

Silage safety - Preventing serious injuries and fatalities

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Introduction 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: not cleaning the mud off the ladder of a pack tractor, standing too close the feed-out face of an over-filled bunker silo, or moving a forage harvester without checking all sides and honking three times. A split second of inattention can cause a fatal accident and nothing will ever be the same again. Few farming operations invite as many different opportunities for a serious injury or fatality as a silage program. The silage industry has nothing to lose by practicing safety but it has everything to lose by not practicing it. The objective is to present common hazards encountered in managing silage coupled with case studies involving these hazards.

Materials and Methods Three hazards in managing bunker silos and drive-over silage piles are: truck or tractor rollover, entangled in machinery, and run-over by machinery. A detailed account of case studies involving these hazards and ways to avoid each one are presented.

Results A 21-year old silage truck driver was killed when a dump-bed rolled over in a bunker silo at a beef cattle feedlot in Texas. According to the Deaf Smith County Sheriff's office, the circumstances of the accident are not uncommon, and silage trucks have been known to rollover if not operated correctly (Hereford Brand 2014). In Paraná State, Brazil, a 58-year old small farmer was killed when the tractor rolled over him when filling a bunker silo. The victim's relatives said that the man was very accustomed to this type of work on the farm, and had operated a tractor since he was 12 years old. According to the local police department, a similar fatal accident happened in this county 1 week before this accident (Intervalo da Notícia, 2012).

Guidelines that reduce the risk of tractor and truck rollovers include: 1. use rollover protective structures (ROPS) to create a zone of protection around the tractor operator, 2. never fill a bunker silo higher than the top of the wall, 3. install sight rails on above ground bunker walls, 4. form a progressive wedge of forage, which provides a minimum slope of 1 to 3 when filling bunker silos and building drive-over piles, 5. establish a driving procedure to prevent collisions when two or more pack tractors are used, and 6. only raise the dump bed of a truck when it is on a flat, firm surface. Note: never back onto the forage ramp of a bunker silo or drive-over pile to unload. Trucks are less stable as the bed is raised. A tire rut or depression from a previous truck, low tires on one side, uneven loading of a truck, or a wind gust increase the risk of a truck tipping over during unloading, especially when two or more of these hazards combine at a single time point.

An 18-year-old employee on a dairy farm in New York was fatally injured when he became entangled in a silage defacer. The youth was idling a tractor to allow it to warm up on a cold morning. The defacer was attached on the front of the tractor and was 1 meter above the ground. The energized defacer caught the sleeve of the victim's coat as he walked in front of the unit. The farm owner heard an unusual sound and went to investigate. He immediately shut off the tractor engine, disentangled the victim from the machinery, and began CPR until a local EMT arrived. The youth was pronounced dead at the scene (Bolsen and Bolsen 2017).

A 55-year old man died during the night of March 29, 2016, after having his leg crushed in a forage harvester used for making silage. The accident occurred near the city of São João do Oriente in the State of Minas Gerais, Brazil. According to the local Fire Department, the victim, Lione José de Souza, tried to unplug the forage harvester using his foot. The machine, which was turned on, pulled the man's leg into

the chopper, and he was entangled for about 1 hour. He was rescued alive, after the machine was dismantled, and taken to the hospital in Ipatinga. He died that night (Aconteceu no Vale 2016).

Guidelines that reduce the risk of being entangled in machinery include: 1. keep machine guards and shields in place on forage harvesters, wagons, and silage feeding equipment, 2. never attempt to adjust, repair, or unclog any machinery while it is running, 3. shut down the engine and remove and pocket the keys when inspection or service work is needed to prevent accidental starting by another person, 4. before adjusting or unplugging the cutter head of a forage harvester, wait for it to come to a complete stop, 5. never approach the defacer blades while the machine is in operation, 6. all forage harvester, truck, and pack tractor operators should be mature, competent, experienced, and well trained for their task, 7. equipment operators should never take an unnecessary risk, 8. employees should never send or receive text messages while operating equipment, and 9. extra persons, especially children, and bystanders should be kept out of the way of the silage making and feeding activities at all times because they only add distractions to the many responsibilities of the equipment operators.

The 29-year old son of a silage contractor in Nebraska was talking with an employee who was in the cab of a large forage harvester near the edge of a field. After the conversation, the employee drove the machine out of the field. A few minutes later, another employee found the contractor's son lying unconscious in the field, and he died 2 hours later in the hospital. Although the details surrounding the accident are unclear, the son was apparently run-over by a rear tire of the forage harvester (Bolsen and Bolsen 2017).

Guidelines that reduce the risk of being run-over by machinery include: 1. never allow non-working bystanders, especially children, near moving harvest and transport equipment in the field, the traffic area on the farm, or a bunker silo and drive-over pile during filling and feeding, 2. rear view mirrors should be adjusted and back-up warning alarms installed on all trucks and tractors, 3. never walk in front of or behind any truck or tractor that is stopped without first making eye contact with the operator, 4. all employees in a silage program should wear high-visibility safety vests at all times, 5. use reverse alarm devices or a remote video camera on large and oversized machines to increase visibility and warn people in the area that the equipment will be operated in a reverse direction, and 7. use standard agricultural hand signals to communicate with others when operating machinery or when helping with machinery movement.

Conclusions The global silage industry has a long way to go to before the senseless fatalities described in this paper are prevented from happening in the future. To that end, every beef and dairy cattle producer and silage operation should have written safety guidelines and procedures for their employees, and they should schedule regular meetings with their employees to discuss safety.

References

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