



Plate (Biscuit) Joiner Safety Rules

The Plate (Biscuit) Joiner is a handy tool to use for certain operations that have traditionally been done using dowels or splines. In this document we'll refer to this machine as a Plate Joiner, which is what most manufacturers call it. Although it's called a Plate Joiner, the most common use of this machine is to install wooden plates called biscuits which are typically made from compressed beech wood. Though some woodworkers question its usefulness in producing solid and durable joints, it has performed satisfactorily for many users, and there's little reason to doubt its ability to help in aligning stock to be edge glued, though in that operation it's working to align the pieces and doesn't significantly strengthen the joint. While it's a great help in keeping stock aligned when gluing, placement of the biscuit joints must be planned ahead to avoid having biscuits in areas where later operations would expose them as biscuits don't provide a good gluing surface for other wood to wood joints.

Although the Plate Joiner isn't the most commonly used tool in our shop, it does have its place. It provides a great way to get the proper alignment between large planks that you might use while building a workbench, or could also be effective in strengthening the glue joints on a simple cutting board. If you were planning to build a more complex cutting board with dished center to hold a bowl for dipping sauce, or if you intended to drill a hole through the cutting board to hang it when it wasn't in use, you'd need to plan the placement of the biscuits to avoid those areas. In a similar way you'd need to plan where the biscuits were located to avoid areas where you'd be installing vise hardware or cutting dog holes in your bench top.

There are cordless models of Plate Joiners that give the user more freedom of movement and can be taken to places where electrical outlets aren't available.

There are Plate Joiners that offer a large number of configurations for setting up the blade, and some even have different sizes of blades available to handle a broad range of joinery tasks. Most of these machines are set up for dust collection and when attached to a good quality shop vacuum or a properly sized port from a dust collector, these tools can come very close to dust-free operation due to the nature of their design which is almost 100% enclosed when the biscuit slot is being cut.

Plate Joiners cut a crescent shaped arc. The depth of this arc into the woods surface determines the size of biscuit that can be used, and the depth is a setting on the Plate Joiner itself. Plate Joiners have a fence that can be adjusted (on most models) for depth of cut and angle of blade entry into the material being joined.

To avoid accidents, the following safety rules must be followed by everyone working with a Plate Joiner in the CWA / JPM shop. Failure to follow these safety rules can result in personal injury or injury to others and can result in a loss of shop privileges.

WARNING: When using electric tools, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and personal injury. Safety measures that you should take while using the Plate Joiner follow.

Start with a Risk Assessment to ensure a safe work area, and that the machine is ready to use:

1. Follow all procedures in **CHARLOTTE WOODWORKERS' ASSOCIATION Shop Rules and Guidelines, Electrical Safety Rules and Guidelines, and Shop Safety Best Practices.**

2. **Keep your work area clean and well lit.** Cluttered benches and dark areas invite accidents.
3. **Ensure that all guards are in place and attached properly.**
4. **Check the tool for proper operation of moving parts.**
5. **Check for binding of moving parts, and for misalignment of moving parts, breakage of parts, and any other condition that may affect the tool's operation. After carefully checking for visible damage and damage to the fence and adjustment setting, it may be necessary to try the Plate Joiner on a piece of scrap wood to verify that the joiner is working properly and that the blade returns when you remove that force you used to push it into the scrap stock. If damaged, have the tool serviced before using it. Many accidents are caused by poorly maintained tools. Develop a periodic maintenance schedule for your Plate Joiner and follow it.**
6. **Inspect tools for any damage prior to each use.**
7. **Check the handle and body casing of the tool for cracks or other damage.**
8. **If the tool has auxiliary or double handles, check them all to see that they are installed securely.**
9. **Inspect cords for defects:** check the power cord for cracking, fraying, wear, cuts or other faults in the cord insulation.
10. **Check for damaged switches. Do not use the tool if the switch does not turn it "ON" or "OFF" reliably.** Any tool that cannot be controlled with the switch is dangerous; have it repaired before using it.
11. **While checking that the switch turns the Plate Joiner "On" and "Off" reliably, check the Plate Joiner for excessive vibration. Do not use a tool that vibrates excessively or appears unsafe in any way.**
12. **Inspect the plug on Plate Joiners with cords for damage; including cracks and missing, loose, or faulty prongs.**
13. **A damaged or malfunctioning part must be properly repaired or replaced prior to use to avoid risk of personal injury.**
14. **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.** Power tools create sparks which may ignite the dust or fumes.
15. **Don't operate corded Plate Joiners in damp or wet locations. If operating the joiner in a damp location is unavoidable, use a ground fault circuit interrupter (GFCI) protected supply to power the tool.** Use of a GFCI protected supply reduces the risk of serious electric shock. **Even with GFCI protection, AVOID RUNNING A CORDED PLATE JOINER WHILE STANDING IN WATER!!!**
16. Keep the area around where you'll be working clear of people and debris that could impair your traction or footing to avoid potential slips and falls.
17. The blades on Plate Joiners can be dangerous. You can injure yourself or a bystander if you aren't careful where you're holding them.
18. **Plate Joiners have a number of moving parts including the rotating blade. They have the potential to grab and wrap hair, jewelry, fabric or similar material around the blade. If a Plate Joiner blade catches anything while it's running it will either sever it immediately or wrap it up until the blade stops turning. The sliding portion of the Plate Joiners mechanism can also damage items in certain situations.** Air vents often cover moving parts and should be avoided.
19. **Dress properly when using this tool. Don't wear loose clothing or jewelry.** If you're wearing jewelry such as necklaces, bracelets, or rings that could become caught or entangled in moving parts, remove them and store them safely. Roll up long sleeves, tuck in or remove ties, etc.
20. **Tie back, or otherwise secure, long hair.**
21. **Don't wear gloves.** If you're working in our shop environment it should never be too cold to work without gloves. If it is, ask a Shop Foreman to have someone turn on a heater.
22. For your safety you need to keep everything except the material you're cutting well clear of the blade while the machine is running.

