KENTUCKY State FACE Program
Fatality Assessment & Control Evaluation

Kentucky Injury Prevention and Research Center
Bona fide agent for Kentucky Department for Public Health
333 Waller Avenue, Suite 242 • Lexington, KY 40504 • 859-257-5839

**REPORT#:** 23KY005 **REPORT DATE:** 12/12/23

# Roofer in Boom Lift Electrocuted by Overhead Electrical Line — Kentucky

## E6INCIDENT HIGHLIGHTS

**DATE:**
January 17, 2023

**TIME:**
12:11 p.m.

**VICTIM:**
27-year-old roofing worker

**INDUSTRY/NAICS CODE:**
Roofing contractors/238160

**EMPLOYER:**
Roofing contractor

**SAFETY & TRAINING:**
Unknown

**SCENE:**
Commercial office building

**LOCATION:**
Kentucky

**EVENT TYPE:**
Electrocution

## SUMMARY

Two roofers were using a telescoping boom lift to descend from a roof when they contacted overhead electrical lines. The head of the lift operator, a 27-year-old roofing worker, contacted one of the electrical lines, and he was fatally electrocuted. The other roofer in the lift, a 21-year-old male, suffered 2nd degree electrical burns to his left elbow, wrist, and hand.

… READ THE FULL REPORT> (p.3)

## CONTRIBUTING FACTORS

**Key contributing factors identified in this investigation include:**

- *Overhead electrical hazards in work area*
- *Windy conditions*
- *Exposure to energized lines*
- *Lack of appropriate personal protective equipment*
- *Need for electrical hazards training*

…LEARN MORE> (p.9)

## RECOMMENDATIONS

**Kentucky investigators concluded that, to help prevent similar occurrences, employers should:**

- Implement a job hazard analysis) process to determine appropriate measures to safeguard employees from the hazards associated with overhead electrical lines. Follow applicable OSHA regulations and use safe work practices to ensure that employees and equipment are located at a safe distance from overhead power lines. …LEARN MORE> (p.9)

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**Fatality Assessment and Control Evaluation (FACE) Program**

This case report was developed to draw the attention of employers and employees to a serious safety hazard and is based on preliminary data only. This publication does not represent final determinations regarding the nature of the incident, cause of the injury, or fault of employer, employee, or any party involved.

This case report was developed by the Kentucky Fatality Assessment and Control Evaluation (FACE) program. Kentucky FACE is a NIOSH-funded occupational fatality surveillance program with the goal of preventing fatal work injuries by studying the worker, the work environment, and the role of management, engineering, and behavioral changes in preventing future injuries. The FACE program is located in the Kentucky Injury Prevention and Research Center (KIPRC). KIPRC is a bona fide agent for the Kentucky Department for Public Health.

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## INTRODUCTION

A roofing contractor was replacing sheet metal roofing components on a commercial office building in the center of a small, rural city. As part of the job, employees were using a telescoping boom lift to access certain areas of the roof. Two roofing employees were using the lift to come down from the roof when they contacted an energized overhead electrical line located adjacent to the roof. A 27-year-old roofing worker was operating the lift at the time. His head contacted the electrical line, and he was fatally electrocuted. The other employee in the lift, a 21-year-old male, suffered 2nd degree electrical burns to his left elbow, wrist, and hand.

## EMPLOYER

The employer was a local roofing contractor with four employees and had been in business for approximately 11 years.

## WRITTEN SAFETY PROGRAMS and TRAINING

Because it was not possible to conduct interviews with the owner or other employees, the nature of the employer's written safety programs and training is unknown.

## WORKER INFORMATION

The deceased worker was a 27-year-old male roofer. The worker's experience and length of employment with the company are unknown. His coworker who was working in the lift with him was a 21-year-old male. Neither of the workers in the lift were using personal protective equipment. Two other workers, ages unknown, were working on the roof at the time. One of them was the owner of the company.

## EQUIPMENT

The telescoping boom lift used by the roofing workers to access the roof was a T350 model manufactured by JLG. This type of lift is transported using a tow hitch and then positioned by hand. Four outriggers are deployed to stabilize the lift. It is capable of raising the work platform to 34 ft. 5 in. in height (JLG.com, 2023). It is unknown if the equipment was owned by the employer or rented. Images 1 and 2 show the type of lift involved in the fatal incident.

