

Machine Guarding Blitz (External)

November 3 to December 14, 2014

Safe At Work Ontario
Enforcement > Compliance > Partnership >

Ministry of Labour

Note:

This presentation has been prepared to assist the workplace parties in understanding their obligations under the Occupational Health and Safety Act (OHSA) and the regulations. This document does not constitute legal advice. To determine your rights and responsibilities under OHSA, please contact your legal counsel or refer to the legislation.

Focus

- The primary focus of this inspection blitz is machine guarding and lockout of machines and equipment.
- In support of the many other ministry health and safety priorities, Inspectors will also check for:
 - Internal Responsibility System (IRS)
 - hazards that can lead to musculoskeletal disorders (MSDs),
 - exposure to chemicals (such as metal working fluids and degreasing solvents) that can cause occupational disease

Workplace Selection

Inspectors will focus on the following sub-sectors during this Blitz:

- automotive
- food and beverage
- wood and metal fabrication
- textiles and printing
- chemical, rubber and plastics
- ceramics
- logging (sawmills)
- pulp and paper

Rationale for Guarding and Lockout Focus

- Improper or non-existent guarding and lockout of machines and equipment can result in disfiguring injuries, amputations and death. The following LTIs were reported by WSIB in 2012:
 - 1,976 LTIs (lost time injury claims) for caught in or compressed by equipment
 - 305 LTIs for rubbed or abraded by friction, pressure or jarred by vibration
 - 367 amputations
- The MOL enforcement statistics for the 2013 calendar year are as follows:
 - Approximately 17% of all orders (written under Regulation 851) related to guarding and lockout contraventions
 - Approximately 1.5% of all orders (written under Regulation 851) related to lockout contraventions

Roles and Responsibilities

- Employers, supervisors and workers have responsibilities under the *Occupational Health and Safety Act* (OHSA) and the Regulation for Industrial Establishments (R.R.O. 1990, Reg. 851). Some of the responsibilities may include:

Employers must:

- Provide appropriate information, instruction and supervision to protect workers (OHSA, clause 25(2)(a)) (i.e. training in lock-out and guarding procedures)
- Ensure that the equipment provided is maintained in good condition (OHSA, clause 25 (1) (b)) (i.e. by replacing/ repairing damaged components of a machine)

Roles and Responsibilities

Employers must:

- Ensure appropriate guarding:
 - When a hazard exists from a exposed moving part that may endanger a worker it is required to be guarded by a guard or other device that prevents access to the moving part (Reg. 851, section 24)
 - Any machine that has an in-running nip hazard that may endanger a worker must be equipped with a guard or other device to prevent access to the pinch point (Reg. 851, section 25)
 - An operating controls that act as a guard for a machine not otherwise guarded (Reg. 851 section 28) shall:
 - be in a location where the safety of the operator is not endangered by moving machinery
 - be arranged so that it cannot be operated accidentally
 - not be made ineffective by a tie-down device or other means

Roles and Responsibilities

Employers must:

- Ensure appropriate lockout and blocking procedures:
 - A machine should only be cleaned, oiled, adjusted, repaired or have maintenance on it when motion that could endanger the worker is stopped and any stopped part that could move has been blocked (Reg. 851, section 75)
 - Where the starting of a machine may endanger a worker, lock out control switches or other control mechanisms, and take other effective precautions to prevent any starting (Reg. 851, section 76)

Roles and Responsibilities

Supervisors must:

- Take every reasonable precaution in the circumstances for the protection of workers [27(2)(c) of OHSA]
- Ensure workers comply with the OHSA and its regulations [27(1)(a) of OHSA]
- Ensure workers use any equipment, protective devices or clothing required by the employer [27(1)(b) of OHSA]
- Advise workers of any potential or actual health and safety dangers [27(2)(a) of OHSA]

Workers must:

- Participate in training including lockout and guarding [28(1)(a) of OHSA]
- Follow lock-out and guarding procedures [28(1)(a) of OHSA]
- Report machine hazards and other workplace hazards to their supervisor [28(1)(d) of OHSA]
- Use or operate machinery in a safe manner [28(2)(b) of OHSA]

