

# LOCKOUT / TAGOUT (LOTO)

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## Topics of Discussion

- Definitions
- LOTO Required
- LOTO Other Requirements
- LOTO Materials & Hardware
- Hazardous Energy Control Procedures (HECPS)
- **Periodic Inspections**
- Training
- Alternative Measures



# LOCKOUT / TAGOUT

## Definitions

- What is Lockout?

Lockout means the use of devices, positive methods and procedures to **effectively isolate** or secure prime movers (the source of mechanical power), machinery and equipment from **hazardous energy** sources.

# LOCKOUT / TAGOUT

## Definitions

Examples of hazardous energy sources include:

mechanical,

hydraulic,

pneumatic,

chemical,

electrical,

thermal,

potential and

other sources.



# LOCKOUT / TAGOUT

## Definitions

- What Activities are Included in Lockout/Tagout?

Cleaning, repairing, servicing, setting-up, adjusting, and unjamming prime movers, machines, and equipment.



# LOCKOUT / TAGOUT

## Definitions

- Which employees are at risk of injury?
- Employees risk of injury from equipment and machines varies depending on what they are doing. There are two categories of employee:
  - Authorized
  - Affected



# LOCKOUT / TAGOUT

## Definitions

- **Authorized Employees or Persons** - A **qualified person** who locks out or tags out specific machines or equipment in order to perform cleaning, repairing, servicing, setting-up, and adjusting operations on that machine or equipment.

# LOCKOUT / TAGOUT

## Definitions

- **Qualified Person:** A person designated by the employer who by reason of training and experience has demonstrated the ability to safely perform their duties and, where required, is properly licensed in accordance with federal, state or local laws and regulations.





# LOCKOUT / TAGOUT

## Definitions

- **Affected Employees** - An employee whose job requires them to **operate or use a machine** or equipment on which cleaning, repairing, servicing, setting-up or adjusting operations are being performed under lockout or tagout, or whose job requires the employee to **work in an area** in which such activities are being performed under lockout or tagout.



# LOCKOUT / TAGOUT Definitions



- What is a Prime Mover?
  - The source of mechanical power for a machine.

# LOTO Required

- **When is Lockout/Tagout Required?**
  - Lockout/Tagout is required when the **unexpected energization** or start up (or release of stored energy ) of machines, equipment or prime movers **could injure workers** during cleaning, repairing, servicing, setting-up, adjusting and un-jamming.



# LOCKOUT Required

- **When is Lockout/Tagout Required?**
  - **During Cleaning, Servicing, Adjusting Operations:**
    - Machinery or equipment capable of movement must be stopped and power source(s) de-energized or disengaged.
    - Accident prevention signs or tags or both must be placed on the controls of the power source of the machinery or equipment.
  - **Tags must be completed with the following information:**
    - Reason for placing tag.
    - Name of person placing the tag and how that person may be contacted.
    - Date tag was placed.



## LOCKOUT Required

- **When is Lockout/Tagout Required?**
  - If necessary, the moveable parts must be **mechanically blocked** or locked out to prevent inadvertent movement, or release of stored energy.
  - *A mechanical block to prevent the machine part from falling on employees.*



# LOCKOUT Required

- **Exception**

- If machinery or equipment must move during these operations you must minimize the hazard by providing and requiring the worker to use *extension tools* (eg., extended swabs, brushes, scrapers) or other *methods, or means to protect workers from injury*. Workers must receive *thorough training* on the safe use and maintenance of these tools, methods or means.



# LOCKOUT Required



- Use of Extension Tools

# LOTO Required

- **During Repair Work and Setting-Up Operations, Machines, Equipment /Prime Movers:**
  - Must be locked out or positively sealed in the "off" position if they have lockable controls (or are readily adaptable to lockable controls).
  - Must be de-energized or disconnected from their power source (or other actions taken to effectively prevent inadvertent movement or release of stored energy) if they do not have lockable controls
  - Accident prevention signs and tags (or both) must be placed on the controls





# LOTO Required

- **Outside Servicing Personnel**
  - Whenever outside servicing personnel are to be engaged in activities covered by the lockout/tagout regulation, **the employer's on-site lockout or tagout procedures must be followed.**



# LOTO Other Requirements

- Under certain specific conditions or when working on certain types of machines and equipment, lockout/tagout is not required. Instead, **other requirements apply**.
  - During Cleaning, Servicing, Adjusting, Repair Work and Setting-Up Operations If You Are:
    - **Making Minor Tool Changes and Adjustments, and Other Minor Servicing Activities:**
      - That take place during normal production operations and,
      - Are routine, repetitive and integral to the use of equipment or machinery for production and,
      - Using **alternative measures to provide effective protection**
  - OR
    - **Using Cord and Plug Connected Electrical Equipment:**
      - Which can be unplugged from the energy source and
      - The plug is **under the exclusive control** of the employee performing the work.



