird proof? Can birds perch anywhere? “I” beams must be gusseted.

Are wash tubs included for the tanker driver and milkers?

In A Rotary What amount of space do you want around the outside of the platform? Also remember that different makes of platform have different outside diameters. Both of these factors can have big effect on the shed cost as they impact on portal size plus, of course, concrete, colour steel etc.

In a Herringbone, What pit depth do your prefer? 900mm is the new industry standard but this can be anywhere from 800mm to 900mm.

*Key Point:
Visit dairy sheds during the day and night to observe both natural and artificial light.

Herringbone Vs Rotary

Herringbone or rotary?

The general rule of thumb is herringbone for herds up to 400-450 cows, and above that rotary is the preferred system.

Dairies run most efficiently when the capacity of the equipment to milk the cows matches the capacity of the labour to milk the cows. This means your staff won't be waiting for the equipment to finish, and you can rest assured that your system is being fully utilised, not idle and waiting for milkers to catch up.

The higher capital outlay involved in building a rotary compared to an equivalent herringbone is justified by greatly increased labour efficiency, the opportunity for more automation and a better milking environment.

Some things to consider are

Herd size

The new dairy needs to stand the test of time and still be performing optimally in 25 years, so how big will the herd be then? Choosing the right farm dairy today will future-proof your business.

Milking time

How long do you or your team want to be in the farm dairy? Most farmers, regardless of the number of milkings per day, agree that 2.5 hours is the optimum time ensuring the herd spends the majority of each day eating grass – not walking to or from the dairy or waiting to be milked.

Staff

How many people do you want in the farm dairy? Herringbones – depending on the length of the pit – often require two or more staff to milk efficiently whereas, with automation, one person can efficiently milk 1000 cows in a 60 bail rotary.

Total cost of ownership

It is easy to get side-tracked by the up-front cost of renovating or building the new farm dairy but it is important to consider the total cost of ownership over the life of the building, system and technology.

You want to know that the investment you make today is future proofed so it can easily be updated over the years to keep pace with advances in technology. You also want a system which is reliable with reduced maintenance costs.

Choosing the right system

The type of dairy you choose is strongly influenced by farm size and budget. The decision to choose a herringbone over a rotary is closely related to cow numbers, milking time expectation and budget limitations.

Location

When choosing the location of your new farm dairy you may want to consider the correlation of the new milking platform to your paddock layout and existing farm races. Proximity to essential services is critical eg distance to power, tanker track and effluent ponds. You also need to consider the potential for future expansion ie will the new dairy be in an optimal location of you add another block of land or a feed pad?

Pros and cons

Advantages and disadvantages of herringbone dairies

Advantages

- Cheaper to build and maintain
- Cows are in full view of the milker while in the dairy
- Easier to drench
- Can increase capacity (by lengthening the pit if starting from a small dairy size)
- More sociable.

Disadvantages

- Requires a lot of walking and swivelling for milkers
- An efficient milking routine is important to achieve maximum throughput
- Loading and unloading can be slow in large herringbones
- Slower milking cows can slow down the whole row if MaxT (milksmart.co.nz) is not used
- In-shed feeding system not as simple as for a rotary.

Advantages and disadvantages of rotary dairies

Advantages

- Quick entry and exit times, if working well
- Cow flow less affected by cow/people interactions
- Usually a low milk line, so lower vacuum
- Little walking required of the milker
- Slower milking cows do not hold up more than one set of cups
- Platform speed can be varied with the stage of lactation and yield of the herd
- Automation often easier to install
- Generally brighter and airy working environment.

Disadvantages

- Expensive to build
- Difficult to expand
- Awkward for drenching
- Difficult for the milkers to see the cows for at least some of the milking
- More moving parts than a herringbone, requiring more maintenance.

Round Yard versus Rectangular Yard

The following comments apply to both herringbone and rotary cowsheds.

We believe that both types of yard can work well when set up correctly and both can suit certain applications more than the other, but there are as many views about this argument as there are experts.

Round Yard VS Rectangular Yard

Round Yard	Rectangle Yard
More Compact = less excavation and concrete	Need a longer site to accommodate yard and entry.
Shorter exit race in a rotary	
Generally cheaper even with two backing gates	Generally more expensive due to higher cost of backing gate and longer length of rails.
Not able to flood wash	Can easily set up floodwash (clean or green water)
More difficult to cover yard if needed	Yard can more easily be covered

Rotary Platforms

Key points to keep in mind are cluster alignment, reliability and ease of servicing.

