

# WOOD SHOP SAFETY

Rev. 2011

## INTRODUCTION

Hand tools and power driven machine tools have been developed to save time and to do more accurate work. A hand tool or power tool is built to perform a specific operation. Tools will do the same operation thousands of times without a mistake (if they are properly used, cared for and understood). In nearly all cases, the person using the tool makes the first mistake. Whether the tools are helpful or harmful depends in you.

A study made by the National Safety Council on school accidents show that more accidents happen Wednesday around 10:00a.m., than any other time and day of the week, except days just before or following vacations. Of course this does not mean you may relax your safety habits during other days.

In addition, the most dangerous shop is the wood shop. In wood shop, the tools that are involved in most accidents are listed below (the most dangerous first in each area):

<u>HAND TOOLS</u>	<u>POWER DRIVEN TOOLS</u>	<u>GENERAL CAUSES OF ACCIDENTS</u>
1 Chisel	1 Shaper	1 Ignorance
2 Saws	2 Table Saw	2 Carelessness
3 Knives	3 Jointer	3 Lack of judgment
4 Planes	4 Radial Arm Saw	4 Rushing a job
5 Hammers	5 Wood Lathe	5 Making too heavy a cut
	6 Power Miter Box	6 Overconfidence
	7 Grinder	7 Talking while working
	8 Sander (Disc)	8 Inadequately guarded machinery
	9 Band Saw	9 Using a dull tool
	10 Jig Saw	10 Using an improperly set or adjusted tool
	11 Drill Press	11 Fatigue
	12 Planer	12 Using unlabeled material
		13 Absent-mindedness
		14 Working in a disorderly shop
		15 Improper position of feet and body while working on a machine
		16 Improper Clothing
		17 Using unsafe material
		18 Eye strain

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### SPECIFIC CAUSES OF ACCIDENTS

1. Startling a person while he or she is working at a machine.
2. Crowding or hurrying a person at a machine.
3. Failing to stop machinery for adjustments.
4. A guard not being replaced after it has been removed.
5. Fingers dropping into moving parts of cutters.
6. Failing to stop machinery for measurements.
7. Students not starting and stopping their own machines.
8. Operating machinery without receiving instructions on its use.
9. Machines being operated while instructor is out of the room.

### GENERAL SAFETY RULES IN WOODWORKING

1. You are not compelled to use any power-driven machinery. You may be excused from using any machine by consulting your instructor.
2. Safety glasses or a face shield must be worn while using any power driven tool.
3. All work to be done in the shop must have the instructor's approval.
4. All special set-ups must be checked by the instructor before the power is turned on.
5. All accidents and injuries, no matter how slight, must be reported to the instructor immediately.
6. If you feel ill, report to your instructor.
7. Only the operator and the teacher (if helping student) are permitted within the working area around any machine. This is for the protection of the operator, the instructor, as well as others nearby the machine.
8. With the exception of very special, instructor approved set-ups, only the operator may start and stop a machine and after the machine is turned off, he or she should stand by until the machine has stopped running.
9. If you are engaged in any activity where eye hazards from flying particles or corrosive substances exist, use suitable eye protection.

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10. Wear safe clothing when working in a shop. Fasten or remove loose clothing before you operate any machine. Roll long sleeves above the elbows. Apron fastenings should be such that they will break if the apron becomes entangled in a machine.
11. Long, loose hair can easily be caught in revolving machinery and ripped out, causing serious scalp lacerations. Have your hair under control, tied back or tightly covered.
12. Wearing gloves is forbidden when you are working within the wood shop.
13. Remove jewelry (bracelets, rings, chains, beads) and other accessories that, in the judgment of the instructor, are hazardous.
14. In any level of the woodworking program, you are under no obligation to use power tools or machinery. Hand tool operations can be substituted for any and/or all machine operations.
15. Keep machine guards in proper position at all times.
16. Report all breakage or damage to tools, instruments or machinery to the instructor immediately.
17. Overloading or forcing any hand-operated or power-driven machine in any manner is dangerous. Use only the material or stock furnished or approved by your instructor.
18. Keep rags away from machines that are in operation.
19. Rags that have absorbed any amount of oil, linseed oil, gasoline, alcohol, shellac, paint, varnish or lacquer must be put in an approved covered metal container as a precaution against spontaneous combustion.
20. Nothing should be hung on fire extinguishers and the area around them should be kept clear so that they may be reached without delay if fire breaks out.
21. If a machine makes an unusual sound or is found to be out of adjustment, or in need of repair, it should be shut off and reported to your instructor immediately. Only machines in good repair may be operated.
22. You must avoid distracting the attention of students using machines; likewise, you must not allow your attention to be diverted while you are using a machine. Such distractions can cause the operator to make serious mistakes.
23. Machines must come to a full stop and the power turned off before oiling, cleaning or adjusting.

