TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: Laborer falls through skylight opening in warehouse roof to the ground below and dies in California

SUMMARY
California FACE Report #98CA011

A 39-year old laborer (decedent) died when he fell through an opening in a warehouse roof 20 feet, 7 inches to the ground below. The employer was demolishing the roof of a warehouse. The decedent had removed the skylight covering the opening and was in the process of removing ventilation equipment. As he was walking and changing the socket on his power wrench, he stepped on a 4X8 foot sheet of plywood covering the opening. The plywood gave way and the decedent fell through the opening. The plywood had been nailed to the roof's frame from inside the building during the time the building sat empty. The opening was not otherwise guarded or marked. The decedent was not wearing personal fall protection. The CA/FACE investigator determined that, in order to prevent future occurrences, employers should as part of their Injury and Illness Prevention Programs (IIPP):

- guard roof openings to prevent employees from walking on surfaces with unknown load ratings or provide personal fall protection.
- ensure visual warnings are placed around all areas that present a fall hazard.

INTRODUCTION

On August 6, 1998, at 8:50 a.m., a 39-year old male laborer was fatally injured when he fell through an opening in the roof of a commercial building. He removed the skylight covering the opening and was in the process of removing ventilation equipment. The opening was covered by a 4X8 foot sheet of plywood which gave way when the decedent walked on it. He fell to the ground 20 feet, 7 inches below. The CA/FACE investigator learned of this incident on August 11, 1998 from the local legal office of the Division of Occupational Safety and Health, California Department of Industrial Relations (Cal/OSHA). On August 12, 1998, the CA/FACE investigator traveled to the incident site where he met with the general contractor's superintendent and the employer's foreman. He photographed the area where the incident happened.

The employer, a demolition and concrete cutting contractor, had been in business for approximately 3 years at the time of the incident. The company had 20 employees with 10 working on site at the time of the incident. The decedent had worked for the company for 3 years and had worked at the site of the incident for 1 day as the employer's leadman. Overall

company safety is the responsibility of the president. Company safety responsibilities were assigned to the site foreman on the day of the incident.

The company had a written Injury and Illness Prevention Program (IIPP) and a code of safe practices. Safety meetings were conducted once a week at the main facility and tailgate safety meetings were held every morning at the job site. Prior to the job, a site survey was conducted by the company president, foreman and a representative of the general contractor to detail the job and identify potential hazards. The decedent did not receive training that specifically addressed the hazards associated with the fatality.

INVESTIGATION

The site of the incident is a large, single-story commercial building under demolition (**exhibit 1**). The employer was hired by the general contractor to demolish the roof of the warehouse which included removing the tar paper, the skylights, and the heating, ventilation and air conditioning (HVAC) equipment.

After the roofing material was removed, it was shoveled into a dump truck on the ground floor through an opening in the roof. The crew began removing the roof in the southeast portion of the building. The skylights and HVAC equipment were to be removed and set aside until they could be properly removed from the roof top. The decedent had removed a skylight from the opening in the southwest portion of the building. He laid the skylight aside (**exhibit 2**) and began to dismantle the HVAC equipment located on the south side of the opening. The decedent was using a power wrench. As he was changing from a larger to a smaller socket he walked onto the plywood located in the skylight opening **(exhibits 3 & 4)**.

During the time the building was sitting empty, portions of it were boarded up. This included nailing 3/8-inch thick, 4X8 sheets of plywood from inside the building to the bottom of the skylight frames. The sheet of plywood on which the decedent stepped was nailed with 1 1/2-inch long dry wall nails along both long sides. It was nailed along one side with 7 nails driven straight in and on the opposite side with 10 nails which were toe-nailed. The plywood gave way on the side where 7 nails were located. It remained attached and hanging by the side that had 10 nails. The decedent dropped 20 feet, 7 inches to the dirt below and sustained trauma to his head. It is unknown if the decedent struck his head on the large, steel truss during his fall.

His coworkers immediately came 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 8:51 a.m. and arrived at 8:54 a.m. They found the decedent to have such massive injuries, he was not treated and immediately pronounced dead at 8:55 a.m.

Subsequent investigation by the CA/FACE investigator, who climbed the fixed ladder to gain access to the roof, revealed that the workers needed personal fall protection. They had been working at the edge of the roof which was protected only by a 20-inch parapet. According to the employer's foreman, the employees were warned about not stepping on the plywood covering the skylight openings. No painted lines or other visual warnings had been placed around the skylight openings. Prior to the arrival of the CA/FACE investigator, painted lines had been placed around the roof edge and employees were warned not to go beyond those lines.

CAUSE OF DEATH

The death certificate stated the cause of death to be blunt head and chest injuries.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should, as part of their IIPP, guard roof openings to prevent employees from walking on surfaces with unknown load ratings or provide personal fall protection.

Discussion: In this incident the load rating of the plywood covering the roof openings below the skylight was not determined. It was unknown whether or not the plywood would be capable of supporting the weight of an employee and his/her tools if stepped on. Although, according to the employer's foreman, employees were told they should not step on the plywood covering the openings beneath the skylight, they were not assured that it could or could not support their weight. The opening where the 4X8 foot sheet of plywood had been nailed was left unguarded and improperly covered. Openings in roofs are normally guarded by standard guardrails or equivalent means. Another means of providing protection from falling through the opening, 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. Although the opening was covered with a piece of plywood, it was not capable of supporting the weight of the decedent. In addition, the decedent was not required by the employer to wear personal fall protection on this job. Since the roof opening was not properly guarded or covered, it would normally be required because the decedent could walk in the area where a danger of falling existed including the skylight roof openings. If the skylight roof opening had been properly guarded or covered, of if personal fall protection was worn, this incident may not have happened.

Recommendation #2: Employers should, as part of their IIPP, ensure visual warnings are placed around all area that present a fall hazard.

Discussion: No visual warnings were placed on the roof at the time of the incident to alert employees to fall hazard areas. Verbal admonitions were given to employees not to walk on the plywood covering the skylight openings, but there were no visual warnings around these openings. Painted lines, barrier tape, "NO STEP" signs, or other visual warnings, if in place around the perimeter of the skylight, may have prevented the decedent from walking on the plywood-covered skylight opening.

References:

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 Title 8 of the California Code of Regulations: 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 Public Health Institute, 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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