

# Healthy Hooves

Prevention and management of lameness



Delivering  
*for* Dairy



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**Disclaimer**

The content of this publication is provided for general information only and has not been prepared to address your specific circumstances. We do not guarantee the completeness, accuracy or timeliness of the information.

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# Foreword

Lameness is a constant challenge. Efforts to prevent lameness, identify and treat lame cows, and adjust how herds are managed as they get larger are critical for the ongoing success of the dairy industry.

Reducing and preventing lameness is a major animal welfare goal in Australia. It is a clear and compelling signal that we care about our herds.

I would like to thank you in advance for reading this manual. Our aim is to help you reduce the number of lame cows in your herd, and in turn reduce the associated costs which include veterinary fees, longer breeding intervals and reduced milk income to withholding period losses.

Dairy Australia's Healthy Hooves prevention and management of lameness provides a great resource for you and your staff. One of the key messages of this manual is that prevention is always better than treatment, with most types of lameness in cattle able to be prevented by good stockmanship, attention to herd nutrition and maintenance of yards and laneways.

We are confident that the Healthy Hooves program will be an essential source of advice for your farm.

Best wishes,



A stylized, handwritten signature in black ink, appearing to read 'D Nation'.

**David Nation** Managing Director

Reducing and preventing lameness is a clear and compelling signal that we care about our herds.



# Lameness

## A problem with many causes

It can be difficult to identify causes of lameness and make changes to reduce the number of cows becoming lame. Understanding the risk factors is critical. Multiple risk factors may contribute to a lameness problem.

The key risk factors influencing incidence of cow lameness within Australian dairy herds are:

- poor dairy shed entrance and/or exit design slowing cow flow
- stockmanship: human actions altering normal walking behaviour of herd
- rough surfaces and long walking distances contributing to excessive wear or trauma to hooves
- herd management for example:
  - nutrition – feed and use of feed pads
  - management in wet conditions – use of standoff areas.

### Example: How multiple factors can result in lameness

- Periods of high/prolonged rainfall may soften skin between the claws.
- Small sharp stones may lodge between the claws and cause a break in the softened skin.
- Bacteria from soil and manure on the laneway may contaminate and infect the broken skin. This results in the lameness condition footrot.



*Copyright Jakob Malmö*

### Assessment

Each factor is not the single cause, but in combination, a case of footrot results. To get to the root of the problem can often mean piecing together a puzzle involving all of these risks.

The economic costs of lameness are significant, particularly if the lameness occurs soon after calving.


Each cow that becomes lame is likely to:

- suffer pain
- incur treatment costs (such as antibiotics and antiinflammatories)
- reduce voluntary dry matter intake
- reduce milk income due to withholding period losses
- have a drop in milk production
- be less likely to cycle
- lose weight, and
- be more likely to get culled.






Cost to your business

Lameness may result in very significant costs to the farming business. An estimate of what it is costing your business can be calculated by using the Lameness Cost Calculator.

See: [dairyaustralia.com.au/lameness](http://dairyaustralia.com.au/lameness)

 CALCULATOR AND TOOL

Seasonal Calving Calculator

SHARE     PRINT 

Calculate the cost of lameness to your seasonal calving pattern.

Farm	<input type="text" value="Enter your farm name"/>
Calvings annually	<input type="text" value="Enter no."/>
Lameness episodes in your herd	<input type="text" value="No. in past year"/>

Treatments

What were the total numbers of treatments used for these lameness episodes  
(For some lameness episodes, you may have given the same treatment more than once (eg repeated penicillin injections) or two or more different treatments (eg a block and several penicillin injections).  
Please enter the total numbers of Cowslips®, blocks and injections.)

Total no. used

Cowslips™

# Preventing lameness

## Overview

Preventing lameness contains these sections

Chapter	See page
Herd management	Overleaf
Milking yards and laneways	17
Constructing a new laneway	29



## Herd management

### Introduction

As Australian dairy herds increase in size, with longer distances walked on laneways to dairy sheds, it is critical to understand:

- the way a cow walks and
- how cows respond to being pushed.

Safe and efficient movement of dairy cows from pasture/feedpads to milking shed is important.

#### Herd Management contains these topics

Topic	See page
Understanding normal cow behaviours	7
Influence of dominant cows in the herd	8
How to get good cow flow from laneway to milking yard	9
Stock handling: How people influence cow behaviour	11
Safe use of barriers to move cows forward in milking yards	12
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# Understanding normal cow behaviours

Most of the lameness we see in Australian herds is the result of a change in the normal behaviours of cows on the laneways, milking yards or entrance/exit of the milking shed. By understanding normal cow behaviour, we can start to recognise unwanted changes.

## Space to move

Cows need space to move in a safe and comfortable manner. If cow movement is compromised by failure to allow cows sufficient space on laneways and in milking yards, the risk of sole injury and subsequent lameness increases.

## Normal walking behaviour

Normally, cows select a safe spot to place their front feet when walking.

Rear hoof placement is almost in the same place as the front hoof on the same side. When cows walk with their heads freely able to move up and down they can:

- find safe hoof placement
- avoid cows of higher dominance
- respond to pain if they stand on a rock.

Under pressure and on slippery or sharp surfaces the rear hoof steps short and may not be placed on a safe spot. This can lead to hoof damage and injury.



*Cows displaying normal posture walking on laneway*

## Flight distance

Cows have flight distances. Every herd is different depending on how the cows have been handled. If a cow is not frightened of humans or has learned to trust you, then the flight distance may be very short.

Cows bunching up and lifting their heads indicate that they are under pressure as a result of people, vehicles or dogs within their flight distance.

Flight distance will be quickly affected if a new vehicle or new person comes into contact with the herd. Be mindful when introducing new staff into the dairy that the cows' flight distance will usually increase.

# Influence of dominant cows in the herd

The presence of dominant cows and their position in the herd has an important effect on the behaviour of the rest of the herd.

## Where are they?

Many of the dominant cows will be at the front of the herd but a significant number will be present throughout and at the rear. Cows must have space at all times to keep their distance and avoid forced interaction with cows around them of similar or higher dominance.

## Walking speed

Dominant cows set the walking speed of the herd. If the flow of dominant cows is halted, the less dominant cows behind will stop and wait for the dominant cows to move on. Applying pressure to the rear of the herd on a laneway or in the milking yard causes the rear cows to bunch up to avoid overtaking the more dominant cows in front. The front cows are almost unaffected and don't walk any faster.

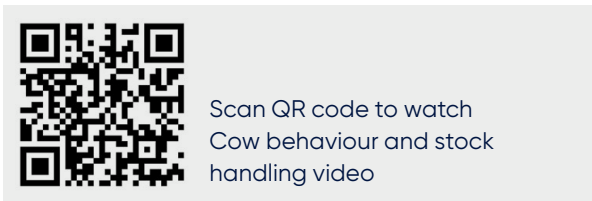
## Guidelines for preventing damage while walking

### What to avoid

It is important that cows are able to select where their next hoof placement should be and to quickly alter their position to avoid a bruise or similar injury from a rock or other uncomfortable object. When herding cows some farmers allow the cows to walk at their own speed while others encourage them by shouting, using sticks, dogs or motor bikes. This pressure causes cows to bunch up and raise their heads, not looking where they are placing their feet which can ultimately cause lameness.

- Give the herd sufficient space and time to walk with head down and allow optional placement of feet on laneways.
- Consider using timed gate latches to allow cows to drift to the shed instead of having to stay behind the cows, pushing them out of the paddock.
- Always be patient while assembling and herding cows. Herd cows gently over laneways and through gateways. Allow the herd to drift to and from the milking shed. The average herd walking speed is 45 metres/min (2.7km/hr) varying depending on condition of tracks and number of lame cows in the herd.
- Do not pressure cows. Move back from the cows if you see heads starting to rise up. Cows' heads rising up above the bodies of other cows, either on one laneway or in the yard, indicate that they are under pressure and do not have sufficient space for safe movement. When this occurs, cows are at risk of unsafe hoof placement and are more likely to bruise/puncture their sole on sharp stones.
- Do not apply pressure on the rear; allow cows to continue moving at their own pace.
- Do not use a tractor or dog to herd cows.

**For more information** on cow behaviour and lameness. See the 'Cow behaviour and stock handling' video by scanning the QR code below.





# How to get good cow flow from laneway to milking yard

A key risk area for lameness is poor cow flow from the laneway to the milking yard.

## Walking order vs milking order

Cows have a pecking order. Their milking order is slightly different to the order in which they enter the milking yard.

After entering the yard, cows need time and space to be able to rearrange themselves before they enter the milking bails.



*These cows have sufficient space as they walk into the yard and move into their milking order.*

## Minimum requirements for space in milking yards

Cows do not like physical contact and will avoid bumping other cows. Cows need a minimum area for gathering in a milking yard:

- 1.3m<sup>2</sup>/cow for Jerseys
- 1.8–2m<sup>2</sup>/cow for Holsteins. (See also *Milking yards and laneways* page 17)

## Check for sufficient space

When there is sufficient space in the yard all the cows' heads will be down, whereas when the area of the yard is too small some heads will be up over the backs of other cows.

If cows are given less space the resultant pressure causes sideways shoving and unplanned hoof placement. Pushing, turning and shuffling will cause cows to slip and to have less control over where they place their feet. If stones and gravel are carried into the yard the risk of claw injury increases.

## Managing the available space

If you do not have sufficient space to hold your whole herd, consider splitting the herd into two milking groups.

## Impact of pressure on cow flow in the milking yard

Cows follow the leaders. A cow reversing indicates too much pressure is being applied to the herd. Watch for legs pushing out of the yard beneath bottom rails, indicating cows are under too much pressure to stand normally.

Under pressure:

- Less dominant cows reverse out of tight spots using the front hoof for propulsion. The front foot takes most of the pressure.
- A dominant cow pushes sideways and forward using the back leg closest to the cow she is leaning against for propulsion. The rear foot takes the most pressure.

Monitor and investigate increases in white line lesions or lameness in the same claw in a number of cows over 2–3 weeks. This may indicate a pressure point in cow flow that needs to be identified and removed.

### **Guidelines for safe movement of cows in milking yards**

- Avoid using harsh noises to move cows. Do not frighten cows. Cows respond to voices and noise. Calling out or whistling to cows from behind the herd along the track keeps them moving without causing fear. Use a friendly tone to call cows into the bails, never a sharp or gruff low voice.
- Ensure you allow sufficient space and time for cows to shift into their milking order from their walking order.
- Cows have two balance points. Their shoulder can be used to direct them backward or forward, their backbone to direct them left or right. Stand behind a cow's shoulder if you want her to move forward, away from you. Avoid coming out of the shed to gather cows as it puts you in front of the shoulders and the cow will turn away or reverse.
- Be consistent in the cows' milking routines. As creatures of habit, cows respond positively and flow better if they have a routine that everyone follows.
- The top gate and the backing gate must be moved in the correct way by all staff or cow flow will be negatively affected.
- Human movement around cows needs to be slow and steady, to allow cows time to react.
- Patience will allow the cow to think and move to where there is space/open gates/better feed etc.

