Designing silage and feed storage areas (1-48)

Well placed supplementary feed storage areas can save money through reduced spoilage, fuel use and travelling time. Ideally, you want to store feed as close to where you will be using it as possible. A good design will help to reduce spoilage from rodents, surface or rainwater, and prevent water pollution by capturing toxic leachate and run-off. Placement should also take the food safety minimum distances into account.

Site selection
Silage storage facilities should be sited on land that is:
- easily accessible (e.g. close to the feed pad if you have one) and relatively flat
- at least 45 metres from any farm dairy
- at least 50 metres from waterways, open drains or dams, and the catchment areas of bores; further away if the land is steep, soils are coarse textured, or ground water may enter sensitive waterways
- well away from gullies or other places where run-off catchment water can flow into the storage area
- not prone to flooding or that has a high water table
- away from any subsurface drains.

Silage leachate should never enter waterways as it is highly toxic to aquatic life.

Construction
The walls and floor of a silage bunker must be capable of withstanding the hard knocks of tractors and other machinery as well as resisting corrosion from leachate. Concrete with a water/cement ratio less than 0.4:1 should be used. A concrete floor should be 125 mm thick and reinforced to support 20 MPa if vehicles are used on it.

The silage bunker floor should be watertight and extend out beyond the bunker walls. Construct a nib wall along the sides. This will keep freshwater out and leachate in. Slope the floor 1m:50m towards a drainage channel laid across the front of the bunker.

For bunkers cut into the side of a hill, an impermeable surface is still essential. Concrete is best, but compacted clay may be suitable. Check with your local council for any requirements they may have.

Silage stacks on the ground also require a sealed surface with leachate directed to a collection point and properly contained. A shallow cut-off trench around the stack will help prevent water run-off from the paddock entering the stack.

All other stored feed is best contained in a concrete bunker. At the very least, it needs a sealed surface plus proper sides and a cover to keep rain and wind out and control leachate production.
Minimising leachate

Silage leachate is surplus water from silage, which carries soluble sugars, proteins and nutrients with it as it seeps out of the stack. This leachate is extremely acidic and polluting to waterways. It is approximately 40 times stronger than farm dairy effluent and 200 times stronger than raw domestic sewage. It is also extremely corrosive and can damage concrete and steel. Leachate entering freshwater is likely to result in regional council enforcement action.

Leachate production is initially determined by the moisture content of the cut pasture (or other feed) when it is placed in the bunker. Maize silage produces very little leachate.

Wilting is the key to minimising silage leachate (see FarmFact 1-44). If grass is cut and ensiled without wilting, over 500 litres of leachate per tonne of grass would be produced; if the grass is wilted to 25% dry matter (DM), less than 30 litres per tonne is produced.

Properly covering stacks to keep the oxygen out and prevent rainwater entering is crucial to reduce the volume of leachate.

- For bunkers with sides, the cover should extend and be secured over the sides. Stack the grass higher in the middle to allow water to run off the cover.
- For free-standing stacks, timber or concrete posts and soil should be used to hold the cover in place.

Silage and feed bunker leachate collection

If the silage stack or bunker is close to the farm dairy, the easiest option may be to channel leachate into the farm dairy effluent system (unless it is an oxidation pond treatment system as this will overload the system).

If the silage stack or bunker is away from the dairy, leachate should be directed into a watertight storage sump. The sump should be resistant to corrosion with at least 3m³ storage per 100 tonnes of grass ensiled. It is recommended that it is diluted (1:1) and applied to land at regular intervals, or it can be added to farm dairy effluent. Applying 25 m³/ha will supply approximately 25-75kg/ha of nitrogen, 25 kg/ha of phosphate and 100kg/ha of potassium.

To ensure continued efficient leachate collection, clean and inspect the walls, floors and drainage channels when bunkers are empty and mend any cracks, corrosion or other faults before refilling.