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EC92-736 Safety with Center Pivot Irrigation

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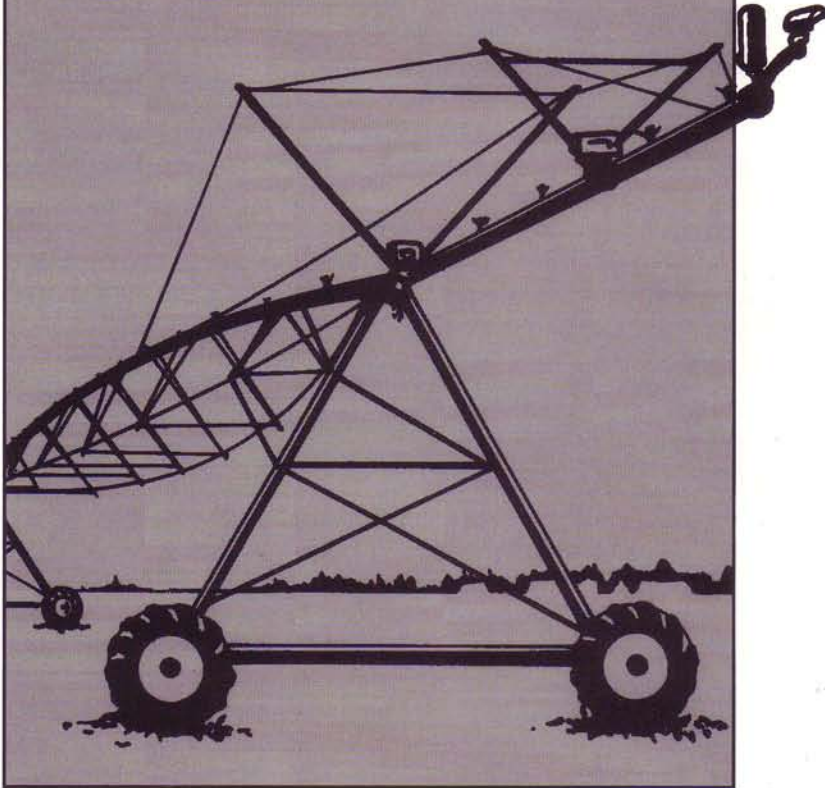
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SAFETY

with Center Pivot Irrigation



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Center pivot irrigation has proven to be an effective and low labor method of applying water and agricultural chemicals, such as fertilizers and pesticides, to cropland. It is a young industry in terms of use. Consequently, manufacturers and users of the equipment have an opportunity to keep it a safe method of water application.

As with any piece of equipment, users may want to move to a larger and more efficient system. This can result in used equipment for sale.

If equipment is sold to a new owner, it should be reconnected with the latest electrical wiring and any other device that can broaden the range of safe jobs the pivots can perform. With these improvements, there must be a continued emphasis on safety.

1. Read and follow the directions in the owner's manual. Pay particular attention to the safety precautions listed.
2. Always disconnect power before servicing the machine. Make sure electric power cannot be applied to a location not under immediate control of an employee maintaining or servicing the equipment. This means there should be a means on the main switch that can be operated only by the person performing the maintenance. Some of the older machines do not have this lockout. All new machines manufactured must have a lockout device.

Those who use the equipment should have a written plan to follow, and all employers should be aware of the procedures listed in the plan. Training employees is a requirement of the new Sept. 1, 1989 OSHA law. Even though agriculture is exempt from inspections in some instances, that exemption is not an excuse to use unsafe procedures.

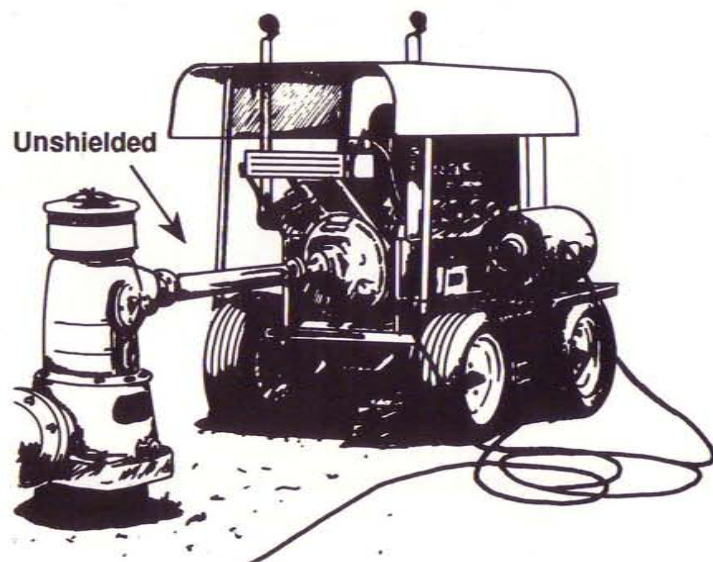
People servicing the machine must secure the machine themselves. Don't leave it to someone else. Make sure everyone is clear before the machine is turned back on. Irrigation pumps and systems should be turned off before the main power switch is turned on.

3. Stay away from the machine during an electrical storm. The center pivot makes a good path to earth. It is probably the highest object in the field, which makes it a good lightning receptor.



