

Student _____

The objective of this Safety Program is to establish a set of rules which, if followed, will make the machine shop a safe environment in which to work. It is not the intent of this program to address every possible injury causing situation. Such an attempt would be impossible. Most of these rules are simply an exercise in good common sense. Applying common sense and continually analyzing the possible consequences of your actions before continuing, cannot be overly stressed.

The following list represents the machines and operations that cause the highest percentage of injuries in a machine shop.

1. Drilling, reaming, honing, and boring - Accidental contact with chips and drill, removing chips with fingers or rag instead of brush especially when tools are in motion. Not clamping work vise securely.
2. Grinding & sanding- Eye injuries from flying particles, hand contact with wheels or abrasive material, bursting of wheels when improperly installed or misused, run at incorrect speeds or grinding aluminum with an improper wheel type.
3. Lathe Turning - Loose clothing catching on revolving parts, contact with chuck or lathe dogs, removing chips with hands, and flying chips from cast iron and non-ferrous metals.
4. Milling - Accidental contact with cutter, removing chips with a rag instead of a brush, attempting to use power to tighten the arbor nut or by attempting to adjust the workpiece while the machine is in motion.

The following are important safety procedures you are to take. Not following these precautions causes a major percentage of injuries.

1. OSHA approved Safety Glasses (Z87 minimum rating) must be worn, at all times, when in the Machine Tools Lab. Eye injuries often occur at unexpected times.
2. Only short sleeve shirts are allowed as long sleeves tend to catch in revolving machinery. Rolled up sleeves are strong and if they get caught an arm is often lost. Do not wear loose clothing or tank (open) top shirts.
3. If you have long hair, (below the collar) wearing a hat, hair net, pony tail, head band, or some other control device is required. Hair and scalp is often caught and removed by rotating machines if long hair is not controlled.
4. Do not use compressed air to clean yourself or clothing. Body openings cannot withstand the pressure, the result being internal rupture causing serious injury or death.

GENERAL SAFETY RULES:

1. Do not run or participate in horseplay in the shop.
2. Keep aisles and walkways clear and floors free of oil, grease, water, or any liquids.
3. Do not store or place materials where they can become a tripping hazard.
4. Do not wear watches, rings, neckties, gloves, long-sleeved shirts, or anything that might possible become caught in a machine.
5. Wear OSHA approved (Z87 minimum rating) safety glasses at all times.

6. Do not operate a machine unless authorized by your instructor.
7. Do not operate machinery unless another person is in the shop.
8. Do not operate a machine unless all guards are in place.
9. Do not leave any machine until it has stopped completely.
10. Do not attempt to stop any machine with your hands - in case of emergency, get out of the way, then if safe, shut off the machine.
11. There should only be one person operating a machine at one time - do not have others operate switches.
12. Do not talk to the operator of any machine when the machine is running.
13. Do not lean against machinery.
14. In case of any injury, get first aid and notify your instructor.
15. Know the location and use of fire extinguishers.
16. Know the location and contents of the first aid kit.
17. Know fire and other disaster procedures utilized at De Anza.
18. Bare feet, open toed and tennis shoes are not allowed.
19. Chuck keys are not to be left in lathe or drill chucks.
20. Use brushes and rags for cleaning parts and machines, not hands.
21. Do not clean machines or parts when a machine is running.
22. When lifting, keep back straight and bend knees. If an item is too heavy to lift, get help.
23. Do not work in a machine shop under the influence of alcohol or drugs, prescription or otherwise.
24. Do not work in a machine shop if you have a medical problem that might be a danger to you or others.
25. Before starting machine, double check set up and other students who may be in the way of moving machines or parts.
26. When applying coolants, be sure brush does not catch and pull your hand into the machine operation.
27. If something falls, do not try to catch or break the fall, as it may be sharp or heavy.

I. **HAND TOOLS:**

A. Screwdrivers:

1. Avoid holding work in the hand as the screwdriver may slip and injure the hand.
2. Never grind a screwdriver to a sharp edge.

3. Use proper screwdriver for the type and size of screw head.
4. Never use a hammer on a screwdriver handle.

B. Wrenches:

1. Use only properly fitting wrenches.
2. It is generally better to pull on a wrench than to push on it.
3. Keep knuckles clear of obstructions when turning a wrench.
4. Pull on adjustable wrenches in the direction which applies the majority of force to the fixed jaw.

C. Hammers:

1. Never use hammers that are chipped or cracked.
2. Never use a hammer unless the handle is tight fitting and in good condition.
3. Never hammer on tools or parts that are brittle due to hardening.

D. Chisels:

1. Keep chisels free of burrs and mushroomed heads.
2. Hold the chisel firmly and keep both the chisel and hammer faces free of grease.

