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## **S-77**

**Purdue University**

**Cooperative Extension Service**

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# **The Dangers of Flowing Grain**

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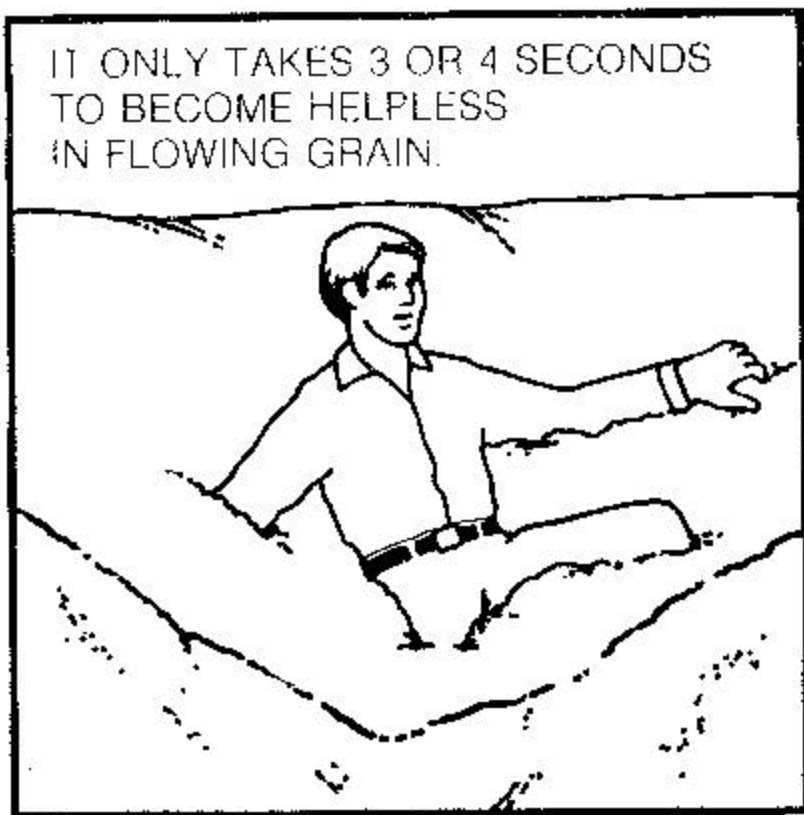
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There has been growing concern during the past few years over the considerable number of entrapments and suffocations taking place in flowing grain. Major causes that have been identified include faster grain handling procedures, larger storage facilities, year-round storage of grain, and a lack of awareness of the great danger in handling flowing grain.

Working with flowing grain is hazardous. An unsuspecting farmer who enters a grain bin with the unloader running may be caught in the grain flow before realizing what has happened. It takes only 4 or 5 seconds for you to submerge to the point where you're helpless. And, it takes less than 20 seconds to be completely submerged in flowing grain.



## **Bins Hold Many Hazards**

The hazards in a grain bin are many. These case histories illustrate some of them.

A farmer found the flow to his unloading auger plugged when he started to unload his bin. Working alone, he let the auger run while he poked with a pipe from above. When the pipe broke through the grain caked over the auger intake, he was almost immediately submerged to his waist in the grain. Luckily, the pipe jammed the intake, but he was trapped in the bin until late in the day.

A father and son found an unbroken surface crust in a bin after removing several loads. The son walked across it safely, but the heavier father broke through and plunged into the cavity and flowing grain. He was submerged before his son could stop the equipment.

A grain farmer entered the wet holding bin that feeds his automatic dryer. The dryer started automatically and he was drawn into the wet grain and suffocated.

An elevator worker entered a bin to break up a vertical pile of grain that would not flow. When he dug into the base of the pile, he was covered in an avalanche. He suffocated under only 12 inches of grain. He could not get up, since each square foot of his body was covered by a cubic foot of grain weighing nearly 50 pounds.

## **It Takes Only a Few Seconds**

Few people realize the hazard from flowing grain. You sink in about a foot when walking on dry grain. Grain removal below will almost instantly submerge you over the knees. It takes less than 5 seconds to

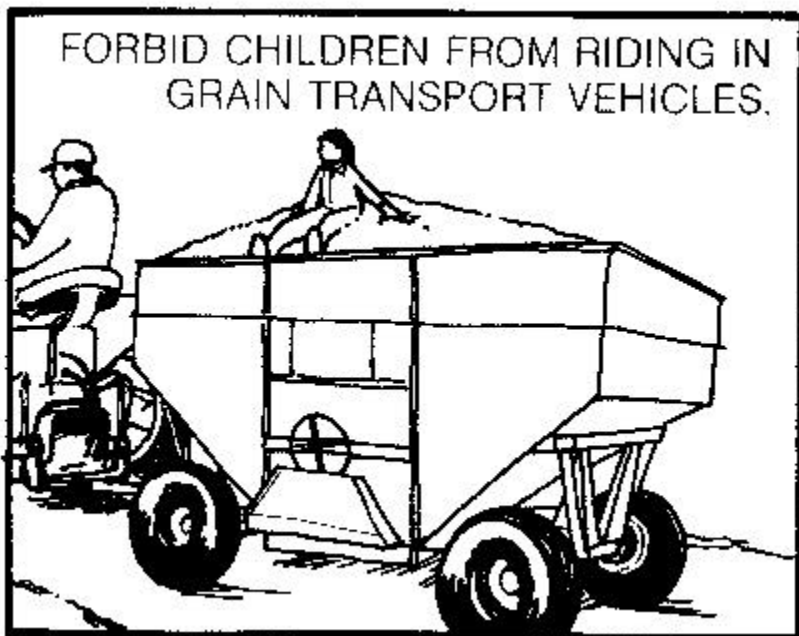
render you completely helpless.

