

TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: A tractor operator died when his tractor rolled over on him.

SUMMARY
California FACE Report #04CA009

A 64-year-old equipment operator died when the tractor he was operating rolled over on him. He had been driving across a slope in a canyon while clearing trees and vegetation. A witness to the incident saw the tractor tumbling down the slope but did not see the victim exit the tractor. The tractor was equipped with a rollover protective structure (ROPS) and seat belt. The CA/FACE investigator determined that, in order to prevent future occurrences, employers, as part of their Injury and Illness Prevention Program (IIPP), should:

- Ensure operators do not perform maneuvers that adversely affect the center of gravity and increase the likelihood of a tractor rollover.
- Ensure operators are trained on the equipment they are assigned to operate and their achievement of skills is verified through a testing program.

INTRODUCTION

On August 26, 2004, at approximately 2:00 p.m., a 64-year-old male equipment operator died when the tractor he was operating overturned as he drove across a slope. The CA/FACE investigator learned of this incident on August 27, 2004, by facsimile from the local office of the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA). On September 2, 2004, the CA/FACE investigator went to the decedent's place of employment and interviewed the company owner, then traveled to the incident site and interviewed the general contractor and viewed the incident scene from the top of a ravine. There was no road or path access to the bottom of the ravine, and police, fire, paramedics, and investigators had to be guided in by rescue crews with special equipment.

The employer of the victim was a land clearing company that prepared property for housing and commercial developments. The company had been in business for over 30 years and had 12 employees working for them at the time of the incident, three of whom were at the site when the incident occurred. The owner of the company stated the victim had worked with him for over 30 years and was an experienced equipment operator. He had been working at the site for four days when the incident occurred. The company had a written Injury and Illness Prevention Program (IIPP) which contained generic codes of safe practices, including a code of safe practice for heavy equipment. The code did not give absolute restriction for working on a slope. That type of work was guided by the site conditions. The company's IIPP required supervisors to conduct

a “job safety survey” at all job sites in order to “ensure safe job conditions and work practices.” There was no job safety survey for this job site. The only training made available to employees was undocumented on-the-job-training (OJT). The victim had over 30 years experience as an equipment operator; however, there was no documentation to verify any training he might have received over those years or evaluations to verify his skills.

INVESTIGATION

The site of the incident was a ravine in a canyon with steep terrain and dense trees and brush. The soil in the ravine was very soft and dusty. The company had been subcontracted to clear all of the trees and vegetation in the area. On the day of the incident, the victim was operating a crawler-type tractor with a blade. The tractor was equipped with an enclosed cabin for the operator, a retractable lap seat belt, and a ROPS device. The victim was clearing the ravine of trees and shrubbery. This was the typical task for the victim and one for which he was not directly supervised. According to the general contractor, the sides of the ravine sloped upward with a grade of approximately 130%, and the distance from the bottom of the ravine to the top was approximately 300 yards. The bottom of the ravine was approximately 20 feet wide. It is not known if the victim or his supervisor performed a job safety survey of the ravine prior to the clearing operation.

A co-worker who witnessed the incident stated he saw the victim operating his tractor pushing brush up the ravine. When the tractor made a left turn approximately two thirds of the way up the ravine and started traversing sideways on the ravine, it turned over and rolled down the hill. The blade was still down when he made the turn and it is not known why he turned. The markings in the soil where the tractor turned left indicated that the left track of the tractor sank into the soft soil and slid downward. The center of gravity of the tractor was then affected, causing it to turn over. The tractor stopped rolling about halfway down the ravine and was lying at an angle on its left side. The co-worker started climbing the ravine to assist the victim when the tractor, which was still running, righted itself and began tracking down the ravine. He got out of the way of the tractor and as it passed him he looked into the cab but could not see the victim. The co-worker then ran to get help from another co-worker.

Both co-workers ran back and saw the victim’s tractor ascending the opposite side of the ravine, and then flip over onto its left side. They found the victim in the tractor path about 15 feet below the area where the victim’s tractor first righted itself and about 50 yards from where the tractor first rolled. The paramedics responded within minutes of being called, but when they checked the victim for spontaneous respirations and pulse and found none, they pronounced the victim dead at the scene.

After the incident the seat belt was inspected and it was found retracted in its holder. It is not known if the victim was wearing the seat belt and unbuckled it in an attempt to jump free of the tractor, or if he wasn’t wearing the seat belt at all.

CAUSE OF DEATH

The cause of death, according to the death certificate, was blunt head and face injuries.

RECOMMENDATIONS / DISCUSSION

Recommendation #1: Ensure operators do not perform maneuvers that adversely affect the center of gravity and increase the likelihood of a tractor rollover.

Discussion: Most safety manuals for crawler-type tractors state that it is unsafe to drive across a steep slope under any circumstances. They also state that the dozing techniques required to clear

brush and trees from sloped hillsides require special knowledge and experience. Soil conditions and the slope angle may vary when covered by heavy brush and dense trees. When the victim traveled up the slope and then turned left to go across, he most likely encountered these varying conditions. It is not known why he turned to go across at the top. Even experienced employees can benefit from periodic refresher training which reinforces the need to follow written basic safe work procedures. Employers can enhance worker compliance with safe work practices through programs of task specific training, supervision, safe work recognition, and progressive disciplinary measures.

Recommendation #2: Ensure operators are trained on the equipment they are assigned to operate and their achievement of skills is verified through a testing program.

Discussion: Training should be provided for employees that operate heavy equipment machines. The training should not only emphasize the proper procedures for safe operation, but also underline the safety features of the machine and the proper safety precautions to take when operating under extreme circumstances. The training should also stress the machine's warning signs and what would happen if those signs are ignored. A testing program would assure employers that employees are not only qualified in the machine operation, but also knowledgeable of all the machine's safety features and their limitations. Had such training and evaluation been performed for this employee, this incident might have been prevented.

References

California Code of Regulations, Vol. 9, Title 8, Sections 1590, 1596

Safety Manual for Operators and Mechanics, Crawler Tractor/Loader, EMI, 1991

[State FACE Reports](http://www.cdc.gov/niosh/face/stateface/ca/98ca014.html) (http://www.cdc.gov/niosh/face/stateface/ca/98ca014.html)

[Investigation Reports](http://cdphinternet/programs/ohb-face/Documents/98CA014.pdf) (http://cdphinternet/programs/ohb-face/Documents/98CA014.pdf)

[NIOSH FACE Reports](http://www.cdc.gov/niosh/face/In-house/full9213.html) (http://www.cdc.gov/niosh/face/In-house/full9213.html)

[NIOSH FACE Reports](http://www.cdc.gov/niosh/face/In-house/full9616.html) (http://www.cdc.gov/niosh/face/In-house/full9616.html)

EXHIBITS:



Exhibit #1. A tractor similar to the one involved in the incident.



Exhibit #2. The location where the tractor involved in the incident came to rest.



Exhibit #3. A view from the rear of the tractor involved in the incident after it came to rest.



Exhibit #4. A closer view of the tractor involved in the incident after it stopped rolling.

Hank Cierpich
FACE Investigator

Robert Harrison, MD, MPH
FACE Project Officer

Laura Styles, MPH
Research Scientist

October 10, 2005

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, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, Oklahoma, Oregon, Washington, West Virginia, and Wisconsin.

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

**California FACE Program
California Department of Health Services
Occupational Health Branch
850 Marina Bay Parkway, Building P, 3rd Floor
Richmond, CA 94804**