OSU Woodshop Safety Manual

The College of Forestry currently has two dedicated woodshops: the Oak Creek Woodshop (OCW) and the Kiln Bay Woodshop (KBW). No person may use OCW or KBW before completing the required safety training for each specific tool. Because gaining access is a lengthy process, short, one-offs are discouraged and better performed under a fee-for-service arrangement by qualified personal. Personal projects (work not related to classes or research) are discouraged and must be approved by lab managers. Access can be revoked based on any gross safety violation; blatant misuse of the tools or facility; acts of complete disrespect to tools, other users, or user responsibilities; or other violations of these guidelines.

Access is granted after users have completed a four part training program.

- Step One: A user must read and understand all parts of the 'tool safety' section of this manual and pass the quizzes associated with each tool. These materials are available on the WSE safety website (to be created).
- Step Two: A user must read and understand the 'user's responsibilities' section in this manual.
- Step Three: A user must complete a qualifying hand-on training session with qualified personal.
- Step Four: Supervisors must verify that their employees have completed and recorded the required safety training.

Qualifying exams are filed and stored in the WSE department office and can be accessed through office specialists as well as recorded to a user's OSU ID number. A list of qualified individuals will be kept in each shop and updated frequently. Persons not on the list will not be allowed under any situation to use any part of OCW or KBW.

General Safety Guidelines

1. You must have permission to use the OCW or KBW. You may not use any tool that you are not qualified to use.
2. Stay Alert and Aware of your surroundings. Most accidents can be prevented simply by avoiding dangerous situations.
3. You may not borrow or lend out any tools. Tools may not be taken from OCW or KBW.
4. You must clean your area and stow tools after each use of the OCW and KBW. Do not leave unfinished projects on benches, carts, or tool surfaces. Projects must be stored in appropriate locations.
5. You must respect the guidelines and rules of OCW and KBW and other users of OCW and KBW.
6. You may not use any tool or material inside John Mikkelson's area (green tape) without permission from John.
7. Safety equipment, such as eye protection and hearing protection must be worn when machines are in use.
8. Report any damaged, broken, or unusable tools to supervisors. Never use damaged or broken machines. Never use a machine that is producing an unusual sound.
9. You must report an accident immediately (see accident reporting).
10. You must use installed guard systems unless removal has been approved by Kent Davis or John Mikkelson. Be sure guards are properly adjusted. Never remove guards; the removal of guards unnecessarily will result in loss of permission to use OCW or KBW.
11. Plan out what you are doing before you do it.
12. When in doubt, ask for assistance.
13. Closed toed shoes must be worn. No loose jewelry, hair, or clothing is allowed when operating power tools.
14. All machines must be used for their intended purpose. Never overload machines by forcing the operation
15. Never leave running tools unattended. Always turn power off when finished.
16. Always keep hands and fingers a safe distance (at least 2") from any moving blade. Never wear gloves when operating a power tool.

17. The operators' position should be keep clear of dust or scraps to prevent tripping or slipping.
18. If you are unsure of any special setups, have approved personal approve the operation.
19. Never distract anyone using a machine. Wait until they have completed the operation before approaching or initiating any conversation.
20. Always use the dust collection system to reduce airborne dust in the shop.
21. Always refer to tool manuals before performing any maintenance operations.

