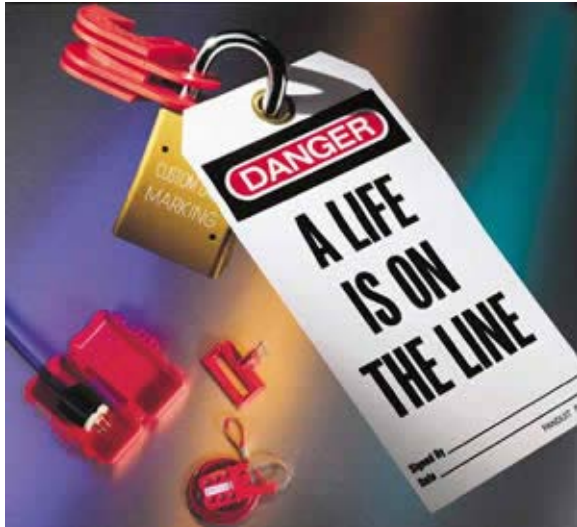


Introduction

Lockout protects your personnel and plant from injury or accident by ensuring that equipment and machinery is properly isolated during scheduled maintenance, shutdown, or whenever personnel have to enter the site for any reason.



Training Briefing Overview

Tasks Covered Herein

- What is Lockout?
- Why is a Lockout Necessary?
- Responsibilities for Lockout
- When Lockout is Required
- When Lockout is Not Required
- How to Lockout

Tasks Covered in Related Literature

There are multiple documents linked to this one. See the **Training Matrix** for additional details.

What is Lockout?

“Lockout” means to physically neutralize **all** energies in a piece of equipment before beginning any maintenance or repair work. Lockouts involve stopping all energy flows by:

- Turning off switches, or valves on supply lines;
- Locking switches and valves;
- Securing the machine, device, or power transmission line in a de-energized state (for example, by applying blocks or blanks, or bleeding hydraulic or pneumatic pressure from lines); and
- Ensuring that all energy is dissipated from the machine or line prior to placing the lock.

Why is a Lockout Necessary?

Without proper knowledge and awareness of lockout procedures, workers could be severely injured or killed.

Often power sources are inadvertently turned on, or valves opened mistakenly before the work is completed, resulting in serious injuries and fatalities. Therefore, it is important not only to ensure that all energies are properly locked out, but also that they remain locked out until the work is completed.

If a lockout is not performed, uncontrolled energies could cause:

- Electrocutation (contact with live circuits);
- Cuts, bruises, crushing, amputations, or death, resulting from:
 - inadvertent movement of equipment;
 - moving chipping heads and/or saws
 - entanglement with belts, chains, conveyors, rollers, shafts, impellers;
 - entrapment by bulk materials from bins, silos or hoppers.
- Burns (contact with hot parts, materials, or equipment);
- Fires and explosions;
- Chemical exposure (gases or liquids released from pipelines).

Responsibilities for Lockout

The following responsibilities come from the WorkSafeBC Guide to Lockout and the company responsibility matrix.

Employer Responsibilities

- Establishes a lockout system.
- Provides written procedures
- Provides personal locks, marked clearly, to identify the worker who applies it.
- Trains all workers in lockout procedures.
- Coordinates all contractors to ensure they meet company standards and WorkSafe BC lockout requirements prior to beginning any job.
- Periodically inspect the use and content of the Lockout Verification Records for the Supervisors under your supervision.
- Review the completed Lockout Verification Records books at the end of each quarter. Forward completed records to the SMS Resource Person.

Supervisors

- Ensure all personnel who are required to employ lockouts receive proper training **initial** and **annual** refresher training.
- Enforce all lockout requirements consistently.
- Issue temporary locks to a person with a tag lock as long as it is clearly identified as a "Spare".
- Complete a *Lockout Verification* for each employee under your direction **every 3 months**.
- Lead the lock removal process following the guidelines in the *Lock Removal Record* and forward the Company Copy to your Manager for review.

