

## **Grain Storage Safety and Tips** *by Craig Kilby*

Most growers should be aware stored grain on the farm this year is not always of ideal moisture, quality, and condition. Considering these factors, grain removal from storage promises to be a challenge as grain is stored into late spring and summer and farmers are tempted to enter grain bins to restore grain flow.

Therefore, the safe handling and removal of this grain is of extreme concern for both farmers and rural fire/rescue personnel.

Just as in hunting there are cardinal rules to live by such as "Treat every firearm as if it were loaded";

"Never enter a grain bin with equipment running" stands for those storing grain.

Failing to heed either rule can prove fatal.

### **Entrapment in grain can occur 3 different ways:**

#### **1. The collapse of bridged (crusted) grain**

Grain can become bridged when it is moldy, high in moisture, or in poor condition. The kernels stick together and form a crust, which may be self-supporting. This gives a false indication that it is safe to stand on the surface of the grain. The worker cannot tell if there is grain under the crust or not.

#### **2. The collapse of a vertical wall of grain**

Grain can "set up" in a large mass against the bin wall or in various formations when it has been stored while in poor condition. The mass of grain can collapse and "avalanche" down on workers who attempt to break it loose with shovels or other objects. There will be no warning when it breaks loose and cascades down. The impact will knock workers off their feet, burying them in various positions. Individuals working in the bin can be buried almost instantly.

#### **3. Entrapment in flowing grain**

Flowing grain will not support the weight of a person. It will pull a person down and into the grain mass as it flows. The "suction" action is strong enough that a person cannot "swim," climb, or walk against it and get out. As grain flows out of a bin the victim will be pulled down and under very quickly with little time to react. A person cannot be pulled from flowing grain without risk of injury to the spinal column if the grain is at waist level or higher. The grain will have a very strong grip on the body. Research has shown that up to 400 lbs. of pull is required to extract a body from waist-deep grain. That is more than enough force to permanently damage someone's spinal column.

### **If someone is found trapped in grain:**

1. Shut off all grain-moving machinery. Stop the flow of grain.
2. Contact the emergency rescue service or local fire department.
3. Ventilate the bin using the drying fan without activating the heat source.
4. Work in such a way that additional grain pressure is not exerted on the victim.
5. Protect the rescue workers; be sure the power to the auger is locked out, and use safety lines and respiratory protection or support.
6. Make a retaining wall if the grain is above the victim's head. Form retaining walls with plywood, sheet metal, or snow fence and tarps to keep grain from flowing to the victim.
7. Remove grain from around the victim using shovels and a grain vacuum conveyor. Use extreme care when victim is not visible.
8. Cut holes in bin sides to drain grain away from the victim if the person is completely submerged. Cut at least two V-shaped or U-shaped holes on opposite sides, or more holes equally spaced around the bin, using a cutting torch, metal-cutting power saw, or air chisel.
9. Apply care to the victim as soon as possible, providing breathing assistance, maintenance of body temperature, and emotional support. **PLAN AHEAD FOR VICTIM REMOVAL PROCEDURES.**
10. **DON'T GIVE UP** when conditions appear to be grim. People have survived submersion in grain for up to **TWO HOURS**; sometimes the victim can still breathe while buried in the grain. **NEVER GIVE UP!**

## Safe methods and tools for restoring grain flow in bins.

1. A small auger tipped rod can be inserted in the inspection/sampling hole in the bin door to break up chunks in the center sump. This device was highlighted on the US Farm Report 3 weeks ago. Check it out at: <http://johnwphipps.blogspot.com/2010/02/dont-ask-what-you-can-do.html>
2. Drive a small diameter pvc pipe through the grain to the center outlet. Next slide into the pvc pipe either a thread rod or smaller diameter pipe to break up chunks blocking flow.
3. Insert a small diameter pipe either from the door inspection hole or grain surface. Attach an air chuck fitting and use high pressure air to blast open blocked unloading sumps.