Measuring the true value of dairy cow comfort

The cow's environment is a major component in performance—but cow comfort is still often undervalued. For one dairy farm in Dumfries, a mattress upgrade has lifted daily individual yields by up to two litres.

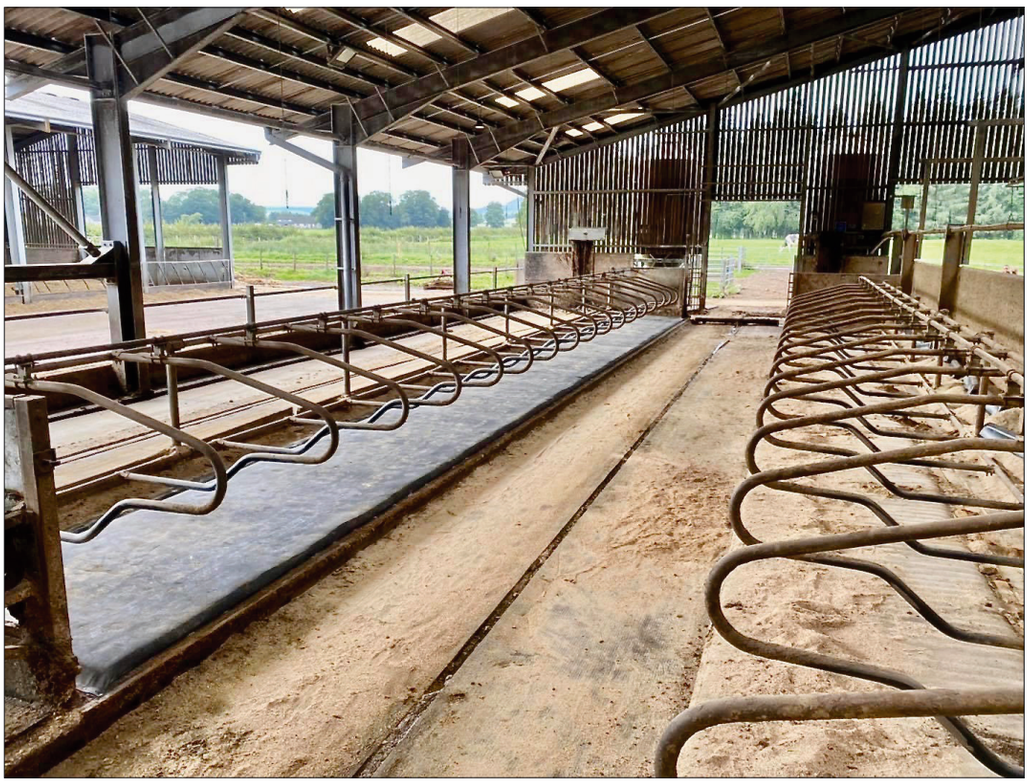
Investing in cow comfort could boost milk yields by 1.0 to 1.6 litres per cow for every additional hour of lying time over 10 hours, according to industry experts. Any investment is a risk—but, extrapolated over the herd, the value of increased cow comfort can be substantial.

SRUC's Crichton Royal Farm in Dumfries is a renowned dairy research establishment. However, it still encounters the challenges of a commercial farm and must produce milk at a profit—at the time as addressing its role in scientific trials.

So when farm manager Hugh McClymont proposed to invest £16,000 in cow comfort, this had to align with both the farm's research and commercial objectives.

One of the farm's aims is to improve cow health and welfare using methods that are transferable to UK dairy herds and beyond, says Mr McClymont. "And while the farm is unlike a normal commercial unit it is still a business producing for a contract, with the research taking into consideration economic viability."

The Langhill herd at Crichton comprises 180 pedigree Holstein Friesian cows, which are grouped according to genetic merit—high (select) and moderate (control). These groups are then split equally over two contrasting systems for five-year periods. They are currently running a comparison of standard and high energy diets.



The cubicles at Crichton Royal Farm's Langhill Unit after the mattress upgrade was completed.

Farm facts

- Crichton Royal Farm—Dairy Research farm operated by SRUC
- Langhill herd—180 pedigree Holstein Friesian milking cows
- Arla 360 contract
- 12,000 litre lactation average (select)
- 9,000 litre lactation average (control)
- All-year-round calving
- 380 day calving interval
- 30% replacement rate
- £320 approximate cost of lameness treatment
- £200 approximate cost of mastitis treatment.

Observations

In September 2019, the herd was just meeting the minimum target lying time—averaging 10.07 hours per day.

