

TO: Director, National Institute for Occupational Safety and Health

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

SUBJECT: A machine operator is crushed between the plates of an injection mold while performing maintenance.

SUMMARY
California FACE Report #01CA007

A 47-year-old machine operator died when crushed between the plates of a plastic injection mold. The victim was performing maintenance at the time of the incident. The victim was asked by the shift supervisor to correct one problem. A second problem arose when the victim activated the mold and the parts came out incomplete. The supervisor was the only person allowed to perform Lockout/Tagout on the machine but he wasn't asked and he didn't request that the victim let him do so prior to any further work on the machine. The victim did not disconnect any of the sources of energy. In an attempt to correct the second problem, the victim opened the sliding front gate guard, shielding the hydraulic plates, and stepped in between them. When the supervisor approached the machine, he saw where the victim was positioned and told the victim to get out of the machine, turned around and closed the sliding gate guard. The closing of this gate activated the machine and crushed the victim between the plates of the injection mold. The supervisor tried, but was unable to stop the machine in time to prevent this incident.

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 employees follow all manufactures and company safety procedures when operating and performing maintenance on machines.
- Ensure employees are adequately trained and that workers' achievement of skills is verified through a testing program.

INTRODUCTION

On May 19, 2001, at approximately 2:30 a.m., a 47-year-old machine operator was crushed between the plates of a plastic injection mold while performing maintenance. The CA/FACE investigator learned of this incident on May 23, 2001, through the Legal Unit of the California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA). On June 13, 2001, the CA/FACE investigator traveled to the decedent's place of employment and interviewed the company's Plant Manager and machine operators and reviewed

the company's safety policies, procedures, and records. Pictures of the machine involved were taken.

The employer of the victim was a plastic molding company that manufactures crates for the dairy, bakery, and beverage industries. The company had been in business for over 50 years and had approximately 30 employees working three shifts at the time of the incident. Seven employees were at the site when the incident occurred. The victim had been with the company for 3 ½ years and worked as a floor person and material handler for two days a week. The rest of the week the victim worked as a machine operator. At the time of the incident the victim was working as a floor person and material handler. The incident occurred approximately half way through the work shift, which was 11:00 p.m. through 7:30 a.m.

The company had a safety program and a written Injury and Illness Prevention Program (IIPP) with all the required elements at the time of the incident. There were written task specific safe work procedures for all job functions and machine operations. Safety meetings were held monthly and documented. Training was provided to all employees by the company and was documented. The type of training made available was task specific and machine specific for all operators. The methods of training included on-the-job-training (OJT), classroom, video, and manual training. The victim was trained on all the company's maintenance policies and procedures. The company did not require machine operator certification or licensing. Training was measured through productivity.

INVESTIGATION

The site of the incident was a manufacturing plant of plastic crates used for milk cartons, beverage bottles, and bakery goods. The machine involved in this incident was a 700-ton plastic injection-molding machine labeled as machine #4. This machine, through a combination of hydraulic and electrical controls, moves a mobile molding plate horizontally onto a static molding plate. The molding plates measured 28 ½ X 24 ½ X 1 ¼. The machine was equipped with many safety features that included the front and rear safety gate guards. The machine could not be operated unless both gate guards were in the closed position. The machine included a mechanical safety bar that was provided to prevent the moving platen from closing when the safety gate was open. There was also an emergency reverse push button switch located on the operator's control panel. The main switch could additionally be locked out.

On the day of the incident, the victim was working as a floor person and materials handler. He was also assisting the duty supervisor with repairs when needed. The machine operator for machine #4 had just returned from a break when she noticed the trays being molded were coming out the wrong color. She went to the duty supervisor, who was working on another machine, and reported the problem. The duty supervisor motioned for the victim to go to machine #4 and make the necessary adjustments. This adjustment did not require any power disconnection or lock-out/tag-out. The victim adjusted the color on machine #4 and when the machine was re-activated, the molded parts came out incomplete. The victim then left the area to get a tool to correct the second problem and informed the duty supervisor of the second problem with the machine. The victim did not ask and the supervisor did not request that the machine be locked out prior to work on the second problem. The victim then returned to machine #4. He opened the front safety gate guard, and got in the machine between the static and mobile mold plates. The victim never turned off the power to the machine or positioned the mechanical safety bar in place before he stood upright facing the static mold plate.