23. **If the area you're working in has dust collection capability, ensure that it's connected and properly used.** Use of dust collection capability can reduce dust related hazards. Most Plate Joiners have built in connectors for attaching a vacuum hose. A shop vacuum makes an ideal dust collector for this machine and if the connection is available you should use it.
 24. **Keep the Plate Joiner handles dry, clean and free from oil and grease.**
 25. **Never carry the Plate Joiner with your finger on the power switch (trigger).** Carrying tools with your finger on the switch or plugging in tools that have the switch held "ON" invites accidents.
 26. **Remove any wrenches and adjusting keys before turning the tool "ON".** A wrench or an adjusting key that is left where it may come in contact with a moving part of the tool can cause personal injury to the operator or a bystander. There's also the possibility that it may damage the tool, the wrench, or adjusting key. It could also damage the material being worked on.
 27. **Use safety equipment. Always wear eye protection.** Non-skid safety shoes, hard hat, and hearing protection must be used when situations call for them.
 28. **Safety glasses (ANSI Z87.1) and (CAN/CSA Z94.3) with side shields or a face shield must be worn.** Everyday eyeglasses are only made of impact resistant glass, they aren't safety glasses. If you're not wearing actual safety glasses, wearing safety goggles over your regular glasses can provide the protection you need.
 29. **Hearing protection should always be worn.**
 30. **Use the appropriate dust mask or respirator in dusty work conditions.** Plate Joiners can create dust and if your operation does, protection from that dust is important.
 31. **Give the work your undivided attention.**
- Operational Safety Rules:**
- Plate Joiner Safety – You Play a Key Role**
1. **Approach your work in the Shop & while using the Plate Joiner with a safe attitude!**
 2. **Read the manual of operating/safety instructions (User Manual) that came with the Plate Joiner.** If you can't find it and if the Shop Foreman can't help you find it, someone can download a copy of the manual from the internet. This manual should tell you where the various switches and controls for the Plate Joiner are and how they're supposed to work.
 3. **If you don't know how to use the Plate Joiner properly for the work you plan to do, get instruction** on how to use it correctly for what you want to do **BEFORE** beginning.
 4. **Keep bystanders, children, and visitors away from the work area while operating a power tool.** Having anybody not involved in the plate joining operation nearby can create distractions that can cause you to lose control.
 5. **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use tools while tired or under the influence of drugs, alcohol, or medication.** A moment of inattention while operating a power tool may result in serious personal injury.
 6. **Use the Plate Joiner, its accessories and blades in accordance with the manufacturer's instructions for that item and in the manner intended for the particular type and model of tool that you're using, taking into account the working conditions and the work to be performed.** Use of any tool, especially a power tool, for operations different from those it's intended for could result in a hazardous situation.
 7. **Keep the Plate Joiner's air vents clear to maintain adequate airflow through the tool.** Proper ventilation helps keep the Plate Joiner from overheating while in use.
 8. **Use the proper tools that are the correct size when making adjustments or changing blades.** Using tools that don't fit properly can damage the parts that these tools engage when performing these tasks (adjusting screws can be damaged) wrenches can slip on a nut if they don't fit properly and may damage the nut or you could be injured when the your hand strikes the Plate Joiner unexpectedly.
 9. **Keep power cords away from heat, water and oil.** Though it should be obvious, when using the Plate Joiner, make sure you don't plunge the joiner into the power cord.
 10. **Always make sure that the switch is "OFF" before plugging the Plate Joiner in or**

