TO: Director, National Institute for Occupational Safety and Health

FROM: California Fatality Assessment and Control Evaluation (FACE) Program

SUBJECT: Structural ironworker foreman falls off beams of warehouse roof to the floor below and dies in California

SUMMARY

California FACE Report 98CA010

A 42-year old structural ironworker foreman (decedent) died when he fell off steel beams in an incomplete warehouse roof approximately 38 feet to the floor below. The employer was installing the final structural steel beam (bar joist) in the roof of a new cold storage warehouse under construction. After a crane had lifted a beam into place, the decedent was using a hammer in an attempt to straighten it. He had one foot on a joist girder and the other on the roof deck. As he was preparing to strike another blow, his foot slipped off the joist girder. His hands caught the bar joist, but slipped off and he fell. The decedent had removed some safety lines to gain access to the area and was not wearing fall protection. The CA/FACE investigator determined that, in order to prevent future occurrences, employers should ensure as part of their Injury and Illness Prevention Program (IIPP), that:

- all workers working at heights are wearing fall protection equipment.
- openings are properly protected, covered or use alternate means of access.

INTRODUCTION

On June 29, 1998, at 3:28 p.m., a 42-year old male structural ironworker foreman was fatally injured when he fell from an opening in the roof of a commercial building under

construction. He was using a hammer to knock a steel beam into place. While preparing to strike another blow, his foot slipped off a joist girder (structural steel roof truss) and he fell to the floor below. The CA/FACE investigator learned of this incident on June 30, 1998 from the local legal office of the Division of Occupational Safety and Health, California Department of Industrial Relations (Cal/OSHA). On June 30, 1998, the CA/FACE investigator traveled to the incident site where he met with the company owner; a labor management consultant representing the owner; the vice-president and the superintendent of the general contractor; and two representatives of Cal/OSHA. The CA/FACE investigator also took photographs of the area where the incident happened.

The employer, a structural steel erection contractor, had been in business for approximately 17 years at the time of the incident. The company had 30 employees with 12 working on site at the time of the incident. The decedent had worked for the company for 16 years and had worked at the site of the incident on two separate occasions for a total of 10 weeks. Company safety responsibilities were defined, with the company owner having overall responsibility and the site foreman (decedent) having responsibility on the day of the incident. The company had a written Injury and Illness Prevention Program (IIPP) and a code of safe practices. A fall protection plan was not available to the FACE investigator.

The general contractor had a site specific safety plan which the subcontractors were required to follow. It included the provision of a competent person for construction activities which included fall protection methods and systems. The plan dictated the use of fall protection when working above 6 feet or inside of a catenary (safety) line.

The decedent was trained and experienced in the hazards of the structural steel erection as verified by his long work history in the trade. Safety meetings were conducted once a week. Prior to the job, a site survey was conducted by the end user, general contractor and the subcontractors to identify potential hazards.

INVESTIGATION

The site of the incident is a large, commercial, cold storage building under construction. The employer was hired by the general contractor to erect the steel structure including the roof of the building. Most of the structural steel had been erected and most of the roof decking had been completed prior to the incident **(exhibit 1)**.

The structural steel order was short one beam (bar joist). When this bar joist finally arrived, the roof decking could be completed. The decedent was the foreman in charge of finishing this job. A truck-mounted crane **(exhibit 2)** was used to lift the bar joist into place.

When the bar joist was placed into position between two joists already in place, it was not quite straight. It was a very tight fit between a bar joist on the other side and the panel wall. The decedent decided that, in order to straighten this bar joist, that he would use a hammer to pound it into place.

Decking had been laid on the east and south sides of where the last bar joist was put into place. There was no decking on the north and west sides of the area in which the decedent needed to work **(exhibit 3)** . The area had been barricaded by the use of wire rope safety (catenary) line on all four sides. In order to access the area, the south and east safety lines were

removed.

The decedent was standing on the deck on the east side of the work area with his right foot. He moved his left foot out, over the opening, and placed it on the nearest joist girder (a structural steel roof truss). The decedent had his body facing in an easterly direction. He hit the bar joist with a hammer to move it in a westerly direction in an attempt to straighten it.

The first hammer blow was not fully effective in straightening the bar joist. The decedent was repositioning himself to strike another blow with the hammer when his left foot slipped. This caused him to lose his balance and begin to fall. He reached out and briefly caught onto the bar joist he had been working on with his hands, but he lost his grip.

The decedent fell and struck the cab area of the truck-mounted crane **(exhibit 4)** and then fell to the concrete floor 38 feet below where he had been working.

The decedent's co-workers immediately went to his aid, but his injuries were obviously massive and no first aid was attempted. A call was made to emergency services. The paramedics were dispatched at 3:29 p.m. and arrived at 3:32 p.m. They found the decedent to have massive injuries, he was treated with CPR and transported to a local hospital where he was pronounced dead.

CAUSE OF DEATH

The death certificate stated the cause of death to be multiple blunt trauma**.**

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should ensure as part of their IIPP that all employees working at heights are wearing fall protection equipment.

Discussion: In this incident the opening from which the decedent fell was, at the time, unguarded and uncovered. The decedent was not wearing fall protection at the time of the incident. There was a great danger of falling from the opening because the decedent was spanning part of the opening with his body. Although fall protection equipment was made available to the employee according to the company owner, the decedent did not wear it. Employers must assure that fall protection equipment is always worn when employees are working at dangerous heights. If the decedent was wearing proper fall protection and was properly tied off, this incident may not have happened.

Recommendation #2: Employers should ensure as part of their IIPP that openings are properly protected, covered or use alternate means of access.

Discussion: In this instance, the decedent removed the safety (catenary) line around two sides of the perimeter of the open portion of the roof. He then placed his body into the open portion of the roof. Since the decedent did not use personal fall protection equipment (i.e. harness and lanyard), other means should have been employed to protect the opening. Safety nets could have been used in this instance. Another means of providing protection from falling

from the opening so employees do not have to straddle it, is to place a cover over the opening that is capable of supporting the weight of employees and materials that may be placed upon it. Aerial lifts (zoom booms) were available on site and could have been used to lift the decedent to the height he needed to perform the task of straightening the bar joist. This incident may not have happened if the decedent had used other protective measures or other means of access.

Resources:

Barclays Official California Code of Regulations, Vol. 9, Title 8, Industrial Relations, South San Francisco, 1998

For general information regarding protection of roof openings and demolition work refer to: http.www.dir.ca.gov./title8/1632.html, /1734.html, /1735.html, /1736.html, /3212.html

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FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The California Department of Health Services, in cooperation with the California Public Health Foundation, and the National Institute for Occupational Safety and Health (NIOSH), conducts investigations on work-related fatalities. The goal of this program, known as the California Fatality Assessment and Control Evaluation (CA/FACE), is to prevent fatal work injuries in the future. CA/FACE aims to achieve this goal by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

NIOSH funded state-based FACE programs include: Alaska, California, Iowa, Kentucky, Maryland, Massachusetts, Maryland, Minnesota, Missouri, Nebraska, New Jersey, Ohio, Oklahoma, Texas, Washington, West Virginia, and Wisconsin.

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Additional information regarding the CA/FACE program is available from:

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