IOWA STATE UNIVERSITY
Extension and Outreach

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Contacts:

Charles Schwab
Agricultural and Biosystems Engineering Professor and Extension Specialist
515-294-4131
cvschwab@iastate.edu

Gretchen Mosher
Agricultural and Biosystems Engineering Assistant Professor
515-294-6416
gamosher@iastate.edu

Confined Spaces are Hazardous for Farmers

Farm Safety and Health Week is September 20-26

AMES, Iowa – Farmers are exposed to various types of confined-space hazards during normal working conditions. However, it is possible to avoid being injured if proper steps are taken. During National Farm Safety and Health Week, Sept., 20-26, agriculture engineering experts at Iowa State University Extension and Outreach suggest farmers plan ahead for hazardous situations that may occur in confined spaces.

Agricultural confined spaces can include manure pits, milk tanks, silage bunkers and grain bins. The definition of a confined space is one or more of three fundamental characteristics: it is not designed for regular occupancy by people, it has a limited entryway and/or exit, or it contains a hazardous material or atmosphere.

During harvest time, farm safety concerns focus on confined spaces such as grain bins, transport vehicles and other grain storage structures. Grain bins are not designed for human occupancy and they typically have limited entry and exit points. However, the real danger in a grain bin is the physical hazard for humans of being entrapped in grain.

Grain entrapments can happen quickly. To ensure an even flow of grain from the silo or wagon through a small opening at the unloading gate, workers will walk on top of the flowing grain and become trapped within seconds. “Grain is like quicksand,” explained Charles Schwab, professor and extension specialist in agricultural and biosystems engineering at Iowa State University. “And the more you struggle, the deeper you are pulled downward.”

Even when the grain has stopped flowing, Schwab said it is difficult to rescue a submerged victim. “For instance, if someone is buried up to their chest in corn, even victims with great upper-body strength would still be unable to pull themselves out. Grain has a tremendous force of friction that most people don’t understand unless they’ve experienced it,” said Schwab.

According to Schwab, a common misconception is that people can climb up and out once they are sucked down into the grain. However, the strength required to lift a 165-pound person out of shoulder-deep grain is more than most people can handle – about 625 pounds of force is needed to pull someone out of the grain. As a person sinks deeper, the grain exerts friction and pressure, requiring easily up to 2,000 pounds of force to raise an adult.

The key is to avoid the hazard by following standard procedures while handling, transporting and storing grain:

- Always lock all access doors to grain storage structures.
- Never allow anyone to play or ride on grain wagons or be in the grain work area.
- Lock out power to all types of grain-handling equipment when entering storage bins.
- Notify a second person of where you are at all times when loading or unloading grain.

"With the variable weather this summer and leftover quality issues from last year's harvest, expect inconsistent grain quality this fall," said Gretchen Mosher, assistant professor in agricultural and biosystems engineering at Iowa State University. "Historically, quality issues in grain lead to higher incidents of grain entrapments, both on the farm and at the grain elevator. While good-quality grain can engulf a person just as quickly as poor-quality grain, when we manage grain quality adequately, there is less reason to enter a confined space grain bin," she said.

"The goal is to make farms a safer place to live and work," Schwab said. "Now is the time to share the concern and understand the danger of grain entrapment hazards during the 72nd observance of National Farm Safety and Health Week, Sept. 20-26."

More information about agricultural confined spaces is available at nasdonline.org.

Related links:

Agricultural Health & Safety – www.abe.iastate.edu/extension-and-outreach/agricultural-health-safety

Related publications:

For publications on farm safety, see ISU Extension and Outreach online Store – http://store.extension.iastate.edu/Topic/Farm-Management/Farm-Safety
Or see the National Ag Safety Database – http://nasdonline.org/

Graphic: