Massachusetts Elevator Mechanic Dies in Twenty Foot Fall from a Fixed Ladder on the Side of a Building

Investigation #: 98-MA-030-01
Release Date: January 6, 1999

SUMMARY

On June 4, 1998, a 23 year old male mechanic helper died of injuries sustained in a twenty foot fall from a fixed ladder on the side of a warehouse. The victim was climbing the ladder to the roof when the incident occurred. There were no witnesses to exactly what occurred before the fall. An engineer who was climbing the ladder just below the victim immediately yelled for help and aided the victim until emergency medical services arrived. The victim was transported to a nearby baseball field where he was airlifted to an urban trauma center. He died the next day as a result of his injuries. The MA FACE Program concluded that to prevent similar future occurrences:

Employers should:
- **together with employees, develop and implement a site specific health and safety plan for each site under contract.**
- **develop, implement, and enforce a comprehensive safety program that includes, but is not limited to, worker training in fall hazard recognition.**

Building owners should:
- **consider building outside stairways, where space allows, to provide access to the roof.**

INTRODUCTION

On June 8, 1998, the MA FACE Program learned through a newspaper obituary that a 23 year old mechanic helper had died of injuries received in a fall on June 4th. An investigation was immediately initiated. On June 11, the MA FACE Program Director and associate traveled to the incident site where a co-worker was interviewed. On the next day, the engineer who was present at the time of the incident and who worked for a different employer was interviewed. The death certificate, witness interviews and multiple photographs were obtained during the course of the investigation. There was no police report of the incident.

The company was an elevator construction company in business for approximately four years at the time of the incident. It employed fifteen workers. At the time of the incident, there were two company employees on site including a journeyman mechanic and a helper (the victim). An engineer from another company was also present at the site. There was not a designated safety person on the incident site and there were no specific written company safety policies and

procedures in place. Both the mechanic and the helper had been trained through a union apprenticeship program. The victim had worked for the company for six to eight weeks at the time of his death.

INVESTIGATION

On June 4, 1998, two elevator constructors, a journeyman mechanic and a helper (the victim) from an elevator construction and maintenance company, were servicing elevators at a self-storage warehouse. Mechanics from the company normally serviced elevators at several locations each day. On this particular job, the company had received a complaint about the programming of one of the elevators at the warehouse. Because of the nature of the work involved, the crew expected to be at this site all day.

Around noon, the two elevator constructors met with an engineer from another company that was responsible for the software programming of the elevators. When the engineer arrived, the helper (the victim) assisted him by carrying a box with his laptop and testing equipment to the roof. The box was cardboard, approximately 12" by 18" by 10" tall and weighed about 15 lbs. There was no access to the roof from inside the building. The only access was up a fixed ladder in the loading dock area. The engineer had carried the box up the ladder to the roof in the past without difficulty. The mechanic had worked on this site many times over the last three plus years. He estimated that he had been up and down the ladder at least 50 times.

The investigation revealed that the ladder was in fair to poor condition with visible rust. It had been welded together from a number of ladders. This was evident because the space between rungs was shorter where you could see the rails had been welded. The distances between rungs were either 11" or 14". One rung was approximately at the roof surface (slightly higher). There were two rungs above that. The height of the ladder above the roof surface was no more than 3 feet. The rungs were 3/4" diameter steel bars. The rails were steel stock 2" deep by 1/2" wide, with a width of 15" between rails. The ladder was slightly tilted toward the building (angle $< 90^{o}$). The distance from the ladder to the building wall was 32" in order to clear the overhang. There were no gutters on the overhang. The roof was sloped down slightly from right to left as a climber would face it, and there was new flashing on the edge. At the step off area on the roof there was a rubber mat, approximately 3' wide and 2' deep. The roof was covered with single-ply roofing and stones.

The foot of the ladder rested on a grid of steel beams and deteriorating concrete. At the foot of the ladder was a rusted steel grating which extended back from the ladder approximately 3 feet to a steel tube guardrail. Beyond the guardrail was a 6 foot deep loading dock for customers.

At time of the incident, the victim was wearing high sided work boots and no gloves. The victim fell after placing the box he had carried on his shoulder onto the roof at the right hand side of the ladder. He may have taken one more step before falling. It is possible that he could have slipped when attempting to place his foot on the roof. If he lost his grip on the ladder, his momentum would have pushed him out from the ladder and the building. He fell head first onto the steel rail fence below, then onto the concrete surface of the loading dock.

