

# **A hotel maintenance engineer died when struck by the counter weights of an elevator in Texas.**

**Investigation # 98TX14601**

**Release Date: October 30, 1998**

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## **SUMMARY**

A 51-year-old, male hotel maintenance engineer (the victim) died when he was struck by the descending elevator counter weights in a three-car hoist way enclosure. The victim was responding to a work request to locate keys that had fallen out of the pocket of another employee and through the opening in the elevator landing sill. Without reporting the work request to the superintendent, the victim entered the pit area of the elevator. When he did not see the keys in the immediate area, he walked through the pit of one elevator into an adjacent pit one floor lower. While the victim looked down into the pit, the counterweights from the elevator struck the victim on the back of the head and pinned him to the floor.

The TX FACE Investigator determined that to reduce the likelihood of similar occurrences, employers should:

- \* include the elevator repair company in an initial evaluation of the pit spaces for compliance with the permit required confined space standard 29 CFR 1910.146.*
- \* establish a procedure that prevents unauthorized access to the pit areas of elevators.*
- \* The elevator service company should develop procedures for isolating the power source of elevators that protects employees from contact with hazardous energy when entering pit areas.*
- \* install guards to cover the face of the counterweights opposite the elevator's car.*

## **INTRODUCTION**

On April 6, 1998, a 51-year-old, male hotel maintenance engineer (the victim) died when he was struck by the descending counter weights of an elevator. The TX FACE program officer was made aware of the fatality by a newspaper clipping on April 10, 1998. On April 30, 1998, the TX FACE program officer visited the site. The general manager and the maintenance superintendent were interviewed and photographs were taken. The autopsy report was also obtained.

The hotel had been in business for 75 years and employed 135 workers. Five of these employees worked in the maintenance department. The victim had been employed for five years as a maintenance engineer whose primary responsibilities involved plumbing.

The hotel's Human Resources department is responsible for safety management. There is a written safety program, but it does not address elevators. Initial training for a new maintenance worker involves working with three different people for three to four shifts each. Refresher training is also part of the safety program and is conducted every six months. The classroom method is generally used. In addition to in-house training, the employer sends maintenance employees to off-site training courses once a year. For this particular task there was no training.

All maintenance employees were verbally instructed not to go past the safety zone inside the enclosure that made up the elevator pits. The employer relied on the elevator repair company for situations involving the elevators. The elevator company can respond to their calls 24 hours a day within one to two hours. At the time of the incident there were no witnesses.

## **INVESTIGATION**

The hoistway enclosure in this incident contained three passenger elevators, one of which descended to the basement level of the hotel. Access to the elevator pit was through a locked door at the basement level. Immediately inside the doorway was an area 14 feet by 3 feet that had been identified as a safe area by the employer because it was outside the metal framework and moving parts of the elevators. Three feet from the door was the metal structure for elevators one and two. Within the structure are pulleys, cables and counter weights that operate the elevator cars. It was possible to enter this area because of the three feet wide by five feet high openings between the structure members, though the superintendent of the engineering department had directed his workers never to go past the frame members. Adjacent to the pit for elevators 1 and 2 is the pit for the third elevator. Elevator 3's car and counterweights are alongside of and descend past the pit level of elevator 1 and 2. The two pits, located in the same hoistway, were not separated by guards or railings. It is possible to enter the pit to elevator 3 by walking through the metal frame supporting elevators 1 and 2.

Several days prior to the incident a set of keys that had been dropped through the opening in the elevator door sill by an employee. A work request had been prepared and submitted to the maintenance department notifying them of the dropped keys in the elevator hoistway. This was not an unusual situation and had occurred in the past with guests.

The maintenance superintendent conducts a meeting every weekday at 10:00 a.m. Maintenance department employees are given the opportunity to discuss issues confronting the department. It is also a time when safety-related subjects are discussed.

On Saturday, another maintenance engineer found the work request and attempted to locate the keys. When he opened the door that led to the elevator pit area, he did not see the keys in the immediate area. (Maintenance employees were able to find the keys, in most cases, just inside the door leading to the elevator pit area.) He then took the work order and placed it on a work bench in the engineering department, intending to tell his supervisor that he couldn't find the keys the following Monday afternoon.

On Monday morning the victim reported for work. He found the work request laying on a workbench in the maintenance department. He did not tell the superintendent about the work request. After their maintenance meeting, the victim tried to locate the keys. The victim unlocked the entrance door to the pit area and, like the previous maintenance engineer, could not locate the keys. He then walked through the metal framework, leaned forward and looked down into the pit to elevator three. As he was looking down, the counterweights from elevator three were descending. (The weights slide down rails attached to the edge of the pit. They are extremely quiet when they travel).

