


Lockout / Tagout Control of Hazardous Energy

Environmental & Occupational Health Support Services (EOHSS)
Campus Services Building, Room 202
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Lockout / Tagout : Agenda

- ✓ Review OHS Requirements
- ✓ Review Purpose of Lockout
- ✓ Review Lockout Procedures
- ✓ Review RMM #306 (LOTO Program)
- ✓ Video





Why is LOTO Important?

- Every year in North America workers are killed or seriously injured due to machinery or equipment that is not properly locked out.
- Improper lockout of machinery may result in severed fingers, crushed limbs, or death.
- Improper lockout of electrical equipment may result in electrical shock, burns, or electrocutions.



Mississauga Company Fined \$50,000 After Worker Injured (June 13, 2008)

- An employee was working in the electrical room removing an existing 60 amp circuit breaker so it could be upgraded to a 100 amp circuit breaker. The power to the electrical panel was not disconnected and locked out. As the worker proceeded, an explosion occurred, injuring the worker's face and head.
- An MOL investigation concluded that the company had not established or implemented any written procedures.
- In addition to the fine, the court imposed a 25-per-cent victim fine surcharge.



School Board Fined \$100,000 After Worker Death (September 11, 2007)

- Technician was accessing an electrical panel using a laptop computer in order to troubleshoot a mechanical problem when the technician was found collapsed on the floor in a mechanical room. The technician died as a result of an electrocution.
- An MOL investigation found that the technician, who was not wearing personal protective equipment, either fell into or accidentally touched the live high-voltage electrical panel.
- The School Board's procedures did not state when personal protective equipment was required for work near live power. The School Board pleaded guilty to having insufficient procedures for working safely on or near live power.
- In addition, the court imposed a 25-per-cent victim surcharge.



McMaster Incident / MOL Orders

- Worker cleaning meat slicer.
- Meat Slicer was unplugged.
- Employee was not trained.

MOL Order:

Pursuant to the Act section 25(2)(a), the employer shall provide machine lockout information and instruction to workers required to lockout in the Student Centre Catering Kitchen to protect the health and safety of the workers.

McMaster Incident

- Electrical lines for lab benches use a large plug, the lines are plugged in under the sink areas.
- Due to a leak, a plug filled with water.
- A worker reassembled the plug and when he plugged it in it shorted out (large boom and flash of light under the bench).
- It was unsafe to use the plug, but no one locked out the breaker.

Lockout / Tagout: OSHA Requirements

Construction Projects – Regulation 213/91

- Section 188

Health Care & Residential Facilities – Regulation 67/93

- Section 66
- Section 67

Industrial Establishments – Regulation 851

- Section 42
- Section 76

❖ The University is classified as an Industrial Establishment




What is LOTO?

- Employing a lock or locks to make machinery or equipment inoperable, or to isolate an energy source.
- Lockout ensures that devices (switch, circuit breaker, or valve) cannot be operated while workers perform maintenance on machinery or equipment.



When is LOTO Required?

- If injury can be caused by machinery or equipment activating without warning.
- If injury can be caused by an unforeseen release of energy.



When is LOTO Required?

Adhere to the following steps to verify if lockout is required:

- 1) Review the area where work needs to be completed.
- 2) Identify all energy sources.
- 3) Ask yourself: Is there a potential hazard for workers if energy is released?


If there is a hazard to workers, lockout is required

OHSA Requirements: When is LOTO Required?

Regulation 851 – Industrial Establishments

Section 42.(1)
The power supply to electrical installations, equipment or conductors shall be disconnected, locked out of service and tagged before any work is done, and while it is being done, on or near live or exposed parts of the installations, equipment or conductors.

Section 42.(2)
Before beginning the work, each worker shall determine if the requirements of subsection (1) have been complied with.



When is LOTO not Required?

Lockout is not required during “normal production work” in the following circumstances:

- 1) After all sources of energy are considered, there are no potential hazards for workers if energy is released.
- 2) If there is a risk of injury, decide if the machinery or equipment is adequately safeguarded to protect workers from injury. If the machinery or equipment is adequately safeguarded, lockout is not required.
- 3) Safe work procedures must always be followed.



When is LOTO not Required? OSHA Requirements

Regulation 851 – Industrial Establishments

Section 42.(3)
 Locking out is not required.

- (a) if the conductors are adequately grounded with a visible grounding mechanism; or
- (b) if the voltage is less than 300 volts and there is no locking device for the circuit breakers or fuses and procedures are in place adequate to ensure that the circuit is not inadvertently energized.

