

MACHINE GUARDING: *PROTECTING YOU FROM HAZARDS*

This easy-to-use Leader's Guide is provided to assist in conducting a successful presentation. Featured are:

INTRODUCTION: A brief description of the program and the subject that it addresses.

PROGRAM OUTLINE: Summarizes the program content. If the program outline is discussed before the video is presented, the entire program will be more meaningful and successful.

PREPARING FOR AND CONDUCTING THE PRESENTATION: These sections will help you set up the training environment, help you relate the program to site-specific incidents, and provide program objectives for focusing your presentation.

REVIEW QUESTIONS AND ANSWERS: Questions may be copied and given to participants to document how well they understood the information that was presented. Answers to the review questions are provided separately.

INTRODUCTION

In today's work environments, many machines and processes are used to make our jobs easier, safer and more productive. Various types of equipment and machines can bend, cut, punch, press and perform countless other operations. As useful as these machines are, their movement and operation create extreme hazards. While your company has installed various types of machine guarding and safety devices to protect you from these hazards, these mechanisms will not protect you unless they are installed, maintained and used properly.

This video discusses common types of machine hazards, how they can be controlled and what actions must be taken to stay safe around moving equipment and machinery. Featured is testimony from workers who have been injured after removing or bypassing guards, or taking other risks around moving machinery.

Other topics include potential machine hazard areas, controlling machine hazards, fixed guarding, adjustable guarding, electrical interlocks, photoelectric devices, pressure-sensitive trips and restraint devices.

PROGRAM OUTLINE

POTENTIAL HAZARD AREAS

- Any time a machine performs work, three potential hazard areas exist.
- First, the immediate area around the machine may be subjected to flying debris or falling objects caused by the machine's actions.
- Secondly, the moving parts that drive a machine's actions such as drive shafts, gears, pistons and other transfer devices can present serious hazards.
- Finally, perhaps the most hazardous area is the point of operation. This is where a machine's raw mechanical or electrical power is harnessed to perform useful work.

CONTROLLING & ELIMINATING MACHINE HAZARDS

- When machines are initially designed and installed, every effort is made to eliminate and control hazards. Such engineering controls are the preferred methods of eliminating hazards.
- If a hazard cannot be engineered out during the design process, various types of machine guarding may be used to restrict employee access to the hazard areas.
- Of course, every hazard associated with a machine cannot be eliminated. This is why operator training and always following safe work practices is critical to staying safe while working with equipment and machinery.

- As part of their training, machine operators and maintenance personnel should be familiar with the various types of machine guarding and other safety devices used to protect them from hazards.

TYPES OF PROTECTION FROM MACHINE HAZARDS

- Machine guarding can be divided into two general categories: fixed guarding and adjustable guarding.
- Fixed guarding is considered by many to be the most effective because it cannot easily be removed or defeated.
- In some instances, fixed guarding may interfere with a machine's normal operation. When this is the case, some type of adjustable guarding may be used.
- Some types of adjustable guarding are adjusted manually by a qualified operator or maintenance worker, while others self-adjust during the operation of the machine.
- Additional devices may also be used to protect workers from machine hazards. These additional measures are commonly referred to as safety devices.
- Like all safety devices and procedures, machine guards only protect us when they are installed, maintained and used properly.
- Once installed properly, machine guards require little maintenance but should be inspected regularly. Operators should stay alert for missing pieces, loose bolts, broken parts, corrosion or other conditions that may reduce the effectiveness of the guard.

FIXED GUARDING

- Fixed guarding is ideal for those hazard areas that don't require frequent access, such as a machine's drive train.
- When guarding such as wire mesh is used, both the size of the openings and the distance of the guard from the hazard are important safety considerations.
- When guards have openings large enough to allow fingers or other body parts to pass through, the guard must be far enough away from the hazard that the hazard cannot be reached.
- If you feel a guard in your area has an opening too large for its distance from the hazard, report it right away.
- Machine guards are installed to protect you from a machine's hazards. Bypassing or removing these devices is asking for trouble.
- No matter what type of machine you are using, the guard should not be removed.
- If you find the guarding to be in your way while operating the machine, you are not operating it in the proper manner. Check with your supervisor to resolve the problem, but do not remove the guard.