### **Importance of consistency and routine**

With a calm and consistent routine, there should be no need to use a backing gate. Cows will walk onto the platform without outside pressure. If you use a backing gate, the gate movement should only ever take up space vacated by cows. It should not be used not to push rear cows. Use the gates consistently to avoid making cows fearful of gate movement. When using the backing or top gate during milking ensure all farm personnel use the same routine and system so cows know what to expect.

# Stock handling

## How people influence cow behaviour

Studies have found that the level of lameness in a dairy herd is closely related to the knowledge, training and awareness of cow behaviour by the people who work with the herd. Learning how to manage lameness risk factors and practicing movement of cattle in an efficient manner that works with normal cow behaviour will lower the risk of lameness in a herd.

### Understanding good stock handling

Cows can become afraid of people through poor stock handling and poor attitudes. Cows that are afraid of people are more difficult to handle, potentially leading to further ineffective behaviour from stock people and increased fear in the cows. All stock people should understand the basic principles of cow behaviour, practice good stock handling, and understand their role in reducing lameness.

### Guidelines for good practice in handling dairy cattle

Remember that excessive pressure causes the last cows in the line to bunch up and raise their heads, not looking where they are placing their feet which can cause lameness. These are general guidelines:

- Move cows by working calmly at the edge of their flight distance.
- Use a friendly, raised voice with the cows to keep them moving, but don't frighten them.
- Allow time to adjust to new routines and practices. Cows may take 3–4 weeks to learn new patterns in the milking routine.
- Avoid negative behaviour, like fast and sudden movements, slapping, hitting and yelling. Reduce the incidence of noises, like banging gates.

- Minimise negative interactions between groups of cattle. To reduce bullying of heifers, use separate herds for heifers and older cows, especially on farms with large herds.
- Use positive behaviour with cows whenever possible. This includes being steady and predictable in your movements, talking, patting, stroking and resting your hand on their backs.
- Avoid using a dog unless it is very quiet, doesn't bite and is trained to stay a safe distance from the cows. During milking always have the dog safely restrained away from the yard and cows. If there is a dog used with the milkers, the cows should have been trained to the dog as young stock.



*Positive behaviour will reduce the risk of cows bunching up and raising their heads.*



Scan QR code to watch  
Cow behaviour and stock  
handling video



# Safe use of barriers to move cows forward in milking yards

Backing gates may not be necessary for a herd which is trained to willingly flow into the milking shed. Where they are installed, it is important that they are used correctly.

## Gate backing controls

When installing backing gate controls make sure they are accessible and positioned so that the operator can see the backing gate while operating it. Do not position the controls so that the operator must stop normal activities to operate the gate. A mirror positioned to see how tightly the cows are packed in the yard is very helpful.

## Recommended speed for gates

### Recommended speed for backing/top gate in milking yards

Yard shape	Speed of gate	Maximum distance gate moves in 1 minute
Round	1m/ 5 sec	12m
Rectangular	1m/ 10 sec	6m

## Key points for using backing gates

Do not use electrified backing gates. When using gates:

- Allow the cows to re-form their milking order comfortably, do not use the backing gate:
  - for at least 15 minutes after the last cow enters the yard, or
  - until at least 2 rows or platforms of cows have been milked.
- Use an overhead mirror or a flag on a stick attached to the backing gate to show you where the gate is positioned in the yard, relative to the herd.
- Do not keep the backing gate moving forward for longer than 5 seconds at any stage. Install a timer on the forward switch. Regulate the top gate to no more than 2 seconds in each forward movement with a button switch control.
- It is good practice to have a buzzer, water or noise associated with movement of the backing gate to provide warning to the cows.

# Time budgets

## How cattle spend time in specific activities

Allowing enough time for cows to rest is important for hoof health. Failure to provide sufficient lying time for cows has been associated with an increase in lameness. Consider a cow's time budget to manage lameness risk in dairy herds.

Cattle grazing in pasture based systems spend less time lying compared to housed cattle. Most studies of cow time budgets have been done on cattle in housed systems. Further research is needed to understand the time budget requirements of grazing dairy cattle and the effects on lameness.

### Dairy cattle daily activities

It is not known whether grazed cattle have a lowered requirement for lying because:

- they are walking on more giving surfaces, or
- they need more time for grazing, so have less lying time.

Activity	Grazing (hours/day)	Housed (hours/day)
Eating	8.3–9	4.5
Drinking	0.5	0.5
Milking	1–4	1–4
Walking to/from the dairy	1–4	1–2
Standing in stalls		2.9
Standing in alleys moving to/from dairy		2.5
Lying time (required)	Estimated at 8–11	12

### Factors that reduce lying times

- Increasing herd size
- Increasing milk production
- Increasing distance or walking time to the dairy
- Mixing new animals within a group (including transition period)
- Increasing milking time per day, associated with increasing herd size
- Stage of lactation: Reduced lying times after calving is particularly accentuated in first lactation heifers.
- Heat stress has a significant contribution to reduced lying times and may increase the risk of poor hoof health. In hot conditions, cows will stand more to allow greater heat loss. In summer, avoid walking cows long distances after consecutive milkings (within a 24 hour period) to reduce the total daily distance walked by the herd
- Wet weather.

# Minimising lameness risk when using feed pads

Cows need to lie down for at least 8 hours every day. Not being able to lie down will result in tiredness and eventually exhaustion. If you are using a stand-off or feed pad it is critical that you understand the risks and construct and manage your pad appropriately.

How often cows are stood off and for how long is determined by weather and soil type, while surface type and area per cow are determined by you. If the surface type and area per cow are not right for the frequency of use and time on surface, cows are likely to suffer significant discomfort. Following some simple guidelines can ensure that your cows are kept healthy and content.

## Area per cow by time

The area allowed per cow during standing off will affect the animals' comfort levels and their ability to lie down. When cows stand in a yard before milking, they take up about 1.0 square metre each.

If the pad is being used:	Then cows need:
For short periods of time	3.5m <sup>2</sup> /cow
For longer periods of time Example: 12hrs per day	a comfortable lying area allowing a minimum of 6m <sup>2</sup> /cow
Permanently with no on-off grazing	minimum of 9m <sup>2</sup> /cow, plus 1m <sup>2</sup> feeding area per cow

**Note:** When constructing feed pads and calculating the area, allow for any future herd size increases.

## Minimum area per cow by surface

Based on a cross-bred size cow. Add an extra 1.0m<sup>2</sup> per cow if you have large Holsteins.

Surface	Short term + 12hrs/day (up to 2 days in a row)	Long term + 12hrs/day (3 or more days in a row)	Permanently No on-off grazing
Woodchip	3.5m <sup>2</sup>	5.0 m <sup>2</sup>	<div>9.0m<sup>2</sup> including a comfortable lying area</div> <div>Length of feed face</div> <div>0.7m per cow if fed all at once</div> <div>0.3m per cow if fed ad-lib</div>
Sand	3.5m <sup>2</sup>	5.0 m <sup>2</sup>	
Concrete	3.5m <sup>2</sup>	Not recommended	
Crop	8.0m <sup>2</sup>	8.0 m <sup>2</sup>	
Paddock	8.0m <sup>2</sup>	8.0 m <sup>2</sup>	



## Surface type

When deciding on a pad surface, consider the cows' ability to lie down on the surface. While they need to lie for 8 hours a day, a cow prefers to lie down for 11 hours per day. Three key features of surface material affect cows' willingness to lie down:

- softness
- slipperiness, and
- wetness.

In high traffic areas rubber matting can improve the stability of the walking surface for cows.

## Feed pad surfaces should:

- shed water
- not become excessively muddy

**Important:** Regularly remove slurry from alleyways and yards so that cows are not continuously standing in urine and faeces. Wet hooves can become soft and more prone to wear and lameness.

- not have sharp exposed gravel. Remove any stones that find their way on to concrete surfaces.



*A muddy feed pad, becoming a risk factor for lameness*

# Preventing lameness during the mating period

Herd fertility can be undermined if herd lameness is not monitored and risk factors are not well managed from calving through to end of the mating period. The majority of herd lameness occurs in early lactation as cows adjust to changes in diet, new herd-mates and new milking routines, including walking to and from the dairy shed. Lameness in early lactation will have a greater impact on milk production and fertility compared to lameness occurring in late lactation.

## Bull performance and soundness

Leg conformation and absence of lameness are key to bull soundness. Once you have the right number of bulls on hand, they must be managed throughout joining to achieve good conception rates.

The most common cause of bulls breaking down during the joining period is lameness.

## Bringing bulls onto the farm

When possible have the bulls on farm 2–3 months before they are needed. If this is not possible, ensure that the bull team is at least in the same paddock on an out block so that the hierarchy can be worked out well in advance of the joining period. To reduce the risk of fighting and injury use bulls that have been kept together with an established pecking order. Sometimes using bulls of different sizes will reduce fighting.

## Managing the bulls

Ensure all stock handling staff have been trained to treat bulls with caution. Use caution when separating bulls from a herd or cows on heat as their behaviour can be dangerous and unpredictable. Keep bulls in paddocks and do not allow them into the shed with cows. Move the bulls directly to their next paddock without following cows through the dairy shed or yard.

If this is difficult in the dark early mornings put a reflective paint mark on the bulls, so that they show up easily in the lights of a vehicle or torch, and can then be cut-out at the gate. It can take a few mornings to teach the bulls not to come in with the cows, but perseverance pays off. Minimising the walking on farm tracks will reduce the risk of trauma and wear on bulls' hooves.

If you find it too difficult to cut bulls out at the gate, or if the dairy shed is on the way to the next paddock, it may be necessary for bulls to walk in with the cows.

Do not leave bulls in the yards with cows during milking. Cut them out at the shed and allow them to walk to their next paddock.

## Restricting grain for the bulls

If the bulls do walk up with the cows they should not be allowed access to grain. Bulls do not need the grain, and intermittent grain feeding can increase the risk of acidosis. Acidosis has been associated with laminitis or inflammation of structures of the hoof which increases the risk of lameness lesions developing.

## Hoof care for bulls

In some situations where laneways are particularly bad or movement of bulls cannot be well controlled, using blocks on all claws of the hind feet may reduce the risk of traumatic injury.



*Blocks on the hindfeet of a bull*

## Heifer familiarisation

Familiarising your heifers with the yard and milking shed before calving will make them easier to handle once they have calved and are being milked. Introducing heifers to the environment they will be exposed to 2–3 weeks before calving will assist flow through the milking shed after calving.

## Benefits

Good heifer flow through the dairy shed will reduce the risk of sole injury and traumatic damage to the white line region of hooves in the time around calving. Heifers that are calm and settled in the first weeks after calving will be less fearful, will flow better into the yard and through the shed, and will be less prone to lameness. Time spent during slightly quieter times on the farm training will save time when there is a lot happening with calving.

# Milking yards and laneways

## Overview

Well-constructed infrastructure can support your initiatives to limit lameness in your herd.

### In this chapter

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# Dairy yard and entrance design

## Importance of design

Milking should be a pleasant experience for cows. Cow flow from the milking yard to the milking shed should be smooth. If cows do not come forward willingly to be milked, there may be a shed problem.

### Why it matters

A poorly designed shed will affect the normal flow of cows through the yard and in to the shed. The majority of herd lameness can be attributed to issues with cow movement in the milking yard and the milking process. Understanding how infrastructure influences cow flow enables problems to be identified and resolved to improve herd hoof health.