Section 42.(4)
 If locking out is not required for the reason set out in clause (3)(b), the employer shall ensure that the procedures required by that clause are carried out.




Hazards in the Workplace from Electrical Contact

- Equipment
- Panels
- Fixtures
- Generators
- Motors



Mechanical Hazards in the Workplace

- Belts, Conveyors
- Objects or Materials in Motion
- Charged Objects (i.e. spring loaded)
- Gravity




Who is Responsible for LOTO?

Employer

Supervisor

Worker



LOTO Procedural Guidelines: RMM #306

- 1) Assess type of lockout required and ensure that written procedures are in place (individually controlled/centrally controlled).
- 2) Assess type of lockout equipment required to control accidental release of energy and hazardous materials (padlocks, tags, bars, chains, etc.).
- 3) Inform other people affected by the shutdown of the equipment or machinery.
- 4) Assess and identify all energy sources to and from the machinery, equipment or pressure systems.
- 5) Identify the shutdown procedures necessary to achieve a zero energy state.



LOTO Procedural Guidelines: RMM #306

- 6) Isolate all energy sources (electrical and mechanical energy, pneumatic, hydraulic, steam and gas pressure, vacuum, cryogenic gases and gravity).
- 7) Use padlocks, lockout bars, chains, blocks and blanks as necessary to isolate energy sources.
- 8) Take steps necessary to dissipate any stored energy (compressed air, hydraulic pressure, electrical and mechanical energy).
- 9) Verify that all energy sources have been isolated.
- 10) Ensure that all persons authorized to work on the machinery, equipment or pressure system, apply a Lockout and Tagout to all energy isolating devices and retain possession of the key.



LOTO Procedural Guidelines: RMM #306


- 11) Information on Tags shall identify the date, machine, equipment or pressure system being serviced, authorized persons name and supervisor's name.
- 12) Identify the sequence of steps to be taken by authorized persons to remove the padlocks and tags and re-energize the machinery, equipment or pressure system after service has been completed.
- 13) Notify affected persons that the machine, equipment or pressure system has been returned to service.



LOTO – When is an Electrician Required?


- Isolating an electrical power source.
- Electrician's must review and ensure that all power sources are neutralized.
- Electrician's must place their personal lock on the point of lockout.






Multiple Person LOTO

- Every person responsible for working on the machinery or equipment must lockout.
- Numerous people can lockout using a multiple lockout clasp.
- The person who applies the first lock must ensure that the equipment will not start.
- The person who removes the last lock must ensure that the area is clear and the equipment can be safely restarted.






Multiple Person LOTO: OSHA Requirements

Regulation 851 – Industrial Establishments

Section 42.(5)
 If more than one worker is involved in the work referred to in subsection (1), the worker who disconnected and locked out the power supply shall communicate the purpose and status of the disconnecting and locking out.






Locks and Tags

- Standard padlocks are issued on an individual basis – Only assigned to authorized persons.
- Waterproof tags are provided to authorized persons.
- Multiple Lockout Clasps are issued to authorized persons to accommodate multiple locks.
- If required, a supply of lockout devices are provided to authorized persons.





Lockout Tag

LOCKED OUT

DO NOT REMOVE

THIS DEVICE IS LOCKED OUT TO PROTECT THE WORKER IN A STATE OF EMERGENCY.

UNAUTHORIZED REMOVAL OF THIS LOCK COULD BE FATAL TO THE WORKER USING THE EQUIPMENT.

Do not use equipment with

NAME OF PERSONAL ITEM OR LOCK: _____

DATE LOCKED OUT: _____

WORKER'S NAME: _____

TITLE/DESCRIPTION OF WORK BEING DONE: _____

CONTACT NUMBER: _____

MACHINE NO. / ID: _____

LOCATION: _____

DATE LOCKED OUT: _____

UNLOCKED BY: _____

DATE UNLOCKED: _____



Tagout: OSHA Requirements

Regulation 851 – Industrial Establishments

Section 42.(6)

If a tag is used as a means of communication, the tag,

- (a) shall be made of non-conducting material;
- (b) shall be secured to prevent its inadvertent removal;
- (c) shall be placed in a conspicuous location;
- (d) shall state the reason the switch is disconnected and locked out;
- (e) shall show the name of the worker who disconnected and locked out the switch; and
- (f) shall show the date on which the switch was disconnected and locked out.



LOTO Removal Procedure

PERSONAL LOCKS MAY ONLY BE REMOVED BY THE PERSON WORKING ON THE MACHINERY OR EQUIPMENT

If this is not possible, the following process must be carried out before a lock is removed:

- A Supervisor must make every reasonable attempt to contact the owner of the lock.
- A Supervisor must ensure the equipment or machinery can be operated safely.
- Worker's must be advised that a personal lock has been removed.