# LOTO Other Requirements

- **When Working With Repetitive Process Machines (Robotic)**
  - On repetitive process machines, such as numerical control machines, which require power or current continuance to maintain indexing and where repair, adjustment, testing, or setting-up operations cannot be accomplished with the prime mover or hazardous energy source disconnected, such operations may be performed under the following conditions:
    - The operating station where the machine may be activated must at all times be under the control of a qualified operator or craftsman.
    - All participants must be in clear view of the operator or in positive communication with each other.
    - All participants must be beyond the reach of machine elements which may move rapidly and present a hazard to them.
    - Where machine configuration or size requires that the operator leave the control station to install tools, and where machine elements exist which may move rapidly if activated, such elements must be separately locked out by positive means.
    - During repair procedures where mechanical components are being adjusted or replaced, the machine shall be de-energized or disconnected from its power source.



# LOTO Other Requirements

- **No accidents prevention signs or tags are required** if there is a uniform system with **unique and personally identifiable locks** designed for lockout, that are placed on the source of energy.



# LOTO Materials & Hardware

- Accident prevention signs, tags, padlocks, seals or other similarly effective means which may be required for cleaning, servicing, adjusting, repair work or setting-up operations **must be provided**.
- Signs, tags, padlocks, and seals must have means by which they can be readily secured to the controls. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a **minimum unlocking strength of no less than 50 pounds**.



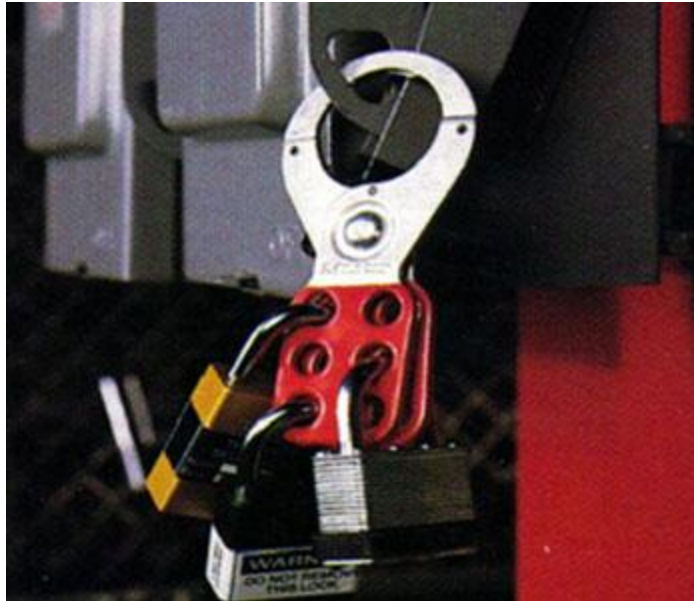
## Examples of lockout devices

- *Lockout/tagout devices - storage board*
- *Gate valve lockout device*



## Examples of lockout devices

- *Locks and tags for electrical panels*



# Examples of lockout devices

- *Pneumatic energy isolation device*



*Cord and plug lockout device*





## Examples of lockout devices

- *Lockout/tagout hardware - lock, tag, and hasp*
- *Equipment switch lock and tag*



## Examples of lockout devices

- Breaker switch lock and tag*
- Plug lock and tag*



## Examples of lockout devices

*Plug lockout device*



*Gang lockout device*



# Hazardous Energy Control Procedures (HECPS)

**Each machine, piece of equipment or prime mover must have separate procedural steps for their safe lockout/tagout.**

**Exception:**

The same procedural steps may be used for the safe lockout / tagout of **groups** or **types of prime movers, machines or equipment**, under the following conditions:

Operational controls are configured in a similar manner, **and**

Locations of disconnect points (energy isolating devices) are identified, **and**

The sequence of steps to safely lockout or tagout the machinery or equipment are similar.

**OR**

Machinery or equipment has a **single energy supply** that is readily identified and isolated and has no stored or residual hazardous energy.