installing its battery pack. You'll need to verify that nothing is depressing the power switch, including your finger(s), and that the switch isn't locked "ON". Accidental start-ups have the potential to cause injury.

11. **Carrying a Plate Joiner with your finger on the trigger switch invites accidents** if the tool is plugged in or is a cordless model. While it may seem that the blade is well guarded, a slip or fall could result in the blade being plunged into any number of places where it would be most unwelcome.
12. **Never unplug tools by pulling on the power cord.** When unplugging equipment pull on the plug, not on the cord.
13. **Hold Plate Joiners only by the handles or another insulated gripping surface when cutting slots into areas that may contain "live" wires.** On most handheld power tools, Plate Joiners included, contact with a "live" wire may make exposed metal parts of the tool "live", which can shock the operator. If possible, do not cut into existing walls or other blind areas where electrical wiring may exist. If this situation is unavoidable, disconnect all fuses or circuit breakers feeding that part of the worksite before proceeding.

Plunge Depth Adjustment

14. **Set the plunge depth on the Plate Joiner per the instructions that are provided in that machine's user manual.** The depth of cut (plunge depth), when set correctly is set to match the dimensions of the particular size biscuit you will be using. The numbers on the depth adjustment scale, typically (0, 10, 20), coincide with the three commonly available sizes of biscuits.
15. **Some Models of Plate Joiners support other plunge depths.** Porter-Cable, for instance has a setting for FF (for face frame biscuits) and DeWalt's DW682-XE has an M setting (Max) that was added for future use. For the most complete information on the way the Plate Joiner you're using works, consult the User Manual that accompanied the tool or that you should be able to access on the internet if the shop copy has been misplaced.

Using the Plate Joiner

16. **Never abuse the power cord on corded tools.**
17. **Never use the cord to carry the Plate Joiner.**
18. **Maintain tools with care. Keep the tools clean and in good repair. Keep Plate Joiner blades clean and sharp.** Properly maintained tools, with sharp blades, are less likely to bind and are easier to control. You also have a better chance of getting satisfactory cuts using tools in good condition.
19. **Always turn off and unplug the Plate Joiner before making adjustments or changing blades or accessories.**
20. **Turn off the Plate Joiner and let the blade come to a complete stop before unplugging the tool.**
21. **Any alteration or modification of the Plate Joiner is considered misuse and may result in a dangerous condition.**
22. **Inspect your stock carefully before cutting slots with the Plate Joiner. Stock should be clean, free of dirt and other debris, and not have metal fasteners (nails, screws, staples, etc.) of any kind in the area that will be cut by the Plate Joiner blade.**
23. **Never place any part of your body directly in line with the Plate Joiner' blade's movement. If you do, eventually you'll end up cutting yourself!!! That is painful at a minimum and could be fatal at worst.**
24. **STOP the Plate Joiner and wait until the blade has come to a complete STOP before moving the workpiece, clearing sawdust and chips, or setting the Plate Joiner down.** This is safer than working around a tool with a moving blade.
25. **Do not cut a workpiece that is too small to be safely supported and held securely. If you're working with pieces of stock too small to use the Plate Joiner safely with, choose a different method of joining them.**
26. **When taking a break or when finished using the Plate Joiner for the day, unplug the Plate Joiner or remove the battery pack and store the tool and all of its accessories properly, out of the reach of children and other untrained persons. Tools are dangerous in the hands of untrained users.**

