

Grain Bin Safety

Grain bin accidents, resulting in injury and deaths, have been increasing. Increases in the number of grain entrapments normally follow years where grain quality is difficult to maintain in the bin. Knowledge and prevention are crucial for stopping flowing grain tragedies.

WHAT TO CONSIDER

Higher corn yields, leading to more stored grain, have resulted in an increasing number of grain bin accidents, injuries, and deaths. All of the injured and killed are males, including adults and teenagers. An estimated 55

percent of documented grain entrapments result in death. Many others leave victims with life-changing, permanent injuries. Every flowing grain entrapment is a preventable incident.

INJURY OR DEATH CAN OCCUR QUICKLY

It Happens Fast! An average person stepping into a bin of grain will sink about a foot instantly. If the grain auger is removing grain from the bottom of the bin, the person can sink to his waist in 3 to 5 seconds. At that point, it is impossible to escape without assistance. Within 15 to 30 seconds, the whole body will be engulfed. Engulfment can happen even faster if a victim breaks through a surface crust or bridge and falls into moving grain, or if caked grain on bin walls falls and covers a victim.

How Do People Get Trapped? “Someone is in a hurry, trying to fill a grain truck when the grain stops flowing. They think ‘I’ve been in the bin 100 times before and

nothing has happened,’” says Dan Neenan, Director, National Education Center for Agricultural Safety. “Without thinking, he climbs into the bin to get the grain flowing. If he breaks through a bridge or crusting, he drops into the loose grain below and stays trapped. Sometimes crusting is thick and heavy enough to knock a person unconscious. If the auger is running, the flowing grain will pull him deeper. He’s the heaviest thing in the bin, so he’s going to move down.” Neenan says.

Deaths and Injuries: Corn weighs about 50 pounds per cubic foot. “Once the legs are covered, there is tremendous pressure on the legs. If someone is wearing shorts, the grain can press into the skin within 10 minutes. If the victim is taken out within 10 or 15 minutes, it can take more than an hour for the grain marks to work their way out of the skin,” Neenan says. “With this extreme pressure, blood can’t flow, and gas exchanges can’t take place,” Neenan continues. “Once the victim is extracted, he may need surgery to relieve the swelling. Depending on how long he has been trapped and how long it takes to transport him for proper treatment he could easily lose his legs. In the best case, he’s facing a long and painful recovery. If the victim is submerged up to his chest or deeper, oxygen cannot be circulated to his heart, lungs, and brain,” Neenan says. “Once he’s submerged, the grain may get in his nose. When that happens, his natural reaction is to open his mouth. Once grain gets in the mouth and nose, moisture causes it to expand. That



Figure 1. Grain bins are excellent tools for storing and marketing grain, but can also pose a significant safety hazard. Knowing the safety rules and adding proper signage around bins can help prevent tragedies.

makes it impossible to breathe. Unless he is extracted immediately, he can't survive." Neenan cautions that grain bins are not the only places where injuries or death from flowing grain can occur. Grain trucks or wagons, and

combine harvesters can also become death traps. Never allow anyone, especially children, to ride on a load of grain.

TIPS FOR PREVENTING GRAIN ENTRAPMENTS

- **Grain bins are off limits to children and unauthorized personnel.** Treat grain bins and grain handling facilities as hazardous areas. Allow only trained family members and employees near the facility. This is never a play area for children.
- **Never work alone around grain bins.** Work in tandem with good communication. Someone should know what the activities are and should communicate if they leave the bin area. Never lose sight of the other person.
- **Never enter a bin of flowing grain.** Educate and train authorized family members and employees on the dangers of flowing grain. Ignorance is deadly. An understanding of the speed of engulfment combined with the tremendous force of grain will develop respect for safety around flowing grain.
- **Lockout and tagout the power supply on all unloading mechanisms before entering any grain-holding structure.** Always lock out the power source while someone is working on grain mechanisms or is inside the grain bin. This prevents anyone from unknowingly starting equipment while someone else is inside the structure. Lockout/Tagout is a serious signal that can prevent a significant injury.
- **Manage and monitor stored grain for quality.** The number-one reason entrapments occur is out-of-condition grain. Spoiled grain creates problems

unloading bins. Attempts to break up crusting can result in a serious injury. A good stored grain management and monitoring program can prevent problems from occurring. Management and monitoring is something you can control.

Additional Safety Tips

- Label grain bins to warn of entrapment hazards.
- Lock entrances to grain handling areas to keep bystanders and children out.
- Check the oxygen content of the bin. Bins are a confined space and may have a low oxygen content.
- Always wear a body harness and be tied off above the level of the grain.
- Install ladders inside bins.
- Wear National Institute of Occupational Safety and Health-approved dust-filtering respirators when working in and around grain-handling areas. High amounts of dust and mold spores could be present and are extremely dangerous.
- Wear approved hearing protection when working around noisy equipment, such as aeration fans and dryers.
- Be very cautious of grain that may have gone out of condition. Crusted grain may have cavities beneath the surface that can collapse, leading to entrapment and suffocation.

Sources

Grain bin safety - Growing safely. Focused on safety in agriculture. Monsanto.

Field, B. 1990. The dangers of flowing grain. S-77. Purdue University. <http://www.extension.purdue.edu>.

Neenan, D. Personal communication. December 3, 2013.

Web sources verified 09/21/2015. 131210060307

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