Hazardous Equipment Posters
Grain Augers and Hazards

A grain auger is used to put grain into a grain bin or transport grain out of the bin to a truck or grain wagon to take to market. This grain auger is portable and can be moved from bin to bin by using the wheels attached to it.

A grain auger is a tube containing a solid shaft in the center with *flighting*, a spiral of flat steel, welded onto the shaft. As the shaft turns in a clockwise direction, the flighting pulls the grain in and pushes it up the shaft. You can imagine what would happen to someone if their arm or leg was pulled into the end of an auger.
Grain Bin and Storage Hazards

Grain bins are commonly found on Illinois farms. These bins are used to store grain such as corn, soybeans, wheat, oats, and grain sorghum.

Grain being stored is removed through an auger system in an opening in the center of the bin floor. As you can see, this process pulls the stored grain down and toward the center of the bin. Note how a depression in the middle of the grain is formed.
Hazards During Grain Removal

If someone is in the bin while the grain is being removed, they, too, will be pulled down and toward the center of the bin. If grain continues to be removed the person will be covered with grain in a matter of seconds!

This person has been pulled down into the grain and pulled toward the center of the bin. Once the person as been pulled into the grain above their knees, they cannot get out of it by themselves. The pressure of the flowing grain and the grain against their legs gives them no place to go.
Hazards of Crusted Grain

Grain can become crusted on the surface as it sits in the bin. This can be hazardous to people working in bins.

Vertically crusted grain can collapse on a farmer who is attempting to break it up while in the bin.

Grain crusted on the surface can be over voids (open spaces) and a person’s weight can cause the grain to collapse and the person can be covered with grain.
Miscellaneous Hazards

This is a sweep auger. It helps to collect grain when the bin is almost empty. As it circles slowly on the floor, it can become an entanglement hazard to someone in the bin.

Grain wagons can be a hazard, particularly to youngsters. Moving grain in a wagon acts just like that in a grain bin. It is pulling down on whatever might be in the grain. Children are not strong enough to pull themselves out of the moving grain.
Safety Precautions

- Whenever possible, do not enter a grain bin.

- Break up crusted grain from the outside with a long pole. Check to see that the pole does not come into contact with electric lines.

- If you must enter the bin, as a farm owner/operator you should:
  - Wear a harness attached to a properly secured rope.
  - Stay near the outer wall of the bin and keep walking if the grain should start to flow. Get to the bin ladder or safety rope as quickly as possible.
  - Have people, preferably two, outside the bin to help if you become entrapped. They should be trained in rescue procedures and should know and follow safety procedures for entering the confined space.

- Grain fines and dust may cause difficulty in breathing. Anyone working in a grain bin, especially if cleaning the bin, should wear an appropriate dust filter or filter respirator.
Safety Precautions, cont’d.

- Stay out of grain bins, wagons and grain trucks when unloading equipment is running.

- If it is necessary to enter the bin, remember to shut off the power to augers and fans. It is a good idea to lock out any unloading equipment before you enter a bin to prevent someone from unintentionally starting the equipment while you are in the bin.

- Children should not be allowed to play in or around grain bins, wagons, or truck beds.

- Where possible, ladders should be installed inside grain bins for an emergency exit. Ladders are easier to locate inside a dusty bin if there are brightly painted stripes just above or behind the ladder.
Auger Safeguards

In order to keep objects other than grain from being pulled into the end of an auger, guards are placed over the intake end. The augers pictured on the left are good examples of guards on the end of grain augers.

However, many grain augers in use do not have any guard at all, or they may have guards such as the one on the left. This old guard would allow large objects to be pulled in. It should be replaced with a guard similar to the good examples shown.
Portable Augers and Electric Lines

Portable grain augers like the one shown **can be 60 feet long.** Because of this it is very important to lower the grain auger to its lowest position before moving the equipment. As this picture shows, if the grain auger is moved when it is raised it could get into power lines and electrocute those moving it. It is also important to have proper clearance between the bin and any electrical wires. If possible it is safer to have electric lines to bins buried under the ground.
PTO and Implement Drives

The PTO (Power Take-off) is located on tractors and other implements. The PTO takes power from the tractor and in turn uses that power to run another piece of machinery. In this picture the tractor master shield that normally covers the PTO shafts has been removed for clarity. Some tractors have only one PTO shaft, others have two like this tractor.

PTO shafts can run at various RPMs. This PTO shaft runs at 1000 revolutions per minute (RPM). It is normally found on larger equipment.

This PTO shaft runs at 540 RPM.

This is the end of the driveline shaft that connects to the tractor PTO shaft.
Master Shield and Implement Driveline

This picture shows a tractor hooked up to a piece of equipment, a portable electric generator. Notice that the master shield on the tractor is in place.

The Implement Driveline is the shaft that connects the PTO on the tractor to the piece of equipment.
Driveline Connector Shields

This is the front end of a grinder for hay. Safe operation requires that shafts are shielded. In the picture above, you can see that both ends of the implement driveline shaft have coverings and the shaft itself is also completely covered with a shield.
This is a PTO driven grain auger. It has the shaft shield with connector shields on it. You can see the white plastic bushing that used to hold the shield in place. This means the shields can no longer do their job, and in fact create more of a hazard. **This is not good. It should be fixed.**
Examples of Missing Shields

NO Master Shield in place on this tractor with a PTO driven implement. This is not good. It should be fixed.

NO Connector Shields and NO Shaft Shield on the this PTO driven implement (as well as no Master shield). This is not good. It should be fixed.
This is a pair of coveralls stuffed with straw. It demonstrates what can happen if someone got pulled into a rotating PTO and Driveline. This is a small tractor hooked up to power a hay baler that operates at 540 RPM.

An example of how fast this can happen. If someone wearing a hooded sweat shirt got too close to the rotating shaft, the strings on the hood could get wrapped around this shaft. **Operating at full speed, the rotating PTO and driveline could wrap up 7 FEET of the hood string in 1 SECOND!!** This is much too fast for the person to do anything.
Safety Precautions

To perform intended functions, farm machinery operates in a powerful, aggressive fashion. Operators must adopt good safety habits to prevent injury. Even with well-shielded equipment, operators are at a high risk for injury or even death.

Following are key considerations for preventing PTO entanglement:

• **Always disengage the PTO, shut off the engine and remove the keys before leaving the tractor seat.**
  You can't be injured by the PTO or other machine parts if the driveline isn't rotating! Taking the keys prevents unexpected start-up by another person while you are cleaning, lubricating, adjusting, or making repairs.

• **Keep the tractor's master shield in place at all times.**
Safety Precautions, cont’d.

• **Check frequently to confirm that integral shields are in good condition.**
  With the powershaft stopped, you should be able to rotate the shield freely by hand. Look for nicks, dents or bends that could catch clothing. Damaged shields or bearings must be repaired immediately. Don't operate the machine until damaged parts are fixed or replaced.

• **Never step across a rotating powershaft.**
  Some equipment must be operated in a stationary location where you are working (e.g. forage wagons and blowers, grinder-mixers, etc.) When such machines are running, always walk around the revolving shaft. Safety devices are usually reliable, but could malfunction.

• **Dress for safety.**
  Wear close fitting clothes and keep long hair covered. Raggy old coats and long boot laces can easily be grabbed by rotating parts.