Safety Rules
for the KCWG Shop

Kansas City Woodworkers' Guild

Version 2.0 / June 13, 2017

Everyone working In the KCWG shop must observe the safety rules outlined in this booklet. *Failure to follow these rules may result in the loss of shop privileges*.

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Shop-wide rules

1. **Be sure that a shop foreman is present,** and wear your green card while working in the shop.
2. **Approach your work with a safe attitude!**
    - **Focus**. Concentrate on what you're doing, and don't get distracted. Distraction causes injury.
    - **Be strong.** No, this does not mean muscle strength. It means the strength to do it right, even when you are under time pressure. Follow the safety procedures.
    - **Don't rush.** Take the time to do things correctly and using the right guard or personal protective equipment (PPE). Is saving a few minutes worth a lifelong injury?
    - **Work responsibly.** If you care about yourself and your family, follow the safety procedures.
    - **Don't gamble**. A one-in-a-thousand risk is not worth the possible cost. Do not play the odds. Follow the safety procedures.
3. **Give the work your undivided attention.**
4. **Wear safety glasses with side shields** when the shop is in operation, wherever you are working, not just when you are using a machine yourself. Glasses should be ANSI Z87.1 rated.
5. **Protect your hearing.** Hearing protection is *required* in the CNC Shop area. However, it is a good idea to use hearing protection anytime when working in the shop. Consider using other personal protective equipment (PPE), such as a mask or respirator when working in dusty conditions.
6. **Do not wear anything that might be caught by a machine.** This includes rings, wristwatches, other jewelry, loose-fitting clothing, long sleeves, and gloves. Tie back long hair.
7. **Do not wear open-toed shoes, sandals, or flip-flops** when working in the shop.
8. **Ask for help.** Unless you are *sure* that you know what you are doing and can handle it yourself, ask the foreman or another member for help.
9. **Stand comfortably**. Maintain a balanced stance at all times so that you do not fall or lean against the machine you are operating.
10. **Maintain a 2-foot perimeter.** Make sure you keep people, obstructions, and any debris that might impair traction at least 2 feet away from the machine you are using.
11. **Use the dust collector.** If the machine you are using has a dust collector, make sure it is on and the blast gate for the machine is open before starting.
12. **Observe the 3-inch rule.** Always keep your hands and fingers 3 inches away from the blade of a power saw, the bit of a drill press, the abrasive medium of a sander and any other moving parts of a woodworking machine.

13. **Stay behind the blade.** Never place your hands or fingers directly in line with any blade where you could cut them if you slipped.
14. **If it's broken, don't use it.** Report malfunctions, missing parts, etc. to the foreman immediately.
15. **Tidy up after you set up.** Clear the work area of any wrenches, chuck keys or other adjustment tools before turning on a machine.
16. **Avoid surprises.** Inspect your stock carefully for knots, twists, nails, staples, other foreign material, etc.
17. **Wait until it starts.** Do not start a machine with the blade, bit, or abrasive medium in contact with your workpiece. Wait until the machine is running at normal operating speed.
18. **Don't force it.** If you need to use excessive force with any woodworking machine, something is wrong. Stop and consult the shop foreman.
19. **Wait until it stops.** Never clear small pieces while the blade, bit, or abrasive medium is moving. And don't leave a machine work area until the machine is off *and has come to a complete stop.*
20. **Unplug it.** Always disconnect the power before changing a blade or performing any other maintenance operation.
21. **Use the correct guard.** Before using any power tool, be sure all guards are in place and working properly.
22. **Clean up.** When you are through with any machine or hand tool, clean the work area with brush, broom and dustpan or vacuum, and put away whatever you took out. (Yes, this is a safety issue as well as a courtesy.)

Start with a risk assessment to ensure a safe work area:

1. Is the area clear of people and obstructions?
2. Is the floor clear of sawdust and chips that might impair traction?
3. Is your workpiece of a size and weight that you can handle safely without help? Is it so small you are at risk of violating the 3-inch rule?
4. Does the workpiece have any foreign material (nails, staples, etc.) embedded in it?
5. Are all the guards on your machine in place and working?
6. Does the environment warrant your use of personal protective equipment in addition to safety glasses?
7. Is the blade, bit, or cutter head, clean and sharp, so as to prevent jams or other mishaps?

