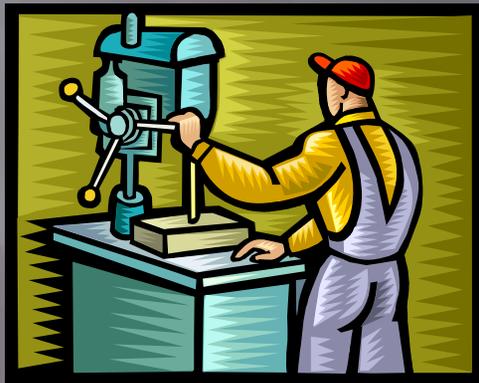


# MSA FACILITIES SAFETY AND HEALTH INSPECTION PROGRAM

## Machine and Machine Guarding



# Machine and Machine Guarding

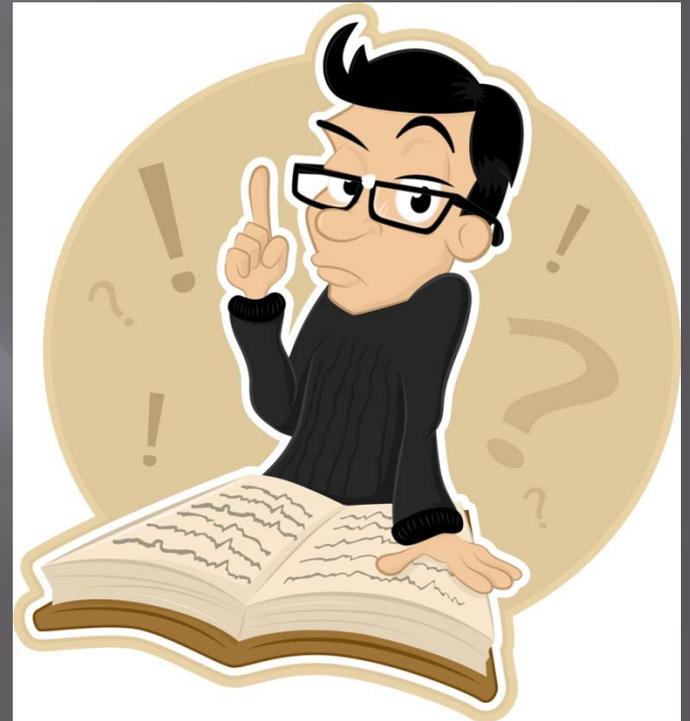
At the completion of this unit you shall be able to:

1. Utilize section V of the Safety and Health Hazard Inspection Program Checklist to identify compliant and non-compliant safety behaviors.
2. Identify areas of concern requiring immediate action to mitigate or prevent a possible injury.

Please use “Slide Show” to properly view this presentation!

# Machine and Machine Guarding

- ▣ Let's start with a discussion of machine guarding.



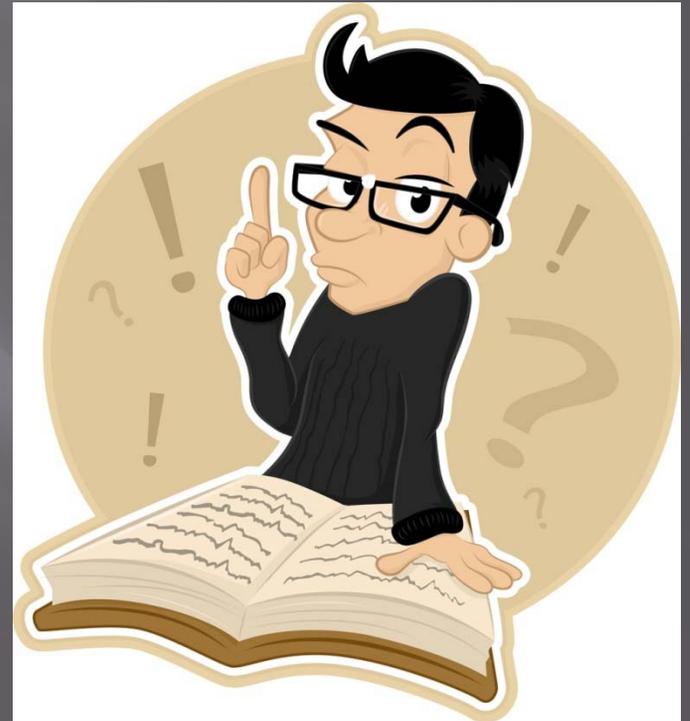
# Machine and Machine Guarding

- One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks.
- Moving machine parts have the potential for causing severe workplace injuries, such as crushed fingers or hands, amputations, burns and blindness, just to name a few.
- Safeguards are essential for protecting workers from these needless and preventable injuries.



# Machine and Machine Guarding

- In a nutshell, if the machine or machine part has the potential of injuring someone it must be guarded!!



# Machine and Machine Guarding

- Let's start with a discussion of the types of machine hazards we need to look for.



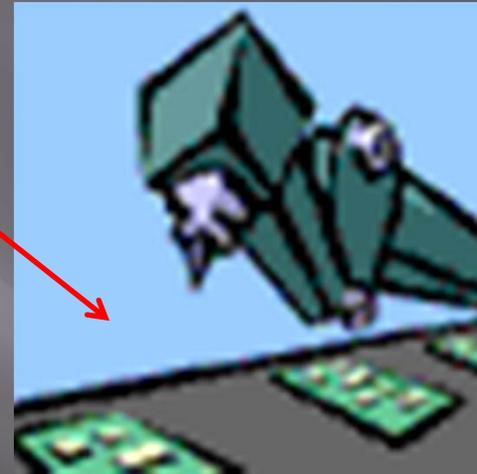
# Machine and Machine Guarding

- Typically, people are hurt when;
  - They reach in to “clear a machine”.
  - They don’t use LOTO.
  - They are unauthorized or unqualified to use the machine.
  - The machine is missing or has defective guards.