All of the main milking plant companies have their own rotary platforms and of course try sell the whole system as a package, i.e. platform and milking plant. The supply of rotary platforms is very competitive so margins aren't great. Some may discount the platform to get the milking plant where there is greater opportunity for longer term servicing business and all will use the argument that you are better off dealing with one company rather than two. Invariably the platforms are installed by a separate company even if sold by the milking plant company.

There is an opportunity to shop around for a platform that suits the farmer's needs and has the specifications he/she wants. The real keys to a rotary platform are cluster alignment, reliability and ease of servicing (platform and milking system).

On the next page is a list of things to consider when looking at installing rotary milking platforms.

Rotary Platform key points

Do you want cabinets or open bails? What level of automation do you want? Cup removers, retention arms, milk metering, mastitis detection, auto plant wash? Can herd testing be done from outside or does it need to be done from centre of platform?

Do want steps down in to the centre of the platform? Or are you having an underpass? Are the steps supplied on your preferred platform? Are they OSH compliant?

Do you want a concrete deck, steel, stainless steel or composite deck? The vast majority of platforms these days are concrete mainly because of low noise and non slip factors.

If concrete, what is the concrete specification? It should be not less than 40mpa plus have other hardeners and additional strength additives.

What reinforcing is in the concrete? There is a significant variation in the amount of reinforcing included in different platforms. The more the better. Less reinforcing = more uncontrolled cracking.

What level of finish is applied to the concrete surface? It needs to a balance between too rough and too smooth.

How big is the platform? The outside diameter (OD) impacts on building costs.
Platforms made by different companies have differing ODs.

Is there a drenching race or room to fit a feeding system?

Are the bail sizes right for your cows? You can vary bail sizes.

What size pipe is used for bail construction and rump rails?

What is the size of the pipe posts used for rump rails supports and who supplies them? The builder or the platform supplier?

What is the quality of the welding like? Are the welds brushed and cold galv. painted (not just silver painted).

How is pedestal fixed to the concrete floor? Is it imbedded in the concrete or dyna-bolted?

Who installs the pedestal footing plates – the builder or the platform installer?

Multi roller support works well but like all platforms, is very dependent on quality of installation. It is more difficult to service the outside drives.

What sort of contact surface occurs between the rollers and the track? The greater the better.
Is there auto lubrication installed?

Check the platform height. Is it user friendly? 900mm is a good average height that covers the height of most operators. The platform height also governs the height of the yard bridge, the yard and also the centre of the platform and there for any effluent drainage.

Do you want the platform to slope inwards or outwards? This will impact on drainage and the milking system. Be aware of what you are getting.

Does it have a skirt? Is it stainless steel (who removes the plastic protective covering? – a good day's work for someone) or plastic? Some platforms have the milking system on the outside without protection from the deck wash and effluent.

Is the skirt stationary or rotating? A rotating skirt, while easy to keep clean with a stationary jet of water, does tend to blow water under it while hosing out, into the centre. Fixed skirts can be cleaned by water from a rotating jet and make for a clean dry environment in centre – easier for servicing milk lines, drives etc.

Who supplies and places the skirt and its brackets– the builder or the platform installer?

Who supplies the console/s – the electrician or the platform installer? How many consoles are you getting – cups and cups off? Cups off has more time to control the backing gate.

Who supplies the VSD (variable speed drive) control module (contains VSD, PLC and motor overloads)? Is it complete and ready for the electrician to provide cables and termination or do you still have to pay the electrician to design and provide VSD, PLC and overloads?

Is the milking system easy to install on your preferred platform? Ask the milking system installer – not the platform/milking system salesman.

Herringbone Key points

How many sets of cups? (10 rows or less is ideal) Are you likely to acquire more land and more cows? Would it be worth making the pit longer to accommodate more sets of cups in the future?

What Cup centres do you want? What size cows do you have? A standard of 700mm centers is the most common and will do from cross breeds up to medium/large fresians.

Do you want a standard pit width and depth, is there a pit overhang required for low lever jetters, or are they swing down.

Will there be a feed system going in during the build or in the future? The shed might need to be made wider to accommodate feed system.

Does the washwater from the vat stand and filters come out thru the pit wall where it is visible to the milker incase of an open vat door or tap left open?

Will you be having Auto drafting or is there a chance you will in the future? It is cheaper to provision for it at build time than cut concrete and move rails down the track.

Final words

There are lots of issues to think about and deal with. We trust this booket helps you in your decision making. Remember the dollar considerations are generally short term ones. You may have to live with the shortcomings of your choices for a long time. The other aspect is to choose a team you have faith in, are comfortable working with and who you feel will service you well in the long run.

From the team at Don Chapman Waikato Ltd we wish you well on your new dairy shed design and installation