



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces  
through safety and health research



# Sheet Metal Mechanic Dies After Falling 25 Feet Through Roofing Insulation – South Carolina

FACE 9519

## SUMMARY

A 41-year-old male sheet metal mechanic (the victim) died after stepping backward and falling 25 feet through a roof opening covered only with fiberglass insulation. The victim was a member of a five-man crew that was replacing the old metal roofing panels and insulation on a church roof. The crew would remove three 3-foot by 6-foot metal panels and the underlying insulation, then lay down new insulation and install a new 2-foot by 16-foot panel. The roofer would pull each panel back as the mechanics removed the screws anchoring the panels to the roof. On the second day at the site, the victim had just removed the final two screws on his side of a panel when he stood up and stepped backward. The victim stepped on exposed insulation, lost his balance, and fell between the roof joists to the hardwood church floor below. The foreman went to the parsonage to tell the preacher to call the emergency medical service (EMS), while the other crew members went to aid the victim. The victim was found unconscious, but breathing. The EMS arrived within 10 minutes and transported the victim to the hospital where he was pronounced dead 1 hour later. NIOSH investigators concluded that, to prevent similar incidents, employers should:

- **perform a hazard evaluation at each work site before any work is initiated**
- **ensure that fall-protection equipment is provided and utilized by employees whenever work is performed from an elevation where the potential for a fall exists**
- **train employees in the recognition of hazards, and methods to control such hazards, including the use of appropriate safety equipment.**

## INTRODUCTION

On July 20, 1995, a 41-year-old male sheet metal mechanic (the victim) died after falling 23 feet through roofing insulation and landing on a hardwood floor. On August 22, 1995, officials of the South Carolina Safety and Health Administration (SCOSHA) notified the Division of Safety Research (DSR) of this fatality, and requested technical assistance. On September 20, 1995, a DSR safety specialist conducted an investigation of the incident. The incident was reviewed with the employer, the SCOSHA compliance officer, and the county coroner. Photographs of the incident site taken immediately after the incident were viewed during the investigation.

The employer in this incident was a roofing contractor that had been in operation for 22 years and employed 12 workers. The employer had a written safety policy and safety program. General written safety rules were reviewed with all employees upon hire. Training was accomplished on the job. Tailgate safety meetings were conducted by the job foreman

when necessary. Safety meetings were held prior to the start of each job to discuss the safety hazards associated with that job. The victim had worked for the employer for 12 years and had 15 years prior experience. This was the first fatality experienced by the employer.

## INVESTIGATION

The employer had been contracted to replace the fiberglass insulation and corrugated metal roofing on an 80-foot-wide by 140-foot-long church roof with a 1:12 pitch. A five-man crew (general superintendent, foreman, roofer, and 2 sheet metal mechanics) was sent to the site to complete the task. The men were to remove a 36-inch width of metal roofing and insulation at a time and replace them with new panels and insulation. This required removing three, 3-foot-wide by 6-foot-long panels and replacing them with the new 20-inch-wide by 16-foot-long panels.

To remove the panels, the roofer would hold the end of the old panels up and pull them back as the sheet metal mechanics removed the screws that attached the panels to the roof joists. Because the men were installing panels smaller in width than those being replaced, open space with exposed insulation existed around the work area.

At 3:00 p.m. on the second day at the site, work had progressed to a point where the men had completed work on an area measuring approximately 25 feet by 115 feet. As the victim finished removing the screws holding the next piece of old roofing, he stood up and stepped backward into an opening approximately 3 feet by 6 feet that was covered only with fiberglass insulation, and fell 23 feet to the hardwood floor inside the church, striking his head. The foreman went to the church parsonage to have the preacher summon the emergency medical service (EMS) while the rest of the crew assisted the victim. The victim was found unconscious but breathing. He was transported to the hospital by the EMS, where he died 1 hour later.

## CAUSE OF DEATH

The attending physician listed the cause of death as skull fracture.

## RECOMMENDATIONS/DISCUSSION

### **Recommendation #1: Employers should perform a hazard evaluation at each work site before any work is initiated.**

Discussion: The employer should identify all potential hazards at a work site. Job hazard analysis consists of analyzing the sequential steps in routine operations to identify potential hazards, and attempting to develop procedures or other control measures which effectively eliminate or reduce the hazards. Each specific job involves hazards particular to that job or working environment. Therefore, employers should conduct a jobsite survey, identify all hazards, and implement appropriate control measures prior to starting a job. A jobsite and/or hazard analysis survey in this instance would have determined that there would be exposed roof openings and a need for some type of fall protection. Both job hazard analysis and pre-job survey techniques can be effectively used to train workers in hazard identification and appropriate control measures.

### **Recommendation #2: Employers need to ensure that fall-protection equipment is provided and utilized whenever work is performed from an elevation where the potential for a fall exists.**

Discussion: The use of a “traditional” safety belt/lanyard combination, as required by 29 CFR 1926.104(d), is sometimes not practical during roofing operations, particularly where worker mobility is required. Use of a retracting lanyard equipped with a locking device and attached to a lifeline, can provide sufficient mobility in some cases. Alternative forms of worker protection, such as safety nets (as specified in 29 CFR 1926.105) or a catch platform, could also be considered.

### **Recommendation #3: Employers should train employees in the recognition of hazards, and methods to control such hazards, including the use of appropriate safety equipment.**

Discussion: Employers are required by 29 CFR 1926.21 (b)(2) to instruct each employee in the recognition and avoidance of unsafe conditions, and to control or eliminate any hazards or other exposures to illness or injury. Employers need to provide training that ensures that employees understand existing hazards and how to properly use personal protective equipment to protect themselves.

## REFERENCES

29 CFR 1926.104 (d) Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register

29 CFR 1926.105 Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register

29 CFR 1926.21 (b)(2) Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register.

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