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Machine Guarding

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Purpose

- Understanding the different types of machine guarding & devices
- National emphasis



Objectives

- Machine guarding principles
- Types of machine guarding
- Self audits
- Training

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Responses...

- “We have been doing it this way for 20 years and nobody got hurt.”
- “The machine came that way.”
- “Nobody is going to stick their hands in there.”
- “Nobody goes behind the machine.”
- “The guard is in the way.”
- “The OSHA inspector never said anything.”

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Best Response Ever?

“We will put the guard back
if OSHA shows up.”

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Subpart O of the OSHA Standard

- 29 CFR 1910.212-219
- 29 CFR 1910.243

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What is a Machine Guard?

- Machine guards are the primary line of defense between workers and their machines
- Any machine part, function, or process that may cause injury must be safeguarded
- Guard must be secure, protect from falling objects and create no new hazards

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Machine Hazards Occurrence

- Point of operation - work performed
 - Cutting, shaping, boring, forming
- Mechanical power transmission
 - Flywheels, pulleys, belts, sprockets, connecting rods, cams, spindles, gears
- Other moving parts
 - Rotating, reciprocating, feeds

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Non-mechanical Hazards

- Electrical - proper grounding & wiring
- Noise
 - Startle, disrupt concentration, interfere with communication
- Cutting fluids, coolants

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Methods of Machine Guarding

- Guards
- Devices
- Location/distance



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Types of Guards

- Fixed
- Adjustable
- Self adjusting
- Interlock



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Safeguarding Devices

- Presence sensing
- Pullback
- Restraint
- Safety controls and trips
- Gates



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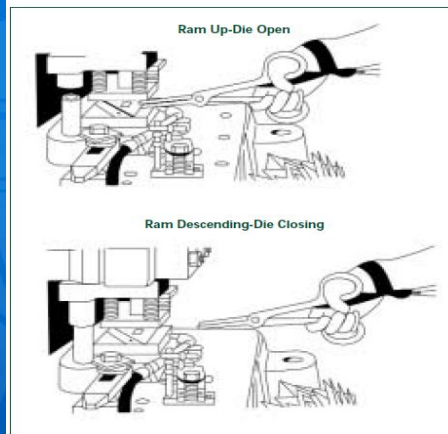
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Holding Tools

- Used to place and remove stock in the danger area
- Not to be used instead of other machine safeguards, but as a supplement

Figure 24 Hand-Feeding Tools Used in Conjunction with Pullbacks on a Power Press

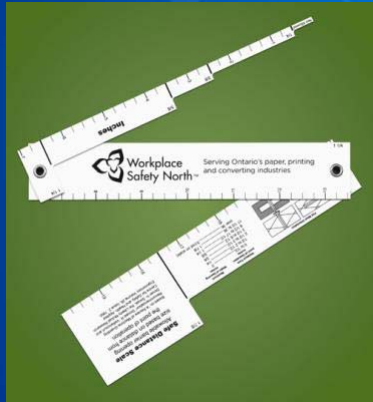


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29 CFR 1910.217 – Table O-10



OSHA GUARD-OPENING REQUIREMENTS

The maximum permissible opening for guards as required by OSHA 29 CFR 1910.217 for mechanical power presses is as follows:

Distance of Opening From Point-of-Operation Hazard (Inches)	Maximum Width of Opening (Inches)
1/8 to 1 1/8	1/8
1 1/8 to 2 1/8	1/4
2 1/8 to 3 1/8	3/8
3 1/8 to 5 1/8	1/2
5 1/8 to 6 1/8	5/8
6 1/8 to 7 1/8	3/4
7 1/8 to 12 1/8	1 1/8
12 1/8 to 17 1/8	1 1/2
17 1/8 to 21 1/8	2 1/8
Over 21 1/8	6

Per No. 430011

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Guarding by Distance is Acceptable When:

- Guards are not feasible
- Limited to one-time only fabrication
- Training
- Good history & enforcement

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Self-Audit

- Document recognized hazards
- Hazards have been corrected
- Accompany all outside visitors
- Encourage employee participation

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Fixed Guards



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Interlock Guard



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Adjustable Guards



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Self-Adjusting Guard



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Guarding Devices

- Presence sensing - photoelectrical
- Radio frequency
- Electrical mechanical

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Guarding Devices



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Pullback and Restraint Guarding

