

The Safety & Health Advisor

Machine Safety Special Edition - Spring 2010



Machine Accident Case Study 2010 California FACE (Fatality Assessment and Control Evaluation) Investigation Summary

A 27-year-old male Hispanic machine operator died when he was crushed in a molding (die) press machine that closed on him. The victim was in the process of setting up the machine when a piece of plastic dropped inside. The victim reached inside to retrieve it, and the machine closed and crushed him. It is not known if the victim had received training about how to safely retrieve displaced material. The CA/FACE investigator determined that, in order to prevent future occurrences:

- ❖ *Press machine manufacturers should design presses that minimize the chances of material falling into or becoming lodged in the machine.*
- ❖ *Employers should design and implement machine specific safe work procedures for removal of displaced materials from press machines.*
- ❖ *Employers should fully train press machine operators in retrieving displaced material and verify their knowledge and skills through testing.*

Introduction

On November 7, 2007, at approximately 5:00 p.m., a 27-year-old male Hispanic machine operator died when he was crushed by a molding press machine that molds sheets of plastic into display products. The CA/FACE investigator was notified of this incident on November 15, 2007, by the Department of Investigations of the Division of Occupational Safety and Health (Cal/OSHA).

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On May 14, 2008, the CA/FACE investigator inspected the site of the incident and interviewed the company business manager and four employees. A machine operator demonstrated the machine operation and safety features. On June 5, 2008, a telephone call was conducted with two additional employees with the assistance of a Spanish interpreter.

The employer of the victim was a plastic display manufacturer. The company had been in business for 15 years and had 40 employees. The victim had worked for this company for one month and had no prior experience as a machine operator. The victim was born in Mexico and had been in the United States for 14 years. The victim had a sixth grade education and only spoke Spanish. He communicated with other employees and his immediate supervisor in Spanish.



Molding (Die) Press Machine in "Open Position"

The company had a non-specific written Injury and Illness Prevention Program (IIPP). There were no written machine specific procedures for incidents in which material fell into or was lodged in the press. There were no routine safety meetings or training for employees. All training was conducted for employees only as needed for specific machine operations.

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The victim was deemed knowledgeable in machine operation by his supervisor after on the job training and observation in his native language. It is not known if the victim received specific instruction on how to remove displaced material.

Investigation

The site of the incident was a business that manufactured plastic display products. The machine involved in the incident was a creasing and cutting press machine (Zhejiang Wity Machinery Group Co., Ltd., Model ML-1400). During operation, the machine operator lays a sheet of plastic onto the flat bottom table of the machine. The bottom table automatically tilts forward and presses the plastic against the top table that contains the cutting and shaping dies. According to his supervisor, on the day of the incident the victim was installing dies. The press was powered on to test the die settings. The victim placed a sheet of plastic into the flat bottom table of the machine, and the sheet fell into the machine. As the victim reached with his hands into the machine to retrieve the plastic sheet, the machine cycled and the victim was crushed between the top and bottom tables. Coworkers were unable to extricate the victim from the machine. Emergency personnel were finally able to remove the victim after partially disassembling the machine. The victim was pronounced dead at the scene.

Recommendations/Discussion

Recommendation #1: Press machine manufacturers should design presses that minimize the chances of material falling into or becoming lodged in the machine.

Discussion: When employees retrieve materials that have fallen or become lodged in areas of press machines, they may be at risk for serious injury or death from moving machine parts. In this incident, the machine had no guards or barriers to prevent material falling off the back of the table. If this creasing and cutting press had been designed with such barriers or guards, the victim would not have needed to retrieve the material.

Recommendation #2: Employers should design and implement machine specific safe work procedures for removal of displaced material from presses.

Discussion: During routine machine operations and/or setup, material may become lodged in the press. When this happens, the operator may need access to potential pinch points to retrieve the material. During this process the operator is at risk for entrapped body parts, serious injury, or death. In this case, the machine operator attempted to retrieve a piece of plastic that had fallen into the machine. If the employer in this incident had implemented safe procedures for retrieving displaced materials, the victim may not have placed himself in a pinch point of an energized machine. Examples of the types of procedures that might have been used are lock-out/tag-out or the use of a long-handled tool.