Sliding Compound Miter Saw

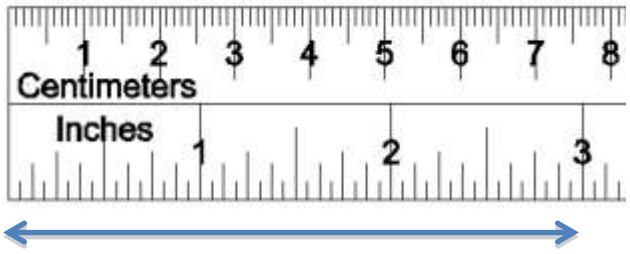
The miter saw is a power tool used to make quick, accurate crosscuts and miter cuts. A compound miter saw can make simultaneous miter and bevel cuts, and a sliding compound miter saw like the ones in the KCWG shop has rails for the motor head and blade to travel on to allow cuts in wider stock. This saw is often used to cut stock to rough length at the beginning of a project.

Safety Rules

1. Always hold the workpiece securely on the table and against the fence when making cuts. Where possible, use clamps to hold the workpiece in place—and always do so when cutting a workpiece so short that holding it would violate the 3-inch rule. Be aware of the risk of kickback.
2. Support the end of a long workpiece at the same height as the saw table.
3. When cutting a cupped or bowed piece of stock, make sure the workpiece is oriented to leave no gap between it and the fence or the saw table at the point of the cut. If not, you risk pinching the blade and causing kickback.
4. Never reach under the saw blade or perform a cross-handed operation.
5. When you start the saw, allow the blade to reach full speed before cutting; do not force the blade and always start the cut gently.
6. When using a sliding compound miter saw like the ones in the KCWG shop, make your cut in three steps:
   a. *First* pull the motor head out.
   b. *Then* start the saw.
   c. *Finally,* push the blade down into the stock and towards fence to make the cut.

   If your work piece is more than 1" thick, make multiple cutting passes to complete your crosscut.
7. Don't raise the motor head from the workpiece until the blade has come to a complete stop.
8. Never try to remove or clamp the workpiece to the saw while the blade is rotating.

9. When installing a blade, match the direction of the arrow on the blade with the direction of the arrow on the tool casting. The teeth at the bottom of the blade should point back toward the fence.
10. Use only blades with arbor holes that fit the arbor of the saw. Be sure the arbor nut is tight to prevent slipping or loosening of the blade.
11. Use sharp blades. A damaged or dull blade could throw teeth, causing serious injury. Make sure the blade is clean. Buildup on the surface of the blade will cause excessive friction.



Remember the 3-inch rule.
Keep your hands away from the blade or bit.

Jointer

Jointers are used to prepare stock for making joints by smoothing and flattening an edge or surface of stock. They have high-speed rotating knives that remove material from the bottom face or edge of the board as it is pushed past them. Typically a jointer is used to make one face of a board flat, straight, and smooth and to make one adjacent edge flat, straight, smooth, and perpendicular to the jointed face.

Safety Rules

1. Set the jointer to remove no more than 1/16" of stock per pass.
2. Joint only stock that is at least 12" long and narrower than the cutting head.
3. Use push blocks when needed to keep your hands at least 3" from the cutter head at all times.
4. Do not joint the face of a board that is thinner than 5/8".
5. Although the fence can be tilted, jointing the stock at an angle could be difficult. The use of push blocks and hold-down devices is highly recommended. If possible, consider another machine for this operation.
6. Make sure that any cutter head in back of the fence is covered by a guard.
7. Always run wood through the jointer with the grain running parallel to the length of the jointer bed; never joint across the grain. Examine the stock for grain direction, warp, twist, burl, swirl, kink, and cup before jointing.
8. When straightening a cupped or bowed piece of stock the concave face should face down and the humped or convex face up.
9. Always feed toward the out-feed table.
10. When you are jointing the face of a board, don't let your thumb or fingers hang over the back end to push it through the jointer.
11. Walk a long board through the cut. Never stand facing the fence.
12. Avoid applying pressure to the leading few inches of stock, since that may result in tipping the board or your fingers into the cutter at the start of the cut.
13. Do not back your workpiece out of a cut; either keep going in the direction of the out-feed table or shut the machine off and lift your workpiece off once the cutter head has come to a stop

