

PART 16

MACHINES, TOOLS AND ROBOTS

DIVISION 1

Application

16.1 This Division applies to every workplace where a machine or tool is used.

Safe work procedures

16.2(1) An employer must

- (a) develop and implement safe work procedures respecting all machines and tools used in the workplace;
- (b) train workers in the safe work procedures; and
- (c) ensure that workers comply with the safe work procedures.

16.2(2) The safe work procedures must include practices and procedures dealing with the lockout of machines used in the workplace.

Duty to inform workers

16.3 An employer must ensure that a worker is

- (a) informed of any risks associated with a machine or tool used in the workplace; and
- (b) provided with information, instruction and training in the safe use and operation of the machine or tool.

MACHINE AND TOOL SAFETY

Machine and tool safety

16.4(1) An employer must ensure that any machine or tool in the workplace is

- (a) capable of safely performing the functions for which it is used; and
- (b) used, inspected and operated in accordance with
 - (i) the manufacturer's specifications, and

(ii) the safe work procedures for the workplace.

16.4(2) An employer and the supplier of any machine or tool must ensure that the installation, testing, repair and maintenance of or any modification to any machine or tool is carried out in accordance with

(a) the manufacturer's specifications; or

(b) the specifications certified by a professional engineer.

16.4(3) An employer and a supplier must ensure that any machine or tool under his or her control is inspected at regular intervals to ensure that, so far as reasonably practicable, the machine or tool is capable of

(a) withstanding any stress that is or is likely to be imposed on it; and

(b) safely performing the functions for which it is used.

Safeguards required

16.5(1) Subject to section 16.6, an employer must ensure that a machine has safeguards on it that will prevent a worker from coming into contact with the following hazards:

(a) moving parts on the machine;

(b) points of the machine at which material is cut, shaped or bored;

(c) surfaces with temperatures that may cause skin to freeze, burn or blister;

(d) energized components;

(e) debris, material or objects thrown from a machine;

(f) material being fed into or removed from the machine;

(g) any other hazard that may pose a risk to the safety or health of the worker.

16.5(2) An employer must ensure that any safeguard required under this Part is designed, constructed, installed, used and maintained in accordance with CSA Standard Z432-04, *Safeguarding of Machinery*.

Alternative mechanism

16.6(1) When it is not reasonably practicable to provide a safeguard on a machine, an employer must ensure that an alternative mechanism, system or change in work procedure is put into place to protect the safety and health of a

worker.

16.6(2) An alternative mechanism, system or change in work procedure must offer protection to a worker that is equal, or greater to, the protection provided by a safeguard that meets the requirements of section 16.5.

Removing a safeguard

16.7(1) No person may remove a safeguard or make it ineffective unless it is necessary to perform servicing, repairs, tests, cleaning, maintenance or adjustments on or to the machinery that cannot be done with the safeguard in place.

16.7(2) When a safeguard is removed or made ineffective for the purposes of subsection (1), an employer must ensure that

- (a) alternative protective measures are in place until the safeguard is replaced;
- (b) the safeguard is replaced immediately after the task is completed; and
- (c) the safeguard functions properly once replaced.

16.7(3) When a safeguard is removed or made ineffective for the purposes of subsection (1) by a worker who does not directly control the machine, an employer must ensure that the worker who removes the safeguard or makes it ineffective locks out the machine in accordance with the requirements of this Part.

Operating controls

16.8 An employer must ensure that

- (a) the operating controls of a machine
 - (i) are readily and clearly identifiable,
 - (ii) are located within reach of the operator, and
 - (iii) cannot be activated by inadvertent contact; and
- (b) subject to subsection 16.19(1), a machine is equipped with a stopping device that is
 - (i) readily and clearly identifiable, and
 - (ii) located in the direct view and within reach of the operator at all times.

Worker apparel

16.9 When there is a risk that a worker or a worker's apparel may come into contact with a moving part of a machine, an employer must ensure that the worker

- (a) wears close-fitting clothing;
- (b) confines long hair with a hairnet, close-fitting cap, close-fitting headwear or some other effective means; and
- (c) does not wear dangling neckwear, jewelry, wristwatches, rings or other similar items that may create a potential hazard.

Starting a machine

16.10 The operator of a machine must ensure that the starting of the machine does not endanger the operator or any other person.

Warning system

16.11(1) When the operator of a machine does not have a clear view of all parts of the machine and the surrounding area, an employer must ensure that the machine is equipped with

- (a) an audible alarm system that provides a warning of sufficient volume and for a sufficient period before start-up of the machine to alert a person of the imminent start-up; or
- (b) a distinctive and conspicuous visual warning system to alert a person of the imminent start-up.

16.11(2) An employer must place clearly visible warning signs at each point of access to a machine that starts automatically. The warning signs must give clear instructions to a worker on the nature of the hazard posed by the machine.

