

# Preventing Light Industrial Hand, Finger, and Limb Injuries

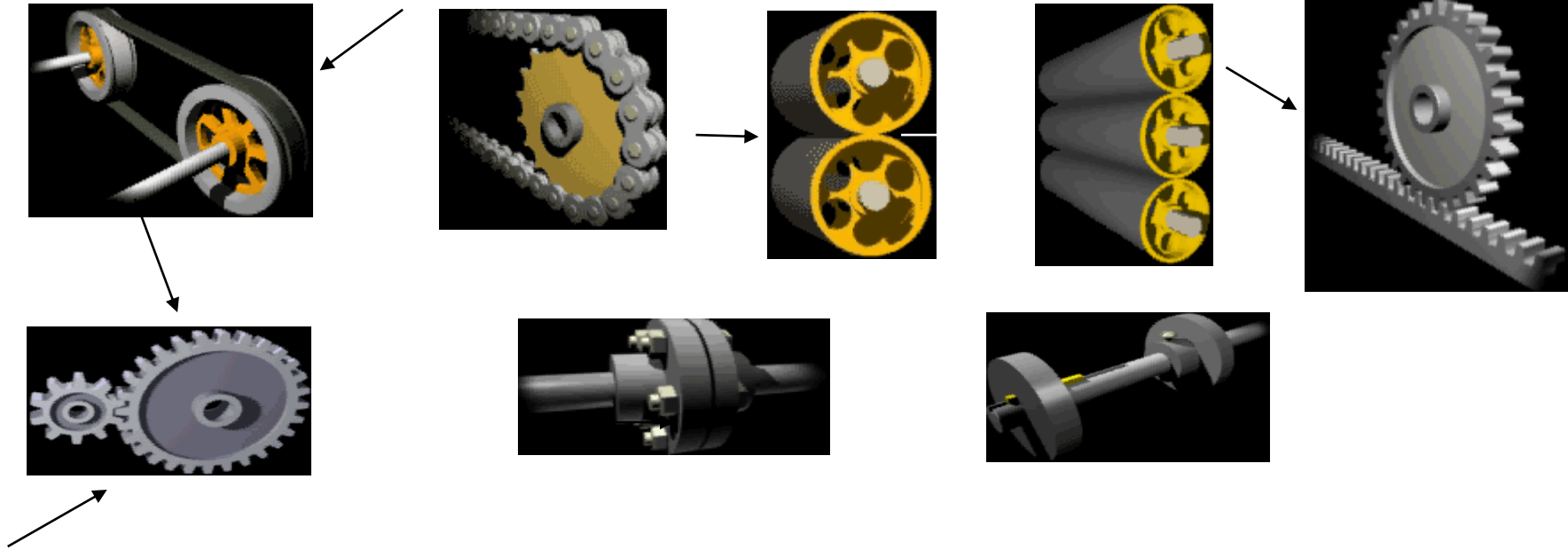
**Amputation is one of the most severe and crippling injuries**



# Amputations

- Amputation is one of the most severe and crippling types of injuries in the occupational workplace, often resulting in permanent disability.
- Amputation injuries are widespread throughout many industries and involve a wide range of activities and equipment.
- Approximately one-half of all amputations occur in the manufacturing sector, while the remaining amputations are construction, wholesale trade, retail trade, services, etc.

