Workplace injury prevention

Machine guard assessment

worksafesask.ca

WorkSafe™ SASKATCHEWAN

Work to live.

Purpose

The purpose of this assessment is to prevent an injury to a worker's fingers, hands or arms while operating a machine, working near a machine, or adjacent to a machine.

When used as intended, the machine guard assessment documents will assist the employer in ensuring that the machine guard(s) within their workplace are following *Part 10, Machine Safety, Safeguards 10-4 (1-5)* of the *Saskatchewan Occupational Health and Safety Regulations 2020*.

The machine guard assessment documents have been created to provide employers with a methodology to assess and document the state of machine guarding within their workplace. These documents have been created based on the following:

- *Saskatchewan Occupational Health and Safety Regulations 2020.*
- *Canadian Standards Association, Safeguarding of Machinery, CSA Z432-16*
- *Machine guarding best practices from WorkSafe British Columbia, Saskatchewan and Manitoba.*

The machine guard assessment documentation package contains the following.

- *Machine Guard Assessment Tool with drop-down menu selections to be used on an electronic device, such as a laptop or tablet.*
- *Machine Guard Assessment Tool that can be printed and all information entered manually when an electronic device is not available or practical to use in the workplace.*
- *Guard Safety Stick instructions for use. This tool is designed to assist in determining if the machine guard is capable of protecting the worker.*
- *Machine Guard Assessment Log to record all machine guard assessments and to track when a guard defect has been observed, what actions were taken, and the status of the machine.*

Definitions

Guard – this includes mechanical guards, electronically controlled guards, audible/visual warnings, or a combination of these measures to protect the worker from injury or harm.

Machine – the term 'machine' throughout this document refers to all stationary machines, stationary tools or pieces of equipment. Machine does not include hand tools.

Worker – refers to the machine operator, maintenance personal and all workers who may be working adjacent to, or near the machine.

Machine guard assessment tool instructions

The *Machine Guard Assessment Tool* (MGAT) has two available versions for use. One MGAT is to be used on an electronic device to document observations with interactive menus. The second version is printable, allowing for manual entry when an electronic device is not available or practical for use in the workplace.

Sheet 1 of the MGAT is the form that will be used when performing the assessment. Sheet 1 has drop-down menus for the selection of information that is common in machine operation and machine guarding. When using the MAGT, if an item or condition is not listed in the drop-down menu, it can be entered manually in the "Other:" area for documentation.

Sheet 2 of the MGAT has the list of items that are available in the drop-down menu. If the item or condition that was manually entered will be observed in the future, it can be added to the drop-down menu in Sheet 2 for future selection in Sheet 1.

The instructions for what is required to be entered in each column of the MGAT is listed below in the order that the information will be entered onto the MGAT form. These instructions apply to both the electronic or manually entered information on the MGAT assessment forms.

1) **Employer/owner:** Enter the name of the company. If a private business, enter the owner's name.

   For example: Workers' Compensation Board (WCB) Regina is a major employer and could be identified this way. A privately-owned company could be identified as Gerry's Machine Shop, Owner, Gerry Peters.

2) **Address:** Enter the company's mailing address. This allows for a copy of the MGAT to be sent to the owner or the manager to review the form. The owner or manager's office address may be different than the machine's inspection address.

3) **Inspected by:** Enter the name of the person performing the machine guard assessment. Add the names of any additional support personnel who are in attendance afterwards. This could be the owner, manager, supervisor, worker(s) or members of the OH&S committee.

4) **Date:** Enter the date that the machine guard assessment took place. Date is entered in the year, month and day format (YYYY/MM/DD).

5) **Machine location:** Enter any information that would assist in locating the machine within the facility. When many machines are present within a large facility, more detail may be required for positive identification. For example; along west wall by the emergency exit, by pillar 42 in the Pipe Mill, or the third machine in from the left side in the line of milling machines.