Table Saw

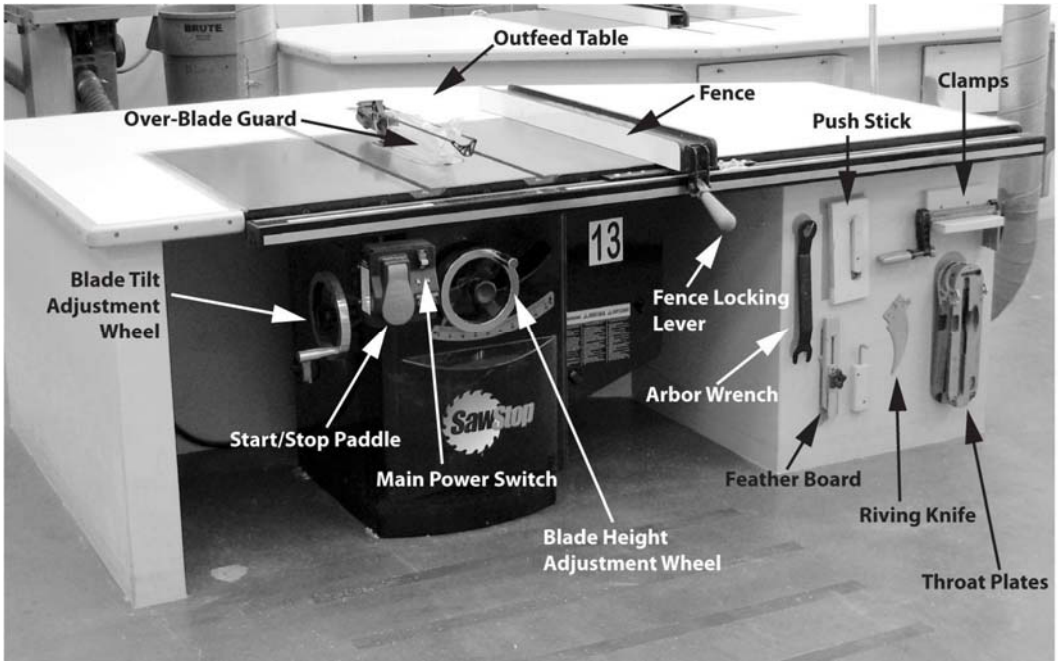

Figure 1

Although the table saw is one of the most useful machines in the wood lab and one of the most used, it is also one of the most dangerous. You will need to become comfortable using the table saw because you will encounter it in any manufacturing setting. It can be used to accurately rip and crosscut lumber and sheet goods. The table saw can also be used for special operations including cutting dadoes and rabbets and for re-sawing, however, other machines can do these operations more efficiently and safer. Use alternative machines for special operations whenever possible. With special jigs, the table saw can be used to

accurately produce a number of different joinery cuts. In addition, the blade can be tilted for cutting bevels and miters.

The table saw in OCW and KBW uses a 10”diameter blade and tilts left (that is, away from the fence). Not all table saws tilt to the left, Delta for example produced many saws that tilt to the right, creating a dangerous pinching situation during bevel cuts. SawStop saws are equipped with a safety system (flesh sensing technology) that detects when someone accidentally contacts the spinning saw blade, and then stops the blade in milliseconds. In **most** cases, such an accident would result in just a nick on a SawStop saw, instead of the devastating injury which would likely occur on an ordinary table saw. However, wet wood or sometimes treated wood can trigger the safety system, resulting in a false positive response. Wet wood and treated wood should not be cut on the SawStop.

The SawStop electronic safety system induces an electrical signal onto the blade and then monitors that signal for changes. Because the human body has a relatively large inherent electrical capacitance and conductivity, this signal drops when flesh contacts the blade. Wood, on the other hand, has a relatively small inherent capacitance and conductivity and therefore does not cause the signal to drop when it comes in contact with the blade.

A fast-acting brake immediately stops the blade. The brake includes a heavy-duty spring that is held in compression by a fuse wire. When you touch a spinning blade, the system sends a surge of electricity through this fuse wire to burn the wire and releases the spring. The spring then pushes a block of aluminum (called a brake pawl) into the teeth of the spinning blade. The blade’s teeth cut into the aluminum and bind, thereby stopping the blade. All of this happens in about 3–5 milliseconds, or 1/200th of a second. At the same time, the angular momentum of the blade causes the blade to retract below the table and the power to the motor is shut off.

Both the standard brake cartridges and the dado brake cartridges are single-use components that must be replaced if the brake is ever activated and in most cases the blade will also be damaged. Replacement of brake and blade could cost up to $200. Changing a brake cartridge is fast and easy – no more complicated than changing the blade. The brake cartridge must be installed properly, approximately 1/8” away from the blade.

The SawStop has a built-in MAIN POWER SWITCH. When you flip the switch on, red and green lights flash for approximately 20 seconds as the system runs through a safety check. When the red light turns off and the green light remains on, the saw is ready.

To activate the blade, you will pull the red START/STOP PADDLE at the bottom. The saw can be turned off by gently bumping the paddle with your knee.

