

Bunker Silo Management

If you're feeding more cows, a horizontal silo can ease the workload.

Dairy herds are getting bigger, and if yours is one of them you need a forage system that lets you handle large quantities of feed more efficiently. Bunker silos can do just that.

U.S. agricultural economic studies have shown top-unloading concrete stave and bunker silos have a similar total annual cost for a dairy farm. However, bunker silos can provide considerable time-savings for daily feeding chores.

Many producers are concerned about using bunker silos due to higher storage and ensiling losses. Is this really a problem? Losses reported for different silage systems in various research papers vary from three to 25 per cent. Some even mention up to 70 per cent losses. The large variation is not due to the system, but the management that goes with it.

Dry matter losses in a well-managed bunker silo typically range from 10 to 15 per cent. For a similarly managed tower, losses range from two to 15 per cent. The key word here is management. If you choose bunker silos, these new tools have new management rules.

Silo Size

Silo height and width should be carefully planned to allow removal of a minimum of 15 centimetres (six inches) of silage each day. A thicker slice will make the bunker easier to manage during the summer.

Compaction studies have shown that the minimum height of a bunker silo should be 1.8 metres to 2.4 m (six to eight feet) to achieve the proper level of compaction. Width should be equal to or less than five times the height in order to maximize volume and minimize exposure to air at the bunker face.

Filling

Theoretical length of cut should be set at 3/8 of an inch for haylage to provide 15 to 20 per cent of forage particles at greater than 1 1/2 inches long.

If you use other forages in your dairy ration, you need to adjust length of cut. If particle size is too small, inadequate efficient fibre level in the dairy ration may result. Particles cut too long may interfere with proper compaction.

Moisture content of the ensiled material should be no less than 60 per cent and no more than 72 per cent to allow adequate compaction and provide good fermentation. Filling should be done as fast as possible to maintain quality and stability of the silage during feed out.

A Cornell University research team headed by K.A. Ruppel studied three different filling procedures:

- Full Height. Total silo height was maintained and length was increased;
- Full Length. Total silo length was maintained and height was increased;
- Progressive Wedge. Loads were added with a slope of 20 to 30 degrees as length and height were increased simultaneously.

The progressive wedge method improved preservation of digestible carbohydrates and increased stability at feed-out, apparently because of reduced exposed surface area when compared with the full-length method. It also permitted easier packing than the full-height method.

Compaction

In a tower silo, the silage compacts itself and excludes oxygen because of its own weight. In a bunker, you have to do this with a tractor.

Time required to compact will vary with the weight of the tractor and the surface of the bunker silo. Filling rate will have a direct impact on the weight of the tractor required to provide adequate compaction.

Cornell's K.A. Ruppel and his team found that packing intensities (time spent packing/tonne) greater than 0.64 hour per tonne of forage ensiled resulted in higher silage densities, lower losses and increased feed stability at feed-out. So, a one-tonne tractor has to compact one tonne of silage for at least 0.64 hours to get the proper compaction level.

Covering

After you properly compact your silage, you need to cover it carefully. Research data from K.K. Bolsen and his Kansas State University team have shown that silage will lose an average of 30 per cent or more of its dry matter when stored in an uncovered bunker silo.

The best option is to use an oxygen barrier plastic film specifically designed for covering silages. The use of six or eight-millimetre plastic film is an alternative. In concrete bunkers, plastic should be used on the side walls and folded over the pile when the bunk is full to help prevent water from running down the inside walls of the bunker from precipitation. Drainage conduit is one option to use along the concrete edge to protect the side plastic from tearing while it is hanging over the side wall during filling. Weigh down the entire silage surface with tires, pea-gravel filled bags or other suitable materials. Research results show that a greater tire density increases silage preservation. For optimal results, place tires close enough to kiss each other. It's critical to seal the bunker properly as soon as possible after you finish filling it, do not follow any advice that suggests that you should let it settle after tractor packing is complete or wait to cover the pile until the next day - losses occur the longer it is exposed to the oxygen in air.

Feed-Out

Feed-out management is as important as filling. Losses can be large when you open the bunker and expose its face to oxygen.

Take precautions to minimize oxygen penetration. Shaving or chipping the face will help you achieve this goal. Keep the face as clean as possible. Removing the required amount of feed will reduce heating and keep dry matter losses to a minimum.

Precautions

Very tall faces of bunker silos can be dangerous should an avalanche of forage material break loose from the face. Take precautions and avoid working near the face of the bunker closer than a distance of twice the height of the face material. Avoid removing forage material so as to develop overhangs of forage at the top of the face.

Bunker Silo Basics

- Build the right size silo.
- Adjust harvester to get a theoretical length of cut of 3/8 of an inch or at least as short as the final dairy ration will allow.
- Harvest forages with a moisture content of 60 per cent to 72 per cent.
- Fill the silo in as fast as possible and use the progressive wedge method.
- Compact well with a heavy tractor.
- Cover the silo with plastic oxygen barrier film and hold it down with tires placed close together.
- Feed out a slice of at least 15 cm (six inches) thick a day.
- Avoid fracturing the face and clean up loose silage.
- Take precautions and avoid working at the face of the bunk.

This article first appeared in the July 2000 Ruminations column of the Ontario Milk Producer magazine.