Cattle shelter – clear plastic roof

Simon and Pep Rea – 'Glenwood' Panmure, South-west Victoria

Farm location

Farm history

Simon's parents commenced dairy farming on 170ha at Panmure in South West Victoria in the late 1960s. In 2010, Simon and his wife Pep purchased the Rea family farm, having purchased an adjoining 80ha two years earlier in 2008.

At the time, Simon's parents were milking 400 Holstein-Friesian cows, operating a split calving system with 90 per cent of cows calved in March-April and 10 per cent calved in August-September.

In 2012, Simon built a new 50-unit rotary dairy to replace the worn-out 30-stand rotary dairy. While this enabled more cows to be milked per hour, expansion and development of the farm business remained impeded by wet conditions over Winter months each year, which resulted in considerable damage to pastures and tracks.

"Our biggest limiting factor on this farm has always been Winter. Summer is not a problem," Simon explained.

Few cows have been milked in January-February, as most have been dried off by Christmas, and most paddocks have adequate tree shade for these cows.

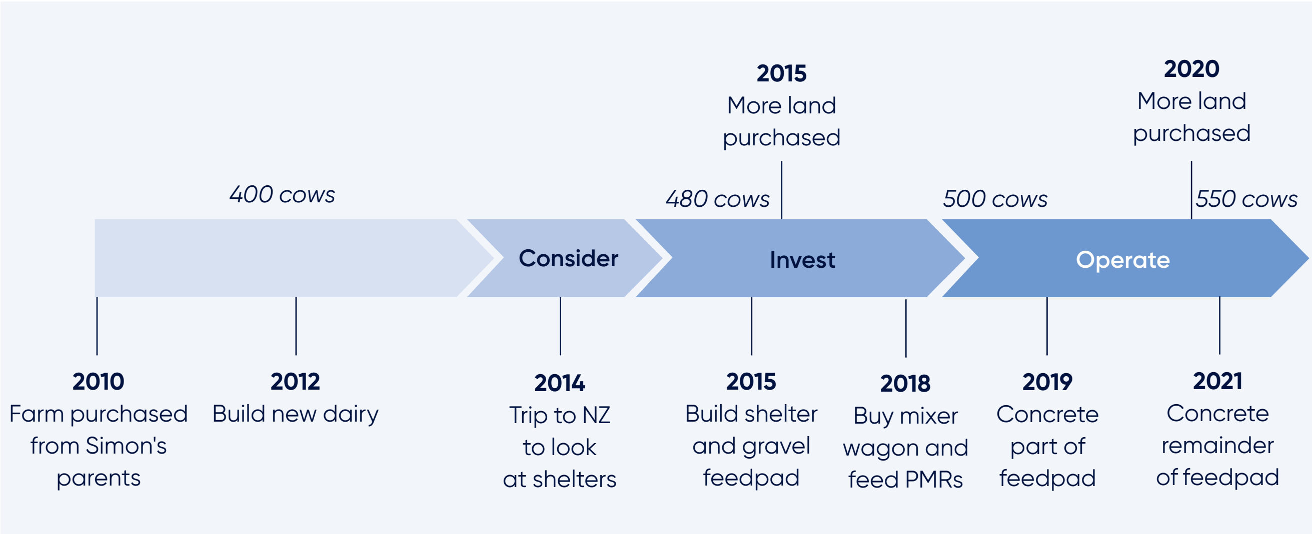
Consider phase

Simon and Pep began to consider building a facility near the dairy that would provide shelter to cows during the Winter, while at the same time enabling them to grow and harvest extra grass. If the shelter made it possible for them to increase their pasture utilisation by 10 per cent, from 8 tonnes DM/hectare to 8.8 tonnes DM/hectare, then an additional 80 tonnes DM of pasture per year per 100ha would be harvested by cows and converted into milk.

Simon enquired about clear, plastic roofed Redpath shelters, as used for horticulture and for housing dry cows in New Zealand. In late 2014, Simon visited New Zealand to see several shelters in use on dairy farms and returned home certain that such a shelter was an affordable solution for his farm. "I wanted a facility that I could use to manage the farm, the pasture and the cows in Winter, and this shelter seemed to tick the boxes," said Simon.

Committed to operating a pasture-based grazing system, Simon never considered a contained housing system.

Timeline



"We're grass farmers. This shelter was put in with the opposite intention – to complement our grazing, not replace it."

Invest phase

Construction of the cattle shelter began in March 2015 and it was commissioned in June 2015. The cost to build the shelter was A$350,000. Today, it would cost A$400,000-A$440,000, based on an area of almost 4,000m^2 at A$100-110/m^2 built.