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24. If you see oil or grease on the floor, wipe it up immediately; you may prevent someone from slipping.
25. The floor, aisles and passageways should be kept clear of large pieces of wood, products, tools and materials. Objects on the floor may cause someone to slip or fall into an operating machine.
26. No used materials of any kind may be used in any milling process unless they are approved by your instructor.
27. Always sweep scraps from your work bench or table with a brush or piece of wood rather than with your hands. There may be sharp or jagged particles among the scraps.
28. Always carry long objects, such as metal rods and long boards, with the front end high enough to avoid striking someone.
29. Report to your instructor any odor of gas in the room. Gas fumes may make you ill or cause an explosion.
30. All portable electric tools and appliances must be disconnected when not in use, when making adjustments, inserting cutters or bits, etc.
31. When disconnecting an electric tool from a circuit, remove the attachment plug from the receptacle by pulling on the plug instead of the wire.
32. Be sure your hands are dry before touching electrical switches, plugs or receptacles. If your hands are wet, you may receive a severe shock and serious burns.
33. If it is necessary to use an extension cord, see that it lies flat on the floor.
34. When using air under pressure be sure that the air stream is not directed toward you or any other person. Compressed air should never be used for cleaning the shop and the equipment therein.
35. Use the proper tool for the job.
36. It is good safety practice to be courteous and considerate of others.
37. If you have prescription eye glasses, wear them; eye strain is a frequent cause of accidents.
38. The instructor should be notified if a violation of safety instructions is observed. You may thus save yourself or someone from a serious injury.
39. If you are in doubt about the use of any tool or machine, or about any shop procedure, ask your instructor for help.

## WOOD SHOP SAFETY

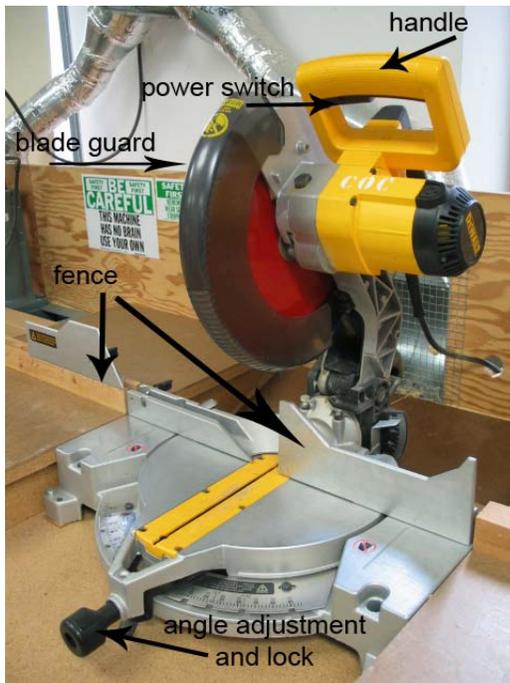
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40. Dull tools are dangerous to work with because you must apply extra force to make them cut; always use sharp tools (power or hand).
41. The term “margin of safety” refers to the minimum distance which the operator’s hands and fingers should be from the cutter, blade, bit, etc.
42. When entering another shop, report to the instructor of that shop immediately.
43. CO<sub>2</sub>, extinguishers should be used on gasoline, most chemical and electrical fires. Do not use water on these types of fires.
44. Sharp edges or points of tools should be directed down and away from the body.
45. The portable circular saw is NOT to be used at any time by students.
46. Students must be instructed in the correct use of any machine before any work can be done with or on that machine.
47. Do not lift anything in the shop that is too heavy for you. Seek help. We will either use more personnel or preferably employ mechanical help such as a lever, dolly, jack, forklift, wheels or roller. Numerous people are seriously injured by lifting something that is too heavy. When lifting is done, keep your back straight and lift with your legs. Do not strain yourself; ruptures occur easily.

# COMPOUND MITER SAW

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## COMPOUND MITER SAW

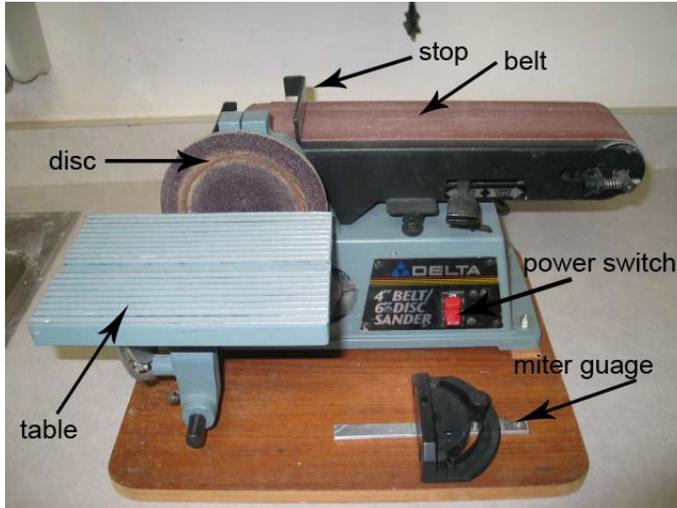
### GENERAL INFORMATION

The power miter box is one of the most accurate, specialty machines found within the woodworking facility. It has taken the place of most of the operations previously done by hand miter boxes or picture frame miter boxes. It is extremely useful for making 90 and 45 cuts on drawers, doors, moldings and face frames.

