Major Tool Identification Sheet

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This sheet follows as closely as possible, the order of operations which should be followed in a shop such as this. The first machines to be used on a piece of lumber are listed first, and the way in which you move through the shop from machine to machine are listed in a specific order. For example, you would not want to cut a board to length on a miter saw before milling it to the proper thickness and width. Why? Because the smallest allowable length that can be cut on a miter saw is 6" and the shortest board that you can mill on a table saw, planer, or jointer is 12", so by cutting a board to length of less than 12" first, you are effectively preventing the use of other necessary machines in the shop. There area several other reasons why you should follow the order of operations, but these will be discussed as necessary.

Do not assume that the information contained in this packet covers everything you need to know. There is much more to know about the proper and safe operation of the machinery in this shop then can possibly be provided here. ***Failure to follow proper safety procedures can result in serious injury to yourself or others.***

Safety is priority one in this shop. We are all responsible for our own safety as well as the safety of others in the shop. If you see something that may seem unsafe, it is your responsibility to let your teacher know.

Damage to machines due to inattention or negligence may result in your being charged for the cost of the repairs!

The number one priority in this shop is Safety!!!

Milling Processes

Order of Operations; Follow the "FEE" system.

Work the faces, then the edges, and finally the ends ("FEE"). Start at the jointer and flatten one face of the board. Then run the board through the planer with the jointed face down to create a parallel, flat opposing face. After the faces are flat and parallel, work on the edges. Back at the jointer, run the board on edge until it is square to the face. The last edge is cut parallel to the jointed edge on the tablesaw. Finally, trim one end square on the miter saw and crosscut the other end to final desired length.

This process may not always be prudent or possible (such as when the board is too wide to for the jointer when flattening the face) but it is important to realize that quality projects begin with properly milled lumber. Pieces that are not square end up as part of an entire project that is impossible to make right.

Jointer: Solid Stock Only! Used for flattening the face and/or squaring the edge of a board. Always check for loose knots or foreign materials that may be embedded in your stock prior to using. Be sure to open the blast gate prior to use. ***No sheet or manufactured materials allowed***. Always try to joint with the grain to avoid tear-out. ***Stock must be at least 12" long,*** and ***push sticks must be used at all times!!!*** Do not joint end grain! You are responsible for checking that the fence is square to the table prior to using. Feed your lumber at a slow and consistent rate and maintain contact with the fence at all times. **NEVER PUSH THE GUARD OUT OF THE WAY WHEN USING THE JOINTER!**

Planer: Solid Stock Only! Used for ***thicknessing*** stock. This machine is used to reduce the overall thickness of material very quickly and efficiently as well as to create two parallel faces. Always check for foreign materials or loose knots before planing. You need to accurately measure the thickness of your stock using a caliper prior to setting the depth of cut. Amount of material removed with each pass are to be ***no more than 0.125 (1/8")***. No sheet goods or manufactured materials allowed. ***Minimum length of material that can be planed is 14" and the minimum thickness is ¼"***. Be sure that the blast gate is open prior to use.

Cabinet Saw / Table Saw: The cabinet saw is the machine of choice for ***ripping lumber to width***. There are many other uses for this machine as well. ***No stock less than 12" long*** is to be cut on this machine and any stock ***less than 4" wide requires the use of a push stick***. All blade guards / safety devices must remain in place at all times. Always check material for foreign objects prior to cutting. Always check blade height (set to approx. ¼" above stock), blade angle and width of cut prior to cutting. ***The long, jointed edge of a board should always be placed against the fence when cutting*** (this is the definition of a "ripping" operation). Do not stand directly behind the material being cut and ***NEVER*** remove your hands from the material when cutting. Always maintain control of material during a cut.

Panel Saw: Used for cutting larger sheet goods to ***rough*** size. Do not expect this machine to accurately cut to finished dimensions! Allow the saw to do the work and do not force the saw through the material. Always clamp smaller pieces to the machine prior to cutting. This machine is intended to mill larger, difficult to handle material down to a more manageable size.

Wide Belt Sander / Drum Sander: **Solid Stock Only!** For sanding panels and oversized pieces. ***Minimum length of material to be sanded is 14" and minimum thickness is ¼".*** Maximum material removal between passes is ***0.010" (just under 1/64")***. You need to accurately measure the thickness of material to be sanded with a caliper before setting the feed bed prior to your first pass. Always check for nails, staples and foreign objects before sanding. Dust collection must be turned on prior to use. **No sheet goods allowed!**

Sliding Compound Miter Saw: A ***crosscut*** saw used to cut material to length as well as produce miters and bevels (as well as compound cuts) on the ends of lumber. This particular machine is capable of crosscutting material ***up to 12" in width***. The ***shortest material that you may cut is 6".*** The stop must be used when cutting more than one board to the same length. Be careful when using this machine and do not rush your cuts. Hold material firmly against base and the fence and keep your hands clear of the blade. ***Your material must be in tight contact with the fence directly on either side of the blade.*** It takes 2 cuts to properly cut a board to length! 1st cut is a trimming and squaring cut and the 2nd cut is to final length. ALWAYS use a stop when cutting multiple boards to the same length!

