

Prevention at Work

Work-Related Electrocution Deaths, Oklahoma, 2000-2009

General Information

Contact with electrical transmission or electric current results in thousands of injuries and deaths each year in the United States. In 2009, 170 workers died due to fatal electrocution injuries. During the 10-year period 2000-2009, 62 people were killed in work-related electrocution incidents in Oklahoma. Electrocutions accounted for 6% of all work-related deaths in Oklahoma during this time period. Ninety percent of workers were Oklahoma residents. The age of workers killed ranged from 20 to 73, with a median age of 34. Fatal injuries were most common in the months of July and August and less common in November and December. More than half of fatal injuries occurred between 10:00 a.m. and 4:00 p.m.; most of these occurred from 10:00-11:00 a.m. and 2:00-3:00 p.m. The largest number of fatal injuries occurred in Tulsa and Oklahoma Counties, with 16 and 7 fatalities, respectively.

Linemen/Electricians

- An older adult lineman was working in a manlift performing restoration service work after a storm. He was blown by high winds into a 7,200-volt power line resulting in a phase-to-ground incident. The lineman caught on fire before his coworkers could get him down. He died three weeks later in a hospital burn unit.
- An adult lineman was working alone on a high-line pole. He touched a 7,200-volt live wire and was electrocuted. He was found by firefighters hanging unconscious from the pole by his safety belt and leg spikes. He sustained burns to one-fourth of his body and died two weeks later in a hospital burn unit.
- A young adult lineman and two coworkers were installing a 35-foot wooden utility pole with a copper grounding rod. The utility pole was to be junctioned with a 7,200-volt power line. The lineman, who was assisting in positioning the pole, was not wearing properly rated rubber gloves under his leather gloves. The lineman was electrocuted and died in the emergency room.
- An adult lineman was clearing ice from low-hanging power lines during an ice storm. The lineman thought the power was off and grabbed a neutral line. He was electrocuted and died an hour later at a local hospital.
- An adult lineman was working from a fiberglass ladder leaning against a high line with a power line 3-4 feet behind him. The weather was rainy and windy. The lineman somehow contacted the power line and fell from the ladder, was electrocuted and sustained rib and sternum fractures.
- A young adult lineman was working in a bucket/sky hook alone installing new power lines. The lineman was pulling new wire but dead-ended it by attaching it to a neutral line. The existing primary was energized and contacted the new wire in the lineman's hand. He was electrocuted and died at the scene.
- An adult electrician was changing a fluorescent light ballast and was electrocuted. Only one wire from the light was exposed.
- An adult lineman was repairing and replacing old power lines. He was in an insulated bucket and while reaching over a de-energized line he touched an energized line carrying 7,620 volts. He died an hour later.
- An adult lineman was working on power lines from a cherry picker basket. He asked a coworker to throw a tool up to him. The tool went high enough that when he reached for it his arm came in contact with a line that had 14,400 volts. It took two extinguishers to put out the fire and he suffered third degree burns to 30% of his body.
- An adult electrician was standing on a ladder rewiring light fixtures in the ceiling of an office building. He disconnected the neutral wire first from the fixture instead of the hot wire. He came in contact with the wire, was electrocuted, and fell to the ground.
- An adult utility worker was in the bucket of a bucket truck and attempting to ground the truck. He had the ground wire in his right hand and touched the hot wire (7,200 volts) with his left hand. He was electrocuted and collapsed but did not fall out of the bucket. He died at the scene.
- A young adult electrician was working 20 feet off the ground on an electrical pole wire that was thought to be uncharged. The worker was electrocuted when an oil well generator back fed and charged the line. His coworker had to drive an ATV five miles to get help. The electrician died at the scene.

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- An adult lineman was working on a 14,400-volt power line from a bucket truck. He was using the bucket's controls to position the lift over the power line. The bucket contacted the primary line and the pistol grip control pad and metal around the bucket became energized. The lineman was electrocuted and burned over 40% of his body. He died nine days later at the hospital.

Tree Trimmers

- A young adult was standing on a metal ladder trimming trees when the ladder slipped onto a power line and he was electrocuted. The tree trimmer was knocked ten feet from the ladder. He was pronounced dead at a local hospital a few minutes later.
- An adult tree trimmer was clearing tree limbs from power lines using an aluminum pole. The tree trimmer was suspended approximately 25 feet in the air with a safety strap. The pole contacted an energized power line and the worker was electrocuted. He fell from the tree but was suspended by his safety belt. He died approximately an hour later at a local hospital.
- An adult landscape designer was trimming a tree when his saw contacted a power line. He was hospitalized for five days before he died.
- An adult landscaper was trimming tree limbs from the bucket of a cherry picker. His right arm contacted a 14,400-volt power line and he was electrocuted. The tires on the vehicle were blown out from the force of the electricity.
- An adult tree trimmer was removing a large tree limb from a construction site. The tree limb was suspended in air by a large crane. The tree trimmer was on the ground and spun the branch around, causing one end to come in contact with a high power line. He was holding the other end of the limb and was electrocuted.