27. **Before storing the Plate Joiner for the day, clean it to remove sawdust so that it will be free of debris when the next person wants to use it. Coil the cord neatly (if it's a corded model), and then store the tool properly.**
28. **Make certain that all locking adjustments are properly locked and the blade is properly installed and tightened correctly before plugging the Plate Joiner in or installing its battery pack.** Loose adjustments can slip and cause loss of control. Loose blades behave unpredictably, but you can expect they will cause problems once they contact the workpiece to be cuts. A general best practice is to lock each adjustment properly before moving on to the next task as you make the Plate Joiner ready to use. NOTE: properly tightened means just that, follow the instructions in the user manual or other reliable reference. These parts can be over tightened too, so be sure you know how tight "properly" tightened is.
29. **For maximum protection from accidents, effective control of the Plate Joiner requires two-handed operation. Keep your second hand on the auxiliary handle or on the motor housing if there isn't an auxiliary handle.** To be sure of the proper approach to gripping the tool for the model of Plate Joiner that you're using consult the instruction manual that was provided for that model. **If both of your hands are holding the Plate Joiner properly, they cannot be cut by the blade.**
30. **Keep a firm grip on the Plate Joiner to maintain control and get the cleanest possible cut.** Firm means comfortably firm, not a knuckle whitening clenched grip.
31. **Support and secure the work properly. Stay alert and maintain your grip on the Plate Joiner while cutting and until the blade comes to a complete stop after you've finished the cut.** This will help prevent a loss of control which could cause injury.
32. **Keep your hands and all other parts of your body, as well as those of any helper or assistant, at least 3 inches away from where the Plate Joiners blade will be while you're making cuts.**
33. **Keep both hands away from the area where the Plate Joiner will be cutting.**
34. **Do not reach under the material being cut.** Caution all assistants to avoid putting any body part in the areas where the Plate Joiner's blade may be traveling and warn them not to reach under that area of the workpiece where the blade will be plunging in to make the cut.
35. **Do not overreach. Keep proper footing and balance at all times.** Proper footing and balance enables better control of the tool in unexpected situations.
36. **Be sure that the Plate Joiner is up to full speed before the blade contacts the material to be cut.** On a typical model this only takes a second or so, but you still need to allow that short time for the blade to get up to full speed.
37. **Release the switch immediately if the blade binds or the Plate Joiner stalls.**
38. **Do not force the Plate Joiner. Though these tools are typically very quick, let the blade cut at a rate where it is able to clear the chips and sawdust well and where you don't feel like you're asking it to cut faster than it's able to without bogging down.** The Plate Joiner will do its job better and more safely at the rate that it was designed for. If you're having problems with Plate Joiner performance, contact the Shop Foreman who can help you determine what's going wrong.
39. Forcing a tool to cut faster than it's able to cut easily will result in poor cut quality.
40. **Keep your Plate Joiner blade sharp.** If the blade becomes dull, replace it with a sharp blade and contact the Shop Foreman so that the dull blade can be sent for sharpening or replaced in inventory. **DO NOT store dull blades for the next member to use.** No one benefits from doing that.
41. **Before making any adjustments, performing maintenance, or installing or changing blades, turn the Plate Joiner "OFF", let it come to a complete stop, then unplug it or remove the battery pack.** Such preventive safety measures reduce the risk of starting the tool accidentally.

Changing Blades

42. There are several reasons you may need to change blades. On models that only support a

single blade size, your blade will, in time, simply wear out and need replacement. On models like the Porter-Cable 557 you may want to switch from the 4 inch blade used for cutting slots for the #0, 10 and 20 to the 2 inch blade to cut slots for the FF face frame biscuits. To remove the blade, follow the steps below.