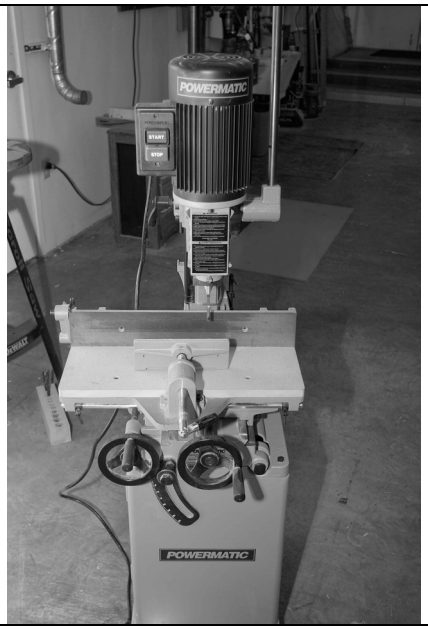
Joinery

The following machines (panel router, mortise machine, dado saw) are generally used for producing some of the joinery used in woodworking. Some of the joinery that might be produced on these machines are dadoes, rabbets, stopped dadoes, grooves and lap joints just to name a few. This is by no means a complete list of what these machines are capable of. There are many other machines in our shop that can be used to accomplish similar tasks, but these are quite specific in their uses.

Joinery is an art, there are many ways in which a particular joint may be produced. Don't limit yourself to learning only one way to do something. Ask questions and be open to trying different ways of doing things!

Panel Router: Used for routing dadoes and rabbets in larger pieces of material. Sheet goods are clamped in place and the router is moved vertically to create the dado or rabbet. Take care to adjust the location of cut and the bit depth accurately. A minimum of 2 clamps are required to hold your material securely when cutting. Do not force the router through the lumber; let the bit do the work.

Dado Saw: Used to mill dadoes and rabbets in material. *Stock must be at least 12" long* and you need to use a push stick or pad when cutting stock. ***The blade cannot be seen when milling dadoes and rabbets so use extreme caution!!!*** The long edge of the board must be against the fence. Slow and consistent feed rates are required! ***You must always use two push pads when using the dado saw!***

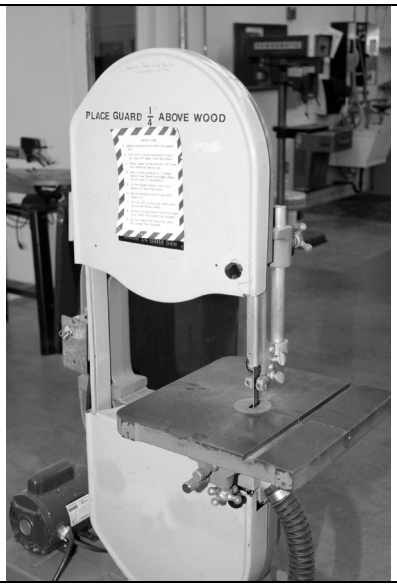


Mortise Machine: This machine is able to drill square holes (a mortise) used in mortise and tenon joinery (square peg in a square hole). Bits are available in various sizes to match the particular need. Do not force the cutting action and if the bit begins to heat up stop to allow it to cool down before proceeding.

Other Machines

The following machines do not fall into any specific category of use, other than that they are capable of many different sorts of operations. Bandsaws have no minimum limitations as to what sizes of lumber they can safely cut, although common sense should prevail in that regard. These machines have so many different uses that they cannot all effectively be listed here.