4. Use a good ladder or other stable device to perform overhead maintenance. Portable lifts can be used; however, there should be some provision for guard rails to protect the person on the platform from falling.
5. Center pivots are not playground equipment. Discourage children from playing around or climbing on the machine. Falls against or onto the equipment might result in fractures or cuts. Turning shafts on the aligning mechanism also might be a hazard if a person gets too close.

6. All three-phase electrical equipment must be connected to grounded four-wire electrical service. Work with the power suppliers and your electrician and insist they install the electrical service according to the manufacturer's specifications and to American Society of Agricultural Engineering Standard S397. Have your electrical inspector check out the system to ensure it is wired properly.
7. Have qualified service personnel perform any hazardous repair or maintenance.
8. Guard all power take-off drives. This includes belts and power line drives. The use of a belt drive to an auxiliary generator is no excuse to omit the guard. OSHA requires shielding all power line drives where employees will be working around the equipment.



9. Electric power units should be de-energized before beginning any work. Capacitors on electric motors can hold a charge even though electricity is turned off. Treat them as you would a fully charged electrical system.

10. If you suspect a short circuit as a result of feeling a "tingle," do not touch the machine again until the machine is checked out for safe use by a competent electrician.



11. Be careful when fueling equipment. Diesel does not pose the same problems gas does. Gasoline, natural gas and propane will ignite at a low level of 2 percent and upper level of 15 percent, with natural gas having 15 percent, or the upper level. Never use gasoline as a cleaning agent since it could ignite from a static or open spark.
12. Center pivots have good traction. It is possible for them to climb over equipment and also over buildings. If the unit is not set up for full circle, make sure the stops and reverses are set properly for the degree of the circle desired.
13. Be sure the center pivot will not contact power poles or electrical wires. The irrigation stream should not wet any overhead electrical lines.
14. Avoid ditches, overhead power lines, buildings, etc., when towing from field to field. Lives have been lost when the tractor towing the unit overturned and crushed the operator.

15. Bury and guard all power lines around the pivot. It is also recommended that you mark the area with a buried power line sign. Include a simple diagram and description with the land abstract to ensure a permanent record of installation.
16. Never attempt to clear vegetation or other material from moving parts while the machine is operating. Always shut down the machine for maintenance. The area around the machine should be free of vegetation and any other potential tripping hazards.
17. Avoid getting hands or clothing caught in moving parts such as wheel spokes, oil or water cylinders and linkages, chains and sprockets, V-belt, pulleys, etc. Improperly guarded equipment is dangerous for the unwary human and for livestock that might be grazing in an irrigated pasture.
18. Avoid putting any portion of your body in contact with high pressure water streams such as end guns. Be careful of fast return end guns. Avoid working around end plugs when there is pressure in the system. Fatalities have occurred when plugs came loose and hit the person working on the unit.

Be careful of leaks in high pressure hydraulic hoses. A pinhole leak can release a fine stream of fluid which can penetrate the body. This is definitely an emergency situation if it occurs.

19. If chemicals are applied with the center pivot, comply with all federal, state or local regulations. These regulations provide for personal safety and protection against contamination of the water supply. Many states have laws that require permits when chemigation is used, special training for the operators, anti-pollution equipment, and posting of the area.

In addition, the pesticide labels specify whether a chemical may be applied with irrigation water. The label will provide directions and procedures for its use. Guidelines for anti-pollution equipment are provided in *EC 89-730, Anti-pollution Protection When Applying Chemicals With Irrigation Systems*.

Other safety considerations include using hoses and fittings of adequate pressure rating that are compatible with the chemical. It is important to inspect all injection equipment before operation. Care should be taken to avoid leakage and application to non-target sites.

20. Never over-fuse. If fuses or circuit breakers keep blowing, something is wrong with the system. Find the cause. A grounded phase should never have a fuse.
21. Run the engines and generators only at the recommended limits set by the manufacturer. Excessive speed can cause undue wear and short life for the equipment.
22. Do not operate at freezing temperatures. Spraying water has a cooling effect and the water will freeze even though the air temperature is slightly above freezing. Shut the system down at 40 degree Fahrenheit (4.5 degrees Celsius).
23. It is against the law to allow any water to spray on state or county roads in most states. This is a serious hazard and should not be allowed. Erosion of the bank or roadway surface could result in an auto accident.



24. Periodically check your system for any loose or missing bolts, or other signs of possible structural failure.
25. Instruct all employees about the safe use of the equipment at the time of their initial assignment, and at least annually thereafter.

A safety program is much like a chain. It is only as strong as its weakest link. A breakdown of good safety procedures can cause the center pivot safety program to fail.

A safety program does not hinge on one person. It starts with the manufacturer of the equipment. Next, the supplier of the equipment gets involved. When he sells the equipment he must keep safety in mind. In fact, he should include safety equipment in his bid. A good retailer will point out that he has his customer's safety in mind.

The person who installs the equipment must be trained in the proper use of the equipment, and thoroughly indoctrinated with safety procedures. If one person in the system fails to do a safe job, the chain is broken.

The author appreciates the contribution of information from DeLynn Hay, Extension Water Resources and Irrigation Specialist; LaVerne Stetson, Agricultural Research Service Engineer; Glenn J. Hoffman, Department Head; Biological Systems Engineering Staff; and members of the center pivot commodity group of the Irrigation Association.