

# Union County Public Schools

## Facilities Department

### **Machine Guarding**

### **Safe Work Practices**

Machine guarding is designed to protect the operator and other employees from hazards created by nip points, rotating parts and flying debris or sparks. OSHA standard 1910.211-219 gives specific instructions as to the operation of machinery and machine guarding.

#### **General requirements for machine guards:**

- The safeguard must prevent hands, arms or other body parts from making contact with dangerous moving parts known as the point of operation.
- Employees shall not remove or tamper with guards rendering them ineffective.
- The safeguard should ensure that no object can fall into moving parts to prohibit it from becoming a hazardous projectile.
- Safeguards should not create a new hazard such as a shear point, jagged edge or unfinished surface that may cause a laceration.
- Safeguards should not impede an employee from performing their job duties quickly and efficiently.
- Safeguards shall be designed to meet applicable standards.

#### **Employees shall:**

- Ensure equipment and machines are equipped with appropriate safeguards.
- Utilize proper PPE when necessary.
- Inspect equipment before use.
- Do not operate equipment or machines when safeguards have been removed or are not in proper placement to be effective. Never remove or alter a machine guard unless you are performing maintenance on the equipment and it has been properly locked and tagged out.
- Report malfunctions and safety concerns to your supervisor.

If there is a question about machine guarding for specific machines, please contact your supervisor or the facilities safety administrator.

## **Carpentry Shop Procedures**

The facilities department carpentry shop may be utilized by all employees of the Facilities Department for completing required projects or fulfilling work orders. The Facilities Department carpentry shop is equipped with a planer, jointer, radial arm saw, table saw, band saw, drill press, table grinder, belt sander, vacuum, and table mounted vise.

### **General requirements for the carpentry shop:**

- Maintain a safe workplace by performing proper housekeeping, storage practices, and allowing for time to clean your work area.
- Report unsafe equipment or conditions to the attention of your supervisor immediately.
- Machinery and equipment shall be positioned in a manner to allow for a clear and safe operating area.
- Shop layout and machinery placement must not interfere with clear access to emergency exits, fire extinguishers, or electrical disconnects.
- Wet surfaces or slippery floors are expected to be cleaned or otherwise addressed immediately.
- Materials must be stored in a manner that prevents objects from falling.
- Equipment found to be needing repair shall be tagged out of service. Damaged equipment shall also be disconnected from the power source.

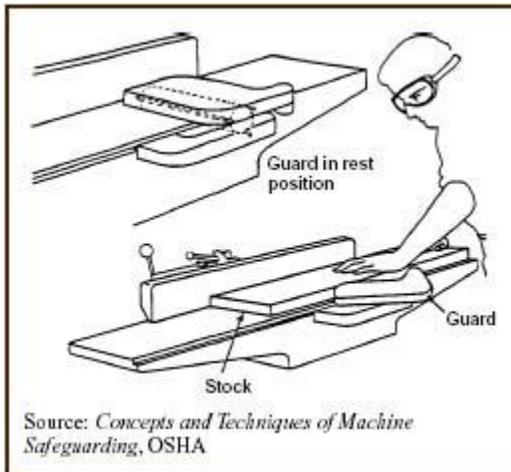
### **PPE and dress code for the carpentry shop:**

- Open toed shoes are not permitted.
- Long pants must be worn while performing job tasks which will create sparks such as welding or grinding.
- Shirts must be tucked in and long sleeves rolled up or otherwise secured to prevent becoming entangled in moving parts.
- Shop users must remove all jewelry that may create an entanglement or amputation hazard.
- Safety glasses must be worn at all times while in the carpentry shop when power tools or shop equipment is in use.
- Face shields are required for tasks that produce flying objects or sparks.
- Shop users must wear hearing protection when noise from shop tools and equipment is being generated.

- Gloves shall not be worn near rotating equipment such as drill presses and radial arm saws. Gloves are necessary for material handling tasks that could cause splinters or job tasks that could create sparks.