Thickness Planer

Like a jointer, the thickness planer removes material from the surface of a board. It can be distinguished from a jointer in that the cutter head is mounted above the feed table to remove material from the upper face of the board. It is used to smooth and flatten the second face of a board that has been jointed, ensuring that the two faces are parallel.

Safety Rules

1. Adjust the planer to remove no more than 1/16" per pass.
2. To avoid kickback, do not run boards with loose knots through the planer.
3. Plane only boards longer than 12".
4. When planing stock 3/8" thick or less, use a backer board. For stock thinner than 1/4", use a belt thickness sander with a backer board instead.
5. When using the planer, stand to the side of the machine to avoid kickback or shattering of the wood.
6. As you feed boards into the planer, be careful not to get your fingers pinched between the board and the in-feed table.
7. Unplug the machine to make any adjustments other than the depth of the cut and the rate of feed.
8. If the board is thicker on one end than the other and jams in the machine, do not shut it off. Slowly crank open the height adjustment wheel until the board resumes feeding through the planer.
9. Always run wood through the planer with the grain running parallel to the length of the planer bed; never plane across the grain. Examine the stock for grain direction, warp, twist, burl, swirl, kink, and cup before planing.

Table Saw

Table saws are designed to rip, crosscut, and cut bevels and angles with precision.

Safety Rules

1. Always use the fence, crosscut sled or miter gauge. Never cut free-hand on the table saw.
2. Use the blade guard for all crosscut and rip operations except when using the crosscut sled or when ripping workpieces too narrow to fit a push stick between the guard and the fence, in which case replace the guard with the riving knife.
3. When cutting with the crosscut sled, use the riving knife, and make sure the outfeed table guide slots are aligned with the saw-table slots.
4. Position your body to the left of the blade so that it is not In line with the “kickback alley.”
5. When you crosscut multiple pieces to the same short length, use a stop block clamped to the rip fence as your reference point. Using the fence together with the miter gauge or crosscut sled without a stop block risks kickback.
6. Do not reach over the blade until the blade has stopped completely.
7. Keep the tips of the blade teeth only 1/8" to 1/4" above the stock.
8. Never operate a table saw with the throat insert removed. Use a zero-clearance insert when appropriate.
9. Keep the area in back of you free of people in case of kickback. Be careful not to put pressure on the workpiece in a way that would press it against the side of the blade or pinch closed the kerf made by the blade.
10. Use a push stick to rip stock that is too narrow for you to keep your hand 3" from the blade while cutting it.
11. Make sure that the blade has stopped turning completely before you remove scrap pieces from the table or adjust for another operation.
12. When installing a blade, match the direction of the arrow on the blade with the direction of the arrow on the tool casting. The teeth at the top of the blade should point toward you.
13. Use only blades with arbor holes that fit the arbor of the saw. Be sure the arbor nut is tight to prevent slipping or loosening of the blade.
14. Use sharp blades. Damaged or dull blades could throw teeth, causing serious injury. Make sure the blade is clean. Buildup on the surface of the blade will cause excessive friction.

Band Saw

The Band Saw has a thin blade in the form of a continuous loop. It is useful for cutting curves, resawing, and cutting thick material.

