

Machine Guarding – Amputation Prevention

Amputations are some of the most serious and debilitating workplace injuries.

They're widespread and involve a variety of activities and equipment. Amputations occur most often when workers operate unguarded or inadequately safeguarded mechanical power presses, power press brakes, powered and non-powered conveyors, printing presses, roll-forming and rollbending machines, food slicers, meat grinders, meat-cutting band saws, drill presses, milling machines as well as shears, grinders, and slitters.



These injuries also happen during materials handling activities and when using forklifts and doors as well as trash compactors and powered and non-powered hand tools. Besides normal operation, the following activities involving stationary machines also expose workers to potential amputation hazards: setting up, threading, preparing, adjusting, cleaning, lubricating, and maintaining machines as well as clearing jams.

The following types of mechanical components present amputation hazards:



- **Point of operation** - the area of a machine where it performs work on the material.
- **Power-transmission apparatuses** - flywheels, pulleys, belts, chains, couplings, spindles, cams, gears, connecting rods and other machine components that transmit energy.
- **Other moving parts** - machine components that move during machine operation such as reciprocating, rotating, and transverse moving parts as well as auxiliary machine parts.

All mechanical motion is potentially hazardous. In addition to in-running nip points ("pinch points")—which occur when two parts move together and at least one moves in a rotary or circular motion that gears, rollers, belt drives, and pulleys generate—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 action 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 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.



Prevention: Use Employee Training, Machine Guarding, Administrative Controls & Hand Removal / Withdraw Devices to aggressively address and prevent these injuries. Also, when purchasing equipment, always obtain the optional safety equipment and safeguards.