### Entrances to milking yard and exits from milking shed

A range of factors can make cows fearful and reluctant to enter the milking yard or milking shed:

- animals being forced into the front gate whilst on the herringbone platform
- poor treatment of cows whilst in the shed
- sharp turns from the laneway to the yard
- a dog chained to the backing gate
- slippery concrete surfaces
- shadows across the route
- electrified backing gates
- narrowing entrances, or
- stray voltage.

### Consequence

Cows will push away with their feet from what frightens them. This is likely to result in sole damage and separation of the white line.



*This photo shows a wet entrance where cows make a right angle turn to enter the milking yard.*



# Guidelines for good milking yard design

The design of the entrance and exit of the milking yard is a key area for optimising cow flow.

## The yard entrance width

It is helpful if the laneway widens as it approaches the milking shed to accommodate herd compaction. Ideally, the laneway should enter straight into the holding yard and cow flow should continue into the shed. Eliminate the things that may make cows reluctant to enter the holding yard and milking shed such as:

- shadows or shade over laneways
- dogs attached to gates
- slippery concrete, and
- sharp turns.

## Clean and clear entrance

After each milking:

- clean the yard, including any stones and the concrete apron linking the yard to the main laneway
- ensure that flood wash water does not spill onto the transition area of the track
- ensure that slurry does not accumulate at the yard entrance.

## Correct alignment

Encourage cows to move into correct alignment to flow from the yard into the milking shed. Ensure there is enough space for 3–4 cows to line up before entering the herringbone bails or rotary platform. These lead-in positions provide a safe place for cows to stand and wait before entering the milking platform.

## Pipework

Keep pipework (rails and gates) in good repair to ensure safety and prevent injury.

In the dairy, ensure cows have adequate head space at the front of the bail.

## Smooth exit

Allow an adequate area for cows to exit smoothly from the milking shed. The exit race should lead directly into the exit yard and exit laneway. If cows are required to turn, the exit should be at least 4 metres wide – cows need 4 metres to be able to turn without twisting their feet. This area should be followed by an exit race at least 2 metres wide unless weighing scales, automatic teat sprayers or a hoof bath are in use. The wider the race, the faster cows will exit.



*An exit race with a poorly maintained surface and a right angle turn likely to slow cow flow*



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Cow behaviour and stock  
handling video

# How big should the milking yard be?

Ensuring that the yard area is large enough and that the surface provides adequate traction to allow cows to safely move from their walking order to their milking order will:

- assist with cow comfort, and
- reduce the incidence of claw injuries in your herd.

## A big enough yard

Ensure the yard is big enough to allow cows to move from their walking order to their milking order without coming in contact with other members of the herd. When herd numbers increase, it is important to consider the available yard space at milking time.

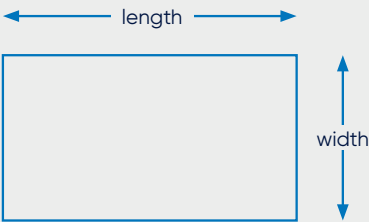
**Note:** At least 1.3 m<sup>2</sup>/cow for Jerseys, 1.8–2 m<sup>2</sup>/cow for Holsteins. (Also in *Herd Management*, page 6.)

**Example:** A 400 Holstein cow herd milked through a 60 bail rotary requires 1.8–2 m<sup>2</sup> area/Holstein x (400 cows – 60 bails) = 612 m<sup>2</sup> yard area

### Calculating rectangular yard area

A 400 Holstein cow herd with 60 bail rotary would need a rectangular yard 20m x 30.6m = 612 m<sup>2</sup>

$$\text{area (m}^2\text{)} = \text{length (m)} \times \text{width (m)}$$

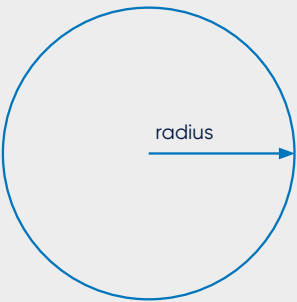


### Calculating circular yard area

A 400 Holstein cow herd with a 60 bail rotary would need a circular yard with a radius of 14m

$$\text{area (m}^2\text{)} = \pi \times \text{radius}^2 \text{ (m)}$$

$(\pi = 3.142)$



## Surface of the milking yard

The risk of hoof damage will increase and cows will be reluctant to enter the yard or move into the milking shed if the surface of the dairy yard is:

- slippery or uneven or has exposed aggregate
- lacking in space to allow cows to move into their milking order without touching other herd members.

**Note:** If excessive wear and White Line Disease are identified as a cause of lameness, check that the surface of the yard is not too abrasive, and also check the length of time that cows have to stand on it.

### Rubber matting



*Rubber matting may be strategically placed in high traffic areas such as entrance and exits of the bails where cows are likely to twist and turn.*

*Copyright Jakob Malmo*

### Worn concrete surface on bridge entrance to rotary platform



*An example of a surface with problems*

### Recommendation

Keep concrete surfaces clean and in good repair. Make sure that concrete surfaces are non-abrasive and not slippery. Slippery concrete contributes to poor cow flow. Concrete needs to be rough enough to provide a non-skid surface to prevent cows slipping and falling over, but not so rough and abrasive that it causes excessive claw wear. If cows slip frequently on concrete, consider grooving the surface or adding rubber matting.

## Improving traction

We can improve the traction of cows by grooving the dairy yard in the direction of cow flow. Current recommendations are to groove alleys in the direction of traffic with:

- 1.91 cm (3/4 inch) grooves
- 1.27 cm (1/2 inch) deep and
- spaced 8.3 cm (3 1/4 inch) on centre.

The areas between the grooves are to be flat, not rounded, and the edges sharp and smooth.

The narrower space between the grooves reduces the amount of slipping that has to occur before the hoof hits a groove and the wider groove allows for a bigger catch area. This type of floor can be put into wet concrete with a float or cut in after the concrete is dry.

## Drainage of water/slurry from milking yard



Grooving the yard in the direction of cow flow

## Using nib walls

Nib walls direct water flow away from the junction between the laneway and concrete yard, however they can impede cow flow if cows don't have sure hoofing on either side.

At the edge of the yard nib walls:

- direct drainage away from entrance or exit laneways, and
- help prevent the migration of gravel onto the concrete.

## Construction of nib wall for dairy yard

The nib walls should be:

- smooth-edged and flush with the bottom rail of the yard fence
- 200–250mm high, with cows stepping up to the concrete yard.



Example of nib walls



# Stray voltage

Cows are more sensitive to stray voltage than people and will react to voltages that people can't feel. An alternating current with stray voltage of 0.5 volts or more between the neutral and earth voltage should be cause for concern. Stray voltage may enter the dairy shed via the water supply or via any electrical machinery not completely earthed, including electric fences.

## Signs of stray voltage

Signs that stray voltage may be causing a problem in the milking shed include:

- cows hesitating to enter the milking platform or they rush out of the platform when released
- cows dancing or step around constantly when being milked
- normal milk letdown is interrupted and may lead to cows not being milked out properly.

## What to do

A professional should be called to test for stray voltage, if you suspect an electrical problem is occurring.

## Reduce the effect on cows

Earth the milking shed to avoid stray voltage upsetting cow flow:

- All metal structures or equipment that a cow can touch should be electrically bonded together so that no potential difference can exist.
- Laying an earthed ground wire in a trench around the outside of the dairy shed as a 'moat' may isolate any stray voltage getting back to the dairy shed. Ensure that all pipe work and platforms are adequately earthed.

# Transition zones

## Stone traps and drainage

Poorly maintained laneways close to the milking shed will slow the flow of the herd into the milking yard and increase the risk of stones, causing unplanned hoof placement and sole injury.

### Transition to the yard

The first 300–500 metres of laneway closest to the milking yards requires the most attention, as this is the area of greatest cow traffic and pressure. At this junction point, sand or stones can be carried from the farm laneway onto the concrete surface of the milking yard, particularly if the entrance area to the yard is muddy or badly constructed.



*This photo shows gravel carried onto the milking yard*

### Gravel carried onto milking yard

Any junction between gravel and concrete poses a risk including where:

- gravel lanes meet a concrete yard
- a concrete lane meets gravel placed in a gateway, or
- a road crossing meets a gravel lane.

### Recommendation

Minimise the number of these junctions by:

- avoiding the use of gravel in transition areas, or
- placing transition material such as sawdust, post peelings, bark chips or lime over the top of gravel at the junctions.

### Transition zone stone traps

A soft transition surface between the laneway and the yard can act as a stone trap, reducing the amount of stones brought onto the yard by cows' hooves. Several constructions can be effective solutions to reduce the amount of stones brought onto the milking yard from the laneway by cows' feet:

- A concrete apron extending from the milking yard a variable distance down the farm track can help reduce the amount of stone chips transported onto the milking yard by cows' feet.
- A nib wall is useful at the start of the concrete to reduce gravel being transported onto the concrete yard surface, and to stop water flowing on to the laneway.
- Sawdust, woodchips, lime or pumice can sometimes be used successfully as transition materials to absorb gravel being transported onto the concrete yard. Materials such as fine crusher dust should always be avoided to prevent small stone chips being transported onto the hard concrete, where they can cause bruising and sole penetration.

### Materials in transition zone construction



*In this example pulverised wood and sawdust create transition zone drainage*

*Copyright Jakob Malmö*

# Footbaths

Footbaths can be a useful tool in the prevention of some forms of lameness. It is important that they are constructed and used properly.



## Why use footbaths?

The aim of using a footbath for dairy cattle is to control infectious causes of lameness. Their use is driven by the need to control digital dermatitis. (See *Digital dermatitis*, page 70.)

Well designed and maintained footbaths are effective for disinfecting cows' feet. They provide an opportunity to apply a solution such as formalin, zinc sulphate or copper sulphate to each cow's feet for the control of infection at every milking.

## Footbath design

The success of a footbath depends on the transfer of the chemical to the hoof and the contact time with the hoof. Ideally, the feet should be cleaned in the dairy with an udder hose, before using the footbath and afterwards allowed to dry for the chemicals to work.

A well designed footbath should:

- Have minimal impact on cow flow and should:
  - be part of the exit race, in a position that will not affect cow exit flow from dairy
  - have a non-slip floor at the same level as the approach and exit concrete
  - have walls constructed of flat blocks with sharp edges ground off.
- Maximise the number of hoof 'dunks' per pass
- Reduce the total fluid volume required for medication
- Reduce the amount of manure contamination, taking into account:
  - solution depth 8–10cm, with volume = 1L per cow in herd, and
  - good drainage to facilitate easy cleaning and a 10–12cm drain hole in lowest corner.

**Example:** A 400 cow herd requires a footbath that will hold 400L.

## Design promoted to optimise hoof immersions and reduce footbath volume

Recommended dimensions 3.0–3.7m long, 0.5–0.6m wide and 28 cm high. For advice on how deep to fill the footbath follow chemical guidelines.

## Footbath products

Although many different products have been tested, there are two common compounds used in footbaths to reduce the spread of digital dermatitis:

- 1–3% formalin, and
- 5% copper sulphate.

## Choosing your product

Both formalin and copper sulphate, while very effective, do have disadvantages.

Formalin is a known carcinogen and can be harmful to people handling it. If formalin is used, the footbath must be put in a well ventilated area so people in the dairy cannot detect formalin vapour.