Safety Rules

1. Before turning on the band saw, make sure that the blade tension lever is in the “On” position and that the blade tracks in the center of the wheel treads when you rotate the wheels by hand.
2. The teeth of the band saw blade should point down toward the table.
3. The blade should be 1/32" from the roller bearing behind the blade.
4. Make sure that the upper and lower wheel guard doors are closed when the saw is running.
5. Keep the blade guard only 1/4" above your stock, or as low as possible if you need to clear the fence.
6. Keep bystanders away from the right hand area of the saw. Broken blades have a tendency to fly out to the right.
7. Don’t cut stock that is not flat on the bottom without holding it in a jig. Use a “V” block when cutting cylindrical stock.
8. Keep your fingers and hands away from the path of the blade. Never use your thumbs to push your workpiece toward the blade.
9. Turn the machine off and wait for the blade to stop before backing out of a cut.
10. When cutting small or short stock, use push sticks, feather boards, or other appropriate safety devices to control the workpiece.
11. Do not force a cut. Allow the blade to dictate the rate of cutting.
12. If the blade breaks, shut the machine off and stand clear until everything stops.
13. When cutting with the table at an angle, clamp a block to the table to keep your stock from slipping off.
14. Never stick an object into the blade to stop the machine. Let it stop on its own or use the brake, if the saw has one.

Drill Press

The drill press is used to drill holes precisely and with repeatable accuracy. It has a motor-driven head with a chuck that accepts bits or cutters. It also has an adjustable table on which the work is mounted. It is operated by pulling a rotary lever that lowers the drill bit into the material.

Safety Rules

1. Make sure the size of the bit is within the capacity of the drill press.
2. Do not exceed the recommended speeds for the type and size of drill bit being used and composition of the stock being drilled.
3. Support the underside of the stock to be drilled with a backer board secured to the drill press table.
4. Use a clamp or vise to securely fasten the stock to the drill press table. Never hold stock in your hand while drilling.
5. To drill into the side of cylindrical stock, hold the workpiece in a “V” block.
6. When drilling into a long workpiece, position the excess stock to your left so that, if the stock rotates, it will hit the fence or the post, not you.
7. If a drill bit binds, turn off the drill press and carefully turn the chuck backwards by hand to free the drill bit.
8. Never reach around or under a rotating drill bit.
9. Don’t try to stop the rotation of the drill chuck, spindle, or stock rotating on bit with your hands or fingers.

Router

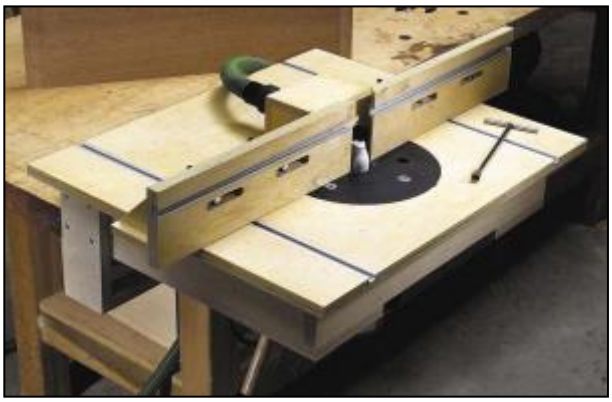
A router is basically a motor that turns a cutter head at very high speed. It is used to perform an extensive range of smooth finishing and decorative cuts.

Safety Rules

1. Use sharp bits, inspect them before each use, and handle them with care. Never use dull or damaged bits or bits with cracked carbide.
2. Consult a speed chart for the correct speed setting for the bit.
3. Use only bits that have a cutting diameter less than the opening in the router base.
4. Unplug the router when changing a bit.
5. When changing a router bit, insert the new bit as far into the collet as possible, then withdraw it about 3/16" before tightening the collet. Make sure that the bit shaft is engaged in the collet at least ½".
6. Always use the wrenches provided with the tool to make adjustments.
7. Be sure that the collet nut and any other adjustment devices are securely tightened before turning the router on. Loose adjustment devices can unexpectedly shift, causing loss of control; loose bits and collets may be thrown violently.
8. Make sure the work surface is free from nails, knots, and other foreign objects. Do not shape particleboard; it could fly apart while being routed.
9. Hold the workpiece securely in a vise or other clamping device. Holding the workpiece by hand is unstable and dangerous.
10. Follow the tool manufacturer's recommendation for the depth of cut.
11. Hold the router firmly with both hands. Motor torque can cause it to twist.
12. Feed the cut against the direction of bit rotation. Feeding the tool in the wrong direction causes the cutting edge of the bit to climb out of the workpiece and may cause loss of control.
13. Never lay the tool down until the motor and bit have come to a complete stop. The spinning bit can grab a surface and pull the tool out of your control.
14. Don't touch the bit immediately after use. It may be hot.
15. Return the bit to the bit holder located in the tool cabinet after use. Never store bits loose in a drawer.