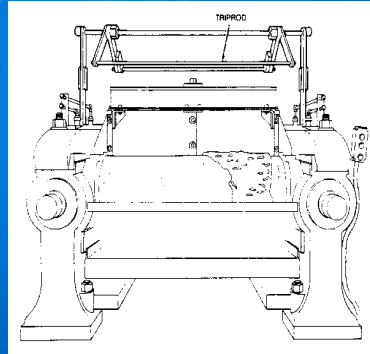


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Safety Trip Control Devices

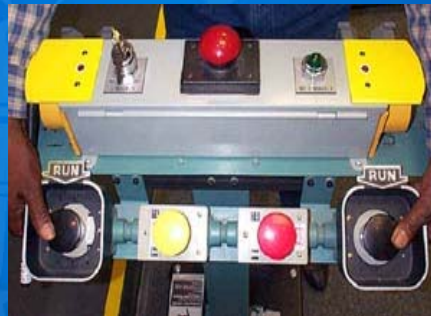


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Two-Handed Trip Devices

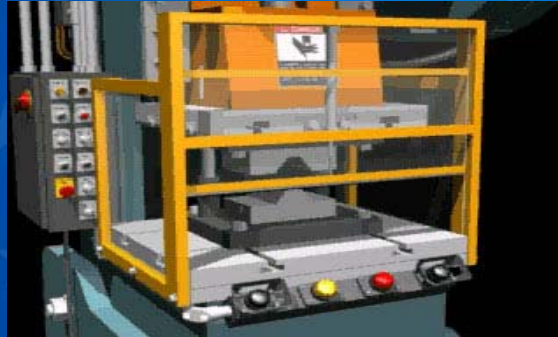


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Safety Gates



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Safety Gates

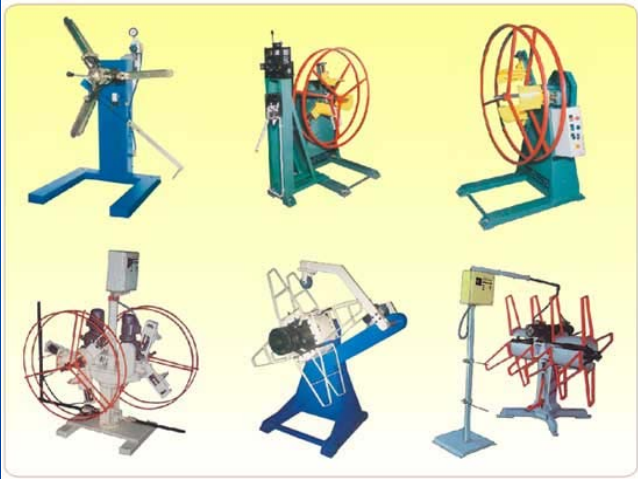


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Feeding and Injection Guard



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Barrier Guards



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Robotics – Multiple Guarding



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Machine Guarding Checklist

Public Services Health
& Safety Association
A Health & Safety Ourselves Partner

✓ Checklist

Machine Guarding Checklist

Organization _____ Date _____
 Machine Name _____
 Department _____ Machine # _____

SPECIFIC GUARDING REQUIREMENTS

Points of Operation:	YES	NO
Is there a guard or safety device provided for each point of operation of the machine?	<input type="checkbox"/>	<input type="checkbox"/>
Do the guards allow the operators hands, arms, or other body parts to make contact with hazardous machine parts?	<input type="checkbox"/>	<input type="checkbox"/>
Is there evidence that the guards have been tampered with or bypassed to make them ineffective?	<input type="checkbox"/>	<input type="checkbox"/>
Are the guards firmly secured and not easily removed?	<input type="checkbox"/>	<input type="checkbox"/>
Power Transmission Apparatus:	YES	NO
Are there any unguarded gears, sprockets, pulleys, flywheels, shafts, belts, couplings, or chain drives on the equipment?	<input type="checkbox"/>	<input type="checkbox"/>
Do power transmission guards allow the operator's hands, arms, or other body parts to make contact with moving parts by reaching over, under, around or through the guard?	<input type="checkbox"/>	<input type="checkbox"/>
Are there any exposed set screws, key ways, collars etc.?	<input type="checkbox"/>	<input type="checkbox"/>
Are guards in good condition and firmly secured? (fasteners should require the use of hand tools for removal)	<input type="checkbox"/>	<input type="checkbox"/>
Operator Controls:	YES	NO
Are starting / stopping controls within easy reach of the operator?	<input type="checkbox"/>	<input type="checkbox"/>
If there are more than one operator station, are separate controls so located that operators can see the entire operation?	<input type="checkbox"/>	<input type="checkbox"/>
Are controls, including foot controls, guarded against accidental activation?	<input type="checkbox"/>	<input type="checkbox"/>
Are controls labelled to identify their function?	<input type="checkbox"/>	<input type="checkbox"/>
Are controls similar in type and arrangement to other similar machines in the plant?	<input type="checkbox"/>	<input type="checkbox"/>
Are emergency stop controls easily accessible and clearly identified?	<input type="checkbox"/>	<input type="checkbox"/>

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Training

- Hazards associated with the machine and/or equipment
- How the safe guards provide protection
- How to use the safe guards
- How and when safe guards can be removed
- Who is allowed to remove safe guards
- Who to contact if safe guards are damaged or missing

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Review

- Machine guarding principles
- Types of machine guarding
- Inspections
- Training

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