## Carpentry Shop Tools and Equipment

### Jointer

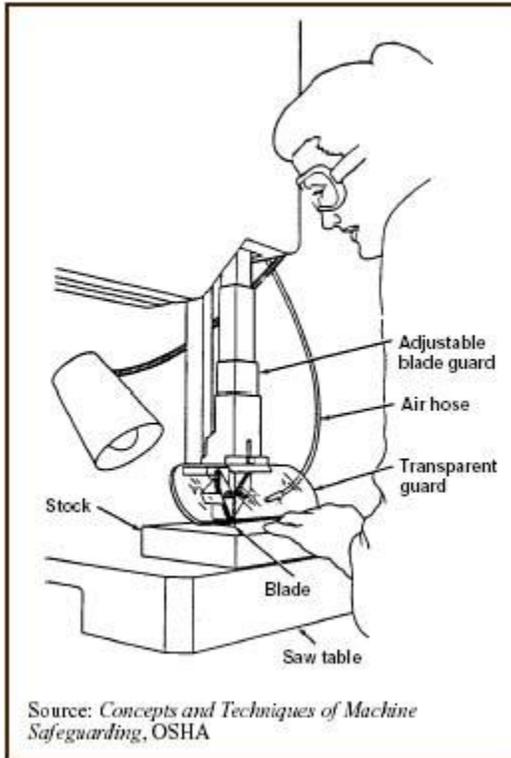


#### Hazards:

- Point of operation—Contact with the knives may occur, especially if a holding device is not used.
- In-running nip points—Clothing, hair, or hands may be caught by and pulled into the in-running rolls of the automatic feed.
- Kickbacks—Stock may be thrown back at the operator after being caught by the knives; this may also expose the operator's hands to the knives.
- Flying chips—Wood chips and splinters may be thrown by the cutting action of the knives.

- Adjust the cylindrical cutter head so that the knife projects no more than 1/8 inch beyond the cylindrical body of the head.
- Adjust the cutter head so that the clearance between the path of the knife projection and the rear table is no more than 1/8 inch.
- Keep the clearance between the table and the head as small as possible.
- Enclose cutter head with an automatic (spring-loaded, self-enclosing) guard that exposes the cutter head only when the stock is being fed. The guard must automatically adjust to cover the unused portion of the head, and it must remain in contact with the material at all times.
- Use hold-down push blocks when jointing wood narrower than 3 inches.
- Avoid deep cuts; they increase the likelihood of kickbacks and require a larger table opening.
- As a general rule, never joint pieces of material that are less than four times the width of the bed opening.
- Check knives regularly for proper setting and adjustment, but only when the power is shut off.

## Band Saw

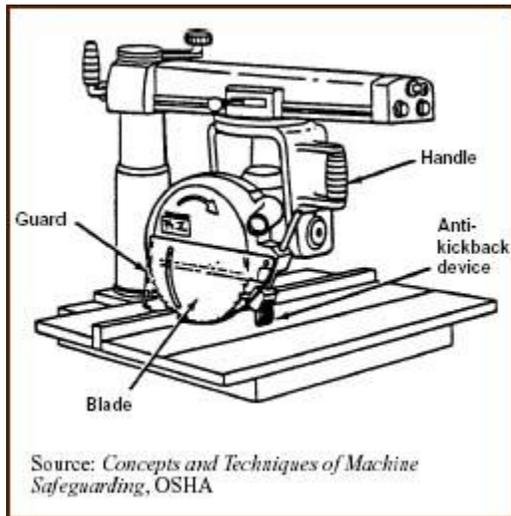


### Hazards:

- Point of operation—Contact with the moving blade may occur.
- In-running nip points—Clothing, hair, or hands may be caught by and pulled into feed rolls or the pulley mechanism.
- Kickbacks—Stock caught by the blade may be thrown back at the operator.
- Flying Chips—Wood chips and splinters may be thrown by the cutting action of the blade.