# Machine and Machine Guarding

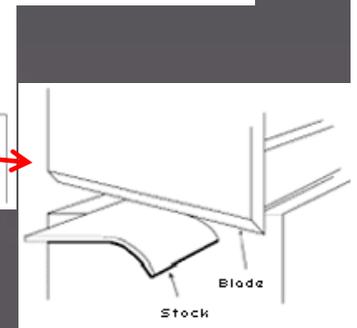
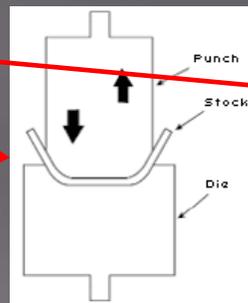
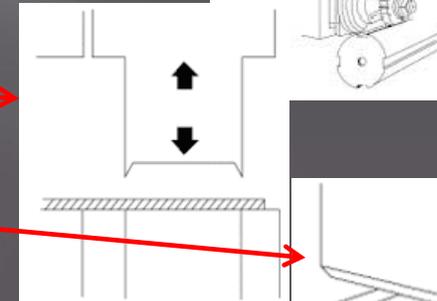
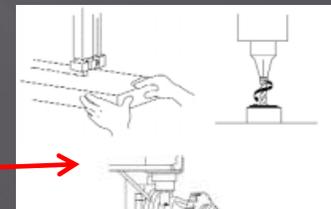
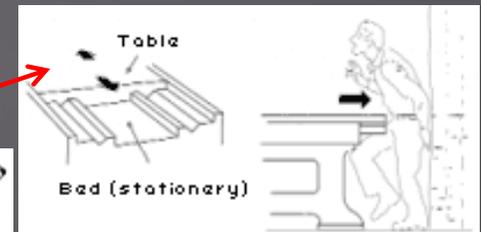
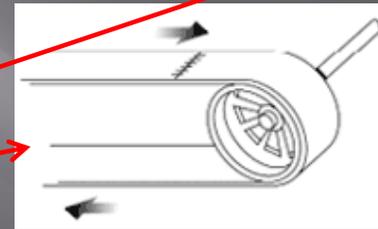
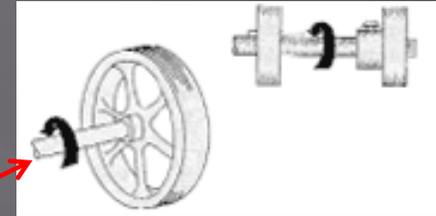
- ▣ The first is the “point of operation”.
- ▣ This is the location where work is actually performed on the material.
- ▣ Injuries occur typically when the body can position itself inside the operation zone of the machine.



# Machine and Machine Guarding

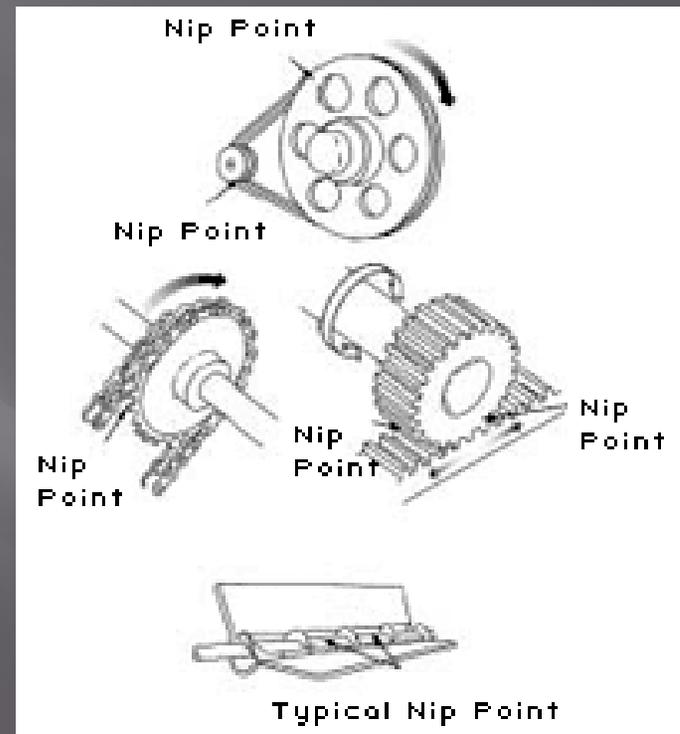
▣ The second is power transmission parts. This includes:

- Rotating motion.
- Reciprocating motion
- Traversing motion
- Cutting action
- Punching action
- Shearing action
- Bending action



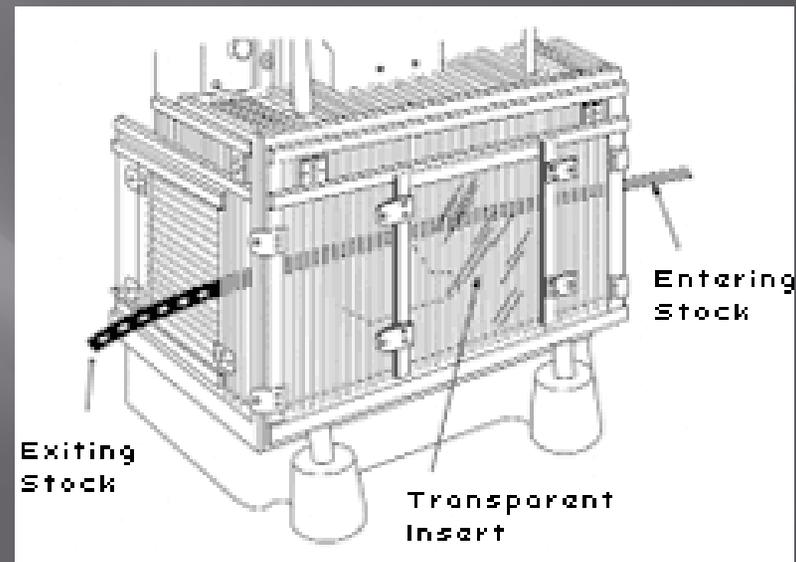
# Machine and Machine Guarding

- ▣ The third is “in running nip points” where gears or belts could catch an operators clothing or body and pull it into the hazard. These are some examples.



