

Moving machine parts have the potential to cause severe workplace injuries, such as crushed fingers or hands, amputations, burns, or blindness. Safeguards are essential for protection from these preventable injuries.

Causes for machine-related injuries include reaching in to “clear” equipment, not using lockout/tag out, unauthorized persons doing maintenance or using the machines, and missing or loose machine guards.

Hazardous Machine Parts

All machines consist of three fundamental areas; the point of operation, the power transmission apparatus, and other moving parts. Each of these components can present hazards that require safeguarding:

- **The Point of Operation:** The point on the machine where work is performed on the material.
- **Power Transmission Apparatus:** All components of the mechanical system which transmit energy to the part of the machine performing the work.
- **Other moving parts:** All parts of the machine that move while the machine is working.

Machine Guarding Requirements

Safeguards must be installed and maintained so that they 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:** Operators should not be able to easily remove or tamper with the safeguard, because a safeguard that can easily be removed and made ineffective is no safeguard at all.
- **Protect from Falling Objects:** The guard should ensure that no objects can fall into moving parts. A small tool which is dropped into a machine could easily become a projectile that could strike and injure someone.
- **Create No Interference:** Any guard that impedes an operator from performing the job quickly and comfortably might soon be overridden or disregarded.
- **Allow Safe Lubrication:** Operators should be able to lubricate the machine without removing the guards.

Having the correct and properly working safe guards can help to minimize injuries. There are four types of machine guards that you should be aware of and know the difference between.

- **Fixed Guard** is the most preferable guard because it is easy to use and difficult to remove because it is a permanent part of the machine. It is part of the machine that does not depend on moving parts to perform its function.
- **Interlocking Guards** will automatically shut off or disengage the machine if the guard is opened or removed. The machine cannot be powered on until the guard is back in place.

- Self-Adjusting Guards allow the barrier to open and close depending on the size and movement of the material. The guard is pushed away as the material moves into the danger area which provides an opening only large enough to accommodate the material.
- Adjustable Guards are useful because they allow accommodation of various sizes of material. However this introduces the potential for accidents from human error.

How can you minimize machine-related injuries in the workplace?

1. Keep all tools in good condition with regular maintenance.
2. Inspect the tool for cleanliness, freely operating parts and damage.
3. Use the right tool for the job.
4. Operate according to the manufacturer's instructions.
5. Use the proper protective equipment.
6. Disconnect tools when not in use, before servicing and when changing accessories and follow lockout/tagout procedures.
7. Keep all observers at a safe distance.
8. NEVER remove machine guarding.

Bench Grinder Safety

Bench grinders are found in many shops and laboratories across campus. These devices have several basic adjustments and machine guarding components that must be utilized so the machines can be used safely. Ensuring all grinding equipment is in safe working order and that all users are properly trained is critical.

Rules that should be followed when operating any bench grinding machine are:

1. Always wear eye protection (safety glasses at a minimum).
2. Remove ties, rings, watches and other jewelry.
3. Adjust the spark arrestor to be close to the wheel.
4. Tool rests should be adjusted close to the wheels and thoroughly tightened in place so they cannot shift position while in use.
5. The wheel guard should cover the spindle end, nut, and flange projections.
6. Inspect the wheels before turning on the power. **DO NOT** use wheels that have been chipped or cracked.
7. Stand to one side of the wheel when turning on power.
8. **DO NOT** use a wheel that vibrates.
9. Have the wheel bearings of the shaft replaced if worn.
10. When grinding, use the face of the wheel, not the side.
11. Don't touch any portion of the work piece until you are sure it has cooled.