Table Saw Rules:

1. The number one accident on the table saw is kickback, **which is not prevented with SawStop technology**. Kickback occurs when the work piece becomes so tightly trapped between the blade and the fence the work piece is forcibly ejected back, towards the operator. Kickback can also occur when the teeth at the back of the blade 'lift' the stock straight towards the operators face. The chance of kickback can be reduced by using a riving knife and kickback pawls - leave these safety devices in place. The best way to help to prevent kickback is to learn to recognize the potential for the situation to develop. Common causes include material bowing during cutting, or material drifting away from the fence during cutting, or using the fence and the miter gauge for crosscutting narrow pieces.
2. Table saws make cuts parallel to the fence while ripping, resulting in two parallel edges. Consider this basic fact before performing your operations. Do not attempt tapered cuts. During cutting, the blade must project about ¼" above the work.
3. Do not perform any 'freehand' operations. A freehand operation is defined as one when the material is not supported or guided by the fence or the miter gauge.
4. The fence is only used during ripping operations. The miter gauge and cross-cut sled are only used during cross-cutting. Misuse is a recipe for kickback.
5. You must use a push stick when you are ripping material narrower than 5". You must push material past the back of the blade before stopping the cut. Material left touching the back of the blade may produce a kickback.
6. Material must have at least 1 straight edge (jointed) and one relatively flat face to be cut on the table saw. Crooked or bowed edges cause material

to shift during cutting and could result in a kickback. If stock has a slight bow, place bow facing down.

7. Any adjustments to blade tilt or height should only be made while the blade is off and stopped. Blade changes or maintenance should only be performed after the saw is unplugged.
8. When you are acting as a helper for cutting long stock, you do not pull the stock, only support it so it does not fall or tilt during the operation. Only the operator controls feed speed.
9. If the blade guard must be removed, you must install the riving knives. Operations that require the riving knife to be removed during the cut are not allowed in OCW.
10. Never move stock backward while the blade is moving. If a situation develops where you can't complete the cut, stop the saw with your knee while holding the stock in place, wait until blades stops, then remove the material.
11. The fence and miter gauge can never be used simultaneously unless the miter gauge is between the fence and the blade, or a stop block on the fence has been installed well ahead of the blade. This setup allows plenty of room for cutoffs to 'hang-out', but not become trapped between the fence and the blade. Ask if you don't understand this setup.

Never use this setup on the table saw.

Figure 2

12. Be sure to use a proper stance while cutting. A proper stance is one that places the operator to the left of the stock (in case of kickback) and allows the operator total control of feeding the stock through the machine. The operator should use the left hand to hold the stock against the fence and down onto the table. The operator's right hand feeds the material into the blade at a speed appropriate for the cut- not too fast, not too slow.
13. Because of the weight and size of large panels (plywood), proper technique and skill must be used with an auxiliary outfeed table. Consider the operation carefully before beginning. If possible, use a buddy system (or the panel saw).
14. Before starting a cut confirm that the fence is locked into position. This sounds obvious, but if the fence shifts during cutting, a kickback or some other incident is sure to happen.
15. Do not attempt to rip stock shorter than 12".

Jointer

The jointer is primarily used for flattening one face of a board and for straightening and squaring the edges of boards to be glued together to form panels. In special circumstances, it may also be used for rabbeting, beveling and tapering, but again, a shaper or router might be better choices. The stock is placed on the in-feed table and pushed, with the aid of a pushblock, over the cutterhead and onto the out-feed table. The fence is used to help guide the stock. With proper technique and a few passes, the downward face becomes flat, but the top face is unaffected. The planer must be used after the jointer to shape the upper face flat and parallel to the bottom face.