The duty supervisor stopped the machine he was working on and went to machine #4 to help the victim. When he got to machine #4, he noticed the victim inside the machine and told him to get out. The duty supervisor then turned and closed the sliding front safety gate guard. The closing of this gate activated the machine and crushed the victim between the plates of the injection mold. It is not known why the victim went into the machine without first de-energizing it or why the supervisor closed the sliding front safety gate guard before the victim exited the machine. The operator of press #4 saw the duty supervisor close the sliding front safety gate guard on the machine while the victim was still inside. She stated that when the gate closed all the way and the mold started to close in on the victim, she knew he was in trouble. She stated the victim was panicking with nowhere to go, and the duty supervisor was panicking trying to stop the machine, so she ran to the office and called 911.

The duty supervisor tried, but was unable to stop the machine in time to prevent this incident. He finally got the machine to retract and the victim fell to the ground, face up. Seeing that the victim wasn't breathing, the duty supervisor called for help and another machine operator responded. They placed the victim on a stretcher and took him to the front of the building and waited for the paramedics. The responding paramedics pronounced the victim at the scene after checking for spontaneous respirations and pulse and finding neither.

CAUSE OF DEATH

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

RECOMMENDATIONS / DISCUSSION

Recommendation #1: Ensure that all employees follow all manufactures and company safety procedures when operating and performing maintenance on machines.

Discussion: The manufacturer's "general operating manual" specifically covers the machine safety features, precautions, set up and operation, and maintenance. Throughout the manual are bold type warnings stating: "...failure to follow these instructions may result in personal injury...". The manufacturer also states that only a qualified service or maintenance person should perform maintenance and repair on the machine and before removing or opening a guard to be sure the main disconnect switch is in the OFF position and post a sign at the switch indicating the work being performed. The company has an extensive LOCK-OUT/TAG-OUT specific procedure for all their machines. The company also has a policy that states only authorized persons are allowed to implement the LOCK-OUT/TAG-OUT procedure. The victim was not authorized to perform this procedure. The shift supervisor was the only authorized person on that work shift who could have initiated this procedure and he could not delegate it to any subordinates. Employers can ensure worker compliance with safe work practices through programs of training, supervision, safe work recognition, and progressive disciplinary measures. Had proper procedures been followed, this incident might have been prevented.

Recommendation #2: Ensure employees are adequately trained and that workers' achievement of skills is verified through a testing program.

Discussion: The company provided training for all their employees and measured that training through the employee's productivity. Company records indicate the shift supervisor was trained and qualified to perform his duties, yet he failed to accomplish some of the basic safety procedures necessary to perform the required maintenance on the machine. Company records also indicated that the victim was trained and qualified to perform maintenance on the machine,

yet he also failed to employ some of the basic safety features associated with the maintenance he was performing. The operator of machine #4 was also trained and qualified to operate the machine according to company records, yet she failed to take appropriate action when witnessing the victim enter the machine without any safety precautions. When training is measured through productivity, the only assurance an employer receives is that the worker is knowledgeable on how to operate the machine in order to produce a product. Productivity does not measure an employee's knowledge of all the features of the machine, only those necessary to achieve a specific goal. Training should be verified through some formalized program that assures employers that employees are not only experienced in the machine operation, but also knowledgeable of all the machine's safety features and that they attain the necessary skills to perform them when necessary. In this incident the supervisor's inability to stop the machine in a timely manner may be indicative of the lack of training in emergency response. Most formalized safety programs include written tests and performance evaluations that are administered semi-annually or annually. Had formalized refresher training been made available for employees, this incident might have been prevented.

RESOURCES

California Code of Regulations, Vol. 9, Title 8, Sections 3314, 4189, 4190, 4196, 4202, 4203, 4204, 4355

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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, Maryland, Massachusetts, Maryland, Minnesota, Nebraska, New Jersey, New York, Ohio, Oklahoma, Texas, Washington, West Virginia, and Wisconsin.

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

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