1. Keep protective guards in place at all times.
2. Remove all wrenches, tools and other foreign matter from the machine before operating the saw.
3. Do not force the tool into the work. Make sure the blade is properly set and sharpened at all times. If in doubt, check with your instructor.
4. Wear safety goggles at all times.
5. Secure work with clamps as necessary.
6. Do not leave the area of the machine until the blade has come to a full and complete stop.
7. Maintain a 6" margin of safety at all times.
8. When adjusting the power miter box or changing the blade, make sure the power cord is unplugged.
9. Remove loose clothing, coats, jewelry, ties, etc., before operating the power miter box.
10. Remove loose pieces and chips only with a scrap of a wood.

## BELT SANDER SAFETY

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### COMBINATION BELT/ DISC SANDER

#### GENERAL INFORMATION

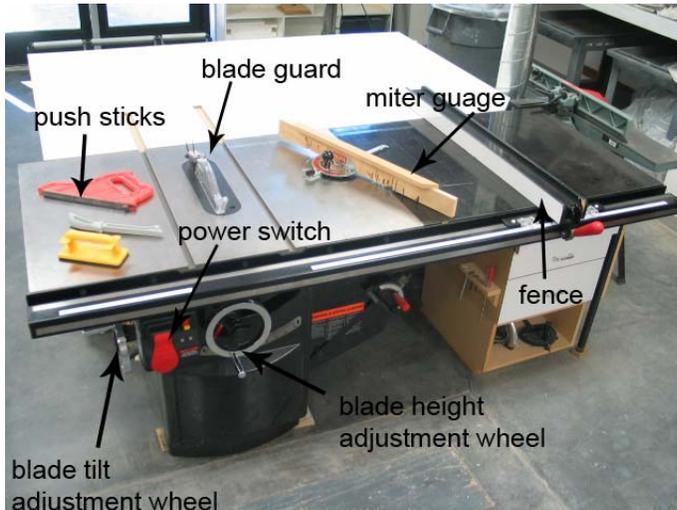
The belt sander features a continuous abrasive belt which works over pulleys at either end of a main sanding table. Adjustments are provided for tensioning and tracking the belt. The size of the sander is

commonly designed the same as the width of the sanding belt that it uses.

1. Excessive pressure against the belt should be avoided. The designed weight of the machine should be the only pressure necessary.
2. Be sure the belt is properly tensioned and tracking true.
3. All adjustments other than tracking are made when the sander is at a complete stop and unplugged.
4. Small stock (2" x 6" or less) should not be sanded on the belt sander.
5. Be sure the work is held firmly against the dog or stop on the table.
6. Use the belt sander in a consistent pattern, always moving away from the power cord.
7. Belts should always be installed with the arrow in the direction of the motor rotation.
8. The belt sander should be used at top (full) speed at all times.
9. When carrying the machine to and from the work area, always use both hands.
10. Wear goggles when belt sanding.
11. Work to be sanded with a portable belt sander should always be held securely with a clamp, vise, etc.
12. When first plugging in the machine, make sure the switch is off and either lay the machine on its side or securely hold the machine off the work surface.
13. Always use two hands when operating the machine.
14. Tracking adjustment is made only when the machine is running

# TABLE SAW SAFETY

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## TABLE SAW

### GENERAL INFORMATION

The table saw is one of the most dangerous machines made and should never be operated carelessly or by anyone who has not made a study of its capabilities and limitations. Specific instructions should be obtained from your

instructor before special work is done or special set-ups made.

Do not use a blade which is not properly sharpened or set. A dull blade will cause pieces to be thrown back or overheat the saw, causing the saw to warp or become slightly convex on one side.

1. On edge-resawing requires special permission from your instructor.
2. You must never lower pieces of stock directly down over the saw blade. This operation is never performed even when cutting holes in rails for drawers fronts or when cutting stop dados. Special permission and instructions must be obtained from your instructor for doing this type of work.
3. The saw guard must always be in place over the blade except when the instructor has authorized its removal for special set-ups.
4. When cutting, the saw blade should project  $\frac{1}{4}$ " or enough to clear the gullets, above the stock you are cutting.
5. All adjustments are to be made only while the saw is at a complete stop
6. After completing a cut, lift your free hand up from the table. Do not drag your hand across the table.
7. You must use a push stick when ripping (cutting with the grain) narrow pieces that are 6" or less in width.
8. Freehanded cutting, ripping or crosscutting without using the fence or miter-gauge is **ABSOLUTELY FORBIDDEN**. The rule applies also to dado head work.

