

SUMMARY

A 21-year-old male electrician (the victim) died of injuries received after falling 60 feet through a roof. The victim and his apprentice co-worker were dispatched to a locomotive repair building to repair electrical equipment located on the roof of the building. The two workers arrived at the job site about 1 p.m. and proceeded to the roof of the locomotive repair building. Once on the roof, the victim reportedly told the co-worker to follow in his foot steps since there were numerous, barely distinguishable fiberglass roof panels located on the roof top. The victim walked down the slightly pitched roof to the ventilator where electrical work was to be performed. The victim then walked around to the opposite side of the ventilator and unintentionally stepped on a corrugated fiberglass roof panel. The roof panel broke, causing the victim to fall through the roof and strike the concrete floor, 60 feet below. Two other employees, who were installing lighting fixtures inside the building, saw the victim fall through the air and strike the concrete floor. One worker rushed to the victim's aid and checked for vital signs while the other worker called 911 for assistance. Cardiopulmonary resuscitation was performed by the worker until paramedics arrived. A medical evacuation helicopter arrived about 15 minutes after being called and transported the critically injured victim to a local hospital. The victim was pronounced brain dead about 43 hours after the incident occurred. NIOSH investigators concluded that, to prevent similar occurrences, employers should:

- *evaluate their current safety program and incorporate specific training procedures emphasizing the importance of recognizing and avoiding hazards in the workplace. These procedures should include, but not be limited to, conducting hazard evaluations before initiating work at a job site and implementing appropriate controls*
- *owners of buildings should evaluate and identify areas that may be hazardous to any personnel, including contractors, and prohibit access to these areas, or eliminate the hazard prior to access.*

INTRODUCTION

On October 25, 1995, a 21-year-old male electrician (the victim) died after falling 60 feet through a roof. On October 30, 1995, officials of the Virginia Occupational Safety and Health Administration (VOSH) notified the Division of Safety Research (DSR) of this fatality and requested technical assistance. On December 14, 1995, a safety specialist from DSR investigated the incident and reviewed the circumstances with the company owner, a manager at the locomotive repair building, and the VOSH compliance officer assigned to the case. Photographs of the incident site were obtained and the medical examiners report was reviewed.

The employer in this incident was an electrical contractor that had been in operation for 222 years and employed 12 workers, 4 of whom were electricians. The employer had a written general safety program and on-job-training was provided to all employees. Electricians were responsible for the enforcement of the safety program and they also conducted tail-gate safety meetings. The victim worked for the company for 5 years and 2 months prior to the incident. This was the first fatality the company had experienced.

INVESTIGATION

One of the employer's current contracts was to perform various electrical installation and repair

services at a locomotive repair building. The contract had been ongoing for several years. The locomotive repair building was about 700-feet long by 170-feet wide by 80-feet high and was constructed in 1969. The roofing materials consisted mainly of corrugated metal panels with corrugated fiberglass panels interspersed into the roof at irregular intervals. Metal panels have structural integrity to support weight, whereas fiberglass panels do not. The corrugated fiberglass roof panels comprised at least 10 percent of all the roof panels and were faded/bleached from exposure to the weather thus looked similar to the metal panels. Additionally, 24 ventilators equipped with electric motors were located on the roof in a single line at the north end of the building.

On the day of the incident, the victim and his apprentice co-worker were assigned a job at a different location from where the incident occurred. Early in the afternoon the victim and co-worker were dispatched to the locomotive repair building to repair damages to an electric motor and wiring at one of the ventilators. The motor and wiring had been damaged in a fire the previous week. The two workers arrived at the building about 1 p.m. and climbed a fixed ladder on the outside of the building to the roof top. Once on the roof, the victim reportedly told the co-worker to follow in his footsteps, since there were numerous fiberglass roof panels all over the roof top. The two workers proceeded down the roof (pitch about 4:12) toward the damaged ventilator motor. Once at the ventilator the victim proceeded to the opposite side of the ventilator while the co-worker remained stationary. As the victim stepped around the ventilator and out of sight of the co-worker, he unintentionally stepped on a corrugated fiberglass roof panel ([Figure](#)). The panel broke and the victim fell through the roof to a concrete floor, 60 feet below. Two other company employees, who were installing lighting fixtures inside the building, saw the victim fall through the air and strike the concrete floor. One worker rushed to the victim's aid and checked for vital signs while the other worker called 911 for assistance. Cardiopulmonary resuscitation was performed by one worker until paramedics arrived about 10 minutes after being called. A medical evacuation helicopter was summoned and arrived about 15 minutes later and transported the critically injured victim to a local hospital. The victim was pronounced brain dead about 43 hours after the incident occurred.

CAUSE OF DEATH

The medical examiner's report listed the cause of death as blunt-force head trauma.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should evaluate their current safety program and incorporate specific training procedures emphasizing the importance of recognizing and avoiding hazards in the workplace. These procedures should include, but not be limited to, conducting hazard evaluations before initiating work at a job site, and implementing appropriate controls.

Discussion: The existence of a safety program is only the first step in obtaining a viable safety record. In addition to enforcement, safety programs should be evaluated and training procedures incorporated which emphasize the importance of recognizing and avoiding hazards in the workplace, following established safe work procedures, and wearing appropriate personal protective equipment. Before starting any work at a job site, the employer or employer's representative should identify, by observation and by collaboration with the job site owner, any potential or existing hazards. These hazards should be reviewed with the work crew, and methods to control the hazards and how to perform the work safely should be discussed. In this instance, the numerous irregularly spaced weathered corrugated-fiberglass roof panels could have been identified as a potential hazard because of their minimum load rating, proximity to the working area, and the visual similarity to the corrugated

metal roof panels. The hazard of the corrugated fiberglass roof panels, although recognized by the victim, was not dealt with in an effective manner. Workers could have been instructed not to access the roof area until arrangements for safe access could be provided. Since the ventilators were all located in a single line across one end of the building, a walkway could have been constructed over the panels up to and around the ventilators for maintenance and repair. Alternatively, the corrugated fiberglass roof panels to and around the access area could have been replaced with metal corrugated panels, thus providing a stable walking/working surface, or a designated walkway marked with paint and protected by stanchions and handrails could have been installed.

Recommendation #2: Owners of buildings should evaluate and identify areas (e.g., roofs) that may be hazardous to any personnel, including contractors, and prohibit access to these areas, or eliminate the hazard prior to access.

Discussion: In 1969 metal and fiberglass corrugated roof panels were used in the construction of the roof of the locomotive repair building. Additionally, 26 ventilators equipped with electrical motors were installed on the roof, on one end of the building, to ventilate exhaust fumes from the locomotives. The fiberglass panels accounted for about 10% of all panels and were irregularly spaced among the metal panels. Also, the fiberglass panels were faded, due to weathering, and resembled the metal panels in appearance. These conditions should have been evaluated and appropriate action to mitigate the hazards should have been taken before access to the roof area was permitted.