Router Table

A router mounted in a table is used to create decorative edges and surfaces on a workpiece and to cut rabbets and dadoes.



Safety Rules

1. *Read and observe the router safety rules, above.*
2. Adjust the fence halves so that the cutter opening is slightly wider than is required to clear the bit, then lock the fence into position.
3. Maintain proper adjustments for in-feed and out-feed fences.
4. Clamp a block of wood to the fence over the top of the bit to help protect your hands from the rotating bit.
5. Take time to examine your workpiece and make sure that all necessary precautions have been taken before cutting.
6. Feed the workpiece against the direction of cutting blade rotation. Otherwise, the cutter blade can grab and pull the workpiece.
7. Never feed the stock between the fence and the bit.
8. Stop the tool and unplug it from the power source before clearing a clogged exhaust port. After the bit has stopped, unclog the exhaust port with a stick.
9. Shaping narrow or small workpieces can be hazardous. Use a push block as needed to keep your hands protected from the revolving bit, and use feather boards to keep narrow pieces against the fence and the table. Use a clamping device to hold small workpieces.
10. Never reach under the table while the tool is running.

Belt and Disk Sanders

These sanders are for surface or edge sanding of nonmetallic materials only. They may be used for many types of rough end-grain sanding and simple shaping.

Safety Rules

1. Power driven sanders can cause serious abrasive skin burns from accidental contact with the abrasive. Failure to keep your hands safely away from the abrasive may cause injury to the fingers and hands.
2. Before turning on the machine, check to make sure the sanding belt or disk is undamaged. Remove scrap pieces and other objects from the table, backstop and belt.
3. When you start a belt sander, make sure the belt tracks properly before beginning your sanding operation.
4. Keep the gap between the sander's table and the moving disk or belt as small as possible.
5. Be careful not to let the wood overheat. Sanding friction may burn the wood and damage or even destroy a belt.
6. Hold the workpiece firmly when sanding, and support the workpiece with the backstop or table or both. If your workpiece is too small to be safely supported, hold it in an appropriate jig or clamp.
7. Avoid awkward hand positions where a sudden slip could cause a hand to move into the sanding belt or disk.
8. When using a disk sander, hold the work firmly on the side of the table where the disk is rotating downward.
9. Do not push hard against the sanding medium. The sander performs best and most safely when it is allowed to remove material at a moderate rate.

Belt Thickness Sanders

These sanders are similar to thickness planers in that they remove material from the upper surface of a board. However, instead of using a series of rotating knives and shaving the material, they use a sandpaper belt to abrade it. The sanding medium spins above the workpiece, which feeds past it on a conveyer belt.

Safety Rules

1. Use these machines to sand only workpieces 6" long or longer. Shorter workpieces cannot be safely supported as they pass through the machine.
2. Check the integrity of the conveyor belt and sanding medium before turning the machine on. Any ripped belts or burn marks should be reported to the shop foreman.
3. Set the depth (with the sander and conveyor OFF) so that the abrasive is in contact with the workpiece just firmly enough that you can still pull the workpiece free. Do not attempt to remove large quantities of material in a single pass.
4. Start the conveyor at 50% of its full speed, adjusting up or down in small increments to improve the quality of the sanding.
5. Beware of getting your hand caught between the sanding medium and the conveyor belt when the machine is operating; serious injury could result.
6. Push the workpiece from the in-feed side until the belt catches it. Remove your hands and let the conveyor belt feed the material through the machine.
7. Stand to the side of the machine while sanding to avoid kickback.
8. Avoid feeding more than one piece through the sander at once. Gang-feeding material may result in kickback. A proper cut is achieved by balancing the depth of cut with the feed rate, keeping in mind the qualities of the material being sanded. A soft wood can have a greater depth of cut and rate of feed than a hard wood.