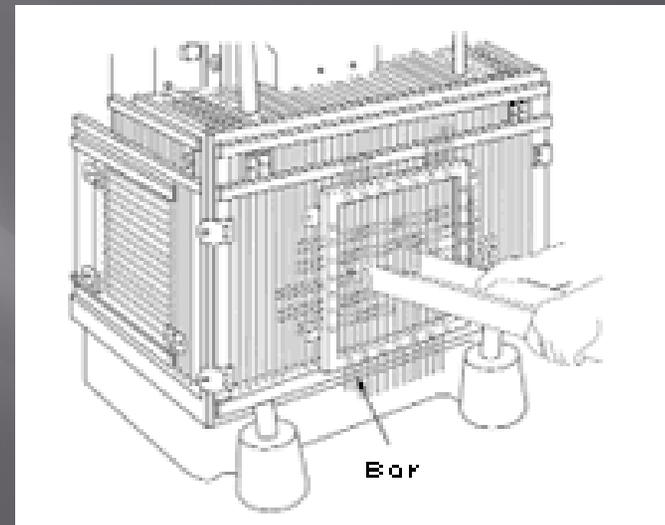
# Machine and Machine Guarding

- ▣ There are many different methods of safeguarding machinery.
  - ▣ Fixed guard



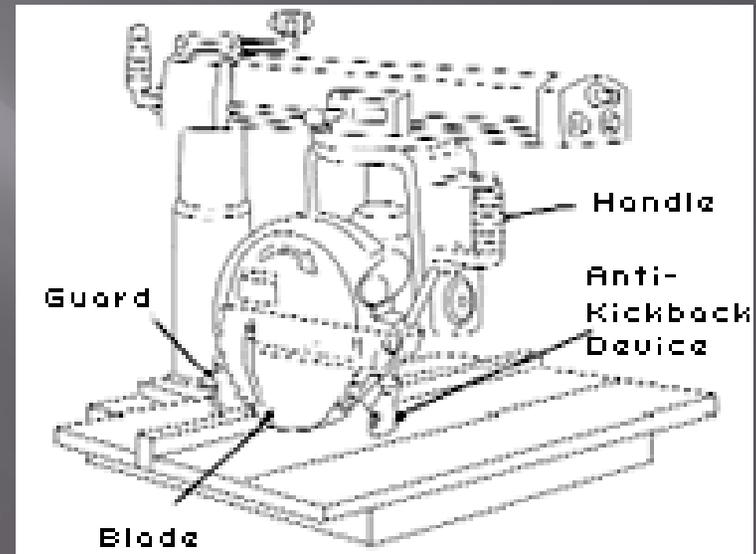
# Machine and Machine Guarding

- ▣ There are many different methods of safeguarding machinery.
  - Fixed guard
  - Adjustable barrier guard



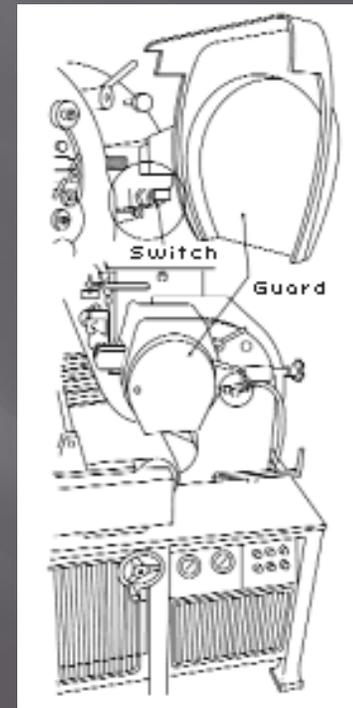
# Machine and Machine Guarding

- ▣ There are many different methods of safeguarding machinery.
  - Fixed guard
  - Adjustable barrier guard
  - Self-adjusting guard



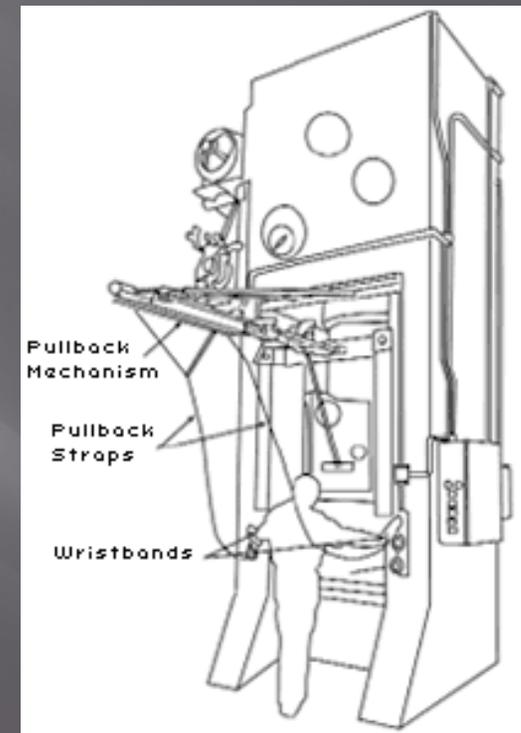
# Machine and Machine Guarding

- ▣ There are many different methods of safeguarding machinery.
  - Fixed guard
  - Adjustable barrier guard
  - Self-adjusting guard
  - Interlocked guard