Copper sulphate can have negative environmental effects if not disposed of properly.

## Recommendation

Change footbath solutions every day or after 200 cows, whichever comes first.



# Lameness prevention on laneways

In Australia, most farms require the cows to walk from the paddock to the dairy along laneways. These are a key area in the prevention of lameness.

## Benefit: good laneways

Well designed and regularly maintained laneways result in easier and faster movement of stock even under wet conditions. Good laneways provide a comfortable walking surface which minimises muck on feet and udders. Careful planning and construction of laneways will give a significant return on investment through improved mastitis control and milk quality, reduced incidence of lame cows, and reduced laneway maintenance costs.

## Consequences: poor laneways

Farms where laneway maintenance is poor are likely to have an increased incidence of lameness. Lameness can be made worse by impatience of the herdsman, which causes cows to have unplanned hoof placement. The risk of sole penetration and bruising injuries increases and cows' hooves are exposed to greater wear and damage.

## Laneway problems

Cows prefer to walk on straight, wide laneways with soft, dry surfaces with a minimum slope of less than 5 degrees. Problems which contribute to congestion and slow cow flow on laneways include:

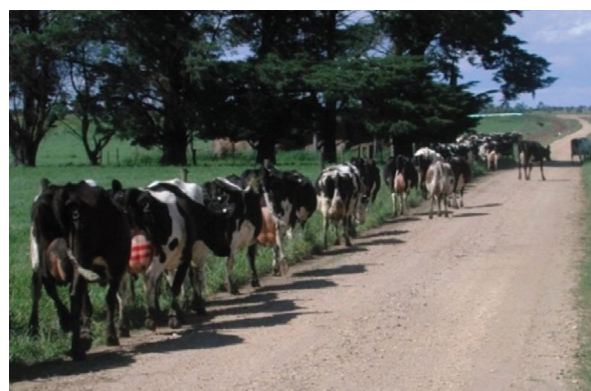
- Wet, poorly drained sections, as boggy areas stimulate cows to defecate and degrade the surface.
- Shaded sections beside trees which are often slow-drying areas that become boggy in wet conditions.
- Excessively angled sections. Cows are reluctant to walk on a road sloping more than 8 degrees. Over steep sections cow flow will slow as cows move into single file to walk on the flattest part.
- Narrowing or sharp, right-angled corners. Sudden changes in direction will disrupt cow flow and result in increased damage to the hoof, particularly the white line.
- Junctions where the top surface material changes.

**Examples:** From gravel to concrete, crossing a road, broken/uneven concrete or slippery concrete, steep gradients going up or down that will cause cows to hesitate, rough, sharp surfaces that cows will attempt to avoid and gateways, culverts, underpasses or creek crossings.

## Cows walking on laneway with uncomfortable top surface



Copyright Jakob Malmo



These pictures illustrate a degraded surface and cows in single file to avoid the surface.



## Laneway design

Laneways should be carefully planned to minimise congestion points and optimise cow flow. An ideal laneway is:

- short: less than 1km
- wide enough to permit free movement.

## Recommended laneway width

This table gives the recommended laneway width for given herd sizes

Number of cows in herd	Ideal width of laneway (metres)
120	5.0
120–250	5.5
250–350	6.0
350–450	6.5
More than 450	8–10 (depends on size of herd mobs)

## Laneway with gentle curve and an even centre

The most effective laneway is straight or gently curved and free of sudden turns and sharp angles.



Drainage ditch on the paddock side of laneway fence  
Copyright Jakob Malmö

## Guidelines for laneway design

Important inclusions are:

- Crowned surface, ideally 3–5% slope. Cows prefer to walk on a flat surface but some slope is required to ensure water run-off. Water pooling on the surface soaks in causing the surface to disintegrate.
- Even width, widening out on approach to the holding yard, with:
  - no congestion points, and
  - gateways the same width as the laneway
- Gentle slope approaches to gates, bridges and culverts to reduce pressure on stock and damage to tracks
- Well drained with drainage placed on the paddock side of the laneway fence
- Non-abrasive, 'hoof friendly' top surface
- No shaded, slow-drying areas.



Scan QR code to watch  
a video on laneway design

# Constructing a new laneway

## Overview

It is highly recommended to use a professional road construction contractor when designing and building new laneways. The construction and drainage of laneways will have a large impact on the future incidence of herd lameness and on the frequency of future laneway repairs and maintenance.

### Construction principles

When constructing new farm laneways these are the steps that should be followed in order to make the best use of resources:

- Construct drains
- Crown the laneway
- Construct a sound base
- Remove all grass and topsoil
- Provide a suitable bearing surface.

Constructing a new laneway contains these topics

Topic	See page
Constructing drains, removing grass and topsoil and constructing a sound base	30
Provide a suitable bearing surface	32
Repair and maintenance of existing laneways	33

# Constructing drains, removing grass and topsoil and constructing a sound base

## Construct drains

### Purpose

Drains are required to prevent water seeping into the track base from the surrounding ground.

### What to do

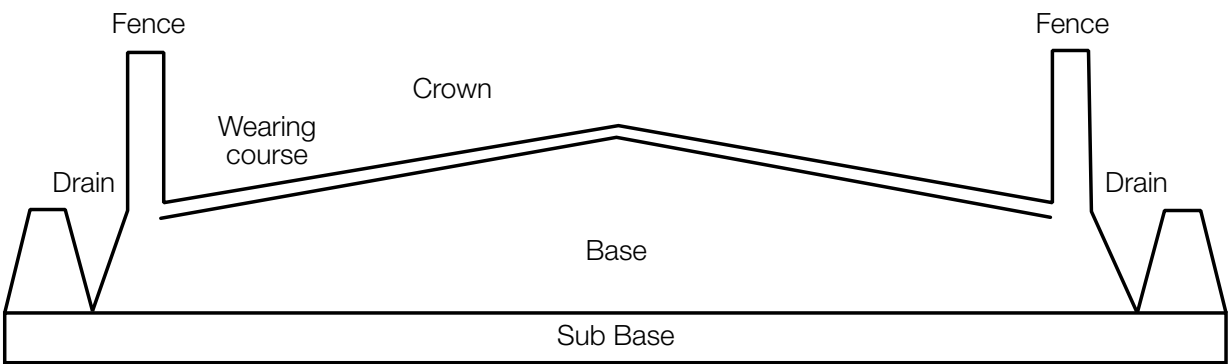
Ensure laneways are adequately drained towards the paddock side of the fence.

Fence drains off so that cattle will not walk in them.

Ensure the lowest wire on laneway fences is high enough to allow cleaning of material that builds up around the edge of the track and interferes with drainage.

### Diagram of laneway drains

Planned drainage on paddock side of laneway fence.



## Construction of a culvert



These photos illustrate construction of a culvert to drain water under laneway (Copyright Jakob Malmo)

## Remove all grass and topsoil

Topsoil containing grass has no strength and can pug rapidly. Remove it before construction begins.

### Construct a sound base

A laneway base should have a well compacted, crowned surface which is above the level of the surrounding ground and has drainage provided on either side. The base should support the top (wearing) surface without moving, becoming too wet, or breaking up. Use coarse material with a clay content of 15 to 30%.

#### Construction of laneway base



These photos illustrate the construction of a laneway base. (Copyright Jakob Malmo)

### Crown the laneway

Laneways should be sufficiently crowned to shed water. A cross-fall of between 3% and 6% is ideal. A cross-fall slope of more than 8% makes walking difficult for cows. Such a slope causes:

- cows to avoid the steep slopes and walk in the side drains, and
- stones to roll to the sides where the cows are walking, increasing risk of injury.

#### Laneway cross-fall

Use a spirit level to assess a cross-fall 1 metre from the centre of the laneway



### Provide adequate compaction

As each layer of base is laid it should be compacted with a vibrating roller. Proper compaction of the base is essential if the resulting laneway is going to withstand heavy cow traffic on its surface.



Vibrating roller for compacting laneway during construction of base layer

# Provide a suitable bearing surface

## Top surface function

The top surface layer serves two functions:

- Waterproofing: so water will not penetrate into the base of the track, causing it to break up.
- Wearing: providing a non-abrasive comfortable surface for the cows to walk on.

## Materials to use

Materials for the laneway surface will depend on local availability. Ask advice from local contractors, other farmers in your district and trusted advisers experienced with local materials. Crushed limestone is a suitable material for surfacing. Generally spread as a 50–100mm layer, it needs firm compaction. A compacting device such as a vibrating roller greatly assists in making a suitable wearing surface. (See *Materials in transition zone construction*, page 24)

### Testing suitability

To check if the material is useful for the top surface, perform this test:

A one cup sample of surface material should shatter under the heel of your gumboot when ground against a concrete surface. The material should crumble into fine particles leaving no sharp-edged 1–2cm stones that could cause sole penetration injuries.

## Concrete laneways

In very wet climates, heavy rain can cause frequent damage to even well-constructed gravel laneways. Although expensive to construct, concrete laneways are very durable and require far less maintenance than gravel tracks. For good cow flow, there are some important design principles to remember:

- Match laneway width with the yard gate width. Cost may mean the lane cannot be as wide as the recommendations prescribe. If possible, widen the sections closest to the milking yard.
- Avoid steep slopes. Ensure that the concrete follows a gently sloping contour as steep sections of concrete can become extremely slippery with light rainfall and should be avoided.
- Provide a transition zone between gravel and concrete surfaces. Lameness is often caused by cows standing on small stones that have been carried onto concrete.
- Keep concrete surfaces clean. Mechanical brooms operated with a small tractor can be used to regularly sweep stones from areas of concrete that cannot be hosed clean.



# Repair and maintenance of existing laneways

It is inevitable that with adverse weather, or over time, even the most well-constructed laneway will begin to deteriorate. However, with regular maintenance, the life of the laneways can be extended and the risk of lameness reduced.

## Frequency

All laneways require regular maintenance. There should always be a 'repairs and maintenance' component budgeted for ongoing work. Repair work will often be best done during dry weather when the incidence of lameness is low and such work may not seem high priority. Using farm bikes, utes and/or tractors on cattle laneways will increase the frequency of maintenance required to uphold the integrity of the laneway surface.

## Sequence of repairs

Repair sections closest to the dairy first. These are the sections where cows are under most pressure and are most frequently used. Act promptly to fill holes and repair broken sections by:

- scraping any build-up of mud and muck off the track to allow it to dry
- reforming the track
- applying another layer of bearing surface
- using a roller at all stages to ensure consolidation.

## Poor laneway drainage

The wet area will cause cows to baulk and halt their flow as they cannot see where to place their front feet to avoid stones. Cows will be fearful to move onto the wet boggy area and they will defecate on the laneway at the point of poor drainage. Water and dung will degrade the surface, allowing water to pool and seep through to cause disintegration of the base course of the laneway. Shade over these sections will make it worse by increasing the time it takes for the section of laneway to dry out.

## Guidelines for improving laneway drainage

- Fix leaks around water troughs.
- Minimise shaded areas to allow the sun and wind to dry out the laneway. Remove hedges or keep them well trimmed.
- Minimise wetting by irrigators or manage the timing of irrigation to maximise drying out before use by cattle.
- Correct poor compaction of top surface or base layer.
- Small drainage channels should be cut into the track surface at intervals on the edge of the laneway to allow water to flow off the laneway
- Do not remove all of the grassy edge as this is necessary to maintain the main structure of the track.



