

There must be a crown on the lane, but it should be only just sufficient to shed the water. Too much slope can damage the animals' hooves by twisting them and causing cracks between the two separate claws of the hoof, allowing footrot infection to enter. The more timid stock are forced to the sides of lanes.

Cows dislike the smell of their own manure (as well as muck and mud), so will be upset and create more manure in the wet boggy places in the lane, so it is important to keep all parts correctly V shaped and clean. Maintain a very slight crown (slightly higher in the middle) to keep it dry. If too steep it will be uncomfortable to walk on, so cows long will walk either on the very centre where is flat, or on the edges where it is also flat.

### Surface material on lanes

A well-shaped firm peat lane with shallow ditches on both sides needs very little metal or gravel on top. I believe that the best product to use for the base is crushed blue 40 mm all-in soft blue rock. It spreads well, can be graded and it packs down. Blue metal dust is also good for surfaces and cheap per square metre spread. Sand, because it doesn't bind, can wash away. Then use crushed coarse agricultural lime on top of whatever base material is used, and for repairs. Keep a small amount on hand to fill holes when they are small, not after they have become large.

Lime chips from 20 mm down to 5 mm make an aggregate that packs tightly and the best surface, but if distant transport is a major cost it may not be economical. Lime chips pack down almost like concrete, but are softer than concrete and stones, and seem to have a sterilising effect, reducing hoof problems. If all are one size they don't pack tightly. Footrot germs don't like the high pH of lime. Farms with footrot problems see it decline rapidly after applying lime to lanes. Lime chips are also dust-free. Cows walking down a hot lane is bad enough without being in a cloud of dust.

Another reason that the lane slope should not be too steep is because the lime can wash off it before it packs down. If your lane has soft areas, it may be necessary to lay road mat (synthetic mesh) to hold the metal or coarse lime in a layer. It is cheaper in the long run because it saves buying so much metal and makes it last longer. The worst to use is coarse rock or anything with stones larger than 15 mm diameter like this on the right, and below left. The left photo was on a corner so cows had to twist their hooves and suffer the large stone damage, so they were nervous and dinged as can be seen.

### Prices

Coarse rock may be about half the price of crushed 10 mm at the quarry, but may be twice the price per square metre delivered and spread more thickly, because of its large size. It is also hard to grade or move in the future



if necessary to grade into a hole. It splits hooves and cuts tyres. The large stones also find their way into paddocks at the expense of machinery. Getting prices will show that the spread prices are only 40% higher per cubic metre delivered, but less than half is needed per square metre spread.

Avoid using any type of coal ash or other ash. They are often concentrated toxins. Many animals have died from eating them. Animals seem to love eating anything different, especially, but not necessarily, if deficient in some minerals and a good soluble nine mineral mix (SMM) is not being fed in the drinking water.

Shallow drains (about 60 cm in consolidated peat, deeper in raw peat) should be dug on BOTH sides of lanes to keep them dry, to prevent water flowing over them and to stop water moving under them to another drain.

If making a new lane, chisel plough the whole area, grade the spoil from the drains into the centre and chisel plough it all until it is well broken down, then grade it up to a good crown. Raw peat above deep peat will sink considerably, so should be given more crown than on consolidated shallow peat. In soft, wet, bog areas a plastic roading mat may be necessary to support the material. It will save considerable amounts of metal and end up costing nothing, and also give a smoother lane less subject to sinking unevenly.

There must be a crown on the lane, but it should be only just sufficient to shed the water. Too much slope can damage the animals' hooves by twisting them and causing cracks between the two separate claws of the hoof, allowing footrot infection to enter. 18 inches) below ground level. Dig a sediment trap below the entrance pipe and keep the hole clean, so that silt can fill up the hole rather than silt up the pipes. Place the pipes on a good slope (fall), so that the water runs through fairly fast, and reduces the likelihood of silting up. Ones with loose tops are available. They can be opened for cleaning. Avoid protrusions from the fences. From within about 50 to 70 metres of the parlor, the cows slow down and need extra width. This is especially the case in very large herds when the lane should be wider near the parlor.

Make sure the lane is wide enough to cope with the herd size. If it is too narrow, the younger and low ranking cows will be forced to the side and rear. Their twisting and stumbling on a hard sloping surface at the edge of the lane can cause hoof problems.

A farm lane should be at least 5 metres wide, with a dairy farm one being about 6 metres plus one metre for every 50 cows. Dividing herds into two or more reduces the necessity for wide lanes.

Having milking start the moment the first cows enter, speeds their entry, so if on your own use a good dog to come behind them while you walk up ahead, and have the radio and machines running as cows near the parlor. Cows associate the machines running with milking so will enter more quickly. If they don't you might have a faulty milking machine, shocks in the parlor or animal management or health problem such as excess manganese, low magnesium, salt, selenium, cobalt, or some other deficiency. If animals always stop at one point check for power fence leaks and current flows (shocks) there. This can be done by walking there in bare feet and taking wide steps. If there is no shock, walk again at right angles. Surface current flows can occur when rain falls after a long dry spell and currents low along the wet surface.

#### Surface Material

When calculating prices do so per metre spread on the farm, including transport - NOT the price per cubic metre at the quarry, because small diameter material can cost more, but spreads further than large diameter material.