Each additional hour of lying time over 10 hours should add milk to the bulk tank. Just one additional litre per cow per day equates to an extra 54,000 litres—or £15,120—over a herd lactation, says Mr McClymont. Without requiring extra feed this is an attractive prospect.

Quarterly scoring and daily checks highlighted that hock rubs and hair loss were present throughout the groups. "Alongside lower lying times this indicated that the beds weren't giving the comfort levels we would want."

Upon inspection of the beds, wear and tear was obvious. "The dairy housing was modernised in 2005 with the installation of 200 Cow Comfort cubicles, followed by Wilson Agri Original Pasture Mats in 2008," says Mr McClymont.

"After 11 years of heavy use, the original mats had become compacted and hard—making them much less effective at cushioning and comfort." Following discussions with cow welfare experts, he decided to invest in the cow beds to improve comfort and welfare.

Mattress upgrade—costs per cow

- £25 latex foam premium pad
- £40 latex waterproof top cover
- £15 labour.

Mattress upgrade

"A complete overhaul was an unnecessary cost," says Charlie Sutcliffe, senior UK sales manager at Wilson Agri, which supplied and arranged third party fitting of the mattress upgrades in November 2019.

"The pasture mats *in situ* were still good enough to provide a raised and insulating base. To address hock rubs and increase lying times, a 30mm latex foam premium pad was installed on top of the old mat, and then covered with a latex waterproof top."

The upgrade took around two

Table of performance and health comparisons			
	September 2019 (3 x daily milking)	March 2020 (3 x daily milking)	August 2020 (2 x daily milking)
Average lying time (hrs per day)	10.07	11.33	11.53
Lying time range (hrs per day)	9.14 – 10.39	9.45 – 12.02	11.14 – 12.26
Yield (Lactation average)	10,294	10,512	10,600
Yield (daily average)	34.9	34.1	37.9
Protein (%)	3.32	3.31	3.36
Butterfat (%)	4.04	4.22	4.21
Lesion (hock rub) score	53	51	43
Cases of lameness (treatments)	25	21	18
Cases of mastitis	9	5	1
Note: Until March 23rd, 2020, cows were milked three times daily through a 28:28 herringbone parlour on intervals of eight, seven and nine hours (4am, 12pm and 7pm). The herd was then moved to a twice a day milking frequency with 12-hour intervals to reduce labour demand as a precautionary response to the Covid-19 pandemic.			

days, based on 100 cow spaces per day with no structural changes to cubicles required.

In total, it cost £80 per cow, which will pay back in 12 months through increased productivity of just one additional litre at the current milk price. In comparison, a complete new mattress with install would cost £115 per cow.

Cow lying times

Lying time has increased by an average of 1.5 hours—and up to two hours in some groups. "The results in yield are exceptional, with an average two litre increase over the period since the upgrade," explains Mr McClymont.

This is generating an additional income of £168 per cow per lactation. That is a herd return of £30,240 on an investment of about £16,000.

Lameness and lesion scores have also improved, he explains. "The hock rubs and hair loss have reduced considerably—and lameness has certainly improved with 28% fewer treatments to date," says Mr McClymont.

Hugh McClymont.

Rear leg sensors and software displays lameness probability using a traffic light system to identify early stage lameness. "Although we are checking more feet, we aren't seeing the same level of lameness," says Mr McClymont.

"Improved lying times mean that the cows are off their feet for longer. We know this helps reduce lameness and yields are less likely

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to be inhibited by discomfort," he maintains.

