

Silage Safety Practices that Save Lives

R. E. BOLSEN¹ AND K. K. BOLSEN²

¹Keith Bolsen Silage Safety Foundation, 6106 Tasajillo Trail, Austin, TX 78739 USA

²Kansas State University, 6106 Tasajillo Trail, Austin, TX 78739 USA

INTRODUCTION

In 2018 approximately 140 million metric tonnes of silage was produced in the USA. Few farming operations invite as many different opportunities for a serious injury or fatality as a silage program. Beginning with harvesting the forage in the field, followed by transporting the chopped material to the farm and placing it into storage, and subsequent feeding of the silage, employees and bystanders are exposed to numerous serious risks in every silage program. Silage-related tragedy knows no age boundary as persons of all ages have been injured or killed during silage harvest and feed-out.

Safety is the control of recognized hazards to reach an acceptable level of risk. A hazard does not always affect the person who caused it - the hazard can affect anyone. Accidents are caused by unsafe behavior or conditions due to the actions of people: stepping over or standing too close to a rotating PTO shaft, working too close to the feed-out face of an over-filled bunker silo, or moving a forage harvester without checking all sides and honking three times. Countless victims have learned the hard way that there is no such thing as a safe bunker silo or silage pile! Every serious injury or fatality silage-related accident could have been prevented. We are not going to create a safety bubble for our employees or a silage program that is hazard-free, but following the guidelines will reduce the risk of someone being injured or killed on the farm. It is important to discuss safe silage management practices several times a year with a silage team because injury-related statistics suggest that many employees do not consistently follow the recommended safety guidelines.

MATERIALS AND METHODS

There are seven major hazards encountered when managing silage in bunker silos and drive-over piles that could endanger lives. These include: 1) complacency and fatigue, 2) exposed to silage gases, 3) tractor or truck rollover, 4) run-over by machinery or equipment, 5) entangled in machinery or equipment, 6) fall from height, and 7) crushed by an avalanche or collapsing silage. A detailed account of case studies involving the last three hazards and guidelines for reducing the risk of a serious injury or death from each of the three hazards are presented here.

RESULTS AND DISCUSSION

Entangled in machinery or equipment: a case study and prevention guidelines

The accident happened on June 21, 1976 on the family farm in Minnesota when Doug Sawatzke was 13 years old. The apron had broken on the silage wagon, and Doug took it upon himself to pull the wagon up to the tower silo and fork out the forage. It was an old Decker box wagon with two rows of front beaters, and no safety mechanism to stop the machine. When the wagon was nearly empty, Doug and Jim Hessel, a friend his age, were cleaning up the floor with the beaters and cross apron still running. Doug's fork got entangled in the beaters, and when he grabbed for it, he ended up in the beaters with the fork. Jim saved Doug's life by jumping over the side of the wagon and turning off the PTO. Doug remembers his dad coming from the field and holding him until the ambulance arrived. Doug's injuries included a broken femur and multiple lacerations. He spent 5 weeks in traction and 3 months in a body cast. Doug said, "It was the only time that I ever saw my dad cry, and I am lucky that I did not get conveyed into the silo blower." Doug said, "It was my decision to pull the wagon up to the silo, and my dad had no knowledge that I was doing that. He was out in the field chopping. My dad was not responsible for my accident." Doug fully recovered from his injuries and is a dairy nutritionist in Minnesota.

Guidelines that will reduce the risk of entanglement accidents include: 1) keep machine guards and shields in place to protect the operator from an assortment of rotating shaft, chain and v-belt drives, gears and pulleys, and rotating knives on forage harvesters, wagons, and silage feeding equipment; 2) when inspection or service work is needed, shut down the engine and remove and pocket the keys to prevent accidental starting by another person; 3) stop the machine before lubricating, adjusting, inspecting, or unplugging; and 4) wait for the cutter head to come to a complete stop before adjusting or unplugging; and 5) never approach the blades of a silage defacer while the machine is in operation.