LOTO Records

To facilitate external audits by regulatory agencies (i.e. MOL), copies of all Lockout Procedures must be retained for a minimum of three years by:

- The Department responsible for the Lockout / Tagout Procedures
- Environmental & Occupational Health Support Services / FHSc Safety Office



LOTO: OSHA Requirements

Regulation 851 – Industrial Establishments
Section 42.(7)
The employer shall establish and implement procedures for compliance with this section.

LOCKOUT / TAGOUT SAVES LIVES!





Electrical Safety

Environmental & Occupational Health Support Services (EOHSS)
 Campus Services Building, Room 202
 Email: eoahss@mcmaster.ca Extension: 24352






Electrical Safety: Agenda


- ✓ Review Importance of Electrical Safety
- ✓ Review Electrical Safety Injuries/Fatalities
- ✓ Review GFCI's
- ✓ Review Electrical Safety Tips
- ✓ Review RMM #316 (Electrical Safety Program)





Waterloo Company Fined \$100,000 After Worker Death (September 12, 06)

- Fined \$100,000 on September 7, 2006 for a violation of the Occupational Health and Safety Act that resulted in the death of an employee.
- A worker was moving a machine that converts raw meat into specific product shapes when a live, 600-volt overhead electrical cord got caught in the machine and resulted in the worker being fatally electrocuted.
- At the time of the incident, the worker was wearing wet leather work boots and was likely standing on a wet floor near a drain.
- Employer pleaded guilty to failing to ensure the machine was moved in such a way, and with such precautions, so as to ensure its moving did not endanger the worker's safety, as required by Section 45(a) of the Regulations for Industrial Establishments.
- In addition, the court imposed a 25-per-cent victim fine surcharge.




Why is Electrical Safety Important?

Since 1998, there have been 69 deaths in Ontario

- 68 deaths resulting from electrical shock
- 1 death resulting from arc flash

(Canadian Society of Safety Engineering, 2016)

The electrical current in regular businesses and homes has enough power to cause death by electrocution.



What is an Electrical Shock?

Electricity will always find the easiest path to the ground, as a result, electricity will flow through metal, water or even a human body!



Electrical Injuries

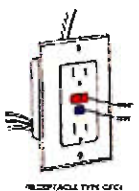
There are four types of injuries resulting from electrical currents:

- Electrocution (fatal)
- Electrical Shock
- Burns
- Falls

What is a GFCI?

Ground Fault Circuit Interrupter:

- Detects any loss of electrical current in a circuit.
- If a loss of electrical current is detected, the GFCI turns the electricity off before injuries or electrocution occurs.
- A GFCI should be used as a protective measure and is not a replacement for safe work practices.
- A GFCI should be installed in all outdoor, bathroom, kitchen, basement, and garage circuits.




RECTANGULAR TYPE GFCI


Electrical Safety Tips


Routinely check for:

- ✓ Damaged electrical cords or plugs.
- ✓ Fuses that blow, or circuit breakers that trip.
- ✓ Extension cords used as permanent wiring.
- ✓ Overloaded Electrical Outlets.
- ✓ Cords that are missing three prongs.



ELECTRICAL SAFETY SAVES LIVES!






McMaster – Reporting Hazards

- ✓ Importance of reporting: For every serious injury, there are 600 near misses!
- ✓ All employees of the University have a legal obligation to report hazards.

Regular Business Hours:

- *Facility Services* (formally known as Physical Plant) customer service desk ext 24740 { inside buildings, stairs leading to buildings, fire exits} or;
- *Grounds* at ext 24632 {snow removal of pathways, sidewalks, roads, parking lots}
- *Parking* at ext. 24232 {repairs to pathways, sidewalks, roads, lots}
- *Emergency?* [On Campus, dial 88, FHSc: 5555, DTC: 911]
- *Injured?* Main Campus/DTC: Call ext. 24352. FHSc: ext 24956



References

Canadian Centre for Occupational Health and Safety. Electrical Safety – Basic Information; 2008.

Electrical Safety Authority. Lockout & Tagout; 2008.

Ministry of Labour. Court Bulletins; 2008.

Occupational Health & Safety Act. Regulation 851-Industrial Establishments (Section 42); 2008.

Risk Management Manual #306. Lockout / Tagout (LOTO) Program for the Control of Hazardous Energy; 2008.

Worksafe BC – Worker's Compensation Board. Lockout; 2008.