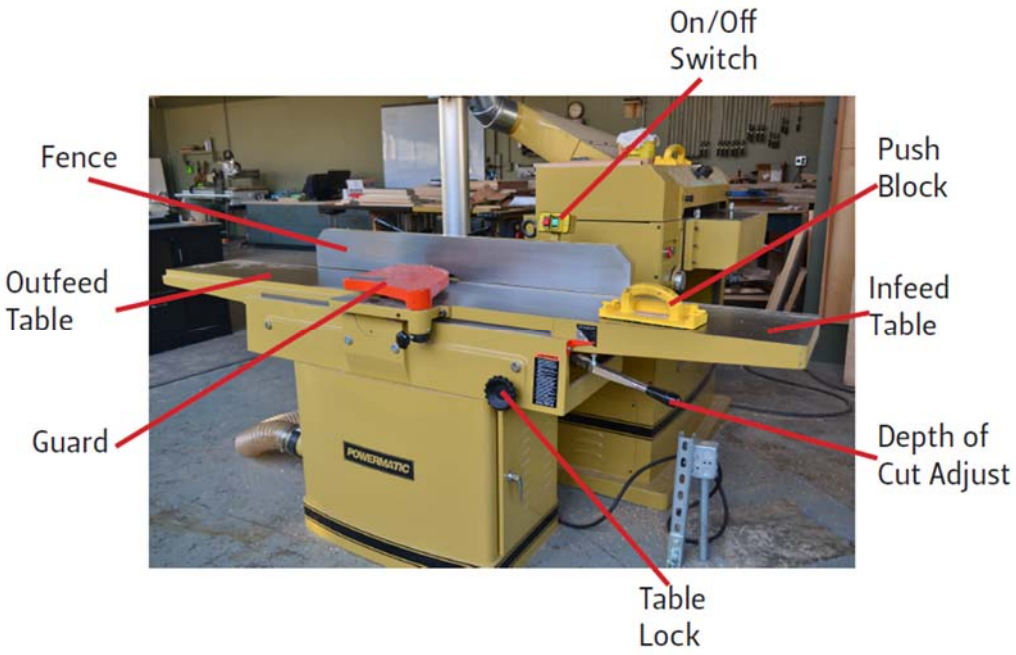

Figure 3

1. Remember the jointer does not have SawStop technology and will severely injure any body part that touches the blades or cutterhead. Kickback is also a concern when using the jointer. Slow, steady feed speed and a thin depth of cut are ways to minimize kickback.
2. Always position stock with bow facing down to achieve the desired results.
3. Always orient stock so that chips are formed ‘with the grain’. To cut ‘with the grain’, the grain angle of the material must be angled toward the operator and down. If you don’t understand this, ask.

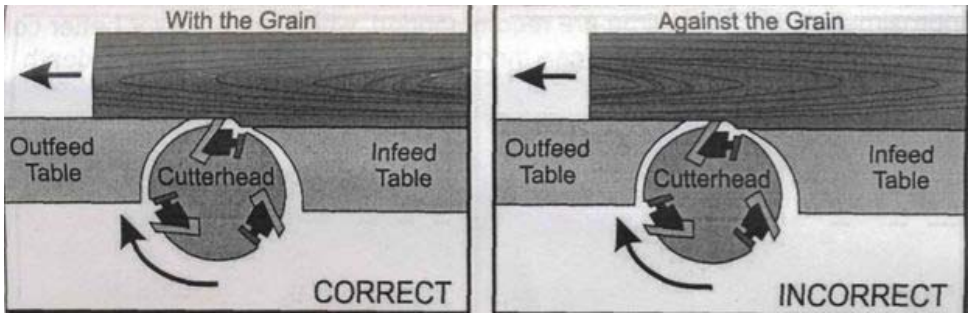

Figure 4

4. Never attempt to pass material in the reverse direction (starting on the out-feed table). This will result in kickback and you will lose control of the stock.
5. Do not remove guard over the cutterhead and always allow it to return against the fence before making the next cut.
6. The maximum depth of cut is 1/16"; never force, or over feed the jointer by taking too thick of a cut. Final passes should be no more than 1/32". Depth of cut is adjusted by raising or lowering the in-feed table. Removing stock in two passes instead of 1 will result in a smoother and safer operation.
7. Do not attempt to joint stock shorter than 12". Do not joint end gain.
8. Always keep your fingers at least 6" from cutterhead, always position hands so that if material is ejected, your hands don't move off the stock and into the cutterhead.
9. Always use push blocks for flattening stock; however do not put undue pressure near the middle for the stock. This will result in stock not becoming flat during jointing.
10. To achieve a square edge, the fence must be positioned square to the table and the stock must be held against the fence during the cut.
11. Never attempt to joint stock wider than the width of the cutterhead.
12. Never adjust the out-feed table. The out-feed table must remain exactly level with the knives of the cutterhead.
13. Never clean lodged chips while the machine is running. Always be sure the cutterhead has completely stopped before reaching up into the machine or using a stick to clean out the machine.
14. Always maintain a proper stance when using the jointer. A proper stance allows the operator to move the material across the jointer in a smooth, fluid motion. Sometimes the operator will have to take a few steps forward when jointing long stock. The operator must always stand to the left of the material to avoid contact with stock during a kickback.

Planer

The planer is used to produce lumber with two parallel surfaces. However, it will not flatten or straighten lumber by itself. After flattening one side of a board on the jointer, the board is run through the planer with the flat side down on the table. Because the cutterhead is located above the table, the top surface is planed parallel to the bottom surface. Stock must be oriented such that the grain angle runs up for cutting to happen 'with the grain'. This can be achieved simply by rotating the stock after 180 degrees before jointing it.

The planers in OCW and FBW are similar; however, the Powermatic at OCW is much more powerful and should be used whenever possible for large planning jobs. If you plan to use the planer in FBW, make sure that you use very thin depths of cut. It is better to make several passes then try to hog it all in one pass.