Hollow Chisel Mortiser

The hollow chisel mortiser is a specialized woodworking machine used to cut square or rectangular holes in a workpiece—most often to cut mortises for mortise and tenon joints. Similar to a drill press in many respects, it combines the cutting of a four-sided hollow chisel with the action of a drill bit in the center. The bit clears out most of the material to be removed, and the chisel ensures that the edges are square, straight, and clean.

Safety Rules

1. Turn the bit one complete revolution by hand before the power is turned on to make sure it doesn't bind.
2. Keep chisel and drill bits sharp and clean for the best and safest performance. Follow instructions for lubricating and changing accessories.
3. Make sure the workpiece is securely attached or clamped to the table. Never use your hand to hold the workpiece.
4. In cutting a mortise wider than the chisel, cut a hole at one end, then move the chisel past material about 2/3 size of the hole, and cut another hole. Continue in this manner until mortise length is achieved. Then go back to remove the material left between holes. Failure to follow this procedure will result in a ruined chisel and bit.

Got them on?

Don't forget: Wear them whenever you are in the shop.

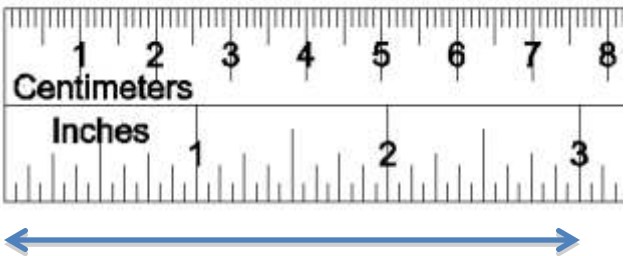
Lathe

The lathe rotates a workpiece about an axis to permit shaping, sanding, and other operations. Lathes are used to create a wide variety of things, from pens to bowls and more.

Safety Rules

1. Select stock carefully and inspect it closely before undertaking a project. Avoid using wood with knots or splits.
2. Rough out your workpiece with a band saw before mounting it on the lathe.
3. When using the lathe, you must wear a full face shield *in addition to* your safety glasses with side shields.
4. Snug the tailstock center against the work and lock it. Lubricate the tailstock center if it is not a ball-bearing center.
5. Position the tool rest a little below center of the workpiece and no further than 1/8" from it. Stop the lathe periodically as you work to adjust the rest as the workpiece diameter decreases.
6. With the workpiece held in the lathe, rotate it by hand to be sure that it clears the tool rest.
7. Never adjust the position of the tool rest while the lathe is running.
8. Before turning on the power to the lathe, make sure the lathe is set to the lowest possible speed and that the stock is secure. Stand to the side of the machine on the initial start-up in case the workpiece flies off the lathe as it gets up to speed.
9. Keep tools off the lathe bed. Keep the woodturning tools on your side of the lathe so you don't have to reach over the workpiece for them.
10. Keep the woodturning tools sharp. A dull chisel requires excessive feed pressure.
11. Hold the turning chisel firmly and brace it securely against the tool rest.
12. Make contact with the work cautiously, and then slowly make the cut more aggressive.

13. Don't use your fingers to check the work for roundness while the lathe is running, especially during roughing operations. Stop the lathe to check the progress, or rest the blade of the tool lightly against the work as it turns.
14. Clean up wood shavings and sawdust often. Sawdust can create a slipping hazard.
15. Remove the tool rest before sanding or polishing on the lathe.
16. When sanding, remember that the spinning stock will cause the sandpaper to heat up from friction. So sand on a low speed; sand on the back side of the stock.



You have the 3-inch rule in mind, right?
Keep your hands away from the blade or bit.

Scroll Saw

A scroll saw is useful for cutting intricate curves. Scroll saws use thin, narrow saw blades similar to those used by coping saws and operate through a quick reciprocating up and down motion.

