

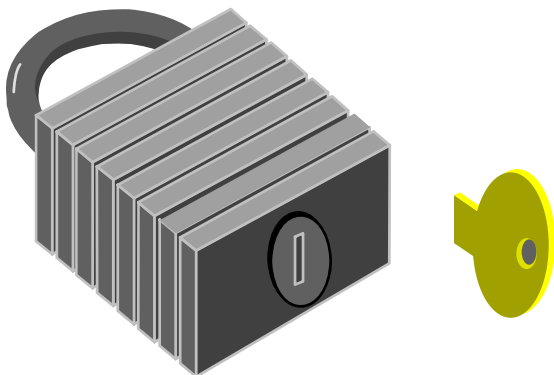
29 CFR 1910.147 (and 1910.333(b)(2)) Control of Hazardous Energy (Lockout/Tagout)



Gary Kukal, CHSP

Performance Based Safety LLC

www.safetyconsultants.org



Scope

- ◆ Covers servicing and maintenance of machines when UNEXPECTED start-up or release of stored energy could cause injury



1910.147(a)(1)(i)

Does Not Cover

- ◆ Construction, agriculture, maritime
- ◆ Installations under exclusive control of electric utilities for power generation, transmission and distribution(1910.269(d))
- ◆ Oil and gas drilling and servicing
- ◆ Exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations (1910.333(b)(2) covers such exposures--see the next two slides.)

Lockout/Tagout- exposure to electrical hazards—1910.333(b)(2)

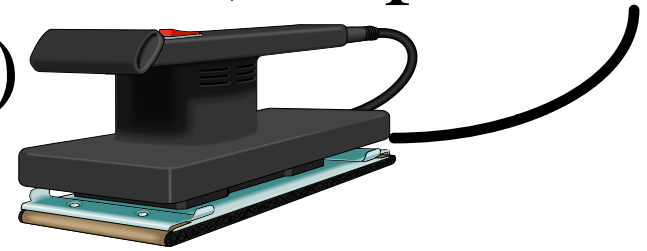
- ◆ Lockout and Tagging." While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out or tagged or both in accordance with the requirements of 29 CFR 1910.333(b)(2).
 - 👉 Note: Lockout and tagging procedures that comply with paragraphs (c) through (f) of 1910.147 will also be deemed to comply with paragraph (b)(2) if two additional conditions are met.

Lockout/Tagout- exposure to electrical hazards—1910.333(b)(2)-cont'd

- ◆ The procedures address the electrical safety hazards covered by Subpart S; and
- ◆ The procedures also incorporate the requirements of paragraphs (b)(2)(iii)(D) and (b)(2)(iv)(B) 1910.333. They requirements are:
 - 👉 **Tags Plus, and**
 - 👉 **A qualified person shall use test equipment verify that the circuit elements and equipment parts are deenergized and also determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage backfeed**

Also Excluded

- ◆ Normal production operations (Subpart O applies--1910.212-219)
- ◆ Work on cord and plug *
connected equipment where plug is under exclusive control of employee performing servicing/maintenance
- ◆ Hot tap operations, under special conditions



1910.147(a)(2)(ii) & (iii)

Application

- ◆ Standard applies to control of energy during servicing and/or maintenance of machines and equipment

👉 NOTE: Servicing/maintenance during normal production operations is covered only if:

- » an employee is required to remove or bypass a guard, or
- » an employee must place his/her body into danger zone

Application-Minor Servicing

- ◆ Note: “Minor Servicing Activities **Exception:** Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, are not covered by 1910.147 if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection (See Subpart O of OSHA’s General Industry Standards).

Application-Minor Servicing

- ◆ The “Minor Servicing Activities **Exception**” is often misunderstood. It cannot be stressed enough that the minor servicing exception does not apply to activities which takes place outside of the normal production process. An example of a maintenance/servicing activity, which does not qualify for the exception because it is done outside the normal production process, is a grinding wheel change out.

Application-Minor Servicing- cont'd

- ◆ It should be noted that merely shutting down the machine as an alternative means of protection does not protect the operator and other employees from normal production operation hazards because the machine or equipment can be easily turned on.

Application--Coverage

- ◆ The following action does not preclude coverage by 29 CFR 1910.147:
 - 👉 Leaving the power on for machines or equipment on the assumption that since the machines are continually operating, any energization is not unexpected since the employees performing the work knew the equipment was operating.

