

# Safety Advisory

## Precautions Against Machine Entrapment

### Always Work Safely Around Machines

A variety of machines are used in many campus shops including:

- drill presses
- table saws
- band saws
- grinders
- milling machines
- lathes



These present real hazards, such as physical entrapment, severe disfigurement, and even death. The guidelines and rules must always be followed to help prevent work-related injuries in shops.

### Machinery Safety Guidelines:

- ✓ You must always have specific training before using machines
- ✓ Follow machine operating manuals
- ✓ Always tie back hair
- ✓ Do not wear loose fitting clothing
- ✓ Use required PPE
- ✓ Ensure proper guards are in place
- ✓ Stay alert and keep others at a safe distance
- ✓ Select the appropriate machine/tool for the job
- ✓ Get everything prepared before using a machine. Change dull blades, clamp work, secure bits, and remove chuck keys
- ✓ Familiarize yourself with operating controls before you begin work
- ✓ Exercise Lockout/Tagout procedures
- ✓ Turn off machinery when unattended

### Rules for Proper Attire

Secure long hair with a hair tie and/or hat



Cuff or roll up long sleeves. Do NOT wear ties or other loose clothing.



Always wear the proper PPE



### Need more information?

The Office of Environment, Health & Safety (EH&S) is available for consultation and can provide additional guidance on the appropriate safety measures to be applied when working with machinery.

Contact EH&S:

Tel: 310-825-9797

Email: [injuryprevention@ehs.ucla.edu](mailto:injuryprevention@ehs.ucla.edu)

[www.ehs.ucla.edu](http://www.ehs.ucla.edu)

# STUDENT/FACULTY MACHINE SHOP SAFETY RULES

## Responsibilities

Supervisors have full authority over the shop and its safe use, including the responsibility, authority, and obligation to prohibit shop or tool access for the safety of an individual, others in the shop, or the equipment.

Student and Faculty Shop Workers must comply with all applicable health and safety regulations, policies, and work practices.

Approval to operate power equipment and/or hand tools must be obtained prior to use. The operation of all shop equipment and tools requires prior training and approval by Shop Manager / Supervisor. A signed "Authorization Form" certifies this level of qualification and must be on file with the Shop Manager / Supervisor.

Never work alone – Supervisor must be present at all times. Appropriate buddy system shall be determined by the supervisor according to the level of hazard type of equipment.

UCLA Shop Safety Policy requires **faculty supervision of Undergrads** and that **Graduate students have a Graduate student buddy** when working with hydraulic or pneumatic machinery or machinery/tools having any of the following power specifications:

- greater than 1/2 horsepower
- equal to or greater than 10 amps @ 120 VAC
- or portable tools equal to or greater than 24V

## Safe Work Practices

- Safety glasses must be worn at all times in the shop. Contact your shop supervisor for specific PPE requirements.
- Work safely and methodically. Resist "rushing" and ask for help when you need it.
- Aisles, exits, and access to emergency equipment must be kept clear at all times.
- Immediately report all problems or concerns to the Supervisor. Report unsafe work when witnessed.
- Damaged equipment or equipment that does not appear to be operating normally must not be used. Lock it and Tag it as out of service and report the issue to the Supervisor.
- All guards and shields must be secured and in place prior to operating equipment.
- Compressed air must not be used to clean skin or clothing. Never use compressed air for cleaning work area surfaces.
- Housekeeping is everyone's duty and includes cleaning up debris from machines and work areas frequently, maintaining proper equipment storage, and keeping walkways and doorways clear.
- Electrically energized shop equipment must be used in a safe manner as intended by the Manufacturer. Equipment must be de-energized and locked out/tagged out, during maintenance or repair.

# STUDENT/FACULTY MACHINE SHOP SAFETY RULES

## Personal Safety

- Cell phones, mp3 players, and other personal electronic devices must not be used when working at any machine. Loud music is prohibited.
- Do not leave machines running unattended.
- Full length pants must be worn at all times and sleeveless shirts or tanks-tops are prohibited.
- Remove loose jewelry before beginning work; including rings, necklaces, bracelets and watches.
- Long hair must be pulled back and secured and contained; long beards must also be contained.
- No loose clothing may be worn in the shop, including ties, scarves, and loose sleeves. Short pants and skirts are also prohibited.
- Keep hands and other body parts a safe distance away from moving machine parts, work pieces, and cutters.
- A machinist's apron tied in a quick release manner should be worn when using machines.
- No open-toed shoes, flip-flops or sandals are permitted.
- Food and drink are permitted in designated areas only.

## Stop Work Policy

All UCLA Shops support a Stop Work Policy when unsafe work is witnessed. It is the responsibility of everyone to exercise this policy when observing unsafe work conditions or practices. If you see unsafe behavior or activities, don't hesitate to use the Stop Work Policy and immediately speak out and stop unsafe work.

