

## Benefits of improving dairy housing

Produced 11<sup>th</sup> May 2017 – Ivor Davey – CowPlan Ltd.



*“Cow comfort is critical when considering herd health, longevity and production!”*

### 1. What does a cow do every day?

When considering cow comfort, I start by looking at the cow’s time budget per day (Grant 2007 WH Miner Ag Research Institute):

Table 1. Typical daily time budget for a lactating dairy cow.

Activity	Time devoted to activity per day
Eating	3 to 5 h (9 to 14 meals/d)
Lying/resting	12 to 14 h
Social interactions	2 to 3 h
Ruminating	7 to 10 h
Drinking	30 min
Outside pen (milking, travel time)	2.5 to 3.5 h

When comparing this to the top 10% of herds, it is easy to see the impact of better housing: Resting increases significantly, while standing in passages decreases.

Table 2. Daily behavioral time budget for top 10% of cows by milk production and average milk production cows (h/d).<sup>1</sup>

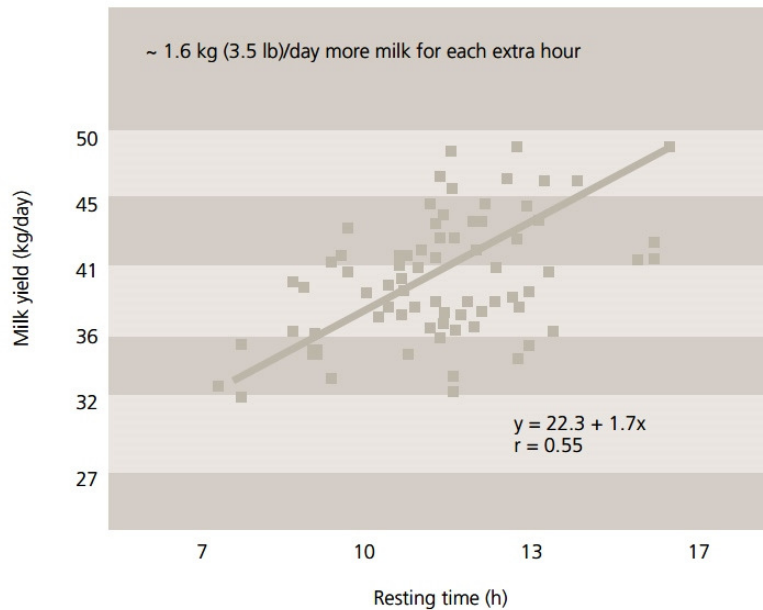
Activity	Top 10%	Average
Eating at manger	5.5	5.5
Resting	14.1 <sup>a</sup>	11.8 <sup>b</sup>
Standing in alleys	1.1 <sup>b</sup>	2.2 <sup>a</sup>
Perching in stalls	0.5 <sup>b</sup>	1.4 <sup>a</sup>
Drinking	0.3	0.4

<sup>ab</sup>Means within a row differ (P < 0.05).  
<sup>1</sup>Adapted from Matzke (2003).

**In summary: “the more a cow rests, the more milk she will produce”**

**CowPlan Ltd. (+44) 07751 050158**  
[info@cowplan.com](mailto:info@cowplan.com)





(Grant 2007 – Relationship between rest and production)

## 2. Impact on production

Simply by improving the cow lying time, we can increase production. The modern, high health cubicle design and mattress, combined with improved bed length and overall space will expect to increase lying time from between 2 hours up to 6 hours per day more.

At 2 hours increase, this equates to 3.2litres of milk/cow/day (based on Grant 2007 figures).

Assuming average herd of 170 cows, this is 544 litres/day, so additional 198,560 litres/year, simply through helping the cows rest easier and longer.

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### 3. Additional benefits on herd health

Key facts and figures:

*If less than 9 hours and greater than 15 hours a day resting, a cow's risk of being culled increases by 67% (Bécotte, 2014)*

*Improving cubicles will help the cows get up and lye down easier. A cow should get up 10 to 15 times/day (Krohn, C.C. & Munksgarrd, 1993). If less than 6 times /day her risk of being culled increases by 102%*

### 4. The new housing

New cubicles proposed are Wilson Agriculture Cowcoons, which have flexible bottom sections. These have been approved by research at the University of Liverpool where they found significant reduction in vertebrae lesions, compared to metal cubicles.

The mattresses proposed be Pasture Mat mattresses, with a 30mm layer of high density foam above a rubber crumb base. The Pasture Mat is the market leader globally, with well over 3million under cows. They have been around for over 20 years, and continued improvements and additions have kept this mattress at the forefront in making cows comfortable globally.



Further information on what a cow requires, and how to access cow comfort will be found in Appendix 1, and at [www.cowplan.com](http://www.cowplan.com)

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Registered Offices: CowPlan Ltd. Rayens Close House Bristol BS41 9HL

## Appendix 1 - General building considerations – applicable to all dairy units

### Feed

We need to ensure that there is enough feed space per animal. This means a minimum of 50cm per adult cow, and preferably, for dry cows, nearer 70cm per cow. For young stock this depends on age and size.

Additionally, we need to consider the feed system. It is common for a TMR diet feeder to be used, however any plans for a new facility or changes to existing, we should allow conversion to a robotic feed system or robotic feed push in the future.

### Water

I would always work on water access of a minimum of 8.5cm face of trough per adult cow, and if a new facility I try to aim for 10cm per cow. The water trough also needs to be easy to clean, so a tip over or fast dump trough is advised. These allowances are adjusted for young stock accordingly.

### Light

In order to optimise yield, it has been found that LDLP (long day light period) lighting has significant benefits. This means we need 16 hours of 200 lux, and 8 hours of less than 5 lux. Therefore, for any dairy building, we will try to install a tailor made lighting system which will maximise the environment for the operator, and the cow.

For milking cows this optimises yield, and for young stock it optimises growth rates. Correct lighting as a direct impact on growth hormone in the body.

### Lying

Comfort is critical! After 10 hours, any additional hour lying is around 1.6 litre of milk production [Grant 2007]. This equates to a saving of 5MJ of energy because the cow is lying down rather than standing up. Therefore, we need to ensure comfortable environment, which are easy to clean. We also need to ensure that any cubicle design allows the cows to use these beds easily, with freedom. We therefore need suitable cubicle dimensions in order to maximise cow comfort.

For young stock, comfort is key in order to optimise growth rates, and overall health. Use of cubicles can be a 'training' period for when they join the main herd. It is key to make the system easy to manage and easy to clean.

### Floor – Slurry system [slats or scrapers or other]

It is important that the floors are clean, and dry. This will optimise cow foot health, and overall longevity of the herd.

### Overall space per cow

As a guide, the more space per cow, the easier it is for her to produce a higher yield of milk, while remaining healthy. We normally work on a guide of 1 square metre is approximately 1000 litres per year. Therefore, I would like to achieve around 10 square metres per milking cow for feed, scrape and lying area.

Prepared by Ivor Davey BSc (Hons) AgAnSci - Director of CowPlan Ltd. 07751 050158

Since 2000, Ivor has advised and designed dairy facilities all over the UK, and parts of Europe. Ivor is known for independent advice on milk robots, and specialising in detailed design of high welfare dairy facilities, while always keeping the cow's health and wellbeing at the fore front.

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