



The National Institute for Occupational Safety and Health (NIOSH)

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# Rofer Helper Dies Following a 22-foot Fall Through a Roof Opening in Virginia

FACE 9203

## SUMMARY

At the time of the incident, a crew of five workers, including a 21-year-old roofer helper (victim), were performing various tasks on a newly constructed gymnasium roof. The victim finished applying weather insulating strips on top of some corrugated metal roof panels, and asked the foreman what had to be done in the area around the plywood. The foreman replied, "Wait until I finish cutting around this unit and I'll show you, because there is a hole there." The victim walked to the area where a 4-foot-wide by 8-foot-long sheet of plywood was covering the roof opening. The incident was unwitnessed; investigators believe the victim either intentionally moved the plywood, lost his balance and fell, or unintentionally displaced the plywood and stepped or tripped into a 292-inch by 35-inch roof opening. The victim fell 22 feet onto the concrete floor, striking his head. The victim died approximately 17 hours later at the local hospital. NIOSH investigators concluded that, in order to prevent future similar occurrences, employers should:

- **implement 29 CFR 1926.500 (b) and 1926.500 (f)(5)(ii), which require that wherever there is danger of falling through a floor opening, it shall be guarded by a standard railing and toe-boards, or cover capable of supporting the maximum intended load and so installed as to prevent accidental displacement**
- **design, develop, and implement a verbal and/or written examination to reinforce and evaluate the effectiveness of the safety training program.**

## INTRODUCTION

On October 2, 1991, a 21-year-old roofer helper died after falling 22 feet through a roof opening. On October 18, 1991, officials of the Virginia Occupational Safety and Health Administration (VAOSHA) notified the Division of Safety Research (DSR) of the fatality, and requested technical assistance. On November 25, 1991, a DSR safety specialist traveled to the incident site to conduct an investigation. The incident was reviewed with a representative from the company and the VAOSHA compliance officer assigned to the case. A schematic of the incident site and a copy of the medical examiner's report were obtained.

The employer in this incident was a roofing and sheet metal contractor who had been in operation for 81 years. The contractor employed about 80 workers, including 20 roofer helpers. The employer had a written safety policy, a comprehensive written safety program, and a full-time designated safety officer. The employer provided on-the-job training, and each new employee viewed a series of three safety-oriented video tapes. The employer offered yearly

cardiopulmonary resuscitation certification and first aid training on a voluntary basis. Additionally, the jobsite foreman conducted toolbox safety meetings, and the safety officer conducted unscheduled safety inspections at each jobsite. The victim had worked for the employer for only 3 weeks prior to the incident.

## INVESTIGATION

A roofing and sheet metal contractor had been subcontracted to provide and install roofing materials on an addition to the gymnasium at a middle school. Work had been intermittent for about 1 year prior to the incident. At the time of the incident, corrugated roofing panels had been secured to the roof deck, and weather insulating strips were being applied over the panels. The roof area was approximately 114 feet long by 96 feet wide, and contained one roof hatch opening 292-inches wide by 35-inches long. The opening was covered by a 4-foot-wide by 8-foot-long sheet of e-inch-thick plywood. The roof had a 1:48 pitch (i.e., the roof rose 1 foot for every 48 feet) (Figure).

On the day of the incident, five workers—a foreman, two roofers, and two roofer helpers—were placing insulating strips over the panels on the roof deck. About 8:25 a.m., the foreman was working on the roof deck approximately 20 to 25 feet away from the roof opening. The victim, after finishing a task, approached the foreman and asked what was to be done at the plywood area. The foreman replied “wait until I finish cutting around this unit and I’ll show you, because there is a hole there.” The victim walked away in the direction of the plywood as the foreman continued his task.

Although no one saw the victim fall, evidence at the site suggests that the victim had either intentionally removed the plywood from the opening, lost his balance and fell, or unintentionally displaced the plywood and stepped or tripped into the opening. The victim fell 22 feet to the concrete floor, striking his face and head.

