

MANUFACTURING

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TARGET ON SAFETY

Machine Safeguarding Basics

Introduction

Machine guards may not always seem like the most convenient part of your job, but they are a necessity in our workplace. Guards are designed to protect you from the many dangerous moving parts throughout the manufacturing floor. In order to keep all our workers safe, it is our policy that machine guards are always used properly and are never tampered with or removed.

What Should Be Guarded

Any machine part, function or process that may cause injury should have a machine guard.

Where Mechanical Hazards Occur

Potentially hazardous moving parts on machines fall into three basic categories:

- **Point of operation:** Where the work is actually performed. This is probably the largest hazard area and where the more sophisticated machine safeguarding methods will be used.
- **Power transmission apparatus:** All components of the mechanical system that transmit energy (power) to the part of the machine performing the work. These components include flywheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks and gears.
- **Other moving parts:** All other parts of the machine that move while the machine is working. This can include reciprocating, rotating and transverse moving parts.

Hazardous Motions and Actions

A wide variety of mechanical motions and actions may present hazards to you while operating a machine. 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 to nearly all machines, and recognizing them is the first step toward protecting yourself from the danger they present. Familiarize yourself with the hazardous motions and actions on any machine you are operating or working near, so that you can avoid injury.

- **Motions:** Rotating motion can be dangerous; even smooth, slowly rotating shafts can grip

clothing and simple skin contact with any moving parts can cause severe injury. Collars, couplings, cams, clutches, flywheels, shaft ends, spindles, meshing gears and horizontal or vertical shafting are examples of common rotating mechanisms that can be hazardous. The danger increases when projections such as set screws, bolts, nicks, abrasions and projecting keys are exposed on rotating parts.

- **Machine Actions:** Machine actions are dangerous due to the amount of force generated at the point of operation where stock is inserted, held and withdrawn by hand. Specific machine actions include punching actions, such as blanking, drawing or stamping metal or other materials; shearing actions, such as knife operations; and bending actions, most commonly performed on power presses, press brakes and tubing benders.

Requirements for Safeguards

What must a safeguard do to protect workers against mechanical hazards? Regardless of the hazard, all machine safeguards have several goals in common:

- **Prevent contact:** The safeguard must prevent hands, arms and any other part of a worker's body from making contact with dangerous moving parts.
- **Remain secure:** Guards and devices should be made of durable material that will withstand the conditions of normal use. They must be firmly secured to the machine.
- **Avoid new hazards:** A safeguard defeats its own purpose if it creates a hazard of its own such as a shear point, a jagged edge or an unfinished surface, which can cause a laceration. Having to "work around" a machine safeguard isn't helpful.
- **Create no interference:** Safeguards that significantly impede the ability to do work are not helpful safeguards. Safeguards should protect workers but not prevent them from operating a piece of machinery properly.

Trust Your Gut

If you feel the guard isn't properly preventing contact or remaining secure during operation, or the guard is interfering with your work, alert your supervisor. Never tamper with or remove a guard.

- **Allow safe lubrication:** Safeguards should allow for the safe lubrication of machines without the need to completely dismantle the guarding system.

Types of Machine Safeguards

Safeguarding a machine is not always with a physical barrier. Here is a list of the various types of machine safeguards used today:

- **Barrier guards** provide a physical shield against machine hazards. They can be metal, metal-mesh, Plexiglas or other types of durable materials. Sometimes barrier guards are interlocked so they stop the machine when the guard is opened.
- **Two-hand trip devices** keep the hands out of the point of operation by requiring both hands to activate the machine function.

- Presence-sensing devices (light curtains) sense when the operator is getting too close the point of operation and automatically stop the machine. These are very effective.
- Restraining devices, such as pullback devices, restrain the operator's hands from going into the point of operation during machine motion. Other types of restraining devices do not allow the operator's hands in the point of operation at any time.

Prior to starting work, inspect the machine to make sure all machine safeguards are attached and functioning properly. Machines should not be used if the machine safeguards are not in place or not functioning.

Machine operators must also consider their own personal effects when operating machinery. Long hair, loose-fitting clothing and hanging jewelry can get caught in machine operations and cause serious injury. Always tie back long hair and avoid wearing clothing or jewelry that could get entangled in a machine.

Machine Operators

All machine operators should be familiar with the machine they are using, the machine safeguarding methods, emergency stop buttons and switches, and how to safely perform routine maintenance functions such as clearing jams or making other incidental adjustments.

You should be able to identify the various types of machine safeguarding methods incorporated into the machine you are using. It may be a combination of light curtains, two-hand trip devices and barrier guards. Regardless of the type, machine operators must be familiar with the types of machine safeguards, how to use those machine safeguards and how to make sure they are functioning properly.