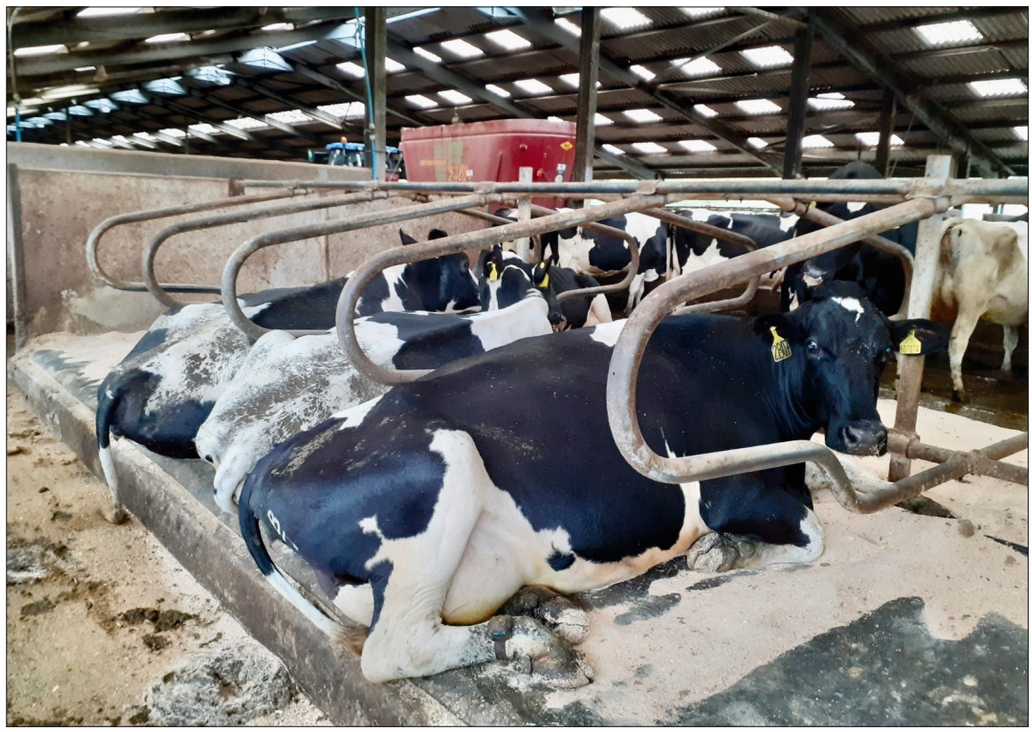
And with lameness treatments costing around £320 per case, a reduction in incidence is further boosting return on investment.

"We are on an Arla 360 contract so we must submit scores quarterly, including locomotion, lesions, cleanliness and body condition. But we score fortnightly for our own records and management," he explains.

Monitoring movements

"The rear leg sensors from IceRobotics record behavioural movement that is fed back to our CowAlert software. This gives us the lying times of groups and individuals as well as oestrus detection, lameness status and mobility scores," says Mr McClymont.

Justin Birch, product manager at IceRobotics, explains how the technology helps. "It is not practical to manually measure lying times. Also, early lameness detection is extremely difficult," he says. "Cow movement—steps, acceleration, lying and standing periods—are accurately recorded by the IceQube rear leg sensors.



Rear leg sensors record cow lying times and have allowed cubicle bedding improvements to be evaluated.

Mobility score and lameness probability (status) are determined by an algorithm within the CowAlert software that can sort individual cows into score and risk.

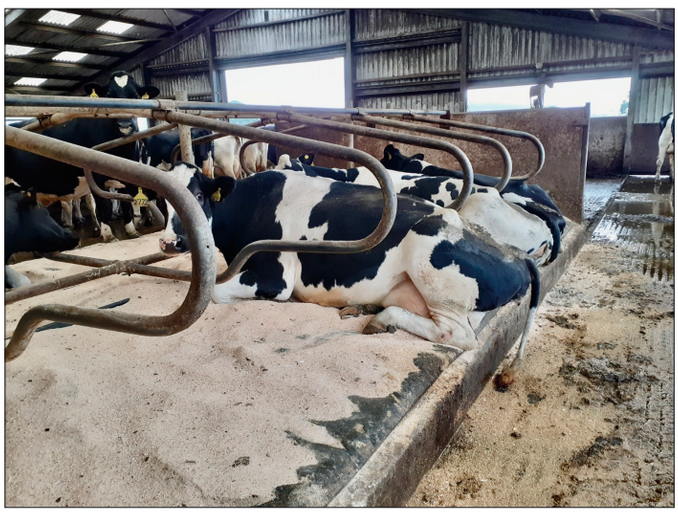
"Farmers can use this information to make changes that are going to improve performance and cow health. Improving lying times and detecting early stage lameness is also going to reduce veterinary costs and loss of production," highlights Mr Birch.

Justifying investment

Success at Crichton has opened up funding for improvements across SRUC's other dairy units—Barony and Acrehead. Mr McClymont needed to produce evidence that the mattress upgrade had a secured return on investment before rolling it out improvements to the other farms.

"The technology has enabled us to produce and compare accurate data detailing the changes in lying times against the changes in yields since the mattress upgrade," explains Mr McClymont.

"This year we have tendered from Wilson Agri for a further 450 mattress upgrades to improve the welfare, yields and lameness on our other units."



Improving the cubicles has led to increased cow lying times, which has resulted in higher milk yields and fewer recorded health problems.