Recommendation #3: Employers should fully train all press machine operators in how to retrieve displaced materials and verify their knowledge and skills through testing.

Discussion: It is not known what training the victim had received in dealing with displaced material prior to the incident. At a minimum, press machine safety training should instruct workers to never reach into an unguarded pinch point of a powered press with bare hands. Although the victim had been observed operating the machine and was judged competent by the employer, there was no comprehensive, documented evaluation program that could have precisely demonstrated the victim's knowledge of safe work practices. By instituting comprehensive training programs with thorough follow-up evaluation, employers can insure that every worker receives the same level of instruction covering every aspect important to the safe operation of their machine.

More FACE investigation reports can be found at:

<http://www.cdc.gov/niosh/face/whatsnew.html>

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Machine Guarding – Lockout/Tagout Resources

Despite the alarming number of machine accidents and recent OSHA enforcement efforts, requirements for lockout/tagout and machine guarding are still viewed by some as confusing and burdensome and ones that can slow production. However, with effective lockout/tagout and machine guarding programs, injuries arising from the failure to control hazardous energy and moving machine parts are entirely preventable.

Atlantic Charter recently added two (2) new safety DVDs that are available for your training needs (free of charge). See the bullets below for detailed information regarding each video. If you are interested in borrowing a safety DVD, please contact your safety/loss control representative.

There are several on-line resources available to assist you with in your safety efforts. Below is a list of on-line resources.

OSHA Standards and Resource Links

Machine Guarding

OSHA Machine Guarding: Standards
www.osha.gov/SLTC/machineguarding/standards.html

OSHA Machine Guarding: eTool
www.osha.gov/SLTC/etools/machineguarding/additional_references.html

OSHA Machine Guarding: Safety and Health Topic Page
www.osha.gov/SLTC/machineguarding/index.html

OSHA Guarding of Portable Powered Tools (29 CFR 1910.243)
www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9850&p_text_version=FALSE

OSHA – Amputation Facts Sheet
www.osha.gov/OshDoc/data_General_Facts/amputation-factsheet.pdf

OSHA Safety & Health Info. Bulletin – Mechanical Power Presses
www.osha.gov/dts/shib/shib020210.html

NIOSH Safety and Health Topic: Machine Safety
www.cdc.gov/niosh/topics/machine/

Injuries and Amputations Resulting from Mechanical Power Presses (NIOSH)
www.cdc.gov/niosh/87107_49.html

A Guide for Protecting Workers from Woodworking Hazards
www.osha.gov/Publications/woodworking_hazards/osha3157.html

Lockout/Tagout

OSHA Control of Hazardous Energy (lockout/tagout)
www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9804

OSHA Hazardous Energy Control: General Requirements – eTool
www.osha.gov/SLTC/etools/electric_power/hazardous_energy_control.html

OSHA Control of Hazardous Energy: Safety and Health Topic Page
www.osha.gov/SLTC/controlhazardousenergy/index.html

OSHA Lockout-Tagout Interactive Training Program
www.osha.gov/dts/osta/lototraining/index.html

OSHA - Facts Sheet
www.osha.gov/OshDoc/data_General_Facts/factsheet-lockout-tagout.pdf

Atlantic Charter Safety DVDs

Machine Guarding: Safeguard Your Future DVD Coastal-- Language: English, Spanish and Portuguese versions

Practically every machine has some sort of machine guarding- a shield, automatic shut off or even a laser curtain- to protect workers if a body part should come in contact with the machine. In fact, OSHA requires specific machines to have specific guards. Make sure your employees understand the importance of knowing about and using the machine guards meant to protect them.