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Images 1 and 2. T350 Telescoping Boom Lift (JLG.com, 2023)

## INCIDENT SCENE

The incident occurred in the downtown area of a small, rural city. The roofing work was being conducted on a commercial office building that fronted the town's main thoroughfare. The building housed a private business and was located within a few blocks of the city hall, police department, fire station, and other governmental agencies and businesses. Overhead electrical distribution lines were run atop poles installed in the sidewalk that ran parallel to the north side of the building. Also, on the north side of the building, electrical service lines for the building were connected to the overhead distribution lines.

The scene is shown in images 3, 4, and 5. Image 3 indicates the roof being renovated, with a red "x" showing the location of the lift and a yellow line showing the overhead power lines. Note: this photo was not taken on the same date as images 4 and 5. The red "x" in image 4 shows the location of the lift, and the yellow circle shows the overhead

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electrical powerlines involved in this fatal incident. The yellow circle in image 5 indicates the overhead electrical powerlines involved in this fatal incident.

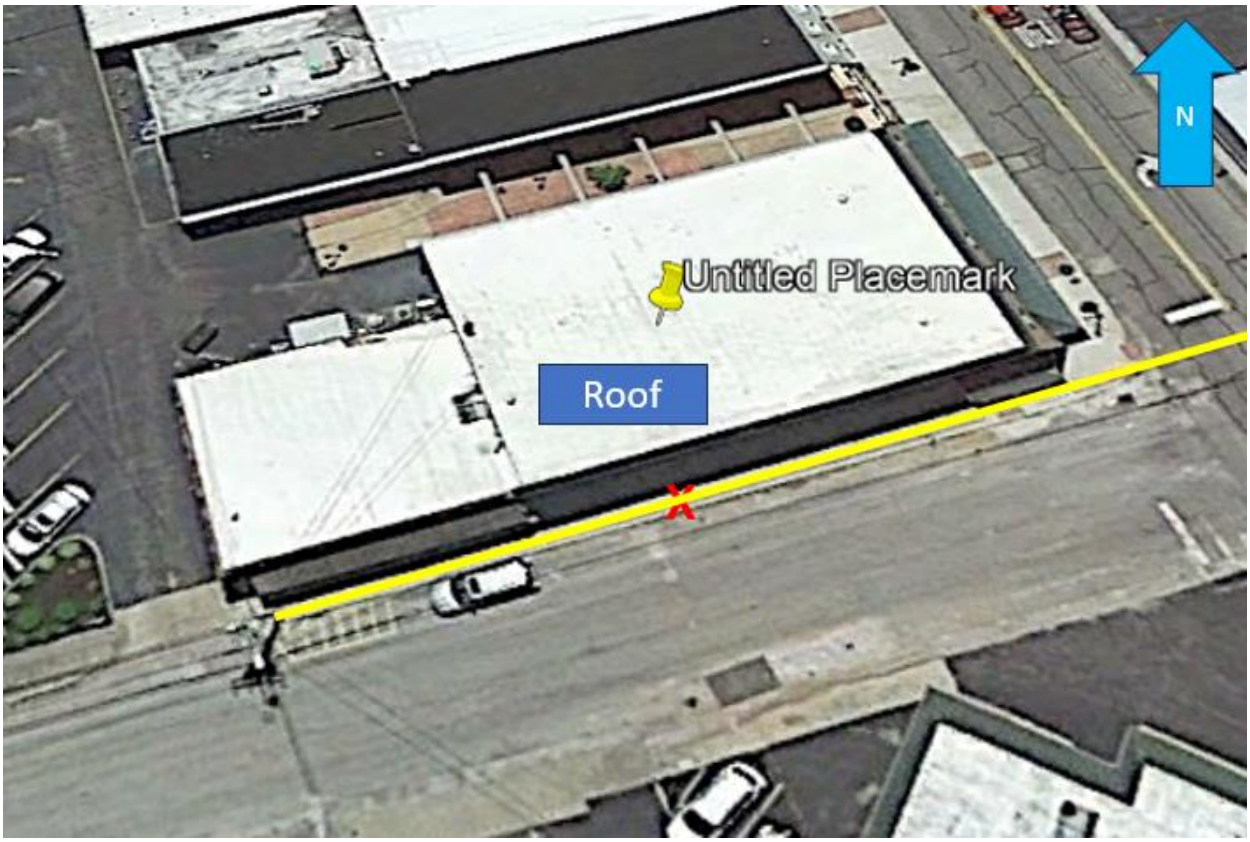


Image 3: Incident scene; aerial view. The yellow line represents overhead power lines. The red “x” shows the approximate location of the boom lift. (Google Earth Pro, 2023.)

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Image 4: Incident scene with overhead wires; facing south. The yellow circle shows the approximate location where the roofer contacted the overhead power lines. The red “x” indicates the approximate location of the boom lift. (Property KY FACE.)

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Image 5: Incident scene with overhead wires; sidewalk facing west. The yellow circle shows where the overhead power line contacted the worker during the incident. (Property KY FACE.)

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## WEATHER

The weather at the time of the incident was approximately 65.1 degrees Fahrenheit, no precipitation, wind at 8.1 mpg, gusts at 11.4 mph from the southwest, and 0.05 inches of precipitation [Weather Underground, 2023]. The wind conditions were noted by emergency responders as being substantial; thus, they are considered to be a contributing factor.