43. **Turn “OFF”, and once the blade comes to a complete stop, unplug the Plate Joiner.**
44. **Remove the screws from that part (often the bottom) of the shoe, using the proper tool (consult the Plate Joiners Instruction Manual).**
45. **Move the cover portion of the shoe out of the way, exposing the blade.**
46. **Make sure the blade you’re planning to install is acceptable for use in the Plate Joiner you’re planning to install it on and that it is appropriate for the work you intend to do. Blades need to match the manufacturer’s specifications for blades to be used on the type and model of Plate Joiner you’re changing the blade on. Consult the Instruction Manual if you plan to install anything other than an identical replacement part.**
47. **Plate Joiners typically have a spindle lock button that keeps the spindle from rotating while you loosen or tighten the blade lock nut or screw when changing blades. NEVER engage the spindle lock while the Plate Joiner is plugged in or has its battery pack installed.**
48. **Depress the spindle lock (typical) on most models to lock the blade and turn the blade by hand until the spindle lock engages (or follow the defined procedure to lock the blade). Continue to hold the blade locked while removing the blade retainer (usually a screw or a nut). Follow the procedure outlined in the Instruction Manual to loosen the blade retention fastener. This may require the use of a tool specific to the model of Plate Joiner that you’re working on.**
49. **Remove the blade, and if it’s dull, have it sharpened or replace it with a new one if the edge can no longer be resharpened. If you’re swapping one diameter blade for another, make the swap and store the removed blade properly to protect it from damage.**
50. **Clean any sawdust and debris from the Plate Joiner’s blade cavity and from all blade mounting hardware.**
51. **Install the replacement blade by reversing the steps above. Be sure the blade teeth point in the correct direction. See the User’s Manual if you are unsure as to the way the blade should be installed.**
52. **Ensure that the blade arbor lock is released and that the blade turns freely by hand before replacing the plate that covers the blade.**
53. **Reinstall the cover portion of the shoe that was removed and tighten all of the fasteners properly.**
54. **IMPORTANT: Always check the fine depth adjustment when sharpening or replacing the blade. Adjust if necessary.**
55. **Never use damaged or incorrect blade washers or the wrong bolt to install a blade in the Plate Joiner.** The blade washers and bolt are designed for the Plate Joiner model that they are intended to be used with. Using the correct ones helps ensure optimum performance and safety of operation.
56. **Do not use dull, bent or damaged blades.** Blades that are in poor condition are basically just waiting to cause you further problems. Sharpen, repair, or replace damaged blades rather than use them as they are.
57. **Most Plate Joiner blades are sharp enough to cut you. Handle these blades with care to avoid injury.**
58. **The sharp edges of most blades can be damaged if they are mishandled, dropped, or stored improperly.** Handle blades with care and respect. Store them in the proper holders so that their edges are protected and don’t drop them, especially on hard floors like the concrete floor in the shop we share with JPM.
59. **When removing blades after the Plate Joiner has been in use, do so with CARE!** Plate Joiner blades are **SHARP**, and after you’ve been using the tool for a while, and especially if the blade has gotten dull, they can be **HOT!** When removing the blade from the Plate Joiner do so with care to avoid cutting, and possibly burning, yourself.
60. **If the blade on the Plate Joiner becomes dull, it will need to be changed.** Refer to the User

Manual for the model you're using for the recommended replacement blade and for the procedure for replacing the blade. Some Plate Joiner blades can be sharpened several times before they need to be replaced with a new blade. Contact the Shop Foreman about having the blade sent out for sharpening.

Dust Collection

61. **Plate Joiners are typically designed to attach to a dust collector (shop vacuum) though some come with a dust bag to capture the dust and chips the tool generates.** Because these tools generate a large volume of dust and chips in a confined space, attaching them to a dust extraction device only makes sense for clean, trouble-free operation.
62. **Plate Joiners usually have an exhaust nozzle that accepts the vacuum hose that pulls the dust away. Some of these nozzles can rotate so that the hose doesn't constrict the movement of the tool as much as a fixed dust port would. If the Plate Joiner you're using has a rotating exhaust nozzle, and the vacuum hose or dust bag isn't attached, DO NOT direct the sawdust toward yourself or others.** To avoid injury from flying sawdust, the best practice is to attach a dust extraction hose or its dust bag to the Plate Joiner.
63. **NEVER insert any foreign object into the Plate Joiner's exhaust opening.**

Accessories – typically only blades and biscuits are listed as accessories for Plate Joiners, but some models have others.

64. **Use only accessories that are recommended by the manufacturer for your model of Plate Joiner or that are approved for use with your specific Plate Joiner model.** Accessories that may be suitable for one model of a tool may become hazardous when used on another model.
65. **Install accessories properly.** Follow the manufacturer's instructions on how to properly install and secure accessories.

Support and Secure Workpieces for Safety

66. **Secure material before making cuts with the Plate Joiner.** Properly supported and secured

stock is safer to work with and will make achieving the best results easier.

67. **NEVER support stock for plate joining by hand or with any part of your body (or an assistant's body). Instead clamp it properly to an appropriate supporting surface and take steps so that you don't cut into the support unless you plan to replace the support after use.** Holding the work by hand or against your body is dangerous and unstable and could lead to serious injury.
68. **Make sure all supports, clamps and holding devices are clear of the blade's path before continuing.**
69. **Keep the stock clamped to the support until you've finished all your Plate Joiner work on that piece in that position.**

CAUSES AND OPERATOR PREVENTION OF KICKBACK:

Kickback is a sudden reaction to a pinched, bound or misaligned Plate Joiner blade, causing an uncontrolled tool to move forcefully and without warning away from the direction of blade rotation. This can cause damage to the cut surface or can result in injury to the operator or an assistant if the blade contacts someone before it's retracted and at a complete stop.

