



Electrocution hazards on the farm

Rain clouds are moving in quickly and you want to finish harvesting that last field. Another wagon is ready to dump, and more will be arriving soon. You need to move the portable auger to the next storage bin. To stay on schedule, you decide to move the auger without first lowering the height. Without warning, the auger contacts overhead power lines and two workers are electrocuted. It was too late to do anything.

This scenario is repeated on dozens of farms throughout the United States each year. Electrocution is quick and deadly, killing an estimated 35 agricultural workers every year.

The tragic aspect is that these deaths could have been prevented. Farm workers can reduce their risks of electrocution by knowing how they, or others on the farm, can unknowingly come in contact with electricity. This publication focuses on electrical hazards posed by overhead power lines, standby generators, and general operating procedures of electrical systems at the farm work site.

Electrocution hazards

The most common risk of electrocution comes from overhead power lines. Utility lines typically are not insulated, meaning that the lines are bare. The lines may have been installed without insulation, or the insulation may have been removed by exposure to the elements.

Always treat overhead power lines as if they are bare. Unlike birds that rest on wires unharmed, humans often die when they touch overhead lines because they contact the earth and wire at the same time. This creates a channel for electricity and electrocution can occur.

Overhead power lines

Many types of farm equipment can come in contact with overhead power lines. Tractors with front-end loaders, portable grain augers, fold-up cultivators, and equipment with antennas easily can become an electrical hazard and must be operated with care.

Performance of certain farm tasks also pose electrocution hazards. Always use ladders with caution so that they do not come in contact with overhead power lines. Construction or harvest of tree crops also pose hazards.

Grain bin regulations

Many electrocutions occur near grain bins, and requirements in the National Electrical Safety Code (NESC) address those dangers. The Code requires raised power lines in dangerous locations where tall equipment is used.

According to the NESC, power lines must be at least 18 feet **above the highest point** on any grain bin with which portable augers or other portable filling equipment are used. The clearance must be maintained a specified distance around the bin, and sloped to meet the lower line clearance. If you are installing new grain bins, contact a licensed electrician or power company representative to help place electrical service lines. Lines also can be buried to reduce risk of electrocution. Installation costs for overhead and underground power lines can vary; contact local reps.

Determine equipment clearance

If you have overhead power lines, ask local utility company officials to help determine line height in each area of the farm.

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How much do you know?

Test your knowledge about electrocution dangers with this quick quiz.

1. Utility lines are uninsulated wires, which means that wires are bare. True or false?
2. A transfer switch removes the farm electrical system from the power company's utility lines. True or false?
3. Which of the following pose electrocution hazards from overhead power lines?
 - a) a tractor pulling a fold-up cultivator
 - b) a tractor with a raised front-end loader
 - c) transportation of a portable grain auger
 - d) all of the above
4. If your tractor comes in contact with a power line, you should wait for help. True or false?

See answers on back.

Never measure line heights yourself! Once you know the height of all power lines, you can determine the clearance needed for equipment that must travel underneath the line. Try to maintain at least a 10-ft. clearance between the power line and the top of all equipment that must travel under it.

Consider the possibility that some equipment during transport is actually taller than when in use. For example, a large, 16-row planter that folds up would be taller during transport than during field use.

Train seasonal employees

Busy planting and harvest seasons may require temporary employees, persons who may not be aware of potential dangers associated with overhead power lines. Always remind additional workers about overhead power lines. Give them special instructions such as, "Never transport this cultivator through this gate because of the overhead line."

Standby generators

Some farms are equipped with a standby generator to provide emergency power for essential farm operations during local power failures. A key component of your operation's emergency power system is the transfer switch, which removes the farm's electrical system from the power company's utility lines.

The switch prevents electricity generated by a farm operation's emergency power system from entering the power company's utility lines, and protects from electrocution those

power company workers who service lines during an outage. The switch also protects your generator when power is restored.

Always use the transfer switch whenever your standby generator is in operation. Make sure all workers know the location of the transfer switch.

Avoid injury

Despite operating precautions, equipment can come in contact with electrical lines. It is important to know how to handle these situations.

If your tractor comes in contact with overhead power lines, **stay on the tractor**. Ask someone to contact the local utility company immediately to remove the danger. If there's an emergency, such as an electrical fire, and you need to leave the equipment, jump as far away from the equipment as possible. **Do not allow any part of your body to touch the equipment and the ground at the same time.**

Once you get away from the equipment, never attempt to get back on or even touch the equipment. Many electrocutions occur when the operator dismounts and, realizing nothing has happened, tries to get back on the equipment.

The best way to handle emergencies is by prevention. Respect electricity and avoid contact with overhead lines.

Prepared by Charles V. Schwab, extension safety specialist.

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What can you do?

- Apply decals to all equipment that may pose electrical hazards and explain decals to persons who work with the equipment.
- Inspect farm equipment for transport height and determine clearance with any power lines under which the equipment must pass.
- Review the possibility of underground utility supplies for new or replacement power lines.
- Determine risks for potential electrical shock and restrict access to that area.
- If you have a standby power system, review its location, operation, and importance with all workers.

Answers to quiz: 1-True; 2-True; 3-d; 4-True

For more information

This publication covers only some aspects of electrical safety. For more information, contact your local power company or cooperative, or request this material:

- *The Agricultural Wiring Handbook*, available from the National Food and Energy Council (NFEC), www.nfec.org. Fee for publication.

- *The Farm Building Wiring Handbook*, MWPS-28, available from the Midwest Plan Service, www.mwps.org. Fee for publication.

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Safe Farm is an Iowa State University Extension and Outreach project helping to make Iowa farms a safer place to work and live.

For more safety information, check the web at www.abe.iastate.edu.