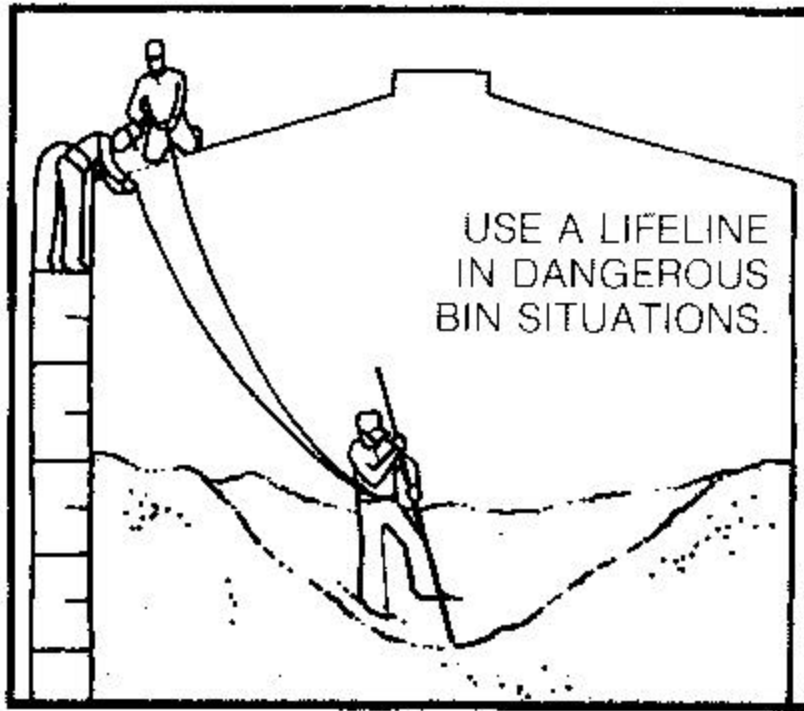
The flow only needs to remove the volume of your body, 5 to 7 cubic feet, to cover you. This only takes 15 to 20 seconds with an average flow. A child is covered even more quickly.

## Grain Transport Hazards

Numerous entrapments and suffocations have also occurred in high capacity grain transport vehicles. Most cases involve trucks equipped with grain beds or gravity dump wagons in which the victims were riding. Nearly all the victims were young children buried during the loading or unloading of the vehicle.

The potential of an extra rider, especially a child, being buried in a truck or wagon can be readily visualized when considering the rate at which modern combines discharge their grain tanks. A 12-inch auger on a typical 6- to 8-row combine can unload a 200-bushel grain tank in less than 2 minutes.





## You Can Prevent Suffocation

Suffocation accidents don't have to happen. Follow these safety rules to protect yourself and others:

- \* Never enter a bin when unloading equipment is running, whether or not grain is flowing.
- \* Keep children off grain vehicles and out of bins while unloading and loading. Forbid them to play in hopper wagons and on hoisted grain beds. Grain flow can cover them quickly, before they realize what is happening.
- \* Don't enter a bin with automatic unloading equipment without locking out the control circuit.
- \* Always be cautious when working with grain that has gone out of condition. Dangers result from molds, blocked flow, cavities, crusting, and grain avalanches. It's a time to be especially alert.
- \* Beware of steep piles of grain. Dislodge the pile with a long pole, rather than with a short shovel.
- \* Never rely on a second person outside the bin, to whom you shout instructions. Equipment noise may block out or garble your calls for action or help. The second person may fall or stumble in the panic and haste of climbing and running to shut down equipment.
- \* Always have three persons involved when entering a questionable storage situation. Two men outside are required to lift one from the inside on a rope and safety harness. You can go for help while the other gives preliminary aid.
- \* Always be cautious before walking on any surface crust. A breakthrough can plunge you into

flowing or hot grain with little chance of survival.



## Respiratory Hazards

Even a small amount of spoiled grain can produce millions of tiny mold spores which easily become airborne when disturbed. Airborne mold spores can be inhaled into the lungs through the nose and mouth, irritating sensitive tissue and in some individuals causing reactions so severe that hospitalization is necessary. Farmers working without respiratory protection inside a bin or other grain storage facility in which moldy grain is present are especially vulnerable to mold reactions.

## Take Safety Steps

Here are some other safety measures that can help protect you:

- \* Install ladders inside and outside all bins.
- \* Always use a rope and safety harness when entering a dangerous bin situation. Have two men who are capable of lifting you out standing by.
- \* Don't rely on a rope, chain or pipe ladder hanging from the roof. They are not reliable and may obstruct flow during filling or increase drag during unloading.
- \* Never work alone in heavy mold dust. Always wear a respirator capable of filtering fine dust particles. Avoid unnecessary exposure to mold dust. Your tolerance may be reduced with each repeated exposure and can lead to an acute reaction from any contact.

\* If you should become trapped in a grain bin or silo, stay near the outer wall and keep moving. If necessary you can walk until the bin is empty and the flow stops.

## **If You Are Under 16**

A Federal farm labor law affects you. Unless you are working on a farm owned or operated by your parent or guardian, you are restricted from operating or helping to operate (including starting, stopping, adjusting, feeding or any other activity involving physical contact) certain farm machinery, including auger conveyor, feed grinder, crop dryer, forage blower or the unloading mechanism of a non-gravity type self-loading wagon. However, you may perform these jobs at age 14 if you have special training.

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