

Boys Republic Woodshop Safety

There are several advantages to working with power tools rather than hand tools. You can do most woodworking operations faster with power tools. Power tools eliminate much of the physical effort in woodworking. Power tools are also easier than hand tools to use accurately. However, power tools can be much more dangerous to operate.

Importance of Safety

Safety is always important. It is especially important when you work with power tools. You should not use any power tools until you understand power tool safety. Machines turn sharp saw blades and cutters at high speeds. Accidents happen so quickly the operator seldom knows what happened. A board caught in a machine can be thrown from the machine with tremendous force. This is dangerous for everyone in the work area. This is why learning to work safely is important for everyone.

Safety Attitude

Most power tool accidents can be avoided. About eight out of ten accidents are caused by workers without the right safety attitude. These workers do not take safety seriously. Instead of working the safe way, they work the fast way. Instead of being safe, they put everyone in danger.

Machine safety is up to you. Develop a safe way is the best way? **Attitude.** Learn all you can about the safe operation of each machine. Listen and watch closely as your instructor demonstrates how to use a machine. Know all the safety rules and the steps for operating each tool. Also, make sure you do the steps in the right order. Doing them out of order is often as dangerous as doing them incorrectly.

Machine Know-How

To operate a machine safely, you must know more than just how to turn it on and off. You must know how to do the basic operations. You also need to know how to make simple adjustments. Above all, you must know the machine's limits. Always keep the machine at a safe, steady speed. Never use the machine for a job the machine was not designed to do.

- You cannot expect to be an expert on all machines right away. **DO NOT EXPERIMENT.** If you have a question, ask your instructor. The more you know about a machine, the safer you will be. A machine only does what its operator directs it to do. It can only be as safe as its operator.
- As you learn to operate a machine, you will gain confidence. Do not become too confident. Overconfidence leads to carelessness, and carelessness causes accidents. This does not mean you should be afraid of machines, however a safe attitude is one of respect- respect for what machines can do.

- Dress appropriately. Remove all ties, scarves, rings, and watches. Roll up long sleeves and tie back long hair. Loose clothing, hair, and jewelry can easily catch in revolving machine parts.
- Always wear approved eye protection in the shop. Some machines require extra eye protection over your safety glasses.
- Never operate a power tool until your instructor has shown you how. Never use a power tool without your instructor's permission.
- Never operate a power tool when alone in the shop.
- Make sure all safety guards are in place. Never remove a safety guard without your instructor's permission. Have your instructor check each setup before you begin working.
- Defects in the wood can be dangerous. Check the stock carefully for knots, splits, and other defects.
- Keep the machine clean. Remove all tools, lumber, and unnecessary materials. Objects left on the machine can vibrate into revolving cutters. They can then be thrown from the machine with great force. Never clean a machine while it is running.
- Always work with a plan of procedure. List every step and think through each one ahead of time.
- Before you plug in a machine, make sure the switch is in the *off* position. You do not want the machine to start unexpectedly.
- If you use an extension cord, use the correct wire size. This is determined by the length of cord and size of motor. Using a wire size that is too small will cause the tool to overheat.
- Keep all power cords away from blades and cutters while you work.
- Always keep your hands a safe distance from cutters and blades.
- Always keep your eyes on the cutting action. Concentrate on what you are doing at all times.
- Be alert for any odors that might indicate overheating of the machine or stock.
- If anything unusual happens, turn off the machine immediately. If the machine does not sound right, turn it off immediately. As soon as it stops completely, check with your instructor.
- Never make an adjustment unless the power is off. The tool must come to a complete stop. This does not include speed adjustments on variable speed tools. These adjustments must be made with the machine running.
- Never leave a machine with the power on. The machine should be completely stopped before you leave it.
- Keep the work area clean. Remove all debris when you are finished.
- Never talk to or disturb anyone working with power equipment. If you must talk to an operator, wait until the operator notices you.
- Make sure the power tool is grounded. One with a double-insulated case need not be grounded. If you are unsure about this, check with your instructor.
- Never work in or around water with power tools. Water increases the chances of severe electrical shock.
- Stand in a comfortable, balanced position when working with power tools. Both feet should be firmly on the floor.