## INVESTIGATION

Roof removal work had begun approximately one week prior to the fatal incident. At the time of the incident, the roofing company owner and another worker were working on the roof. The two workers involved in the incident were coming down from the roof in the lift, with the now-deceased roofing worker operating the lift. The lift had been positioned on the northern side of the building on a sidewalk adjacent to the building. A very narrow area of clearance, estimated at only 8 feet, was available between the office building and the overhead wires to raise and lower the lift.

At approximately 12:11 p.m., the two employees were at a distance estimated to be 20 feet from the ground when they began to ride the lift down. Neither worker was wearing personal protective equipment (e.g., Class E hard hats or other insulative equipment). During the descent, the lift moved toward the power lines such that one worker's head contacted one of the power lines. Upon contact, the worker was exposed to approximately 70,000 volts of electrical current. As a result, he experienced muscular paralysis and could not move himself away from the electrical line. His coworker attempted to remove the deceased employee from the electrical path but experienced shocks each time he touched him. His coworker was eventually able to remove the worker from the electrical path by kicking his feet out from under him.

Emergency services were contacted by the owner of the company, who was working on the roof and witnessed the incident. Local police arrived at the scene to find both workers in the elevated boom basket. The electrocuted employee, who was no longer energized, was slumped on the railing of the lift basket and nonresponsive. Police advised the younger worker to remain still while the electrical utility provider was contacted to de-energize the lines. Power was shut off shortly thereafter and the lift brought down by emergency responders using the lift's ground-level controls.

Image 6 shows the location of the lift and the deceased employee at the time of the incident. The deceased employee suffered 4th degree burns and a fatal shock. According to the EMS report, medical responders did not attempt resuscitation as he was clearly deceased. The other employee in the boom basket suffered second degree electrical burns to his left elbow, wrist, and hand.

