

Lockout - Tagout

Control of Hazardous Energy



A Presentation of the SPI-OSHA Alliance



Occupational
Safety and Health
Administration

The Society
of the Plastic
Industry, Inc.



1910.147 The Control of Hazardous Energy a.k.a. Lockout/Tagout (LOTO)

The specific practices and procedures necessary to disable machinery and equipment so that employees performing service and maintenance activities are protected

The Purpose of LOTO

- Prevent the unexpected startup or release of stored energy
- Reduce the number of fatalities and injuries
- Establish a program and procedures for controlling hazardous energy

Preventing Unexpected Startup or Release of Energy

Energy isolation:

- Minimize potential for inadvertent activation and/or release of stored energy
- Ensure power to the machine is isolated and locked at control points
- Use a method that cannot readily be removed, bypassed, overridden or otherwise defeated

Types of Energy

- Electrical
- Mechanical
- Hydraulic
- Pneumatic
- Chemical
- Thermal
- Gravity

Definitions

- Servicing and/or maintenance where employees may be exposed to unexpected start-up or release of hazardous energy
 - Construction
 - Installing and setting up
 - Adjusting, inspecting, modifying
 - Lubricating, cleaning or unjamming
 - Tool changes



Definitions (cont'd)

- Set-up - Work to prepare a machine to perform its normal production operation
- Lockout – Placement of lockout device on an energy isolating device
- Lockout device – Device that uses a physical means to prevent operation of a machine or equipment



Definitions (cont'd)

- Energized - Connected to an energy source, or containing residual or stored energy
- Energy isolating device - A mechanical device that physically prevents the transmission or release of energy
- Energy source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy

Common Causes of Accidents

- Employees working outside of job description
- Inadequate training and/or comprehension
- Pressure to meet production goals
- Feeling they can do the task after watching someone else do it

LOTO applies when:

- Employees are performing servicing and maintenance, and there is a potential for injury from unexpected start-up or release of stored energy
- Service and maintenance that takes place during normal production, if employee:
 - Must remove or bypass a guard or safety device; or
 - Must place any part of their body into the danger zone

Exception to LOTO

Minor servicing activities that takes place during normal production when alternative effective protection is used

Minor Servicing during Normal Production Operations

- Routine
- Repetitive
- Integral to the use of the equipment for production

Alternative effective protection such as:

- Remote lubricators or other remote devices
- Interlocked gates and barriers
- Other effective guarding devices as described in OSHA's Subpart O and the most current ANSI B 151.1 standard

Accident #1

A setup person suffered an amputation of a finger when it was caught in a pinch point while making adjustments to a knockout mechanism.

Accident #2

- An operator's hand was amputated between the mold halves of an injection molding machine.
- Occasionally, the mold would open half way, and parts would stick, so he was reaching in to pull a part off.
- Operator was pulling at the part with one hand while holding the gate open with the other hand when the mold closed on his hand.

Accident #3

- A supervisor entered an injection molding machine while inspecting for the source of a hydraulic leak when the machine cycled.
- The supervisor died from massive head injuries.
- Two fixed guards were removed about 12 days prior to the accident.

Accident #4

- A set-up person was killed when he entered the machine to remove a jammed part.
- The rear guard interlock had been inoperable for about 6 months.

Accident #5

- An operator crawled under the machine to pick up parts while it was operating.
- His head was crushed when the platen opened.

Core Components of an Energy Control Program

- Energy control procedures for each type of machine
- Training and retraining to ensure employees understand the program
- Periodic inspection to ensure procedures are being followed

ABC Co.
Energy Control Program

Purpose. _____

Compliance with this program

Sequence of Lockout
(1) _____

Energy Control Procedures

- Must be specific to each type of machine and equipment you are working on
- Must include
 - Statement of intended use of the procedure
 - Steps for shutting down and securing machines and equipment
 - Steps for placing, removing, and transferring of lockout devices
 - Requirements for testing and verifying effectiveness of lockout devices

Required Training



- Authorized employees
 - Recognition of hazardous energy sources
 - Type and magnitude of energy in the workplace
 - Methods for energy isolation / control
- Affected employees
 - Purpose and use of energy control procedures
- Other employees in work area
 - Procedures related to restarting machines

Retraining Requirements

Retraining is required if:

- Change in job assignments
- Change in machines
- Change in energy control procedures
- Equipment or processes present new hazards
- Inspections reveal deficiencies in employee's knowledge of energy control procedures
- Retraining must reestablish employee proficiency

Periodic Inspections

- Performed at least annually
- Conducted by authorized employees
- Intended to correct inadequacies identified in program
- Certified



Certification Requirements

- Identification of equipment or machinery
- Date of inspection
- Names of employees involved in the inspection
- Name of person(s) performing inspection