- Do not try to handle large, bulky pieces by yourself. Get someone to help you.
- Do not use the machine until it is operating at full speed.

Band Saw

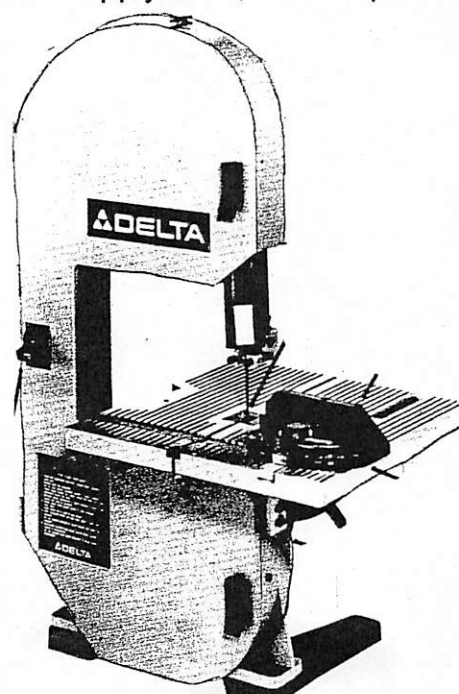
Band saws are used for many different cutting operations. They are used primarily to make outside, irregular cuts. They are also ideal for resawing thick stock. Band saws are not generally used to make precise straight cuts. This is because greater accuracy is possible with table saws. Band saws are also used to cut materials other than wood. Abrasive belts are used on a band saw to sand curved cuts.

Band Saw Safety

- Know and follow the general safety rules for operating power tools.
- Adjust the upper guide so it is from 1/8 to 1/4 inch (3 to 6 mm) above the stock.
- Keep your hands out of line with the blade. Keep your fingers at least 2 inches (50 mm) from the blade at all times. Planning your cuts will help you avoid unsafe positioning.
- Never stand on the right side of a band saw. If the blade breaks, this is a dangerous area.
- Do not start cutting until the machine has reached full running speed.
- Avoid backing out of long cuts and curves. Plan your cuts and make relief cuts. When you must back out of a long cut, turn off the machine. Wait until the blade stops to back out.
- If the machine is making unusual noise, turn it off. If it is not running properly, turn it off. Wait until it completely stops. Then immediately ask your instructor for help.
- If the blade breaks, turn off the machine. Then ask your instructor for help.
- If you cut round or cylindrical stock, clamp the stock securely. This will keep it from rotating while you cut.
- When making compound cuts, be sure the stock is properly supported on the table.
- If you are right-handed, stand slightly to the left of the table. Use your right hand to feed the stock. Use your left hand to guide it. Apply even, forward pressure.

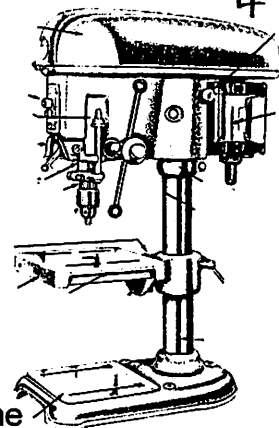
Width of Saw Blade and its
Minimum Cutting Radius for a Circle

| | |
|--------|--------|
| 1/8"- | 1/2" |
| 3/16"- | 3/4" |
| 1/4"- | 1" |
| 3/8"- | 1-1/4" |
| 1/2"- | 1-1/2" |
| 5/8"- | 1-3/4" |



Drill Press

The drill press is used for drilling or boring a hole. The drill bit or tool rotates in the drill chuck.



Setting Up the Drill Press

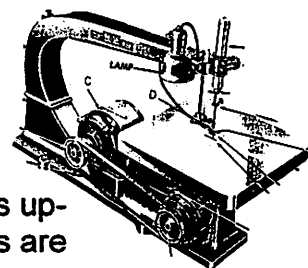
- Each job on the drill press requires several preparations. You must choose the correct drill or bit and install it. You must adjust the speed according to the hole size. You then need to clamp the table at the correct height and position. Finally, you must set the depth stop for the desired cutting depth.
- Many different drills and bits are used in the drill press. You need to select the right one for the material and type of job.
- For woodworking, drill presses run at speeds from 450 to 4700 rpm's.
- Set the speed according to the hole size and hardness of the wood. For large holes (1/2 inch or more) and hard wood, use the lowest speeds. Use higher speeds for small holes.

