TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: Fumigator falls off roof during tenting and dies in California

SUMMARY
California FACE Report #98CA002

A 35-year old fumigator (decedent) died when he fell 22 feet off the second-story roof of a single-family residence and hit his head on a ground-level, concrete sidewalk. The decedent and his crew were placing tarps over the residence prior to fumigation. After the tarps had been placed on the second-story, the decedent went to the roof edge to straighten a tarp so it would hang properly. He lost his balance and fell. The company did not use and did not have available fall protection for employees. The company had no written instructions for the tarp laying (commonly called tenting) procedure. The company also did not have an Injury and Illness Prevention Program (IIPP) but did have a code of safe practices which were generic in nature. The CA/FACE investigator determined that, in order to prevent future occurrences, owners and employers should:

- provide fall protection or alternative methods for employees who work at heights
- employ external lighting when working after dark.
- ensure employees do not approach a roof edge so closely that it places them in danger of falling off.
- develop a written procedure which covers the manner in which tarp laying should be performed.

INTRODUCTION

On February 10, 1998, at 7:00 p.m., a 35-year old male fumigator was fatally injured when he lost his balance and fell off a second-story roof. He was attempting to straighten a tarp, used to contain fumigant gas, so it would hang properly over the roof edge. He lost his balance and fell over the edge of the roof to a concrete sidewalk below.

The CA/FACE investigator learned of this incident on February 12 from a local newspaper article. On February 20, 1998, the CA/FACE investigator traveled to the residence where he met with the homeowner and photographed the home. On February 23, 1998, the CA/FACE investigator interviewed the company's primary owner and a part-time worker who was present at the site when the incident occurred. The CA/FACE investigator returned to the site of the incident on March 10, 1998 at 7:00 p.m. to assess the lighting provided by various sources.

The owner, a fumigator, operated by tenting homes and businesses under contracts with larger pest control companies. The company had been in business for 14 years at the time of the incident. The owner had worked in the industry for a total of 19 years. The company had 1 employee and 3 partners with 3 working on site at the time of the incident. The decedent had been part of the company for 14 years and had previously worked elsewhere in the industry with the owner. The owner stated that the decedent was a partner in the company. Company safety responsibilities were not well defined and the company had no Injury and Illness Prevention Program (IIPP). A generic code of safety practices was available. The decedent was trained by the owner but no documentation was available. The company did not have specific written procedures for the task being performed. The decedent was familiar with the tasks involved in this incident through experience and on-the-job training. Safety meetings were held two or three times a year with site meetings held on an as-needed basis.

INVESTIGATION

The scene of the incident was a home on a street among many single-family residences. The home involved in the incident was a two-story structure with the second-story having been added prior to the purchase of the home by the current residents. The second-story was unusual in that it was taller than one would expect. Although the CA/FACE investigator did not measure the pitch of the roof, the photo indicates that the pitch was approximately 1:2.5 (rise over run).**(See Exhibits 1 and 2)**

The employer in this incident worked strictly on a contractual basis with larger pest control companies, many of whom no longer perform tenting operations. A larger pest control company had contracted with the employer to lay tarps (tent) on the two-story residence involved in this incident. On the day of the incident, the decedent gathered the material needed for the job and traveled to the site. The workers began to place the tarps over the second story since it was the tallest part of the home. They had rolled the tarps out and applied spring-loaded (often called Pony) clamps to seal the areas where the tarp sections overlap.

When the tenting of the second-story was completed, the decedent walked near the northeast edge of the roof. He was attempting to straighten the tarp so it would hang properly at the bottom. This needed to be done to assure proper dispersion of the fumigant gas (Vikane). One co-worker was on the ground placing sandbags on the bottom of the tarp to hold it down. The other co-worker was preparing to lay tarp on the first-story roof.

As the decedent was straightening the tarp, he lost his balance, according to the worker interviewed, and fell. His head struck a concrete sidewalk approximately 22 feet below. The sidewalk set away from the building about 18 inches and was approximately two-feet wide.