# Hazardous Energy Control Procedures (HECPS)

**The HECPS must clearly and specifically outline at least the following:**

- The machines, equipment, operations, and processes where they apply (i.e., scope)
- What the procedures are used for (i.e., purpose and intended use)
- The name of the people who will carry out the procedures (i.e., authorization)  
Rules for carrying out the procedures
- The means to enforce compliance with the procedures
- Techniques used for the control of hazardous energy
- The steps (meaning the procedures and requirements) for:
  - ✓ Shutting down, isolating, blocking, and securing machines or equipment to control hazardous energy;
  - ✓ The placement, removal, and transfer of lockout / tagout devices and who is responsible (i.e., responsibilities) and,
  - ✓ Testing to determine and verify the effectiveness of lockout and tagout devices and other hazardous energy control devices.



# Hazardous Energy Control Procedures (HECPS)

## **“Tools”**

To help you determine all the hazardous energy sources for each machine, piece of equipment or prime mover, see **Tool A; Equipment Audit - Energy Source Determination**

For Sample Lockout/Tagout Procedures, see **Tool B; GENERAL LOCKOUT/TAGOUT PROCEDURE**

To help ensure that all necessary steps have been taken when performing Lockout/Tagout, see **Tool C; Sample Lockout/Tagout Safety Permit**

<http://www.dir.ca.gov/dosh/etools/08-003/index.htm>



### Tool A - Equipment Audit - Energy Source Determination

Equipment name: \_\_\_\_\_ Date: \_\_\_\_\_

Model Number: \_\_\_\_\_ Inspected by: \_\_\_\_\_

Serial Number: \_\_\_\_\_ Reviewed by: \_\_\_\_\_

Location: \_\_\_\_\_

Select each type of hazardous energy and indicate number of energy isolation/disconnect device(s) that apply:

Hazardous Energy/Power	Energy isolation/disconnect device(s)	Number
Electrical: » Battery » Capacitor	Switch	
	Motor control	
	Power panel	
	Circuit breaker number	
	Other	
	Special precaution/requirements	
Mechanical: » Flywheel	Switch	
	Key	
	Special precautions/requirements	
Potential Energy: » Suspended load (gravity) » Spring	Means to control potential energy	

<b>Hazardous Energy/Power</b>	<b>Energy isolation/disconnect device(s)</b>	<b>Number</b>
Hydraulic	Main control	
	Shut off valve	
	Bleed/Drain valve	
	Special precautions/requirements	
Pneumatic	Main control	
	Shut off valve	
	Bleed/Drain valve	
	Special precautions/requirements	
Chemical	Main control	
	Shut off valve	
	Blank flanges	
	Bleed/Drain valve	
	Special precautions/requirements	
Thermal	Main control	
	Shut off valve	
	Bleed/Drain valve	
	Special precautions/requirements	
Other hazardous energy source(s)	Please fill in energy isolation/disconnect devices below:	
	Special precautions/requirements	

Make copies as needed for each machine/equipment you wish to audit



# SAMPLE 1 - GENERAL LOCKOUT/TAGOUT PROCEDURE

## Purpose

This procedure establishes the minimum requirements for lockout of energy sources that could cause injury to personnel. All employees shall comply with the procedure.

## Responsibility

The responsibility for seeing that this procedure is followed is binding upon all employees. All employees shall be instructed in the safety significance of the lockout procedure by (designated individual). Each new or transferred affected employee shall be instructed by (designated individuals) in the purpose and use of the lockout procedure.

## Preparation for Lockout

Employees authorized to perform lockout shall be certain as to which switch, valve, or other energy isolating devices apply to the equipment being locked out. More than one energy source (electrical, mechanical, or others) may be involved. Any questionable identification of sources shall be cleared by the employees with their supervisors. Before lockout commences, job authorization should be obtained.

## Sequence of Lockout Procedure

1. Notify all affected employees that a lockout is required and the reason therefor.
2. If the equipment is operating, shut it down by the normal stopping procedure (such as: depress stop button, open toggle switch).
3. Operate the switch, valve, or other energy isolating devices so that the energy source(s) (electrical, mechanical, hydraulic, other) is disconnected or isolated from the equipment.
4. Lockout energy isolating devices with an assigned individual lock.
5. Stored energy, such as that in capacitors, springs, elevated machine members, rotating fly wheels, hydraulic systems, and air, gas, steam or water pressure, must also be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down.
6. After ensuring that no personnel are exposed and as a check on having disconnected the energy sources, operate the push button or other normal operating controls to make certain the equipment will not operate. CAUTION: Return operating controls to neutral position after the test.
7. The equipment is now locked out.

## Restoring Equipment to Service

1. When the job is complete and equipment is ready for testing or normal service, check the equipment area to see that no one is exposed.
2. When equipment is clear, remove all locks. The energy isolating devices may be operated to restore energy to equipment.