# Mechanical Hazards

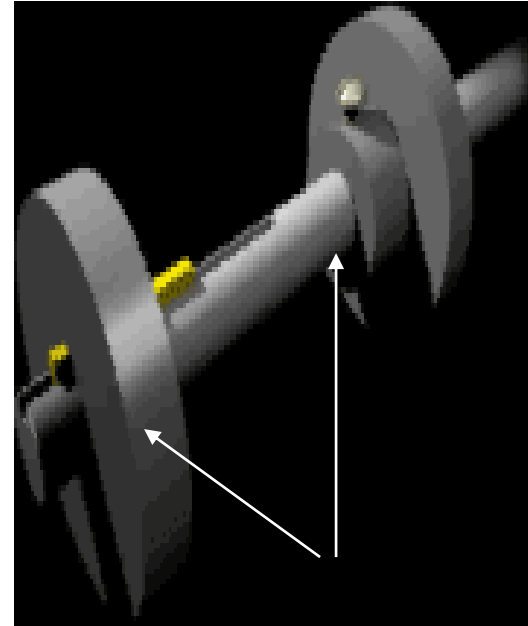
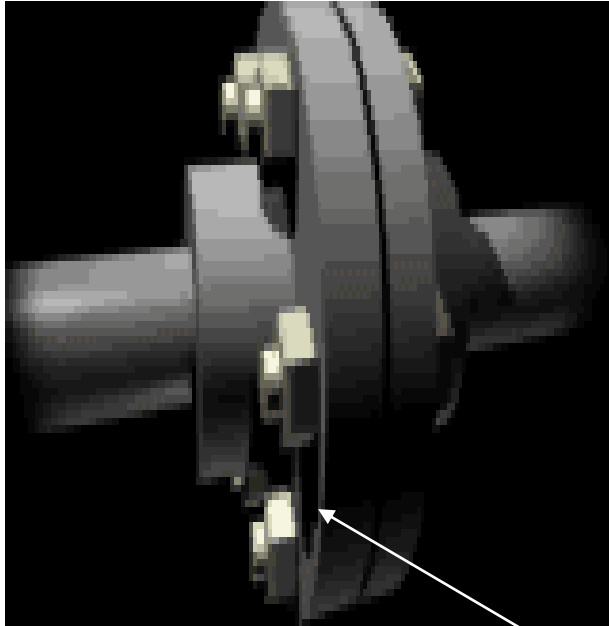


A wide variety of mechanical motions and actions

# Mechanical Hazards

- Stationary and portable machinery is the primary cause of amputations.
  - The focus will be on the machines most frequently involved in amputation and other types of machine related injuries.
  - The purpose is to help you recognize and control common hazards associated with the operation and use of certain types of machines and operations
- Machinery related injuries are long and horrifying.
- Many hazards are created by moving machine parts.
- Safeguards are essential for protecting workers from preventable injuries.
- As you walk through the work site, make note and pay close attention to machine operations and guarding

# Rotating Motion



Examples of Hazardous Projections on Rotating Parts

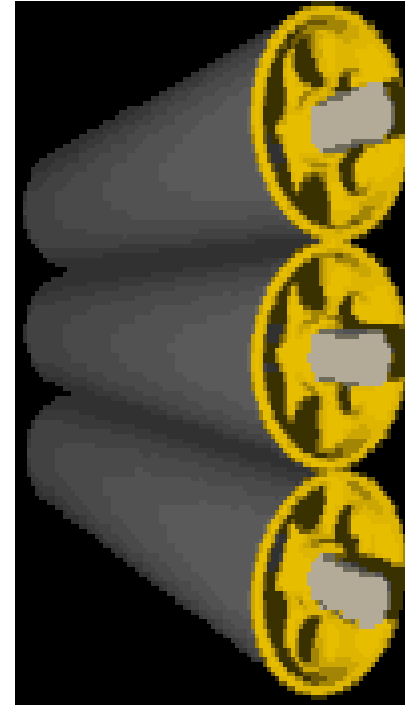
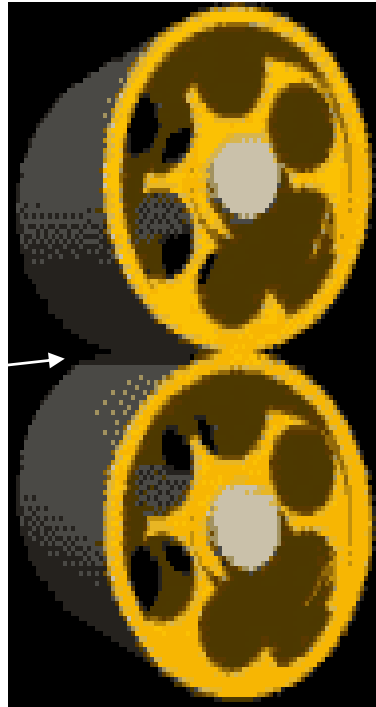
# Rotating Motion

Examples of common rotating mechanisms which may be hazardous are collars, couplings, cams, clutches, flywheels, shaft ends, spindles, meshing gears, etc.