Drill Press Safety

- Know and follow the general safety rules for operating power tools.
- Never leave the chuck wrench in the chuck. Remove the chuck wrench immediately after installing or removing a cutting tool.
- Clamp small pieces of stock. Also clamp the stock when you cut large holes. The cutter could pull the stock from your hand.
- If you are not sure you can hold the stock, clamp it.
- Keep your fingers away from the rotating cutters.
- Use only straight-shanked cutters in the drill press chuck. Never use an auger bit with a tapered tang.
- When using a sanding, routing, shaping, or mortising attachment, know and follow the safety rules for the corresponding machine.
- Use the correct speed for the job. Drilling large holes requires low speeds. Drilling in hard stock also requires low speeds.
- If a cutter catches in the wood, turn the machine off and step back. Wait until the machine stops completely before removing the stock.
- Never leave a machine until it has come to a complete stop.

Scroll Saw

Scroll saws are used to make curved and irregular cuts. Scroll saws are reciprocating saws. This means that the saw blades move up and down. This up-and-down sawing action is the same action used in hand sawing. Scroll saws are like large, power-operated coping saws. Saber saws are like power compass or keyhole saws.



Scroll Saw Safety

- Know and follow the general safety rules for operating power tools.
- Make all setups and adjustments with the power off.
- Use the correct blade for the stock (thickness) and curve (sharpness) being cut.

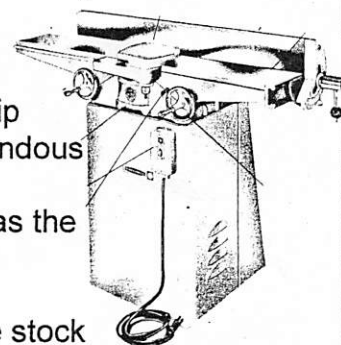
- Never try to turn a small radius with a wide blade. The radius should not be more than three times the blade width.
- Clamp the blade securely in both chucks with the teeth pointing down.
- Adjust the guides so they properly support the blade.
- Adjust the hold down so that it applies light pressure to the stock.
- Rotate the motor by hand to check that all adjustments have been made properly.
- Plan cuts to avoid backing out of curves.
- Do not force the work into the blade. This can cause the blade to bend the break.
- Keep your fingers out of line with the saw.

Jointer

Jointers are machines that do the work of a hand plane. Jointers are used mainly to make edges straight and square. They are also used to smooth surfaces. Rabbits, tongues, chamfers, bevels, and tapers are sometimes cut on jointers.

Jointer Safety

- Know and follow the general safety rules for operating power tools.
- Never joint a board less than 10 inches (250 mm) long. Short stock can tip down into the cutterhead. Then the stock could be thrown back with tremendous force.
- Always use a push stick when planing a face. This protects your fingers as the end crosses the cutterhead.
- Use the safety guard at all times.
- Never stand directly behind the jointer. This is a dangerous position if the stock kicks back.
- Keep your fingers away from the front of the stock. While jointing a face, keep your fingers at least 6 inches (150 mm) from the front end.
- Never apply pressure with your hands directly over the cutterhead. Always keep your hands at least 4 inches (100 mm) from the cutterhead.
- Always feed the stock with the grain. This reduces vibration and produces a smoother cut.
- Get you instructor's approval when making special setups.
- Do not leave the machine until the cutterhead has completely stopped.

