



COURTESY OF KEITH BOLSEN, KANSAS STATE UNIVERSITY AND KIRK ROBERTSON, ALLTECH

It's not uncommon to see overfilled bunkers with feeding faces which reach 18 feet high, such as the one shown here. These overfilled bunkers can cause a tractor rollover during packing and create a feed "avalanche" which can bury people and equipment near the feedout face.

Four ways to be safe around silage

By Kimberlee Schoonmaker

Use these tips to improve safety when working near bunker, trench and drive-over silage piles.

Mac Rickels almost lost his life the day he walked up to take a silage sample near a bunker with a 32-foot high feedout face. In fact, 12 tons of silage collapsed on Rickels — even though he was taking the sample from a silage pile located 20 feet from the face. "I didn't hear anything or see anything," he recalls. Yet, when the mass of silage

came crashing down on Rickels' head, his chest hit his knees with such force that it shattered two of the bones in his leg. Fortunately, someone was nearby to pull Rickels free.

As a result, Rickels, a field representative for Gore Brothers in Comanche, Texas, spent more than six months recuperating from the compound fracture he sustained in the silage

"avalanche". While he is fortunate to be alive, others haven't been as fortunate.

That may be due, in part, to the complacent attitude taken toward safety when working with silage in bunkers, trenches and drive-over silage piles. "I have been in (silage) pits hundreds of times, and you just become kind of complacent because nothing ever happens. It just takes that one time," he says.

Rickels knows firsthand of the dangers which exist when working with silage in bunkers, trenches and drive-over piles. In

fact, "it brought a keen awareness to everyone I was around," he adds.

Bring that awareness to your dairy. Use these precautions during packing and feed removal to protect your family, employees and yourself around silage:

Don't overfill
It's not uncommon for Keith Bolsen and his silage research team at Kansas State University to see forage towering 10 to 15 feet — even as high as 30 to 40 feet — above the walls of a bunker. Similarly, overfilling occurs in trench silos
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and drive-over silage piles.

To prevent accidents, don't pile forage any higher than what your unloading equipment can reach safely, says Brian Holmes, extension agricultural engineer at the University of Wisconsin. Typically, an unloader can reach a height of 12 to 16 feet. Thus, if the walls of your bunker stand 16 feet high, don't try to pack 40 feet of forage into the structure. If you have excess forage to store, consider using plastic silage bags or several small, covered silage piles to store the excess forage.

Take precautions during packing. "The main thing to be concerned about (during packing) is a tractor rollover," says Mark Purschwitz, extension agricultural safety and health specialist at the University of Wisconsin. To prevent a tractor turnover, or to protect yourself if one occurs, Purschwitz and Holmes offer these guidelines:

- Always use a packing tractor which has a rollover protective structure (ROPS).
- Wear your seat belt at all times.

- Allow only experienced operators to drive the packing tractor.
- Set the tractor's wheels as wide apart as possible, or use dual wheels to increase the tractor's stability.
- Use a four-wheel drive or front-wheel assist tractor for better control.
- Pack the forage at a maximum slope of 3:1 — pack 3 feet of silage horizontally for each foot that you pack vertically — to prevent the slope from becoming too steep.
- When packing on steep slopes, back the tractor up the slope of the forage

Before



instead of driving forward up the slope or parallel with the slope.

- During packing, slope the forage away from the walls. (For a description of this process, please see "Pack silage safely in a bunker" below.)

- In a trench silo, pack forage evenly in both directions so that you can drive off the wall onto the ground.
- When two tractors pack one bunker, establish a driving procedure which prevents the tractors from colliding.

In addition, keep people from walking around the bunker, trench or pile during filling and packing, as the equipment operators may not be aware of them and they could get run over, Bolsen says. "It's unacceptable to have someone on foot applying an inoculant," he adds.

Cover with care. When you cover the bunker, trench or pile, it's easy to slip on the plastic and tumble off the edge of the bunker — especially during wet weather. To prevent this, face the walls of the bunker. Then, work *continued on page 62*

After



Overfilled bunkers can result in a feed "avalanche". This 15- to 18-foot high feedout face is shown before and after it collapsed. Stay away from the feedout face to avoid being buried by a silage avalanche.