## TABLE SAW SAFETY

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9. Normally when you are ripping wood, the scrap wood must be to the outside of the blade to reduce the possibility of kickback.
10. When you are using a circular saw, you must stand to the left or right of the saw blade, never directly behind it.
11. Your fingers must be kept clear of the track of the saw and your hands should never cross the saw line while the machine is in operation. Arch your fingers when you are feeding instead of laying your hands flat.
12. Reaching over the saw blade or passing wood over the saw blade while the saw is in motion is forbidden.
13. When you are crosscutting a number of pieces to the same length, a clearance block should be fastened to the rip fence at least 1" in front of the saw blade.
14. When helping to "tail-off," the helper must remember his or her only purpose is to support the stock. The operator pushes the stock through the machine.
15. If it is necessary to clear the table of scraps of lumber, make sure the blade is topped or completely lowered. Use a brush, push stick or scrap of stock to clear scrap. Do not use your hands.
16. All special set-ups and dado heads must be inspected by the instructor before the power is turned on.
17. A "V" block must be used when cutting cylindrical stock.
18. Backing the wood away from the blade while the saw is running will throw the wood toward you. If it is necessary to remove the wood, always stop the saw first.
19. Work should always be held firmly against the fence or miter gauge.
20. The fence is used for ripping only.
21. The miter gauge is used for crosscutting only.
22. The fence and miter gauge are never used both at the same time, except when multiple cuts of the same size are made and this is accompanied by means of a clearance block and must be approved by your instructor.
23. Large panels, pieces of plywood, etc., should be cut with the special crosscutting jig.
24. Never use the fence as a cut-off gauge when crosscutting lumber.
25. Maintain a minimum of a 6" margin of safety.
26. Stock should always have a jointed or surfaced face against the table, miter gauge or fence.

## TABLE SAW SAFETY

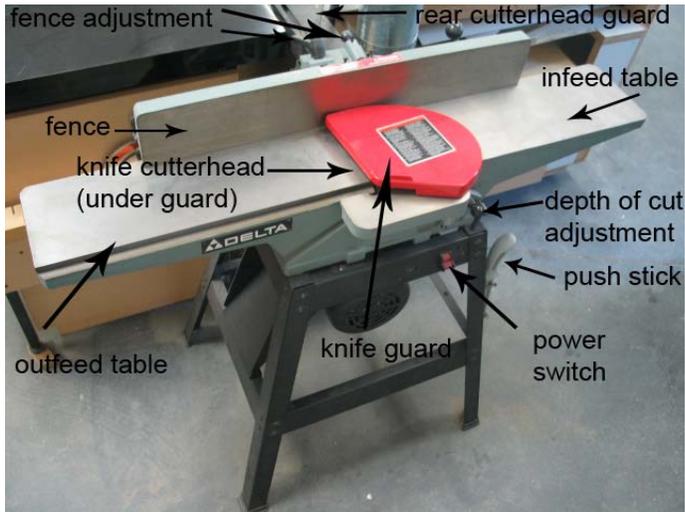
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27. Seek assistance and direction from your instructor before milling materials with defects such as splits, warps and knots.
28. Obtain permission from your instructor for all set-ups using the dado head.
29. Push stock completely through and clear of blade when ripping or a kickback will result.

## JOINTER SAFETY

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## JOINTER

### GENERAL INFORMATION

The jointer is, next to the table saw, the most necessary and useful machine in woodworking. Jointers take the place of the hand plane, are used in production work and are useful in straightening the faces of boards, joining edges of boards to

blued, rabbeting, squaring, beveling and tapering. The most common use of the jointer is jointing face and edge grain.

1. The guard must be kept over the knives at all times while the jointer is being operated.
2. The depth of the cut must be adjusted and locked before power is turned on. Depth of cut is adjusted on the infeed table only and should be limited to 1/16".
3. An 8" jointer must not be used for stock less than 12" long. A 6" jointer must not be used for stock less than 9" long. The 12" jointer should not be used for stock less than 14" long.
4. A push stick/block must be used when jointing narrow or flat pieces of stock. A push stick/block should not be used for any stock narrower than the height of the fence.
5. The Jointer must not be used to edge stock less than 1" wide.
6. Never joint the face of stock less than 1/4" thick on the jointer.
7. Set-up on the jointer for special operation such as rabbeting, beveling, chamfering, tapering, etc. must be checked by your instructor or shop technician.
8. The rear outfeed table must be at the same level as the knives.
9. The rear outfeed table is **never to be adjusted except by your instructor or shop technician.** (This is usually done after the blades have been resharpened.)
10. **DO NOT JOINT END GRAIN.** End grain joining is dangerous, especially on narrow pieces. The jointer tends to splinter the work.

## JOINTER SAFETY

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11. The Jointer should be set at 1/32" for most cuts.
12. Examine stock for knots and splits before cutting. Avoid them if possible.
13. Operations involving "stop cuts" or "drop cuts" require that the stock be held in place by a stop or clamp. These operations must be approved by your instructor or shop technician.
14. The exposed knives on the back side of the fence should be covered at all times with a guard.
15. Always turn the concave side of the stock toward the table and cut with the grain, not against.
16. Never attempt to run a piece of wood across the jointer until the machine is running at full speed.
17. **Maintain at least a 6" margin of safety**
18. The jointer is used only for new clean lumber.
19. For facing cuts, the depth of cut must be light and use a push stick/block.
20. Any adjustment to the outfeed table will severely affect the depth of cut and the safety of the operator as well. **DO NOT ADJUST THE OUTFEED TABLE.**
21. On stock which is severely warped, the best procedure is to band saw the stock in to smaller pieces. This eliminates much of the warpage. The joint the faces concave side down.
22. In facing stock, place both hands on stock, well clear of the knives, protected by the push block.
23. Make sure that all stock is clear of the knives and the guard has returned over the throat and knives before picking up the stock.
24. When beginning to face stock, your hands should be on the stock (which would be located on the infeed table) well in back of the cutterhead. A pushblock would be used at the rear end of the stock
25. The jointer is **not** used for planing stock to even thickness. Nor is it used to make stock parallel in width.

