Machine Guarding – Checklist



PREAMBLE

Thousands of workers across the country are injured each year by the machines they use every day. The risk of accidents from machinery is so high, lack of machine guarding is reported to be the second most frequent safety violation today.

Guards are:

Fixed guards, adjustable guards, self-adjusting guards, drive train guards, perimeter guards, drop probe devices, interlock devices, restrain and pullback devices, adjustment, inspection.

Machines are the Tyrannosaurus Rex of work hazards. They mangle flesh, crush bones, sever fingers, amputate limbs and end lives. There are so many ways for workers to suffer a machine-related injury.

Examples

- Being hit by the part of the machine that presses, punches, cuts, shapes, etc.
- Getting trapped between moving parts.
- Limbs, hair, clothes or jewelry entangled in a chain, belt, shaft, gear, blade, etc.
- Being burned or electrocuted after accidental startup.
- Being hit by material thrown from the machine.

PREVENTION

The general rule is: **Identify the Hazard. “**If it moves, guard it”

A wide variety of mechanical motions and actions may present **HAZARDS** to the operator. These can include the movement of rotating members, reciprocating arms, moving belts, meshing gears, cutting teeth, and any parts that impact or shear. These different types of hazardous mechanical motions and actions are basic in varying combinations to nearly all machines, and recognizing them is the first step toward protecting operators from the danger they present.

The basic types of hazardous mechanical motions and actions are:

Motions

- Rotating (including in-running nip points)
- Reciprocating
- Transversing

Actions

- Cutting
- Punching
- Shearing
- Bending

Safeguards Requirements

Prevent Contact: The safeguard must prevent hands, arms, and any other part of a operator's body from making contact with dangerous moving parts. A good safeguarding system eliminates the possibility of the operator or another worker placing parts of their bodies near hazardous moving parts.

Secure: Operators should not be able to easily remove or tamper with the safeguard, because a safeguard that can easily be made ineffective is no safeguard at all. Guards and safety devices should be made of durable material that will withstand the conditions of normal use. They must be firmly secured to the machine.

Protect From Falling Objects: The safeguard should ensure that no objects can fall into moving parts. A small tool dropped into a cycling machine could easily become a projectile that could strike and injure someone.

Create No New Hazards: A safeguard defeats its own purpose if it creates a hazard such as a shear point, a jagged edge, or an unfinished surface that could cause a laceration. The edges of guards, for instance, should be rolled or bolted in such a way to eliminate sharp edges.

Create No Interference: Any safeguard that impedes an operator from performing the job quickly and comfortably might soon be overridden or disregarded. Proper safeguarding may actually enhance efficiency since it relieves the operator's apprehensions about injury.

Types of Barrier Guards

Barrier Guards are appropriate safeguards for full revolution and part revolution mechanical power presses. They are designed to keep the operator's hands and arms from entering the "danger zone" as prescribed by the particular machine. Barrier guards are usually the first point-of-operation safeguard considered for machines.

Barrier Guard Regulations

- Barrier guards on power presses must prevent the entry of hands or fingers into the point of operation by reaching through, over, under or around the guard.

- The barrier guards must conform to maximum permissible openings tables.
- The barrier guard itself must not create pinch points between the guard and moving machine parts.
- The guard must not be easily removable.
- The guard must not interfere with machine inspection.
- The barrier guard must offer maximum visibility of the point of operation consistent with the other requirements.

Barrier Guard Types

Die Enclosure Guard

- Must be attached to the die shoe or stripper in a fixed position.

Fixed Barrier Guard

- Must be attached securely to the frame of the press or to the bolster plate.

Interlocked Press Barrier Guard

- Must be attached to the press frame or bolster and be interlocked with the press clutch so the clutch can not be activated unless the guard itself, or the hinged or moveable sections of the guard conform to listed requirements.
- The hinged or movable sections of an interlocked press barrier guard must not be used for manual feeding.
- The guard must prevent opening of the interlocked section and reaching into the point of operation prior to die closure or before the slide stops.

