

### INCIDENT SUMMARY

Incident type: .....Electrocution  
 Weather conditions/Time of day: .....Hot and humid/morning  
 Type of operation: .....Corn detasseling  
 Size of work crew: .....72  
 Worksite inspection conducted: .....Yes  
 Competent safety monitoring on site: .....Yes  
 Safety and health program in effect: .....Yes  
 Training and education for workers: .....Yes  
 Occupation of deceased workers: .....Laborers  
 Age/Sex of deceased workers: .....14/F, 14/F  
 Time on job: .....2 weeks  
 Time at task: .....Variable up to 8 hours  
 Time employed/classification (FT/PT/Temporary): .....Temporary  
 Language spoken: .....English  
 Union/Non-Union: .....Non-Union

### BRIEF DESCRIPTION OF INCIDENT

Two 14-year-old temporary workers were electrocuted, and other teenage workers received electrical shock injuries, when one worker touched an electrified irrigation structure in the agriculture field where they were detasseling corn. Detasseling is usually a seasonal job during which workers manually remove the pollen-producing flowers (tassel) from the top of the corn plant and place them on the ground. Two days before the incident, a lightning strike hit the metal irrigation system and melted the insulation on the electrical wires. The wire insulation is necessary to prevent energized electrical conductors from coming into contact with the metal irrigation structure. The irrigation system remained connected to a power source, allowing electricity to travel from the damaged conductors to the metal irrigation structure. This caused all exposed metal parts to become energized, posing an electrical hazard. The first worker was electrocuted when she touched the electrified irrigation structure. The second worker was electrocuted when she attempted to pull the first worker away from the structure. Several workers standing in water collected on the ground were injured by an electrical current that traveled through the second worker into the water.

#### Likely Causes of Incident

The irrigation system, represented in Figure 1, was not effectively bonded or grounded prior to the lightning strike. The interconnected metal parts were not permanently joined (bonded) to ensure electricity from a lightning strike would travel through the system and into the ground. The grounding system was inadequate because the employer:

- Used heavy duty chain links chained at the center pivot instead of appropriate bonding links;
- Did not install an adequate irrigation structure grounding system (i.e., system ground) including enough grounding rods to prevent damage from lightning;

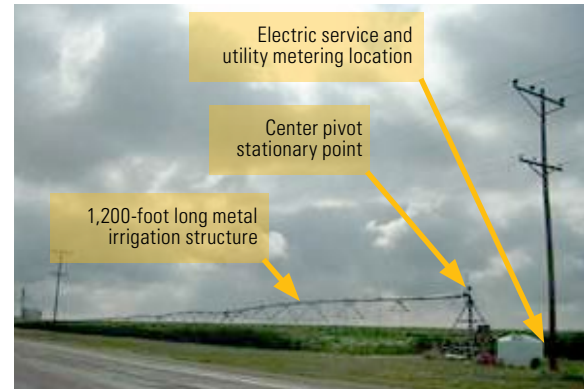


Figure 1: Typical pivot irrigation system on a 1,200-foot long irrigation machine

### You Have a Voice in the Workplace

The *Occupational Safety and Health Act of 1970* affords workers the right to a safe workplace (see **OSHA's Worker Rights page**, [www.osha.gov/workers](http://www.osha.gov/workers)). Workers also have the right to file a complaint with OSHA if they believe that there are either violations of OSHA standards or serious workplace hazards.

### How OSHA Can Help

For questions or to get information or advice, to report an emergency, report a fatality or catastrophe, or to file a confidential complaint, contact your nearest OSHA office, visit [www.osha.gov](http://www.osha.gov) or call our toll-free number at 1-800-321-OSHA (6742), TTY 1-877-889-5627. It's confidential.

### More Information

OSHA standards and regulations:  
[www.osha.gov/law-regs.html](http://www.osha.gov/law-regs.html)

OSHA publications:  
[www.osha.gov/publications](http://www.osha.gov/publications)

OSHA-approved state plans:  
[www.osha.gov/dcsp/osp](http://www.osha.gov/dcsp/osp)

OSHA's free On-site Consultation services:  
[www.osha.gov/consultation](http://www.osha.gov/consultation)

Training resources:  
[www.osha.gov/dte](http://www.osha.gov/dte)

Help for Employers:  
[www.osha.gov/employers](http://www.osha.gov/employers)

- Did not properly ground the energized equipment to the electrical source at the transformer;
- Did not effectively train workers to avoid electrical hazards when walking through the fields.