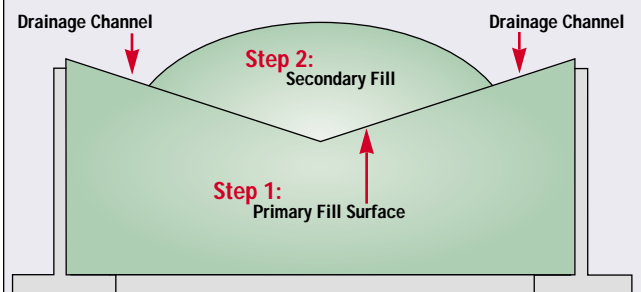
PHOTOS COURTESY OF KEITH BOLSEN, KANSAS STATE UNIVERSITY AND ALAN HENTHORNE, ALLTECH

PACK SILAGE SAFELY IN A BUNKER

To fill a bunker or trench silo, use the "drainage channel" method, says Brian Holmes, extension agricultural engineer at the University of Wisconsin. The "drainage channel" method slopes the forage surface away from the walls — a safety concern during packing — and it creates a drainage channel which directs water away from the walls. Use these steps to help you fill a bunker using this method:

Step 1. Shape the top portion of the forage into a "V" with the lowest point of the "V" positioned at the center of the bunker. This slopes the forage and the packing tractor away from the walls — thereby reducing the risk of the tractor tipping over the sides during packing.

Step 2. Fill in the "V" with a mound of forage so that the bottom edges of the mound extend about 2 to 4 feet from the walls of the bunker. This creates a drainage channel which directs water off the ends of the bunker.



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your way from the edge toward the center of the bunker as you cover the silage, Holmes says. Furthermore, use an unloader bucket to carry tires up the slope of the silage instead of tossing them over the wall onto the silage.

Avert avalanches

Do your employees refuse to remove silage from an overfilled bunker or silage pile? Bolsen knows of employees at one dairy who simply refused to remove feed because of the unsafe height of the silage pile. In fact, those employees had good reason to avoid a feedout face that could easily “avalanche” and bury them beneath tons of silage. “Avalanches can and do occur,” Bolsen says. Here’s how to avoid them:

■ Don’t undercut.

Undercutting occurs when you dig the unloader bucket into the bottom of the silage instead of shaving it down the face of the bunker — a situation that is quite common when the unloader bucket can’t reach the top of an overfilled bunker or pile. Undercutting creates an overhang of silage which can quickly loosen and tumble to the floor of the bunker, Purschwitz says. To avoid a silage avalanche, don’t undercut the silage. Instead, shave the silage down the feedout face. Use these additional precautions when you feedout silage from a bunker, trench or silage pile:

■ Use caution when removing the tires and plastic prior to feedout, especially during wet conditions which can cause the plastic to become slippery.



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Silage overhangs, such as the one indicated by the arrow, develop when you undercut silage in an overfilled bunker. To prevent an overhang, don’t pile forage any higher than what your unloading equipment can reach. And, don’t dig the unloader bucket into the bottom of the silage, as shown at right. Instead, use the unloader bucket to shave silage down the face.

■ Don’t stand on top of a silage overhang. Your weight can cause it to collapse.

■ To prevent a rollover, don’t carry silage in an elevated bucket. Instead, push silage in front of the unloader blade or bucket.

■ Stay away from the face. The face of a bunker silo should not be a gathering place for tours of your dairy or a place where your nutritionist takes a feed sample, notes Mary Kay Siefers, graduate student and member of Bolsen’s silage team at Kansas State University.

To discourage these situations, fence off the area and post a sign which reads “Danger: Do Not Enter! Authorized Personnel Only” at the entrance of the bunker, trench or silage pile. If you need to take a feed sample, take it from the unloader bucket after the silage is removed from the face of the bunker or pile.

Use these precautions to prevent injury or death when working with silage in bunkers, trenches or drive-over silage piles. ❧

Resources available

The following publications and web sites contain safety and management information to help you work safely around bunker, trench and drive-over piles:

■ “Horizontal Silos” (H-76) is available free-of-charge from the Agricultural and Biological Engineering Department at Penn State University. To request a copy, call (814) 865-7685.

■ “Managing and Designing Bunker and Trench Silos” (AED-43) is available from MidWest Plan Service (MWPS). To order, call MWPS at (800) 562-3618. The cost is \$4 each, plus shipping. You can download the publication for a cost of \$4 at the

MWPS web site, located at: <http://www.mwpsdq.org/download.html>

■ “Sizing and Management of Bunker Silos” (AEU-10) is available from the Department of Biosystems and Agricultural Engineering at the University of Minnesota. To request a free copy, call (612) 625-9733. You can view the publication at the following web site: <http://www.bae.umn.edu/extens/aeu/aeu10.html>

■ “Tractor Overturn Hazards” (E-34) is a fact sheet available free-of-charge from the Agricultural and Biological Engineering Department at Penn State University. To request a copy, call (814) 865-7685.