## PLANER

### GENERAL INFORMATION

The planer is a machine which planes boards smooth and to an even thickness. Single planers have the cutting head above the table. When surfacing boards, always place the smoothest surface on the table for the first cut.

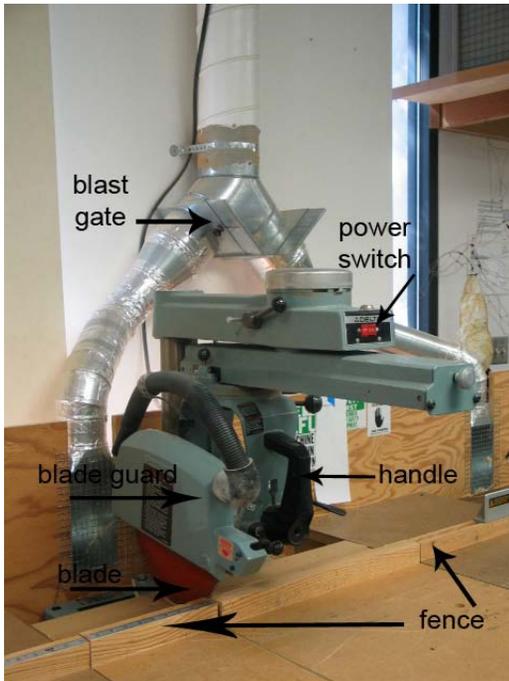
1. Do not remove more than 1/16" of wood at a time.
2. Planers should not be adjusted to plane stock less than 1/4" thick. Stock thinner than this should be run through the planer on thick boards. You must obtain your instructor's permission for this operation.
3. Do not allow your hands to come near the feed rollers when operating the planer.
4. Do not attempt to move or shift boards after the boards have been gripped by the feed rollers. This is unsafe because your fingers are likely to be pinched between the boards and the bed of the planer. Release your hold on the stock and it will feed automatically in the machine
5. After the stock has been started through the planer, **never** ; it will spring the planer head.
6. Make sure the stock has no large cracks, knots nails, dirt or paint on any of its surfaces.
7. The wood should be planed WITH the grain except in special operations.
8. Old, used or painted lumber may not be planed.
9. Never attempt to plane a piece of wood until the machine is running at full speed.
10. Plane pieces of wood in progressive thickness: THICKEST or LARGEST FIRST
11. Do not look into the planer while it is powered on because of the possibility of flying particles. When operating: stand upright and to one side of the machine.
12. For most hardwoods, if a second cut is necessary, the depth of cut hand wheel should be turned on one 1/2 turn or approximately 1/32".
13. There is no maximum LENGTH of stock which can be surfaced or planed.

## JOINTER SAFETY

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14. A planer will only produce two parallel faces when the surface which was table (down) side was originally flat and smooth. It will NOT produce two flat surfaces if the bottom face is warped.
15. If material does not feed into the planer do the following:
  - a. Gently push on the stock. Do not force the material.
  - b. Shift the stock at a slight angle
  - c. Lower the table to the point where the knives are no longer cutting and shut off the planer. **Do not turn the power off when the cutterhead is still in contact with the wood!**
  - d. Ask your instructor or Shop Technician for assistance.
16. Kickback are in frequent, but possible on a surface planer
17. Stand out of line of the stock as it enters the surface planer
18. On a planer it is IMPOSSIBLE to plane “across” the grain. It will shred the wood.
19. The speed of the planers feed roller must be adjusted only by your instructor.



### RADIAL ARM SAW

#### GENERAL INFORMATION

The radial arm saw (or cut-off saw) is one of the machine tools found less frequently in school shops. In proportion to its use it will be found to outrank the circular saw in hazards. The chief claim to glory of this saw over the table saw is in the handling of long boards. The saw moves and the stock remains in one position. This prevents the use of an outer support or an assistant who might throw the kerf out of line. The motor is 1 hp or greater, direct drive, which turns an 8" or

greater diameter blade approximately 3,600 r.p.m. The main use of the radial arm saw is crosscutting stock to length.

1. When making a cut on the saw, the stock must be held solidly against the fence.
2. When crosscutting, the saw should not be forced into the material any faster than it can cut with ease. Because of the direction of rotation of the saw blade, it has a tendency to 'climb' into the wood and stall. Keep control of the rate of cut.
3. Hands should be kept to one side of the direction of the saw cut in the event the saw plows forward because of overfeeding. The hands should be a minimum of 6" from the blade at all times (this is the margin of safety).
4. Only one piece at a time should be cut on the saw because of the difficulty in securely holding more pieces.
5. The saw is for cutting across the grain of the stock and should never be used for ripping.
6. The machine should not be used to cut short lengths of stock because your hands could be drawn into the saw.
7. Extreme care must be exercised in cutting off warped or winded stock as there is a tendency for the kerf to close in this type of defect. To avoid this difficulty, a partial

