

Applicable Standards

29 CFR 1910.212

General requirements for all machines

29 CFR 1910.213

Woodworking machinery requirements

29 CFR 1910.147

The control of hazardous energy
(Lockout/Tagout)

Safeguard Requirements

Safeguards must meet these minimum general requirements:

- **Prevent contact** - A good safeguarding system eliminates the possibility of the operator or another worker placing parts of their bodies near hazardous moving parts.
- **Secure** - 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** - A small tool that is 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 of its own such as a shear point, a jagged edge, or an unfinished surface that can cause a laceration. The edges of guards, for instance, should be rolled or bolted in such a way that they eliminate sharp edges.



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Tennessee Department of Labor and Workforce Development;
Authorization #337361; 2,000 copies;
May 2019; This public document was promulgated at a cost of \$0.18 per copy.



Amputations

Special Emphasis Program



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Amputations

The operations of saws, shears, slicers, and power presses can be extremely dangerous; injuries that result from inadequate guarding on these types of machines often result in permanent disability or death. Because of the serious nature of these injuries, amputations are costly in terms of workers' compensation claims and days away from work. However, the cost to injured employees and their families cannot be counted in mere monetary terms. Jobs lost, families under stress, livelihoods threatened, and physical pain and suffering are some of the personal costs of amputations.

As a result, Tennessee OSHA has implemented a Special Emphasis Program on Amputations to identify and reduce workplace hazards that are causing or are likely to cause amputations. This program targets all types of power presses (including press brakes), as well as saws, shears, and slicers because these machines account for a significant number of amputation injuries in general industry.

What Causes Amputations in the Workplace?

Employees suffer amputation injuries when they attempt to align, adjust, inspect, un-jam, retrieve fallen parts, lubricate, and perform a variety of other operations on machinery, especially unguarded or unprotected machinery. In TOSHA's experience, employee exposure to unguarded or inadequately guarded machines is prevalent in many workplaces in the state.

Safeguards are essential for protecting workers from needless and preventable amputations.

The following are the most common types of hazardous mechanical motion:

- **Rotating** - circular movement of couplings, cams, clutches, flywheels, and spindles as well as shaft ends and rotating collars that may grip clothing or otherwise force a body part into a dangerous location.
- **Reciprocating** - back and forth or up and down actions that may strike or entrap a worker between a moving part and a fixed object.
- **Transversing** - movement in a straight, continuous line that may strike or catch a worker in a pinch or shear point created between the moving part and a fixed object.
- **Cutting** - action generated during sawing, boring, drilling, milling, slicing, and slitting.
- **Punching** - motion resulting when a machine moves a slide (ram) to stamp or blank metal or other material.
- **Shearing** - movement of a powered slide or knife during metal trimming or shearing.
- **Bending** - action occurring when power is applied to a slide to draw or form metal or other materials.

The majority of amputations occur in the manufacturing sector.



Areas of Safeguarding

Any machine part, function, or process that may cause amputation or other injury must be safeguarded. Remember also, new equipment does not necessarily have the guards on the machine required by TOSHA. If not properly guarded, it is the employer's responsibility to add the necessary guarding to protect the employee.

Basic Areas Requiring Safeguarding

The Point of Operation - The point where work is performed on the materials, such as pressing, cutting, shaping, boring, or forming of stock.

- **Power Transmission Apparatus** - All components of the mechanical system that transmit energy 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 parts of the machine that move while the machine is working. These can include reciprocating, rotating, and transverse moving parts, as well as feed mechanisms and auxiliary parts of the machine.

Remember the AUTO Principle

If you can reach **A**round
Under
Through
Over

an existing guard - it's not effective!

A guard must prevent a worker's hands or any part of the body from going around, under, through, or over the guard and entering the dangerous moving parts of the machine.