Worker Responsibilities

- Maintain easy access to locks and keys at all times.
- Ensure that all personal locks are properly marked or tagged to identify the person applying the lock.
- Never lend personal locks.
- Lock out machinery or equipment whenever performing maintenance, emergency repair work, or whenever you have to enter the bite.
- Always test your lockout before proceeding (first person to lock out if multiple people are locking out).
- Use only your personal locks, whether it is your lock alone, or a group lockout procedure.
- Remove personal locks when work is complete. **Never** remove anyone else's lock(s).
- Always ask if you are not sure about lockout procedures.
- Report all lockout violations to your Supervisor or Manager.



Contractor Responsibilities

- Understand and follow all company lockout procedures while on site.

When Lockout is Required

If machinery or equipment can accidentally or unexpectedly start up, the energy source must be isolated and controlled through the lockout procedure.

Energy Types and Controls

Electrical	Controls
Electricity is the most common energy source that needs to be locked out. Power transmission lines; machine power cords; motors; solenoids; capacitors (stored electrical energy).	Turn off power at the machine first, then at the main disconnect switch. Lock the main disconnect switch. Fully discharge all capacitive systems.
Kinetic	Controls
Kinetic energy is the act of machinery or equipment continuing to move after the electricity is turned off.	Physical guards or restraints are required so they cannot move and injure a worker.
Chemical	Controls
Chemical energy is that which can be released by a chemical reaction. The reaction can be started through flammable, combustible, or corrosive interactions.	Store chemicals properly and make sure all chemicals are labeled correctly. Workers must be trained in the use of the hazardous materials. Keep current MSDS sheets for all chemicals.
Thermal	Controls
Thermal energy is that found in heat, which includes steam, hot water, hot hydraulic fluid, fire, and gases or liquefied gases.	Bleed off excess liquids or gases. Allow sufficient cooling time before working on equipment.
Radiation	Controls
Radiation is energy emitted from radiant sources, both non-ionizing (light, lasers) and ionizing (e-rays).	The use of personal protective equipment such as specialized eye wear is mandatory.
Potential	Controls
Potential energy is also known as stored energy. Sources of potential energy include gravity, hydraulic pressure and compressed air, along with coiled materials. If this stored energy can cause something to move, there is a hazard.	Use pins, blocks or other restraints/guards to lock out or prevent the equipment or material from moving. If possible, bleed the air or hydraulic pressure from the equipment being worked on. Check accumulator and/or air gauges to ensure there is no residual pressure in the system.

When Lockout is Not Required

There are very few instances where lockout is not required – make an educated decision about not locking out. For example, equipment may have to be operating when troubleshooting or calibrating it. Work on energized equipment must be performed by qualified workers who have been authorized to do so.

- Survey the identified location where work will be performed.
- Identify all energy sources.
- Answer the following questions:
 - If any energy sources were released, or inadvertent movement occurred, what would be the impact?
 - Would such a release or inadvertent movement be considered hazardous to a worker?
- Follow all safe work procedures.

How to Lockout

Personal, individual, keyed locks are used to secure lockout. Combination locks are not permitted.

If the worker assigned to the lock becomes or is unavailable, the supervisor or manager in charge may remove the lock. Every attempt must be made to contact the worker, and all precautions about restarting the equipment or machinery must be undertaken. The worker whose lock it is must be notified at the start of his/her next shift. This emergency lock removal must be documented.

Basic Steps to Electrical Lockout

- Identify all machinery or equipment (machines, conveyor belts, landing or transfer tables, etc.) that needs to be locked out.
- Shut off the equipment and make sure that all moving parts have come to a complete stop. Unplug the equipment if it is not hard-wired. Keep the plug in full sight and within reach while working on the equipment.
- De-activate the main disconnect or energy-isolating device for each energy source.
- When pulling breakers, stand to the right side, use your left arm/hand, and turn your face away from the breaker.
- Attach a personal lock to the equipment as required, and use guards or restraints to secure any inadvertent movement. Be sure to remove the key and keep it on you.
- Test the operating controls to see that the lockout has been effective. Ensure the controls are turned back to the off position after the successful test. When multiple people are locking out, it is the requirement of the first person to lock out to perform this test.



How to Lockout (continued)

Continuity of Lockout

When lockout is required during shift changes.