## Emergencies

Material Safety Data Sheets (MSDS) contain chemical emergency information. Become familiar with the MSDS to understand chemical hazards in the shop. Know where the location of the nearest Eye Wash Stations and First Aid Supplies are before using shop equipment.

### **IF AN EMERGENCY OCCURS:**

- 1. CALL 911**
- 2. Notify your Supervisor**
- 3. Call EH&S (310) 825-9797 ASAP following any serious injury**

# STANDARD OPERATING PROCEDURES FOR STUDENT SHOP TOOL & MACHINING EQUIPMENT

Specific Training is required for use of the following tools/machinery:

- ◆ MILLING MACHINE
- ◆ DRILL PRESS
- ◆ LATHE
- ◆ VERTICAL BANDSAW
- ◆ BELT & DISC SANDERS

**Familiarity and understanding** of the attached SOPs and additional information included in the UCLA Shop Safety Manual is required prior to operation of all tools/machinery.

## GENERAL SAFETY TIPS

- ◆ Safety glasses with side shields must be worn at all times.
- ◆ Do not wear loose clothing, loose neckwear or exposed jewelry while operating machinery.
- ◆ Do not work alone in the Student shop. (Implement the "buddy" system if possible)
- ◆ Pull back and secure long hair. (Use hair net or ball cap)
- ◆ Do not wear thin fabric shoes, sandals, open-toed shoes, and high-heeled shoes.
- ◆ A machinist's apron tied in a quick release manner should be worn.
- ◆ Always keep hands and other body parts a safe distance away from moving machine parts, work pieces, and cutters.
- ◆ Use hand tools for their designed purposes only.
- ◆ Report defective machinery, equipment or hand tools to supervisor.

# LATHE

## STANDARD OPERATING PROCEDURE 'S.O.P'

- ◆ All stock must be properly secured in the lathe chuck or mounted prior to the machining process taking place. Use the correct sized clamp or vise for the stock being machined.
- ◆ Turn the chuck or faceplate by hand to ensure there is no binding or danger of the work striking any part of the lathe.
- ◆ Check to ensure the cutting tool will not run into the chuck or lathe dog. If possible, feed away from the chuck or dogs.
- ◆ Before starting the lathe, ensure the spindle work has the cup center imbedded; tail, stock and tool rests are securely clamped; and there is proper clearance for the rotating stock.
- ◆ Prior to starting the lathe, ensure that small diameter stock does not project too far from the chuck without support from the tail stock center.
- ◆ When using wood, do not mount a split work piece or one containing knots.
- ◆ When roughing stock, do not force the tool in the work piece or take too big a cut.
- ◆ The operator must always be aware of the direction and speed of the carriage or cross-feed prior to engaging the automatic feed.
- ◆ Never leave the key in the chuck. Do not let go of the key until it is free of the chuck and secured in its proper holding place.
- ◆ Select turning speed carefully. Large diameter stock must be turned at a very low speed. Always use the lowest speed to rough out the stock prior to final machining.
- ◆ The correct speed and feed for the specific material and cutting tool must be used. Stop the machine before making adjustments or measurements.
- ◆ Do not remove metal or wood chips from the table or stock by hand. Use a brush or other tool to properly remove chips or shavings from the table or stock.
- ◆ Never attempt to run the chuck on or off the spindle head by engaging the power.
- ◆ Do not stop the rotation of the chuck by reversing the power to the lathe unless tapping holes.
- ◆ Do not leave tools, bits or excess pieces of stock on the lathe bed.

# LATHE, cont.

## STANDARD OPERATING PROCEDURE 'S.O.P'

All belts and pulleys must be guarded. If frayed belts or pulleys are observed, the lathe must be taken out of service and the belts or pulleys replaced.

- ◆ Stop the machine immediately if odd noise or excessive vibration occurs.
- ◆ Only properly sharpened drill bits and cutting tools in good condition should be used. Dull drill bits and chipped or broken cutting tools must be removed from service.
- ◆ Disconnect the lathe from power source and follow OSEH Guideline IHS011, Lock-out/Tag-out - Control of Hazardous Energy Sources if making repairs or servicing.
- ◆ When an operator has finished working on the lathe, and before leaving the lathe for any reason, the power must be shut off and the machine must come to a complete stop.
- ◆ When an operator observes an unsafe condition with the lathe or stock being worked, the operator must report it immediately to the designated MSSA and the lathe shall be taken out of service until the problem has been corrected.

# MILLING MACHINE

## STANDARD OPERATING PROCEDURE 'S.O.P'

- ◆ Keep all guards in place while operating the machine.
- ◆ While operating the milling machine allow no one else to touch it.
- ◆ Keep hands away from moving cutting tools.
- ◆ Do not make measurements of the stock while the milling machine is powered.
- ◆ Do not allow large quantities of chips to accumulate around the work piece or machine table. After stopping the machine, use a brush or rag to remove all excess chips from the mill bed and stock.
- ◆ Use a rag or Kevlar gloves to handle sharp cutting tools.
- ◆ Cutting tools must be securely fastened in the machine spindle with the proper accessory. Never try to tighten cutting bits or tools by hand.
- ◆ Do not power the machine to tighten or loosen cutting bits or tools.
- ◆ Work pieces and stock must be rigidly fastened to the mill bed with clamps, a vise, or special fixtures.
- ◆ Use appropriate speeds and feeds for the type and size of cutter being used and the material being machined.
- ◆ Make sure the cutting tool is clear of the work piece before starting the machine.