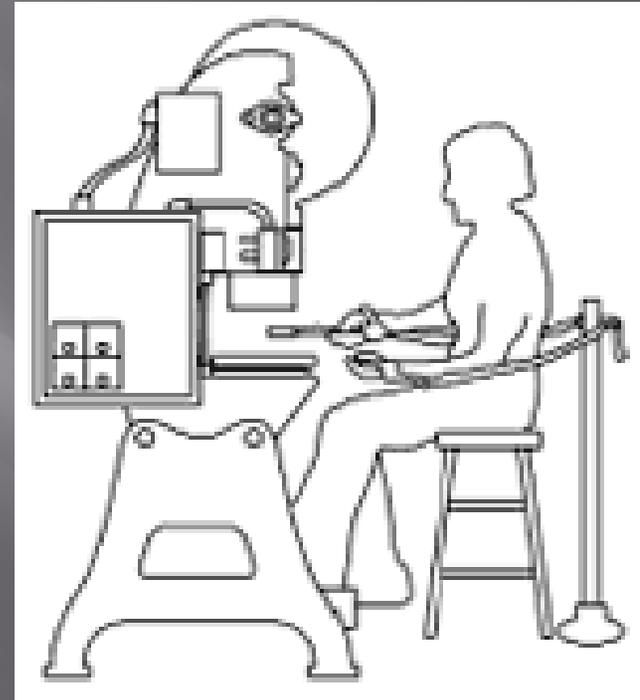
# Machine and Machine Guarding

- ▣ Besides physical guarding systems there are also;
  - ▣ Pull-back devices



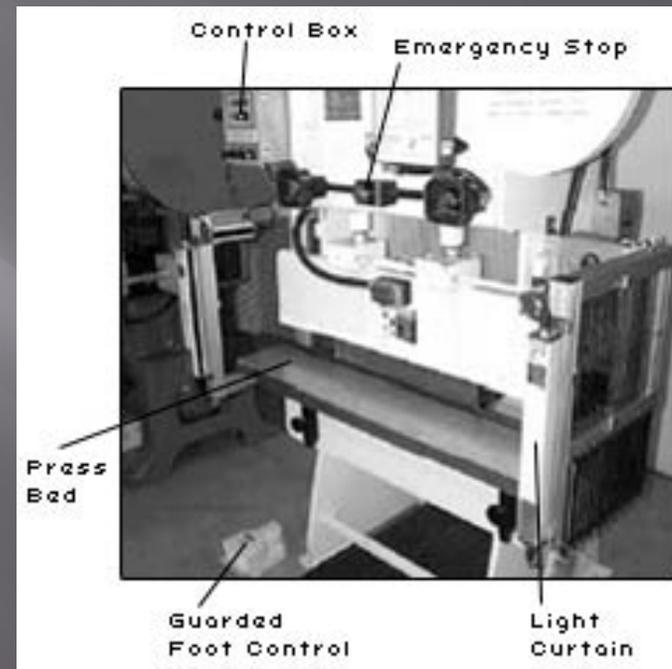
# Machine and Machine Guarding

- ▣ Besides physical guarding systems there are also;
  - Pull-back devices
  - Restraint device



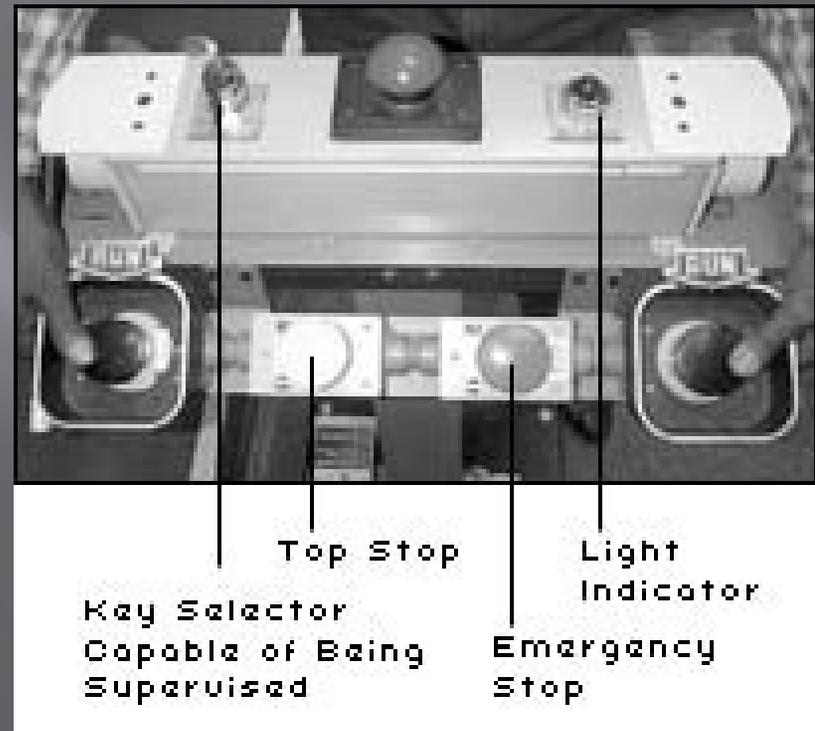
# Machine and Machine Guarding

- ▣ Besides physical guarding systems there are also;
  - Pull-back devices
  - Restraint device
  - Presence sensing device