His two co-workers heard him yell as he fell. The co-worker on the ground turned the decedent on to his side to prevent him from choking. He then ran to the company truck and called 911 on a cellular phone. No first aid was attempted because of the massiveness of the injuries. The paramedics were dispatched at 7:08 p.m. and arrived at 7:13 p.m. The decedent was found to have no pulse, spontaneous respirations or blood pressure. The employee was pronounced dead by the paramedics at 7:21 p.m. at the scene**.**

CAUSE OF DEATH

The death certificate stated the cause of death to be contusions of the brain including brain stem due to multiple skull fractures due to blunt force trauma to the head.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should provide fall protection for employees who work at heights.

Discussion: The employer stated that he had used fall protection when placing tarps on the roofs at other job sites. No fall protection was used at this site. Fall protection becomes very difficult when a home is tented, but should have been considered a necessity due to the fact that the peak of the second story was approximately 28 feet high. The employer must engineer or have fall protection engineered to meet requirements including those of the American National Standards Institute, Inc. (ANSI) and Cal/OSHA. A fall protection plan should be developed, implemented and used as a training tool. If fall protection in not feasible, then an alternative method must be used to protect the employee. For example, aerial lifts meetings regulations for lifting a person or persons could be used to access the tarps at or near the leading edge of roofs. Safety harnessess and lanyards may be used if they can be attached at an approved anchor point.

Recommendation #2: Employers should employ external lighting when working after dark.

Discussion: This incident happened at 7:00 p.m. At that hour on February 10, 1998, the sun had set. The owner of the pest control company indicated that his workers relied on the house lights, patio lights, garden lights and street lights to illuminate the work site. The house lights and patio lights are of no use when the structure is tented because any illumination is blocked. The garden lights are the low-voltage (Malibu) type and offer little illumination at ground level and none at roof level. The street lights offered very little illumination because of the distance from the site. The closest streetlight was 80 feet away and on the opposite side of the street. Its illumination was blocked by a large parkway tree and a tree in the yard of the home. The next closest was well over 100 feet away and on the opposite side of the street southwest of the home. The heights of both street lights were below that of the second-story roof. The owner stated that his tarps are dark blue and gray. With no lighting and dark colored tarps, it most likely would have been difficult for the decedent to discern the edge of the roof. Proper portable lighting for employees may have prevented this incident.

Recommendation #3: Employers should ensure employees do not approach a roof edge so closely that it places them in danger of falling off.

Discussion: It is very dangerous to closely approach the edge of a roof under any circumstances. When the roof edge is made less distinct when covered by a tarp, there is increased danger. The tarp usually does not provide as safe a footing as most roofs because it provides a slipperier surface. Any fold in the tarp can provide a tripping hazard. Normally, the tarps used in fumigation are carried to the roof top and unrolled over the edge. It is normally done so the tarp falls over the edge, pulled by gravity and the weight of the tarp, so that closely approaching the

edge is not necessary. In this case, the edge was approached so the tarp could be straightened. This meant that the decedent had to pick up the tarp while at the very edge of the roof in order to make it hang over the edge properly. Without fall protection, this is a very dangerous task.

Recommendation #4: Employers should develop a written procedure which covers the manner in which tarp laying should be performed.
Discussion: The employer failed to provide written instructions describing the tarp laying procedure to employees. Such instructions would normally contain safety precautions such as not walking too close to roof edges, use of ladders and fall protection, etc. When the tarps have been laid, the roof edge becomes less distinct because it is hidden by the tarp. In such cases, it is especially important to adhere to those safety precautions that address falling. If such instructions were provided, and followed, this fatality may not have happened.

References:
Barclays Official California Code of Regulations, Vol. 9, Title 8, Industrial Relations, South San Francisco, 1998
http.www.dir.ca.gov./title8/ 1670, 1671, 1671.1,1724,3210, 3211,3212,and3299.html

For general information regarding fall protection for workers, refer to Title 8 of the California Code of Regulations, sections 1670, 1671, 1671.1, 1724, 3210-3212, 3299 and American National Standards Institute (ANSI) A10.11, A10.14, A10.32, and Z359.1.

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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, Georgia, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Ohio, Oklahoma and Wisconsin.

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

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