TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: A machine operator died when his glove caught in a wire drawing machine.

SUMMARY
California FACE Report #02CA009

A machine operator died when his glove caught in the wire that was being spooled onto a drum of a wire drawing machine. The victim was pulled between the drum and the machine housing. The machine did not have any guarding around the drum. The company had no operating or safety instructions for the safe operation of the machine. The victim reached into the machine while it was running. One of the machines emergency shut-off devices had been disabled. The other emergency shut off device, which was a switch on the control panel, was not properly labeled. 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 that all machines are properly guarded.
- Ensure that machine operators are trained to operate machines safely.
- Ensure that all emergency shut off devices and switches on machines are properly installed, maintained in working condition, and properly labeled so the operator can identify them in an emergency.

INTRODUCTION

On October 17, 2002, at approximately 11:50 a.m., a 52-year-old machine operator was killed when he got caught in a spool of wire being wound onto a drum of a wire drawing machine. The CA/FACE investigator learned of this incident on October 24, 2002, through the Legal Unit of the Division of Occupational Safety and Health (Cal/OSHA). On October 31, 2002, the CA/FACE investigator traveled to the victim's place of employment where he interviewed the company vice president and other employees in the plant. The investigator also inspected the incident site and took pictures of the machine involved in the incident.

The employer of the victim was an industrial machine shop that produced reinforcement wire for stucco walls and concrete slabs. The employer had been in business for over 8 years and had approximately 30 employees. There were 20 employees at the shop when the incident occurred. The victim had been employed with the company for 8 years.

The company had a safety program but written task specific safe work procedures were not available for all tasks performed in the shop. Safety meetings were held monthly and were documented. The company did not have a formalized training program. Training was usually accomplished by on-the-job-training (OJT) through experienced operators. The victim was one of the company's experienced operators who trained other operators.

INVESTIGATION

The site of the incident was a large industrial machine shop that spooled wire after drawing it through dies to reduce it to specific diameters. The machine used to complete this process was called a "wire drawing" or "wire pulling" machine (**exhibits #1 & 2**). The machine took larger size diameter wire and pulled it through sets of dies to reduce its diameter to a desired size. The pulling mechanism on the machine was a drum (**exhibits 3 & 4**). The operator fed the wire through the dies and a safety stop bar (**exhibit #7**), and then wrapped the wire around the drum. The drum would then rotate pulling the wire through the sets of predetermined dies (**exhibit #1**). As the drum continued to rotate, the wire was fed off the top of the drum through directional guides and into the spooling mechanism. It then spooled the finished wire onto a wire holding device (**exhibit #2**). The wire holding device was then removed from the machine and the finished product would then be stored or shipped.

The machine had a safety stop bar hinged across the front of the machine that had been disconnected (**exhibit #8**). The bar was designed to prevent personal injury by shutting off the power to the machine when pressure was applied to it. If a worker were pulled into the machine, pressure caused by the worker's body against the safety stop bar would shut off the machine. The machine had no identifying marks to indicate its brand name, serial number or age.

On the day of the incident, a repairman was working on a welding machine that was located near the machine the victim was operating. After a break the repairman noticed the wire on top of the machine was broken and was spinning around. He walked toward the side of the machine looking for the operator when he noticed the victim was caught between the drum and the housing of the machine. The repairman immediately turned off the power to the machine then checked on the victim but didn't get any response. He ran to the office to report his findings to the supervisor. 911 was immediately called.

The paramedics and police arrived within minutes. CPR was administered and continued while the victim was transported to the hospital. The victim failed to regain consciousness or spontaneous respirations and was pronounced dead at the hospital. Examination of the incident site revealed that the victim reached into the area of the rotating drum and got his glove caught in the wire. This action pulled him into the machine between the drum and the machine housing.

CAUSE OF DEATH

The cause of death, according to the death certificate was multiple traumatic injuries.

RECOMMENDATIONS / DISCUSSION

Recommendation #1: Ensure that all machines are properly guarded.

Discussion: Machines that have moving parts that can create a hazard for employees should be guarded. Guarding protects the employee from getting caught in moving parts and protects the machine. Had proper guards been in place on this machine, this incident might have been prevented.

Recommendation #2: Ensure that machine operators are trained to operate machines safely.
Discussion: Employers should ensure that operators are fully trained to operate the machine and also be aware of all the safety devices that are required to be in place when operating. In this particular incident, the company did not have any manuals for the machine. Even though safety manuals might have been available on other similar machines, the safety devices might have been different and not applicable to this machine. Safe practices can be assured through programs of training, supervision, rewards, and progressive disciplinary measures.

Recommendation #3: **Ensure that all emergency shut off devices and switches on machines are properly installed, maintained in working condition, and properly labeled so the operator can identify them in an emergency.**
Discussion: The machine involved in this incident had a safety bar that should have automatically shut off the machine when the operator applied pressure to it. This device was non-operative and wired to the face of the machine. The control panel on this machine did not have proper identifying markings on the control buttons to designate their emergency shut off function. When controls are not properly marked the wrong button could be pushed by mistake. Improperly installed, non-functional, or mislabeled safety devices could contribute to an accident. Workers should not be allowed to operate machines that have identified hazards such as disabled and improperly labeled emergency shut off switches.

References:
California Code of Regulations, Vol. 9, Title 8, Sections 3203, 3328, and 4234

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June 30, 2003

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FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The California Department of Health Services, in cooperation with the California 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.

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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, Third Floor
Richmond, CA 94804

EXHIBITS:

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Exhibit #1
View of the wire pulling machine and reducing dies.

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Exhibit #2
View of the wire pulling machine and the wire holding device.

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Exhibit #3
View of the rotating drum the victim got caught in.

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Exhibit #4
View of the rotating drum showing the area where the victim got pulled into.

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Exhibit #5
View of the rotating drum in proximity to the machine control panel.

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Exhibit #6
View of the machine control panel

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Exhibit #7
View of the safety bar the wire goes through before the dies.

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Exhibit #8
View of the inoperative safety bar wired to the machine.