



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research



Sheet Metal Worker Dies After Falling 35 Feet to a Concrete Floor

FACE 9107

SUMMARY

A 54-year-old male sheet metal installer (victim) died after falling 35 feet while installing roof rake angle iron on an outer roof edge of a processing plant under construction. The rake angle sets the wall line at the top of a building and provides anchor points for the structure's exterior panels. On the day of the incident the victim and a co-worker were installing 10-foot sections of rake angle iron to the outer roof edge of the structure. The rake angle iron was being attached to the outer edge of 5-inch-wide I-beams which supported the steel roof joists. The perpendicular I-beams were bolted to 35-foot-high, 8-inch steel "H"-shaped support columns. The victim was carrying a piece of rake angle iron across the I-beam when a co-worker saw him lose his balance and fall 35 feet to a concrete floor. NIOSH investigators concluded that, in order to prevent future similar occurrences, employers should:

- **comply with existing OSHA regulations regarding fall protection for workers exposed to fall hazards**
- **evaluate alternative methods of installing rake angle**
- **develop and implement a safety program designed to help workers recognize, understand, and control hazards.**

INTRODUCTION

On November 12, 1990, a 54-year-old male sheet metal worker died after falling 35 feet onto a concrete floor from a steel I-beam. On November 14, 1990, officials of the South Carolina Occupational Safety and Health Administration notified the Division of Safety Research (DSR) of the death, and requested technical assistance. On December 6, 1990, two safety specialists traveled to the incident site to conduct an investigation. The incident was reviewed with the jobsite superintendent and the OSHA compliance officer. Photographs of the incident site, the police and coroner's report, and the death certificate were obtained during the investigation.

The employer is a general contractor that specializes in constructing industrial complexes and commercial and multi-family dwellings. The employer has been in operation for 15 years and employs 254 workers, including 12 sheet metal workers. The employer has no written safety policy or safety program. Safety materials supplied by insurance companies have been collected over the years and are used during weekly "tailgate" safety meetings conducted by the jobsite superintendent. Worker training is conducted on the job.

INVESTIGATION

The company had been contracted to construct a 74,000-square-foot mineral processing plant. Company employees had been working at the site for 7 months. On the day of the incident, the victim and a co-worker were attaching 10-foot-long sections of rake angle iron to the outer roof edge of the structure. The rake angle iron sets the wall line at the top of the structure and provides anchor points for the structure's exterior siding panels. The rake angle iron was being attached to the outer side of 5-inch-wide I-beams. The I-beams were attached to the top of 35-foot-high, 8-inch steel "H"-shaped support columns ([Figure](#)). The bolts attaching the I-beams to the support columns protruded 2 inches above the top of the beam.

The victim was walking along the 5-inch I-beam flange carrying a piece of angle iron. A co-worker was walking behind him. Both men were wearing safety belts with lanyards, but neither man was tied off to a lifeline. No lifelines or catenary lines were present on the roof. The men would tie off to the 4-inch steel purlins (ceiling joists) only when sitting and making connections. The co-worker saw the victim suddenly lose his balance and fall to the concrete floor below, landing on his face.

The job superintendent, who also saw the victim fall, immediately summoned the emergency medical service (EMS) by telephone from the company trailer. Co-workers could not detect any vital signs. They did not initiate cardiopulmonary resuscitation (CPR) because the victim's face was crushed. Upon arrival, EMS personnel called the medical examiner, who pronounced the victim dead at the scene.

The co-worker stated that the victim had been in an area where bolts were protruding through the I-beam, when he lost his balance. The co-worker was not certain whether the victim tripped over the bolts or lost his balance for some other reason.

CAUSE OF DEATH

The county coroner listed head trauma as the cause of death.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should comply with existing OSHA regulations regarding fall protection for workers.

Discussion: 29 CFR 1926.105 (a) states, "Safety nets shall be provided when workplaces are more than 25 feet above the ground or water surface, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts is impractical." Both men were wearing safety belts and lanyards. However, there were no lifelines or catenary lines present on the roof to use as tie-off points.

Recommendation #2: Employers should evaluate alternative construction methods for installing rake angle components.

Discussion: Lifelines were not present on the roof because the workers only tied off to the steel purlins when they were sitting and making connections. No fall protection was afforded the workers while they were walking across the beams and purlins. Alternative methods of installation that lessen worker exposure to falls should be explored. At the time of the NIOSH investigation, a scissors lift was present at the jobsite. One possible alternative work procedure might be to install the rake iron while working from the scissors lift. This method may have reduced the exposure to a fall hazard.

Recommendation #3: Employers should develop and implement a safety program designed to help workers recognize, understand, and control hazards.

Discussion: OSHA Standard 29 CFR 1926.21(b)(2) states, "the employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury." Companies should evaluate the tasks performed by workers, identify potential hazards, develop and implement a safety program addressing these hazards, and provide worker training in safe work procedures.

REFERENCES

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



Figure.

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