The weights struck the victim on the back of the head and pinned him to the floor. The fire department was notified at 11:30 a.m. They arrived three minutes later. Rescue personnel used a hydraulically-operated tool to lift the weights off the victim. He was pronounced dead at the scene.

## **CAUSE OF DEATH**

The medical examiner determined the cause of death to mechanical asphyxia associated with blunt force injuries.

## **RECOMMENDATIONS/DISCUSSION**

***Recommendation #1 - Employers should include the elevator service and repair company must conduct an initial evaluation of the pit space for compliance with the permit required confined space standard 29 CFR 1910.146.***

Discussion: Based on an earlier request for interpretation from another organization, OSHA described the requirements for elevator pit spaces to be classified as permit-required confined space in a letter of interpretation, "Guidance in determining whether elevator pits meet the definition of permit-required confined spaces," dated October 27, 1995. OSHA stated the following:

1) The need for a ladder to exit an elevator pit means that there is a restricted means of entry and exit. (The pit of the freight elevator falls into this definition.)

2) Most elevator pits are not designed for continuous human occupancy since they generally cannot be occupied during normal elevator operation.

3) In order for a confined space to be classified as "Permit-Required," an acute hazard must be potentially or actually present within the space at the time of entry. Elevator pits generally are permit-required confined spaces by virtue of the electrical-mechanical hazard(s).

The letter also states, "Where the electrical-mechanical hazard(s) can be eliminated, and where there are no potential or actual atmospheric or other hazards, the pit can be declassified and rendered non-permit."

If a permit space is identified, then the “host” employer, in this case the hotel, must inform the contractor (elevator company) of the following:

1) Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting requirements of paragraph (d) of 1910.146.

2) Apprise the contractor of the elements, including the hazards identified and the host employer’s experience with the space, that make the space in question a permit space.

3) Apprise the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near permit spaces where contractor personnel will be working.

4) Coordinate entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by paragraph (d) (11) of 29 CFR 1910.146.

5) Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.

***Recommendation #2 - Employers should establish a procedure that prevents unauthorized access to the pit areas of elevators.***

Discussion: The American Society of Mechanical Engineers (ASME), in standard ASME A17.3, defines who should be allowed access to an elevator’s pit area. These persons must be instructed in the operation and/or maintenance of the equipment. Since the employer relies on an elevator company for maintenance of the equipment, no employee should be allowed in these areas.

Access for authorized personnel, in this case the elevator company employees, shall be provided according to ASME 17.3, para. 2.3.1, Access to Pits. “The access door to the pit must be self-closing and provided with a spring-type lock arranged to permit the door to be opened from the inside of the pit without a key. Such doors shall be kept locked. Keys to unlock the pit access door shall be kept on the premises in a location readily accessible to authorized personnel.”

***Recommendation #3 - The elevator service company should develop procedures for isolating the energy source of the elevator that employees can follow when entering pit areas.***

Discussion: 29 CFR 1910.147 requires employers to establish energy control procedures for employees who perform any servicing or maintenance on a machine or equipment. The procedures must prevent the unexpected energizing, startup or release of stored energy that could occur and cause injury. The procedure isolates the machine or equipment from the energy source.

Using the pit stop switch would not lock out the elevator since it is not a main electrical energy disconnect; the main disconnect to the elevator equipment would have to be used and locked or tagged to accomplish an electrical de-energization.

***Recommendation #4 - The employer should install guards to cover the face of the counterweights opposite the elevator's car.***

Discussion: Whenever there is a possibility that persons may come into contact with moving mechanical parts, it is necessary to isolate potential points of hazards by safely enclosing them or by screening them off so that workers do not come into dangerous proximity to them. Ordinarily, moving parts are considered a hazard if they are within a lateral reach of seven feet or less above the floor level.

An unperforated metal guard, should be installed covering the counterweights according to ASME 17.3, section 2.1.5, Counterweight Guards. The guards should extend from a point not more than 12 inches above the pit floor to a point not less than seven feet nor more than eight feet above the floor.

## **REFERENCES**

29 CFR 1910.146, Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register.

29 CFR 1910.147, Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register.

Safety Code for Existing Elevators and Escalators, ASME A17.3-1996, American Society of Mechanical Engineers.