- Guard the blade entirely except at the point of operation (the working portion of the blade between the bottom of the guide rolls and the table).
- Use a self-adjusting guard for the portion of the blade between the sliding guide and the upper saw so that it raises and lowers with the guide.
- Properly adjust the blade guide post to fit the thickness of the stock and to provide additional guarding.
- Fully enclose the pulley mechanism.
- Guard feed rolls.
- Install a brake on one or both wheels to minimize the potential for coasting after the saw has been shut off; or do not retrieve material until the blade has stopped.
- Make sure the saw includes a tension control device to indicate proper blade tension.
- Use a blade of an appropriate size and type (for example, do not force a wide saw to cut on a small radius).
- Never stop the saw too quickly or thrust a piece of wood against the cutting edge of the teeth after the power has been shut off.
- Periodically examine blades; remove cracked or defective blades immediately
- Make cuts only when the power is on and not while the saw is coasting.
- Set the guard to just clear the stock being cut.
- Use a push stick to control the stock when it is near the blade.
- Use a special jig or fixture when cutting small pieces of stock.

## Radial Saw

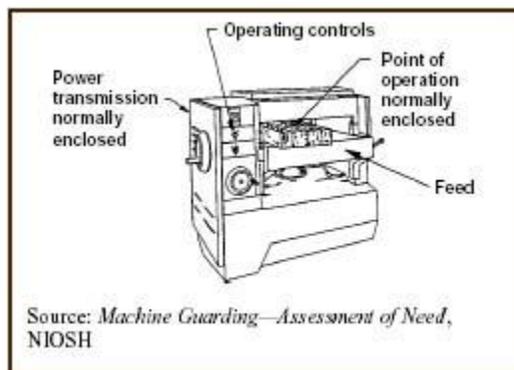


### Hazards:

- Point of operation—Contact with the turning blade may occur.
- In-running nip points—Clothing, hair, or hands may be caught by and pulled into the in-running rolls of the automatic feed.
- Kickback—Stock caught in the blade or fed in the wrong direction may be thrown back at the operator.
- Flying particles—Wood chips, splinters, and broken saw teeth may be thrown by the cutting action of the blade.

- Make sure the saw has a return device. The front end of the unit must be slightly higher than the rear, so that the cutting head will return to its original position when released by the operator. This should also prevent the cutting head from rolling or moving the arm due to gravity or vibration.
- Install an adjustable stop to limit forward travel distance of the blade during repeat cuts.
- Guard feed rolls.
- For ripping, install non-kickback fingers on both sides of the saw blade.
- Use a spreader in ripping operations to prevent the cut in the wood from immediately closing and binding around the blade.
- During crosscutting, operate the saw on the side of table with the handle.
- Make sure that stock is fed in the correct direction. Post a warning label on the hood showing the direction of saw rotation.
- Measure boards against a stop gauge, or turn off the saw if measuring by rule. (Wait for the blade to stop before moving materials or making measurements.)

## Planner

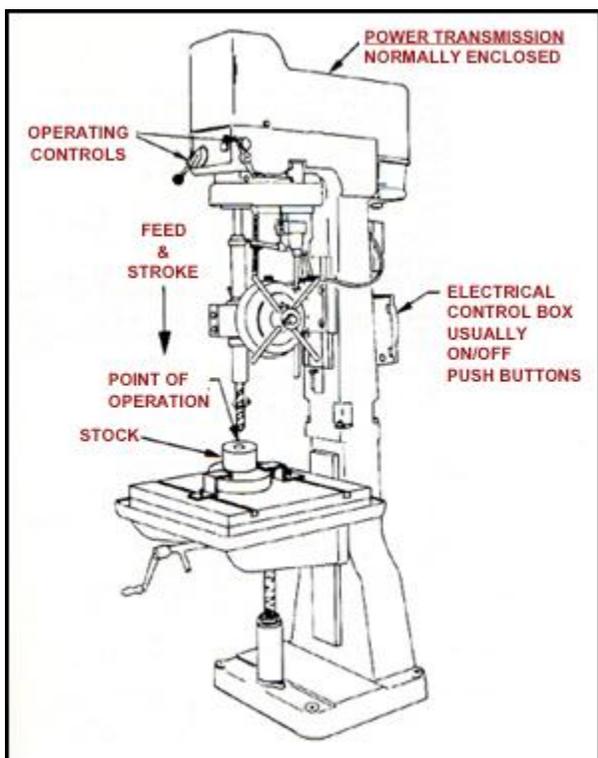


### Hazards:

- Point of Operation—Contact with the cutter head may occur during blade adjustment or other maintenance activities.
- In-running rolls—Clothing, hair, or hands may be caught by and pulled into the automatic feed mechanism.
- Kickbacks—Stock may be thrown back at the operator after being caught by the cutter head.
- Flying objects—Workpiece, wood chips and splinters may be thrown by the cutting action.
- Vibration (and noise) may be produced if the machinery is not anchored to, and insulated from, a solid foundation

