

YORK COLLEGE
MECHANICAL
ENGINEERING
MACHINE SHOP
SAFETY MANUAL

General Guide Lines

1. Approved eye wear must be worn at all times in the shop area. Eye protection is also required in the weld area.
2. All injuries must be reported to the shop manager immediately.
3. Appropriate clothing is also required in the shop when using shop equipment.
Shorts, sandals and open toed shoes are prohibited. In addition, long sleeves are required when welding or observing someone weld. Loose clothing or long hair must be confined to prevent becoming entangled in the machines.
4. If you break a piece of tooling, discover broken tooling or machinery that is not operating correctly; notify the shop manager immediately. Students must comply with this rule in order to prevent injuries by broken or malfunctioning equipment.
5. Tools and materials should not be left hanging over the edge of work benches or machinery because they may be knocked off causing injury or damage.
6. Hands are to be kept clear of moving parts while equipment is in motion. Machines must be completely stopped before handling moving parts or the work piece.
7. The safety guards are to be kept in place at all times, unless the shop manager gives you permission to remove them.
8. Only one person will operate a machine at one time.
9. You may not wear gloves while operating machinery. Holding objects with a rag near moving machinery is also not permitted. Gloves, rags, etc. can be easily caught in machines that are in motion, pulling the operator into the equipment.

10. Machinery may not be left running unattended. You must be at the controls of the machine you are using whenever it is in motion.
11. Clean machines, benches and work areas immediately after each use. Use a brush to clean chips from a piece of machinery. Do not use an air hose.
12. The machine shop is open only when the shop manager is present or one of the professors is available for supervision.
13. Observers must not distract the operator of a machine as this may cause serious injury to the operator or the observer.
14. If you have any questions about safety or the correct setup of any piece of equipment do not hesitate to ask the manager for assistance, that is what they are there for.
15. Ensure the safety of yourself and others by being aware of your surroundings. If you see someone committing an unsafe act, report it to the shop manager immediately. As the machine operator you are responsible for the safety of the people in your immediate area. It is your responsibility to look around and be sure that everyone within your range is wearing safety glasses. Likewise a welder must be sure not to start welding if people without welding helmets are watching him.
16. In summary these guidelines are in place so as to give you the student some general ideas as to enable you to operate in a safe manner. However the shop will only be as safe as we make it.

Machine Safety Guidelines

Drill Press

1. Check the drill press table for security and conditions before starting.
2. A center punch will help to locate the hole to be drilled in the correct place.
3. Select the correct speed for the material and the drill being used.
4. **Remove the chuck key immediately after tightening or removing a drill.** Leaving it in the chuck can injure someone if the machine is turned on.
5. All work pieces must be held securely for drilling by using a drill vise or C-clamps. A work piece that moves when being drilled can break the drill, and injure the operator and destroy the work piece. Large work pieces must be set firmly against the left side of the drill press column so that if the drill “grabs” the work can not spin and cause injury to the operator or others. If the drill grabs the work piece and it is yanked loose of the clamps and begins to spin, maintain downward pressure with the press and turn off the power. Do not retract the drill as this would allow the work piece to be thrown from the press and may cause injury.
6. Hands are to be kept clear of the revolving spindle, chuck, drill and chips.
7. Always ease up on the feed or drill pressure as the drill begins to break thru the work piece. Heavy feed pressure will cause the drill to dig in, and could damage the material being drilled, break the drill, or cause the work piece to spin.
8. Drilling soft materials such as brass, copper, or plastic is done with a drill ground differently than drills used for steel.
9. Be sure the drill press is stopped before removing the work piece, chips or cuttings.

Bench Grinder

1. Make sure that the work rest is 1/16 inch from the wheel face
2. Stand to the side of the grinder, not in line with the wheels, turning on the grinder and while the wheels are accelerating, this is the most common time for a damaged wheel to fly apart.

3. Do not allow hands to come in contact with the grinding wheel while it is in motion.
4. Dress the grinding wheel when it is worn uneven or out of round.
5. Hold the work firmly, and make grinding contact without bumping or impacting the grinder.
6. Use only enough pressure to assure grinding, but not heavy pressure, as this will only cause overheating and grinder damage. If the work piece begins to get warm, quench it in water.
7. Grind only on the face of the wheel. Grinding on the side can cause the grinder wheel to explode.
8. Keep the work piece in motion across the face of the wheel.
9. **Stone type wheels are not for grinding aluminum, brass, or copper because the soft metal becomes imbedded in the stone overheats and can explode.**

Band Saw – Vertical

1. **When preparing to cut material on the band saw is aware of the speed of the blade.** The speed of the blade is a critical factor to blade longevity. The type of material and its thickness will be the determining factor as to how fast or slow you will run the saw. If you are not sure **Check with the shop manager.**
2. Do not cut round stock on the vertical band saw. Use a v-block to cradle the work. **Do not under any circumstances cut round stock lying flat on the table.** This is a very dangerous thing to do.
3. Adjust the upper blade guide so that it is about $\frac{1}{4}$ inch above your work.
4. Plan the cut so as to not have to back out of a cut, as this could pull the blade off the wheels. Make relief cuts as needed
5. When feeding a work piece into the blade your fingers should not be in line with the blade in case the work piece cuts faster than you expected.
6. Clean off the tabletop when you have completed the sawing operation.