## INCIDENT PREVENTION

Employers are responsible for providing a safe and healthful workplace free from serious recognized hazards.<sup>1</sup> When there are temporary employees at the worksite, OSHA recommends that the temporary staffing agency and the host employer specify their respective responsibilities for employee safety in their contract.

Employers can take the following steps to prevent electrocutions and electric shock injuries on agricultural irrigation systems:

- Train workers on the electrical hazards associated with an irrigation system.
- Take proper safety measures to identify and address electrical hazards before conducting work that requires contact with the irrigation system.
- Remove irrigation systems from the field when workers are in the area.
- Use qualified electricians to install all electrical systems.
- Bond and ground all metal parts in the irrigation system in accordance with NFPA 70 (National Electrical Code) Article 250 “Grounding and Bonding” and Article 675 “Electrically Driven or Controlled Irrigation Machines.” It is important for employers to:
  - o Install a grounding system that is continuous and creates a path to ground from all circuits, equipment and enclosures.
  - o Install additional grounding rods when necessary.
  - o Connect a bonding conductor from the transformers to the meter pedestal to establish an effective ground fault current path.

<sup>1</sup> Farms with 10 or fewer workers are exempt from OSHA inspections. For more information, see [CPL 02-00-051 - Enforcement Exemptions and Limitations under the Appropriations Act](#).

- o Install lightning protection to prevent electrical installation failures.
- Re-inspect all electrical installations as needed (for example, after lightning storms) to verify they meet NFPA 70.
- Stay current with equipment manufacturers’ safety notices and recalls.

## ADDITIONAL RESOURCES

Please refer to the following national consensus standards: (<http://nfpa.org/codes-and-standards/document-information-pages>)

NFPA 70 National Electrical Code  
 NFPA 70 Article 250 Grounding and Bonding  
 NFPA 70 Article 675 Electrically Driven or Controlled Irrigation Machines

- Each year, electrocutions account for roughly 3.5% of all fatalities among youths under age 20 on farms. The following sites can help agricultural employers prevent job-related injuries and illnesses among young workers:
- Detailed information on young worker and employer safety solutions for electrocution hazards, [www.osha.gov/SLTC/youth/agriculture/electrocution.html](http://www.osha.gov/SLTC/youth/agriculture/electrocution.html)
- General information on keeping young agricultural workers safe, OSHA’s Youth In Agriculture eTool, [www.osha.gov/SLTC/youth/agriculture](http://www.osha.gov/SLTC/youth/agriculture)
- Young Worker Health and Safety website, [www.osha.gov/youngworkers](http://www.osha.gov/youngworkers) <http://youngworkers.org>
- General information on temporary workers, OSHA’s Protecting Temporary Workers page, [www.osha.gov/temp\\_workers](http://www.osha.gov/temp_workers)

**Note:** The described case was selected as being representative of improper work practices which likely contributed to a fatality from an incident. The incident prevention recommendations do not necessarily reflect the outcome of any legal aspects of this case. OSHA encourages your company or organization to duplicate and share this information.

This Fatal Facts is not an OSHA standard or regulation and it creates no new legal obligations. The recommendations contained herein are advisory in nature and are intended to assist employers in providing safe and healthful workplaces. The Occupational Safety and Health Act of 1970 (OSH Act) requires employers to comply with safety and health standards promulgated by OSHA or by an OSHA-approved state plan. The requirements of OSHA-approved state plans can be reviewed by selecting the state’s website at: [www.osha.gov/dccsp/osp](http://www.osha.gov/dccsp/osp). The OSH Act’s General Duty Clause, Section 5(a)(1), requires employers to provide employees with a workplace free from recognized hazards likely to cause death or serious physical harm.

**For assistance, contact us. We can help. It’s confidential.**



**www.osha.gov (800) 321-OSHA (6742)**



U.S. Department of Labor