Heavy Machinery Operators

- A young adult oil rig operator and coworkers had completed a well service operation using a pole rig. The rig was being lowered when it came in contact with a 7,700-volt overhead power line. The truck had been pulled too far forward before they lowered the rig.
- A young adult roustabout and two coworkers were unloading a large metal oil field stock tank. The tank was being held by a winch truck but came too close to the overhead power lines. The roustabout had one hand on the winch cable and one foot on the ground

when the 12,500-volt power lines arced to the tank and winch truck. He was electrocuted and collapsed.

- An adult driver and a coworker were delivering a large diesel fuel tank to a construction site. The coworker was standing on the bed of the truck operating a crane, and the driver was standing on the ground next to the truck undoing the tie-downs on the tank. The truck was parked underneath high-voltage power lines when the boom came in contact with the lines, electrocuting the driver. The contact caused a fire, burning the rear tires of the truck and lowering it. This caused the boom to release the contact with the power line.
- A young adult equipment operator was dumping a load of gravel in a driveway. After unloading, he pulled the dump truck forward and made contact with power lines. He exited the truck and was electrocuted when his feet hit the ground. The operator died at the scene.
- An adult painter was working from a scissor lift to repaint a light pole. The lift came in contact with two 7,000-volt power lines. He was electrocuted and died at the scene.
- An adult oil field service operator and a coworker were preparing to move pipes from a storage rack. The operator was running the controls of a work truck and a large metal boom raised and hit an electrical wire overhead. The operator was electrocuted and died.
- An adult forklift operator was moving steel beams at a construction site. He raised the boom into high wires and was electrocuted.

Roofers

- A young adult roofer was working on the roof of an apartment complex. The roofer was standing in water while unplugging a circular saw and was struck by lightning. He died en route to a local hospital.
- An older adult roofing salesman was measuring a hotel roof for an estimate. He lost his balance, falling into an 8,000-volt power line. He then fell from the second story roof to the ground. He sustained several fractures and burns to one-fourth of his body. He died the same day.
- An adult roofer was at a job site climbing a ladder to measure a roof when he accidentally touched a 2,000-volt power line. He was unresponsive at the scene and pronounced dead in the emergency room.
- A young adult roofer was working from a ladder helping to put up a metal roof. He leaned back into a

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high voltage line, was electrocuted, and fell approximately six feet to the ground. He was pronounced dead on arrival at a local hospital.

- An adult roofer and coworker were attempting to put up a ladder and climb onto a roof when a wind gust caused the ladder to shift and the coworker lost his balance and let go of the ladder. The roofer still had contact with the ladder when it fell into high voltage lines. The bottom of his pants caught on fire. He died less than an hour later.

Farm Workers

- A young adult farm worker was helping move irrigation pipes with a coworker. He raised a pipe and hit a power line while he and the coworker were standing in water. The farm worker was electrocuted and his coworker suffered an electrical injury.
- An older adult farmer was fixing a wire with a short when he was electrocuted by an exposed end of a buried wire running from the garage to a chicken coop.
- An adult farm laborer was electrocuted while rigging irrigation equipment at a farm when a pipe touched a 7,500-volt power line.

Sign Installers/Sign Repair

- A young adult sign hanger was working in an aerial lift taking the face plate off of a sign to get a model number. The sign had exposed wires; he was electrocuted and collapsed. A coworker called 911. The worker was taken to a nearby hospital and died within an hour.
- An adult worker was in a small attic space of a restaurant installing a commercial neon sign. He attempted to connect a dry cell transformer box to an existing 220-volt electrical line. The line was still functioning when he cut into it with a pair of wire cutters. He was electrocuted and died at the scene.
- An adult welder was 40 feet off the ground on a walkway replacing billboard signs. Approximately eight feet from the welder were high-voltage electrical lines. He removed a 10-foot piece of conduit pipe and lost his balance causing the pipe to contact the electrical lines. He was electrocuted and fell to the ground.
- A middle-aged contractor was changing the lights of a sign from a ladder. He asked the shop owner to turn on the power to the sign and the contractor was electrocuted.

