Calf housing – modifying design and management to maximise results

by Jeanette Fisher, international dairy calf and heifer specialist, Heifermax, Tasmania, Australia.

he 'best' calf housing is labour efficient and produces healthy calves growing to meet target weights. It can vary in style but always incorporates the four basic requirements:

- Ventilation.
- Isolation.
- Comfort.
- Economy.

Many farmers would like to upgrade their calf housing – an understanding of these factors allows structural and management deficiencies to be corrected, therefore improving calf health and growth rates.

Ventilation

Ventilation is the replacement of air containing elevated levels of humidity, pathogens, noxious gases or dust with fresh air from outside.

The ventilation method and amount required depends on a range of factors, including building style, climate, volume of air in the building and the number and age of animals housed. Common design and management problems include:

Draughts. The practice of leaving a gap between the ground and the barn wall cladding is an example of poor ventilation, because, despite good air exchange, calves will be sitting in a strong draught.

Stagnant air. Barns with good air flow at head height can have pockets where the air is not moving sufficiently. Single pens with solid panelling on three sides often have a pocket of stagnant air at the back of the pen at calf height.

Unless ventilation has been specifically directed into these areas, stagnant air can also be found in the centre of very wide barns and in single pens where the solid outer barn wall is also the back of the pen.

Calves sitting in these pockets of unmoving air will be susceptible to respiratory disease.



A well ventilated single calf pen.

• Keeping calves warm. In naturally ventilated barns, blinds and doors are often closed to keep calves warm. This reduces air flow while humidity, ammonia and pathogen levels build up.

Suggestions for improvement include: Good ventilation balances moving fresh air into the calves' immediate environment with avoidance of draughts on the calves.

Fig. 1. A good circulation of air, without a direct draught.



Direct air movement should always be above the calves, not at calf level. Except in hot environments, air blowing directly onto calves will chill them and lead to increased sickness rates.

• Draughts can be minimised by having solid barn walls from ground level to approximately 1 m high.

• Unless rain or snow is blowing directly onto calves curtains should be open, at least at the top.

 Curtains should unroll up not down.
There are several hand held meters on the market which measure airflow and velocity as well as wind chill factor, temperature, humidity, dewpoint and heat stress potential.

Poor ventilation is the primary cause of many calf deaths, so purchasing a tool to assess the effectiveness of ventilation can pay for itself in improved calf health.

● Ammonia levels can be measured with a small gas analyser. High levels (≥5ppm) mean that ventilation and bedding management need improvement.

• Design single pens within barns so that the front and back of each pen is open and sides are solid or use free standing wire mesh pens with walkways between pens.

• Air flow in a badly ventilated barn with a solid back wall can be improved by removing the cladding from the top half of the wall and replacing it using a spacer on the uprights so it sits \approx 30cm outside its original position (see Fig. 1).

"Whirly bird" roof vents installed at the back of a barn can remove stale air cheaply and efficiently.

> • The thermo-neutral zone is that in which animals do not expend energy to keep warm or cool. In newborn Holstein calves this temperature range is 10-26°C and in one month old calves it is 0-23°C. Clearly, calves are comfortable at temperatures humans would perceive as 'cold'. Good ventilation is more important than a warm environment.

• Warmth can be provided for calves by feeding more solids in *Continued on page 26* Continued from page 25

cold weather, giving sufficient straw for calves to 'nest' in and by using coats during the first couple of weeks of life.

Isolation

There are two aspects to isolation:

- The first is isolation from adult animals.
- The second is isolation from other calves. Both aspects give calves' immature

immune systems a better chance to cope with possible high levels of environmental pathogens and poor passive transfer levels.

Common design and management problems include:

Calves being housed near cow traffic areas.

• Calves being housed in the same barn as cows

Individual pens which allow calf to calf

contact and splashing of faecal material.

Failure to completely remove bedding

and clean pen components between calves. Calf raisers and equipment acting as vectors for disease.

Suggestions for improvement include:

Calves should never be housed in the same barn as adult animals, nor should cows walk close to the calf housing, as effluent and aerosolised pathogens can enter the calf area and cause disease.