Causes of Kickback

70. **When the blade is pinched or bound tightly by the kerf closing down, the blade stalls and the motor reaction drives the Plate Joiner rapidly away from the direction of the blade rotation.**
71. **If the blade becomes twisted or misaligned in the cut, kickback can occur.**
72. **Kickback is the result of Plate Joiner misuse and/or incorrect operating procedures or conditions and can be avoided by taking proper precautions as outlined below.**

Reducing Kickback When Using the Plate Joiner

73. **Follow the proper cutting procedure when using the Plate Joiner to cut biscuit slots:**

- Adjust the tool settings per the user manual.
- Place the tool against the workpiece and align the center marking on the tool base with the line marking the desired biscuit location.
- Switch the tool on and wait a second for the cutter to attain full speed.
- Firmly push the fence against the workpiece and plunge the cutter until the stop is reached.
- Allow the tool to retract the blade from the workpiece.
- Turn the tool off.

Following the proper procedure will make kickback less likely.

74. **Read and follow the manufacturer's instructions in the User Manual when making other cuts such as cuts for continuous splines.**

75. **Maintain a firm grip with both hands on the Plate Joiner and position your arms to resist the kickback forces. Position your body so that the Plate Joiner blade will not contact any part of your body if kickback occurs.**

Kickback could cause the Plate Joiner to jump unexpectedly, but kickback forces can be controlled by the operator, if proper precautions are taken.

76. **When the blade is binding, or when interrupting a cut for any reason, release the trigger (On/Off switch) and hold the Plate Joiner motionless against the material being cut while the blade retracts and until it comes to a complete stop. Never attempt to remove the Plate Joiner from the work or pull the Plate Joiner backward while the blade is extended and in motion or kickback may occur.** Investigate and take corrective actions to eliminate the cause of blade binding if it occurs.

77. **After correcting the cause of kickback, always realign the Plate Joiner and allow the blade to come up to full speed before attempting to make the cut a second time.**

You should never plunge the Plate Joiner into the material if the blade is exposed or if the blade isn't up to speed.

78. **Support large panels to minimize the risk of blade pinching and kickback.** Large panels tend to sag under their own weight. Supports must be placed under the panel to provide solid support of the entire panel so that it won't sag or bow as it is being cut.

79. **Do not use dull or damaged blades.** Dull or damaged blades don't cut properly and are prone to bind in the cut.

80. **Use extra caution when making cuts into existing walls or other blind areas.** The protruding blade may contact objects that can cause kickback.

Hazardous Materials

81. **Some dust created by power sanding, sawing, and grinding, drilling, and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:**

- Lead from lead-based paints
- Crystalline silica from bricks, cement and other masonry materials
- Arsenic and chromium from chemically treated lumber

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.

Maintenance

1. Maintain tools with care. Keep tools in good condition and clean for safer and better performance. Follow the instructions in the User Manual for maintenance and changing accessories.
2. Keep all controls dry, clean and free from oil and grease.

3. Keep ventilation slots clear. Use care not to get debris into the interior of the tool when cleaning it.
4. Clean the exterior of the tool with a soft cloth. Don't use anything on the cloth unless specifically recommended in the User Manual. See the warning regarding solvents in the section under "Service".

Service

1. **Tool service must be performed only by qualified repair personnel.** Service or maintenance performed by unqualified personnel could result in a risk of injury. For example, internal wires may be misplaced or pinched. If a tool belonging to CWA or our host organization needs maintenance, contact the Shop Foreman. If the tool is still under warranty, they will make arrangements for the service to be done under the warranty. If the manufacturer's warranty has expired, they will ensure that the tool is repaired by properly qualified repair personnel.
2. **When servicing a tool, use only approved replacement parts. Follow instructions in the Maintenance section of the manual applicable to that make and model of tool.** Use of unauthorized parts or failure to follow the correct maintenance instructions may create a risk of electric shock or injury.
3. **Certain cleaning agents such as gasoline, carbon tetrachloride, ammonia, etc. may damage plastic parts.** Before using chemical cleaning agents on a tool, check the manual for that make and model of tool for approved cleansers and cleaning procedures.