

## Amputations

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

### What types of machine components are hazardous?

The following types of mechanical components present amputation hazards:

- **Point of operation** – the area of a machine where it performs work on material.
- **Power-transmission apparatuses** – flywheels, pulleys, belts, chains, couplings, spindles, cams, and gears in addition to 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.

### What kinds of mechanical motion are hazardous?

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 (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.

### Are there any OSHA standards that cover amputation hazards in the workplace?

Yes. The Occupational Safety and Health Administration (OSHA) has the following standards in Title 29 of the Code of Federal Regulations (CFR) to protect workers from amputations in the workplace:

- 29 CFR Part 1910 Subparts O and P cover machinery and machine guarding.
- 29 CFR 1926 Subpart I covers hand tools and powered tools.
- 29 CFR Part 1928 Subpart D covers agricultural equipment.
- 29 CFR Part 1915 Subparts C, H, and J; 29 CFR Part 1917 Subparts B, C, and G; and 29 CFR Part 1918 Subparts F, G, and H cover maritime operations.

### What can employers do to help protect workers from amputations?

You should be able to recognize, identify, manage, and control amputation hazards commonly found in the workplace such as those caused

by mechanical components of machinery, the mechanical motion that occurs in or near these components, and the activities that workers perform during mechanical operation.

Work practices, employee training, and administrative controls can help prevent and control amputation hazards. Machine safeguarding with the following equipment is the best way to control amputations caused by stationary machinery:

- **Guards** provide physical barriers that prevent access to hazardous areas. They should be secure and strong, and workers should not be able to bypass, remove, or tamper with them. Guards should not obstruct the operator's view or prevent employees from working.
- **Devices** help prevent contact with points of operation and may replace or supplement guards. Devices can interrupt the normal cycle of the machine when the operator's hands are at the point of operation, prevent the operator from reaching into the point of operation, or withdraw the operator's hands if they approach the point of operation when the machine cycles. They must allow safe lubrication and maintenance and not create hazards or interfere with normal machine operation. In addition, they should be secure, tamper-resistant, and durable.

You are responsible for safeguarding machines and should consider this need when purchasing machinery. New machinery is usually available with safeguards installed by the manufacturer. You can also purchase appropriate safeguards separately or build them in-house.

### **Are certain jobs particularly hazardous for some employees?**

Yes. Under the Fair Labor Standards Act, the Secretary of Labor has designated certain nonfarm jobs as especially hazardous for employees under the age of 18. These workers generally are

prohibited from operating band saws, circular saws, guillotine shears, punching and shearing machines, meatpacking or meat-processing machines, paper products machines, woodworking machines, metal-forming machines, and meat slicers.

### **Workers' Rights**

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For additional information, see [OSHA's Workers page \(www.osha.gov/workers\)](http://www.osha.gov/workers).

### **How to Contact OSHA**

Under the Occupational Safety and Health Act of 1970, employers are responsible for providing safe and healthful workplaces for their employees. OSHA's role is to help ensure these conditions for America's working men and women by setting and enforcing standards, and providing training, education and assistance. For more information, visit [www.osha.gov](http://www.osha.gov) or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

**This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.**



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# WORKPLACE SAFETY

A W A R E N E S S C O U N C I L

## Wiring Methods and GFCI

### **What is a GFCI**

A ground-fault circuit-interrupter (GFCI) is a protective device that compares the amount of current going into electrical equipment with the amount of current returning from the equipment and if a targeted deviation (0.005 amperes) is exceeded, the circuit is quickly broken, often within as little as 25 milliseconds.

The GFCI has proven over time to protect employees from electrical shock. During the late 1970's OSHA determined that GFCI use would be mandatory for 120-volt, single-phase, 15- and 20-ampere temporary receptacle outlets used on construction sites [see 1926.404(b)(1)]. During this time OSHA estimates that between about 650 and 1,100 lives have been saved because of it.

GFCI's can be installed permanently (i.e. GFCI receptacle) or used temporarily to protect workers while performing certain tasks.

**Fast Fact:** Since the OSHA standard requiring GFCI use in the construction industry has been passed between 650 and 1,100 lives have been saved

### **Where are Temporary GFCI's Required**

On a construction site the presence of electrical hazards are very prevalent. A worker could be using an electric drill that is connected to a flexible cord set (extension cord). This cord set travels 100' where the plug head is inserted into a temporary power box.

This new level of protection covers all receptacle outlets on temporary wiring installations that are used during maintenance, remodeling, or repair of buildings, structures, or equipment, or during similar construction like activities. Such activities include cleanup, disaster remediation, and restoration of large electrical installations.

**Fast Fact:** An example of a "construction-like" activity would be a worker laying ceramic tile in a lobby of a bank building. The worker is using a drill with a paddle to mix the mortar. The drill is connected to an extension cord which is plugged into a nearby receptacle. This activity is construction-like in nature and therefore would require a GFCI receptacle or an extension cord with built-in GFCI capabilities.



# WORKPLACE SAFETY

A W A R E N E S S C O U N C I L

## Where are Permanent GFCI's Required

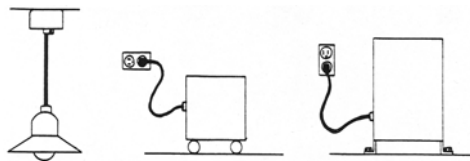
Cord sets and receptacles in wet environments can potentially expose employees to severe ground-fault hazards. Therefore, in a built environment (non-construction) OSHA requires ground-fault circuit protection for all 125-volt, single-phase, 15- and 20-ampere receptacles installed in bathrooms and on rooftops.

This new provision only applies to installations made after the effective date of OSHA's final rule. (August 13, 2007)

## Permitted Use of Flexible Cords

Flexible cords and cables may be used only for:

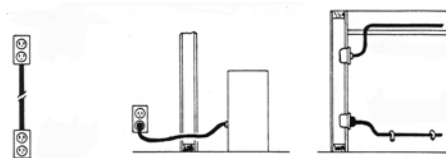
- pendants
- wiring of fixtures
- connection of portable lamps or appliances
- portable and mobile signs
- elevator cables
- wiring of cranes and hoists
- appliances to permit removal for maintenance and repair



## Prohibited Use of Flexible Cords:

Common OSHA violations when using an extension cord include the following:

- As substitute for fixed wiring
- Run through walls, ceilings, or floors
- Run through doorways, windows
- Attached to building surfaces



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# WORKPLACE SAFETY

A W A R E N E S S C O U N C I L

## Inspections of Extension Cords

Since extension cords are exposed to damage they must be visually inspected before use on any shift for both external and internal defects.



External defects include:

- deformed pins
- missing grounding pins
- damage to outer jacket or insulation
- loose plug head

Internal damage may be present if:

- pinched outer jacket
- crushed outer jacket
- broken plug head
- use of duct tape or electrical tape if present

Additionally prior to using an extension cord, the employee must examine the outer jacket to determine if the cord is adequate for the load.

Cord and plug connected equipment and flexible cord sets (extension cords) which remain connected once they are put in place and are not exposed to damage need not be visually inspected until they are relocated.

**Fast Fact:** Circuit breakers are designed to protect equipment – not people. Relying on a circuit breaker to trip as a means to protect an employee from electrocution is a deadly mistake!