Application--Coverage

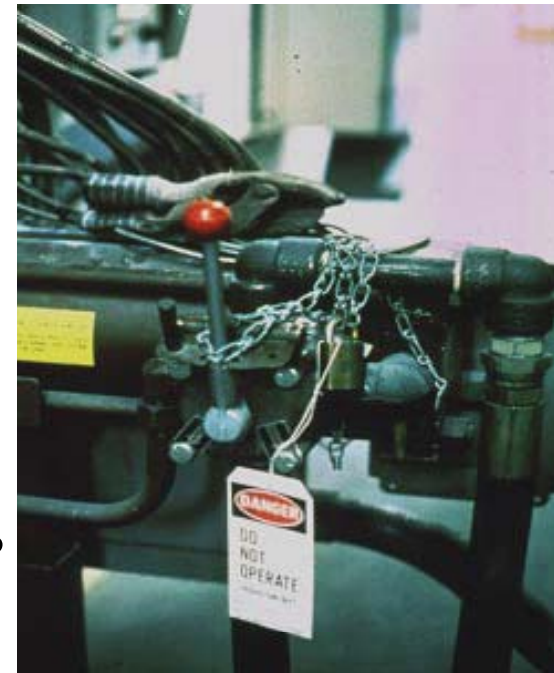
- ◆ Machines or pieces of equipment, which are energized and not in the production cycle, may not necessarily pose "unexpected energization" hazards, certainly could pose employee hazards from "the release of stored energy" or "unexpected startup [activation] of the machines or equipment

Important Document

- ◆ STD 1-7.3 - 29 CFR 1910.147, the Control of Hazardous (Lockout/Tagout) - Inspection Procedures and Interpretive Guidance

Purpose

- ◆ Requires employers to
 - ✎ establish a program and use procedures for affixing lockout devices or tagout devices to energy isolating devices, and
 - ✎ to otherwise disable machines or equipment



to prevent unexpected energization, start-up or release of stored energy in order to prevent injury to employees

1910.147(a)(3)(i)

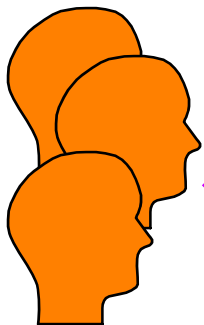
Definitions



◆ Authorized employee* - Person who locks or tags machines/equipment to perform servicing



◆ Affected employee* - One who is required to use machines/equipment on which servicing is performed under lockout/ tagout or who must work in such an area



◆ Other employees** - All employees who are or may be in an area where energy control procedures may be utilized

*1910.147(b)

**1910.147(c)(7)(i)(C)

Definitions (continued)

◆ Capable of being locked out

- 👉 Designed with hasp or attachment to which lock can be affixed; or,
- 👉 Has locking mechanism built in; or
- 👉 Lockout can be achieved without need to dismantle, rebuild, replace or permanently alter

Definitions (continued)

- ◆ **Energy isolating device.** A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices

Definitions (continued)

- ◆ 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

Definitions (continued)



- ◆ Lockout - The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the device and the equipment being controlled cannot be operated until the lockout device is removed
- ◆ Lockout device - A device that utilizes a positive means, such as a lock, to hold an energy isolating device in a safe position and prevent energization

1910.147(b)

Definitions (continued)

- ◆ Normal production operations - Utilization of a machine or equipment to perform its intended function
- ◆ Servicing and/or maintenance (*Abbreviated Definition) Includes lubrication, cleaning or unjamming, making adjustments and tool changes, where employees may be exposed to **unexpected** energization, start-up, or release of hazardous energy

Definitions (continued)



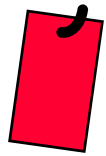
- ◆ Tagout - Placement of a tagout device on an energy isolating device to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed
- ◆ Tagout device - A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device to indicate that the energy isolating device and equipment being controlled may not be operated until the tagout device is removed

Energy Control Program

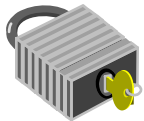
- ◆ The employer shall establish a program consisting of
 - 👉 **an energy control procedure,**
 - 👉 **employee training, and**
 - 👉 **periodic inspections**

to ensure that, before any employee performs servicing or maintenance on a machine or equipment where the unexpected energizing, start up or release of stored energy could cause injury, the machine or equipment **shall be isolated from the energy source, and rendered inoperative**

Lockout/Tagout



- ◆ If an energy isolating device is not capable of being locked out, tagout system shall be used* (Note the definition of “capable of being locked out”)



- ◆ If an energy isolating device is capable of being locked out, lockout shall be used--unless employer can show that tagout* system provides full employee protection
- ◆ (*Tagout +Required)

New or Modified Equipment

- ◆ Machines/equipment replaced or having major repair, renovation, or modification must be capable of being locked out
- ◆ Any new machine or equipment purchased after 1/2/90 must be capable of being locked out

Full Employee Protection

- ◆ When tagout is used on equipment which is capable of being locked out*(Tags+required**)
 - 👉 Tags shall be attached where lockout devices would be, and
 - 👉 Employer must demonstrate that tagout will provide safety equivalent to lockout
- ◆ Equivalent protection requires compliance with tagout provisions and additional measures, such as removal of isolating circuit element, blocking of a controlling switch, etc.