Preventing calf to calf contact for at least

the first two weeks of life reduces the transfer of pathogens between calves and lowers the incidence of disease.

 Calf hutches on fresh ground in a paddock provide isolation and excellent ventilation; the level of soil and airborne pathogens in the area is likely to be extremely low. Calf raisers need to understand the ways disease is transmitted between animals and the role good hygiene plays in disease prevention.

• Extra care is needed if grouped calves are to be raised successfully. Group pens are more labour efficient but the potential for a 'train wreck' is higher than in individual housing.

Comfort

Calf 'comfort' really means lack of stress. Unstressed calves have a greater ability to withstand disease challenges and to maximise their feed conversion efficiency. Housing design should also consider the comfort of staff members. Common design and management problems include:

- Overcrowding.
- Draughty or badly ventilated pens.
- Damp and dirty bedding.
- Inadequate feeding levels.
- Limited or no access to fresh water. Big groups.

Wide age range in group pens. Calves will be most comfortable if they: Have sufficient resting (bedded) area. For housed calves <8 weeks this is between 2.2-2.7m²/calf in individual pens and $\approx 2m^2$ in group pens. Estimate how many heifers will be born before the first calves go out of the barn, then plan temporary housing rather than over crowding the existing barn.

- Are dry and draught free.
- Have fresh, dry, ammonia free bedding. Have easy access to clean water and ade-
- quate amounts of fresh feed.

Are in isolation or in small (\leq 5) groups where there is less stress caused by establishment of a pecking order.

Have a regular routine.

Comfort of workers is also important. Workers are more likely to spend extra time with calves if they are comfortable.

Economy

Factors which have a positive impact on the health and well being of calves will benefit the economics of the enterprise.

Common design and management problems include:

 Not renewing or renovating calf housing when it is economically sensible.

Skimping on the size of a new barn, renovation or labour saving facilities.

Suggestions for improvement include firstly evaluating the following:

Where existing facilities are deficient – is reorganising, renovating or rebuilding the best option?

Whether current calf losses and poor health and growth rates are attributable to poor facilities and how much this is costing. What the herd size will be in five years time.

How many calves will be reared.

• Whether the calving pattern will be the same.

The cost of a new facility vs the cost of renovating or extending the existing one.

Secondly, plan:

• The style of housing best suited to the operation.

The layout which will make calf feeding, supervision and handling most labour efficient.

- How calves will be delivered to the pens. Whether calves will stay in one pen or
- move from pen to pen as they grow. To have areas especially for sick calves,

wet and muddy new arrivals, a heat box etc. • How milk is going to be delivered, stored and fed to calves.

How grain will be stored and brought to the calves.

How bedding will be topped up while calves are in the building.

• The way fresh water will be available to calves.

An area for milk preparation, washing and draining equipment, and for fridge and freezer plus cupboards for colostrum, equipment and medication storage.

- An ample supply of hot water.
- An area for a noticeboard and computer. • Where calves will be weighed and
- dehorned
- How calves will be moved from the barn.
- How the facility will be cleaned.

Thirdly, set up:

• The style of housing which is best suited to the climate and type of herd. Hutches are more economical in a year round rather than a seasonal calving pattern. Hutches are single purpose, whereas barns can be used for storage when not needed for calves.

 A facility incorporating ventilation, isolation and comfort because each contributes to an economical system.

• A facility which is easy to clean; this needs less labour input and so is cheap to clean. It is more likely to be cleaned thoroughly, resulting in lower carry over pathogen loads, resulting in healthier calves next season.

• The easiest feeding and re-bedding methods as these vary considerably in economy. Calf hutches are labour intensive as each hutch requires another stop to fill individual feeders and to record volumes. The further hutches are from the milk preparation area the more time consuming feeding is.

Group pens for calves if saving time is important, but only if good management is assured.

There is no 'one size fits all' housing option for every environment, herd size and calving pattern but modifying housing and its management can improve calf growth, morbidity and mortality rates.