Commonly Used Machine Guards

Type of Machine Guards			
Type	Method of Safeguarding	Advantages	Limitations
Fixed	Barriers that allows for stock feeding but does not permit operator to reach the danger area.	<ul style="list-style-type: none"> • Can be constructed to suit many applications. • Permanently encloses the point of operation or hazard area. • Provides protection against machine repeat. • Allows simple, in-plant construction, with minimal maintenance. 	<ul style="list-style-type: none"> • Sometimes not practical for changing production runs involving different size stock or feeding methods. • Machine adjustment and repair often require guard removal. • Other means of protecting maintenance personnel often required (lockout/tagout).
Adjustable	Barriers that adjust for a variety of production operations	<ul style="list-style-type: none"> • Can be constructed to suit many applications. • Can be adjusted to admit varying stock sizes. 	<ul style="list-style-type: none"> • May require frequent maintenance or adjustment. • Operator may make guard ineffective.

Commonly Used Machine Guards continued

Type of Machine Guards			
Type	Method of Safeguarding	Advantages	Limitations
Self-Adjusting	Barriers that move according to the size of the stock entering point of operation. Guard is in place when machine is at rest and pushes away when stock enters the point of operation.	<ul style="list-style-type: none"> Off-the-shelf guards are often commercially available. 	<ul style="list-style-type: none"> Does not provide maximum protection. May require frequent maintenance and adjustment.
Interlocking Barrier Guards	Shuts off or disengages power and prevents machine start-up when guard is open.	<ul style="list-style-type: none"> Allows some access to clear minor jams without time – consuming removal of fixed guards. 	<ul style="list-style-type: none"> May require periodic maintenance or adjustment. Movable sections cannot be used for manual feeding Some designs may be easy to defeat. Interlock control circuitry may not be used for maintenance and servicing work.

Types of Safeguarding

Type of Safeguarding Devices			
Type	Method of Safeguarding	Advantages	Limitations
Pullback Devices	Cords connected to operator's wrists and linked mechanically to the machine automatically withdraw the hands from the point of operation during the machine cycle.	<ul style="list-style-type: none"> • Allows the hands to enter the point of operation for feeding and removal. • Provides protection even in the event of mechanical repeat. 	<ul style="list-style-type: none"> • Close supervision ensures proper use and adjustment. Must be inspected prior to each operator change or machine set-up. • Limits operator's movement and may obstruct their work space. • Operator may easily make device ineffective by not adjusting the device properly.
Restraint and/or Sensing Devices	Interlock into the machine's control system to stop operation when the sensing field (photoelectric, radio frequency, or electromagnetic) is disturbed.	<ul style="list-style-type: none"> • Adjusts to fit different stock sizes. • Allows access to load and unload the machine. • Allows access to the guarded area for maintenance and set-up activities. 	<ul style="list-style-type: none"> • Restricted to machines that stop operating cycle before operator can reach into danger area (e.g., machines with partial revolution clutches or hydraulic machines). • Must be carefully maintained and adjusted. • Does not protect operator in the event of a mechanical failure. • Operator may make device ineffective.

Types of Safeguarding ... continued

Type of Safeguarding Devices			
Type	Method of Safeguarding	Advantages	Limitations
Presence-Sensing Mats	Interlock into machine's control system to stop operation when a predetermine weight is applied to the mat. A manual reset switch must be located outside the protected zone.	<ul style="list-style-type: none"> • Full visibility and access to the work area. • Install as a perimeter guard or over an entire area. • Configure for many applications. 	<ul style="list-style-type: none"> • Restricted to machines that stop operating cycle before operator can reach into danger area (e.g., machines with part revolution clutches or hydraulic machines). • Some chemicals can degrade the mats. • Does not protect operator during mechanical failures.
Two-Hand Control	Requires concurrent and continued use of both hands, preventing them from entering the danger area.	<ul style="list-style-type: none"> • Operator's hands are at a predetermined safety distance. • Operator's hands are free to pick up new parts after completion of first part of cycle. 	<ul style="list-style-type: none"> • Requires a partial cycle machine with a brake and anti-repeat feature. • Operator may make devices without anti-tie down ineffective. • Protects the operator only.

Types of Safeguarding ... continued

Type of Safeguarding Devices			
Type	Method of Safeguarding	Advantages	Limitations
Two-Hand Trip	Requires concurrent use of both hands, prevents them from being in danger area when machine cycle starts.	<ul style="list-style-type: none"> • Operator's hands are at a predetermined safety distance. • Can be adapted to multiple operations. • No obstructions to hand feeding. 	<ul style="list-style-type: none"> • Operator may make devices without anti-tiedown ineffective. • Protects the operator only. • May require adjustment with tooling changes. • Requires anti-repeat feature.