*Rotating motion* can be dangerous;

- Slowly rotating shafts can grip hair and clothing and force the hand and arm into a dangerous position.
- Injuries due to contact with rotating parts can be severe.
- Collars, couplings, cams, clutches, flywheels, shaft ends, spindles, meshing gears, and horizontal or vertical shafting are some examples of common rotating mechanisms which may be hazardous.
- The danger increases when projections such as set screws, bolts, nicks, abrasions, and projecting keys are exposed on rotating parts.

# In-Running Nip Points



Contact can force the hand and arm into a dangerous position

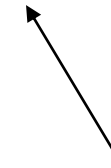
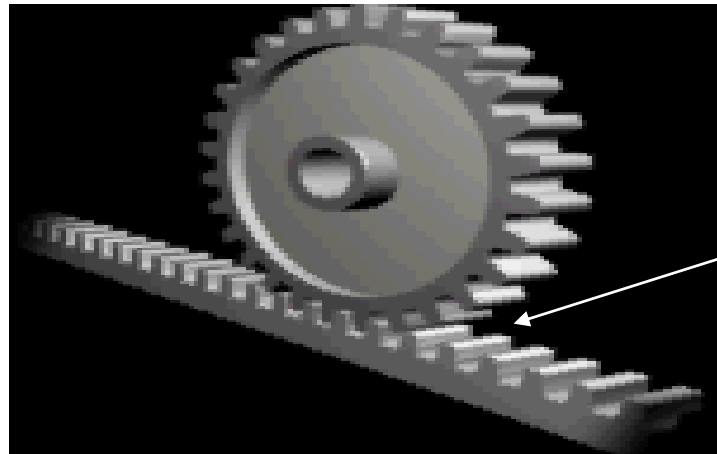
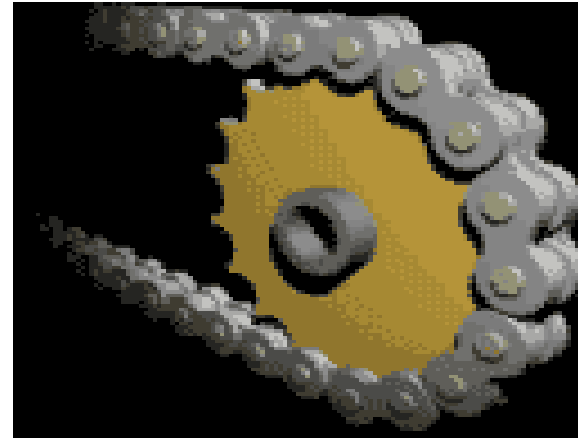
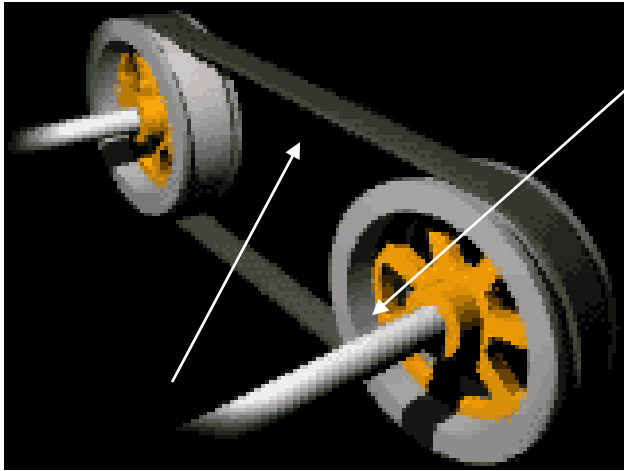


# In-Running Nip Points

*In-running nip point* hazards are caused by the rotating parts on machinery.

- Parts can rotate in opposite directions while their axes are parallel to each other. These parts may be in contact (producing a nip point) or in proximity.
- Stock fed between two rolls produces a nip point. As seen here, this danger is common on machines with intermeshing gears, rolling mills, and calendars.