6) **Machine make/model and serial #:** While not all the information may be entered, enough details should be included so the machine can be identified. The make of the machine should be visible from the front of the machine. Enter the name of the machine or manufacturer. The model and serial number should be present on a plate or label fixed to the machine. This information is usually located on the side or rear of the machine, so it is away from potential damage. This information can positively distinguish the machine from similar machines in case the machine is moved after the machine guard assessment has been performed. The model and serial number information will also assist in identifying what the manufacturer recommends for adequate guarding. Or, what the manufacturer could offer as machine guarding upgrades that are available, due to improvements made from the date of manufacture.

7) **Machine type:** From the drop-down menu, select the machine type as designated by the manufacturer.

   For example; the inspector could be assessing a punch press, which would be a single machine with guarding in place. The auditor would select 'hydraulic/ pneumatic press' from the drop-down menu.

   An assessment could be performed at a production facility where a 1000hp electric motor drives a water pump. These two items do not present a hazard by themselves, but the shaft drive that connects the two to transfer power is without a guard and does present a hazard so shaft drive/PTO/coupling would be selected from the drop-down menu.

8) **Machine hazard:** From the drop-down menu, select the hazard that the machine exposes the worker to.

   For example; A bench grinder without a guard would expose the worker to the abrasive wheel. A lathe without a guard would expose the worker to a rotating lathe chuck.

9) **Guard description:** From the drop-down menu, select the design of the guarding device that is used to protect the worker from the machine hazard.

10) **All six guard criteria statements have to be answered "yes" or "no".**

    A 'yes' answer will indicate the machine guarding is satisfactory and no further action is needed. The inspector can move on to the next statement.

    If the answer to the statement is 'no,' then all the following information has to be entered into the form. This is done by selecting the information from the drop-down menus and any notes that the inspector deems necessary are entered into the corrective actions/recommendations section.

    1) *Guard must be of robust construction and requires hand tools to remove.*

       Rationale: Robust construction. The guard must be strong enough to

prevent accidental contact with the machine hazard, such as the worker falling against the guard, or material striking the guard, knocking it out of position.

Rationale: Hand tools are required to remove the guard, so the worker cannot remove the machine guard for their convenience to make work easier or to speed up production.

2) *Guard must be adequate distance from danger zone. The guard passes the "Guard Safety Stick" test.*

Rationale: The Guard Safety Stick (GSS) test is based on CSA Z432-16 measurement standards for finger, hand and arm physical dimensions and how far away from the machine hazard that the guard has to be to prevent injury. The GSS is placed into the guard square or slot opening measuring the smallest opening. If the GSS touches a hazardous component on the machine, then the guard opening will have to be reduced in size, or moved farther away from the machine hazard. Once an adjustment or modification has been made, the guard is to be retested with the GSS to ensure the guard protects the worker.

3) *Guard cannot be bypassed, modified or rendered non-operational.*

Rationale: Measures have to be taken by the employer to ensure that the guard, guarding device and its controlling system remain in operation at all times, as designed by the manufacturer, or by a mechanical engineer.

4) *Guard does not obstruct machine operation or the production process.*

Rationale: Machine guarding that is not designed to take into account the operator's need to see the work being performed, or the operator's need for an ergonomically adequate work station, does create a hazard.

The operator should be able to see the work in progress from their work station. There should be a clear line of sight.

The operator should be able to operate the machine controls within their normal range of motion. The operator should be able to move material to the machine without having to lift it over a machine guard, lift it around a machine guard, or pull it under a machine guard.

5) *Guard does not present a safety hazard to the operator.*

Rationale: The machine guard's construction should not introduce other hazards into the workplace, such as sharp edges or corners, material that is hazardous, or excessive noise emissions.

Machine guards should not create shearing or crush zones generated by power-operated guards, or by heavy guards which need to be manually

lifted and could cause a muscle strain or fall for the worker when being moved or lifted causing injury.