## Procedure Involving More Than One Person

In the preceding steps, if more than one individual is required to lock out equipment, each shall place his/her own personal lock on the energy isolating device(s). One designated individual of a work crew or a supervisor, with the knowledge of the crew, may lock out equipment for the whole crew. In such cases, it may be the responsibility of the individual to carry out all steps of the lockout procedure and inform the crew when it is safe to work on the equipment. Additionally, the designated individual shall not remove a crew lock until it has been verified that all individuals are clear.

## Rules for Using Lockout Procedure

All equipment shall be locked out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy isolating device bearing a lock.

## SAMPLE 2 - EQUIPMENT LOCKOUT/TAGOUT PROCEDURE



Equipment Number	Equipment Type	MCC	Row	Bucket	Department
0600 - 01	Motor 1	019	B	01	Board Plant
Equipment Name					MCC Location
Belt Transfer On-Rolls Table No. 1					Old Boiler Room

**Potential Hazards:**

<input type="checkbox"/> Electrical	<input checked="" type="checkbox"/> Pneumatic	<input type="checkbox"/> Mechanical	<input checked="" type="checkbox"/> Multiple Lockouts
<input type="checkbox"/> Hydraulic	<input type="checkbox"/> Chemical	<input type="checkbox"/> Combustables	<input type="checkbox"/> Confined Space

**Methods of Neutralizing Energy:**

<input checked="" type="checkbox"/> Relieve Pressure	<input type="checkbox"/> Block/Bleed	<input checked="" type="checkbox"/> Lockout/Tagout
<input type="checkbox"/> Disconnect Lines	<input type="checkbox"/> Set Fire Watch	<input type="checkbox"/> Confined Space Permit

**Permits Required:**

<input type="checkbox"/> Safe Work	<input type="checkbox"/> Hot Work	<input type="checkbox"/> Line Blanking	<input type="checkbox"/> Confined Space
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### Lockout Procedure:

1. Notify Production Supervisor and ALL affected personnel.
2. After completing Step 1, Shut down equipment, if running, as trained. If you are not sure how, contact your supervisor for instructions.
3. Lockout the equipment following the lockout procedure at the WET TRANSFER ON ROLLS cabinet local disconnect on the north wall. This equipment can also be locked out at MCC 19 ROW B bucket 01 in the OLD BOILER ROOM.

Note: Turn off the MAIN Air supply on the North wall to right of the ON ROLL control cabinet and lock the cover. Then isolate both of the surge tanks under the crossover walkway. Close and tag the ball valves before each tank. Push and lock out Dump Valves numbers 4 and 5. LOCK OUT the CROSSBELT #1 at the Crossover walkway local disconnect.

Test the equipment at the "WET END Control Panel" located on the North wall by pushing the "Green Board Transfer start" pushbutton. You can also test this equipment from the crossover pushbutton station at the WET Transfer station by pushing the START SYSTEM pushbuton.

4. After ALL previous steps have been completed, begin your work assignment.
5. After completion of the work, assure that your work area is clean, clear of ALL debris and that ALL guards are secured in place.
6. Notify the Production Supervisor and ALL affected personnel that the equipment is operational and that removal of the lock-outs will occur.
7. Remove ALL locks and tags following the Lock-Out I Tag-Out Program instructions.
8. Prior to start-up of the equipment, inspect the area to ensure that ALL employees, contractors and any other personnel are safely positioned.
9. When production is ready, verify that equipment is operating correctly.
10. Close out any applicable permit/s and return them to your supervisor.

**Tool C - Sample Lockout/Tagout Safety Permit**

**Safety Permit**

Date: \_\_\_\_\_

Time issued: \_\_\_\_\_

Expiration time: \_\_\_\_\_

Permit Issued to: \_\_\_\_\_

Maintenance  Outside Contractor Name: \_\_\_\_\_

Job description: \_\_\_\_\_  
 \_\_\_\_\_

**CHECKED PRECAUTIONS SHALL BE OBSERVED**

- |   |  |
|---|--|
| <input type="checkbox"/> TAG & DISCONNECT<br>ELECTRIC EQUIPMENT | <input type="checkbox"/> FIRE EXTINGUISHER<br>AT SITE      |
| <input type="checkbox"/> LINES BLINDED                          | <input type="checkbox"/> CONTAINS SPARKS                   |
| <input type="checkbox"/> VALVES CLOSED &<br>TAGGED              | <input type="checkbox"/> KEEP AREA FREE OF<br>COMBUSTIBLES |
| <input type="checkbox"/> LOCKED OUT                             | <input type="checkbox"/> BARRICADE AREA                    |
| <input type="checkbox"/> LINES DISCONNECTED                     | <input type="checkbox"/> SHIELD ARC                        |
| <input type="checkbox"/> BLEEDERS OPEN                          |  |