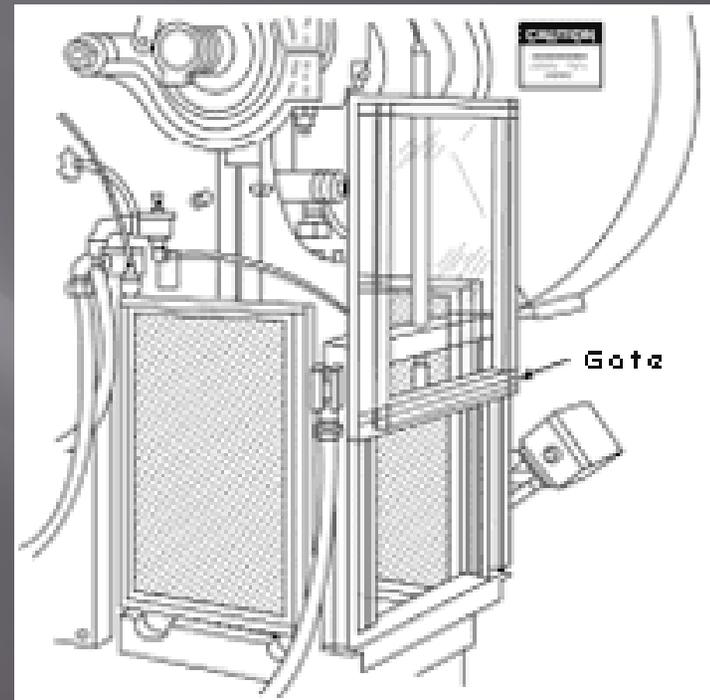
# Machine and Machine Guarding

- ▣ Besides physical guarding systems there are also;
  - Pull-back devices
  - Restraint device
  - Presence sensing device
  - Two hand control



# Machine and Machine Guarding

- ▣ Besides physical guarding systems there are also;
  - Pull-back devices
  - Restraint device
  - Presence sensing device
  - Two hand control
  - Automatic gates



# Machine and Machine Guarding

- Section V deals with the condition/ presence of machine guarding systems.

MSA GENERAL INDUSTRY-BASED SAFETY AND HEALTH HAZARD INSPECTION CHECKLIST

No.	Inspection Observations	Compliant? Y•N•N/A	See Comments (indicate with X)
2	Caution areas are marked with YELLOW or YELLOW/BLACK striping.		
3	Accident prevention signs and tags are posted where necessary, and of the correct type and color.		
4	Other.		
<b>S MEDICAL and FIRST AID</b>			
1	First aid kits are in place, sealed and properly stocked.		
2	Employees are aware of the process to summon help.		
3	Automated External Defibrillator (AED) has received its monthly check.		
4	Safety showers/eyewash stations are provided in areas where severely irritating materials are used.		
5	Self contained eyewashes are sealed and within their expiration limits.		
6	Plumbed safety showers/eyewash stations are tested and inspected as required.		
7	Other.		
<b>T AIR RECEIVERS</b>			
1	Air receivers and pressure relief valves have an established inspection schedule.		
2	Other.		
<b>U MATERIAL HANDLING</b>			
1	Sufficient clearance is maintained through doorways and aisles for material handling equipment passage.		
2	Material is stored in a stable and secure manner.		
3	Storage areas are free from tripping and fire hazards.		
4	Other.		
<b>V MACHINE and MACHINE GUARDING (including exercise equipment)</b>			
1	Guards are securely installed and in place on reciprocating, rotating, and transverse motion parts of equipment.		
2	Fixed machines are anchored to prevent movement.		
3	Saws and cutting blades are properly guarded and have anti-kickback devices.		
4	Power controls are protected from accidental contact, and are within easy reach of the operator.		
5	Fan blades are guarded with material designed to prevent an exposure opening of greater than 1/2 inch.		
6	Other.		
<b>W ABRASIVE WHEEL MACHINERY</b>			
1	Flanges are in good condition and are of the correct size for wheel mounting.		
2	Safety guards are of the proper size and mounted to maintain proper alignment with the wheel.		

# Machine and Machine Guarding

- This section consists of up to 6 items.
- Let's look at these more closely.

MSA GENERAL INDUSTRY-BASED SAFETY AND HEALTH  
HAZARD INSPECTION CHECKLIST

No.	Inspection Observations	Compliant? Y•N•N/A	See Comments (indicate with X)
2	Caution areas are marked with YELLOW or YELLOW/BLACK striping.		
3	Accident prevention signs and tags are posted where necessary, and of the correct type and color.		
4	Other.		
<b>S MEDICAL and FIRST AID</b>			
1	First aid kits are in place, sealed and properly stocked.		
2	Employees are aware of the process to summon help.		
3	Automated External Defibrillator (AED) has received its monthly check.		
4	Safety showers/eyewash stations are provided in areas where severely irritating materials are used.		
5	Self contained eyewashes are sealed and within their expiration limits.		
6	Plumbed safety showers/eyewash stations are tested and inspected as required.		
7	Other.		
<b>T AIR RECEIVERS</b>			
1	Air receivers and pressure relief valves have an established inspection schedule.		
2	Other.		
<b>U MATERIAL HANDLING</b>			
1	Sufficient clearance is maintained through doorways and aisles for material handling equipment passage.		
2	Material is stored in a stable and secure manner.		
3	Storage areas are free from tripping and fire hazards.		
4	Other.		
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5	Fan blades are guarded with material designed to prevent an exposure opening of greater than 1/2 inch.		
6	Other.		
<b>W ABRASIVE WHEEL MACHINERY</b>			
1	Flanges are in good condition and are of the correct size for wheel mounting.		
2	Safety guards are of the proper size and mounted to maintain proper alignment with the wheel.		

# Machine and Machine Guarding

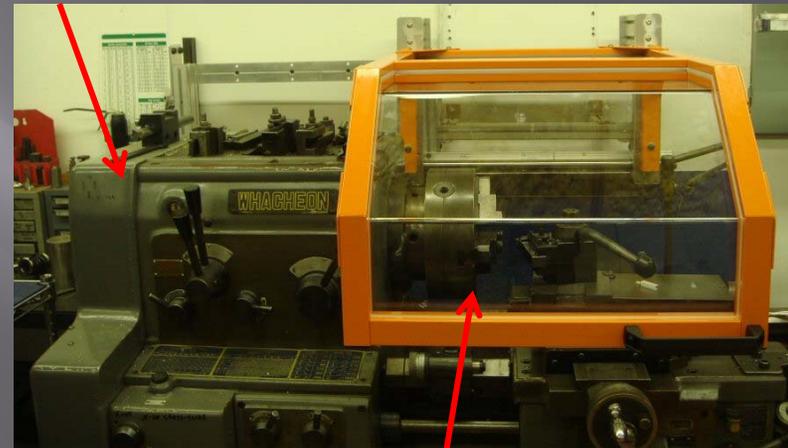
1. Guards are securely installed and in place on reciprocating, rotating, and transversing motion parts of equipment.
2. Fixed machines are anchored to prevent movement.
3. Saws and cutting blades are properly guarded and have anti-kickback devices.
4. Power controls are protected from accidental contact, and are within easy reach of the operator.
5. Fan blades are guarded with material designed to prevent an exposure opening of greater than 1/2 inch.
6. Other.

