Project Engineer Dies in Fall from Roof in Massachusetts

SUMMARY

On September 17, 1997, a 32 year old male project engineer was fatally injured when he fell 29 feet from a roof while measuring the roof for an insulation cost estimate. The victim was walking backwards while measuring when he fell over the edge of the roof. A maintenance person from the building who had accompanied the victim and two co-workers to the roof immediately ran downstairs and called 911 from the office and proceeded to the victim to offer assistance. Emergency medical services arrived immediately. The victim was transported to a nearby local hospital where he was pronounced dead on arrival. The MA FACE Director concluded that to prevent similar occurrences in the future:

Employers should:

- **employ alternative controls for fall hazards when personal fall arrest systems are not required nor appropriate.**
- **develop, implement, and enforce a comprehensive safety program that includes, but is not limited to, training all employees in fall hazard recognition.**

Building owners should:

- **consider the installation of guardrails at the perimeter of flat roofs wherever possible.**

INTRODUCTION

On September 22, 1997, the MA FACE Program was informed through its Occupational Fatality Hotline by a city clerk that on September 17, a 32 year old male project engineer was fatally injured when he fell from the roof of an apartment building. An investigation was immediately initiated. On September 26, the MA FACE Project Director traveled to the site where the property owner, the maintenance person and the employer's representative were interviewed. Multiple photographs, death certificate, corporate information, OSHA information and interviews were obtained during the course of the investigation.

The employer was an energy conservation /engineering services company and was in business approximately 113 years at the time of the incident. Company-wide, they employed approximately 53,000 persons, 2 of which were working at the site at the time of the incident. There was no person assigned safety responsibilities at the site. The company had extensive written safety procedures, but it is unknown if the employees on site had received safety training.

INVESTIGATION

On September 17, 1997, at approximately 9:30 a.m., three engineers arrived at a publicly-owned apartment complex to examine and measure the buildings in preparation for writing a proposal to the city for the provision of energy conservation engineering services. Two of the engineers worked for the general contractor (the employer) and one worked for a lighting subcontractor. The municipal Request for Proposals described the work to be bid as comprehensive energy management services, including capital improvements and maintenance at six separate public housing developments.

The three engineers were accompanied by a maintenance person who was employed by the housing development. His job was to take the group to the various buildings as they requested. The weather was sunny, hot and clear, and not a factor in the incident. The group had examined three buildings before entering the building from which the victim fell. It was approximately 11 a.m. when they started on this building. The roof was accessed by stairs to a small penthouse. The door of the penthouse would lock from the outside, so a clipboard was used to keep the door ajar. Each building was a modified L-shape, and the roofs of several buildings were attached. Some areas of the roof were narrow with less than six feet of width for walking. There was a short stack pipe on the roof of each building, but no ventilation or other equipment were located on the roof. The roof was covered with standard gravel over tar and was entirely flat to the edges.

Two of the engineers were measuring the roof with a tape measure. The third engineer was writing down the measurements. They were working quickly and had been on the roof only 5 to 10 minutes. As they were about to leave, they noticed that they had not measured one section. While the other two engineers and the maintenance person waited by the door, the victim, carrying a flashlight, pulled out the tape measure while quickly walking backwards from the door. Apparently not aware of how close the edge of the roof was, he walked over the edge and fell. The distance from the penthouse door to the edge of the roof was approximately 38 feet. The victim fell approximately 29 feet to the sidewalk below. Emergency medical services were called and arrived on the scene. The victim was transported to a nearby local hospital where he was pronounced dead on arrival.

CAUSE OF DEATH

The medical examiner listed the cause of death as blunt head and chest trauma.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should employ alternative controls for fall hazards when personal fall arrest systems are not required nor appropriate.

Discussion: Although a fall protection system is not be required by law (29 CFR 1926.500) when performing site evaluations for bids, it may still be necessary to employ controls for fall hazards. The engineers working on the roof in this incident were exposed to a fall hazard when it was necessary to measure the size of the roof. The employer's safety plan should provide guidance for these situations above and beyond OSHA regulations.

One option for fall hazard control that could have been employed is the use of a "safety monitoring system" described in OSHA regulation 29 CFR 1926.502 (h). This is a method of work organization where one person, a safety monitor, is placed in charge of assuring that everyone is aware of where they are on the roof. This strategy could be particularly useful in situations where people will be exposed to fall hazards for brief periods. Assigning one person to keep track of everyone and to remind people when they are close to the edge both creates an awareness of the hazard and established a method for control.

Recommendation #2: Employers should develop, implement, and enforce a comprehensive safety program that includes, but is not limited to, training all employees in fall hazard recognition.

Discussion: The company did have a comprehensive written safety program, including requirements for fall protection systems on construction sites. However, inspections of sites prior to the actual beginning of construction work were specifically excluded from requiring a fall protection plan. This gap in the safety program permitted engineers to be on sites for which they did not develop a hazard analysis nor plan for controlling hazards encountered. Before the start of any job, an analysis of the hazards present or anticipated should be developed. Field employees should be encouraged to perform such an analysis by providing forms or checklists for their use. Anticipation of hazards will allow field employees to plan and bring with them any equipment (such as personal protective equipment, ladders, etc.) which might be necessary to control hazards.

Employee safety training should include professionals such as engineers. There may be a presumption that professional engineers are also skilled in identifying and controlling safety hazards. Although these employees can be expected to be personally responsible for their activities on a project, health and safety training reinforces the idea that no one is immune from job hazards and provides suggestions for the control of hazards in varying situations. One person from each team should be assigned safety responsibilities. This assignment serves as a reminder that safety hazards exist and that the employer takes these hazards seriously for all its employees.

Recommendation #3: Building owners should consider the installation of guardrails at the perimeter of flat roofs wherever possible.

Discussion: In this incident, four people accessed the roof in order to measure for insulation. This building was an older building and did not have heating, ventilation and air conditioning equipment on the roof. However, there was convenient access to the roof through the penthouse door. Although not required by building codes at this time, a guardrail around the perimeter of the roof would protect people on the roof from falling. Guardrails could be decorative in appearance, yet should be able to withstand at least 200 lbs. of horizontal force in order to be protective.

Many building do have equipment on the roof which must be accessed by maintenance and service personnel. Roofs have become the location of choice when this equipment is retrofit to older buildings. Since many of these service tasks are of short duration, the individual servicers are not likely to provide their own fall protection. Therefore, if building owners were to install permanent guardrails, all of these workers on the roof would be protected from falls.

REFERENCES

Code of Federal Regulations, Labor 29 Parts 1926.500 - 503, Subpart M Fall Protection

Ellis, J. Nigel, Introduction to Fall Protection, American Society of Safety Engineers, Des Plaines, IL, 1993.

To contact Massachusetts State FACE program personnel regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE web site Please contact In-house FACE program personnel regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.