# Management and treatment of lameness

## Overview

Management and treatment of lameness contains these sections

Chapter	See page
Effect of seasonal weather conditions	Overleaf
Nutrition and hooves	42
Monitoring and review of lameness	45
Identification and treatment of problems	51

# Effect of seasonal weather conditions

## Overview

Difficult weather conditions have the potential to reduce feed availability as pasture growth slows. If pasture shortages occur and there is insufficient effective fibre in the diet, the risk of subacute ruminal acidosis increases.

Acidosis can cause inflammation of the sensitive tissues of the hoof. This results in lameness and/or a disruption to the normal growth of horn tissue and production of poor quality horn.

Very wet conditions also lead to softening of the hooves, predisposing the cows to injury.

In extreme conditions the whole herd may become "sore-footed" and the problem becomes self-perpetuating. Poor cow flow may contribute to impatient handling, which will produce more injury and lameness, slowing the movement of the herd even further.

### Effect of seasonal weather conditions contains these topics

Topic	See page
Impact of wet weather on lameness risk factors	37
Managing lameness in severe wet conditions	38
Anatomy of healthy hooves The structure of the hoof	40

# Impact of wet weather on lameness risk factors

There are several different ways in which wet weather could potentially increase the risk of lameness in the herd.

## Softening of hooves

Extremely wet conditions are associated with higher rates of lameness in dairy cows. Prolonged exposure to moisture causes the hooves to soften, making bruising, sole penetration and White Line Disease more common. The skin between the claws and around the hoof also softens and macerates, leaving the skin more prone to infections such as footrot.

Higher bacterial loads present in wet, muddy environments can also add further risk.

## Degradation of laneway top surface

Changes also occur to the surfaces cows walk on and these changes slow cow flow and increase the risk of claw penetration or injury, eg:

- the fine topping materials of gravel laneways are often washed away
- larger stones may be exposed
- sharp gravel may be washed or more easily carried onto concrete
- poorly-drained laneways will begin to break up, producing muddy sections of track

## Changes in cow flow and stockmanship

Changes to the nature of the surface cows are forced to walk on are likely to impair cow flow. Farm staff may become frustrated and start pushing cattle from behind, causing unplanned foot placement that increases the risk of injury.



# Managing lameness in severe wet conditions

In extremely wet conditions managing increasing numbers of lame cows, while dealing with other challenges, contributes to the stress levels of herd managers and farm staff. A plan to reduce lameness risks during extreme weather conditions is essential.

## Stockmanship

- Calm and patient stockmanship will allow cows to place their feet carefully if given time to walk at their own pace.
- Discuss the effects of the wet conditions on tracks and cows' feet with staff and increase the amount of time allowed for bringing in cows.
- Consider putting slow walkers and young cows in a separate herd to improve cow flow. Smaller herds reduce the competitive pressure between cows.
- Give cows additional time to choose a path through areas where the track surface has been damaged.
- Refrain from honking horns or using barking dogs.

## Care of cows on concrete

Take particular care on concrete and in the holding yard. Soft hooves are easily damaged by twisting, sliding sideways and turning on abrasive surfaces. To protect soft hooves from excessive hoof wear:

- Keep the concrete clean – remove stones from the concrete surface daily.
- Place protective mats, carpet or rubber tiles on turning areas.
- Strategically place protective mats at the yard entrance to catch small stones brought onto the concrete yard and to cushion cows' feet. These mats must be cleaned daily.
- Let the cows move into the shed at their own pace.
- Avoid overcrowding in the yard (see *Dairy yard and entrance design*, page 18).
- Backing gate movements should be limited by a timer to 5 seconds per movement. (See *Safe use of barriers to move cows forward in milking yards*, page 12).
- Minimise the time cows spend on concrete, using calm and quiet handling techniques.

## Prioritise laneway repair

If it is not possible to re-surface tracks during wet conditions, preventative maintenance can reduce their deterioration:

### Immediate repairs

- Keep the drains clear.
- Remove large or sharp stones and fill in potholes with fine screenings.
- Fence off severely damaged areas of track that are beyond temporary repair.

### Drainage

Clear or cut drainage paths through built up mud on the edge of tracks to drain water off the surface.

### Patching

- Compact repaired surfaces well.
- Incorporate 0.3–1% cement in the capping repair material to help stabilise the surface.
- Top up problem sections of laneways with a thick layer (at least 300mm thick) of sawdust or woodchips as a temporary fix. Finely crushed rock/limestone can be used. Sleepers confine the material to the laneway.
- If the cattle are carrying stones onto the concrete holding yards, consider topping the 25m of laneway closest to the yards with sawdust or woodchips, to create a stone trap transition zone.
- If there is no nib wall at the yard entrance, place a log (125mm high) for the cows to step over at the laneway-yard junction, to reduce the number of stones brought onto the concrete.

## Keeping hooves clean

Maintain the dryness and cleanliness of calving and feed pads:

- Calving pads should be sufficiently dry so that no water collects in foot prints made with a gumboot.
- Scrape feed pads and stand-off areas regularly to prevent the build-up of slurry.

## Treat lame cows early

Early identification, diagnosis and treatment will improve lame cow welfare and minimise costs. Treatment costs and recovery time are greatly reduced. (See *Identification and treatment of problems*, page 51).

# Anatomy of healthy hooves

## The structure of the hoof

### Why it matters

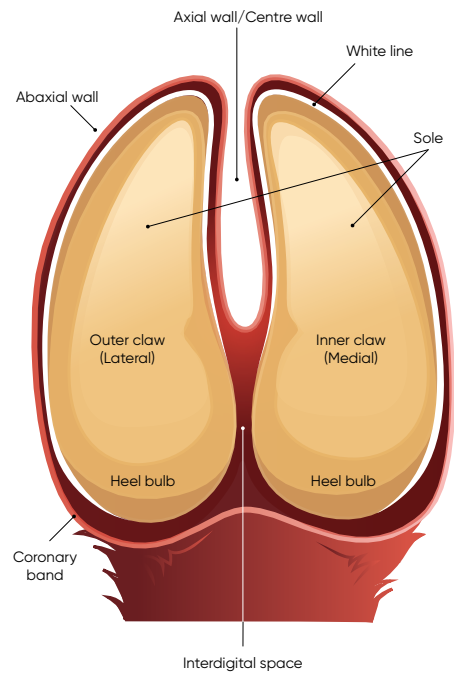
To identify the lesions associated with lameness, it is important to understand the anatomy of the cow's hoof. Parts of the hoof can be damaged by moisture and wear and become infected.

### The hoof: under view

The hoof has two claws. The hoof wall is made of protective tough keratin (or horn) that softens when wet.

### Anatomy of the under view

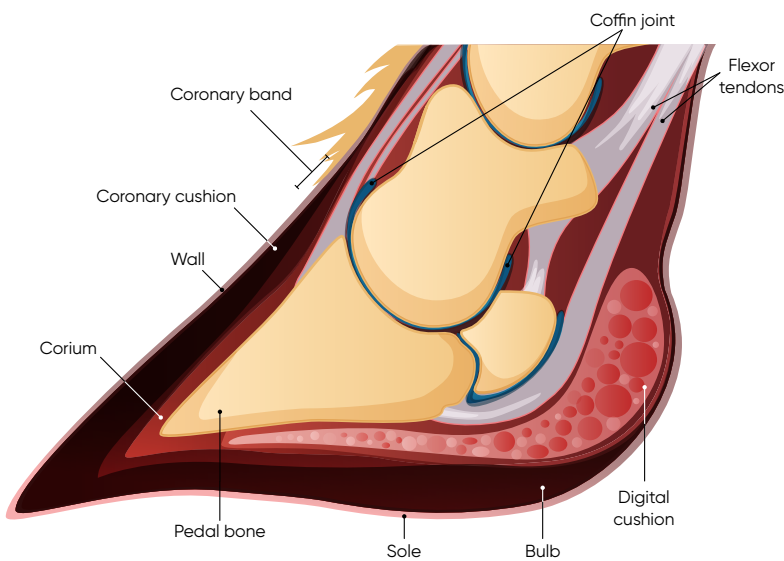
These are the parts of the hoof from the under view



Part	Description
Heel bulb	Merges with the inside and outside wall and the sole. A soft rubbery part of the hoof continuous with the coronary band.
Inner claw (medial)	Controls direction and carries more weight than the outer claw in front hooves. In the front hooves the inner claw is slightly larger.
Outer claw (lateral)	Controls direction and carries more weight than the inner claw in rear hooves. In the hind hooves the outer claw is slightly larger.
Interdigital space	The space between the inner and outer claws. This space can become impacted with debris.
Coronary band or coronet	A pale hairless band at junction of hoof and skin. Point at the top of the hoof from where the hoof wall is produced.
Wall Axial or centre, and Abaxial or outside	Grows downward from the coronary band approximately 5mm per month. Made of tough horn.
White line	Junction where sole meets hoof wall. Runs from the bulb of the heel to the toe and then back along the first third of the inside wall. Softer than the wall and sole. It is a point of weakness and often the site for wedged stones and entry of infection.
Sole	Sole horn is softer than the wall horn.

Anatomy of the side view

These are the bones, joints and ligaments in the side view of the hoof



Part	Description
Coronary band	Joins the hoof and the skin. A pale hairless band.
Wall	Grows from the coronary band downward at a rate of approximately 5mm per month. Made of tough horn.
Corium	Supports the pedal bone within the hoof wall.
Pedal bone, or Distal phalanx	Connects with other bones in the hoof to give the hoof flexibility. Tendons allow the bone to move forwards and backwards in normal movement. Protected by the digital cushion and corium.
Sole	Grows down directly from beneath the pedal bone. This horn is softer than the wall horn. The sole is joined to the wall by the white line.
Bulb	Merges with the inside and outside wall and the sole continuous with the coronary band. A soft rubbery part of the hoof.
Digital cushion	Acts as a shock absorber, bearing the weight of the cow as she steps onto her foot.
Coffin, or Distal interphalangeal joint	Allows the hoof to flex. Prone to injury involving the attachment of the deep flexor tendon to the pedal bone. The tendon will separate and the toe of the claw will turn up.

# Nutrition and hooves

## Overview

Nutritional disturbances affecting rumen health will increase the risk of lameness. A well balanced dairy cow ration will:

- support healthy rumen function
- provide adequate trace minerals, fibre, protein and energy for milk production, and
- ensure body condition is maintained at a level that will allow good reproductive performance.

### Purpose

This chapter provides general guidelines supporting good cow health in an Australian pasture/grain supplement system. It would be essential in any herd lameness investigation to investigate the nutritional management of the herd.

### Maintaining healthy rumen

Variable amounts of concentrate supplementation can influence hoof health. Sudden changes to the diet can cause inflammatory diseases that reduce the quantity and quality of hoof material produced, so:

- manage diets to ensure cows receive the recommended balance of fibre, protein and carbohydrate
- monitor cow rumen function for indications of nutritional problems
- change cows’ feed slowly over a period of time
- monitor feed quality.