6) *Guards allow for essential maintenance work without being removed or disabled.*

   Rationale: If a machine guard has to be removed for maintenance, it has the potential to not be reinstalled and creates a hazard in the workplace. If a machine guard needs to be modified to perform maintenance, there is the potential that the modification is not being performed under the instruction of the manufacturer or a mechanical engineer. This would create a potential hazard, due to the guard being less effective than its original engineered design. There is also the potential for legal liability for the employer/owner if they modify the machine guard, as the modified guard is now their responsibility, not the manufacturer's.

11) **Guard defect:** From the drop-down menu, select which condition exists when the guard is observed/determined to be defective.

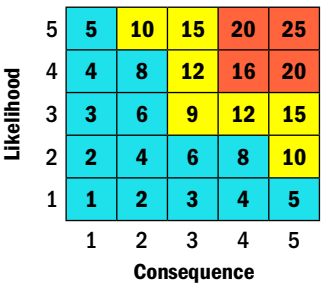
12) **Worker hazard:** From the drop-down menu, select what may happen to the worker if they were to come in contact with the machine hazard that is present due to the guard defect. What type of injury would the worker experience if they were to contact the machine hazard?

13) **Risk assessment:** Identified hazards that cannot be eliminated immediately must be effectively controlled to eliminate or reduce the risk to the worker. Risk estimation is used to prioritize hazards by the degree of risk they pose and to evaluate the effectiveness of implemented controls.

Risk assessment matrix

When assessing the risk level of a hazard, you first must decide how likely it is that the hazard will cause harm. Think about how often the task is completed and the number of people completing the task at any one time. Once likelihood has been determined, the next step is to consider what the potential consequences would be. Consequences are based on WCB claims definitions. The final step is to use a tool such as the risk matrix on the next page to get a risk rating.

Risk assessment matrix



Risk rating = (likelihood) x (consequence)

High	– work stops until risk is addressed
Medium	– implement temporary precautions until risk is addressed
Low	– address risk as soon as reasonably practical

Likelihood (probability/frequency)

5. **Almost certain** (expected to occur regularly under normal circumstances)
4. **Likely** (expected to occur at some time under normal circumstances)
3. **Possible** (may occur at some time under normal circumstances)
2. **Unlikely** (not likely to occur under normal circumstances)
1. **Rare** (could happen, but probably never will under normal circumstances)

Consequence

5. **Fatality**
4. **Major injury** (permanent disability)
3. **Serious injury** (time loss incident)
2. **Medical aid incident** (healthcare facility treatment)
1. **Minor injury** (first aid at worksite)

Risk assessment workplace examples:

a) A woodworking shop has a vertical belt sander that is used to finish the outer edge of a table tennis paddle. There is a slotted opening and perimeter screen that prevents the worker from accidental contact with the abrasive sanding belt while working. Due to the height of the slot opening to accommodate the material for finishing, there is a possibility of a worker with long skinny fingers coming in contact with the sanding belt if they reach under the guard to clean away debris.

A risk assessment was performed and it was determined that the likelihood of this occurring and causing harm was unlikely (2) and the consequence was minor (1) so the risk rating was determined to be a (2).

The risk rating is low and the corrective action could be to move the guard away from the sanding belt another 2.5 cm or ½". The corrective action could be done during the next maintenance period.

b) A shop has a metal break that has all the necessary guarding in place for the use it was intended for, bending thin mild steel. Production has changed and a high-grade carbon steel is being formed in the metal break. It was reported that a piece of metal broke off while bending.

The manufacturer was contacted and the metal break can be used for this purpose, but metal breaking off may be an occurrence, depending on the quality of the high-grade carbon steel being supplied.

A risk assessment was performed and it was determined that the likelihood of this occurring and causing harm was likely (3) and the consequence was

medical aid treatment (3) so the risk rating was determined to be a (9).

