## Make Silage Safety Priority #1

DAIRY

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n excellent silage management program is vital for dairy and beef operations to be productive and profitable. This includes managing for high-quality silage such as harvesting at proper moisture and maturity, and proper packing, inoculating, sealing, and feed-out. However, this may be pointless if silage safety is not a priority. Numerous people, including children, have been injured or killed as a result of silage avalanches, falls from heights, run over by machinery, machinery entanglements, silo gas, or tractor/truck rollovers. There have been several recent incidents across the US. Keith and Ruth Bolsen have documented a number of tragic accidents which were preventable if a silage safety plan had been in place and followed. You can find testimonials in addition to other silage safety information on the Keith Bolsen Silage Safety Foundation website (silagesafety.org). Remember, we have nothing to lose by practicing safety but everything to lose by not practicing it! The following provides information on some of the hazards related to a silage program and guidelines to reduce the risk of a serious injury or fatality from the hazards. The Foundation has a detailed Silage Safety 101 handbook available at no cost.

Training is always a good idea before allowing people to work in or around a silage program. Family members, especially children, must be educated about the dangers. Written safety guidelines should be posted in break rooms or areas where employees meet and hazard signage placed around silage storage areas. A silage safety plan and frequent reminders of the hazards, help keep everyone safe!

**Silage Avalanches or Collapses.** Silage avalanches can occur in any bunker, pile, or even inside a tower silo no matter how well managed. Avalanches happen in an instant with no warning or time to escape. Anyone can become complacent about approaching the feed-out face as it has never collapsed before; however, it only takes one time! These guidelines can help reduce risks of being injured or killed by a silage avalanche:

- Use the buddy rule whenever working on or around a bunker silo or silage pile.
- Do not allow anyone to approach the silage face for any reason, such as sampling or removing fallen tires or tire sidewalls.
- Do not fill bunkers or piles above the height the unloading equipment can easily reach (usually 12-14'). This eliminates undercutting of the silage face.
- Develop a plan for your inventory and provide additional storage if needed. It is better to use more land than attempt to put several thousand tons into too small a space, leading to unsafe storage conditions. Silage can also be packed to a higher density, resulting in better feed quality and less shrink loss.
- To take samples, remove silage from across the face as usual with a defacer or loader bucket, then use a TMR mixer to mix the sample or make a pile at a safe distance from the face to sample from. If farm staff is not available, non-farm workers such as nutritionists or veterinarians must take the samples at a later time. There are no exceptions to the buddy rule!!
- Do not stand closer to the silage face than 3 times the face height since collapsing silage will travel a considerable distance from the face.



A pack tractor working on an over-filled bunker silo.



Dangerously close to the silage face edge removing spoilage.



Dangerous practice of approaching silage face to take a sample.

- Never undercut the face by digging into the bottom of the silage. This creates an overhang, which is more likely to collapse.
- If a new silage crop must be put in with a previous crop, mark where the two crops meet as this area is more likely to lead to an avalanche.

**Fall From Heights.** With silage heights ranging 12-30', severe injury or death will occur during a fall. Guidelines to reduce fall risk accidents include:

- If silage face is undercut, do not go on the top to remove plastic, tires or tire sidewalls.
- When removing sealing materials from the top, do not work or stand closer to the edge of the feed-out face than its height. Remove more tires and plastic than needed (equivalent to the silage face height) to avoid needing to get close to the edge. Having additional surface spoilage and shrink loss is better than risking a serious injury or loss of life. A safety harness tethered with a heavy rope or cable is recommended to minimize fall risk.
- Do not manually "fork off" spoilage from the top of a feed-out face as it not worth the risk of slipping and falling off the edge.

**Run-over or Entangled in Machinery.** With more people working in a silage program and larger equipment with blind spots, the risk of accidents increases. These accidents can be avoided by:

- Keeping all shields in place to protect from moving parts and do not cross over the PTO shaft.
- Not allowing non-working persons near harvesting equipment, especially children.
- Wearing highly visible clothing to be easily seen.
- Turning off the PTO and tractor, and removing the key to eliminate the possibility of the tractor turning on when leaving it to check equipment.
- Ensuring operators are well-rested and nourished so they are alert during silage harvest operations.

**Tractor or Truck Overturn.** Pack tractor overturns in a bunker silo or silage pile happen far too often and lead to injury or death, even with protective equipment. These accidents can be avoided by:

- Not filling bunker silos above the sidewalls or silage piles with too steep of slopes (<1' rise for each 3' of run on all sides); steep slopes are more likely to cause overturns.
- Ensuring equipment has a functional rollover protective system and all employees use seatbelts.
- Installing sight-rails on bunker walls so operators can see edges.
- Using low center of gravity pack tractors with ample weight, and backing up steep slopes to reduce risk of rollbacks or flip-overs.

**Silage Gas.** Silage gases are dangerous and can overcome a person quickly. Nitric oxide forms during the first few weeks of ensiling, especially the first 1-3 days. It is a reddish-orange to yellowish-brown gas that accumulates on the silage surface. Nitric oxide changes to nitrogen dioxide when it contacts oxygen. It is highly toxic and burns the mouth, throat, and lungs, and leads to permanent damage or death. Carbon dioxide is odorless and colorless and gives little or no warning before asphyxiation. Carbon dioxide forms in the first 3 weeks and accumulates in closed spaces, such as unventilated feed rooms near the chute of tower silos. Feed rooms should be ventilated by opening windows and outside doors, but doors leading to livestock areas should remain closed. If it becomes necessary to enter a tower silo, run the blower 15-30 minutes with the top door open for ventilation. Use of a rescue-breather and lifeline going to someone outside the silo is recommended. Remember the buddy rule!

**Take Home Message.** Schedule regular meetings with your silage team to discuss safety and include all employees whether or not they work in the silage program. Use zero tolerance when enforcing silage safety guidelines, policies, and procedures. Reward all employees and members of your silage team for safety compliance and accident-free time periods.