The facility, which is 81m long and 49m wide with five bays, is on the same 1 per cent slope as the adjacent feedpad, and is oriented north south. Each bay has 27 posts running down each side set in concrete footings 1.2m deep, coated in plastic to prevent corrosion. The open sides of the shelter are 4m high. The shelter's steel frame has an expected working life of at least 25 years. The plastic roofing material, which is 254 micron thick and rated to withstand winds of 165 km/hour, is guaranteed for five years and has an expected working life of ten years. The shelter's compost bedded pack is 500mm deep. Export-grade pine wood chips were initially laid over a compacted clay surface.

For additional rain protection, the west side of the shelter has a 1.8m eave attached to it. A wall was also provided for the west side of the shelter but has not been installed. For use during hot Summer conditions, the most western and eastern bays of the shelter are fitted with shade cloth curtains under the roof that can be extended over the bay to reduce solar radiation. In addition, the apex of the shelter's second bay has a roof vent fitted along its entire length which can be opened electrically to enable hot air to escape.

When Simon visited New Zealand, he observed that in shelters with the middle bay used as a feeding lane, the bedding pack tended to become wet 2-3m each side of the trough. As he wanted to avoid any wet bedding problems with his milkers, he opted to build a feedpad external to the shelter, with two modular 1.2m wide concrete troughs positioned 9m apart that are sufficient for 450 cows. Initially a compacted earthen feedpad was built – this was later concreted in two stages in 2019 and 2021. Today, it would cost an additional A$200,000 to build this concrete feedpad from scratch. So in today's dollars, the total investment for Simon's shelter and feedpad would be A$600,000-A$640,000.

For the first three years after the shelter and feedpad were commissioned, Simon continued to use a silage cart. Then, in 2018, he bought a twin screw, vertical mixer wagon and began to prepare more complex partial mixed rations.

Operate phase

The Reas have been operating their facility for eight years now. It remains in good condition and is fulfilling its purpose.

"This shelter gives us good control of our pastures in wet Winter months and the ability to milk extra cows, which helps to dilute our fixed operating costs," said Simon.

Simon's aim is to provide cows in Winter a warm, touch-dry bed. He was initially fearful that stocking the shelter at 7m^2 per cow (4,000m^2 for 550 cows) would result in wet bedding, even when it was only occupied overnight, between PM and AM milkings. So he split the herd into two separate groups to effectively halve the stocking density, with half the herd using the shelter between AM and PM milkings and the other half between PM and AM milkings. However, Simon found that this system was far too labour intensive, so he returned to managing the cows as one group using the shelter only between PM and AM milkings.

At times of the year when the weather is fine and plenty of pasture is available, the shelter is not used at all.

"It's not a high-cost facility that I feel I must use every day of the year," said Simon.

The daily routine is as follows: cows exit the dairy after am milking, eat some PMR from the feed troughs and then walk to their day paddock. Simon then takes 25 minutes to till the shelter's pack with a field cultivator. Its tines aerate the pack to a depth of 300mm. The fluffed-up pack is then left undisturbed for the remainder of the day.

After PM milking, cows eat some more PMR from the feed troughs and then walk to their night paddock. They are not locked in the paddock and are free to make their way to the shelter overnight if they wish. Simon will usually find at least a few cows resting in the shelter when he goes to bring the cows up for AM milking.

"If it belts down rain overnight, I will find most of the cows here," Simon explains.

In Winter, when paddocks and tracks have become very wet, Simon changes the routine. He provides cows with a full evening ration as a mixed ration on the feedpad and locks them in to stay the night in the shelter.

"When the farm is crying out for a bit of help – its wet, days are cold and there's more rain forecast – I can lock the cows in every night. So, we can go straight from a 30-day rotation to a 60-day rotation. We halve their walking, and after morning milking they are keen to go to a paddock."

In the very wet Spring of 2022, cows used the shelter every night from the start of July to mid-October, with minimal grazing to protect flooded paddocks from damage. Despite this, the bulk milk somatic cell count remained at about 50,000-55,000 cells/ml, keeping Simon in the top 5 per cent of his processor's suppliers. While pastures remained too wet to graze well into October, they grew very well. So when the paddocks were finally dry enough, a bumper silage crop resulted, enabling Simon to build up his fodder reserve. In extremely wet conditions, Simon has kept cows in the shelter continuously when not being milked for up to four consecutive days.

By only giving cows access to the shelter for 10-12 hours per day (between PM and AM milkings), Simon has found that he is able to accommodate twice as many cows in the shelter as he would if it had a solid roof, without any wet bedding problems. He attributes this to:

- The shelter's clear plastic roof, which permits about 80 per cent of solar radiation to pass through it onto the compost bedded pack, resulting in faster drying than in a shelter with a solid roof, and;
- The practice of tilling in the morning and leaving the pack fluffed up and undisturbed until PM milking, which enables the pack to dry more than it would if it was immediately tramped on by cows after AM milking.