Vibrations

16.12 An employer must not install or place any machine in a workplace that may cause vibrations that would pose a risk to the safety or health of any person.

Unattended or suspended machines

16.13 An employer must ensure that a worker does not leave a machine or any part of a machine unattended or in a suspended position unless the machine or part has been

- (a) immobilized and secured against movement; or
- (b) enclosed by a safeguard to prevent access by any other worker to the

machine or part.

LOCKOUT

Locking out - safety precautions

16.14(1) Subject to subsections (3) and (4), when a machine is serviced, repaired, tested, cleaned, maintained or adjusted, an employer must ensure that no worker performs work on the machine until it has come to a complete stop and the worker performing work on the machine has

(a) locked out the machine and removed and rendered safe any hazardous condition; or

(b) otherwise rendered the machine inoperative in a manner that prevents reactivation and provides protection that is equal to, or greater than, the protection provided by clause (a).

16.14(2) An employer must ensure that a worker does not perform work on a machine that is to be serviced, repaired, tested, cleaned, maintained or adjusted until

(a) the machine is tested to ensure that it is inoperative; and

(b) the worker is assured that it is inoperative.

16.14(3) An employer must develop and implement safe work procedures for the service, repair, testing, cleaning, maintenance or adjustment of a machine when

(a) the manufacturer's specifications require the machine to remain operative when it is serviced, repaired, tested, cleaned, maintained or adjusted; or

(b) there are no manufacturer's specifications and it is not reasonably practicable to lockout the machinery when it is serviced, repaired, tested, cleaned, maintained or adjusted.

16.14(4) When it is not reasonably practicable to lockout the machinery when it is serviced, repaired, tested, cleaned, maintained or adjusted, an employer must ensure that the safe work procedures developed in subsection (3) offer protection to a worker that is equal to or greater than the protection provided by a lockout procedure.

Removing a lock

16.15(1) No person may remove a lock from locked out machinery unless the

person is the worker who installed the lock.

16.15(2) Despite subsection (1), a competent person designated by the employer may remove the lock in an emergency or when the worker who installed the lock is not available.

16.15(3) An employer must ensure that no worker returns a machine to operation after it has been locked out or rendered inoperable until the worker determines that no other person may be endangered by the operation of the machine.

Lock and key process

16.16(1) When the lockout procedure uses a lock and key, an employer must

(a) issue to each worker who is required or permitted to work on a machine a lock that is operable only by that worker's key or a duplicate key;

(b) designate a worker to keep the duplicate key;

(c) ensure that the duplicate key is accessible only to the designated worker;

(d) ensure that the lock used has a unique mark or identification tag on it that identifies the worker to whom the lock is assigned; and

(e) ensure that a logbook is kept to record the use of the duplicate key.

16.16(2) Where it is not reasonably practicable to use a worker's key to remove a lock, the employer may permit the designated worker to remove the lock if the designated worker has determined that

(a) the key used to lock the lock is not available; and

(b) it is safe to remove the lock and activate the machine.

16.16(3) When the lock has been removed, an employer must ensure that the worker who locked out the machine is informed of the removal of the lock.

Control of more than one machine

16.17 When a central automated system controls more than one machine, an employer must ensure that any machine to be serviced, repaired, tested, cleaned, maintained or adjusted is isolated from the central system before the lockout procedures are implemented.

Transitional: continued use of tag-out system

16.18 Despite the requirements of this Part, an employer may continue to

use a tag-out system at a workplace for no more than one year after this regulation comes into force if a tag-out system was in use at the workplace when this regulation comes into force.

ADDITIONAL SAFEGUARDS FOR CONVEYORS

Emergency stopping system for conveyor

16.19(1) An employer must ensure that a conveyor has an emergency stopping system that is readily accessible to workers working at the conveyor unless worker access to the conveyor is prevented by guarding or other means.

16.19(2) An employer must ensure that a conveyor emergency stopping system is designed and installed so that manual resetting is required before the conveyor can be restarted after an emergency stop.

16.19(3) An employer must ensure that a conveyor cannot be restarted after an emergency stop until an inspection has determined that the conveyor can be operated safely.

Emergency pull-cords

16.20 When the emergency stopping system uses emergency stop pull-cords, an employer must ensure that

(a) the pull-cords are clearly visible and readily accessible at the operator's normal control station and at other appropriate points; and

(b) the system is activated when

(i) the pull-cord is pulled in any direction,

(ii) the pull-cord breaks, or

(iii) the failure of a single spring in the pull-cord assembly occurs.

Elevated conveyors

16.21 If an elevated conveyor crosses over a place where a worker may pass or work, an employer must ensure that a suitable guarding system is provided to prevent materials on the conveyor from falling on the worker.