# Machine and Machine Guarding

1. Guards are securely installed and in place on reciprocating, rotating, and transversing motion parts of equipment.

- This item is to determine the presence of a safe guarding system on the machine at all areas of danger.
- A compliant rating would indicate that the machine has a safeguarding system.

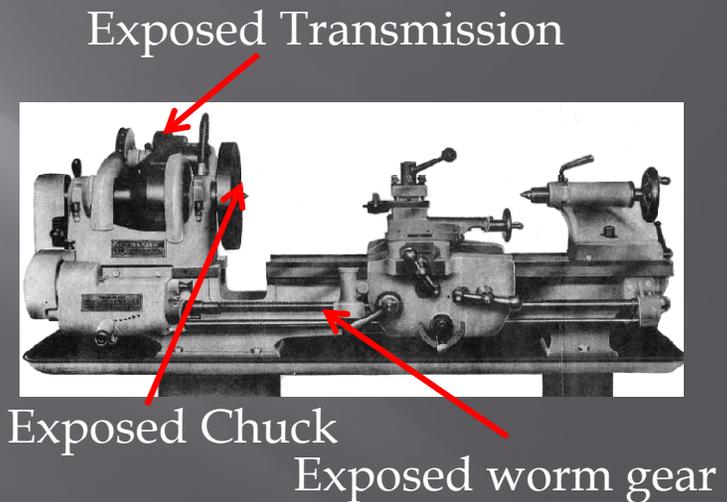
Guard for transmission



Guard for chuck

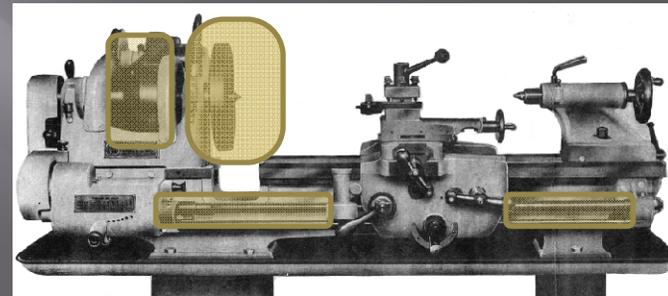
# Machine and Machine Guarding

1. Guards are securely installed and in place on reciprocating, rotating, and transversing motion parts of equipment.
- A non compliant rating on this item would indicate that the machine safeguards were not present or the machine is so old that safeguards were never a part of the original machine.



# Machine and Machine Guarding

1. Guards are securely installed and in place on reciprocating, rotating, and transversing motion parts of equipment.
- A non compliant rating on this item would indicate that the machine safeguards were not present or the machine is so old that safeguards were never a part of the original machine.
  - In the comments section of the checklist you can recommend that guards be fabricated/obtained, many vendors are available for this purpose.



# Machine and Machine Guarding

2. Fixed machines are anchored to prevent movement.

- Many machines are capable of falling over or moving from vibration during operation.
- The purpose of this item is to verify that machines such as machine shop tools, fan motors, etc. are secured properly to the floor.



# Machine and Machine Guarding

2. Fixed machines are anchored to prevent movement.

- ▣ A compliant rating on this item would mean that the machine was properly anchored.



Anchors in place

# Machine and Machine Guarding

2. Fixed machines are anchored to prevent movement.

- ❑ A compliant rating on this item would mean that the machine was properly anchored.
- ❑ A non compliant rating would mean that the machine either was not anchored or the anchoring system was ineffective (missing/broken/loose bolts)
- ❑ In this case the machine must not be used.



# Machine and Machine Guarding

3. Saws and cutting blades are properly guarded and have anti-kickback devices.
- All cutting tools are required to have the exposed non-cutting portions of blades guarded such that an employee cannot come into accidental contact.



# Machine and Machine Guarding

3. Saws and cutting blades are properly guarded and have anti-kickback devices.
- All cutting tools are required to have the exposed non-cutting portions of blades guarded such that an employee cannot come into accidental contact.
    - This may be a guard that the operator adjusts prior to the starting the machine.



# Machine and Machine Guarding

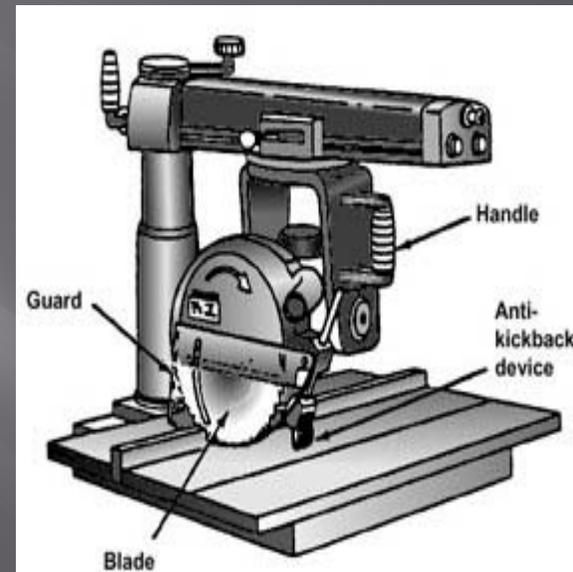
3. Saws and cutting blades are properly guarded and have anti-kickback devices.

- Or, this may be a self adjusting guard on the machine itself.



