

Machine Safeguarding Methods

Detail Sheets

Requirements

1910.212 General requirements for all machines.

(a) Machine guarding. (1) Types of guarding. One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are barrier guards, two hand tripping devices, electronic safety devices, etc.

(2) General requirements for machine guards. Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.

(3) Point of operation guarding.

(i) Point of operation is the area on a machine where work is actually performed upon the material being processed.

(ii) The point of operation of machines whose operation exposes an employee to injury, shall be guarded. The guarding device shall be in conformity with any appropriate standards therefore, or, in the absence of applicable specific standards, shall be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.

(iii) Special hand tools for placing and removing material shall be such as to permit easy handling of material without the operator placing a hand in the danger zone. Such tools shall not be in lieu of other guarding required by this section, but can only be used to supplement protection provided.

(iv) The following are some of the machines which usually require point of operation guarding: {a} Guillotine cutters {b} Shears {c} Alligator shears {d} Power presses {e} Milling machines {f} Power saws {g} Jointers {h} Portable power tools {I} Forming rolls and calendars.

(4) Barrels, containers, and drums. Revolving drums, barrels, and containers shall be guarded by an enclosure which is interlocked with the drive mechanism, so that the barrel, drum, or container cannot revolve unless the guard enclosure is in place.

(5) Exposure of blades. When the periphery of the blades of a fan is less than seven (7) feet above the floor or working level, the blades shall be guarded. The guard shall have openings no larger than one half (1/2) inch.

b) Anchoring fixed machinery. Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

Explanation

“General Duty Clause” for machine guarding.

Paragraph (a)(1) requires employees in the work area be protected from the hazards created by the point of operation, ingoing nip points and rotating parts.

Paragraph (a)(2) describes the manner in which guards are to be secured to the machine. The correct application is not described; therefore, other similar OSHA or consensus standards (ANSI) can be used for guidance.

Paragraph (a)(3)(ii) describes the requirements for safeguarding the point of operation for the operator. It does not say “how” to safeguard. Other OSHA standards can be used for guidance (specifically the power press standard for how guarding and devices should work). You can also use an ANSI standard or similar information. Always check with the equipment manufacturer for added guidance. Advancements in machine design offer additional protection and you should be aware of what the manufacturer’s are providing on new equipment. Retrofit existing machines to conform.

Paragraph (a)(3)(iv) lists some of the machines that require safeguarding. Just because your machine is not listed, it does not mean that it does not need to be safeguarded. If a hazard exists, the machine **MUST** be safeguarded. See the flowchart for guidance.

Paragraph (a)(5) describes guarding for man-cooling fans. Vent fans are covered under 1910.212(a)(1). This requirement is intended to prevent objects from falling into blade area and being thrown out, but may also prevent someone from sticking their finger into the blades.

Paragraph (b) says that if you have a machine that stays in one place (fixed), it must be anchored to prevent movement.. This standard does not require all machines to be attached to the floor. The machine can be “anchored” by its size and weight. Use common sense. Ask: What’s the Hazard? If a hazard exists, anchor it. For example, a machine that is top heavy should be secured to prevent it from falling over. A machine that is moving due to vibration can be “anchored” by using vibration pads to eliminate movement. If no hazard exists, you do not need to do anything.



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Look for these Hazards ...



Examples: Belt drives, chain drives, gear drives, and feed rolls.

PINCH POINTS

Where two parts move together and at least one of them moves in a circle; also called mesh points, run-on points, and entry points.

When shields cannot be provided, operators must avoid contact with hands or clothing in pinch point areas. Never attempt to service or unclog a machine while it is operating or the engine is running.



Examples: Rotating power transmission shafts or shafts that protrude beyond bearings or sprockets.

WRAP POINTS

Any exposed component that rotates.

Watch components on rotating shafts, such as couplers, universal joints, keys, keyways, pins, or other fastening devices. Splined, square, and hexagon-shaped shafts are usually more dangerous than round shafts because the edges tend to grab fingers or clothing more easily than a round shaft, but round shafts may not be smooth and can also grab quickly. Once a finger, thread, article of clothing, or hair is caught it begins to wrap; pulling only causes the wrap to become tighter.



Examples: Shears, saws, mowers, rotary shredders and cutters, augers, chain and paddle conveyors, certain points in an equipment frame during raising or lowering, hedge-trimming shears, and rotary mower blade.

SHEAR POINTS

Where the edges of two moving parts move across one another or where a single sharp part moves with enough speed or force to cut soft material.

Keep hands and feet out of these areas. Recognize the potential hazards of cutting and shear points on equipment that are not designed to cut or shear.



Examples: Gears, platens or machine beds, hitches, telescoping shafts

CRUSH POINTS

Points between two objects moving toward each other or one object moving toward a stationary object.

Guard yourself! Never stand between two objects moving toward one another.



Examples: Feed rolls, grinders, hammermills, fans and blades on blowers, flywheels on balers.

PULL-IN POINTS

Points where objects are pulled into equipment, usually for some type of processing.

Machines are faster and stronger than people. Never attempt to hand-feed materials into moving feed rollers. Always stop the equipment before attempting to remove an item that has plugged a roller or that has become wrapped around a rotating shaft. Freewheeling parts, rotating or moving parts that continue to move after the power is shut off are particularly dangerous because time delays are necessary before service can begin.

Allow sufficient time for freewheeling parts to stop moving. Stay alert! Listen and Watch for Motion!



Examples: Rocks, stones, sticks, and pieces of metal, wood, plastic, etc.

THROWN OBJECTS

Any object that can become airborne because of moving parts.

Keep shields in place to reduce the potential for thrown objects. Wear protective gear such as goggles to reduce the risk of personal injury if you cannot prevent particles from being thrown.

Ranking Safeguarding Methods Flowchart

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Eliminate the Hazard

Control the Hazard

Safe Work Practices
(Administrative)

Person Protective
Equipment (PPE)

- 1st Choice: Guards** (prevent the hazard)
- Fixed
 - Interlocked
 - Adjustable
 - Self-Adjusting

- 2nd Choice: Devices** (control the hazard)
- Presence Sensing
 - Photoelectric
 - Radiofrequency
 - Electromechanical (probe)
 - Safety mats
 - Pull Backs/Restraints
 - Safety Trip Controls
 - Pressure sensitive bar
 - Tripwire cables
 - Tripods
 - Moveable Barriers (Gates)
 - 2-Hand
 - Controls
 - Trips
 - Levers

- 3rd Choice: Other Methods**
(requires supervision and diligence)
- Safe Holding
 - Safe Opening
 - Safe Position of Controls
 - Safe Distance

- Specific Procedures & Work Rules
- Training, Education & Enforcement
- Awareness Barriers & Shields
- Warning Devices - Alarms or Lights
- Holding Tools, Push Blocks
- Signs