Why is Lockout necessary?

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

- Cuts, bruises, crushing, amputations, death, resulting from:
 - Entanglement with belts, chains, conveyors, rollers, shafts, impellers

Energy forms, energy sources and lockout considerations

Energy Form	Energy Source	Lockout Considerations
Hydraulic Energy	hydraulic systems (e.g., hydraulic presses, rams, cylinders, hammers)	shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves; bleed off and blank lines as necessary.
Pneumatic Energy	pneumatic systems (e.g., lines, pressure reservoirs, accumulators, air surge tanks, rams, cylinders)	shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves; bleed off excess air; if pressure cannot be relieved, block any possible movement of machinery.
Kinetic Energy (energy of a moving object or materials moving object may be powered or coasting)	blades; flywheels; materials in supply lines of bins or silos	stop and block machine parts (e.g., stop flywheels and ensure that they do not recycle); review entire cycle of mechanical motion, ensure that all motions are stopped. block material from moving into area of work; blank as required.
Potential Energy (stored energy that an object has the potential to release due to its position)	springs (e.g., in air brake cylinders); actuators; counterweights; raised loads; top or movable part of a press or lifting device	if possible, lower all suspended parts and loads to the lowers (rest) position, block parts that might be moved by gravity; release or block spring energy.
Thermal Energy	supply lines; storage tanks and vessels	shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves; bleed off excess liquids or gases; blank lines as necessary.

Lockout Prosecution

- **Manufacturer of Corrugated Products fined \$70,000 for failing to lockout a machine (worker injured) and co-worker fined \$2,000 for operating equipment in unsafe manner**
 - A worker entered a stacker machine to remove a build-up of glue on the machine. The injured worker had stopped the machine by opening its door which disconnected an interlock switch and disabled power to the machine, as per the user manuals and training provided by the manufacturer.
 - A spring loaded latch blocked and prevented the door from accidentally closing.
 - Another worker pulled back the spring loaded latch and closed the door of the stacker machine while a worker was still inside of it. The machine powered back on and cycled. A separator moved and impaled the worker who could not get out of the way.

Lockout Prosecution... continued

- All sources of power to the machine were not locked out by the injured worker, which would have absolutely assured that the machine would not cycle.
- The company failed to ensure that where the starting of the machine endangered the worker, the control switches or other control mechanisms were locked out and the starting of the machine was prevented.
- The co-worker did commit the offence of, as a worker, using or operating any equipment, machine, device or thing or working in a manner that may endanger himself or any other worker contrary to clause 28(2)(b) of OHSA.
- The co-worker was unaware that the machine was not locked out and did not know that closing the door would restart the machine.

Key Focus for Inspectors – Blocking

Inspectors will focus on the following key priorities to ensure:

- employers are ensuring that a part of a machine shall be cleaned , oiled, adjusted, repaired or have maintenance work performed on it only when any motion that may endanger a worker has stopped and that may subsequently move and endanger a worker has been blocked to prevent its movement

Blocking

- Applicable requirements: section 76 of Reg. 851
- Anyone who operates, cleans services, adjusts or repairs machinery or equipment must be aware of the hazards associated with that machinery.
- Every year workers die or are critically injured because the equipment they are working on does not have adequate blocking installed.
- It is critical to block all forms of hazardous energy, including gravity, hydraulic pressure, or stored electrical or mechanical energy.
- The lack of blocking allows equipment to move or drop, striking workers, leading to fatal and critical accidents.
- Additional information can be found at:
 - MOL Alert: Equipment Blocking
<http://www.labour.gov.on.ca/english/hs/pubs/alerts/a23.php>

Prosecution for Failing to Block Motion

- **Auto Parts Manufacturer fined \$55,000 for failing to block machine to prevent movement (worker injured)**
 - An automotive parts manufacturer was fined \$55,000 for a violation of the OHSA after a worker was injured.
 - Workers were clearing pallets that had jammed on an assembly line. One worker had a hand on the conveyor of a machine when part of the machine cycled down, crushing the worker's hand and causing muscle damage.
 - A Ministry of Labour investigation found that the power to that part of the assembly line had been disconnected, but there was still residual energy in one of the machine's cylinders, causing it to cycle.
 - The company pleaded guilty to failing to ensure that the machine was blocked to prevent movement while it was being maintained.

