Lesson 14: Machine Guarding

General Requirements for Machine Guarding
Where the operation of a machine can injure the operator or other workers, the hazard must be controlled or eliminated.

The purpose of machine guarding is to protect the machine operator and other employees in the work area from hazards created by ingoing nip points, rotating parts, flying chips & sparks.

Guards must also be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard must be such that it does not offer an accident hazard in itself.

The point of operation is the area on a machine where work is performed.

Eye and face protection must be provided to each employee when exposed to eye or face hazards from flying particles.

The employer must establish an energy control program consisting of energy control procedures, employee training, and periodic inspections.

Safeguarding
At minimum, a safeguarding system should prevent, secure, protect employees from falling objects, create no new hazards or interferences and allow safe lubrication.

The photoelectric (optical) presence-sensing device uses a system of light sources and controls which can interrupt the machine's operating cycle.

The electromechanical sensing device has a probe or contact bar which descends to a predetermined distance when the operator initiates the machine cycle.

Pullback devices utilize a series of cables attached to the operator's hands, wrists and/or arms. This type of device is primarily used on machines with stroking action.
Safety trip controls provide a quick means for deactivating the machine in an emergency situation. A pressure-sensitive body bar, when depressed, will deactivate the machine.

The restraint (holdout) device utilizes cables or straps that are attached to the operator's hands and a fixed point. The gate is a moveable barrier that protects the operator at the point of operation before the machine cycle can be started.

**Abrasive Wheel Machinery**

The most common hazards associated with abrasive wheel use are struck-by hazards caused by flying objects.

Abrasive wheels must be used only on machines provided with safety guards as defined in the following paragraphs of this section, except:

- Wheels used for internal work while within the work being ground;
- Mounted wheels, used in portable operations, 2 inches and smaller in diameter; and
- Types 16, 17, 18, 18R, and 19 cones, plugs and threaded hole pot balls where the work offers protection.

The safety guard must cover the spindle end, nut and flange projections. Grinding machines must be equipped with flanges in accordance with OSHA requirements.

All guards used on abrasive wheel machinery have to comply with OSHA requirements to ensure their effectiveness. The maximum exposure angles specified in this section must not be exceeded.


**Safety Considerations**

The most common causes of machine accidents are:

- Reaching in to “clear” equipment
- Not using Lockout/Tagout
- Unauthorized persons doing maintenance or using the machines
- Missing or loose machine guards
Rotating motion can be dangerous; even smooth, slowly rotating shafts can grip hair and clothing, and through minor contact force the hand and arm into a dangerous position. Injuries due to contact with rotating parts can be severe.

In-running nip point hazards are caused by the rotating parts on machinery.

Even the most elaborate safeguarding system cannot offer effective protection unless the worker knows how to use it and why. Specific and detailed training is therefore a crucial part of any effort to provide safeguarding against machine-related hazards. Thorough operator training should involve instruction or hands-on training in the following:

- A description and identification of the hazards associated with particular machines;
- The safeguards themselves, how they provide protection and the hazards for which they are intended;
- How to use the safeguards and why;
- How and under what circumstances safeguards can be removed and by whom (in most cases, repair or maintenance personnel only); and
- When a lockout/tagout program is required.
- What to do (e.g., contact the supervisor) if a safeguard is damaged, missing or unable to provide adequate

The maintenance and repair crew must never fail to replace the guards before the job is considered finished and the machine released from lockout. In order to prevent hazards while servicing machines, each machine or piece of equipment should be safeguarded during the conduct of servicing or maintenance.