- Completely enclose belts and pulleys of line shaft with sheet metal or heavy mesh guards; guards must be used regardless of the location of the line shaft.
- Cover cutting heads with a metal guard or cage. The exhaust system may be integrated with the guard.
- Guard feed rolls with a wide metal strip or bar that will allow boards to pass but that will keep operators' fingers out.
- Provide barriers at the loading and unloading ends to keep hands out of point of operation.
- Install anti-kickback fingers on the in-feed side across the width of the machine.
- Use a barrier or guardrail when the machine is running.
- Stand back once the boards have been put through to avoid injuries from kickback and flying splinters.
- Do not feed boards of different thicknesses. Thinner boards will be kicked back.

## Drill Press



### Hazards:

- Point of Operation – Contact with rotating parts.
- Flying objects – Wood chips or the workpiece

- Whenever possible, a hold-down fixture should be used rather than the hands.
- Power transmission components should be enclosed entirely on those machines that have adjustable belt drives. The enclosure should have an interlocked access door to facilitate speed changes.
- Push button controls should be shrouded and an emergency shut-off switch installed near the machine. A main disconnect is necessary.

## Belt Sander

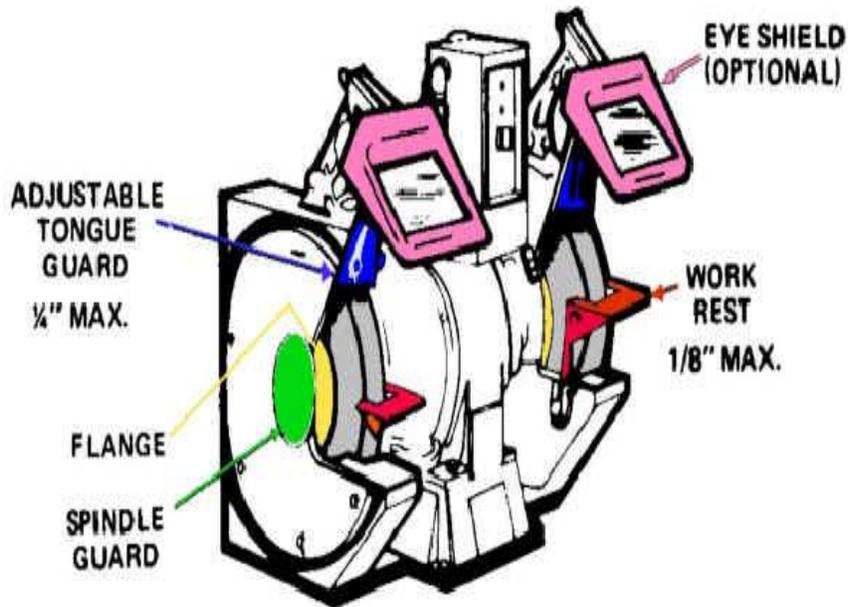


### Hazards:

- Point of Operation – Contact with disc or drum may occur.
- In-running nip points – Clothing, hands or hair may get caught by and pulled into the in-running rolls on automatic sanders or sanding belts.
- Flying objects – Wood splinters and chips may be thrown from the sanding action.