Energy Control Procedure

- ◆ Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in servicing and maintenance

**ABC Co.
Lockout Program**

Purpose. _____

Compliance with this program

Sequence of Lockout
(1) _____

Exception to Documented Program

◆ Documentation not needed when all below exist:

👉 Equipment:

- » no potential for stored/residual energy
- » single energy source
- » isolated from energy source & locked out

👉 Isolation & lockout of one energy source completely deactivates equipment

👉 Single lockout device achieves locked-out condition

👉 Lockout device under exclusive control of authorized employee performing maintenance

👉 No other hazards created

👉 Employer has had no related accidents 1910.147(c)(4)(i)

Procedures

◆ Must include:

👉 Scope

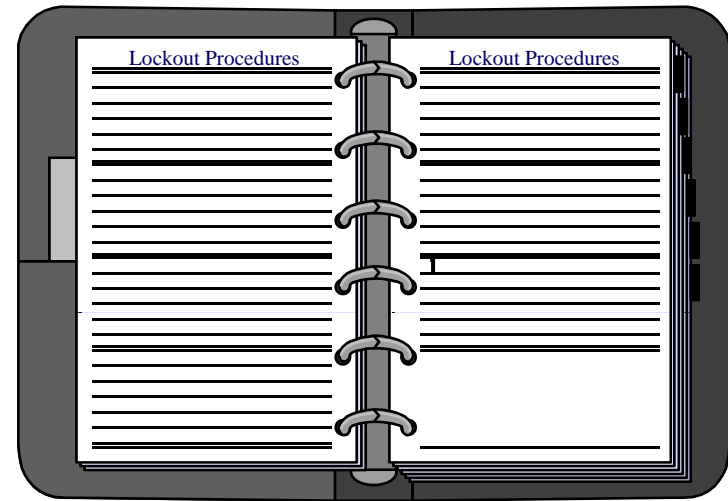
👉 Purpose

👉 Authorization

👉 Rules

👉 Techniques to be utilized

👉 Means to enforce compliance



Materials/Hardware

- ◆ Provided by employer
- ◆ Singularly identified
- ◆ Only devices used
- ◆ Not used for other purposes
- ◆ Durable
- ◆ Standardized
- ◆ Substantial



Periodic Inspection

- ◆ At least annually
- ◆ Performed by authorized employee [other than the one(s) using procedure being inspected]
- ◆ Designed to correct deficiencies
- ◆ **LOCKOUT:** Must review each authorized employee's responsibilities
- ◆ **TAGOUT:** Must review each authorized and affected employee's responsibilities and additional training requirements of 1910.147(c)(7)(ii)
- ◆ Employer certification required 1910.147(c)(6)(i)

Training - Authorized Employee



◆ Training** shall include:

👉 Recognition of hazardous energy sources

👉 Type & magnitude of energy in workplace

👉 Methods for energy isolation/control

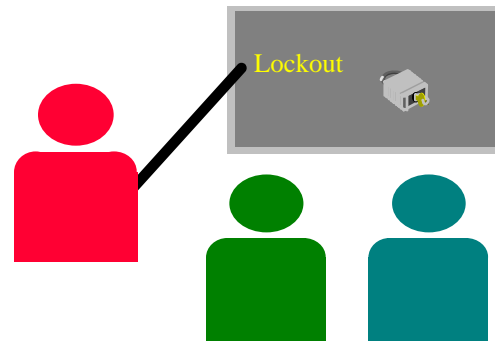
» **Employees, as a result of the training received, must have acquired the required skills and knowledge mandated by the standard.