**PROTECTIVE EQUIPMENT REQUIRED**

- |  |   |
|--|---|
| <input type="checkbox"/> WEAR GOGGLES<br>FACE SHIELDS  | <input type="checkbox"/> WEAR RUBBER<br>BOOTS             |
| <input type="checkbox"/> WEAR GLOVES<br>RUBBER THERMAL | <input type="checkbox"/> WEAR SAFETY<br>BELT & LINE       |
| <input type="checkbox"/> WEAR HOOD<br>ACID THERMAL     | <input type="checkbox"/> WEAR RESPIRATOR<br>DUST CHEMICAL |
| <input type="checkbox"/> WEAR SUIT<br>RUBBER THERMAL   |   |

OTHER PRECAUTIONS:  
 \_\_\_\_\_

**PERMIT CONDITIONS AND REQUIREMENTS UNDERSTOOD**

**APPROVALS**

PLEASE CIRCLE ONE: \_\_\_\_\_ SIGNED  
 ENGINEER | FOREMAN | CRAFTSMAN

SAFETY INSPECTOR \_\_\_\_\_

OPERATIONS FOREMAN \_\_\_\_\_ TIME \_\_\_\_\_

OPERATIONS FOREMAN \_\_\_\_\_ TIME \_\_\_\_\_

Work must begin within ninety minutes of issuance of this permit.  
 If the work is interrupted the foreman craftsman, or contractor must indicate equipment condition to operations foreman or operator when leaving job for more than two hours or when job is complete.

JOB COMPLETE \_\_\_\_\_  JOB INCOMPLETE \_\_\_\_\_

**THIS PERMIT IS TO BE KEPT ON THE JOB UNTIL WORK IS COMPLETED, PERMIT EXPIRES OR IS REVOKED**

# Periodic Inspections

- There must be a *periodic inspection* of the energy control procedure(s) *at least once a year* to **evaluate their continued effectiveness and determine the necessity for updating the written procedure(s).**



# Periodic Inspections (Continued)

The periodic inspection must be performed by an **Authorized Employee or person other than the one(s) utilizing the hazardous energy control procedures being inspected.**

Where lockout and/or tagout is used for hazardous energy control, **the periodic inspection must include a review between the Inspector and Authorized Employees of their responsibilities under the hazardous energy control procedure being inspected.**

**The employer must certify that the periodic inspections have been performed.**

The certification shall:

- Identify the machine or equipment on which the hazardous energy control procedure was being utilized,
- The date of the inspection,
- The employees included in the inspection, and
- The person performing the inspection.



# Periodic Inspections (Continued)

Basically, the intent is the following:

- Are the steps of the procedure being followed [T8 3203(a)(2)]
- Do employees know their responsibilities [T8 3203(a)(2)]
- Is the procedure adequate [T8 3314(h)]



## Training

- **Authorized Employees** must be trained on hazardous energy control procedures and on the hazards related to performing activities required for cleaning, repairing, servicing, setting-up, adjusting, and unjamming prime movers, machinery, and equipment.
- **Affected Employees** must be instructed in the purpose and use of the energy control procedure.
- All **Other Employees** whose work operations may be in an area where energy control procedures may be utilized, must be instructed about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.
- The training must be documented as required by your Injury and Illness Prevention Program (T8CCR [3203](#)).



# Alternative Measures

Under specified conditions some work activities are exempt from the Cal/OSHA lockout/tagout regulation (T8CCR [3314](#)). Under these specific conditions lockout tagout is not required. These conditions are:





# Alternative Measures

## Condition

- **1.** If the machinery or equipment must be capable of movement during cleaning, servicing, and adjusting operations in order to perform the specific task.

## Requirements for employee protection

- The employer shall minimize the hazard by providing and requiring the use of extension tools (eg., extended swabs, brushes, scrapers) or other methods or means to protect employees from injury due to such movement. Employees shall be made familiar with the safe use and maintenance of such tools, methods or means, by thorough training.



# Alternative Measures

## Condition

- **2.** Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations are not covered by the requirements of Section 3314 if they are routine, repetitive, and integral to the use of the equipment or machinery for production.

## Requirements for employee protection

- The work must be performed using alternative measures which provide effective protection.



## Reference

- <http://www.dir.ca.gov/dosh/etools/08-003/index.htm>