The foreman, upon hearing a noise, turned around and saw the victim falling through the opening. The foreman yelled to the other crew members and they all descended from the roof to aid the victim. The victim was conscious, but bleeding from the ears, nose, and mouth. The emergency medical service (EMS) was called and arrived about 10 minutes later. The victim was transported to the local hospital where he died 17 hours later.

## CAUSE OF DEATH

The medical examiner’s report listed the cause of death as a fractured skull and cerebral edema.

## RECOMMENDATIONS/DISCUSSION

**Recommendation #1: Employers should implement 29 CFR 1926.500 (b) and 1926.500 (f)(5)(ii), which require that floor openings be guarded by a standard railing and toe-boards, or a cover capable of supporting the maximum intended load, and so installed as to prevent accidental displacement.<sup>(1)</sup>**

Discussion: Although the one remaining roof opening was covered with a 4-foot-wide by 8-foot-long by e-inch-thick piece of plywood, the plywood was not secured to prevent inadvertent displacement. Since the incident was unwitnessed, a determination could not be made as to whether the victim intentionally or unintentionally moved the plywood. Securing the plywood properly would have eliminated any unintentional movement. Employers should ensure that all roof openings which have the potential of becoming hazards during construction, be safeguarded in one of the following manners: The roof opening should be secured with a standard railing and toe-boards on all exposed sides, or with a cover capable of supporting a worker’s weight without danger of displacement.

**Recommendation #2: Employers should design, develop, and implement a verbal and/or written post-training examination to reinforce and evaluate the effectiveness of the safety training program.**

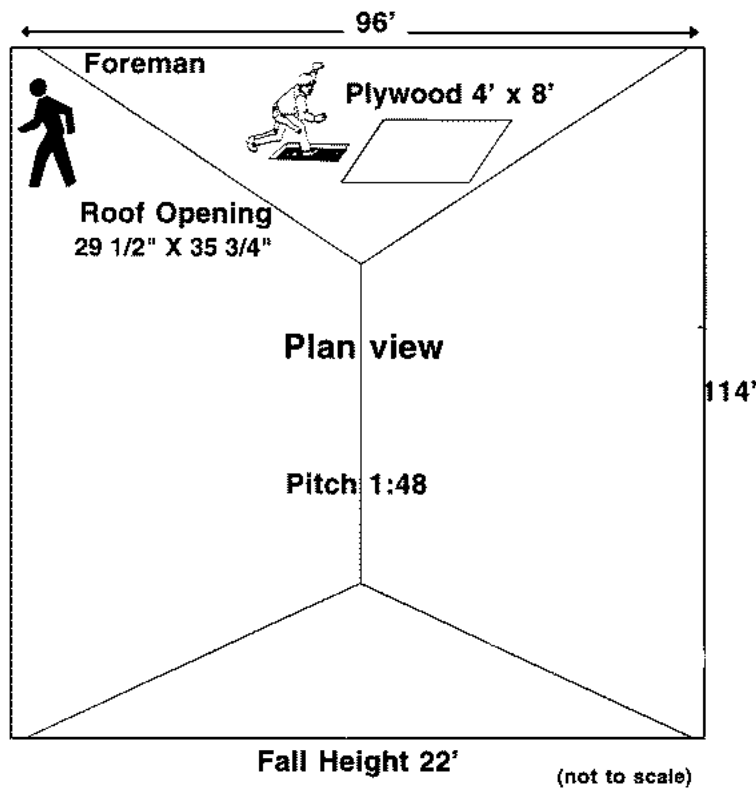
Discussion: Safety programs available at the time of this incident included the recognition and avoidance of fall hazards, and worker training which emphasized methods and materials for covering roof openings to prevent falls through openings.

Additionally, about 3 weeks prior to the incident, the victim viewed three video tapes which addressed recognition and avoidance of fall hazards. The incident occurred in spite of the safety program, which included the video tapes. Employers should design, develop, and implement a verbal and/or written post-training examination to reinforce and evaluate the effectiveness of the training program immediately after initial training and at regular intervals (e.g., monthly, quarterly, yearly, etc.) thereafter.

## REFERENCE

Office of the Federal Register: Code of Federal Regulations, Labor 29 Part 1926. p.190. July 1, 1990.

### Figure. Roof Opening (FACE 92-03)



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