Key Focus – Musculoskeletal Disorder (MSD) Prevention

The ergonomics portion of the Manufacturing Blitz will focus on potential MSD hazards associated with activities that may be in an industrial establishment. Employers should address the following MSD hazards:

1) Loading and Retrieving Items into/from a Machine

- MSD hazards that can be associated with loading or retrieving items into/from a machine can include repetition, force, awkward or sustained postures, prolonged standing, or prolonged sitting.

2) Installing/Removing Guards

- Awkward postures and/or high forces can be associated with installing or removing guards.

More information on MSD and Ergonomics is available on the MOL website at:
<http://www.labour.gov.on.ca/english/hs/topics/pains.php>

Key Focus for Inspectors – Internal Responsibility System (IRS)

Inspectors will focus on whether employers are ensuring that the requirements respecting the establishment and maintenance of a comprehensive IRS are being met.

In addition, Inspectors will focus on the following key priorities to ensure employer's are complying with OHSA requirements (as applicable to the workplace), including but not limited to:

- Health and safety policy and program to implement the policy.
- Workplace violence and harassment policies and programs.
- Joint Health and Safety Committee or Health and Safety Representative.
- Posting requirements (e.g. OHSA, Health & Safety at Work poster, etc.).
- Mandatory health and safety awareness training (O. Reg. 297/13 effective July 1, 2014).

Key Focus for – Occupational Disease

Inspectors will focus on the following key priorities to ensure:

- employers have taken adequate measures to protect workers from exposure to chemicals that could cause an occupational disease.

An occupational disease due to chemicals is a condition that results from a worker exposed to a chemical agent to the extent that normal physiological mechanisms are affected and the health of a worker is impaired. It includes an occupational disease for which a worker is entitled under the Workplace Safety and Insurance Act 1997.

Occupational Disease – Metal Working Fluids

A focus will be given to metal working fluids.

- Metalworking fluids comprise a range of oils and other liquids that are used to cool and lubricate metal work pieces when they are being machined, ground, milled, etc. Workers can be exposed to metalworking fluids during application through skin contact or inhalation.

Occupational Disease – Degreasing Solvents

A focus will be given to degreasing solvents.

- Solvent degreasing is a process to prepare a part for further operations such as electroplating and painting. Typically it uses petroleum- or alcohol-based solvents to dissolve the machining fluids and other contaminants on the part. Exposure can occur through skin contact and inhalation.

Occupational Disease – Occupational Dermatitis

General Awareness

- Occupational skin disease represents 8.5% of all occupational disease claims to WSIB.
- Dermatitis is the most prevalent form, with 1,200 to 1,500 claims in Ontario annually, but it is believed that less than half of the cases are reported.

Note: The source of these statistics is from a WSPS Fact Sheet entitled: General Awareness of Occupational Skin Disease and the link is:

http://www.wsps.ca/WSPS/media/Site/Resources/Downloads/WSPS_Dermatitis_General_Awareness.pdf?ext=.pdf

- Occupational dermatitis (OD) is often characterized by a rash and dry, cracked skin. It can cause significant pain, discomfort, and can be debilitating, limiting the ability to work and the quality of life.

Occupational Disease - Occupational Dermatitis (OD)

Causes

- OD is generally caused by prolonged and frequent skin contact with a range of chemicals, including metalworking fluids and degreasing solvents.
- Other common risk factors include wet-work, mechanical irritation of the skin, and the prolonged use of dirty gloves.
- Dermatitis can develop acutely or develop over time becoming a chronic disease. A history of pre-existing allergies or skin disease has been associated with increased risk.

Resources – Occupational Dermatitis

- [General Awareness of Occupational Skin Disease \(Fact Sheet\)](#)

http://www.wsps.ca/getmedia/d629a960-69eb-46ed-95c4-43f59b1d40d8/WSPS_Dermatitis_General_Awareness.pdf.aspx?ext=.pdf

Occupational skin disease fact sheet providing general awareness recommendations. This document is part of a suite consisting of 3 fact sheets. The purpose is to provide high level occupational skin disease overview and education.

Thank You