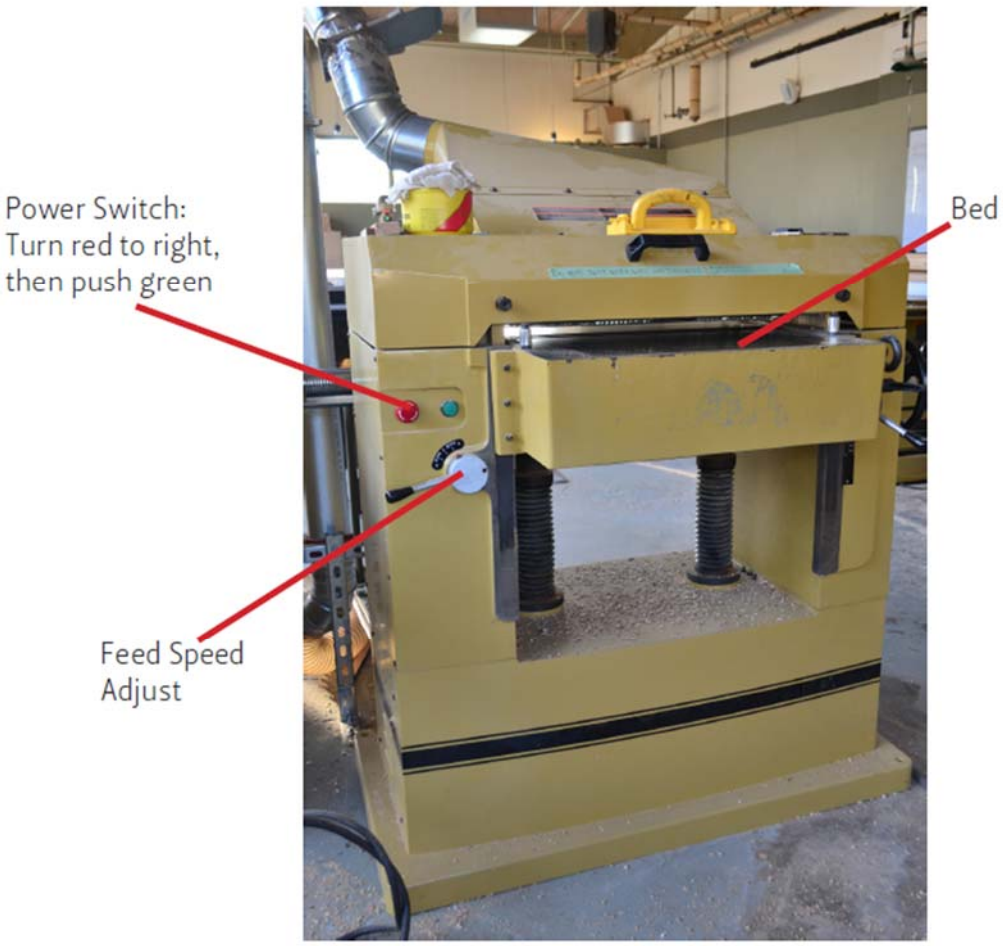

Figure 5

1. Do not attempt to remove more than 1/16” per pass (one turn). Do not over load motor. Multiple passes result in less tear-out and are easier on the machine.
2. Always determine the thickness of the thickest part of the board and adjust planer to match this thickness.
3. Do not attempt to pass stock less than 12” in length through the planer.
4. In the planer in OCW has two feed speeds; use the 20 fpm whenever possible. For softwood, the 30 FPM setting can be used, but will result in a low quality planed surface.
5. Never put hands or fingers into planer while the cutterhead is moving. Never look into planer. Never open top when machine is running.
6. Always open the gate for dust collection to extract chips while using planer.

7. Never attempt to force feed the planer; always allow stock to move through under the force of the feed roller only. If stock gets stuck, push slightly on the stock, move the stock to an angle or lower table. Never stop planer while stock is in the planer. If this happens often, wax the tables or ask John or Kent.
8. Always plane with the grain, never perpendicular to grain (i.e., feed boards lengthwise not width-wise).
9. Never attempt to reverse feed stock.
10. Be careful not to let your fingers become pinched between stock and table.