Mixed lime chips from 20 mm down to 5 mm make an aggregate which packs tight. If all chips or gravel are one size they don't pack tightly. Lime chips are then rolled and packed down and is softer on hooves than blue metal or concrete and have a strengthening and healing effect on hooves. If transport is a major cost lime may not be viable, but remember that lime chips and dust are sometimes waste products and are cheap per square metre spread because they can be spread thinly. They pack down almost like concrete so get difficult to grade into a hole, but are softer, and seem to have a sterilising effect, reducing hoof problems. Some lime companies market a soft lime chip especially for lanes. Footrot germs don't like the alkaline pH of lime so farmers changing to lime based surfaces enjoy a reduction in hoof problems that can be a problem in large herds walking long distances on large grazing farms. Sand, because it doesn't bind, can wash away. Metal or chips and lime from the top of quarries have a little clay so are no good for bitumen or tar roads, concrete or for selling as lime, so are cheaper because the quarry has to get rid of them. Dirty sand (contains some clay) is a better than pure sand because it binds together. Blue quarry dust can be cheaper and does the same. Both are waste products from quarries so should be cheap. If clean pure sand is the cheapest then mix it in with little of the existing soil so it can pack down. A rotary hoe or roller cultivator can make a good job of mixing it, but don't go too deep and lower the sand proportion too much. Do a trial area. In soft, wet, boggy areas a plastic roading mat (woven or spun polypropylene) under the lane supports the surface material to a degree, but will sink if the lane is on organic bog and/or peat which decomposes. It can be cheaper in the long run because it saves buying so much material and makes it last longer. If this can't be done or the land is muddy or frozen, then spreading bark helps. If bark can't be obtained then shavings or sawdust would be next best, but won't last as long. All are free or cheap and light to cart. Course sand with salt in it as used on roads to reduce slip on frozen surfaces, costs more.

The worst to use are large rocks or anything with stones larger than 4 cm. Un-crushed rotten rock may be about half the price of crushed 4 cm at the

quarry, but may be twice the price per square metre delivered and spread, because of its large size. It is also hard to grade with a tractor blade or move in the future if necessary to grade some into a hole. Sharp pieces split hooves and cut tyres. The large stones also find their way into paddocks at the expense of mowers.

Broken up waste bitumen or tarseal from abandoned roads or ones to be

repaired can be used but needs rolling and packing down well to avoid rough and pointed pieces. If dug out with sand or a little clay from under it, it will be easier to pack down. Large pieces should not be used to should be placed in holes.

No material should be spread on to anything but a firm slightly crowned base in dry conditions. On peat the crown should be higher because it'll sink.

A major cause of hoof damage is their carrying stones onto concrete lanes and yards so plan to avoid this by using finer crushed material on all the surface, but certainly close to any concrete.

Avoid using any type of coal ash or other ash because they are concentrated toxins and many animals have died from eating them. Animals seem to love eating anything different, especially, but not necessarily, if deficient in some minerals.

The back stretch of the lane can be drained, crowned and sown in grass, unless it gets muddy. If so, material can be spread just in the wet areas to save money.

A small heap of gravel or lime chips should always be on hand to fill holes when they are small, not after they are large.

On our first peat bog farm drainage was poor, the ten metre deep peat was wet, raw and soft it could not be walked over, so we had to cut scrub (brush) and lay it in the worst places. We fitted eight wheels across the back and four in the front and it could then go anywhere.

Make lane drains run into paddocks so that no environmental approved sump and pump are required.

Any trees or hedges should be on the side which allows the sun and wind to dry out the lane.

Place gateways on an angle for ease of animal and machinery movement.

Check for stray electricity leaking across the lane, especially when a power fence runs down the sides. A sign of this is when cows suddenly change from walking several abreast in the lane to single file for no apparent reason.

When moving cows along the lane don't pressure them so much that they bunch up and have to lift their head so that they can't see where they put their feet. If their bodies touch they are too tight.

Concrete has no give (movement) so is tiring to walk on over long distances, but is permanent. Concrete in lanes, yards and parlors should be made of smooth river pebbles or ground smooth to avoid the sharpness of crushed material gripping and twisting cows' hooves. If slipping is a problem, get cuts a few cm apart made in the surface.

Place any cross drains on nearest side of paddock so they can be checked from the gate when fetching the cows for milking.

#### Reducing manure

Some of our best farms have very little cow manure on the lanes and in the parlor. They achieve this by allowing the cows to stand for a while at the gate in the paddock before they walk along the lane and always having them go to fresh pasture after EVERY milking so they know, and come out of the parlor quickly and keep walking to the paddock. Also the first cows are milked as soon as they enter the parlour and the last are then brought in to the yard - all to speed up their return and to have them off the pasture for as short a time as possible.

#### Hoof Health from Minerals

As herd size increases with longer walking distances, mineral balance become even more important to ensure strong hooves and clefts. Correct fertilising of pastures and crops and supplying soluble minerals through the drinking water help achieve this.

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Low quality, blue metal chips with fines like on the right is cheap, and far better. It compresses, makes the cheapest and best lane and costs almost nothing in hoof damage. It is more expensive per cubic metre, but far cheaper per metre of lane and easier to spread evenly and grade to fill in hollows. The delivering trucks can spread it. It doesn't damage cows' hooves, and doesn't blow away in wind or as dust from vehicles, or wash away in rain, and last tens times longer. We used it since 1958, yes nineteen fifty-eight, on two metre deep raw peat that I had chisel ploughed to consolidate and then shaped.

With slope, the dung washes off in rain. There is no dust to stick on teats, or stones to damage hooves.

In USA and Australia it was found that from adjacent wooded areas (open bush) with livestock excluded, nitrates in surface runoff were nearly twice as high as from pasture. USA figures showed that 25% of the rainfall in the wooded area ran off, while only 17% ran off that in pasture, so it looks as if trees with a pasture base are likely to do the best job in reducing nitrates entering streams. Applying this could help reduce the pollution of streams and lakes in peat and other areas.