# Common Nip Points on Rotating Parts

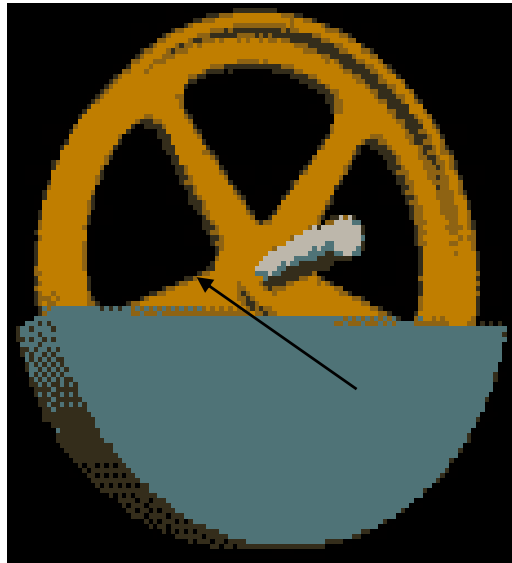
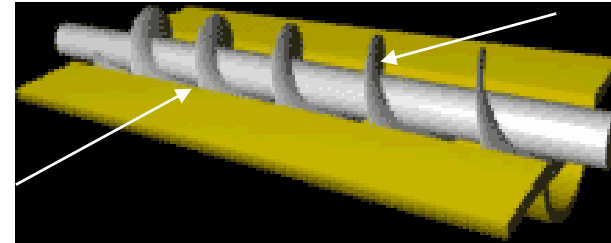


# Common Nip Points on Rotating Parts

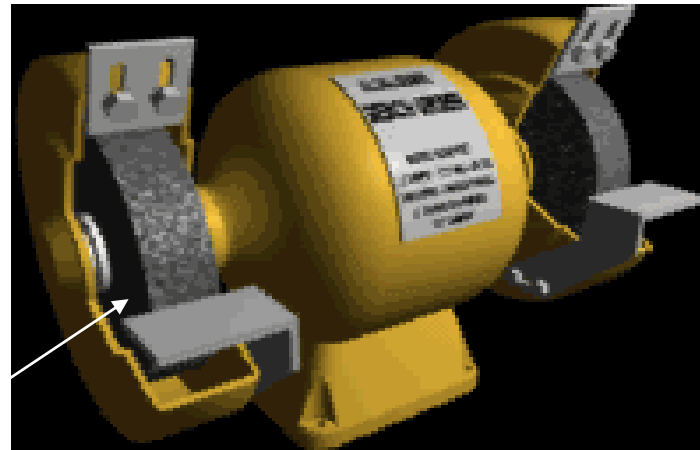
- Nip points are also created between rotating and moving parts.
- Examples would be –
  - the point of contact between a power transmission belt and its pulley,
  - a chain and a sprocket, and a rack and pinion.

# Nip Points Rotating and Fixed parts

Nip Point Between Rotating Screw Conveyor  
and Fixed Trough



Spoked Flywheel



Rotating Abrasive Wheel  
on a Grinder

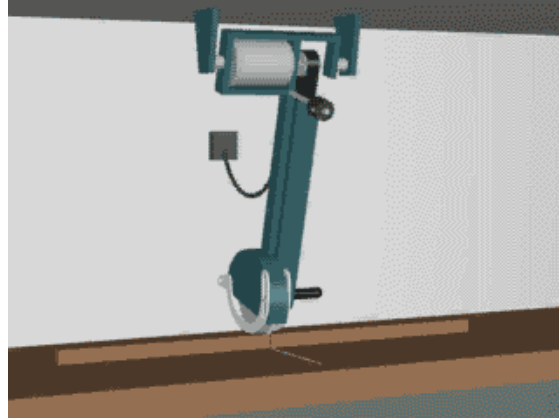
# Nip Points Rotating and Fixed parts

- Nip points can occur between rotating and fixed parts.
- Examples are:
  - spoked handwheels or flywheels,
  - screw conveyors,
  - abrasive wheel and an incorrectly adjusted work rest and tongue.

# Saw Operations



Table saw with guide



Swing Cut-off Saw in Motion



Scroll Saw with safety guard



Chop Saw



Guarded radial saw



Miter saw

# Saw Operations

Accidents may occur if the operator is inexperienced, improperly trained, or if the blade is not properly guarded.