Fall from height: a case study and prevention guidelines

On January 26, 2013, Alisdair Davidson was working with his father, William Davidson, at Poldean Farm, Moffat, Scotland. At about 2:00 p.m. they accessed the silage shed via the rear door and walked along the top of the silage to the

front of it. They began to remove the sandbags and peel back the plastic sheets. Alisdair was about 3 meters from the edge of the silage completing his work with the sandbags. William had taken hold of the top black sheets and was engaged in pulling them back. Alisdair was busy with his own task and did not directly see what led his father to lose his balance and fall. When he heard his father shout and looked, it appeared likely that William's feet become entangled in the sheets, and he toppled over the edge of the silage pile. He fell about 5 meters and struck his head on the concrete floor below. Alisdair rushed to his father's aid, dialed 999, and was given instructions on resuscitation over the phone before the arrival of paramedics who carried out CPR but found Mr. Davidson had died.

Guidelines that will reduce the chance of a fall from height accident include: 1) installing guardrails on above ground level walls; 2) when removing plastic or oxygen-barrier film, tires, tire sidewalls or gravel bags, use caution and wear a safety harness tethered with a heavy rope or cable; 3) never standing closer to the feed-out edge than the height of the silage face and 4) use equipment operating from ground level to remove surface-spoiled silage; 5) never allow a person to ride in a front-end loader bucket; and 6) there should be no horseplay when working on top of the silage in a bunker or pile.

Crushed by an avalanche or collapsing silage: a case study and prevention guidelines

In the fall of 2000, Ted Gramm's family cattle operation in west-central Minnesota used a custom operator for the first time and over-filled a bunker silo with corn silage. The feed-out face was 4 to 4.5 meters high. Ted was doing chores and calving cows in the late afternoon on a Sunday in early March 2001. As Ted recalls, "It hadn't been a good day; it was gloomy, I didn't get to go to church, and I was feeling down about a lot of things. My family was in the house and knew that I probably wouldn't make it home for supper." When Ted was ready to feed silage, he noticed that a tire had come down off the pile. He walked up and grabbed the tire, and that was the last thing he knew ... the avalanche hit him. In Ted's words, "Only by the Powers from Above did my brother drive in the yard, see me get buried, and knew where I was. He managed to find me and pull me out." Ted suffered displaced ankles and had surgeries on both knees. Ted continued, "These types of things are real, they happen. During the minute, or so, that I was buried; I could see my kids around the table. A lot of things flashed through my mind." Ted fully recovered from his injuries and is a feed sales manager in Minnesota.

Guidelines that will reduce the risk of a serious accident or fatality caused by a silage avalanche include: 1) do not fill bunkers and build piles more than 3 to 3.5 m maximum height; 2) when filling bunker silos, do not exceed the height of the safety rail on the walls or the maximum height at which unloading equipment can remove silage from the feed-out face safely; 3) never allow people to approach the feed-out face; 4) never stand closer to the feed-out face than three times its height; 5) suffocation is a primary concern and a likely cause of death in many silage avalanches, so follow the 'buddy rule' and never work alone in a bunker or pile; 6) the top edge of the feed-out face is highly unstable so use caution when removing plastic or oxygen-barrier film, tires, tire sidewalls or gravel bags; 7) never ride in a front-end loader bucket; 8) never park vehicles or equipment near the feed-out face; 9) never drive the unloader parallel to and in close proximity of the feed-out face in an over-filled bunker or pile; 10) do not walk close to the top edge of the feed-out face; 11) post warning signs around the perimeter of bunkers and piles saying, 'Danger! Silage Face Might Collapse'; and 12) avoid being complacent and never think that an avalanche cannot happen to you.

CONCLUSIONS

A silage accident can occur anywhere, any time, in any bunker or pile, in a fraction of a second, and without warning. We cannot totally prevent accidents from happening, but we can prevent people from being under them. Every farm, feedlot, dairy, digester plant, and silage-harvesting contractor should have silage safety policies and procedures for their silage team members, and they should schedule regular meetings with all their employees to discuss safety. If a silage program is not safe, nothing else about it really matters.

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