E. Scrapers:

1. Keep scrapers well protected from contact with other hard objects.
2. Do not scrape towards the body or hands.
3. Wear a thumb protector.

F. Files:

1. Keep handles in good condition and tight on the tang.
2. Keep a firm grip on the file at all times.
3. When filing on a lathe, file left handed (file handle in your left hand).

G. Hack Saw:

1. Use the correct blade for the job.
2. Be sure the blade is secure in the frame.
3. When the saw breaks through the work, ease up on the pressure to prevent striking the work or the vise with your hands.
4. Be sure the work is clamped securely in the vise.
5. Do not use excessive pressure.

H. Taps and Dies:

1. Keep hand away from newly cut threads.
2. Avoid hand contact with broken tap ends.
3. Do not use taps or dies under power unless a tapping head is used.

II. **METAL SAWS:**

- A. Always use a pusher for hand feeding.
- B. Keep fingers away from the saw blades and out of line with the blade path when hand feeding.
- C. Never hand feed round stock in a band saw unless the stock is properly clamped in a vise or suitable clamping device.
- D. Never attempt to disengage a stuck blade from a workpiece until the machine is turned off.
- E. Use only sharp blades adjusted to the proper cutting speed.

III. **PEDESTAL GRINDER & SANDERS:**

- A. Be sure the face of the wheel is dressed flat and that the tool rest is set within 1/16 inch of the wheel face - if gap is larger, stop machine and adjust.
- B. Stand to one side when starting machine.
- C. Work should be fed slowly across the face of the wheel - any excessive or suddenly applied pressure can cause wheel breakage.
- D. Shut off the machine in case of excessive vibration or chatter and call the instructor.
- E. Hold workpieces firmly in hands or use a suitable clamp for small pieces.
- F. Never attempt to wipe off or adjust the tool rest with the machine running.
- G. Safety glasses are particularly important around grinders.
- H. Do not grind aluminum or materials other than steel on an aluminum oxide wheel.
- I. Make sure the wheel is "sound", that is, the wheel has no fractures or breaks in it before mounting.
- J. Replace sanding belts/disks which are torn or damaged.

IV. **DRILL PRESS:**

- A. Use only properly sharpened and straight drills.
- B. Use correct speeds and feeds for the particular material and drill size.
- C. Remove chuck wrenches before starting machine.
- D. Clamp vise to the drill press table.
- E. Clamp the workpiece to the drill press table (do not drill into the table).

- F. If the workpiece slips from the clamping device, shut off the machine, if safe, and then make adjustments.
- G. Stop the machine before changing bolt position on the V belt type machine.
- H. Deburr all drilled holes.
- I. Do not use hands, rags, or air pressure to remove chips.

V. **LATHES:**

- A. Remove the chuck wrench from the chuck whenever the wrench is not actually used. The wrench should never leave the operators hand. A flying chuck wrench can cause fatal injury.
- B. Secure the workpiece, the tailstock, and the cutting tool before turning on the machine.
- C. Never make measurements of adjustments to the set-up when the machine is running.
- D. When filing in the lathe, be sure to use a file with a file handle and use the file left handed holding the file across the full face of the chuck.
- E. Never use fingers to pull on chips or check for sharp edges on a revolving workpiece.
- F. Never make heavy cuts on long or slender workpieces.
- G. Keep all hand tools off the machine and on a work bench except when in use.
- H. Never use rags near a revolving workpiece.
- I. Do not extend long slender bar stock beyond the left side of the head stock unless it is supported.

VI. **MILLING MACHINES**

- A. Fasten the work securely in the vise or to the table.
- B. Never apply coolant with a brush in a manner which could result in the brush being caught between the workpiece and cutter.
- C. Keep hands and arms away from revolving cutters.
- D. Do not check work or measure work while the cutter is revolving.
- E. Stop the machine and use a suitable brush to clean chips from the cutter (or cutters) or vise. Rags must not be used near rotating cutters.
- F. Do not walk away from the machine while the cutter is revolving.
- G. When removing end mills and face milling cutters, always hold a rag over sharp edges of the cutting teeth.

VII. **GRINDING MACHINES, SURFACE:**

- A. Wear safety glasses at all times when performing any operation on any grinder.
- B. Make sure that the work is securely and properly clamped.
- C. Make sure the wheel is properly mounted on the machine.

- D. Make sure that the wheel is "sound", that is, that the wheel has no fractures or breaks in it before mounting.
- E. Be sure that you know the safe operating speed of the wheel you are using.
- F. Double check magnetic chuck by trying to move part immediately before starting to grind.
- G. If magnetic chuck is electrically powered, check for frayed wiring at table edge.