



## PREVENTING SILAGE-RELATED INJURIES AND FATALITIES AMONG FARM WORKERS

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Silages are feed ingredients frequently included in diets for dairy cattle. In the United States, approximately 125 million tons of corn silage are produced per year, which are typically stored on farm and fed year-round. Different types of silos exist to store corn silage and these include tower silos, silo bags, pile silos, and bunker silos.



The ensiling process starts with cutting and chopping the whole corn plant in the field. Then, the chopped material is transported, spread, and layered on the floor, and it is then tightly packed to exclude the oxygen and induce an anaerobic fermentation. In both pile and bunker silos, the chopped material is built vertically. The main difference between pile and bunker silos is that in the latter the ensiled material is contained by lateral walls while in the former is not.

Due to the packing process, the resulting density of corn silage ranges from 15 to 50 pounds per cubic foot, which is equivalent to 550 to 1,650 lb per cubic meter. To give some perspective, 1 cubic meter is smaller than a washing machine. Keeping this in mind, can you imagine suddenly getting caught under 3,300-lb avalanche of corn silage?

Multiple chores, such as extracting silage for feeding or collecting samples for analysis, are performed around pile and bunker silos. As these are very common tasks, people approach the silo areas with full confidence and without understanding the associated hazards. The major hazard is being trapped by a silage avalanche, which happens when a piece of the silo face breaks off and falls. This avalanche can easily crush anyone close to the silo face.

Although infrequent, injuries and fatalities caused by silage avalanches have occurred several times in the past. In 1999, a nutritionist was collecting a sample when he was buried by a 6-ton avalanche. Even though he survived, he suffered a spinal cord injury becoming quadriplegic. In 2008, a truck driver parked close to the face of a 50-foot pile silo. An avalanche of silage collapsed on his truck while he was inside the cab. As he was struck in the head, the driver died instantly. In 2010, a 19-year-old worker died after being caught by a silage avalanche originated from a 10-foot pile silo. The worker was shoveling close to the face of the silage when this happened. Also in 2010, while riding his bicycle in the area of a 24-foot pile silo, an 11-year-old boy died after being caught by a silage avalanche. It took 20 minutes to find and unbury the body. In 2013, a farmer died and his employee was severely injured after being buried by a silage avalanche originated from a pile silo.

There are many safety precautions workers can take when working around pile and bunker silos. An educational video addressing these safety precautions was recently developed by the Department of Dairy Science at Virginia Tech. The video actually shows an avalanche collapsing from the face of a bunker silo. Also, the video was produced and published in both English (<https://youtu.be/SwPkJ2koclg>) and Spanish (<https://youtu.be/7J1fm9xhCM8>) so all farm workers, English or Spanish-speaking, can increase their awareness that working around pile and bunker silos is dangerous.

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