Training - Affected Employee



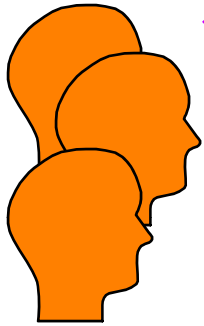
◆ Training shall include:

👉 Purpose and use of the energy control procedure



1910.147(c)(7)(i)(B)

Training - Other Employees

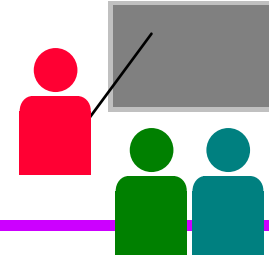


- ◆ All other employees whose work operations are, or may be, in an area where energy control procedures may be utilized, shall be instructed about:
 - ◆ the procedure, and
 - 👉 the prohibition related to restarting or reenergizing machines that are locked or tagged out

Additional Training - Tagout System

- ◆ Employees shall be trained in the limitations of tags, as follows:
 - 👉 Warning devices only
 - 👉 Must not be removed/bypassed/ignored
 - 👉 Must be legible and understandable
 - 👉 Must withstand environmental conditions
 - 👉 May evoke false sense of security
 - 👉 Must be securely attached

Employee Retraining



- ◆ Shall be provided for all authorized and affected employees when:
 - 👉 Change in job assignments
 - 👉 Change in machines, equipment or processes that present new hazards
 - 👉 Change in energy control procedures
 - 👉 Periodic inspection reveals, or employer has reason to believe, there are deviations in employee knowledge of procedures

1910.147(c)(7)(iii)

Application of Energy Control

- ◆ Lockout/Tagout procedures shall cover the following elements in the following sequence:
 - 👉 Preparation for shutdown
 - 👉 Machine/equipment shutdown
 - 👉 Machine/equipment isolation
 - 👉 Lockout/tagout device application
 - 👉 Release of stored energy
 - 👉 Verification of isolation

Release from Lockout/Tagout

- ◆ Prior to restoring energy, the following procedures are required
 - ✎ Inspect machine and equipment
 - ✎ Safe positioning and notification of employees
 - ✎ Removal of lockout/tagout device by
 - ✎ May only be removed by authorized employee who applied device*

Testing of Machines

- ◆ When lockout/tagout devices must temporarily be removed for testing/positioning:

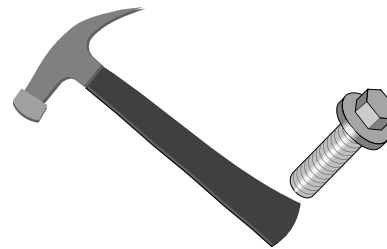
- 👉 Clear machine of tools

- 👉 Remove employees

- 👉 Remove lockout/tagout device

- 👉 Energize and test

- 👉 Deenergize and reapply energy control measures



Outside Personnel (Contractors)

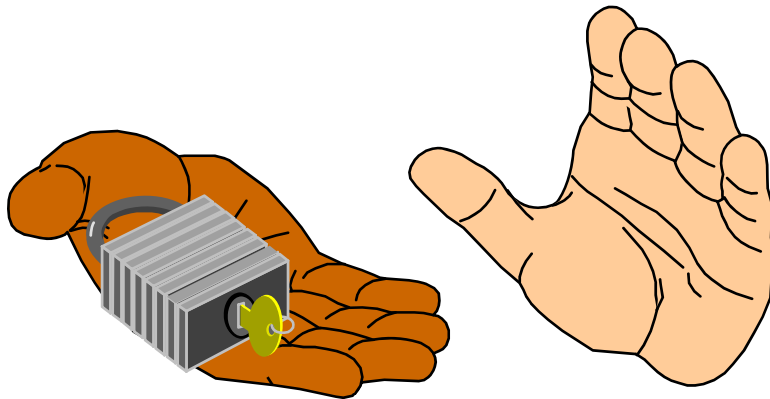
- ◆ On-site employer and outside employer shall inform each other of their respective procedures
- ◆ On-site employer shall ensure that his/her employees understand and comply with contractor's procedures

Group Lockout/Tagout - Additional Requirements

- ◆ Primary responsibility is vested in an authorized employee for a set number of employees
- ◆ Authorized employee must ascertain exposure status of group members
- ◆ If more than one crew is involved, coordinator needed
- ◆ Each authorized employee shall use a personal lockout/tagout device and remove it when finished

Shift/Personnel Changes

- ◆ Specific procedures needed to ensure continuity of lockout/tagout protection, including provision for the orderly transfer of lockout/tagout devices between off-going and oncoming employees



Lockout or tagout device removal

- ◆ **Lockout or tagout devices removal.** Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. **However there is a limited exception to this requirement:---**When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program.

Lockout or tagout device removal—cont'd

- ◆ The employer shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure shall include at least the following elements:
- ◆ **(e)(3)(i)** Verification by the employer that the authorized employee who applied the device is not at the facility:

Lockout or tagout device removal—cont'd

- ◆ **(e)(3)(iii)** Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.
- ◆ **(e)(3)(ii)** Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and