

Machining

Machine Guard Infographic: The Point of Operation

Don Sears | Feb 13, 2018

Get the cold hard facts on must-have machine guarding in this infographic. Know the OSHA and ANSI standards, and the principles of safeguarding aimed at protecting workers from unnecessary harm on the shop floor.

Presses. Alligator shears. Guillotine cutters. Grinding wheels. These essential manufacturing machines are incredibly powerful and help fuel production output, but they come with inherent dangers to machine operators and machinists. Their moving parts can cause a range of serious injuries, including amputations, crushed fingers, legs and hands, and blindness from flying cut parts. The goal of OSHA standard **(1910.212)** is to incorporate safeguards that allow for protected operation of this equipment. There were over 1,900 OSHA violations for improper machine guards in 2017—making it No. 8 on **Top 10 OSHA violation** list—right in the same spot it had been **in 2016**.

For those companies that have yet to comply with machine safeguarding standards, it is important to understand these injuries have a business cost. A joint 2015 **study** from the American Journal of Industrial Medicine found the following when looking at the effects of machine guard injuries in small metal fabrication shops: “While safeguards for metal fabrication machinery can cost hundreds or thousands of dollars, these costs should be weighed against the economic and personal cost of serious traumatic injuries: The average total cost to a business of a workplace amputation is estimated at \$133,000, \$111,000 for a crush injury, and \$95,000 for a fracture.”

Enter **machine guards**. One of the most important areas to safeguard when it comes to machines is at the point of operation—wherever a material is being cut or being shaped with the help of a worker pressing a button or feeding a material directly into the machine.

Here is what you need to know about safeguarding your machines from the point of operation and beyond.

Machine Worker Safety In Focus: The Point of Operation

Amputations and other life-threatening machine accidents can be prevented, but they still occur too often. Get the facts on how to protect the work area most likely to cause an injury: The point of operation. Work should never be performed without the proper machine guards in place.

Key Injury & Fatality Data



Over **800** Fatalities / Year



18,000 Injuries / Year

Crushing Injuries

Abrasions

Amputations

Lacerations

The Standards to Know

OSHA 1910.212 SERIES

- Law Unchanged Since 1975
- #8 on OSHA's Top 10 Violations
- 1,933 Violations in 2017



ANSI B11 SERIES

- Metalworkers: Learn ANSI B11.0-2015
- And ANSI B11.19-2010, "Performance Criteria for Safeguarding"

Safeguarding Facts You Need to Know



Point of Operation Openings

- Should not exceed 1/4"
- Prevents entry or contact
- First 1.5" from danger line should not exceed 1/4" opening



Machine Guard Principles

- Safe distance rule: 7"
- Guards: Workers can't get in
- Devices: Presence sensing mats, pullbacks, light curtains, restraints



Proper Guard Characteristics

- Integration with machine
- Handle workpiece in-feed and ejection
- Ease of inspection and maintenance
- Tamper-proof or foolproof

What Are Shear Points?

ANSWER: Area of cutting movement of a mechanical part

What Are Pinch Points?

ANSWER: 2 moving parts or one fixed and one moving

What Are Nip Points or Bites?

ANSWER: 2 or more parts rotating in opposite directions

Beyond the Point of Operation



Look Out for Powered:

- Flywheels
- Pulleys
- Belts
- Chains
- Couplings
- Spindles
- Cams
- Gears

And Other Moving Parts that:

- Reciprocate
- Rotate
- Transverse
- Auxiliary

Machine Guarding Myths

New Machines Are Safe: **Yes and No**

Older Machines Are "Grandfathered": **Nope**

OSHA Rules Are Just Guidelines: **No**

Not Sure What to Do? **Alert a Supervisor**



Plant Managers Should:

- Perform machine risk assessments
- Get training and train workers
- Have written plans
- Document injuries

Don't Forget to Protect Your Eyes & Face



THE LAW: OSHA 29 CFR 1910.333

The Consensus Standard on Quality, Impact, Specifications:

ANSI Z87.1-2015

Eyewear Needs to Protect Against:

- Flying particles
- Molten metals
- Liquid chemicals
- Gases and vapors
- Light radiation
- Side protection

Spotlight on Protection from Machines

Here is a collection of the best articles on machine guarding and lockout/tagout procedures.

Why Machine Guarding Is Key for Workplace Safety

4 Essential Workplace Safety Tips for CNC Machinists

5 Ways to Improve a Lockout/Tagout Program and Promote Workplace Safety

Preventing Safety Hazards with Effective Lockout/Tagout Programs

Spotlight on Optimizing Your Machining Operation

Here is a collection of helpful machining articles.

How to Maximize Throughput and Part Quality When Threading

Learn How to Push Your 5-Axis Machine's Output

How to Maximize Machine Productivity with Toolholders

How to Improve Your Machine Shop's Grinding Operation

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