Nutrition contains these topics

Topic	See page
Building stronger hooves	43
Hoof trimming	44



## Building stronger hooves

Supplements can help in developing strong, healthy hooves.

### The effect of supplements

The trace minerals: copper, selenium, zinc and sulphur have a role in the formation of the hoof wall and biotin helps maintain the integrity of the hoof wall. Supplements need to be in the diet for at least four months to have an effect.

### The role of trace minerals in hoof health

Zinc is important in claw horn formation and zinc deficiency has been implicated in lameness in dairy cattle. Zinc is required at 40–50mg per kg of dry matter. Supplementation with a zinc derivative, such as zinc methionate, has been demonstrated to reduce the incidence of hoof abnormalities.

Copper is required at a level of 10mg/kg of dry matter in the diet of cattle, assuming no interference in uptake of copper.

Biotin contributes to the formation of the hoof wall. Adding biotin to the diet, (20mg/cow/day) over a period of 3–4 months, has been shown to improve hoof hardness.

### Avoid excessive loss of body condition from calving to mating

The fat pad in the cow's hoof acts as a shock absorber. Cows with low body condition will have a thinner cushion which is associated with sole ulcers and White Line Disease especially in heifers. Cows are most likely to lose condition between calving and mating as they adjust to new diets and the demands of lactation.

# Hoof trimming

The benefits of treating lameness lesions will be quickly undermined if the defects in claw conformation that contributed to the lesion are not corrected. Hoof trimming can be an important strategy to improve claw shape and prevent recurrence of lameness.

## Principles of hoof trimming

The shape of the hoof is a balance between growth and wear. Most cows' hooves grow at approximately 5mm/month. If the wear is less than the growth, overgrowth of the horn leads to incorrect weight bearing. The way in which cows' feet wear depends on their walking surfaces. Hard surfaces such as some laneways and yards can be abrasive and cause excessive wear.

Commonly, the toe wears slower than the heel. The result of this is a cow with longer toes and shallow heels, lowering the hoof angle and putting more pressure on the bottom of the rear pedal bone. Lameness is caused by unbalanced weight bearing leading to more pressure being applied.

### Examples for functional (left) and therapeutic (right) trimming



Example of a functional hoof trim



Underrun sole removed (Copyright Jakob Malmo)

## What are the risks?

Specialised training is required for functional foot trimming. Inadequately trained people can damage a cow's foot and leave her lame.

Common mistakes are:

- trimming the toe too short and permanently damaging the horn-growing cells
- removing wall horn, or too much tissue from the inside (medial) heel, causing unstable weight bearing which leads to lameness.

If cows become lame after trimming, promptly:

- assess the cows, and
- have your trimming methods reviewed by skilled practitioners.

### Limiting the spread of infection

It is critical that the foot trimmer follows hygienic procedures in order to limit the spread of infectious lameness conditions, such as digital dermatitis, between cows in the herd or between herds.

# Monitoring and review of lameness

## Overview

It is vitally important that the herd is regularly monitored for lameness. Cows identified as lame early, and treated quickly, will have more chance of recovering to their full production potential.

### Daily check

- Cow behaviour
- Stockmanship

### Weekly check

- Laneway drainage

### Monthly check/after an adverse event, for example: flooding









- Laneway surfaces
- Laneway drainage
- Lameness lesions

Monitoring and review of lameness contains these topics













Topic	See page
Lameness scoring	47
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Weekly monitor	49
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Use of treatment records	49

# Lameness scoring

Lameness scoring is an essential tool to measure how well your prevention plan is working. Lameness scoring should be done on a regular basis to identify cows going lame early. Aim to score your herd once a week for the first 8 weeks after calving and once a month for the rest of the season.

Score	Walking speed	Stride
<div>0</div> <div>Walks evenly</div> <div>No action required</div> <div>This cow is normal</div>	<div>Confident. Similar walking speed to a person. Maintains position in the herd.</div> <div></div>	<div>Long, even and regular. Rear foot placement matches front foot placement.</div> <div></div>
<div>1</div> <div>Walks unevenly</div> <div>Minor action required</div> <div>Record and keep an eye on her – some cows normally walk unevenly</div>	<div>Not normally affected, should easily maintain position in the herd.</div> <div></div>	<div>May have uneven stride and/or rhythm. Rear foot placement may miss front foot placement.</div> <div></div>
<div>2</div> <div>Lame</div> <div>Action required</div> <div>This cow is lame and needs to be recorded, drafted and examined within 24 hours</div>	<div>May be slower than normal; may stop, especially when turning a corner.</div> <div></div>	<div>Shortened strides – rear foot placement falls short of front foot placement.</div> <div></div>
<div>3</div> <div>Very lame</div> <div>Urgent action required</div> <div>This cow is very lame and needs urgent attention. Draft and examine as soon as possible</div>	<div>Very slow, stops often and will lie down in paddock. Cannot keep up with the healthy herd.</div> <div></div>	<div>Shortened and very uneven. Non lame leg will swing through quickly.</div> <div></div>

For further information on lameness scoring, go to the Healthy Hooves website and watch the videos 'Indicators of lameness' and 'Lameness scoring'

Weight bearing	Backline	Head
Evenly placed and weight bearing when standing and walking.	Straight (level) at all times.	Held in line or slightly below the backline and steady when walking.
		
May stand or walk unevenly but difficult to identify which leg/s are affected.	Straight when standing, may be mildly arched when walking.	May have slight bob and/or may be held lower than normal.
		
Uneven – lame leg can be identified.	Often arched when standing and walking.	Bobs up and down when walking.
		
Lame leg easy to identify – ‘limping’; may barely stand on lame leg/s.	Arched when standing and walking.	Large head movements up and down when walking.
		



Scan QR code to watch a video on lameness scoring



# Daily monitor

The majority of problems contributing to the risk of lameness occur on laneways or as cows pass through the dairy shed during milking. Daily monitoring of cow behaviour gives an early warning of issues arising. Some aspects of cow behaviour strongly influence the risk of lameness. Take action when you see adverse changes to cow behaviour.

## Cow observation quick reference

Observation	Good	Poor	Action
Walking on laneway	<ul style="list-style-type: none"><li>Cows use all of laneway, with cows walking 2–3 abreast on laneway.</li></ul>	Cows walk single file toward edge of laneway.	Seek adviser help to assess track construction.
Position of cow's head when she is walking on laneway	<ul style="list-style-type: none"><li>Head down</li><li>Cows able to observe where they will place fore feet</li><li>Hind feet are placed in same spot as fore feet.</li></ul>	Heads up as cows bunch together in response to herding pressure.	Develop awareness in farm team for good stockmanship practices that encourage cows to have a safe walking action to minimise risk of hoof injury.
Flow from laneway onto milking yard	<ul style="list-style-type: none"><li>Smooth transition to milking yard.</li><li>Cows have time and space to move from walking order into milking order.</li></ul>	<ul style="list-style-type: none"><li>Cows baulk</li><li>Flow obstructed by other cows on yard</li><li>Backing gate pushes cows up tight so that they cannot easily move into milking order.</li></ul>	<ul style="list-style-type: none"><li>Seek adviser help to assess entrance width and location.</li><li>Develop awareness in farm team for good stockmanship practices in milking process.</li></ul>
Cows standing in yard waiting to be milked	<ul style="list-style-type: none"><li>Heads down</li><li>Legs straight.</li></ul>	<ul style="list-style-type: none"><li>Heads up</li><li>Cows pushing against each other</li><li>Legs splayed</li><li>Cows reluctant to come into shed to be milked.</li></ul>	Investigate risk factors of: <ul style="list-style-type: none"><li>yard size</li><li>use of backing gate</li><li>noise at shed entrance</li><li>slippery surface at shed entrance</li><li>lack of guidance into shed</li><li>stockmanship in encouraging cows to enter shed</li><li>training cows to enter the shed.</li></ul>
Cows eating supplement. Rapid changes may have a negative impact on rumen health	<ul style="list-style-type: none"><li>Each cow eats allocated allowance</li><li>Cows not passing undigested feed in dung.</li></ul>	Some cows: <ul style="list-style-type: none"><li>not eating feed</li><li>have watery dung with undigested grain in dung</li><li>looking off colour.</li></ul>	<ul style="list-style-type: none"><li>Call for veterinary attention to sick cows.</li><li>Check ration allowance with nutrition advisor.</li><li>Check feed delivery mechanism.</li></ul>

## Weekly monitor

Breakdown of laneways is primarily due to water eroding the walking surface. Ensuring that water is free to drain away from the laneway helps maintain a good walking surface for the herd. Watch for:

- Areas of water beginning to pool on laneways or sections where cows are reluctant to walk.
- Reasons for poor drainage or disturbance to cow flow. Seek help to correct the issue.

## Monthly monitor

Plan to do regular laneway maintenance before periods of high risk/use such as heavy rainfall, calving and joining to minimise the risk of traumatic injury to hooves.

### Introducing new structures

When new structures such as feed pads or underpasses are built, the herd flow, behaviour and lameness should be assessed to ensure early identification of problems that may contribute to hoof injury in the herd.

The requirement for new structures and likely impact on herd flow should be well considered with appropriate advisers before implementation.

### Repairs after damage

After adverse events (e.g. floods) damage to laneways must be assessed and a plan to minimise risk of hoof injury developed whilst laneways are repaired. Strategies may include:

- Sacrifice paddocks to provide a soft walking surface close to the shed.
- Lay temporary surface material such as post peelings or woodchips to provide a soft walking surface and mop up excess moisture in laneways close to the shed.
- Use plastic gratings in high traffic areas to assist in laneway stabilisation.
- Increase time allowance for cows to drift through the damaged laneway to the shed for milking.

## Use of treatment records

It is important that all cases of lameness are recorded so that targets can be met and changes made if necessary.

### Performance against targets

Aim to have no more than 8% of cows with lameness requiring treatment (greater than score 2) per year and no more than 0.5–1% of cows with lameness requiring treatment per month.

### Know when to seek expert opinion or assistance

Sometimes effective treatment of an individual case of lameness or control of an outbreak of lameness in a herd is beyond the ability of a farmer or herd manager. Veterinarians and professional hoof trimmers represent a vital source of information and assistance, so that effective treatment or control is provided.

### Call a veterinarian when:

- The lameness is to such an extent that the animal is in severe pain.
- A lame cow is examined and the cause of the lameness cannot be determined.
- Technical skills, drugs or equipment are lacking to effectively treat a lame cow.
- A lame cow is treated, and the lameness does not show marked improvement in 1–2 days.
- There is an outbreak of lameness in a herd, and the cause is not obvious or it is not known how to rectify the cause.
- If more than 8% of cows have lameness requiring treatment (greater than score 2) per year or more than 0.5–1% of cows have lameness requiring treatment per month.



# Identification and treatment of problems

## Overview

Some types of lameness are found more often when specific risk factors are present. In this section, all the types of hoof lesions seen are included, but the ‘big five’, which have been the most common lesions found in recent Australian studies are discussed first.

### Most common

- White Line Disease
- Sole injury (penetration/abscess/underrun)
- Sole bruising
- Axial wall crack
- Footrot

### Other hoof lesions

- Digital dermatitis (DD)
- Ulcers (toe/sole)
- Overgrown Claw

Identification and Treatment of Problems contains these topics

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# Treatment toolkit

If you are planning to examine lame cows yourself, you need to have the correct equipment.