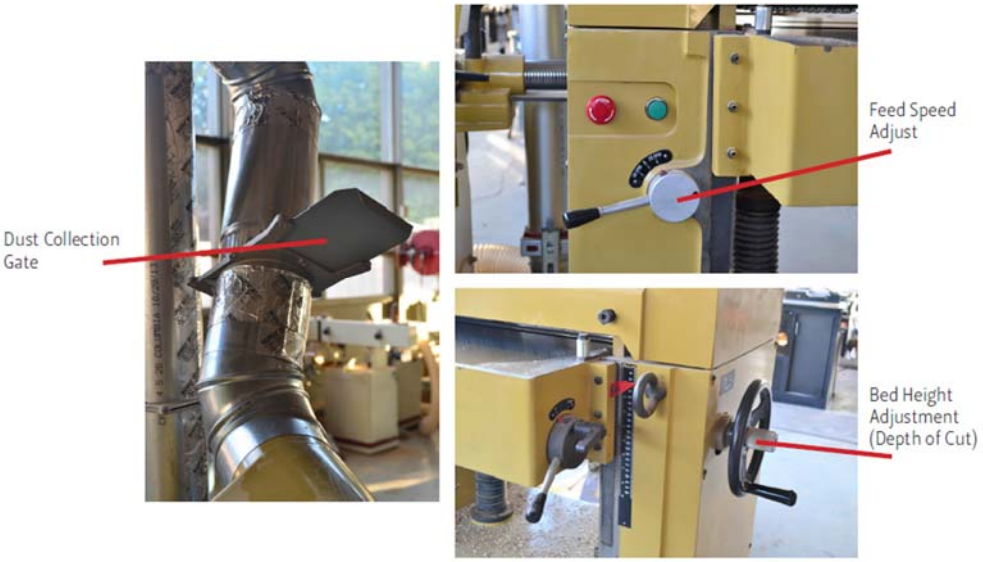

Figure 6

Bandsaw

The bandsaw is an indispensable tool in the woodshop. It is often used to make curved cuts, but can be used to re-size large pieces of lumber before using the jointer or planer. The blade of the band saw is a thin loop of steel carried on two wheels, one above and one below the table. The blade is held in position by blade guides above and below the table. Because of the shape of the teeth, the band saw is a very efficient and safe way to break down large stock.

The two smaller bandsaws in OCW and KBW are very similar; however, the large, and much more powerful, 42" saw in OCW requires special training before use. Be sure to mention which machines you intend to use during your hands on training.