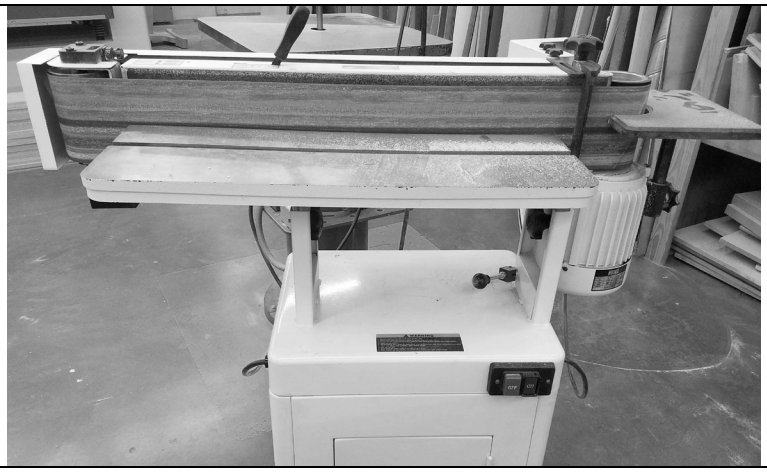
Resaw Bandsaw: Generally used for ***resawing solid lumber to thickness*** and cutting of large / thick stock. The ***foot needs to be set within 1/4" from the stock*** while cutting. No adjustments are to be made to the blade guides by students. ***Never force material*** into the blade, let the machine do the work (forcing material results in weakening and eventually breaking of the blade). ***Keep your fingers out of the path of the blade when cutting!***



14" Bandsaw: Used for cutting curves and shapes in lumber. The ***foot needs to be within 1/4" of the material*** being cut. ***Never force your material*** into the blade, let the machine do the work (forcing material results in weakening and eventually breaking of the blade). ***Keep your fingers out of the path of the blade when cutting!*** Turn the saw off before attempting to back the blade out of a cut. Sharp turns may require that you create ***relief cuts*** prior to cutting.

Drill Press: Used for drilling and boring holes in wood. The use of larger bits (and drilling in smaller pieces of wood) requires the use of a clamp to hold your material while drilling. This is a variable speed drill press and the ***speeds should only be changed while the machine is running.*** The bigger the bit, the slower the speed, the smaller the bit the faster the speed. Always use a backer board to protect the bits and table from damage. This will also help to reduce tearout on the back of your work. ***When raising or lowering the table you must first unlock the table!!!***

Spindle Sander: Used for sanding shapes and irregular pieces. Always keep your material flat on the table. Watch your fingers! ***Spindles are to be changed by instructor only!!! Do not force you material against the spindle! Move your material against the rotation of the spindle.***



Edge Sander: Used to sand edges and shapes. ***This machine is not intended, nor is it capable of producing straight, even edges.*** Always keep your material flat on the table. Always sand against the rotation of the belt (from right to left). ***Do not force material against this machine as it will ruin the belt!!!*** This machine will remove a lot of material very quickly, so be aware. Lumber only is allowed on this machine! No sheet goods! Watch your fingers!

General Shop and Machinery Information

- ✓ Always ask for help from the instructor when you are unsure of an operation you are attempting.
- ✓ Check the set-up of a machine before you make a cut. You should never simply assume that a blade is square or a machine is set up properly. The accuracy of each and every cut is your responsibility!
- ✓ **Measure twice, cut once.** Do not waste materials because of impatience!
- ✓ If you believe that a machine you are using just doesn't sound right or isn't cutting properly, notify the instructor. You can often hear something going wrong before it actually happens. Do not simply continue with your work and leave it for the next person to deal with. We are all responsible for the proper operation of the machines in this shop.
- ✓ Stay out of the danger zone when others are operating machinery. Do not stand in the path of kickback!
- ✓ Stay at least five feet back from another person operating a machine and do not talk to the operator or otherwise distract them from the job at hand.
- ✓ Table saws and miter saws are particular in that they both require that you place a straight, flat edge of your lumber against the fence when milling lumber. ***Always place the long jointed edge of the blade against the fence***
- ✓ **Wear safety glasses! Wear safety glasses! Wear safety glasses! Wear safety glasses!**
- ✓ ***Remove material from machines only after the machine has stopped completely***. When you have removed waste material, put it where it is supposed to go; in the trash or back in the proper scrap bins / locations.
- ✓ When possible, use scrap for projects as opposed to cutting large boards for small projects.
- ✓ Place hand tools back in their proper location.

- ✓ Label your material and store it properly at the end of class. Sadly, theft does occur in this shop and a bit of prevention goes a long way to discourage it.
- ✓ Do not sit, stand, walk on or otherwise abuse or damage stacked materials (sheet goods, stacked lumber on floor, etc.)
- ✓ Do not talk to or otherwise distract another student when they are operating machinery. Concentrate on the task at hand.
- ✓ Use common sense. Think about what you are doing and how you are going to do it. Above all, read your plans and instructions before asking questions that can be easily answered by reading the plans first!
- ✓ ***Everything that you are working on in this shop must have accompanying plans that have been pre-approved by your instructor.***
- ✓ Show your work to the instructor as it progresses. Often times the teacher can help you avoid mistakes before they occur.
- ✓ You must be constructively busy in the shop at all times. If this means that you simply pick up a broom and clean the shop, then do so!