- An adult sign installer was working on a lighted sign at a shopping center. He crawled into the sign and came into contact with a hot wire. The sign did not have a breaker box so it had a constant electrical current.

Construction Workers

- A young adult construction worker was on 21-foot high scaffolding holding an electric grinder. He asked his coworker for an electrical cord so he could plug in the grinder. When he plugged it in, he was electrocuted and fell to the ground below.
- A middle-aged foreman was installing/repairing electric wire when he made contact with the wire and was electrocuted. He was hospitalized for a month before his death.
- A young adult construction worker and a co-worker were remodeling the bathroom of a residence. The worker was in the attic in an area where only one person could work and was working near a hole in the ceiling where an exhaust fan/light was being replaced. He was electrocuted and found holding an electrical wire with a pair of wire cutters still on the wire.

Other Workers

- A young adult plumber's helper was working with a coworker to remodel a residential bathroom. The plumber's helper went beneath the house to extend a riser pipe. He grabbed a water line to help pull him under the house and was electrocuted. His coworker found him several minutes later lying unconscious on two water pipes under the house. The home owner had some work done recently and a 220-volt wire from where a hot water heater was removed was not capped. The wire came in contact with a copper gas line which crossed over a water line.
- A young adult truck driver was transporting a large air handler. He was using an escort vehicle but the pole was much shorter than the height of the truck load. He tried to pass under power lines that were too low for his vehicle. He attempted to use zip ties to tie a communications wire and ground wire, but contacted a high voltage (4,000 volts) wire with his shoulder. He was exposed to the electricity for at least 30 minutes before the power could be stopped.
- A middle-aged service technician stepped out of his boom truck to work on downed power lines. As he came in contact with moist grass, he was electrocuted

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by a set of three-phase power lines. Despite resuscitation efforts by coworkers, he was pronounced dead at the scene.

- A young adult food preparation worker was working on a mobile food court trailer cleaning a fryer. The fryer was powered by an extension cord from a nearby building. The worker was electrocuted and died.
- An older adult church maintenance worker was repairing an outdoor photo cell light fixture atop a 15-foot aluminum ladder. The new light fixture was put in place with wires still exposed and the worker was electrocuted and then fell from the ladder.
- An adult worker was repairing a leaking automatic cattle watering trough. The worker tried to repair a PVC plumbing connection without turning off the power to the trough. He was electrocuted and died at the scene. The worker's was normally employed as a truck driver.
- An adult mechanic was cleaning near a high voltage electrical box with an alcohol-based solvent and was electrocuted.

Prevention

- Be alert to potential hazards. Do not distract fellow workers.
- Always pre-plan your work through a documented job briefing: identify the correct work methods (including possible hazards, risk mitigation, and emergency response), procedures, tools, equipment and Personal Protective Equipment (PPE).
- Wear proper safety equipment, such as hard hats, gloves, arc-rated/flame-resistant clothing, and protective footwear. Dielectric footwear should be

worn by workers whose feet may be exposed to electrical hazards.

- Call 811 or 1-800-522-OKIE before digging. Always use the one call system to have underground utilities identified before digging or drilling.
- Be aware of and keep a safe distance from power lines near the work site (at least 10 feet; a larger distance is required for very high voltage power lines).
- Avoid using metal or ladders with metal components near electrical work or power lines.
- Work closely with utility companies to determine if power lines are energized or insulated.
- De-energize and visibly ground electrical distribution and transmission lines.
- Use independent insulated barriers to prevent physical contact with power lines.
- Ensure workers are clear of power lines before re-energizing them.
- Follow proper lockout/tagout procedures for all electrical panels, boxes, etc.
- Do not store materials or equipment below or near overhead power lines.
- Ensure ladders and scaffolding are level, supported, and stable to avoid movement and contact with power lines.
- Test before touch. It's the last thing you can do to prevent injury and/or death. Use the correct test equipment and procedures to ensure that circuits have been opened and are safe.
- Install warning devices on mobile machinery to alert the operator if machinery comes too close to power lines.

Resources

<http://www.callokie.com>

<http://www.cdc.gov/niosh/crane.html>

<http://www.osha.gov/Region7/overheadpowerlines/>

<http://www.cdc.gov/niosh/docs/99-110/pdfs/99-110.pdf>

<http://www.cdc.gov/niosh/88-104.html>

<http://www.cdc.gov/niosh/docs/wp-solutions/2007-155/pdfs/2007-155.pdf>

http://www.osha.gov/SLTC/etools/construction/electrical_incidents/mainpage.html

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