

# Machine Safeguarding - Training Program Standard



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comply with the *Manitoba Workplace Safety and Health Act and Regulation*, as may be amended from time to time.

## 1. Training Standard Topic

Machine Safeguarding

## 2. Purpose

The purpose of a Machine Safeguarding Training Program Standard is to provide workers with:

- an awareness of the hazards and risks associated with machines and tools
- an understanding of what controls are available to protect against that risk and how those controls work
- awareness of the legislation and standards associated with machine safeguarding

The training is intended for workers who are operating, maintaining, cleaning and/or working around machinery or equipment.

The Machine Safeguarding Training Program Standard outlines the minimum requirements for the development and delivery of Machine Safeguarding training programs in Manitoba. It was developed in consideration of the *Manitoba Workplace Safety and Health Act and Regulation* and *Canada Labour Code Part II* and is consistent with the *CSA standard Z432: Safeguarding of Machinery*.

Please note that this training standard does not include details on lockout and working with robots.

### 3. Design

The design of the training program must meet the following criteria:

- Compliance with adult learning principles:
  - a. ensure learners know why they need to learn specific content and its relevance to their workplaces
  - b. relate training to learners' own experiences when simulating workplace scenarios
  - c. challenge and engage learners using a variety of activities that allow opportunities for participation, feedback and interaction
  - d. recognize the limits of attention spans and apply techniques to address the various ways that adults learn
  - e. use realistic activities and tools to support the transfer of learning to the workplace
- Use language that is appropriate for all learners;
- Provide content that is accurate and current;
- Include references to legal and technical information;
- Use a variety of technical teaching aids;
- Provide learner materials that follow the principles of instructional writing and good graphic design;
- Be consistent with provincial and federal legal requirements.

### 4. Delivery

Regardless of the delivery method, all Endorsed Training programs must meet the requirements of this standard along with ***The Accessibility for Manitobans Act (AMA)***, and the delivery method must be reasonable and practicable to support the learner's ability to attain the applicable learning outcomes.

#### 4.1 Face-to-Face Learning

The following is the maximum ratio of learners to instructor:

- Basic Theory Module: 24:1

The following are the minimum hours for training delivery:

- Basic Theory Module: 3.5 hours

The timing for delivery of this training program may be extended for various reasons such as the amount of equipment available for demonstration of learning outcomes, instructor experience and/or the learning needs of training participants.

## **4.2 E-Learning and Blended Learning**

The eLearning content should be consistent with Manitoba e-Learning Instructional Design Guidelines ([click here to learn more](#)).

This type of learning is acceptable for:

- Basic Theory Module

## **4.3 Distance Learning**

Distance learning includes training via a live video link; a plan for interactivity with a qualified instructor should be developed and available.

This type of learning is acceptable for:

- Basic Theory Module

# **5. Learning Outcomes**

Employers will need to supplement any training program that meets the requirements of this training program standard with additional information, instruction and training in workplace-specific policies and procedures and workplace-specific hazards and equipment related to Machine Safeguarding.

## **5.1 Basic Theory Module**

### **5.1.1 Legal Requirement**

**Content must include:**

- an overview of the legal framework, including rights, duties and responsibilities and general requirements pertaining to working with machinery and equipment
- a brief overview of the CSA standard Z432 Safeguarding of Machinery, including what is contained in the standard, and how to access the standard

**At the end of this module, learners will be able to:**

- identify parts of the *Manitoba Workplace Safety and Health Act and Regulation* and/or *Canada Labour Code Part II*, as applicable, pertaining to working with machines and equipment

- explain the duties and responsibilities of the employer, supervisor and worker as they relate to machine safeguarding
- describe workers' rights and how they relate to working with machines and equipment
- describe the importance of the owner's manual and manufacturer's specifications
- recognize the need for and importance of the *CSA Standard for Safeguarding of Machinery* and how to access it
- describe what a competent and authorized person is in relation to designing and/or modifying machine safeguarding.

