

Grain bins

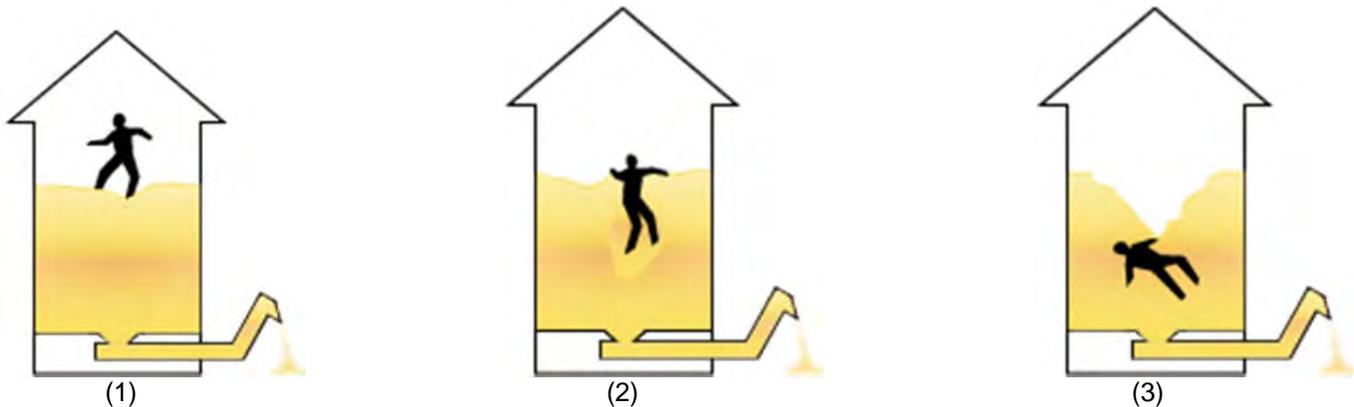
Initiative

Every year, there are Minnesota workers who lose their lives in grain bins due to suffocation. Suffocation is a leading cause of death in grain storage bins. In 2010, Minnesota was second only to Illinois in the number of fatal and nonfatal grain entrapment incidents according to Purdue University research.

The purpose of this Minnesota OSHA Safety Hazard Alert is to heighten public awareness of the danger of entering grain bins without proper precautions.

Description of the hazard

Grain stored in a grain bin might appear harmless, but it behaves similarly to quicksand, engulfing and burying the worker in as little as 30 seconds. Getting out of a pile of grain can be extremely difficult without assistance because of the weight and nature of the grain.



- (1) The worker starts to be pulled down into the grain within seconds of the auger starting up.
- (2) Within four to five seconds, the worker is trapped.
- (3) After 11 to 22 seconds, the worker is completely engulfed by the grain.

Source: U.S. Department of Labor OSHA

Workers should not: stand on moving or flowing grain; stand near or try to loosen grain packed on the side of the bin, which can collapse unexpectedly; or stand on or below a bridge of grain – bridging occurs when grain clumps together because of moisture or mold, creating an empty space beneath the grain, which can collapse.

Similarly, grain that has started to spoil produces carbon dioxide and other hazardous gases. As the gas is generated, it first collects at the surface of the grain, displacing the oxygen. A worker entering the bin can be quickly overcome by the toxic gases or the lack of oxygen and die or suffer serious injury.

Controlling and eliminating the hazard

Grain bins should never be entered unless absolutely necessary and then only with the proper precautions and procedures. Practices such as “walking down” grain are prohibited.

When entry cannot be avoided, the following precautions must be taken.

- Turn off and lock out all powered equipment, especially augers and other grain moving equipment.
 - Grain must not be emptied or moved into or out of the bin while workers are inside.
- Test the air within a bin for oxygen content and the presence of hazardous gases before entry.
 - Provide and continue ventilation until any unsafe atmospheric conditions are eliminated.
- Provide each worker a body harness with lifeline or a boatswain’s chair when entering a bin from a level at or above the level of stored grain, or whenever a worker walks or stands on or in stored grain of a depth that poses an engulfment hazard.
 - Ensure the lifeline is positioned and of sufficient length to prevent a worker from sinking further than waist-deep in grain.
- Provide workers with rescue equipment specifically suited for rescue from the bin.
- Station an observer who is equipped to provide assistance and perform rescue operations outside the bin. Communications shall be maintained between the observer and employee entering the bin.
 - This observer should be trained about rescue procedures and assigned no duties other than monitoring the worker inside of the bin.
- Train all workers for the specific hazardous work operations they are to perform when entering and working inside of grain bins.
- Issue a permit each time a worker enters a bin, unless the employer (who would otherwise authorize the permit) is present during the entire entry operation.
 - The permit must certify all safety precautions have been implemented before workers enter the bin.

For more information

Employers and employees with questions and concerns about this hazard may consult 1910.272 Grain Handling Facilities, the federal OSHA Grain Handling Web page at www.osha.gov/SLTC/grainhandling, the MNOSHA Compliance grain-handling information Web page at www.dli.mn.gov/OSHA/GrainHandling.asp or call MNOSHA Compliance at (651) 284-5050 or toll-free at 1-877-470-6742.

Acknowledgements

The grain bin illustrations were taken from the *Grain Bins: Worker Entry Into Grain Storage Bins* fact sheet and the *Grain Handling Safety* wallet card (OSHA 3329), both created to U.S. Department of Labor OSHA.