- In the event that servicing or maintenance continues beyond a certain shift, the off-going personnel must ensure that at least one lock remains on the equipment until a lock from the on-coming personnel can replace it.
- If the off-going personnel will be continuing the work on their next scheduled shift, their lock(s) can remain on the equipment.
- In the event that maintenance shifts are not congruent (back to back), a maintenance lock may be applied to ensure lockout continuity. Once the maintenance lock is applied, all off-going personnel may remove their locks. The maintenance lock(s) may only be removed by a member of the appropriate department (Mechanical, Filing, Electrical) after on-coming personnel have applied their lock(s), or the equipment is deemed ready for service.
- Each department has their own unique Maintenance Lock.



- If a Maintenance Lock is applied, an explanation of the work being done needs to be logged.
 - Mechanical Department (Millwrights) - use the Maintenance Book located in the Foreman's Office.
 - Filers – use the Filers Log Book located in the Filing Lunchroom.
 - Electricians – use the computerized log book in the main Sawmill Computer Room.
- In all cases, the off-going personnel are responsible for removing their personal tools from the area, and the on-coming personnel are responsible for surveying the work area for hazards before beginning their work.

Note: Under no circumstances can a Maintenance Lock be used for a Personal Lock. All personnel working on a piece of machinery must have their own lock(s) applied to each MCC disconnect switch, or in the case of Contractors/Vendors working on a large project, as per the approved Lock Box System.

Multiple Person Lockout

- Each person performing work on the machinery or equipment must apply a lock.
- The first worker to apply a lock is responsible to verify its effectiveness. Subsequent people putting locks on after the first lock must not perform a power test.
- Individual locks are removed when each worker's task is complete.
- The worker to remove the last lock is responsible for ensuring all workers are in the clear prior to the equipment being restarted.

Multiple Point Lockout

Where there are multiple energy sources, several energy-isolating devices will require lockout. In this case, several locks may be used, or cables may be used. If a cable is used, the following steps are taken:

- Run the cable through the lock hole in each switch that is part of the series.
- Ensure there is an eye on the opposite end of the cable, and place a lock or scissor and lock on this eye after locking the final switch.
- Use a cable of a diameter large enough to prevent the switch from being activated under any circumstance.

Group Lockout

- **Group lockout (Lock Box System) is not authorized at this site for regular maintenance. The Lock Box System is only meant to be used on a major project where it becomes impractical for every worker to lock out the MCC's. See the Lock Box System for further information.**

Hydraulic or Pneumatic Lockout

- Identify the machinery that needs to be locked out.
- Shut off the equipment and make sure that all moving parts have come to a complete stop.
- De-activate the main disconnect or energy-isolating device for each energy source.
- Close the valve feeding the cylinder.
- Attach a personal lock to the equipment as required, and use guards or restraints to secure any inadvertent movement.
- Test to make sure the pump or compressor does not start. Make sure there is no residual pressure in the lines, reservoirs, or accumulator feeding the cylinder. Bleed any residual pressure.



Interlocked Systems

A good example of interlocked systems is multiple conveyor belts, or transfer tables.

- All interlocked belts, transfers, roll cases, etc., must be locked out or overridden.
- Verify that energy-isolating devices are locked out.
- Use a secondary means of verifying lockout – such as a person knowledgeable of the interlocked system.

Electrical Hazards

Electricity-related hazards include electric shock and burns, arc-flash burns, arc-blast impacts, and falls.

- **Electric shock and burns.** An electric shock occurs when electric current passes through your body. This can happen when you touch an energized part. If the electric current passes across the chest or head, you can be killed. At high voltages, severe burns can result.
- **Arc-flash burns.** An electric arc flash can occur if a conductive object gets too close to a high-amp current source or by equipment failure (for instance, while opening or closing disconnects). The arc can heat the air to temperatures as high as 35,000° F, and vaporize metal in the equipment. The arc flash can cause severe skin burns by direct heat exposure and by igniting clothing.
- **Arc-blast impacts.** The heating of the air and vaporization of metal causes a pressure wave that can damage hearing and cause memory loss (from concussion) and other injuries. Flying metal parts are also a hazard.
- **Falls.** Electric shocks and arc blasts can cause falls, especially from ladders or unguarded scaffolding.