## RADIAL ARM SAW SAFETY (Cross Cut Saw)

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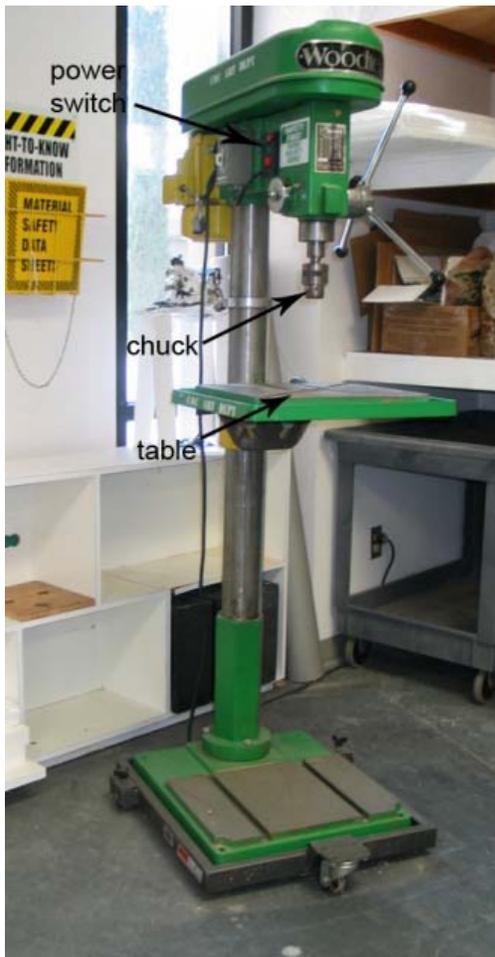
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cut should be made; the saw should be backed out of the cut and started again. This process should be repeated as long as a tendency to bind is observed.

8. The dado head may not be used on the cut-off saw.
9. Always give the blade clearance and let it reach full speed before pulling the blade into the wood being cut.
10. Never use this saw without a properly adjusted safety guard.
11. The blade should project only 1/8" into the table for most operations.
12. Because of the tendency of this saw to plow forward when crosscutting, the operator should keep a firm grip on the handle and control the rate at which the blade passes through the stock.
13. Before turning on the motor, be certain that all clamps and locking devices are tight and the depth of cut is correct.
14. Always return the saw to the rear of the table after completing a crosscut. Never remove stock from the table until the saw has been returned.
15. Any unusual noise or vibration should be brought to the immediate attention of your instructor. A noise or vibration could be caused by a blade with the wrong size arbor hole and/or a blade which is "out of round".
16. Make adjustments on the saw only when at a complete stop.
17. When crosscutting on the radial arm saw, the saw should be returned gently but firmly to its rear stop immediately after the stock has been cut but without moving the stock.
18. When crosscutting on the radial arm saw, hold stock firmly against the fence.

# DRILL PRESS SAFETY

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## DRILL PRESS

### GENERAL INFORMATION

In industry and the home shop, the drill press is one of the most versatile of all modern power-driven machines. This tool can be used to perform such varied operations as drilling, sanding, mortising, shaping and grinding with equal efficiency.

1. The procedure of selecting spindle speed varies from drill press to drill press. Check with your instructor prior to making speed adjustments.

2. Make sure that the belt guard is in place.
3. Be certain that the table and head of the drill press are secure.
4. Select proper drill bits (avoid dull bits). Make sure that the correct speed is used for the bit selected. If uncertain, check with your instructor.
5. Insert the drill bit in the chuck properly and tighten it securely before starting the drill press.
6. Remove the chuck key before the power is turned on. If the chuck key is not removed it will be thrown out from the chuck at tremendous speed when the power is turned on.

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7. Use the drill press vise or clamp(s) whenever necessary to firmly secure your work.
8. Use a base block under work or be sure drill is over the center hole when boring completely through wood.
9. Make sure that no one but the operator is inside the safety zone.
10. Keep hands away from the revolving spindle.
11. Operate the feed handle so that the drill cuts evenly into the work.
12. Ease up on feed pressure when the drill begins to break through.
13. Back the drill out as soon as the hole is drilled.
14. When boring to depth, use the lock nut on depth adjustment.
15. Stop the drill press before attempting to remove workpiece.
16. Keep the floor clean around the drill press.
17. If work comes loose and is seized by the drill press, turn the power off immediately without endangering yourself, if possible. If it is impossible to shut off the power, move away from the machine and alert others to move away.
18. The drill bit should be backed out occasionally to clear shavings and cool the bit.
19. Obtain approval from your instructor for any special set-ups on the drill press before beginning any operation.
20. Always wear eye protection when using the drill press.

# BAND SAW SAFETY

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## BAND SAW

### GENERAL INFORMATION

The band saw is almost indispensable in making furniture and work where many curves need to be cut. The saw is also used for resawing operations.

Twisting, binding or pulling the saw off the wheels while backing out of a cut are usually the causes of a broken saw blade. Placing a new blade on the band saw and tracking the saw to run in the proper place should only be done after you have been instructed on the correct procedure.