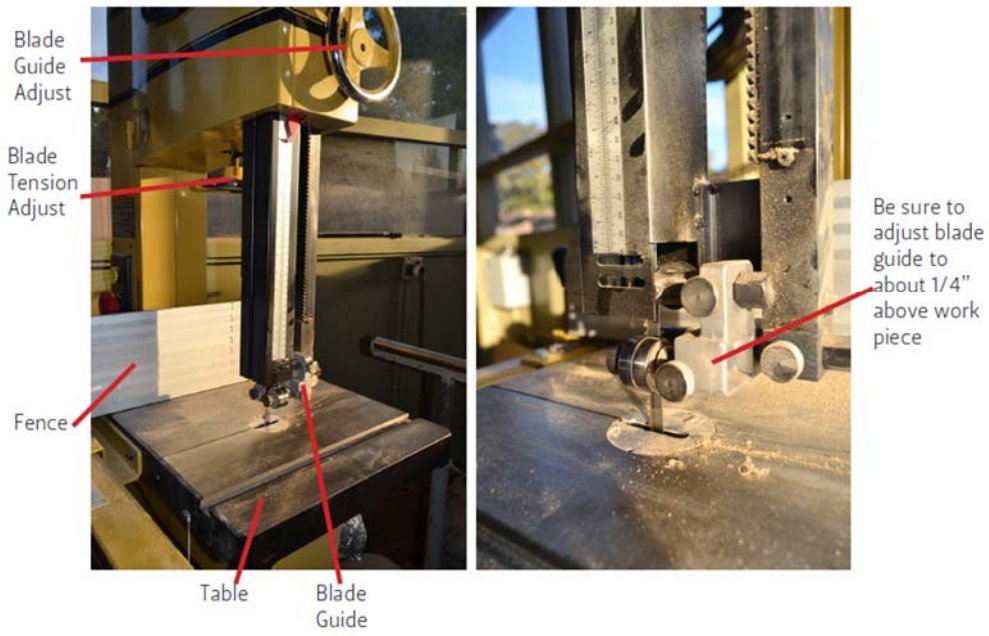

Figure 7

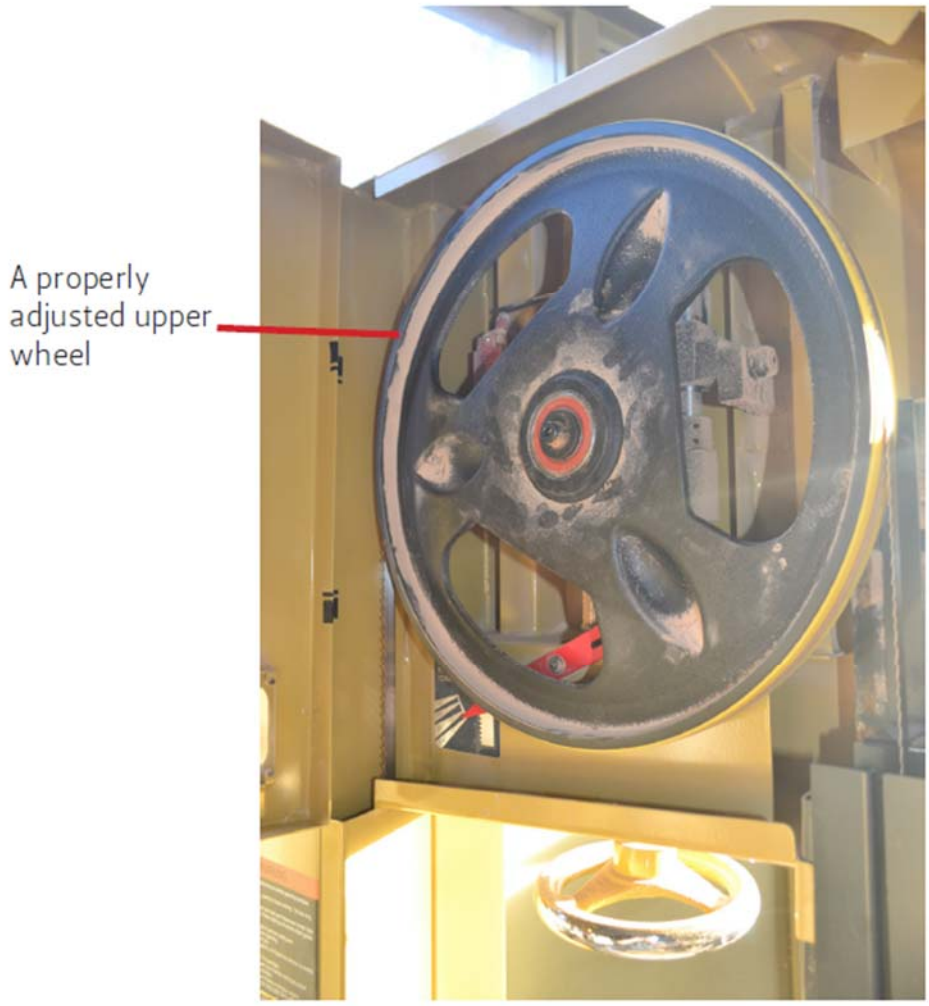

Figure 8

1. Before use, confirm that the blade is on the wheels and that it is properly tensioned.
2. Adjust the upper guide (the one above the table) to about ¼" above the stock before turning on the saw
3. Never pull stock in the reverse direction. This will likely result in the blade coming off the wheels. If a situation develops where the blade is binding or burning, stop, turn off the power and wait until the blade stops moving, then carefully remove the work.
4. If the blade breaks under use, stop the motor immediately and wait until the wheels stop moving, then remove the stock and replace the blade.
5. Never make adjustments to the blade guide while the blade is moving.

6. Maintain a 4” margin of safety between your fingers and the moving saw blade.
7. Keep both upper and lower doors closed while using the saw.
8. Never try to saw round stock (small logs or dowels) unless they are securely fastened in a V-block or special log jig (sled).
9. For long curved cuts, plan a series of relief cuts perpendicular to the curve. The relief cuts help to minimize the need to back-out of curved cuts
10. Never stand to the right of the saw while it is running.
11. If you hear funny noises (such as squeals), stop the saw and inspect blade and wheels.

Chop Saw

The miter, or sometimes called a chop saw, excels at making clean, smooth and accurate cross-cuts. It can be used to cut material to finish length as well as rough cutting lumber into short pieces for milling operations. It is normally used to make precision 90° cuts, but can be set to both miter and bevel cuts from 0 to 45°. As useful as this tool is, it can also be very dangerous. Kickback and ‘climbing’ of the blade toward the user are common. Small cutoffs can be ejected.