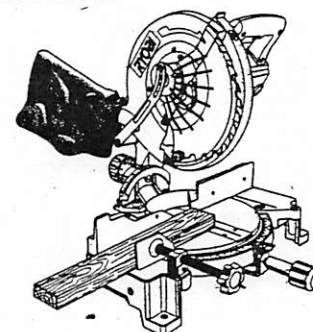


Sliding Miter Saw

The Sliding miter saw motor and blade moves back and forth on an arm. The stock stays in place while you push or pull the saw through it. This makes the sliding mitersaw perfect for cutting long boards to length. The sliding miter saw is also used to make accurate angle cuts. These boards are hard to handle on a table saw.

Sliding Miter Saw Safety

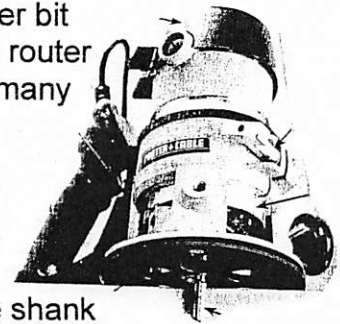
- Know and follow the general safety rules for operating power tools.
- Make all adjustments while the machine is turned off.



- Never reach across the path of the blade. When the machine is running, always keep your hands at least 6 inches (150 mm) from the blade.
- Keep the safety guard in position at all times.
- Wait until the blade is running full speed to start a cut.
- Never stand in line with the blade. If you push the blade with your right hand, stand to the left. If you push the blade with your left hand, stand to the right.
- Use one hand to push the saw through the stock. Use the other hand to hold the stock against the fence. Keep both hands away from the cutting line.
- Cut only one piece of wood at a time.
- Feed the blade slowly.

Router

Routers are widely used for shaping the surfaces and edges of stock, and for joinery. A router is basically a motor mounted in a base. The base adjust to the desired cutting depth. A chuck on the motor holds the router bit. The router bit turns at high speeds to make the cut. The work is held stationery and the router is moved across the stock. There is a wide variety of bits available to do many different jobs.



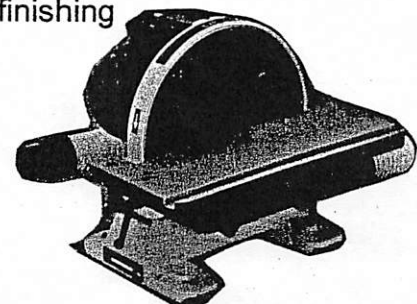
Router Safety

- Know and follow the general safety rules for operating power tools.
- Disconnect the power before changing router bits.
- Clamp router bits securely in the chuck. At least 1/2 inch (12 mm) of the shank should be inserted.
- Make sure the router switch is in the off position before connecting the power.
- Do not make any router cuts unless the stock is securely clamped. The router can throw loose stock with great force.
- Before you start cutting, make sure nothing is in the router's path.
- Hold the router tightly when starting the motor.
- Always feed the router against the rotation of the bit. If you feed with the rotation the bit can dig into the stock. This can cause the router to kick back or throw the stock.
- After finishing a cut, wait for the router to completely stop. Then lay the router down. The bit should point away from you.

Sanding Machines

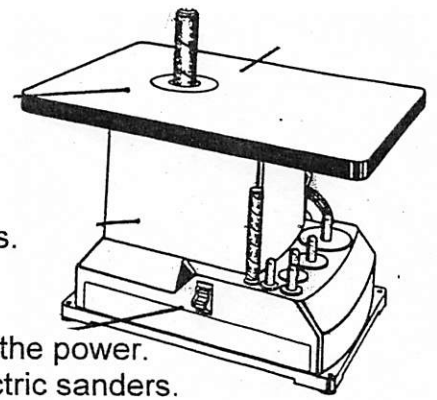
Sanding machines make sanding fast and easy. Used properly, they can save you much time. Used improperly, they can do more damage than good.

There are many types and styles of sanders. They can be divided into two groups: stationary and portable. Stationary sanders are large shop machines designed for heavy-duty work. Belt sanders, disc sanders, belt-stroke sanders, spindle sanders, thickness sanders, and sand-grinders are some examples. Portable sanders are small, hand-held machines. Portable belt and finishing sanders are the two most commonly used for woodworking.



