Checking Buildings for Healthy Cattle

Getting cattle housing right is a win-win. It helps ensure the health of the herd, which is good for the bottom line of a farm business, and good for the environment.

There are many factors that can contribute to healthy cattle when housed and these include feeding, water supply, stocking density and parasite control. All these factors are directly affected by building design and use. Whether designing from new or making best use of existing buildings there a few essential things to consider to provide the optimum housing environment.

If a building does not fully support health and performance, it is highly probable that the building is failing to deliver adequate control of the following:

1. **Hygiene**
2. **Moisture**
3. **Fresh air**
4. **Air speed**
5. **Temperature**

Shed roof with appropriate air outlet

The challenge in assessing the impact of buildings on animal health and performance is to provide a correct diagnosis. Some items are obvious; other less so but there are many clues to look for:

- Doesn't matter what the building looks like
- Check animal behavioural preferences; where do the dominant animals choose to lie/eat?
- Check for signs of poor performance and health
- Always check links to climate: is there a pattern to problems?
- Provide practical solutions
- Prioritisation of actions: short-term fixes and mid-term solutions

1. Hygiene standards required for good health and performance cannot be maintained without periodic cleaning that is time efficient and effective. Livestock housing systems should be managed to provide the ***routine*** opportunity for effective cleaning. Main failures are:

- Lack of space and or lack of time to empty and clean pens effectively
- Surfaces (floors, pen divisions, drains, feeders, drinkers) that are not cleanable

The impact of lack of space and time on livestock health can be significant. It is good practice to step back and consider whether the whole cleaning process of individual pens can be made easier, faster and more effective. Access with suitable machinery, use of renders and epoxy resins on cracked surfaces, replacement of pen fittings that are not cleanable, and drainage channels where they are needed will all repay investment. The gains will be seen in animal health, improved financial returns and use of time, and reduced antibiotic use.

2. Moisture. Livestock systems are wet systems. If a calf produces 5 litres a day of urine, a group of 40 calves will produce 1,400 litres a week. These volumes only start to become a health and performance problem when moisture accumulates unmanaged, and contributes to increased moisture in the air or in the lying surfaces. The increased dampness reduces the effective temperature (temperature as experienced by the animal) in the building, and supports many pathogens outside the host, in the environment. General maintenance should tackle:

- Adequate drainage; a key feature of all competent buildings
- Maintain dry bedding
- Minimise water loss from drinker system

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- Check/stop roof leaks, maintain gutters and downpipes
- Ensure external ground/plant features do not direct water towards building

3. Fresh Air. A good delivery of fresh air through a system, competent ventilation, not only removes stale air and aerosols including disease pathogens, but helps to maintain a dry atmosphere which therefore 'feels' warmer in cold temperatures.
The main driver of natural ventilation is wind. There will be a predominant wind direction but it will also come from all points of the compass at some time of the year. When the wind is not blowing, or where the side of a building is not exposed to the wind (by an adjacent building or wall) a competent building will ventilate by stack effect. Buildings without effective ventilation will naturally accumulate heat, moisture, dust, gases and microbes, some of which are likely to be pathogenic. Questions to ask:

- Is wind able to provide ventilation throughout a building?
- Are there parts of the building where ventilation is compromised?
- Is ventilation compromised when wind direction changes?

A simple method for calculation of the inlet and outlet areas of any building is available at https://ahdb.org.uk/knowledge-library/brp-better-cattle-housing-design*. The solution is typically to replace sidewall cladding with Yorkshire board or similar to provide the calculated inlet area whilst protecting from wind and rain, and creating adequate outlet area in the ridge. Many calf houses may require mechanical ventilation because most calf house systems do not create a stack effect.

4. Air speed. We need air movement to provide continuous fresh air, but a draught has a significant negative impact on performance and the health of all livestock. For youngstock a draught should be considered as >0.5 m/s, and >2 m/s for all stock. However, an elevated air speed is useful for productive cattle housed in the summer months because it helps heat loss and helps to keep stock in their thermal neutral (comfort) zone.

Positive pressure tube ventilation

5. Temperature. Animals have a thermal neutral zone (TNZ) where they expend no additional energy to keep warm, or don't need to change their behaviour (seeking shade, reducing feed intake). Where stock are below the lower limit of their TNZ, some of the energy for growth goes into keeping warm, and therefore productivity is reduced. The immune competence can be suppressed when below the TNZ as well. Most calves born in the UK in winter months are below the TNZ for the first two or three weeks of life, as will many animals exposed to a combination of cold temperature, raised humidity and increased air speed. The target is for dry housing, a dry bed, fresh air with no draughts and appropriate nutrition.
Temperatures of 20°C and above (above the TNZ) can reduce performance of higher yielding stock. Ensure that natural ventilation is working as well as possible, plenty of access to cool, clean drinking water, and shade. Increasing air speed with mechanical fans is effective, but should not be confused with ventilation.

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