The engineer was climbing the ladder right behind the victim. The engineer heard the victim place the box on the roof. After taking another step up, he saw the victim fall past him to the ground. He heard no other sound but the victim striking the rail. Seeing the victim fall, the engineer climbed down the ladder to assist him and called out for help. The journeyman mechanic had left the loading dock to enter the building to operate the elevator. He was waiting at the front door for someone to let him in when he heard shouting from roofers working across the street. They were yelling that someone had fallen. The mechanic ran back around the building and saw the victim on the ground and the engineer leaning over him. The mechanic then ran next door to the fire department to seek assistance.

The fire department responded immediately and requested an ambulance. The ambulance later transported the victim to a nearby baseball field where he was airlifted to an urban trauma center. He died the next day as a result of head injuries.

CAUSE OF DEATH

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

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers, together with employees, should develop and implement a site specific health and safety plan for each site under contract.

Discussion: Service contract companies are in a unique situation for health and safety planning. Work may be performed on several sites every day and a site may not be revisited for several weeks or months. Therefore, it is difficult for field personnel to remain aware of and prepared for the hazards on each site. A site specific health and safety plan should be developed for each site for which the company has a contract. The employer, working together with the employees familiar with the site, should write a plan which would include an analysis of the hazards present or anticipated. Anticipation of hazards will allow field employees to plan and bring with them any equipment, such as personal protective equipment, ladders, hoists or other devices which might be necessary to control hazards. These hazards and their associated controls should be documented. Field employees should be encouraged to adhere to these plans by providing forms or checklists for their use.

A necessary part of any health and safety plan is the method by which hazards will be abated or controlled. Employees should be encouraged to report all site hazards to the employer. There should be a system in place where the employer will contact the customer and advise them of the hazard. The employer has a responsibility to provide a safe and healthy workplace. Therefore, the plan should include a method, possibly specified in the contract with the customer, for controlling work site hazards.

In this case, such a plan would include an analysis of the fall hazards inherent in working at heights and the use of ladders. In writing such a plan with the employees who work on the site, the employer would have been made aware of the inadequacy of the fixed ladder access to the roof. It then might have been possible to address the situation with the customer.

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

Discussion: The company did not have a comprehensive safety program, nor provide safety training. Employers should develop, implement and enforce a comprehensive safety program that includes, at a minimum, routine job site hazard surveys (as outlined in Recommendation #1), and worker training in the recognition and avoidance of fall hazards. Employers should also appoint an individual with safety knowledge and the authorization to take corrective measures to eliminate hazards to be the designated safety officer, or competent person, on site.

Ladders are probably the most commonly used device in building construction/repair, yet are also the most hazardous. Training should be provided for all workers who use ladders in the following topics:

- the nature of the fall hazards in the work area;
- correct procedures for erecting, maintaining and disassembling the fall protection systems to be used, if any;
- proper construction, use, placement and care in handling of all ladders - including how to identify deficient ladders and instructions not to use them;
- maximum intended load-carrying capabilities of the ladders being used;
- applicable OSHA and other standards regarding the safe construction and use of ladders.

In this case, worker training in fall hazard recognition would include the proper use of fixed ladders and the identification of defective or unsafe ladders. When climbing ladders, three point contact should be maintained at all times. This means that tools and equipment should not be carried up the ladder. Another means must be devised for this purpose. Ropes are often used to hoist tools and equipment up to the roof. Carrying the box up the ladder in this case may have contributed to the fall by causing the victim to be unstable during and after placing the box on the roof. The workers also may have identified the inconsistent spacing of ladder rungs as a fall hazard.

Recommendation #3: Building owners should consider building outside stairways, where space allows, to provide access to the roof.

Discussion: As building systems become more sophisticated, more equipment is placed on roofs and access to roofs is more frequent by service contractors, maintenance and others. If there is no access to the roof through the inside of the building, owners should consider stairways rather than ladders to provide access to the roof. This would more easily enable service contractors to carry materials and tools up to the roof.. It would also provide a stable structure to attach a portable hoist for heavier materials.

In this situation, the loading dock area had undergone a major renovation to provide better access for customers using self-storage. Building an outdoor stairway to the roof might have been a part of that renovation. Access to the stairway could have been locked if security was an issue.

REFERENCES

Code of Federal Regulations, Labor 29 Parts 1926.1050 - 1060 Stairways and Ladders.

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

American National Standard for ladders - fixed - safety requirements, ANSI A14.3-1992, American National Standards Institute, New York..