- Safety guards
- Safety devices
- Lockout/ tagout
- PPE

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Lockout/ Tagout: Lightning In a Bottle DVD COASTAL – Language: English, Spanish, Portuguese versions

Fatal injuries occur when hazardous energy is released and safety precautions are not in place. Never allow that to happen. Bottle up that uncontrolled energy, train your employees and boost your lockout/ tagout measures with this shockproof program.

- Kinds of energy lockout/ tagout can control
- Lockout/ tagout basics
- OSHA's LOTO standard
- Six steps of lockout/ tagout

LOCKOUT/TAGOUT: Elements often overlooked...

The Occupational Health & Safety Administration's (OSHA) standard for Control of Hazardous Energy Sources (CHES), known widely as Lockout/Tagout, (29 CFR 1910.147) has been on the books for a long time. Most companies have a written Energy Control Program (Lockout/Tagout) with procedures, employee training and lockout/tagout devices; however, when the program elements are reviewed during a loss control hazard recognition survey visit (or possibly during an OSHA on-site inspection) oftentimes deficiencies are found with certain elements, which could result injury, regulatory violations and/or penalties. In this article, three (3) specific program elements are highlighted that are often overlooked or not fully implemented.

The OSHA language states "This standard covers the servicing and maintenance of machines and equipment in which the unexpected energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy."

The purpose of a lockout/tagout program is to ensure that all machinery and equipment is brought to a zero-energy state prior to performing any maintenance or service work to avoid employee injury. It does not apply to normal production operations. However, what is often

not recognized is that energy is more than just electricity, it includes other types of sources such as mechanical, pneumatic, hydraulic, nuclear, chemical, thermal, stored (i.e. batteries, capacitors, springs) and even gravity. All energy sources must be identified and the steps to bring the equipment to zero-energy must be included in a specific written procedure. Locking out a certain numbered breaker in a specific electrical panel, disconnecting a pneumatic line, bleeding a hydraulic line, discharging a capacitor, disconnecting a backup battery or blocking a part that could move by gravity or other force are some examples. A clear description and location for all energy source disconnects should be provided in the written procedure. OSHA does provide some exceptions to written procedures such as minor tool changes and adjustments or work on some cord and plug connected electrical equipment, but you should refer to 1910.147(a)(2) to be certain of the exception requirements in your specific situation.

Another item often overlooked is employee training. Oftentimes the individuals performing the lockout/tagout function, known as "authorized" employees, have received appropriate training on the program, procedures and devices, but those individuals that are known as "affected" or "other" personnel have not been included in the training program or their training has not been documented.

The standard defines these employee types for training as follows:

Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

Each affected employee shall be instructed in the purpose and use of the energy control procedure.

All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

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Another frequently cited item involves the actual lockout devices in terms of type, durability, standardization, identification and control. The primary types are locks (preferred) and tags and a number of adjunct devices are available to allow locking out in difficult situations, such as blank flanges, plug covers, wedges, fuse or circuit breaker covers or valve covers to name a few. The devices should be durable enough to withstand the environment to which it is subjected; standardized by color, shape or size (same print format if tags); substantial enough, so that it cannot be easily removed; and identifiable as to who the lock/tag belongs to (i.e. name, photo). It is preferred that locks only have one (1) key with the second key destroyed or an alternative effective process. This could be a second key kept in a secure supervised office that would require other knowledgeable persons being involved in the lock removal decision, including formal notification to the employee whose lock is being removed to prevent inadvertent injury. The best practice is "One lock, one person, one key".

It is important that the appropriate person(s) review and evaluate the lockout/tagout program and procedures to ensure that all elements have been addressed to prevent injury to personnel and compliance with OSHA regulations. Your Atlantic Charter Safety and Health Consultant can also provide assistance in this matter.

The following Internet links may be helpful for review in evaluating your program.