1. Cutting cylindrical or irregular stock on the band saw may be done only with a special jig, such as V-blocks.
2. Adjust the guard to about  $\frac{1}{4}$ " above thickness of the stock with the machine at a full stop.
3. Plan cuts carefully; layout and make "relief" cuts before cutting long curves and curves of small radii. Turning holes should be made when possible. Plan work so that the majority of all cuts will be made in the forward direction.
4. If the stock binds or pinches the blade, do not attempt to back out until the power has been shut off and the machine stops.
5. When removing scrap material from the band saw table, always be aware of the blade. Use a piece of scrap stock to remove scrap pieces. **Do not use your hands.**
6. Keep the floor area around the saw clear of scraps.
7. If the blade breaks, stand clear and shut off the power if possible; keep others clear until the machine stops completely; notify your instructor.
8. Make all cuts under power - never while the machine is coasting.
9. Leave the machine only after the power is turned off and the blade has stopped moving completely.
10. Never adjust the saw while it is running.

## BAND SAW SAFETY

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11. Students must not allow their fingers to come dangerously close to the saw when cutting stock. A 4" margin of safety should always be maintained.
12. If it is necessary to back the saw out of long cuts, turn the power off and allow the machine to come to a complete stop.
13. When applying the brake, do not exert too much pressure on the pedal. Use the brake for emergencies only.
14. When resawing, make sure the fence is securely clamped to the table.
15. All resawing set-ups should be approved by your instructor.
16. Use a push stick when resawing.
17. When resawing, always have the face of the stock on the table planed as well as the edge jointed against the fence.
18. Keep upper and lower doors closed and all guards in place.
19. Use a push stick or guide for cuts near the saw blade.
20. Allow the saw to reach full speed before starting to feed your work.
21. **If you hear a clicking noise, turn off the saw at once.** This indicates a crack in the blade as it passes through the guide.

## ROUTER

### GENERAL INFORMATION

The router is a simple, relatively safe portable electric tool which is extremely versatile. Its use is limited only by the imagination of the operator. The router consists mainly of two pieces; a motor with a chuck mounted on one end of the armature and a base which holds the motor upright. A bit or cutter is mounted in the chuck and protrudes below the surface of the base to do the cutting. The depth of the cut can be adjusted by sliding the motor up or down inside the base and locking it at the desired depth setting.

1. Use only accessories that are specially designed for operation in high speed routers.
2. ALWAYS disconnect the plug from the electrical outlet before changing bits or making adjustments. This also applies to special set-ups where the router is mounted in a “shaper” stand.
3. Be sure the router is properly grounded.
4. Make sure the bit is firmly secured in the chuck before starting work.
5. Make sure the router motor is secured to the router base before power is turned on.
6. When starting the router, make sure the bit is not in contact with the work.
7. Hold the router firmly when turning on the power to overcome the starting torque of the motor.
8. Keep hand and loose clothing away from revolving bits and cutters.
9. Operate the router in the proper direction, e.g., into or against cutter rotation.
10. Do not overload or “bog down” the speed of the motor.
11. Make several light cuts where large amounts of material are to be removed
12. Always make sure the bit is sharp; if unsure, check with your instructor; never use a dull bit.
13. The shank of the router bit should not be inserted to the bottom of the collet locking ring.
14. The work to be routed must be securely clamped or otherwise secured.
15. Before starting, check to be sure the bit is sharp, clean and unobstructed.

16. When using multi-piece router bits, double check to make sure that all nuts and bearings are tightened properly.

## SHAPER SAFETY

### GENERAL INFORMATION

The shaper is designed to produce high quality work in furniture, cabinet work and production work. The spindle speed is 2000 r.p.m. to 10,000 r.p.m. depending on the motor pulley you select. If you are not thoroughly concentrating on what you are doing the shaper can become the most dangerous machine in the shop.

1. The shaper is NOT to be turned on without direct permission from your instructor. Never run the shaper unless your instructor is present and/or has specifically authorized you to proceed
2. Whenever making any adjustments or when you turn off the shaper, both the main switch and the reversing switch must be in the 'off' position
3. The shaper has been designed with as many safety features as possible, however, always remember that a shaper is only as safe as its operator.
4. Before starting the shaper, be sure to check the following:
  - a. table for foreign matter
  - b. spindle for possible damage
  - c. spindle nut for possible damage and tightness; spindle nuts (or 'locking nuts') must be in good condition
  - d. cutters for sharpness
  - e. cutterhead for tightness under the nut
  - f. spindle rotation
  - g. special lock washer is in place between the nut and last cutter or collar (Delta Shaper); double nutted on SCM shaper
  - h. the spindle should turn freely
5. Make certain spindle flats and spindle nut are in good condition. Rounded corners prevent locking of head securely. Make sure the special spindle lock washer is in place between the spindle nut and the spacer or cutter.
6. As material is fed into knives, stand well to the right front (unless reverse rotation of spindle is being used) and then to the left front.
7. Safety goggles must be worn at all times.