Safety Rules

1. Make sure your scroll saw is firmly secured to the stand, tabletop, workbench, or cabinet.
2. Insert the blade with the teeth pointing forward and down toward the table.
3. Maintain the proper blade tension.
4. Clear the table of everything but your workpiece and make sure all adjustment handles are locked before starting the machine.
5. Never reach under the table while the machine is running.
6. Support a large workpiece to avoid pinching and perhaps breaking the blade.
7. Adjust the saw's hold-down foot so that it presses lightly on the workpiece. Reset the hold-down for each new operation.
8. Hold the work firmly against the table.
9. The KCWG shop has variable-speed scroll saws; use the proper speed for the job and type of stock you are cutting.
10. Make relief cuts before cutting long or sharp curves.
11. Cut only workpieces that have flat bottoms that can rest on the table.
12. Do not cut a workpiece that is too small to be held and supported safely.
13. If your blade gets stuck, turn the machine off before backing out of the cut.
14. Use a "V" block to cut cylindrical stock.

Bench Grinder

The bench grinder uses a motor to drive one or more abrasive wheels. Depending on the grade of abrasive, it may be used for sharpening cutting tools.

Safety Rules

1. When using the grinder, you must wear a full face shield *in addition to* your safety glasses with side shields.
2. Don't operate a grinder unless it is securely mounted to the workbench.
3. "Ring test" grinding wheels before mounting:
   a. Suspend the wheel by putting a pin or your finger through the arbor hole in the wheel. Heavier wheels may be allowed to rest in a vertical position on a clean, hard floor.
   b. Tap the flat side of the wheel with a light non-metallic implement, such as the handle of a screwdriver, at a point 45 degrees from the top center on each side of the wheel and 1"-2" from the edge of the wheel. Large, thick wheels may be struck on the periphery rather than the side of the wheel.
   c. Rotate the wheel 45 degrees and repeat the test until the entire wheel has been checked. If it produces a clear ringing tone it is in good condition. If it sounds dull, replace it.
4. Inspect the wheels for hairline cracks before using. *Do not use a cracked wheel.*
5. Make sure the wheel housing guards are in place.
6. With the grinder stopped and unplugged, position the tool rests 1/8" from the wheels and slightly below center; position the spark guards (at the top of the wheel housing guards) 1/16" away from the wheels. Readjust the tool rest and guards as the wheel wears down.
7. Stand to one side of the wheels when turning on power. Allow the grinding wheel to run at full operating speed for one minute before grinding. *Do not use a vibrating wheel.*
8. Dress and true the wheel as needed to eliminate vibration or if it is out of round, clogged, or worn smooth. Dress the wheel on the face only. Dressing the side of the wheel could cause it to become too thin for safe use.
9. Do not grind on the side of the wheel.

10. Bring the tool or object you want to grind into contact with the grinding wheel slowly and smoothly.
11. Move the object being ground back and forth across the face of the wheel, as this prevents "ruts" or grooves from forming in the wheel, which can lead to disintegration of the wheel.
12. Do not attempt to grind or sharpen anything that cannot be adequately supported by the tool rest. Use clamping pliers when grinding parts that cannot be held easily by hand.
13. Do not touch the ground portion of the workpiece until it has had time to cool.
14. When you turn off the grinder, don't try to slow it down or stop it. Let it stop on its own.

Leave it in the car!
Give the work your *undivided* attention.

(Your fingers will thank you.)

Hand Tools

Compared to a lathe spinning at 4,000 RPM, hand tools may appear innocuous. And by and large, they are safer than power tools. Nevertheless, they can hurt, as anyone who has hit a thumb with a hammer or gashed a hand with a knife can attest.

Safety rules

1. Use the right tool for the job and use it as it was designed to be used. Improvisation can lead to injury.
2. Make sure any edge tools you use – knives, chisels, carving tools, planes, etc. – are *sharp.* Dull edges require excessive force, and that can lead to accidents.
3. Carry pointed tools by your side with the points and heavy ends down.
4. Whenever possible, secure your workpiece with a vice or clamp.
5. Keep both hands behind the blade of a chisel or knife and out of the path of a saw. Don't cut toward any part of your body.
6. When you need to pull a knife to make a cut, make sure that you pull it to the side of your body.