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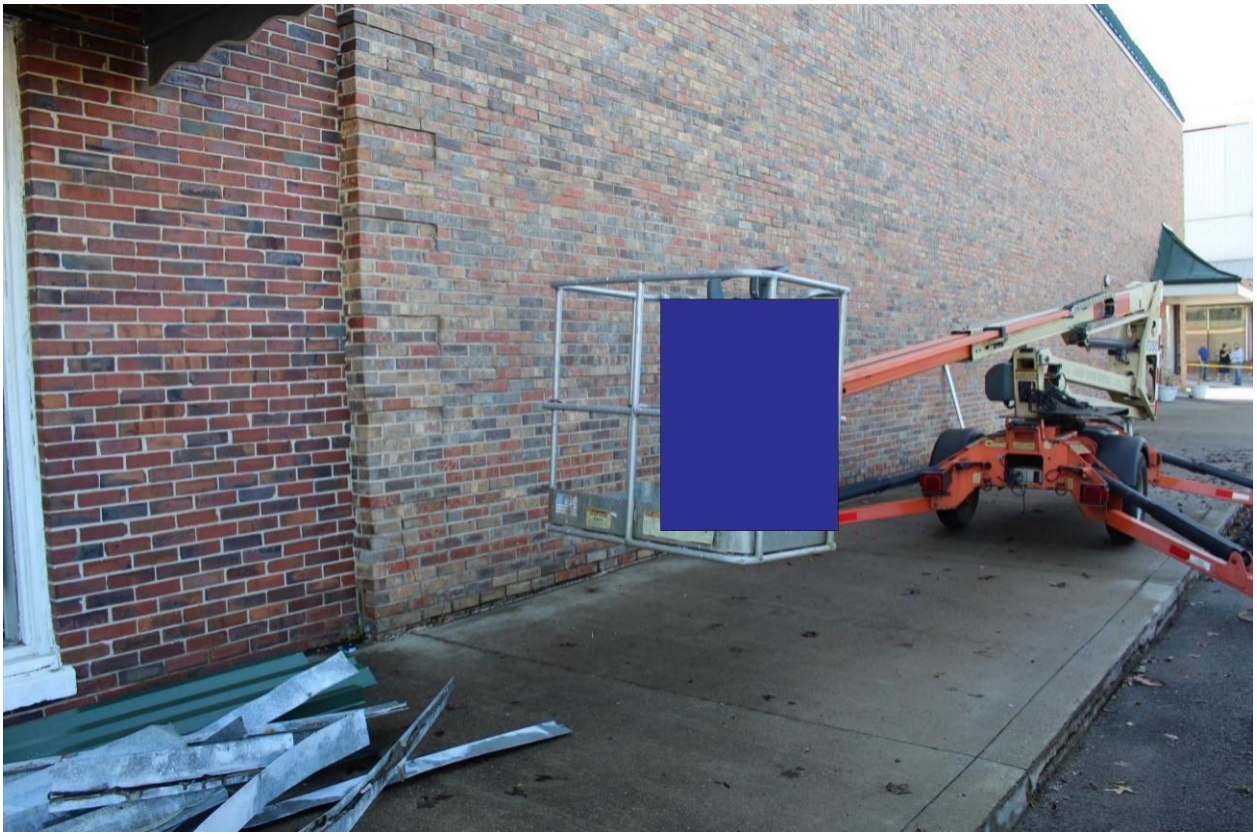

Image 6: Boom lift position; sidewalk facing west (Property KY FACE)

## CAUSE OF DEATH

According to the coroner, the cause of death was electrocution.

## CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. Kentucky FACE has identified the following unrecognized hazards as key contributing factors in this incident:

- *Overhead electrical hazards in work area*
- *Windy conditions*
- *Exposure to energized lines*
- *Lack of appropriate personal protective equipment*
- *Need for electrical hazards training.*

## RECOMMENDATIONS/DISCUSSION

***Recommendation #1: Employers should implement a job hazard analysis (JHA) process to determine appropriate measures to safeguard employees from the hazards associated with overhead electrical lines.***

Discussion:

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Employers should conduct JHAs to identify hazards and develop specific prevention measures. A JHA focuses on the relationship between the worker, the task, the tools, and the work environment so that the hazards associated with each component and each step of the task can be identified before they cause an issue. It is critical that a JHA is conducted on new jobs, complex jobs, jobs with high injury or illness rates, jobs with the potential to cause severe or disabling injuries or illness, or jobs in which one simple human error could lead to a severe accident or injury. Based on the hazards identified through a JHA, the employer can then develop and implement appropriate control and prevention measures and standard safe work procedures for workers to follow.

The JHA focuses on the relationship between the worker, the task, the tools, and the work environment [OSHA, 2002]. Essential questions used to discover hazards during the JHA include:

- What can go wrong?
- What are the consequences?
- How could it occur?
- What contributing factors might exist?