Sanding Safety

- Know and follow the general safety rules for operating power tools.
- Do not operate a sander with a torn belt or loose disc.
- Disconnect the power before changing abrasives.
- On a portable sander, be sure the switch is off before connecting the power.
- Always clamp or hold the stock securely when using portable electric sanders.
- Keep your fingers away from the abrasive. The abrasive can quickly remove skin.
- Always let portable sanders reach full speed before setting them on the stock.
- Always lift portable sanders from the stock before turning them off.
- Wait until portable sanders come to a complete stop before setting them down.
- Use only light pressure, just enough to hold the work against the abrasive.



Stationary Disc Sander Safety

- Do not use the disc sander until it reaches full speed.
- Always work on the side of the disc that is turning down.
- Hold the stock firmly on the table.
- Apply light pressure against the rotating disc.
- Reduce the pressure if the disc starts to slow down.

Surfacer (Planer)

Surfacers are also called thickness planers. They are used to cut boards to a desired thickness. They are not used for any other purpose.

Surfacer Safety

- Know and follow the general safety rules for operating power tools.
- Remove all loose knots from the stock before surfacing.
- Do not surface stock shorter than the distance between the centers of the infeed and outfeed rolls. This is usually about 12 inches (300 mm), or more.
- Never stand directly behind a board being surfaced. The stock could kick back and cause an injury.
- Never look into the surfacer while the cutterhead is rotating.
- Make sure one face is flat before you surface a board. Place the flat face against the table.
- If a board does not feed through the surfacer, turn off the power. Wait until the cutterhead stops completely. Then lower the table and remove the board.
- Keep your hands away from the areas around the feed rolls. You could easily pinch your fingers in these areas.
- Feed the stock with the grain. Otherwise, the stock can chip and break. The pieces can then be thrown from the surfacer.

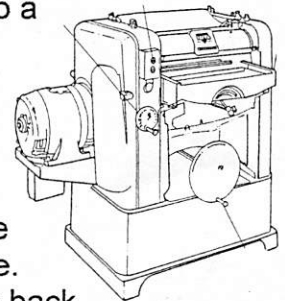


Table Saw

Table saws are also called circular saws. They are used for many basic operations. They are also used to cut several kinds of joints. Ripping, crosscutting, mitering, and tapering can all be done on table saws. Table saws are probably the most useful, versatile power tools used in woodworking.

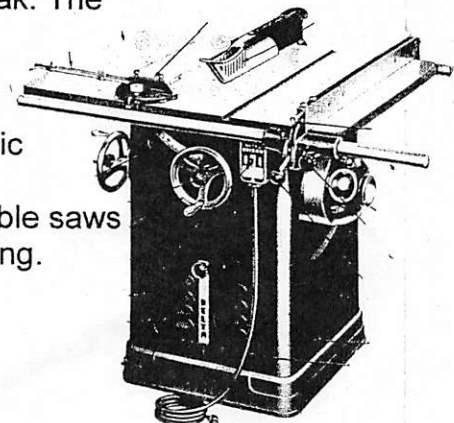


Table Saw Safety

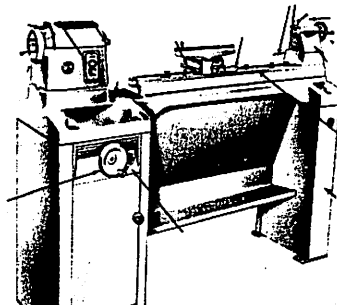
- Know and follow the general safety rules for operating power tools.
- You cannot use the guard for all operations. Have your instructor check any setup that does not include the guard. Special setups should also be checked by your instructor.
- Never cut freehand on the table saw. Use the rip fence for ripping and the miter gauge for crosscutting.
- Always maintain control of the stock between the fence and the table. Use your hand to push the stock away from the blade. Use a push stick for narrow stock. This will prevent a kickback.
- Never stand directly behind the blade.
- Never place your hands in line with the cut.
- Use a sharp blade. Dull blades are dangerous. They are more likely to cause kickbacks. Dull blades also require more pushing. This increases the chances of your hand slipping.
- The stock must lie flat on the table. Never cut warped or twisted stock on a table saw. Edges placed against the rip fence must be straight.
- Helpers should only support and hold stock. They should never pull or push the stock through the blade. The operator should always be in control.
- Never remove scrap cuttings from around the blade unless the machine has been turned off and has come to a complete stop.
- Never use the fence as guide if the distance between the blade and the fence will be greater than the length of stock against the fence.
- Clamp a clearance block to the fence when you use the fence as a stop for cutting short pieces to length.
- Table saw blades should project no more than 1/8 inch (3 mm) above the surface of the stock.
- Lower the blade below the table when you finish with the saw. Do not leave the machine until the blade comes to a complete stop.