The risk rating is medium. The operator will wear a full-face shield while performing this task until the manufacturer can supply and install the screen guard used to prevent ejected metal from hitting the machine operator.

c) An old router table that was in storage has been brought back into the shop because a new product is going to be produced. A new table has been purchased, but will not arrive for 18-24 months. The old router table can shape wood up to 7.5 cm or 3" thick and the router bit turns at 10,000 rpm. The table has no guarding on it.

A risk assessment was performed and it was determined that the likelihood of this occurring and causing harm was almost certain (5) and the consequence was major injury (4) so the risk rating was determined to be a (20).

The risk assessment is high. This requires that work will not be performed with this machine as the hazard to the worker is too great. If no guarding can be supplied by the manufacturer or designed by a professional engineer, then this machine will be rendered inoperable and scrapped. It cannot be sold to another person for the purpose of performing work.

14) **Risk rating:** The assessed risk rating will be automatically calculated in the pdf form.

15) **Machine status:** From the drop-down menu select the operational status of the machine based on the risk assessment.

Action log

16) **Priority:** From the drop-down menu select the priority that the employer/owner will assign to the machine guard deficiency.

a. *High priority* – indicates that the potential for injury or fatality is likely or certain and that the result would be a serious injury or a fatality. The machine is tagged out of service. No work can be performed on this machine under any circumstance. Workers must be informed of this condition and the hazard that it presents. Immediate action must be taken.

b. *Medium priority* – Indicates that the potential for injury ranges from unlikely to certain, and at a minimum could inflict a medical aid injury to a fatality. Uncontrolled, there is a potential for serious harm to the worker. Restrictions have to be placed on the machine as to what conditions it can be operated under. There may be the need to have direct supervision when the machine is operated, to ensure the restricted conditions are being followed. The corrective actions/recommendations are to be scheduled, completed and tested under direct supervision in order to remove the restrictions.

c. *Low priority* – Indicates that the potential for injury is low and that the corrective actions/recommendations could be performed when service/repair personal are available, or at the next maintenance period.

17) **Corrective actions/recommendations:** The inspector will enter any comments, recommendations or action items that are not available from the drop-down menu. The inspector may want to enter information that will provide more detail from their observations to assist in eliminating the machine hazard.

18) **Person responsible for corrective action/recommendations:** This will be manually entered into the MGAT. The inspector has to ensure that the person entered has the authority to direct work, take machines in and out of service and to oversee the installation, modification or repair of machine guarding. They are also the person who will perform a risk assessment after the guard has been installed, determining if the guard is adequate for a re-start and usage. They would observe the initial use of the machine to ensure it is safe for use.

   a. Name: Enter the person's first and last name. Middle initial if required for positive identification.

   b. Position: Enter the person's current employment position as assigned by the company/owner. Take note if this is their full-time position or an acting role on a temporary basis.

   c. Contact email: Enter their email information. The inspector may want to test the email address before they leave to ensure it is correct.

   d. Phone number: Enter their phone number. The inspector may want to test the phone number to ensure they have the correct phone number.

19) **Start date of corrective action/recommendations:** The date may be known at the time of the assessment and recorded at this time. If an outside service provider is required for the work, the date for the start of repairs may need to be provided to the inspector by the person responsible for the corrective actions/recommendations at a later date. Entered as year, month and day.

20) **Completion date for the corrective action/recommendations:** This date will be communicated to the inspector once the work is completed. Entered as year, month and day.

21) **Machine back into service date:** This date may be different than the date the machine guard work was completed. There may be time needed to train the workers on the operation of the machine due to guarding modifications, changes in the work process or work procedure. Entered as year, month and day.

WorkSafe Saskatchewan

Head office
200 - 1881 Scarth Street
Regina SK S4P 4L1

Saskatoon office
115 24th Street East
Saskatoon SK S7K 1L5

Phone 306.787.4370
Toll free 1.800.667.7590
Fax 306.787.4311
Toll-free fax 1.888.844.7773

Online worksafesask.ca

WorkSafe™
SASKATCHEWAN
Work to live.