Lock Box System

When large contractor/vendor crews are working on a variety of equipment and it becomes impractical for every worker to lock out each MCC required disconnect switch, a Lock Box System may be implemented.

Procedure:

In order to utilize the lock box system, a representative from each contractor/vendor and a representative from the mill must make a tour of the area where the crews will be working and identify all drives, air and hydraulics that have to be locked out in order for the crews to work safely.

Lockout procedures outlined below are then to be followed for each piece of equipment as required (including lockouts for electrical power, pneumatic and hydraulic systems).

1. Shut off machine or equipment
2. Shut off energy source at control device.
3. Place and close lock in the inoperative position.
4. Test control buttons to be sure energy source is off. Push start, push stop.
5. Bleed off any stored hydraulic or pneumatic energy.

Once all the equipment in the affected area is locked out, the "one and only key" for the locks used is to be placed in a secure lockable box, and a lockout scissor(s) placed on the box. Each employee working in the area affected must then place his own personal lockout lock on the scissors before entering the area to commence work.

Procedure (Con't)

- A complete list of the drives, air valves and hydraulic valves that were locked out under the lock box system is to be made as the equipment is locked out. This list is to include the MCC number as well as an equipment description. The list is then to be posted beside the lock box so that workers can check to ensure that they are not entering an area that is not covered by the lock box system.
- The contractor/vendor representative(s) and the mill representative that conducted the lockout tour are required are to sign the list before it is posted.
- A copy of the list is to be kept in a secure location in the event that the original list is damaged or destroyed.
- A sign-up sheet will be posted beside the lock box. Each employee is to sign the sheet when his lock is placed on the lock box, and again when his lock is removed from the lock box.

Lock Removal Record

- In an emergency, the *Team Leader/Supervisor or Manager* may remove a lockout lock belonging to another employee. This procedure must be performed in consultation with a *Safety Committee Member* or another employee familiar with the machinery if a committee member is not reasonably available.
- This form must be completed any time a lockout lock is removed by a *Team Leader/Supervisor or Manager*.
- All reasonable efforts must be made to determine the employee's whereabouts and to determine whether the machine is safe to start prior to removing the lock.
- Any employee who removes a lockout lock belonging to another employee assumes personal liability for the consequences of their actions.
- The *Team Leader/Supervisor* must inform the employee their lock was removed at the start of their next shift.
- A lock belonging to an employee on shift cannot be removed until the employee is located.
- Prior to energizing and starting, all machine parts must be in continuous view by Supervisor and a designate/s (including basement, drives, etc.) to make sure employee has not re-entered machine.
- When certain that the equipment is safe, the Supervisor may remove lock and energize the switchgear

Lock Removal Record Forms for L&M are kept on top of the Lock Cabinet in the Quality Control Office in the Sawmill.

Lock Removal Record		008
Introduction		
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Basic Information		
Date:	Lock #:	
Time:	Owner Name:	
Location:	Team Leader / Supervisor Name:	
Search for Employee		
Description	Checked	Search Results
Machinery / Equipment Checked Throughout	<input type="checkbox"/> YES	<input type="checkbox"/> Owner Found <input type="checkbox"/> Owner Not F
Residence Phoned	<input type="checkbox"/> YES	Notes:
Lunchroom Checked	<input type="checkbox"/> YES	
Washroom Checked	<input type="checkbox"/> YES	
Parking Lot checked	<input type="checkbox"/> YES	
Other:	<input type="checkbox"/> YES	
Equipment Assessed		
Is the machinery / equipment safe to operate?	<input type="checkbox"/> YES <input type="checkbox"/> NO	<i>If No, why?</i>
Machinery / Equipment Check By:		
Lock Removal		
Lock Removed By (Print):	Safety Committee or Other Witness (Print)	
Lock Removed By (Sign):	Safety Committee or Other Witness (Sign)	
<input type="checkbox"/> Removed Lock Provided to Owner		
Additional Notes:		
COMPANY COPY		

This form is to be filled out completely and signed