Wood Lathe

The wood lathe is used for making cylindrical shapes such as spindles, legs, and bowls.

Wood Lathe Safety

- Never wear loose clothing or a tie.
- Wear goggles or a face shield.
- Check the wood to make sure it has no defects that would cause it to break when turning.
- Check all glue joints before mounting the stock. A weak joint may come apart when revolving at high speeds. Make sure glued-up stock is completely dry before turning.
- Fasten stock securely between centers. Make sure the tailstock is locked before turning on the power.



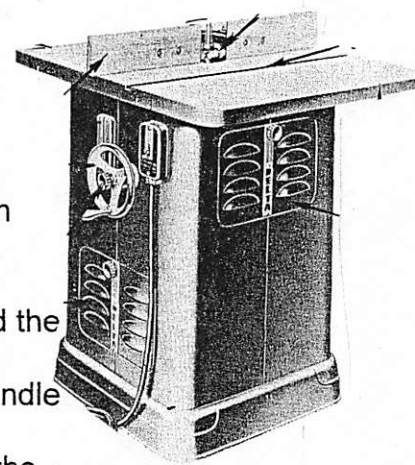
- Adjust the tool rest as close to the stock as possible. Then revolve the stock by hand to make sure it clears the rest.
- Always stop the lathe before making any adjustments such as changing the position of the tool rest.
- Run all stock at the slowest speed until it is rounded.
- For stock over 6" in diameter, maintain slower speed; from 3" to 6", medium speed; under 3", faster speeds.
- Hold turning tools firmly in both hands.
- Keep the tool rest as close to the work as possible. At intervals, stop the lathe and readjust.
- Make sure the stock is firmly fastened to the faceplate before turning.
- Remove the tool rest when sanding or polishing. If you don't, your fingers may get caught between the tool rest and the stock.

Shaper

The shaper is primarily used for making decorative edges and moldings, for producing joints, and for grooving, fluting, and reeding.

Shaper Safety

- Whenever possible, install the cutter so the bottom of the stock is shaped. In this way the stock will cover most of the cutter and act as a guard.
- Make sure the cutter is locked securely to the spindle.
- Always position the left fence so that it will support the work that has passed the cutters.
- Adjust the spindle for correct height and then lock in position. Rotate the spindle by hand to make sure it clears all guards, fences, etc.
- Check the direction of rotation by snapping the switch on and off; watch as the cutters come to rest. **ALWAYS FEED AGAINST THE CUTTING EDGE, THAT IS, FEED THE WORK IN TO THE CUTTERS IN THE DIRECTION OPPOSITE TO CUTTER ROTATION.** Some shapers have a reversing switch so that the spindle can be rotated either clockwise or counter clockwise.
- Examine the stock carefully before cutting to make sure it is free of defects. Never cut through a loose knot or stock that is cracked or split.
- Hold the stock down and against the fence with the hands on top of the material, yet out of range of the cutters.
- Use all guards, jigs, and clamping devices whenever possible.
- Always use a depth collar when shaping irregular work. Put a guide pin in the table to start the cutting.
- Do not set spring hold-down clips too tightly against the work. Use just enough tension to hold the work against the fence.
- Never shape a piece shorter than 10".



IMPORTANT SAFETY NOTICE

Work procedures and shop practices described here are effective methods of performing given operations. Use special tools and equipment as recommended. Carefully follow all safety warnings and cautions. Not that these warnings are not exhaustive. Proceed with care and under proper supervision to minimize the risk of personal injury or injury to others.