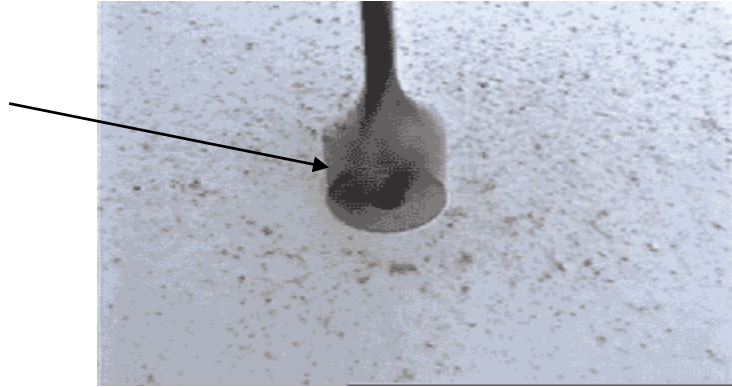
- The easiest way to avoid injury is to use properly guarded saws and appropriate safety equipment.
- Instruct employees to avoid loose-fitting clothes and long hair that might become entangled in a power tool
- Remove rings, watches, neck chains, and other jewelry.
- A push stick for small pieces of wood and for pushing stock past the blade should be available

# Saw Operations - Continued

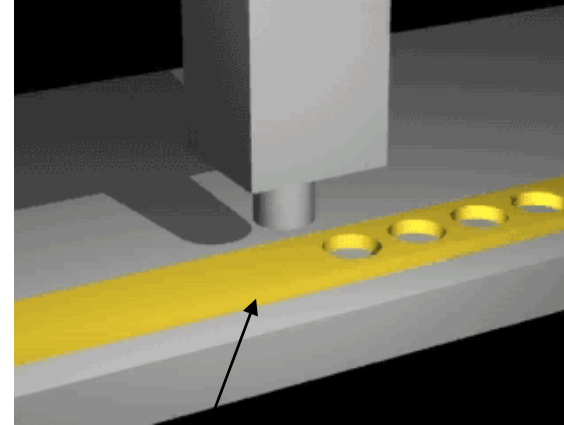
- Guards should be in place over the blade below the table. [\[1910.213\(a\)\(12\)\]](#)
- Guards should be covering belts, pulleys, chains, sprockets, etc. [\[1910.213\(a\)\(9\)\]](#)
- A spreader to prevent material from squeezing the saw or kicking back during ripping should be available [\[1910.213\(c\)\(2\)\]](#)
- Anti-kickback fingers should be used to hold the stock down in the event that the saw kicks back the material. [\[1910.213\(c\)\(3\)\]](#)
- Ask about a preventative maintenance process in place for maintaining and sharpening the blade. [\[1910.213\(s\)\(2\)\]](#)
- Train employees to stand at the side of the saw blade when the saw is running and use the hand nearest the handle to operate the saw. (This keeps the operator's body out of the line of the saw.)