PMRs fed to milkers on the feedpad typically comprise pasture silage, cereal hay or vetch hay, grain and almond hulls. In the bail, cows are fed grain, lupins, canola meal and additives. Maize silage is now a major component of the feeding program.

Simon sees the shelter very much as a pasture management tool, which has enabled him to increase the herd from 400 to 550 cows on the same milking area, and thereby increase the farm's annual milksolids production from 206,000 kg to 311,000 kg. At a milk price of A$10/kg milksolids, this is an extra A$1 million in annual income.

Simon describes the facility as like having an extra 60ha of milking area just 30m from the dairy at about one quarter the cost based on current land values.

"With the shelter and feedpad, the farm actually handles 550 cows easier than it used to handle 400 cows.

The ability to extend the rotation in July–August–early September is like gold. You hit Spring with more grass cover and it effectively allows you to use your urea and fertilisers to better benefit," said Simon.

Other benefits that using the shelter has provided include:

- Reduced annual pasture renovation and track maintenance costs.
- Improved cow comfort and feed conversion efficiency.
- Improved cow hoof health and herd reproductive performance.
- Reduced stress each Autumn, wondering how challenging it will be to farm through Winter and Spring, and a greater sense of control.
- Having cows just 30m from the dairy at 5:00AM on a cold, wet morning (rather than a kilometre away in a paddock).

"When cows have to lie on wet ground in the paddock in Winter, it sucks the heat out of them. When they lie on the pack in the shelter, it pumps heat into them almost!" said Simon.

Even during times of the year when the shelter not being used each day, Simon has found that the pack remains warm, indicating that aerobic bacteria remain active, continuing the composting process. Over time, as the proportion of manure solids in the pack increases, the pack's nutrient content increases. Every 3-4 years, the pack in each bay of the shelter is removed and spread on paddocks as fertiliser.

Most years, Simon does a minor top up with woodchips, with about 80 per cent of their cost recouped through reduced fertiliser purchases. However, in 2022, when fertiliser prices were very high (A$1,000-A$1,500/tonne), Simon took a different approach. He removed all the bedding from all the shelter's bays to a depth of 500mm and spread it over 230ha of the farm instead of buying fertiliser.

What would you do differently?

If he had his time again, Simon would make the shelter a little larger. He wouldn't bother fitting the roof vent and shade curtains or order the wall for the western side of the shelter, as these have not proved necessary for his situation.

Where to from here?

Simon considers the shelter to be one of the best farm investments that he and his wife Pep have made.

"It was about the most affordable thing that we could do, and simple to operate."

Simon plans to replace the shelter's plastic roof in the next two to three years. This will cost about A$30,000, equating to A$3,000 per year over its ten-year life.

Simon has no ambitions to dramatically increase per cow production with the shelter, preferring to maintain about 8,500 litres per cow per year and not push cows too hard. He may however build a second shelter on the farm for use by yearling heifers to provide them with more comfort through Winter and improve management of their pastures.

FOR FURTHER INFORMATION

myda.dairyaustralia.com.au/fse
dairyaustralia.com.au/nationalguidelines
dairyaustralia.com.au/farmsystems

ACKNOWLEDGEMENT

Thank you to Simon and Pep Rea for agreeing to share their knowledge and experience with dairy intensification.

Overview

Farm			
Farm size (ha)	415		
Grazing area (ha)	325		
Cropping area (ha)	25-20 (maize)		
Production system	Grazing based, with cattle shelter and concrete feedpad		
Dairy type	50-stand rotary		
Climate (BoM historical data for farm locality)			
Mean annual rainfall (mm)	783		
Mean no. rain days/year	115		
Mean no. days/year ≥ 35°C	8.5		
Mean no. days/year ≥ 40°C	1.6		
Mean annual daily solar exposure (MJ/m^2)	15.0		
Conditions over Summer	**Dec**	**Jan**	**Feb**
Mean temperature (°C) at 3:00pm	21.3	23.7	24.4
Mean Relative humidity (%) at 3:00pm	52	47	46
Mean Temp. Humidity Index at 3:00pm	67	70	71
Mean wind speed (km/h) at 3:00pm	22.6	22.7	21.7
Mean daily solar radiation (MJ/m^2)	24.2	24.4	21.1
Herd			
Milking cow numbers	550		
Breed	Holstein-Friesian		
Calving pattern	Split (90:10 Autumn:Spring)		
Production per cow per year (L)	8,500		
Infrastructure and equipment			
Infrastructure	• Cattle shelter with clear plastic roof • Concrete feedpad with troughs		
Equipment	• Mixer wagon and tractor		
People			
Full time equivalents (FTEs)	4		
Cows per FTE	137		

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