ADJUSTABLE GUARDING

- Adjustable guards come in many variations. Some simply swing into a certain position, some adjust automatically during the operation of the machine and others require careful setup and adjustment by a qualified operator or maintenance worker.
- Any time adjustable guards are manually set by an operator, the chance for human error exists. Machine guards must be positioned correctly before a machine is operated.

- Always double-check the position of adjustable guards when the type, size or shape of material is changed.
- When workers choose to operate machinery without properly adjusting the guarding, they are at risk of serious injury.
- When operating equipment that requires manual adjustment, take the time to do it right and re-check it periodically. If you aren't sure how to adjust it properly, ask your supervisor for assistance.
- Even self-adjusting guards need to be inspected periodically. Make sure they remain free of dirt, waste material and other debris that could affect their operation.
- If you find a guard obstructed by debris or needing service, be aware that only trained and authorized employees who are familiar with the machine's lockout/tagout procedure may service the machine. Report the situation to your supervisor immediately.
- Treat adjustable guards in the same manner as fixed guarding. Never remove, defeat or bypass adjustable guards. If you find the guard to be in the way of using the machine, then you are not using it in the proper manner.

SAFETY DEVICES

- Safety devices can offer added protection from the hazards of equipment and machinery. There are as many types and variations of safety devices as there are machines that use them.
- Most safety devices fall into one of the following categories: electrical interlocking switches, photoelectric devices, pressure sensitive trips and restraint and pullback devices.

ELECTRICAL INTERLOCKS

- Electrical interlocks are unique in that they work in conjunction with machine guarding.
- These interlocks use sensors or switches attached to various types of machine guarding. These switches complete an electrical control circuit only when the guard is in the proper position.
- The machine is then configured so it can only operate when this control circuit is completed. Any time the guard is out of position, the circuit is interrupted and the machine shuts down.
- These interlocks are installed for your protection. Never attempt to override or bypass these devices. Also, never use these devices as a substitute for proper lockout/tagout procedures during maintenance operations.

PHOTOELECTRIC DEVICES

- Photoelectric devices, also known as light curtains, use beams of light that are directed into photoelectric eyes. If anything breaks one of these beams, a switch is tripped and the machine is shut down.
- Light curtains are often used near the point of operation and must be adjusted to allow material to pass without triggering a shutdown.
- When properly adjusted, the light curtain is set to the proper position to allow the material to enter the point of operation. It will be tripped, however, if the operator's hand or arm also passes through.
- Only trained and authorized employees are allowed to adjust light curtains.
- Don't be tempted to setup the light curtain for the largest stock you run without adjusting it for smaller stock. This defeats the protection offered by the light curtain and leaves you unprotected from the point of operation.

- Light curtains should be regularly inspected and tested. Because the light generally can't be seen by the human eye, an employee has no way of knowing if the curtain is working unless it is tested.
- Many companies have specific testing procedures that operators must follow. In general, each beam of the light curtain should be tested at the beginning of each shift. Check with your supervisor to find out your company's specific testing procedures.
- Never test a light curtain by placing your hand into the point of action. Always use an approved testing device.

PRESSURE-SENSITIVE TRIPS

- Pressure-sensitive trips activate switches when appropriate pressure is applied. Equipment and machinery can be configured to shut down or start up only when the desired pressure is detected.
- Keep in mind that these types of devices are designed for your safety. Trying to "get around" them in a misguided effort to work faster can be a disastrous decision.