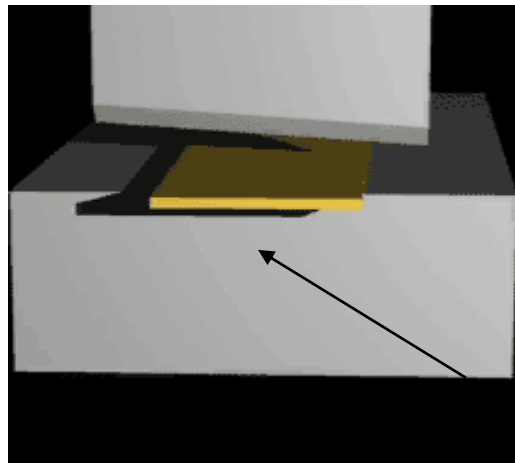
# Press Operations



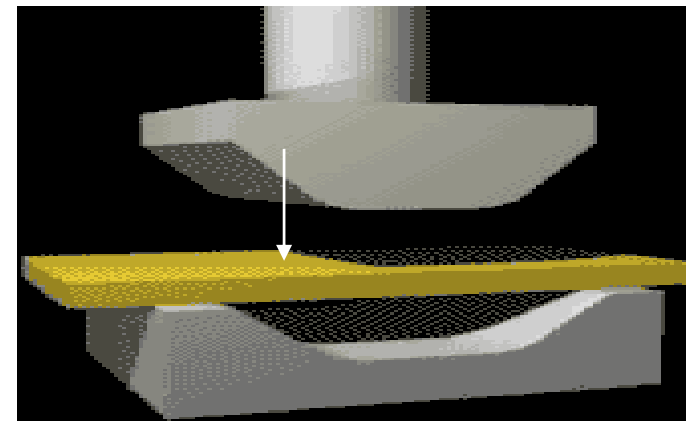
Hazardous Drilling Action



Typical Punching Operation



Shearing Operation



Bending Operation

# Press Operations

- *Cutting Action*
  - The danger is at the point of operation where finger, arm and body injuries occur.
  - Examples include bandsaws, circular saws, boring and drilling machines, turning machines (lathes), or milling machines.
- *Punching Action*
  - Results when power is applied to a slide (ram) for the purpose of blanking, drawing, or stamping metal or other materials.
  - The danger of this type of action occurs at the point of operation where stock is inserted, held, and withdrawn by hand.
  - Typical machines used for punching operations are power presses and iron workers.

# Press Operations - Continued

- *Shearing Action*

- Involves applying power to a slide or knife in order to trim or shear metal or other materials.
- A hazard occurs at the point of operation where stock is actually inserted, held, and withdrawn. (Foot pedal operated)
- Examples of machines used for shearing operations are mechanically, hydraulically, or pneumatically powered shears.

- *Bending Action*

- Results when power is applied to a slide in order to draw or stamp metal or other materials.
- A hazard occurs at the point of operation where stock is inserted, held, and withdrawn.
- Equipment that uses bending action includes power presses, press brakes, and tubing benders.

# Work Site Evaluation Housekeeping

<b>HOUSEKEEPING</b>			
Are floors, aisles, stairs cleaned?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are aisles free of obstruction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are aisles clearly marked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are building exits adequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are exits properly marked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are exits free of obstruction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper storage of materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash and locker rooms clean?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adequate lighting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adequate ventilation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# Site Evaluations

To prevent hand, finger and limb injuries, look for hand hazards before an accident can happen.

- Are areas free of obstruction?
- Are products properly stored?
- Is the lighting adequate?
- Look for slip, trip and falls hazards -
  - employee will always try and catch them self by throwing their hands down to try to catch themselves.
- Make sure good housekeeping rules are in place to prevent such injuries.

# Work Site Evaluation Machine Operations and Guarding

<b>MACHINE OPERATIONS &amp; GUARDING</b>			
Machine operators properly trained?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
No work on unguarded machinery?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Unattended machinery left running?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Moving parts and point of operation guards adequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lockout procedures observed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ventilation or refuse exhaust system adequate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Equipment in good working condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Employees wearing loose clothing near machinery?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Employees wearing jewelry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Employees wearing long hair not secured with net?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# Site Evaluations

- Look at the machine operation and ask about employee job specific training and documentation.
- Are all guards in place?
- Are any machines running with no operator?
- Look at the moving parts and point of operations and are they guarded.
- Is there a LOTO program and will staff be trained on procedures?
- Is equipment in good condition?
- Are employees wearing loose clothing near machinery? What is the dress code?
- Are employees wearing jewelry?
- Are employees with long hair securing their hair back out of their way?

# Best Practice Rules

- Don't use hands to wipe away debris in a machine, use a brush that is designed for that purpose.
- Check your equipment and machinery before you start and after you finish. Be sure that it is in good operating condition.
- Before you repair or clean machinery, be sure that the power is disconnected and follow all safety procedures.
- Do not wear gloves, jewelry, or loose clothing when working near a machine with moving parts.



# PPE

- Most injuries can be prevented.
- Wear the correct protective equipment—gloves, guards, forearm cuffs—for the work you are doing.
  - Be sure your gloves fit properly and are meant for the work you are doing.