### **5.1.2 Hazard Identification and Risk Assessment**

#### **Content must include:**

- an overview of the common hazards associated with working around machines and equipment. including but not limited to. entanglement, abrasion, cutting, pinching, shearing, puncturing, impact, crushing, drawing in, injection by gas or liquids under pressure, hazardous surface temperatures and hazardous energy
- an overview of other machine hazards, including but not limited to, noise, vibration, radiation and musculoskeletal hazards
- an overview of the process for conducting a job hazard analysis and risk assessment, including the factors to be considered for prioritizing hazards

#### **At the end of this module, learners will be able to:**

- identify the common hazards associated with working around the moving parts of machines
- identify other hazards associated with machines and equipment
- describe the process for conducting a job hazard analysis and risk assessment
- perform a risk assessment on identified hazards

### **5.1.3 Machine Hazard Controls**

#### **Content must include:**

- an overview of the hierarchy of controls, including common control measures to reduce or eliminate the risk associated with working with and/or around machines and equipment
- an overview of the general types of guards and their basic function, including but not limited to adjustable, fixed, fixed distance, interlocked, movable and self-closing
- an overview of machine guards used on common machinery in the industry and their basic function

#### **At the end of this module, learners will be able to:**

- describe the hierarchy of controls and understand the importance of using the hierarchy of controls for eliminating or reducing risk
- distinguish between the different types of control measures associated with each hierarchy of control
- identify different control measures to eliminate or reduce the risk associated with machine hazards
- explain the purpose and function of safeguards
- recognize when safeguards are required
- identify the general types of machine guards and explain their basic function
- identify specific machine guards used on common machinery in their industry
- describe the need for safe work procedures for working with and/or around machines and equipment
- describe the requirements for additional safeguards, such as operating controls, emergency stops and warning systems
- explain the control measures for unattended or suspended machines

#### **5.1.4 Removal of Safeguards**

##### **Content must include:**

- an overview of requirements for the removal of safeguards with reference to legislation, including steps to perform during removal and tasks, such as servicing, repairs, tests, cleaning, maintenance and adjustments that may require the removal of safeguards
- an overview of the requirements for implementing alternative mechanisms

##### **At the end of this module, learners will be able to:**

- explain the situations in which a safeguard may or may not be removed
- describe the required steps involved with safeguard removal, including machine lockout
- recognize the need for safe work procedures for tasks that may require removal of safeguards
- describe alternative mechanisms and when they can be used

## **6. Resource Material**

The Machine Safeguarding Training Standard has material requirements for both learners and instructors.

The date and version number should be indicated on all resource materials, which include:

- terms and definitions
- job aids, evaluation tools and templates
- copies of the applicable provincial or federal safety legislation

- manufacturers' instructions for equipment
- participant and instructor manuals with copies of activities
- instructor manual and lesson plan

Learner materials will include:

- learning objectives, agenda, training content and evaluation/testing

Instructor materials will include:

- instructional methods, learning activities and lesson plan timing
- detailed instructor manual and lesson plans, including all learning activities and audio-visual resources

## **7. Learner Evaluation**

The training program must include a plan for learner evaluation that meets the requirements below. There must be a variety of evaluation methods available to the instructor and/or evaluator that are appropriate to the learning outcomes.

### **7.1 Evaluation Methods**

The training program will include methods to evaluate whether key concepts have been understood by the learner using a variety of evaluation methods that are appropriate to the learning outcomes, including:

- open discussion
- group discussion
- questions and answers
- written and/or oral test, where applicable

Evaluation methods must be clearly outlined in the evaluation plan and corresponding results must be documented by the evaluator.

### **7.2 Evaluation of Demonstration Learning Outcomes**

For learners with language, literacy or accommodation needs, alternative evaluation methods may be employed to verify satisfactory demonstration of learning outcomes by the learner.

These evaluation methods must be clearly outlined in the evaluation plan, and the corresponding results must be documented by the evaluator.

## **8. Validation/Refresher Requirements**

### **8.1 Validation Requirements**

Learners who successfully complete an approved Machine Safeguarding Training Program must periodically refresh their training in order to maintain its validity. This requirement supports learners in maintaining their foundational knowledge and skills.

Completion of the Basic Theory Module in accordance with the criteria set out in this standard and the training provider standard is required to confirm a successful training program has been completed.

Training remains valid for a period of three years from the date of a successful completion of the Machine Safeguarding Basic Theory Module.

## **8.2 Refresher Training**

A worker's training is re-validated for another three-year period after successfully completing the refresher training of the Machine Safeguarding Basic Theory Module.

## **Glossary**

### *General terms*

#### **Asynchronous instruction (ASTD)**

A general term used to describe forms of education, instruction and learning that do not occur in the same place or at the same time. It uses resources that facilitate information sharing outside the constraints of time and place among a network of people.

#### **Blended Learning**

Describes the practice of using several training delivery mediums in a single training program and typically refers to the combination of classroom instruction and eLearning.