Engine Lathe

1. Roll up your sleeves, and do not wear loose clothes such as sweaters or neckties while operating the lathe.
2. Be certain that the work piece is set up securely and tightly when using chucks and collets.

3. **Remove the chuck key immediately after each use.** If the lathe were accidentally turned on while the key was still in the chuck, the key would become a fast moving projectile and possibly cause serious injury.
4. Keep hands on the controls or at your side while the lathe is running.
5. Keep hands away from the chips, as they are very sharp and hot.
6. Complete cuts that are close to the chuck or against a shoulder by hand feeding to prevent machinery or work damage.
7. When filing on the lathe move the carriage out of the way.
8. Never push the reverse switch while the chuck is moving forward as this could cause the chuck to unscrew itself and fall off and cause serious injury.
9. Regulate the depth of cut according to the size and type of material .
10. Use the tools that are properly ground for the particular job.
11. You may never check measurements or surface finishes of the work piece while it is spinning.
12. After you have chucked up the work piece and completed your tool setup you must spin the chuck by hand to ensure that the jaws of the chuck will not hit the carriage of the lathe or the tool rest.
13. Clamp the tailstock securely.
14. Do not attempt to remove chips with your hands.
15. **Do not leave the lathe running while unattended or leave the chuck key in the chuck and walk away from the lathe.**
15. Use a brush to clean off the chips from the lathe. Do not use an air hose.
16. When finished clean up your work area and return all tools to the return cart.

Milling Machine

1. The milling machine is a precision piece of equipment so it is important to not damage the table. The table is not a work bench or a place to put tools.
2. **When changing cutters in the mill be sure that you have removed the wrench from the draw tube location on the top of the mill. Leaving it in this position and turning on the mill is tantamount to murder.**
3. Be sure that you know how to stop the mill quickly before operating the machine.
4. Handle cutters carefully. They are sharp. If they can cut metal they can cut you.
5. Use a soft hammer to seat the work piece against the parallel bars or bottom of the vise.
6. Secure the work piece firmly in the vice or with appropriate clamps.
7. Set the machine for the proper depth of cut.
8. Select the correct spindle speed for the type of material and the cutter being used.
9. Select the proper direction of rotation for the cutter.

Disk/ Belt Sander

1. Check the belt or disc to make sure it is in good condition and not torn. The shop manager will replace worn belts or disks.
2. Keep hands and fingers clear of the moving or rotating belt.
3. Hold the work piece securely and use only moderate pressure.
4. Sand only on the downward motion side of the disk.
5. Move the work piece side to side on the sanding surface to prevent rapid wear of the belt or disc.

Table and Chop Saw

1. Unplug the machine before handling or changing the blade.
2. Limit the blade extension to 1/8 inch through the piece being sawed.
3. Use the ripping fence or the cut off gauge when cutting material. Do not attempt to do any free hand cutting on the table saw. You must use either the fence or the cross cut gauge.
4. Keep a push stick immediately available and use it to keep your fingers away from the saw blade.
5. Feed the work at a moderate rate, but not so fast that the motor slows down.
6. When using the fence on the table saw to rip cut a work piece the operator and all observers must not stand in line with the work piece because it can get pinched between the spinning blade and the fence causing it to kick back[that is fired straight back out of the saw at a very rapid rate].
7. When cutting large or long pieces on the table saw, use an assistant to SUPPORT the edge or end of a large or long pieces being sawed. The assistant does not 'feed' the material into or pull it through the saw. This can cause the operator to loose their balance if the work piece move more rapidly then they anticipated and the operator can fall into the saw.
8. Make sure the table saw has a blade guard, splitter, and anti-kickback device installed and operational before using the saw. Exceptions may be made for specialty cuts[e.g. dados, angle cuts etc.]. Check with the shop manager before removing these guards.
9. The table saw and chop saw are for cutting wood only.
10. Do not EVER allow a piece of wood o be entrapped between the rotating blade and the fence. This condition will cause a KICK BACK.

YORK COLLEGE MECHANICAL ENGINEERING MACHINE SHOP WAIVER AND AGREEMENT

I have received hands on instruction on all machine tools in the machine shop area and the wood lab.

I have read, understand and agree to follow all the rules set forth in the York College Mechanical Engineering Machine Shop Safety Manual.

I have taken and achieved a passing grade on the Mechanical Engineering Machine Shop Safety Exam.

I understand that the machine shop and all it's equipment are permitted to be used only when the shop manager is present or with permission of one of the college professors.

I will return all tools to the return cart. I will not enter the tool room unless granted permission by the instructor.

I understand that any violation of these shop rules will be grounds for removal of shop privileges.

When finished working I will clean up my area and return all tools to the return cart

Students Name _____

Students ID _____-_____

Students Signature _____ Date _____