## Essential

- Hoof knives – 1 x right handed, 1 x left handed
- Hoof knife pouch (old teat-cup liner)
- Hoof tester
- Hoof trimmer
- Straps or pulley for lifting leg
- Soft rope for securing foot
- Back bar or rope or support belt for cow
- Antiseptic spray
- Cowslips or blocks
- Sharpening stone
- Diamond hoof knife sharpener
- Fine round chainsaw file
- Glove or wrist protector
- Disinfectant.

## Optional

- Paring hoof knife, rasp or angle grinder with sanding disc
- Antibiotics and antiinflammatories
- Methylated spirits.



# Knife sharpening

## Step 1 Correct the angle

When a knife is first purchased use a rough stone, a file, or an angle grinder to change the inner angle (straight and curved cutting edge) of the blade to 20 degrees (see illustration below). The knife edge should be gradually tapered.



**Only sharpen the inside edge of the knife.**



## Step 2 File the edge

Use a fine chain-saw file, a fine grain stone or diamond hoof knife sharpener (shown in picture). File the sharpened edge again. Ensure consistent angle.



## Step 3 Protect blade

Protect the blade while not in use inside an old teat-cup liner, polythene tubing or leather cover.




## Step 4 Sharpen regularly

Touch the blade up regularly with a diamond sharpener.

**When sharpening a knife, have it securely held to ensure a consistent and sharp edge.**





Scan QR code to watch a video on how to sharpen hoof knives

# Treatment facilities

Farms should have appropriate facilities for treating lame cows

Good facilities can help to ensure prompt treatment and ultimately improve your lame cow management.

Important aspects of any treatment facility include health and safety for both cow and operator.



Scan QR code to watch a video on how to restrain a cow



## Key principles of treatment

Correct treatment by someone that has been trained by an experienced instructor will mean a faster recovery. All lame cows should be kept on pasture, have short walking distances, and be provided good quality feed and easy access to water. Many farmers may also utilise once-a-day milking for lame cows and depending on the time of the season may dry lame cows off.

Key treatment principles for most lameness conditions are as follows:

- 1 Return hooves to the ideal shape so that they are balanced, more able to support the cow's weight and less likely to be affected by future problems.
- 2 Reduce pressure on a lesion by removing the horn around the lesion. This reduces pinching and aggravation of the lesion by the hard horn. It also allows dirt and slurry to drain from around the lesion which decreases the chance of an abscess forming
- 3 Remove damaged horn to promote the growth of healthy new horn.

- 4 Transfer the weight to the healthy claw by either paring down the sole of the affected claw and/or putting a block/slip on the healthy claw. This transferred weight helps cows to walk with less pain and aids healing.
- 5 Avoid bleeding.
- 6 Manage pain during treatment and recovery by using anti-inflammatories. Talk to your vet about options.

If after treatment a cow does not heal or improve within a few days, contact your veterinarian.

# Veterinary medicines

There are several different veterinary medicines that may be used to aid in the treatment of lameness.

These include:

Medicine	What is it?
Antibiotics	A medicine that kills or stops the growth of microbes (usually bacteria). Examples may include Propercillin®, Engemycin® and Excenel®.
Anti-inflammatories	A medicine that reduces inflammation, reduces temperature, and provides pain relief. Examples may include Metacam®, Ketoprofen, Tolfedine®.


## Antibiotics

Antibiotics are only occasionally required for the treatment of lameness. They should never be used without first lifting the affected leg or as a first line treatment for lameness. It is very important that antibiotics are only used where necessary to minimise the risk of organisms developing resistance.

Excenel®, Accent® and Exceed® are some examples of trade names for the antibiotic ceftiofur. Ceftiofur is a highly important antibiotic in human antimicrobial resistance (AMR) and should never be used:

- to treat lame cows
- without written advice from your vet
- for medicating multiple animals at once.

If you are currently using any products containing ceftiofur, contact your vet to find out if there is an appropriate alternative.



## Anti-inflammatories

Anti-inflammatories (e.g., Metacam®, Ketoprofen, Tolfedine®) are important for managing pain during treatment and recovery and should be given to all lame cows. Talk to your vet about options.

Always follow your farm’s standard operating procedures or treatment protocols and carefully read the label before giving veterinary medicines.



# How to restrain a cow

## Step 1

Get an assistant to 'tail jack' the cow by gripping the tail near its base and lifting it up and forward over the cow's spine.

When applied correctly this will prevent the cow kicking.



## Step 2

Pick up the lame leg.



## Step 3

Using a quick release knot secure the leg to the rail. If possible, have an assistant holding this rope, rather than tying it.



### Be aware!

If a cow drops to her knees, with her head in the bail, this may put pressure on her windpipe, suffocating her.

Putting a strap/belt under her chest can prevent this.



# How to examine a lame cow

## 8-point dairy cow hoof examination

1

Observe the cow walking. Which leg is the cow lame in?

↓

Head down? Hind limb.

↓

Head up? Fore limb.

2

Is the leg swollen and obviously painful above the hoof?

↓ No

No swelling present.

Yes ↓

Think of infections like footrot.  
Note: Always check for wire or similar wrapped around leg/claw.

3

Observe the external surface of both hooves on the lame leg and compare with the external surface of hooves on the other feet.  
Are cracks present in external surface of the hoof wall of the lame leg?

↓ No

No abnormality detected in either claw on the lame foot.

Yes ↓

Vertical or horizontal cracks present – possible sand crack(s)

4

Restrain cow in suitable facility and secure the affected leg with a rope or strap.  
Tip: Use a second person to apply a 'tail jack' while attaching the rope. Thoroughly clean the external surface with a brush and water.  
Is there soft tissue swelling with foul smelling discharge and dead and damaged skin in the interdigital space?

↓ No

No abnormality detected in the interdigital space.

Yes ↓

Footrot or a hard fleshing swelling or growth –possible Fibroma or a foreign body (gravel or stone), or foreign body penetration (wire) and injury of the axial wall, or an axial wall crack.

5

Carefully pare or sand away the superficial outer surface of the sole and trim any overgrown wall horn (double sole). Sole horn may be very thin so be careful not to reduce the weight bearing surface around the edge of the hoof more than necessary.  
Is there abnormal discolouration in the sole horn? Do not confuse with normal pigment (usually black).

↓ No

No visible discolouration.

Yes ↓

• Red or bleeding lesion on sole at the sole-heel junction – sole ulcer?

• Red/purple smudges in the sole itself – bruised sole?

• Red paint splash spots/lines in the sole horn – Laminitis?

• Black/dark lines or cracks in the sole – sole penetration and/or under-run sole. Pare away until no black horn, dirt or pus remains detected. Check for presence of foreign body – stones/nail.

6

White line – expanded and filled with mud and gravel, especially towards heel area?

↓ No

No apparent abnormality detected.

Yes ↓

White Line Disease – separation of wall from sole – check for abscess breaking out at the coronet? Trim or grind hoof wall back to normal tissue to allow drainage.

7

Use hoof testers over the sole to gently squeeze the sole against the wall searching for sensitive areas which cause withdrawal reflex (flinching).  
Are there any sensitive areas which cause withdrawal reflex?

↓ No

No apparent abnormality detected in either claw or hoof.

Yes ↓

Withdrawal response detected

• Bruising – rest.


• Toe/foot abscess or under-run sole – trim, pare or grind until loose sole horn removed back to normal horn.

• Pus detected – establish drainage.

8

Seek veterinary advice as lameness may be associated with upper leg abnormality.

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Scan QR code to watch a video on how to examine a lame cow



# How to put on a block or 'cowslip'

## Step 1

Clean the foot thoroughly, then using a paring knife scrape the sole and wall clean. An angle grinder with sanding disc may be used.

## Step 2

Dry the foot with methylated spirits or a hair dryer.



## Step 3

Check the block or 'cowslip' for size. If necessary you can cut the block or 'cowslip' then refer to glue mixing instructions.



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## Step 4

Apply the block or 'cowslip' onto the healthy claw and allow the glue to dry.



Remember to record your lame cow treatments  
[datagene.com.au](http://datagene.com.au)





Scan QR code to watch a video on how to put a block or cowslip on

## Types of lameness

There are six major types of lameness in Australian herds

**White line disease**



**Sole injury**



**Sole bruising**



**Axial wall crack**



**Footrot**



**Digital dermatitis**



## White Line Disease

White Line Disease is separation of the wall of the hoof from the sole, which can progress to abscess formation and impaction of dirt, grit and small stones into the white line.

A consequence of dirt and stones tracking into the space is that the infection may track up the lamellae under hoof wall. This infection may result in an abscess which discharges at the coronary band.

### Causes

- Pressure and poor cow flow, causing twisting and turning of the hooves on concrete
- Mechanical injury from high pressure on cows on abrasive surfaces.

### Major risk factors

- Excess twisting and turning of cows in the milking yard. Allowing impaction with small stones and dirt
- Wet and dirty underfoot conditions that soften claw horn
- Trauma from abrasive concrete dairy/yards
- Claw deformities.



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### How you treat it

The fine cracks between the wall and the sole need to be pared out with a hoof knife or sanding disc attached to an angle grinder.

#### Step 1

- Pare away the wall so sand or gravel does not pack into the pared area.
- Remove all underrun hoof, including hoof over the infection tracking up under hoof wall.



#### Step 2

Create drainage by smoothing edges of pared area so that gravel/dirt cannot pack into pared area.



#### Step 3

Lift weight away from affected claw by placing block/cowslip on unaffected claw.

Before placing block on claw, use hoof testers to check for other lesions



#### Step 4

Treat with an antibiotic and anti-inflammatory drug if severity of condition warrants this treatment. If you are uncertain, seek veterinary advice.



Scan QR code to watch  
a video on how to treat  
White Line Disease

## Sole injury

### Penetration/abscess/underrun sole

Sole injury is a term used to describe three possible conditions associated with damage to the sole.

- Sole penetration is caused by a foreign object entering the sole, causing a small defect which can be seen as a small dark area.
- A sole abscess can then form, which can lead to underrun sole.
- Underrun sole is separation of the sole from the underlying corium.

**Note:** Underrun sole can also develop from White Line Disease, if the infection tracks under the sole.

#### Signs

Cows with these conditions generally show a rapid onset of severe lameness.

- There may be localised swelling above the coronary band, especially the centre part
- The hoof will be very painful when tested with hoof testers
- A dark or black mark is the point of entry.

#### Causes

Poor laneways and grit or stones on concrete may contribute to these conditions which are caused by:

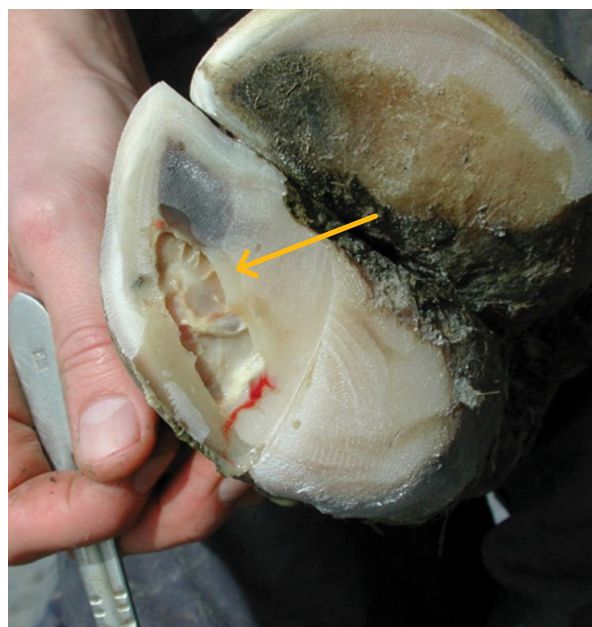
- softening and excessive wear of the sole or poor hoof trimming
- trauma – penetration of some sort
- wet conditions, and
- sharp foreign material.