# DRILL PRESS

## STANDARD OPERATING PROCEDURE 'S.O.P'

- ◆ Know the location of start and stop switches or buttons and keep the drill press table free of tools and other materials.
- ◆ Use only properly sharpened drill bits, sockets and chucks in good condition. Remove dull drill bits, battered tangs, or sockets from service.
- ◆ Do not remove by hand metal or wood chips from the table or stock. Use brushes or other tools to properly remove chips.
- ◆ Do not attempt to oil the machine or make adjustments to the work while the drill press is in motion.
- ◆ Do not insert a drill chuck key into the chuck until the power is shut off and the machine has come to a complete stop.
- ◆ All belts and pulleys must be guarded; if frayed belts or pulleys are observed, the drill press must be taken out of service and the belts or pulleys must be replaced.
- ◆ All stock must be properly secured with a vise or clamps prior to a machining process.
- ◆ If the stock slips in the vise or clamp, the operator must not attempt to hold the work with his/her hand or try to tighten the vise/clamp while the machine is in motion. Shutdown the power to the machine prior to re-tightening the loose stock.
- ◆ Use the correct speed and drill for the type of stock being machined.
- ◆ Use the appropriate bit for the stock being machined. Bits with feed screw or extremely long bits should not be used.
- ◆ The drill bit should be mounted the full depth and in the center of the chuck.
- ◆ Position the table and adjust the feed stroke eliminating the possibility of the bit striking the table.
- ◆ Feed the bit smoothly into the work. If the hole being drilled is deep, withdraw the bit frequently to remove shaving on the bit.
- ◆ Never attempt to remove a broken drill with a center punch or hammer.
- ◆ When operator has finished working on the drill press, and before leaving the drill press for any reason, the power must be shut off and the machine must come to a complete stop.
- ◆ When operator observes an unsafe condition on the drill press, or stock that is being worked on, they must report it immediately to the designated MSSA and the press will be taken out of service until the problem has been corrected.



# VERTICAL BANDSAW

## STANDARD OPERATING PROCEDURE 'S.O.P'

- ◆ Ensure the guard doors are closed and the blade is properly adjusted prior to turning on the machine.
- ◆ Adjust the upper guard assembly to within 1/4 inch of the stock prior to starting the machine. Set the band saw at the appropriate speed for the type of stock being machined.
- ◆ Check to ensure the band saw blade is sharpened
- ◆ Check to ensure the band saw is correct for the type of stock and correct speed being used.
- ◆ Allow the saw to reach full set speed prior to cutting stock.
- ◆ Do not force stock into the saw blade. Let the speed of the blade cut stock appropriately.
- ◆ Make “release” cuts before cutting long curves.
- ◆ Plan saw cuts to avoid backing out of curves in the stock.
- ◆ Never push a piece of stock with hands in front of the saw blade. Use a push stick. Keep hands at a safe distance on either side of the stock being machined.
- ◆ Use a push stick or board to push small or irregular sized stock. Small work pieces can also be secured with a tabletop vise or clamp.
- ◆ All round stock must be secured in a tabletop vise or clamp prior to starting the cut.
- ◆ Hold the stock flat on the table prior to starting the cut.
- ◆ If the saw blade binds on a piece of stock, turn the saw off and wait until it comes to a complete stop before attempting to remove the blade from the stock.
- ◆ Do not allow large quantities of chips to accumulate around the work piece or drill press table. After stopping the machine, use a brush or rag to remove all excess chips from the drill press table and stock.

# **BELT & DISC SANDERS**

## **STANDARD OPERATING PROCEDURE 'S.O.P'**

- ◆ Access to Emergency Stop buttons
- ◆ Ensure the machine and area is clean and free from obstacles.
- ◆ Ensure all guards and adjustable table on disc sander are secured and correctly fitted.
- ◆ Never use without extraction and appropriate dusk mask.
- ◆ Never attempt an operation if you are unsure of what you are doing.
- ◆ Never use for more than one operation at any one time- belt sanding or disc sanding.
- ◆ Ensure the on -off switch works correctly.
- ◆ Check that the sanding belt & disc are installed correctly.
- ◆ Adopt a comfortable stance appropriate to the operation that you are performing.
- ◆ Ensure work is held correctly-. Sitting firmly on right hand side of disc table
- ◆ Use firm , forward pressure without overloading the machine.
- ◆ When you finish Isolate machine.
- ◆ Ensure area is left in clean condition and any waste is removed.