RESTRAINT DEVICES

- Restraint devices are attached to a machine operator to prevent the operator from reaching into any point of operation.
- If you are required to use a restraint device, make sure it is properly adjusted. What may be a properly fitted restraining device for one person may be too short or too long for another.
- Like all pieces of safety equipment, periodically inspect your restraint devices. If they are worn or damaged, remove them from service.

SUMMARY

- Any time we operate or work near equipment and machines, we must always respect their power and recognize their hazards.
- Be aware that the company has studied these various hazards and has installed types of machine guarding and safety devices to protect you from them.
- You must understand that these devices will not protect you unless they are installed, maintained and used properly.
- Make sure the guarding and safety devices installed on the machines you operate offer maximum protection by following inspection and testing procedures.
- When you encounter any damaged or defective guarding or safety devices, report it right way so it can be repaired properly.
- Always remember that these devices are installed for your safety. Never cheat, defeat or override these devices.

PREPARE FOR THE SAFETY MEETING OR TRAINING SESSION

Review each section of this Leader's Guide as well as the videotape. Here are a few suggestions for using the program:

Make everyone aware of the importance the company places on health and safety and how each person must be an active member of the safety team.

Introduce the videotape program. Play the videotape without interruption. Review the program content by presenting the information in the program outline.

Make an attendance record as needed and have each participant sign the form. Maintain the attendance record as written documentation of the training performed.

Here are some suggestions for preparing your videotape equipment and the room or area you use:

Check the room or area for quietness, adequate ventilation and temperature, lighting and unobstructed access.

Check the seating arrangement and the audiovisual equipment to ensure that all participants will be able to see and hear the videotape program.

Place or secure extension cords to prevent them from becoming a tripping hazard.

CONDUCTING THE PRESENTATION

Begin the meeting by welcoming the participants. Introduce yourself and give each person the opportunity to become acquainted if there are new people joining the training session.

Explain that the primary purpose of the program is to stress the importance of installing, maintaining and using machine guarding and safety devices properly to protect against machine hazards.

Introduce the videotape program. Play the videotape without interruption. Review the program content by presenting the information in the program outline.

Lead discussions about specific machines at your facility and the hazards they present as well as the controls and devices used to prevent these hazards from causing injuries.

Copy the review questions included in this Leader's Guide and ask each participant to complete them.

After watching the videotape program, the viewer should be able to explain the following:

- Potential machine hazard areas and how they are controlled and/or eliminated;
- The importance of properly using, installing and maintaining fixed and adjustable machine guards;
- The various types of safety devices that are used to prevent injuries;
- Why machine guards and safety devices must not be defeated, bypassed or removed.

**MACHINE GUARDING:
PROTECTING YOU FROM HAZARDS
REVIEW QUIZ**

Name _____ Date _____

The following questions are provided to check how well you understand the information presented during this program.

1. _____ guarding is ideal for hazard areas that don't require frequent access.
 - a. Fixed
 - b. Adjustable

2. A guard that is in your way while you operate a machine indicates that _____.
 - a. the machine doesn't require a guard
 - b. the guard should be bypassed so the machine will operate properly
 - c. you are not operating the machine in a proper manner

3. Self-adjusting guards require periodic inspection just as other adjustable guards do.
 - a. true
 - b. false

4. Electrical interlocks should be used to isolate the power to a machine during maintenance operations.
 - a. true
 - b. false

5. You must be trained and authorized to adjust a light curtain.
 - a. true
 - b. false

6. Fixed guards are generally considered to be the most effective machine guarding because _____.
 - a. they cannot easily removed or defeated
 - b. the operator doesn't have to inspect them
 - c. they still provide adequate protection when defective or damaged

7. The best way to test a light curtain is to move your hand toward the machine's point of action to make sure it trips the shut-down switch.
 - a. true
 - b. false

**MACHINE GUARDING:
PROTECTING YOU FROM HAZARDS
ANSWERS TO THE REVIEW QUIZ**

1. a

2. c

3. a

4. b

5. a

6. a

7. b