## SHAPER SAFETY

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8. Never wear long or loose sleeves, neckties or jewelry when operating the shaper.
9. “Good housekeeping” is essential for safety. Keep your working area free and clean at all times.
10. The stock must be sound, free of knots, splits and warps and other defect.
11. A trial cut should be made on scrap stock.
12. No piece of stock shorter than 12” should be run through the shaper.
13. Never back stock out when using the shaper.
14. Never step on the shaper’s spindle lock when operating the machine.
15. Verify shaper speed selection with your instructor.
16. When doing spindle or rub collar spindle work, always use a starting pin.
17. When doing rub collar or spindle shaping, a hold device or jig must be used. This should be approved by your instructor.
18. All set-ups, jigs and guards must be double-checked, first by the student and then by your instructor.
19. Do not leave the shaper until it is completely stopped.
20. Ring guards, hold down devices, feather boards and other guards must be used whenever possible.
21. Work is always fed “into” or against the rotation or the cutters.
22. Rotation of the cutter should be with the direction of wood grain whenever possible:
23. Whenever possible, cutters should be placed under the stock and not on top.
24. Keep the area clear of all people when using the shaper.
25. Never run stock between the fence and the cutter(s).

## WOOD LATHE SAFETY

### GENERAL INFORMATION

1. Obtain permission from your instructor before using the lathe.
2. Roll loose sleeves above your elbows and remove or fasten any loose clothing.
3. Make sure the stock is free from checks, loose knots or other defects.
4. Make certain that all glued work is properly glued and dry.
5. Be sure stock is correctly mounted in the lathe.
6. Clamp tool rest holder firmly.
7. Be certain tool rest is adjusted between 1/8" below center and center for most operations.
8. Make adjustments of tool rest only when the lathe is at a complete stop.
9. Concave cuts inside a cylinder are made with a round nosed tool.
10. Wear face shield or goggles.
11. Check sharpness of turning tools and condition of handles; sharp tools permit greatest control.
12. Start the lathe at the lowest speed when beginning any operation, until the stock is balanced and does not vibrate. Unbalanced stock may break apart or fly out of the lathe at high speeds.
13. Stand to the left side when the power is first turned on.
14. Grasp the turning tool firmly with both hands while cutting stock.
15. Hold the turning tool firmly against the rest.
16. Hold the turning tool flat against the rest.
17. Keep your hands away from the stock while it is revolving.
18. Use the correct amount of tool pressure against the stock.

## WOOD LATHE SAFETY

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19. Stop the lathe when using inside or outside calipers.
20. Maintain tool rest as close as reasonably possible to the stock by making frequent adjustments with the machine at a full stop.
21. Remove the tool rest when sanding and finishing.
22. For polishing, use a small rag folded into a pad, to back the abrasive paper.
23. Concave cuts on a cylinder can be made with either a round nosed tool or a gouge.
24. Sanding or polishing is to be done only after the tool post has been completely moved out of the way.
25. When sanding or finishing on the lathe, completely remove the tool rest and tool holder.
26. Always revolve the lathe before turning on power to make certain that no wood strikes any part of the lathe.
27. Sanding and polishing must be done on the underneath side of objects only.
28. The gouge is primarily used only for roughing spindles to a round shape.
29. Before the duplicating jig is used, the set-up must be approved by your instructor.
30. Do not operate the speed selector with the power off.
31. Glued stock should cure at least 24 hours.
32. Tools must be kept sharp. Dull tools are dangerous because they are hard to control and require too much pressure by the operator.

### SPINDLE TURNING INSTRUCTIONS

1. See that the live and dead centers are properly embedded in the stock, otherwise the stock could fly off of the lathe.
2. Use oil or beeswax on the dead center.
3. Clamp tailstock firmly in place and tighten nut.
4. Check clearances by turning the spindle (rough stock) one revolution by hand.

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5. Start the lathe at the lowest speed when beginning operation.
6. Rough stock down to cylindrical form before using a higher speed. Maintain correct tool rest clearance by frequent adjustment.
7. Govern speed according to the diameter of the work.

### FACEPLATE TURNING INSTRUCTIONS

1. Cut stock circular on band saw or back saw.
2. Select proper size and number of screws according to the design of the work. A screw should be in each hold provided in the face plate.
3. Choose the proper size and style of faceplate. Make sure the faceplate is large enough.
4. Fasten stock or sub-base glued to stock to face plate with screws.
5. Be sure screws are tight.
6. Have your instructor check fastenings and adjustments.
7. Keep an accurate check on depth of cut in work to avoid striking screws.
8. Be certain that tool rest adjustment is correct and is correctly maintained.
9. Revolve work once by hand.
10. Use the lowest speed when beginning operation.
11. Use correct speed in relation to diameter of stock.
12. Make frequent inspections of screws to be sure they do not loosen.

## MAX OSCILLATING SPINDLE SANDER

### GENERAL INFORMATION

One of the most time-saving machines in the shop is the spindle sander. It is used to sand inside curves of stock. The spindle travels in a circular motion as well as oscillating up and down.

1. Always use the largest spindle that will do the job. Using a small spindle does a poor job on your stock (it leaves an “unfaired” curve), will often burn your wood, takes longer and wears out the spindles faster.
2. Always feed into the direction of the spindle rotation.
3. Wear eye protection.
4. Use the appropriate throat plate to leave the minimal opening around the spindle.
5. Hand tighten spindles. DO NOT USE WRENCHES TO TIGHTEN SPINDLES!
6. Every component of the spindle sander has its place on the tool rack. Do not leave spindles, throat plates, etc. lying around; return each component to it.
7. Notify your instructor when spindles are excessively worn.