1. Never remove or hold the guards out of the way while using the miter saw.
2. Be sure all scraps have been removed from around the blade before using saw.
3. Never allow your hands or fingers closer than 6”.
4. Never cut any material shorter than 8”.
5. Always place material against fence, never attempt to cut anything without material firmly held in place.
6. Allow the blade to reach full speed before attempting to cut.
7. Always pull the saw and out to match the width of the material being cut before initiating cut. As the cut is being made, push saw back, this maintains control of saw and helps to prevent the saw climbing towards the user.
8. You should almost always hold the material with your left hand and control the saw with your right.
9. If you have to cut curved material, place material with curve facing out so that blade doesn’t bind during cut.
10. Be sure to use a blade designed for the miter saw. Never attempt to rip material on the chop saw.

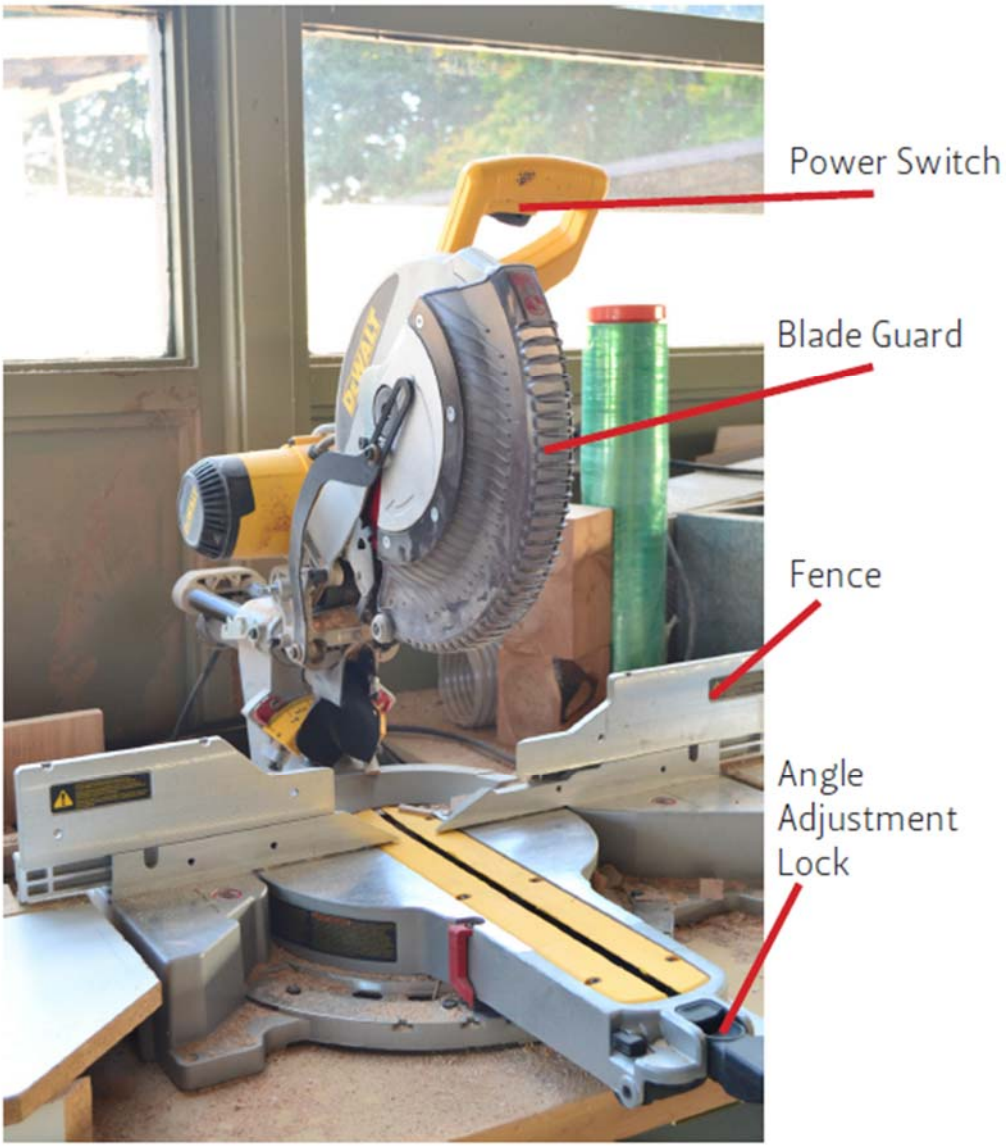

Figure 9