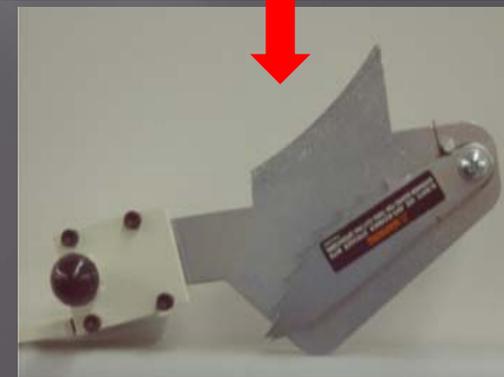
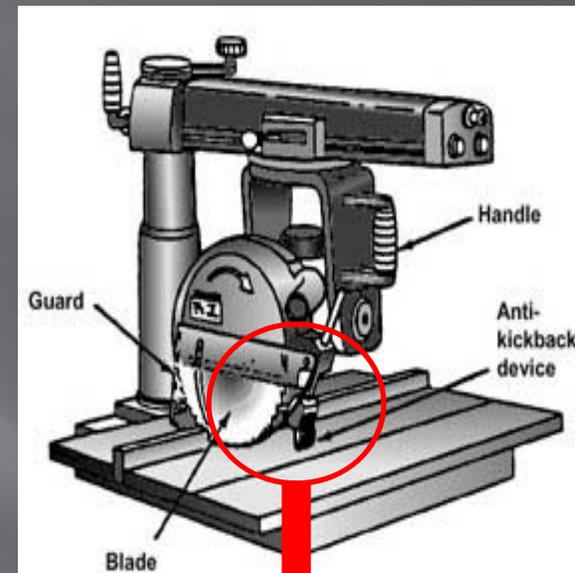
# Machine and Machine Guarding

3. Saws and cutting blades are properly guarded and have anti-kickback devices.
- All saws are also required to have an anti-kickback device. The purpose of this device is to prevent the stock being cut from flying out and striking the operator (“kick back”).



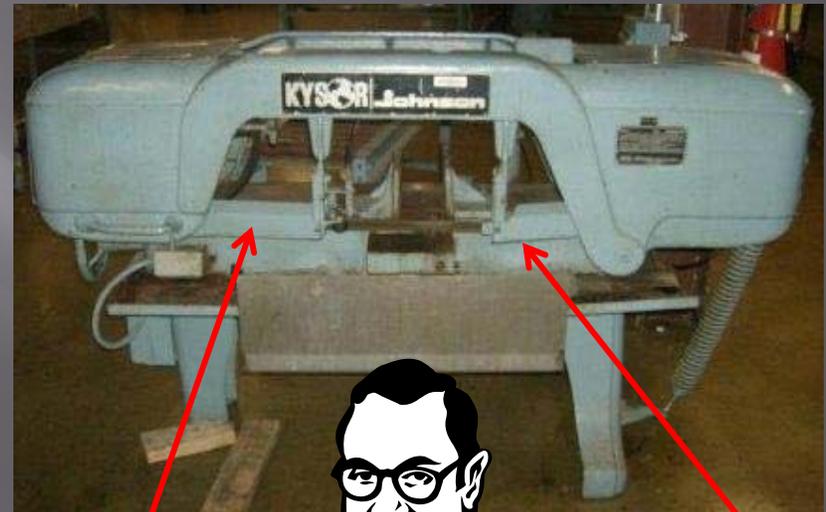
# Machine and Machine Guarding

3. Saws and cutting blades are properly guarded and have anti-kickback devices.
- All saws are also required to have an anti-kickback device. The purpose of this device is to prevent the stock being cut from flying out and striking the operator (“kick back”).
  - This is an example of a kickback device up close.



# Machine and Machine Guarding

3. Saws and cutting blades are properly guarded and have anti-kickback devices.
- A compliant rating on this item would indicate that the machine had the blades guarded, were in position, and an anti-kickback was in place (if required)



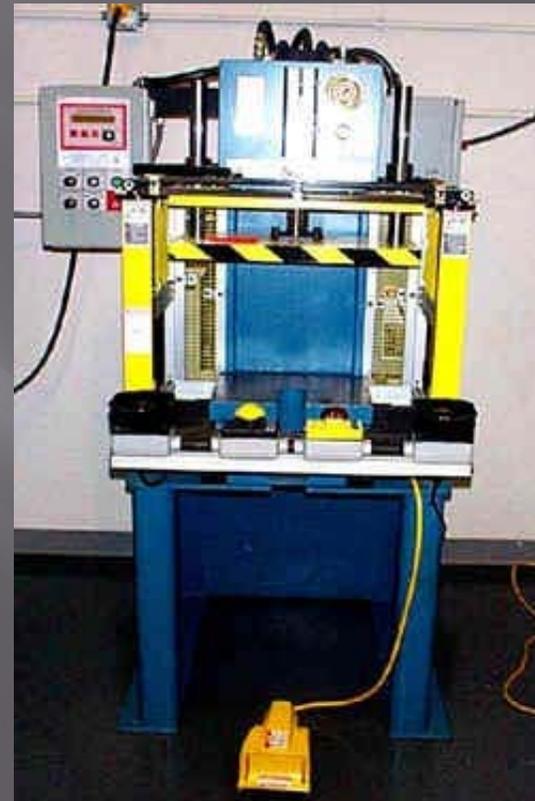
# Machine and Machine Guarding

3. Saws and cutting blades are properly guarded and have anti-kickback devices.
- A non compliant rating would indicate that the machine blades were either not guarded or the guard was not being used properly.
  - These machines should not be used!