Adjustable Barrier Guard

- Must be securely attached to the press bed, bolster plate, or die shoe, and shall be adjusted and operated in conformity with instructions.

Types of Operator Safety Devices

Safeguarding devices – are designed to allow employees access to a danger zone, without having to remove physical guarding. These devices do not allow the machine to start operating, or they stop the machine from operating while an employee or part of an employee is in the danger zone. These types of controls include:

- **Presence-sensing Devices –** light curtains, pressure sensitive mats, and photoelectric devices.
- **Alternative Operating Modes –** limit the machine movement or travel at a safe range or speed. This option is ideal for machine set-ups or die changes.
- **Emergency Stop Devices –** sense when an operator is or has entered the danger zone and immediately stops the machine cycle.
- **Placement of Controls –** by placing controls in locations away from the danger zone, the employee is protected while the machine is operating. Controls that fall in this category include the “hold-to-run control”, “deadman”, or, “operator-maintained” control.

INSPECTION

After the **Risk** has been assessed and the **Guards** are selected, the **Inspection Process** must be implemented. There are general things to check including verifying that guards are:

- Effective in keeping the worker’s body, hair and clothing from contacting moving parts.
- Firmly secured so that workers can’t easily remove them.
- Free of jagged edges, shear points, unfinished surfaces and other hazards.
- Allowing workers to do their job quickly and comfortably – if they don’t, workers may try to remove them.

Finally, make sure your inspection covers:

- Guards used at the point of operation.
- Guards at the power source.
- Each continuous line of shafting.
- Pulleys, ropes, belts, chains and chain drivers, sprockets and gears.

The principle means of preventing machine injuries is the use of guarding devices. Your challenge is to decide which guards to use to control risks you identify in your hazard assessment.

There are four basic types of machine guarding methods you can use alone or in combination, including:

1. Physical barriers that block workers’ access to the danger area.
2. Automatic stopping devices – such as presence sensing devices and pullback devices.
3. Automatic or robotic feeding and ejection so that materials don’t have to be manually fed into and taken out of the machine.
4. Locating/distance guarding – placing machines away from work areas and/or in locations that are impossible or difficult for workers to get to.

Don’t forget, you’ll likely need to supplement these engineering solutions with **safe work practices** and policies and PPE.

Work with your safety director to do a hazard assessment of each machine in the workplace.

Do the hazard assessment:

- When the machine is first installed.
- At least monthly or more often if the manufacturer recommends it.
- After injuries, near misses and other incidents.
- After the machine malfunctions or is moved.

Cover the four areas where machine injuries are most likely to occur:

- The point of operation, or machine part where the cutting, shaping, boring, forming or other operation is done on the material.
- Moving parts, including flywheels, pulleys, belts, couplings, chains, gears, conveyors, feed mechanisms, etc.

- In-running nip points, or spaces between rotating and/or slowly-moving parts.
- Primary power source, including engines, turbines and other equipment used to power the machine.

Responsibilities

Employers

Provide appropriate information, instruction and supervision to protect workers such as training in lockout and guarding procedures. Ensure equipment is maintained in good condition by replacing and/or repairing damaged machine components.

Ensure an appropriate machine guard or other device exists to protect workers when:

- A moving part may endanger workers.
- A machine has an in-running nip hazard.

Ensure an appropriate machine guard or other device exists to protect workers when:

- Cleaning, oiling, adjusting, repairing or having maintenance done on machines.
- Lock out control switches or other control mechanisms, or taking other effective precautions to prevent starting, when the starting of the machine could endanger a worker.

Supervisors

- Take every reasonable precaution in the circumstances for the protection of workers.
- Ensure workers comply with the OHSA and its regulations.
- Ensure workers use any equipment, protective devices or clothing required by the employer.
- Advise workers of any potential or actual health and safety dangers.

Workers

- Follow lockout and guarding procedures.
- Report machine hazards and other workplace hazards to their supervisor.
- Use or operating machinery in a safe manner.
- Use or wearing protective devices or clothing required by the employer.