MISCELLANEOUS MACHINES AND TOOLS

Grinding machines

16.22(1) When a worker is operating a fixed or portable grinding machine, an employer must ensure that

- (a) an abrasive wheel is operated only where it is equipped with a safeguard;
- (b) an abrasive wheel is not operated in excess of the maximum speed specified by the manufacturer of the wheel;
- (c) the maximum speed of each grinder shaft in revolutions per minute is permanently marked on the grinder; and
- (d) the mounting flanges for an abrasive wheel have an equal and correct diameter for the wheel.

16.22(2) When a tool rest is installed on a fixed grinder, an employer must ensure that the tool rest is

- (a) installed in a manner that is compatible with the work process;
- (b) securely attached to the grinder; and
- (c) set not more than 3 mm from the face of the wheel or below the horizontal centre line of the wheel.

16.22(3) An employer must ensure that a worker does not use the sides of an abrasive wheel for grinding unless the abrasive wheel is designed for that use.

Storage of explosive-operated tools

16.23 An employer must ensure that when an explosive-operated tool is not in use it is not left unattended unless it is stored in a locked container.

Pneumatic powered tools

16.24(1) An employer must ensure that a worker does not use a pneumatic powered tool unless

- (a) the compressed air supply for the tool does not exceed the tool's pressure rating; and
- (b) the tool's hose connections have a positive locking device or rated safety chains or cable to restrain the hose from uncontrolled movement if the section becomes disconnected.

16.24(2) An employer must ensure that a pneumatic powered tool is disconnected from a compressed air supply before any adjustment to the tool is made or the tool is serviced.

Hand or portable power tools

16.25(1) An employer must ensure that

- (a) a hand tool or a portable power tool is inspected before use to make certain it is in safe working condition; and
- (b) a defective hand or power tool is removed from service.

16.25(2) Before refuelling or servicing a gas-operated power tool, an employer must ensure that the worker stops the motor and allows the motor to cool in accordance with the manufacturer's specifications.

Pressurized hoses

16.26(1) An employer must ensure that an effective restraining device is used on a hose, pipe or connection that is under pressure if inadvertent disconnection of the hose, pipe, or connection could result in a risk to the safety or health of a worker or any other person.

16.26(2) An employer must ensure that the restraining device is used in accordance with the supplier's instructions or the manufacturer's specifications.

Chain saw requirements

16.27(1) An employer must ensure that a chain saw used at a workplace is

- (a) manufactured, used and maintained in accordance with CAN/CSA Standard-Z62.1-03, *Chain Saws*;
- (b) equipped with a safety chain, chain brake and chain catcher;
- (c) operated and maintained in accordance with the manufacturer's specifications; and
- (d) equipped with a mechanism that minimizes the risk of injury from kickback when the saw is in use.

16.27(2) When a chain saw is used by a worker operating from an elevated work platform or personnel basket, an employer must ensure that appropriate start-up procedures are developed and implemented to protect the safety and health of the worker.

Lasers

16.28 An employer must ensure that a laser used in a workplace is installed, used and maintained in accordance with ANSI Standard Z136.1-2005, *American National Standard for Safe Use of Lasers*.

DIVISION 2

ROBOTS

Application

16.29(1) Subject to subsection (2), this Division applies to every workplace where a robot or robot system is used.

16.29(2) This Division does not apply to any of the following:

- (a) a personal or mobile robot;
- (b) an automatic guided vehicle system;
- (c) an automated storage and retrieval system;
- (d) a numerically controlled machine.

Safe work procedures

16.30 An employer must

- (a) develop and implement safe work procedures respecting the installation, operation, use, teaching and maintenance of robots and robot systems used in the workplace;
- (b) train workers in the safe work procedures; and
- (c) ensure that workers comply with the safe work procedures.

Employer's duties

16.31 An employer must ensure that every robot and robot system in the workplace

- (a) meets the requirements of CAN/CSA Standard-Z434-03, *Industrial Robots and Robot Systems X General Safety Requirements*; and
- (b) is installed, anchored, wired and used in accordance with the manufacturer's specifications.

Safeguards

16.32(1) An employer must ensure that every robot and robot system in the workplace has safeguards that prevent a worker from entering the restricted work envelope while the robot or robot system is in motion.

16.32(2) When a safeguard is removed or made ineffective to permit maintenance, repair, testing, teaching or adjustment, the employer must ensure that the safeguard is replaced or made effective before a worker uses the robot or robot system again.

Controls

16.33(1) An employer must ensure that the primary controls of a robot or robot system, including a restart control,

(a) are located outside the restricted work envelope;

(b) are arranged so that the robot or robot system is clearly visible to the worker operating the primary controls; and

(c) cannot be activated inadvertently.

16.33(2) An employer must ensure that a worker operating a robot or robot system is provided with a readily accessible emergency stop device.

DEFINITIONS

Definitions

16.34 The following definitions apply in this Part.

"machine" means any combination of mechanical parts that transmits from one part to another or otherwise modifies force, motion or energy, but does not include a vehicle.

"tool" includes an implement that is powered by the energy of a person, such as a hammer, axe or screwdriver.