- Guard feed rolls with a semi-cylindrical guard to prevent the operator's hands from coming in contact with the in-running rolls on automatic sanders. The guard design must allow for adjustment to any thickness of stock.
- Guard the unused run of the sanding belt against accidental contact. These guards must prevent the operator's hands or fingers from coming in contact with nip points.
- Enclose drum and disc sanders with guards, except for the portion of the sander's drum above the table. The guard can consist of a protective cover at the rear side of the wheel and a hinged cover around the wheel periphery.
- Enclose power transmission pulleys with a fixed guard.
- Replace torn, frayed, or excessively worn belts or drums. A worn-out belt, disk, or drum can cause massive heat buildup, which can cause the belt, disk, or drum to tear or break and pelt the surrounding area with projected bits.
- Keep hands away from abrasive surfaces.
- Sand on the downward-moving side of the disk or belt

## Abrasive Wheel Machinery (Grinders)



### Hazards:

- Point of Operation – Contact with abrasive wheel may occur.
- In-running nip points – Clothing, hands or hair may get caught by in-running abrasive wheels.
- Flying objects – Sparks and flying debris may be thrown from the wheel action.

- Guards must cover the spindle, nut and flange and 75% of the wheel diameter.
- The work rest must be kept within 1/8 inch of the wheel.
- The adjustable tongue guard must be kept to 1/4 inch of the wheel.
- The maximum RPM of each abrasive wheel must be compatible with the RPM rating of the grinder motor.
- Abrasive wheels must be visually inspected for cracks and wear before each use. New wheels must be inspected and ring tested before they are mounted.
- A face shield must be worn when using abrasive wheels.
- Bench and pedestal grinders must be permanently mounted and properly grounded.
- Abrasive wheels machines must have an individual on/off control switch.

## Table Saw



### Hazards:

- Point of Operation – Contact with the blade if hands are placed too close while cutting.
- Kickback – Blade may catch wood and throw it back toward operator.
- Moving parts – Contact with the blade under the table or with the power transmission if not enclosed.
- Flying objects – Wood chips, splinters and broken saw teeth may be thrown by the cutting action of the blade.

- Blade must be enclosed with a self-adjusting guard for the portion of the saw above the table. The guard must adjust to the thickness of the material being cut and remain in contact with it.
- Blade must be guarded for the portion of the saw below the table to protect operators when reaching under the table.
- When using a rip saw, use a spreader to prevent material from squeezing the saw or kicking back during ripping.
- Keep hands out of the line of the cut.
- Use a push stick for small pieces of wood and for pushing stock past the blade.
- Use the proper blade for the required cutting action.
- Operate the saw at the speed specified by the manufacturer.
- Maintain and sharpen blades as needed.
- Leave sufficient clearance for stock.
- Stand to the side of the saw blade to minimize the potential for kickback.
- Avoid cross cutting long boards on table saws as it may create a safety hazard.
- Use a filler piece between the fence and saw blade when necessary (ex: when there is little clearance on the fence side).
- Guide stock parallel to the rip fence to minimize the potential for kickback.
- Properly support all pieces of stock, including the cut and uncut ends, scrap, and the finished product.
- Remove cracked saw blades from service.

## Carpentry Shop Cleaning

A disorderly shop can lead to unsafe conditions which can result in accidents and injuries. A clean shop can also reduce costs in the prevention of lost or damaged tools and equipment. The risk of safety hazards is reduced because obstacles and spills are

reduced. The following rules must be adhered to each time an employee used the carpentry shop. Cleaning requirements are expected to be completed after each use of the shop with no exceptions.

- Stock lumber and other stock materials should be stored in such a manner that pieces are readily accessible and do not create a fall hazard.
- Scrap materials shall be separated (wood, metal) and placed into the appropriate waste or recycle bin and be emptied before exiting the shop for the day.
- All saw dust and other debris shall be wiped off of elevated work surfaces and the tools/equipment that was used and into a pile on the floor. This pile shall be collected and placed into the proper waste bin or collected with the saw dust vacuum.
- If the saw dust vacuum is full, you must dispose of the waste inside in the appropriate manner before you start to, or continue to use it.
- Flammable liquids shall be stored in special storage containers designed for this purpose.
- Dirty, soaked rags are a fire hazard and shall be disposed of in a metal container with a sealable lid.
- Ensure your work area(s) including the floor are clean and free of scraps and debris.
- Ensure tools and equipment are returned to their proper places.