# Machine and Machine Guarding

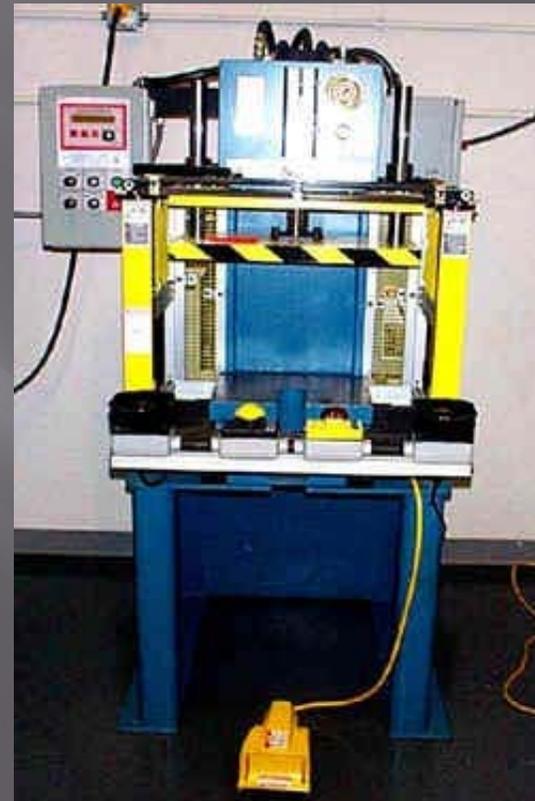
4. Power controls are protected from accidental contact, and are within easy reach of the operator.
- This item is to ensure two things;
    1. That the machine controls are guarded or located so that actuation of the control and an unplanned startup of the machine cannot happen.



This foot pedal has a shield that ensures that the machine will not be actuated by materials falling on it.

# Machine and Machine Guarding

4. Power controls are protected from accidental contact, and are within easy reach of the operator.
- This item is to ensure two things;
    1. That the machine controls are guarded or located so that actuation of the control and an unplanned startup of the machine cannot happen.
    2. That the controls are in reach of the operator.



# Machine and Machine Guarding

4. Power controls are protected from accidental contact, and are within easy reach of the operator.
  - ▣ A compliant rating would indicate that the machine controls were within easy reach of the operator and were protected from accidental activation.
  - ▣ A non compliant rating would indicate that the controls were not located near the operator or were subject of accidental activation.



# Machine and Machine Guarding

5. Fan blades are guarded with material designed to prevent an exposure opening of greater than 1/2 inch.

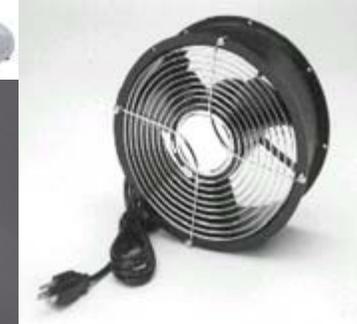
- This item is to help ensure that any fans that are within reach are guarded to prevent personnel fingers or other body parts being hit by the blades.
- A spacing of  $<1/2$  inch will ensure that the finger tip will not come into contact with the blade.
- Within reach means within 7 feet of an accessible floor. (this is why ceiling fans aren't guarded)



# Machine and Machine Guarding

5. Fan blades are guarded with material designed to prevent an exposure opening of greater than 1/2 inch.

- A compliant rating would indicate that all accessible fans were guarded with a  $<1/2$  inch material or were more than 7 feet from the accessible ground.



# Machine and Machine Guarding

5. Fan blades are guarded with material designed to prevent an exposure opening of greater than 1/2 inch.
- A non compliant rating would indicate that the fan was accessible and was not sufficiently guarded.



# Machine and Machine Guarding

- If at any time you have any questions about how to fill out the form or about the items on the form please contact your project OS&H group.

**MSA GENERAL INDUSTRY-BASED SAFETY AND HEALTH  
HAZARD INSPECTION CHECKLIST**

Facility:	Facility Representative:
Date:	Team Member:
Total Items Reviewed:	Team Member:
Total Non-Compliant Items:	Team Member:

No.	Inspection Observations	Compliant? Y·N·NA	See Comments (indicate with X)
<b>A</b>	<b>FIRE PROTECTION INSPECTION</b> <i>(All issues must be observed as applicable see note 2)</i>		
1	Emergency Lights - Each unit must be operable when tested.		
2	Portable Fire Extinguishers (PFE) - Each unit is properly mounted, an inspection tag is in place and reflects through previous month, the pressure gauge is in the "green" zone (where applicable).		
3	PFE is not obstructed, is visible, and the seal is not broken.		
4	Sprinkler Clearance - Clearance between the sprinkler deflector and the top of any storage is 18 inches or greater.		
5	Fire Riser Pressure Gauge Inspection - Inspect gauges to verify pressure to the building and pressure held in the fire system. Typically both gauges will have similar pressure readings.		
6	Fire Risers - Access to fire system sprinkler risers and other system components must be unobstructed.		
7	Fire Riser Valve Inspection - Check all seals, position and supervision for broken seals or possible tampering.		
8	Post Indicating Valve Inspection - This valve will be located outside of the facility. It must be verified that the window on the side of the valve reads "OPEN".		
9	Exit Signs - Exit signs with an internal lighting source must be checked to ensure all lamps are functional. - Exit signs that use Tritium must be observed that they have not been damaged, all applicable labels are present, the sign has not expired, and it is not covered with another sign.		
10	Fire Doors - Identify that fire doors operate freely and latch securely upon closure. Fire doors must not be propped open.		
11	Ceiling Tiles - Where automatic sprinklers are installed drop ceiling tiles are in place. Missing tiles slow response of fire suppression sprinklers.		
12	Manual alarm stations are easily identified and readily accessible.		
13	Other.		
<b>B</b>	<b>GENERAL SAFE BEHAVIORS</b>		
1	Employees are taking the necessary safety precautions for the work being performed.		
2	Work is being performed such that collocated employees in the area are not exposed to occupational hazards or unsafe conditions.		

1 A-6004-299 (REV 2)

Thank you for your time  
and desire to help us have  
a safer workplace