

## Training Module: Grain Bin Entrapment

**Objective:** To gain an awareness of the danger of flowing grain, and to learn how to prevent grain bin entrapment.

**Trainer's Note:** Divide the employees into three groups, read and discuss the three different ways people become entrapped in grain and have each group come up with prevention strategies for each one of the entrapment types (allow five minutes for this exercise). After the groups are finished, go over the prevention strategies presented in this module. For better understanding, the graphics provided on this sheet may be reproduced for each group.

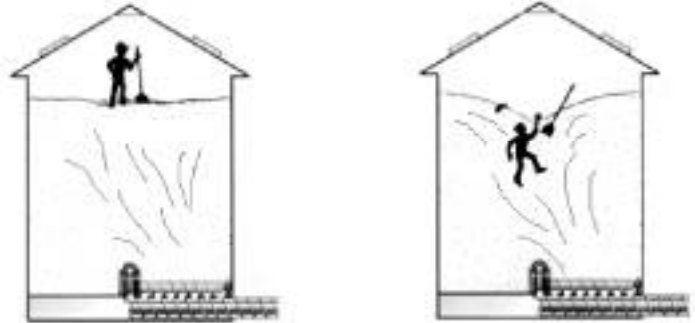
### Background

#### Three Types of Entrapment:

##### Flowing Grain

During unloading, the grain in a bin flows downward from the top center of the bin, creating a “funnel” effect that draws material and objects down the auger. An unloading conveyor at the bottom of the bin transports the grain outside. Depending on the size of the auger, it may take only two to three seconds to

become emerged up to the knees in flowing grain, rendering the worker helpless. Flowing grain acts like quick sand and can pull a worker under and result in suffocation.

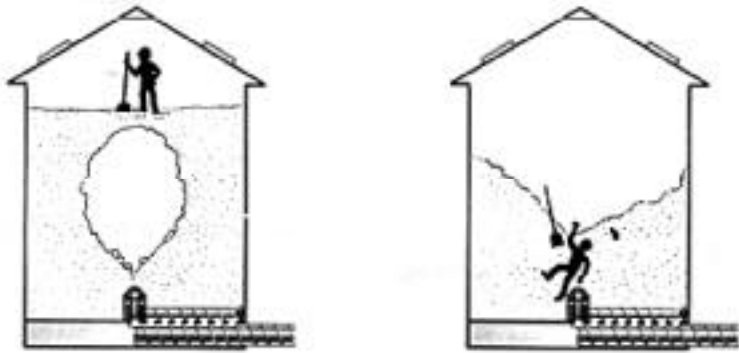


##### Prevention Strategies

- Warn family, employees, and visitors of the dangers of flowing grain.
- Place warning decals on all bin entrances and gravity wagons.
- Have an established form of nonverbal communication. It is difficult to hear over the equipment noise.
- Turn off and lock out power controls (see Lockout/ Tagout Module) to unloading conveyors before entering a bin.
- Always use a body harness with a lifeline secured to the outside of the bin, and have at least two observers during bin entry.
- Secure grain storage areas to prevent unauthorized entry.

### Collapse of a Grain Bridge

A grain bridge can form when grain on the surface is moldy or is frozen together to form a hard, thick crust. When grain is unloaded from a bin with a surface crust, a hollow cavity forms underneath the grain bridge. If anyone enters the bin and attempts to walk on the crusted surface, the additional weight will cause the crust to collapse and the individual could be partially or completely submerged instantly. The shifting grain can move the victim four to five feet from the point of entry where the victim was last seen, making it difficult to determine exactly where the victim is located.

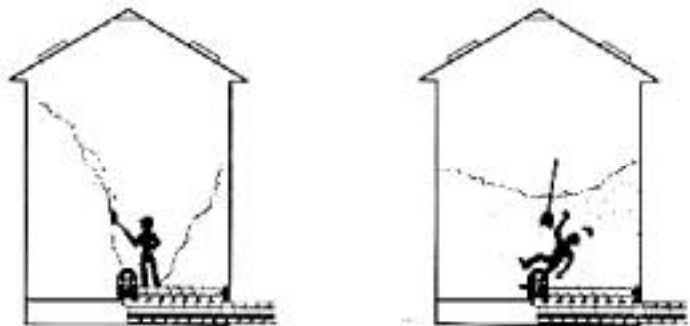


### Prevention Strategies:

- To detect whether a grain bridge exists, always look for an inverted cone or funnel after unloading from a bin.
- From the bin roof hatch or from the inside ladder, while tied securely to the ladder, use a pole or a weighted line to free the bridge. Do not stand on the grain surface.
- Manage grain to avoid conditions that cause spoilage and bridging.

### Avalanche of a Vertical Grain Wall

Grain in bad condition can cake in large vertical columns against the bin wall. Workers may try to dislodge the grain by poking it with a stick or shovel. This can cause the grain wall to break free and result in an avalanche that can completely bury workers inside the bin.



### Prevention Strategies:

- Use of body harness with a lifeline that is securely tied to a point which can withstand 5,400 lbs. of stress.
- If the bin must be entered, a person should be lowered from the top of the bin, dislodging the grain as they descend into the bin staying above the top of the vertical column.
- Be prepared for the entire grain wall to break free and fall at any time.
- Manage grain to avoid conditions that cause spoilage and formation of vertical grain walls.

### Review The Following Points

- Turn off and lock out the power source to the unloading conveyors before entering a grain bin.
- Grain bins should be secured to prevent unauthorized entry.
- Inspect for grain bridges by looking for inverted cones after unloading.
- Educate on the dangers of flowing grain.
- Workers should work from the top to the bottom on vertical grain walls.

### True or False Answer Key

1. T, 2. T, 3. T, 4. T, 5. F

## Grain Bin Entrapment Quiz

**True or False**

**Name** \_\_\_\_\_

- |   |   |   |
|---|---|---|
| 1. During unloading, the grain in a bin flows downward from the top center of the bin, creating a “funnel” effect that draws material and objects down to the conveyor. | T | F |
| 2. Flowing grain acts like quick sand and can pull a worker under and result in suffocation.  | T | F |
| 3. Always turn off and lock out power controls to the unloading conveyor or auger before entering a bin.  | T | F |
| 4. Grain bins should always be secured to prevent unauthorized entry.   | T | F |
| 5. All that is needed during grain bin entry is one observer.   | T | F |