CNC Router

The CNC router is a computer-controlled cutting machine used for various hard materials such as wood, to create a decorative design on or the functional shape of a workpiece. CNC stands for *computer numerical control*.

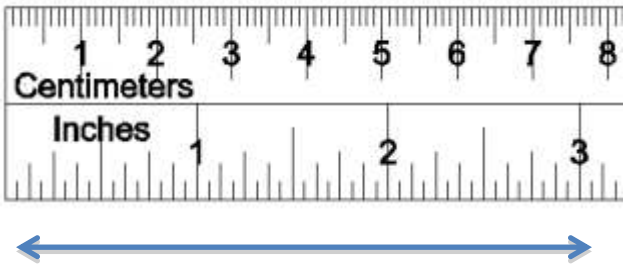
1. In addition to safety glasses with side shields, hearing protection is required in the CNC Shop area.
2. Ensure that your workpiece is secured to the CNC table.
3. Ensure that all clamps used to secure the workpiece to the CNC table are out of the cutting area or the tool path.
4. Do not leave the CNC machine unattended while it is routing the workpiece.
5. Use only sharp bits free of rust and pitch to avoid excess friction. A dull or dirty bit could result in the workpiece coming apart and causing damage to the equipment or the operator.
6. Always use the wrenches provided with the CNC machine during set-up and when making adjustments during the routing of the workpiece.
7. After changing the bits or making any adjustments, ensure that the collet nut is tightened securely.

Handheld power tools

Next to the large, powerful stationary tools in the shop, handheld power tools may seem relatively benign. Don't be fooled; they're powerful enough to do you great harm, and they're swinging around at the end of your arm, not fastened to the floor. The circular saw may be the most dangerous tool in the shop.

1. **Know your power tool** – Read the owner's manual carefully. Learn its applications and limitations, as well as potential hazards specific to that tool.
2. **Ground all tools** – If the tool is equipped with a three-prong plug, it should be plugged into a three-hole receptacle. **Never** remove the third prong.
3. **Don't force your tool.** It will do the job better and safer if used at the rate for which it was designed.
4. **Use the right tool.** Don't force a small tool or attachment to do the job of a heavy duty tool.
5. **Don't abuse the electrical cord.** Never carry a tool by the cord or yank it to disconnect from the receptacle. Also, keep the cord away from heat, oil and sharp edges.
6. **Secure your work.** Use clamps or a vise to hold your work piece. It's safer than holding the piece in your hand, and it frees both of your hands to operate the tool.
7. **Avoid accidental starting.** Don't carry plugged-in tools with your finger on the switch, and be sure the switch is off when plugging in the tool.
8. **Don't lock the switch "ON"** when using a tool by hand, so that you can instantly release the trigger switch if it "binds" in the work piece. The locking button is for use only when the tool is mounted in a table or stand or is otherwise held stationary.
9. **Additional safety rules for circular saws:**
    - **Let the blade guard do it's job. Do not wedge or tie the lower guard open**. Do not use if the lower blade guard does not close briskly over the saw blade.
    - **Keep your hands away from the blade.** Do not place your free hand on your workpiece behind the saw when making a cut. Do not reach underneath your workpiece or attempt to remove cut material while the blade is rotating. Remember: The blade coasts after the saw is turned off.
    - **Always be aware of the cord location,** and keep it well away from the rotating blade.
    - **Support large panels.** To minimize the risk of blade pinching and kickback, place multiple supports under the panel you are cutting, with two supports equidistant from the blade, about 3" away. Arrange your cut so that the saw is supported by the larger portion of the panel when cutting off a smaller portion.

- **Always keep the correct blade depth setting.** The blade should not extend more than ¼" below the material to be cut. More depth will increase the chance of kickback and cause the cut to be rough.
- **Make sure the depth and bevel adjustments are tight** before making a cut.



One last reminder:
Keep your hands at least 3 inches away from the blade or bit.