Application of the Energy Control Procedure (Lockout)

1. Prepare for shutdown
2. Shut down equipment
3. Isolate all energy sources
4. Apply locks & tags
5. Release stored energy
6. Verify equipment isolation
7. Perform the task
8. Release from Lockout

Step 1: Prepare for Shutdown

- Understand equipment hazards
- Notify other workers of shutdown

Step 2: Shut down equipment

- Use the normal shutdown procedures
- Turn all switches to OFF/Neutral

Step 3: Isolate all Energy Sources

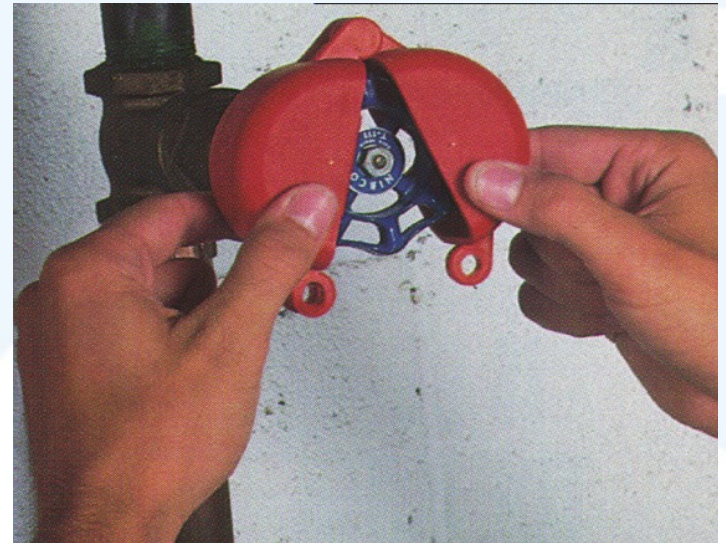
- Use energy isolation devices in accordance with established procedures to prevent transmission or release of energy



Step 4: Apply Locks & Tags

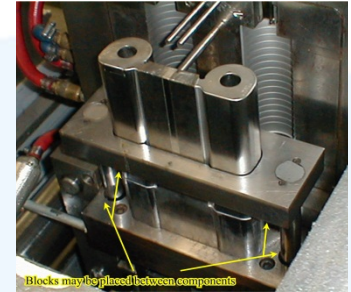
Apply locks and tags to:

- Valves
- Breakers/electrical disconnects
- Mechanical blocks



Valve lockout device

Step 5: Release or Block all Stored Energy



- Discharge capacitors
- Block/disconnect lines
- Block or release springs
- Block elevated parts
- Relieve system pressure
- Drain fluids
- Vent gases
- Allow system to cool (or use PPE)
- Apply any additional locks and tags needed

Step 6: Verify Equipment Isolation

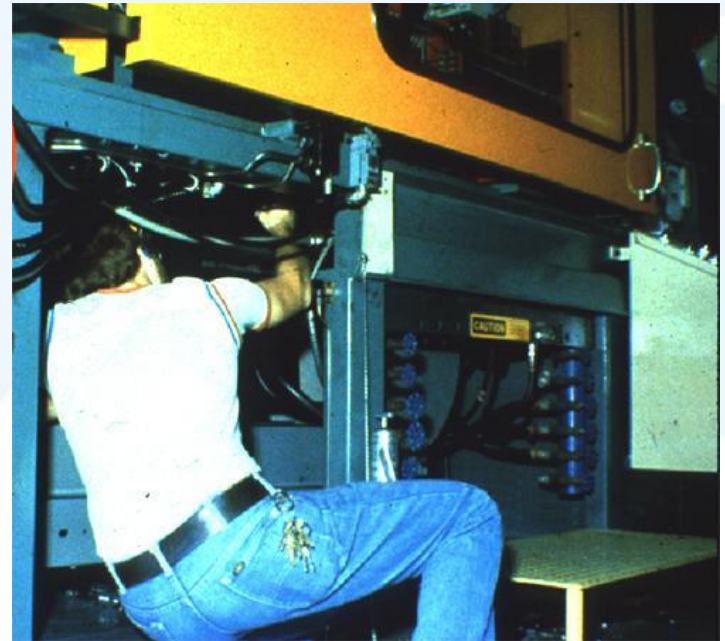
- Check that other workers are clear of potential hazards
- Check that locking devices are secure
- Attempt normal startup
- Return control to OFF/ Neutral



Controls to verify energy isolation

Step 7: Perform the Task

- Perform maintenance or service



Step 8: Release from Lockout

- Ensure machinery is properly assembled and all tools removed
- Ensure that employees are outside of danger zones and are notified that devices are being removed
- Remove LOTO devices
 - Must be removed by authorized employee who applied it

Questions?

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