#### **Distance Learning**

An educational situation in which the instructor and students are separated by time, location or both. Education or training courses are delivered to remote locations via synchronous or ASTD.

#### **eLearning (Electronic Learning)**

A term covering a wide set of applications and processes that includes web-based learning, computer-based learning, virtual classrooms and digital collaboration.

#### **Face-to-Face Training**

Usually refers to traditional classroom training in which an instructor teaches a course to a

room of training participants. The term is used synonymously with on-site training, classroom training and instructor-led training (slightly modified from ASTD definition).

### **Minimum Hours for Training Delivery**

The timing for instruction of a training program that excludes breaks and lunch:

- 3.5 hours of instruction is equal to a half-day of delivery;
- 7 hours of instruction is equal to a full-day of delivery.

### **Module**

A unit of instruction that can be measured, evaluated for change, assembled to form complete courses or bypassed as a whole, and that is usually intended to teach one or a group of skills or areas of knowledge (slightly modified from ASTD definition).

### **Evaluator**

A person who evaluates learners.

### **Instructor**

A person who delivers training programs.

### **Qualification**

A skill, quality or attribute that makes somebody suitable for a job, activity or task.

### *Machine Safeguarding Terms*

#### **Alternative Mechanisms**

A device, system, procedure, tools, tooling, or combination of the preceding provides a level of protection to the operator that is equal or greater to the protection that would be provided by a guard.

#### **De-energized**

The removal of hazardous energy from machinery or equipment before lockout is applied.

#### **Guard**

A physical barrier or cover designed, constructed and installed over moving parts to prevent contact with them. Guards prevent access to the hazardous area and require a tool to remove.

- **Adjustable guard** - a fixed guard that is adjustable as a whole or that incorporates adjustable parts. The adjustment to the guard remains fixed during operation.



- **Fixed distance guard** - a fixed guard that does not completely enclose the hazard but that prevents or reduces access because of its physical dimensions and its distance from the hazard.
- **Fixed guard** - a guard kept in place (i.e., closed or attached to a fixed surface) either permanently (e.g., by welding) or by means of fasteners (e.g., screws, nuts), requiring tools for the removal or opening.
- **Interlocked guard** - a guard attached and monitored by the control system in such a manner that it prevents the operation of hazardous machine functions under specified conditions.
- **Movable guard** - a guard connected by mechanical means (e.g., hinges or slides) to the machine frame or an adjacent fixed element. It can be opened without the use of tools.
- **Self-closing guard** - movable guard operated by a machine element (for example a moving table) or by the workpiece or a part of the machining jig, so that it allows the workpiece (and jig) to pass and then automatically return (by means of gravity, spring, other external power, etc.) to the closed position as soon as the workpiece has vacated the opening through which it has been allowed to pass.

### **Job Hazard Analysis**

A method used to perform an assessment of a job task by breaking the job task into steps to help identify hazards and measures to control workers' exposure to harm.

### **Lockout**

The disconnection, blocking or bleeding of all sources of energy that may create a motion or action by any part of a machine and its auxiliary equipment.

### **Machinery**

An assembly of linked parts or components, at least one of which moves, with the appropriate machine actuators, control and energy circuits, etc., joined together for a specific application, in particular for the processing, treatment, moving or packaging of material.

### **Safeguard**

Protective measures consisting of the use of specific technical means to protect workers from hazards that cannot be reasonably removed or sufficiently limited by design.

### **Safe Work Procedure**

A document that outlines a precise sequence of steps to describe how to do a specific task safely.

### **Shield**

A physical barrier or cover designed, constructed and installed over moving parts often to divert chips, sparks, swarf or fluids away from the operator. Shields restrict access to the

hazardous area and act as a partial barrier, but are not considered guards because they restrict and do not prevent access to the hazard.

### **Zero Energy State**

A zero-energy state is achieved when all energy sources have been removed or controlled, and all stored or residual energy has been discharged.

### **Acknowledgements Statement**

The Machine Safeguarding committee/working group has developed a Machine Safeguarding Training Program Standard that outlines the minimum requirements for program objectives, training requirements and learning outcomes that are designed to educate Manitoba workers on working in compliance.

Please note that while reasonable efforts have been made to ensure the criteria of the Training Program Standard is met, responsibility resides with employers to ensure compliance with training requirements under the *Manitoba Workplace Safety and Health Act and Regulation*. In determining what rights or obligations a party may have under the province's legislation, reference should always be made to the official version of the WSH Act and Regulation.

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