OSHA Standard 1910.147

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9804

OSHA eTool – Lockout/Tagout Interactive Training Program

<http://www.osha.gov/dts/osta/lototraining/index.html>

OSHA sends letters to 15,000 high-injury worksites

About 15,000 employers recently were sent letters from OSHA informing them their workplaces had a higher-than-average injury rate. Based on results from a 2009 survey sent to 100,000 worksites collecting injury and illness data from the previous year, OSHA identified the organizations with the highest number of injuries and illnesses resulting in days away from work, restricted work activities or job transfers – known as the DART rate. The employers who received letters had a DART rate of 4.5 per 100 full-time workers. According to OSHA, the national average is 2.0.

Included in the letter was a list of the most frequently cited OSHA standards for each employer's specific industry, along with offers of assistance to help reduce injuries. OSHA sends out the letters annually.

As suggested in the letter, feel free to contact your Safety & Health Consultant for advice. We would be happy to assist you.

OSHA Citations – Machine Guarding & Lockout/Tagout

Did you know that two sections each of OSHA's machine guarding requirements (29 CFR 1910.212) and the control of hazardous energy - lockout/tagout (29 CFR 1910.147) were in the 'Top 10' of OSHA's most frequently cited serious violations during its most recently completed 2008 fiscal year (FY) ending September 30, 2009? Procedures, program, periodic inspection, training, and device application were the top 5 most frequently cited paragraphs of 29 CFR 1910.147, while machine guards – general, point of operation, and pulleys were amongst the top 5 for 1910.212. Furthermore, 29 CFR 1910.147 and 29 CFR 1910.212 were 3rd and 9th respectively, as standards for which OSHA assessed the highest penalties in FY 2008.

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As mentioned in the Fall 2009 issue of Atlantic Charter's Safety and Health Advisor, (www.atlanticcharter.com/Fall2009.pdf) OSHA has significantly stepped up its enforcement efforts since July of 2009. Between July 2009 and February 28, 2010, OSHA posted news releases of 40 inspections/citations in Region I, which encompasses all New England states. The majority of the initial fines were for \$50,000 and above.

Violations of OSHA's machine guarding and lockout/tagout standards were noted during five (5) of the 40 inspections. A brief summary of these are as follows:

Operations	Reason for Inspection	Violations
Food products packager	Employee caught in a labeling machine while cleaning it	Not guarding the machine against employee contact; not shutting down and locking out the machine; lack of lockout/tagout training and hardware, no annual inspection of the plant's hazardous energy control procedures
Composite materials R&D, mfrgr. and assembler	Site-specific targeting program	Incomplete lockout/tagout program and training
Medical equipment mfrgr. and packager	Employee lost the tip of a finger while operating a packaging machine	Lack of guarding of moving machine parts
Small firearms mfrgr.	Complete inspection	Lack of guarding of moving machine parts; and lack of energy control procedures
Fastener, wire and brass inserts mfrgr.	Complete inspection	Lack of guarding of moving machine parts; lack of periodic inspections of hazardous energy control procedures; and failure to exchange hazardous energy control information with outside service contractors.

As noted above, an OSHA inspection of a company's machine guarding and lockout/tagout program may not only result from a serious machine incident, but can occur during a targeted or comprehensive inspection. Thus, it behooves employers to proactively address these areas to prevent employee injuries and minimize potential OSHA violations and fines.

www.osha.gov/pls/imis/industryprofile.html is a link to *Industry Profile for OSHA Standard*. This displays the industry SIC codes in which a specified Federal OSHA standard is most often cited. For example, the following SIC codes had the most violations of 1910.147 during FY 2008.

3089: Plastics Products, Not Elsewhere Classified
3599: Industrial and Commercial Machinery and Equipment, Not Elsewhere Classified
2752: Commercial Printing, Lithographic

Also available is *Frequently Cited OSHA Standards* at www.osha.gov/pls/imis/citedstandard.html which lists standards cited for a specified SIC.

If you need assistance in evaluating your machine guarding/ machinery hazards or safety related programs, please contact Neal Freedman, John Cotnam, Margie Lobaton, or Mark Hickox from Atlantic Charter's Safety and Health Department at (617) 488-6500.