#### Important: possible bacterial infection

Treat promptly to prevent the underrun area getting larger, or infection entering deeper areas of the hoof. Delayed or poor treatment can result in a second, more severe infection.



Sole penetration (Copyright Jakob Malmo)



Underrun sole following a sole abscess (Copyright Jakob Malmo)

## How you treat it

The fine cracks between the wall and the sole need to be pared out with a hoof knife or sanding disc attached to an angle grinder.

### Step 1

Remove all underrun sole and any hoof wall underrun by sole abscess that has tracked under hoof wall.

**Note:** The cracks that cause an underrun sole can be difficult or impossible to see. If, after cleaning claw and paring thin sliver of horn over the white line of claw, you cannot see any penetrating wound in sole of hoof, use hoof testers to locate lesion. If you are unable to locate lesion call for veterinary attention to the lame cow.



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### Step 2

Create drainage to ensure:

- all underrun horn is removed
- all pus is drained, and no gravel/dirt can be trapped in pared area of claw.

#### Warning

Try to avoid cutting corium as this layer will bleed easily if cut. If you are not confident you can to do this effectively, contact a veterinarian so that the condition can be treated professionally.



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### Step 3

Apply a cowslip or block to the unaffected claw.

**Note:** It takes time for a new sole to grow and lameness can persist for some weeks after drainage. Raising the hoof off the ground minimises lameness and its side-effects during the healing phase.

### Step 4

Treat with an antibiotic and anti-inflammatory drug if the severity of the condition warrants this treatment. If you are uncertain, seek veterinary advice.



Scan QR code to watch a video on how to treat sole injury



## Sole bruising

Sole bruising is a lesion in which a bruise is visible through the surface of the sole:

- one or more claws/hooves may be affected, and
- the cow is reluctant to walk, prefers to sit and may have a short 'shuffling' gait.

### Causes

First calvers are at highest risk. The lesions may be caused by trauma and/or excessive wear due to:

- poor acclimatisation to concrete yards or newly constructed dairy/yards
- excessive standing/walking due to dairy design
- abrasive new concrete
- laneway construction, or
- poor cow flow.



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### How you treat it

Rest is important; bruising repairs with time. Cows with bruised soles should be drafted into a paddock close to the shed after milking. Walking long distances can lead to additional bruising.

#### Step 1 If one claw is bruised

If only one claw is injured apply a cowslip or block, to the uninjured claw.

This will keep the bruised claw off the ground and immediately relieve pain.



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#### Step 2 If both claws are injured

If more than one claw is affected, but there is only pain in one claw, a cowslip or block may be applied to the non-painful claw. If both claws are painful, keep the animal close to the shed.



Scan QR code to watch a video on how to treat sole bruising

## Footrot

Footrot is a bacterial infection with a putrid odour found between the toes. The skin above the bulb of the heels is hot, swollen and reddened.

### Causes

It is caused by a mixed bacterial infection.

Risk factors include:

- injury to the skin between the claws
- muddy and wet conditions
- cows congregating in areas which harbour bacteria
- worn tracks where blue stone is starting to appear.



# How you treat it

Prompt treatment is essential. Infections become severe if left untreated.

## Step 1

Explore the split between the claws with a finger to check for foreign objects such as buried stones or sticks.

## Step 2

Clean the cleft removing any foreign object or dead tissue.

Note: This can be very painful and the use of pain relief may be required. Consult your vet.



## Step 3

Spray the cleaned cleft with an antiseptic/iodine.

## Step 4

Check claws for other lesions, for example sole abscess or White Line Disease requiring treatment.



## Step 5

If necessary, begin a three day course of intramuscular antibiotics, prescribed by your veterinarian.

Antibiotic and anti-inflammatory treatment will be required for 3–5 days. Seek veterinary advice for treatment suitable for your situation.



Scan QR code to watch a video on how to treat footrot

# Axial wall crack

An axial wall crack is a crack of the inside of the claw at the join of the hoof wall and sole. Swelling and an abscess may develop at the level of the centre coronary band, immediately above the crack. Infection results in moderate to severe lameness.

## Causes

The causes are poorly understood.

Risk factors include:

- overgrown toes
- uneven walking surfaces
- corkscrew claws which can be genetic
- traumatic injury or disease, such as footrot.

Secondary infections associated with wet and muddy conditions can occur.



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Scan QR code to watch a video on treating axial wall cracks



# How you treat it

## Before you begin

Treatment requires experience and sometimes special equipment. It may be a painful condition and a veterinarian should be contacted, so that a local anaesthetic can be used.

This condition may:

- take some time to heal, and
- require more than one treatment.

Excessive pain and lameness can occur. Apply a cowslip or block to the other claw.



## Step 1

Pare out all underrun hoof wall in the axial groove with:

- single bladed hoof knife
- the curled end of a sharp hoof knife, or
- a barrel-shaped bit attached to a Dremel drill.

The lesion may also underrun the axial aspect of the sole of the claw.



## Step 2

Ensure that all underrun hoof wall is pared back to avoid continued movement of edges of underrun hoof wall at the top of the axial groove.

Do not expose too much of the underlying soft tissue when paring out these cracks if they haven't caused lameness.

**Explanation:** If underrun hoof is left in place excessive proud flesh will form as the body's way of trying to repair damaged area of claw. This proud flesh will appear as a red 'cherry' between the claws. If this occurs seek veterinary attention for the lame cow.



## Step 3

Place cowslip or block on unaffected claw.





# Digital dermatitis

Digital dermatitis is the infection of the digital and/or interdigital skin with erosion and mostly painful ulcerations at the start of the disease, which turn into less painful hard areas (but which are still infectious) over time.

## Impact

Digital dermatitis reduces production and profitability due to the damaging effect on milk yield, reproductive performance, lameness and the significant costs associated with treatment and control. It is endemic overseas and presents a risk to the Australian dairy industry.

Although only an emerging disease in Australia, it is important that farmers and veterinarians are vigilant in the detection of lesions and act quickly to accurately diagnose the condition.

## Digital dermatitis infection

Digital dermatitis shows as inflammation of the skin, mostly in the region of the bulb of the heel and the join of the hoof and skin. It can also cause wearing away of the horn tissue in more chronic cases.

## Causes

This is a disease of concern and there are increasing reports of its occurrence. The causes are:

- unhygienic conditions such as water, mud, urine and faeces
- the presence of digital dermatitis bacteria.



## How you treat it

Applying antibiotics to the surface of the infected areas is the most effective form of treatment:

- use a footbath for the whole herd 2–3 times per week to control the spread.

Intramuscular injections of antibiotics do not result in an effective cure, and are unnecessary.



### Step 1

Tie up the foot.

### Step 2

Clean the ulcer or wart with water.



### Step 3

Dry, and then spray with an antibiotic spray.



### Step 4

Let the spray dry for 10–15 seconds and then apply again.



### Step 5

Lower the foot and then let the cow stand for 10–15 minutes on clean concrete.

### Step 6

Repeat the treatment for two more days.

- Severe outbreaks can be prevented with hygiene to keep the feet clean and foot-bathing of every animal.
- Ongoing control is by use of footbaths with antiseptic solutions on a regular basis.



## Caution

Many lesions are chronic and although treatment may seem effective, research overseas has suggested that these recur due to the bacteria being embedded deeper in the skin. There is also evidence that digital dermatitis can establish itself in already existing foot lesions.



## Implementing risk management for digital dermatitis

Overseas experience indicates that once a herd is infected, digital dermatitis appears to be impossible to eradicate.

All properties are different and the key person for assessing and managing risks on each farm is the farm manager. Risk management at the farm level makes sound economic sense and improves animal welfare outcomes.

### Preventing introduction

Strict hygienic controls for stock and equipment are important to prevent the entry of the disease. Repair wet and muddy areas quickly.

Possible strategies to reduce the risk of introducing digital dermatitis include:

- maintaining a closed herd, that is, no use of hire bulls or shared agistment properties.
- only buying cattle from herds that do not have the disease.

May be difficult due to poor awareness of the disease and lack of proper diagnosis.



- providing boot and tyre disinfection facilities for people or vehicles entering the farm
- ensuring any veterinarians or hoof trimmers:
  - apply cleaning protocols to lameness equipment used between farms and animals, or
  - preferably use equipment provided by the farm.

### Rationale

The digital dermatitis bacteria survive well on the metal surfaces of hoof trimming equipment. Using disinfectant reduces bacteria and the risk of transmission from infected to uninfected cattle.



# Ulcers

## Toe ulcer

A toe ulcer is a bleeding, then ulcerative lesion of the sole in the area of the toe. It presents as sudden and severe lameness. Toe ulcers are more common in heifers in early lactation and herd bulls.

Risk factors include trauma, wet conditions, poor bedding and excessive standing. It can occur following laminitis due to nutritional problems.

## Sole ulcer

A sole ulcer is bleeding, then ulcerative lesion of the sole around the junction of the heel bulb. It often occurs on both of the outer areas on the outer hind claw, causing sudden and severe lameness.

## Causes

Commonly occurring after a bout of laminitis, it is caused by:

- excessive standing for long periods on hard surfaces
- long toes and poor balance of the foot.

## Risk factors

Risk factors include high production in housed conditions. Long periods of standing on hard surfaces can cause excessive pressures that crush and destroy horn-producing tissues under the sole. Inadequate time and facilities for rest increase the risk. It is also associated with nutritional Subacute Ruminal Acidosis (SARA) and laminitis.



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# Overgrown claw

There can be several variations of overgrown claws, including:

- slipper foot
- beak claw
- corkscrew claw in one claw, or
- straightforward overgrowth.



*Slipper foot (Copyright Jakob Malmo)*



*Beak claw (Copyright Jakob Malmo)*



*Corkscrew claw (Copyright Jakob Malmo)*



*Overgrown claw (Copyright Jakob Malmo)*

## Causes

With the exception of slipper foot, most cases of overgrown claw are either:

- a result of trauma, or
- have a genetic cause.

Slipper foot results from laminitis and Subacute Ruminal Acidosis (SARA). Risk factors for these conditions are usually nutritional, although laminitis can also occur after other severe illness.

## Lameness Prevention Plan

### Lameness scoring

I will lameness score my herd every \_\_\_\_\_ months

### Track maintenance

How often will you maintain your tracks? What will you do?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Stockmanship

How will the cows be brought to the shed? How will cows be brought into the milking parlour?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Treatment plan

Who will treat animals? When is a vet/hoof trimmer required?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Tools

Where are the tools kept? Who will sharpen knives? What disinfectant will be used to clean the tools?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

### Recording

How will you record lameness events?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_









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