The JHA is considered a process because once the JHA is completed, employers should provide worker training in hazard recognition, avoidance of unsafe and hazardous conditions, and adherence to standard safe working procedures. Employee training should emphasize that under no circumstances should a worker bypass the protection afforded by safety apparatus, such as guards or lockout devices, and that a worker should never risk physical harm to accomplish tasks. Also, the JHA should be reviewed periodically and revised as needed to ensure that hazards are controlled adequately.

In this incident, a JHA could have helped the employer identify the hazards of working near energized overhead power lines and in turn found a safer place for the lift to be placed (away from lines) and provided employees with the knowledge of the hazard.

***Recommendation #2: Employers should follow applicable OSHA regulations and use safe work practices to ensure that employees and equipment are located at a safe distance from overhead power lines.***

Discussion: The location of the boom lift involved in this fatal incident provided insufficient clearance from the energized overhead power lines. Employers whose employees use lifts around live overhead electrical wires that are not protected by protective covers should, at a minimum, comply with OSHA's [n.d.] standard 29 CR 1926.451, which sets forth a requirement to maintain a minimum distance of 10 feet from lines carrying less than 50 kilovolts. In this case, the parking lot to the rear of the building may have provided adequate clearance from the overhead power lines. The orange star in image 7 indicates the rear parking lot area where the boom lift could have been located.

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Image 7: Incident scene; aerial view. The orange star indicates the rear parking lot. (Google Earth Pro, 2023.)

***Recommendation #3: Employers should contact electric utility companies to install insulative covers on power lines when safe distances for employees and appropriate equipment cannot be provided.***

Discussion: Employers should have insulative covers installed when employees and equipment cannot maintain safe working distances from power lines to prevent accidental contact. NIOSH [2022] has noted that employers should check with the local electric utility company before the start of work to request the installation of insulative covers on powerlines if workers are unable to maintain safe distances from power lines. Examples of insulating covers are shown in images 8 and 9.

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Image 8. Salisbury Insulating Blanket. (Zoro, 2023.)

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Image 9. Cover-up Equipment (Chance, 2020.)

***Recommendation #4: Employers should ensure that employees are provided and use personal protective equipment (PPE) appropriate for electrical hazards they may face while at work.***

Discussion: In this fatal incident, the now-deceased employee contacted the overhead line with his head. Employees who have the potential for exposure to electricity should use Class E head protection, which conforms to the most current American National Standards Institute (ANSI) and International Safety Equipment Association (ISEA) standards outlined under *ANSI/ISEA Z89.1* [2023]. Other forms of insulative PPE may be appropriate, depending on the nature of the work and risk of exposure to electricity, and may include PPE for the face, hands, arms, and other types. Employees should be provided with training on the PPE, such as how to don, doff, use it as well as the limitations and care and maintenance of the PPE.

***Recommendation #5: Employers should ensure that employees are provided with a comprehensive safety training program that addresses the electrical hazards they might face while at work.***

Discussion:
Employers should develop, implement, and enforce a comprehensive written safety program for all workers. The safety program should include training for all workers in items such as overhead power line electrocution hazard recognition and safe work procedures. Training should also include lift operator power line hazard recognition, visual limitations, and perception issues as well as emergency procedures should power line contact occur.

It is unknown if training was provided to the employees involved in this fatal incident. However, the incident might have been avoided if adequate training had been provided. Training should include the recognition of hazards and the use of appropriate methods to control exposure to electricity. Training should be provided in the language(s) and at literacy level(s) that workers will understand. Employers can utilize resources such as NIOSH's *Worker Safety Matters When Working Near Power Lines* (2022) and OSHA's *Construction eTool: Electrical Incidents* (n.d.) to supplement training for their employees.

In developing training programs, employers should follow best practices, such as those provided by OSHA in *Resource for Development and Delivery of Training to Workers* [2021]. This publication carries guidance tailored to occupational safety training programs such as:

- Characteristics of sound training programs
- Best practices for training adults
- Principles of adult education
- Program design, delivery, and evaluation elements

Employers should follow a continuous improvement approach and periodically review their safety programs to identify programmatic shortcomings and implement corrective measures.

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## INVESTIGATOR INFORMATION

This investigation was conducted and report prepared by Dr. David Stumbo, OHST, CSP.

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